THE GREEN FUSE

A natural history magazine created by young naturalists for young naturalists

Issue 4
Autumn 2021

Welcome

Welcome to the Autumn issue of The Green Fuse magazine. We can't believe that The Green Fuse has been going for a year! For those of you who are new to The Green Fuse, it is a natural history magazine created by young naturalists, for young naturalists. We love it so much when we get new readers, thank you so much if you are one of them. All of The Green Fuse team hugely appreciate the growing support.

At the moment, The Green Fuse is a small team of contributors, but over time, we hope the team will expand and for more inspired young people to join us in the creation of future Green Fuse issues!

For those of you who don't know, we decided to create the Green Fuse in the hope of sharing our love of nature. It is our goal to inspire young people to learn the importance of protecting nature. We hope to spread the importance of all coming together and helping nature survive.

The name 'The Green Fuse' was inspired by Dylan Thomas's poem. The Green Fuse editorial team consists of home educated children in the UK, many of us live in Carmarthenshire, the home of Dylan Thomas, so we found The Green Fuse a fitting name to take. If you want to read the poem, you can find it on our website at: www.thegreenfusemagazine.com

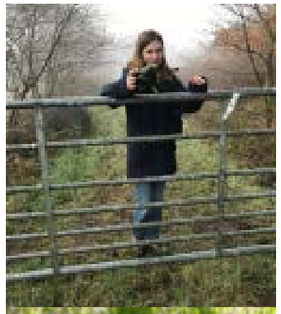
To contact us, please email us at:
thegreenfusemagazine@gmail.com

Photograph by Rose Fulton
Cover photograph by Rose Fulton

Contents

Photograph by Megan George

About Us



Rose Fulton (13)
Editor, Illustrator, Journalist, Graphic Designer

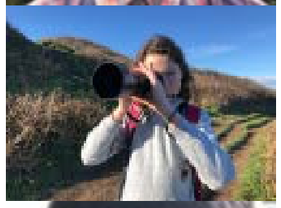
I am home educated and a keen naturalist. I have always loved nature and have recently become interested in geography. I particularly enjoy birdwatching and woodland walks.

Megan George (11)
Co-editor, Photographer, Journalist

I am a young naturalist living on a farm in the beautiful countryside of Carmarthenshire. I love photography and watching wildlife and particularly birds, but my favourite animal has to be my pet sheep Daisy.

George Rover (14)
Co-editor, Web Designer, Journalist

I am a home educated nature enthusiast. I live in the countryside of south-west Wales. I love to read. I am passionate about wildlife, conservation and the environmental impact of humans. After saving up, I have just bought myself a camera and love spending time at our river.



Tom Fox-Dean (14)
Co-editor, Journalist, Photographer

I am Cornwall based and home educated, this gives me a lot more time to explore the Cornish coast and walk the cliff paths. I find sea life fascinating and love freediving with my underwater camera. I also love playing cricket and hockey.

George Fulton (10)
Co-editor, Illustrator, Photographer, Journalist

I love aquatic life. I like birds and would like to work in conservation when I am older. I have my own museum with lots of natural history exhibits. I love drawing and creating things.

Libby Greenhill (12)
Co-editor, Writer, Journalist

I am an enthusiastic naturalist who loves going on walks through the woods and spending time with my pets. I have always loved writing and have started writing more stories and poetry about nature.

Photograph by Megan George

An interview with Megan McCubbin

By The Green Fuse Editorial Team

What aspects of nature are you most interested in?

I really love surprising facts about everyday species that we see all the time. The species that we really know, we really love, that visit our gardens. They're there when we go out for our walks and we think we know everything about them, we think we've figured them out. We know their ecology, we know how they interact with other species, we know how they reproduce, how they behave when they meet one another. But then sometimes there's scientific studies that just flip the table, and change everything you ever thought you knew about them. Most recently, I think Chris loved this as well, the thing that we found out was about butterflies. Now, for a really long time, everyone believed that butterfly wings were essentially lifeless structures, they were just dry and all they were there for was for locomotion for flying, that was their only benefit and that's the reason why they're there. But now scientists have looked at the wings in more detail and found that within the wings are tiny pump like systems that pump hemolymph, which is the insect equivalent of blood, around the wings and essentially what they are using that for is thermoregulation to keep themselves warm when it's cold and cold when it's warm. You see butterflies often with their wings out kind of sunning themselves and they'll be doing that to warm up. So now we know so much more about the structure of butterfly wings than we did before.

There's other stories with bats and how now we know that, not only are they echolocating and pinging out the sonar signals that bounce back to them so that they can find fast moving insect prey, but they don't just follow the prey, we now know that bats are able to judge if an insect is moving behind a tree in their direction, that the bat will then know, well, if I fly over there, I will meet that insect. All these unusual features that we find in science get me really excited — we think we know everything but we're always wrong because there's always more!

Who was your role model when you're growing up?

That's a good question. I met Chris when I was two years old. I, my mum and dad weren't particularly wildlife orientated. My dad is in IT and my mum is a nurse, very, very kind people but they never had kind of an idea about environmentalism. And then I met Chris with his spiky blond hair and his retro punk look and he introduced me, I guess, to the world of wildlife. And he would try and educate me in all different ways. I mean, the downstairs bathroom of the house where I grew up, I'd get in from school and I'd run in to use the loo, and there would be a barn owl sat on the toilet instead. Or there might be, I don't know, a deer recovering or a bird that he'd picked up and I'd open the freezer drawer and there'll be bits of animals that he'd collected from roadkill.

Photographs by Jo Charlesworth

I was a bit nervous about certain species, I remember at one point I was not very keen on cockroaches, they don't always have the best reputation. And I think I voiced that to Chris and next thing I know, I had about eight hissing cockroaches in my room that I had to look after and I very quickly learned to love them. I still love them very much to this day!

Chris definitely taught me that there's beauty in everything. There's beauty in all different things, everything from the big charismatic animals, your elephants and so on, to the little ones, the hissing cockroaches. I had praying mantises, I had all the fluffy things. I had rabbits and gerbils and hamsters and poodles too, but I also had snakes, tarantulas and all the kind of out–there invertebrates that I looked after. So I guess that was kind of my introduction. Chris was working a lot in natural history TV, so from a very early age I would go along with him to film shoots. I was always kind of understanding how the filming side of things worked and getting to travel around the world, which I'm very grateful to him for.

Other than Chris, I grew up in the world of David Attenborough, very much as you have. David has always been a presence on TV, for my generation and yours, so he's always been a huge inspiration. I mean, you can't help but listen to his voice and just be subsumed into a relaxing mental state where you're just transported to some of the most beautiful places on the planet.

And I also loved a TV show, I think it was called Henry's Amazing Animals. Henry was this small green gecko and he would kind of run up on this white screen and then he would talk about all these different animals and I was obsessed with Henry's Amazing Animals. When I was young, I learned a lot from it. I had many different role models, I was really lucky that Chris introduced me to a lot of different people within wildlife conservation. So yes, there are so many amazing men and women who have inspired me over the years but ultimately, Chris is the one that introduced me to wildlife conservation, so I'd have to say him.

Why did you and Chris decide to start up the Self–Isolating Bird Club?

By accident, really. It was pretty much this time last year, to the day actually, that the SIBC started. I was up in my bedroom and I looked out the window and there was Chris lying face–down on a bank by the house. And I thought "that's a bit odd", but, you know, Chris does things like that all the time, so I didn't think anything of it. And he came in and said that he'd just been doing a livestream to Facebook because he'd noticed that the celandine flowers had come out and he found it really kind of exciting and joyful so he wanted to share that with everyone else. And of course, this was the time when the first lockdown had just hit and now we've gone through a year of really, you know, difficult times, but at that point, we didn't know what was going to happen. I think there was a lot of concern there, everyone suddenly going into lockdown and a lot of people being isolated and away from their friends, away from their families. And we know that nature can have a really positive impact on our mental health, we know that it can really help us and it has the potential to be a silver lining.

Where we are in the New Forest, we're incredibly lucky and there's lots of biodiversity, but Chris and I were acutely aware that people might be living in flats without a garden, they might just have a balcony, they might just have a window sill, or they might not have any access at all to green space that will help their mental health. So Chris started that broad–cast with the aim of sharing the little patch of celandines, a little happiness for one hour for people who might not have a patch of celandines nearby. And then he was doing it every day for about a week before he had to go off to work, so then I took over, and when he came back, we decided that we would start doing them together. And that's when Fabian Harrison and Cate Crocker came on board and SIBC kind of formed and it became this community of people who support one another, that's really open and you know, chatty, asking questions about wildlife — where can you see this? what's best to do if this happens? — and it became this really remarkable community of people who were isolated in lockdown, they became connected through their potentially new–found love of nature. So it was a supportive network of people who maybe had already liked nature before lockdown or had just discovered a love of nature, and they were providing support to one another, but also just engaging with wildlife. It was the most beautiful thing to see that community grow and it was great to be able to share what was happening over the seasons in the New Forest with everyone who tuned in to our broadcast. We were able to go international as well, with Michaela Stratton from South Africa and Iolo Williams in Wales. We had people from around the world, we had a fantastic young photographer in India, I think we had a livestream from the Falkland Islands, we were viewing nest cameras and having all sorts of different people come on to tell us their story and what they were getting up to. There's art, there's poetry, and it became this kind of hub of positivity in a time when it was, you know, pretty challenging. It was an amazing community and it's still very inspiring that people are communicating in the way they are about wildlife. SIBC pro–vided a bit of a silver lining, a bit of respite during lockdown.

What is your earliest memory of connecting with nature?

I remember a barn owl called Marmite. I absolutely love owls, especially barn owls, and it's all because of Marmite. Like I said to you earlier, I'd come home from school and there would be various animals sitting on the toilet or in a box recuperating. Marmite was a cap–tive barn owl who was owned by the Hawk Conservancy Trust, and they do some amazing conservation work with raptors and birds of prey. They've also got a really amazing bird of prey hospital, which is where we took that goshawk I told you about.

Marmite was a captive bird that was used for educational purposes and we'd take him out and fly him wherever Chris was giving a talk. Marmite was the first bird I ever learned to fly. I went to a junior school called Grove Place and they asked Chris to come and give a wildlife talk at our big end of year assembly. Chris thought it'd be a great idea to have a live animal, so we would bring Marmite along to fly, and I remember practicing, Marmite was very, very good most of the time and would fly around, back and forward to the piece of chick on your hand. And it came to the moment where I had to get up in front of my entire school with Chris to fly Marmite. Chris had Marmite and I was calling and I had a piece of chick on the glove, I was calling her, I was about six or seven at the time. Marmite took one look at me, one look at the chick, looked up to the ceiling and flew up and land–ed on one of the beams there and proceeded to sit there for about seven hours. The whole school had gone home and there we were waiting for Marmite to decide that he wanted to come down. So that was always, you know, a really fond early memory for me.

Illustration by Rose Fulton

But I'd always be doing bits and pieces in the garden, you know, dissecting squirrels and trying to understand their anatomy. I was very fortunate that I had all those different experiences and getting to travel quite young as well. I remember when I was super young, about three years old, I went to the British Wildlife Trust to meet some otters, and I remember playing tag with an otter and I would run and it would chase me and then I would run and chase it. It was a super friendly otter, it would come up and sit in your lap and everything. But yes, I was exposed to lots of different wildlife quite young. It's hard to pinpoint an exact memory, but those are the ones that for me really stand out.

When did your interest in the natural world begin?

Well, very early on, you know, I was always fascinated by wildlife. I think, growing up, we all have this innate curiosity about the wild species around us, we're always fascinated about how things work, why they work, how they interact. I think initially my passion started off like that, and then the more you learn around the subject, the more you learn about broader topics. All the experiences that I've mentioned before, they're what made me fall in love with wildlife, and then from that point on, you learn about what is threatening wildlife. It's not always good news, in fact most of the time it's kind of the opposite. For me, the motivation is to get on and help make things better. I was always of the mindset that I wanted to face things head on and understand.

I think I was only about 10 or 11 years old when I saw a video about bear bile farming in Asia, something which is a really difficult subject, but I wanted to understand it because I felt that if I understood it, then I would be better able to understand the motivations behind it, and then be more knowledgeable in facing the issue and be able to tackle it more effectively. I remember watching that video and being really upset but also motivated to do something. So I think you start falling in love with wildlife then you learn more about the environment as a whole and that motivates you to do something to protect it. After seeing that bear bile video, I went and worked in China with Animals Asia, a fantastic charity, they're really amazing. They've rescued so many bears from this trade and they all live in the most amazing sanctuary I've ever seen, with the most amazing enrichment, the most amazing enclosures — I say enclosures, but they are really huge, huge areas where the bears can learn to be bears again. I got to work there as a behavioral specialist, understanding how I could try and shape their environment to make it better suited for these individual bears, depending on their various psychological and physical conditions that they were left with after being abused in the trade.

So yes, I think you start off with that connection and you fall in love with the natural world through its simple beauty, through the tadpoles in Chris's pond or the barn owls, and then you expand onto the bigger topics, and then, you know, face them head on and get really motivated.

What is the most amazing wildlife encounter you've ever had?

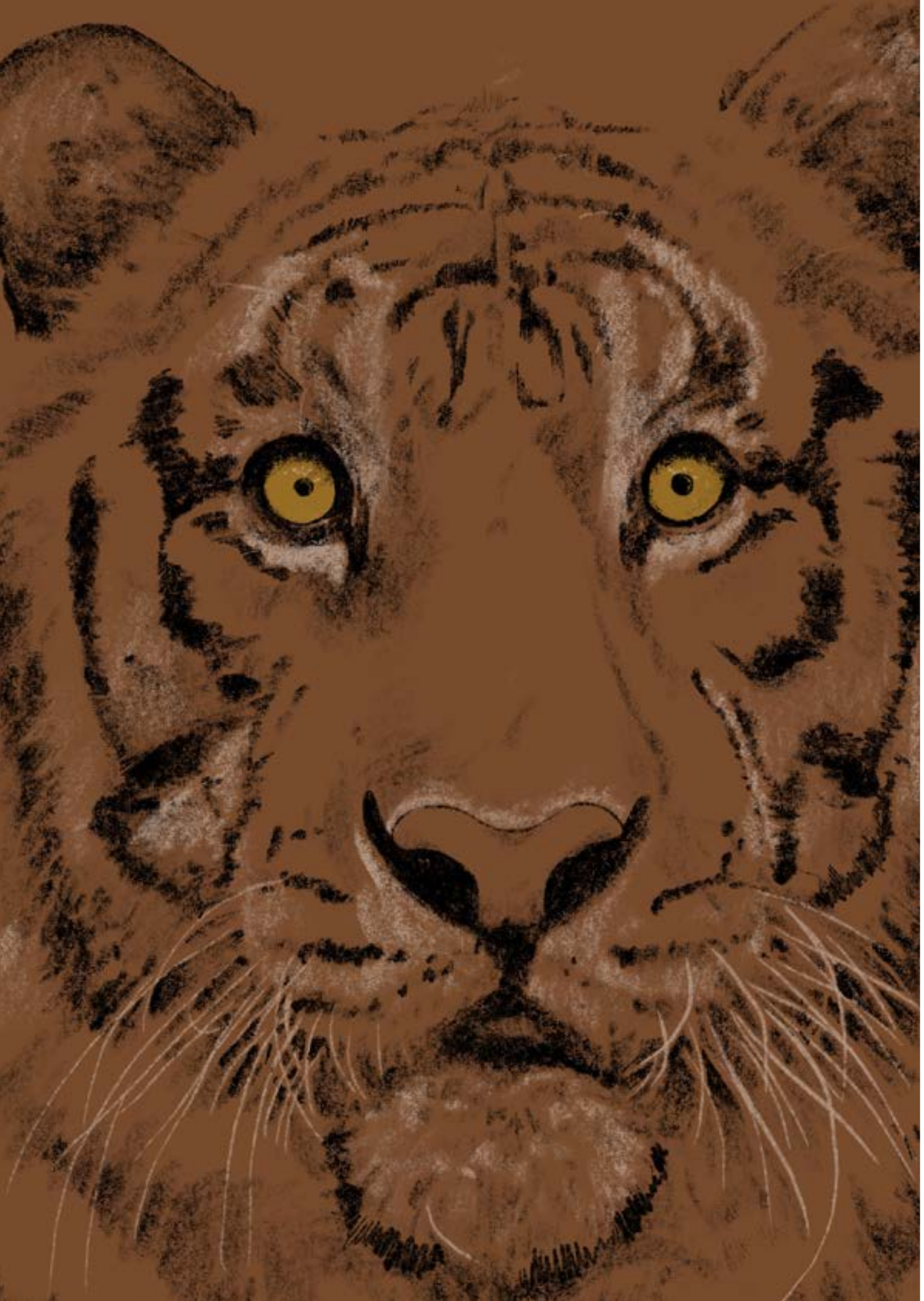
That's a very tricky question because I like lots of different animals for lots of different reasons. One of my favourite groups of animals are Elasmobranchs. Elasmobranchs are sharks skates and rays, and I'm a bit obsessed with sharks. My background is in animal behaviour and I mainly worked on predatory behaviour, so I've worked with big cats and bears and all the big charismatic animals. Anything with teeth and claws I've always been quite interested in! I never really worked in a marine environment until I was 18 when I went for the first time to the Bimini Biological Field Station in the Bahamas, also known as the Shark Lab. I worked there for a couple months as I wanted to get experience working in a marine environment. I remember the first time I ever saw a shark; it was the night I arrived there. I was on the 2:30am wake-up call to go and check a long line that had been set out by the scientists in order to catch sharks so that they could be quickly worked up, which means having their measurements taken, plus DNA samples, isotope samples taken from the dorsal fin and then they're quickly released. You have to go and check these long lines every couple of hours so that the sharks aren't held there for very long, they don't get too stressed and can be released successfully. And remember, I'd never seen a shark before and I hadn't really been trained as a volunteer yet so I didn't know how to do the work off, I didn't know how to take the measurements and DNA samples. I hadn't learned all of that but they still needed an extra pair of hands on both. So, I went out at 2am, it was pitch black and the stars in the sky were just stunning. It was totally clear, no air pollution, it was just like fairy lights all over the place, and we were on this small boat heading out into the ocean and looking down, the water was just lighting up with these bioluminescent organisms that were shining electric blue, it was like the stars were mirrored in the ocean and it was the most beautiful thing.

We got to the longline and the second buoy was down, and when there's a buoy below the waterline that typically means there's something on it. We looked down and, sure enough, there was a shark there, a female tiger shark, she was about two and a half meters long. We managed to get her alongside the boat and I just was fixated on this stunning animal because tiger sharks, they've got beautiful colours on their side, just stunning. I was asked to hold her dorsal fin whilst the other researchers and scientists did the work-up. I've seen lots of sharks since then, I've swum with sharks in lots of different places, but that, for me, was a really special moment.

It wasn't until this year that I started looking at UK shark species. A lot of people underestimate the UK marine environment, but it's actually a very biodiverse, very beautiful place once you brave the cold water, get your wetsuit on and dive in. We actually have up to 40 different shark species that visit the UK, some are migratory so come and go depending on the season, and some are resident all year round. In September last year, I went out with Charles Hood who does these shark expeditions in Cornwall. I was filming for a new project all about sharks in the UK and I got to go and swim with blue sharks.

Blue sharks are one of the most common pelagic shark species. They live in these open water environments, they're not the largest sharks, but they're perfectly adapted to the environment they live in. You look down on them and the sunlight shines they're this electric blue, and what I didn't expect when I was in the water with them is that they're quite purple as well. All sharks have these jelly-filled sacs around their nose called ampullae of Lorenzini which essentially detect electric senses. That's how sharks find their prey, by detecting the electric field. Every living organism has a slight electrical pulse, so when you're in the water with sharks, they can actually feel your heartbeat, which is pretty amazing! It means they're also very attracted to camera technology and especially GoPros. Sharks loves GoPros!

Illustration by Rose Fulton



So I was in the water filming with a GoPro and this blue shark came right up and kept popping its nose on the end of my GoPro and then bumping its nose against me. It wasn't aggressive whatsoever, they're just investigating what you are because sharks are incredibly curious. They don't deserve their reputation, they're actually very gentle organisms and they're full of personality. As much as I love sharks elsewhere in the world, we've also got some beautiful sharks in UK. So, I'd say — a bit of a long winded answer to your question — but I'd say sharks are the most amazing wildlife encounter I've ever had.

What's your favorite animal?

Well, I've already said about sharks, so I'll go for something different. Tigers are a big part of me. As Chris mentioned, his partner Charlotte runs a sanctuary called The Wildheart Animal Sanctuary and, among other things, they rescue ex-circus big cats. I was 12 years old when I first went there and I met a tiger called Zia. Zia was hand-reared by Charlotte, who has hand-reared all sorts of different animals but tigers were kind of her babies and Zia, very much so. I remember meeting Zia, she was this kind of diva character, you know, she walked around strutting her stuff, very sassy, and I really loved that about her. When they meet one another, tigers make a noise called a "chuff" as a friendly greeting, and I remember the first time I walked up to Zia, she did that. I chuffed back and she chuffed back at me. That was really poignant for me because at that point I was trying to decide my A Levels and at that moment I was kind of thinking about doing drama, because I'm quite heavily dyslexic. I found science and maths really hard, maths for me is still hard — I'm glad you're not asking me my times tables, because we'd be here for a very long time! Well, I was unsure about getting into science for a little while, I wasn't sure whether or not I could do it, and then I met Zia and I kind of realised that all my love, my passion was with wildlife and was with animals like Zia. So she was part of the reason why I decided I actually did want to pursue a career in zoology. That's why Tigers have a very sentimental meaning to me.

But if I had to choose from the UK side of things, then foxes are great, I love the foxes, you know, when the cubs come out in early spring and you can see them in the back of the garden. It's always great to hear them and know that they're around. The thing I like about foxes is, they're accessible to everyone. Whether you living in an urban environment or a rural environment, chances are, there's foxes nearby. Foxes are a great way of connecting with wildlife, they're incredibly charismatic and incredibly beautiful.

Illustration by Rose Fulton

How are you finding being a television presenter?

I really love it, I really enjoy it because it's great to connect with a wider audience and that's primarily why I ended up doing it. Presenting was never something that I thought I would get into if I'm honest, it was never an ambition, never something that I was striving towards. I trained as a scientist and I love being in the field, I love researching, I love collecting data. I'm not very good at analysing the whole maths side of things, but I work on it. And you know, I love putting together new science and new discoveries, I like being curious about things. I was always really interested as well in the illegal wildlife trade so I started making films around that subject because I thought it was really important that people saw the untold stories about the species that didn't have a voice or people didn't know about, whether it's bears, pangolins or sharks. I thought storytelling was important so that we can engage with everyone, wherever they are in the world, and share a conservation message.

That's why I got into the filmmaking side of it. I always said to everyone, I don't mind where I am, I will be behind the camera filming. I've always said I'm happy to fit in wherever I am best placed to make a difference. I've started doing lots of different things, I've been behind the camera, I've been the researcher who finds the stories. I work for Lush cosmetics — you know, those glittery, smelly bath bombs that they make — I worked for them for a year doing wildlife filming. A lot of people don't know what goes on behind the scenes of Lush, but it's an amazing company. So I was working in that sector for a while and then I started doing more things in front of the camera and it's kind of naturally evolved over time. But I do really enjoy it because I get to meet so many different scientists that I would never have met otherwise, people who are experts in their field and can tell me loads about it. I'm constantly learning, constantly meeting new people, seeing new places, new species. The most important thing to me, though, is getting those stories out there and connecting with wider audiences —exactly like you're doing with your magazine. You know, you're pulling together your stories, your views, as Chris said, and you're sharing that with a wider audience.

What advice would you give a young naturalist?

Don't ever underestimate the power of your voice! Each of us has such an important role to play. The conversations aren't always easy, they're not always comfortable, but that's ok — if a conversation makes you uncomfortable, then it's probably a very important conversation to have. And don't be held back! If somebody says, "oh, well, you're young, you've got no experience", well, no actually, you know what you're talking about and your voices are incredibly powerful and incredibly influential. So continue to use them, and continue to inspire others to do the same. Talk to your friends about what's going on, build a community.

Before COVID, when Friday's for Future was happening and young people were on the streets marching, I found myself accidentally in the middle of one outside the Commons and I got really emotional because I'd never seen so many incredible young people using their voice for good. It was the most amazing thing I've ever seen. So I would say, for any aspiring young naturalist, you know, as Chris says, get out there and explore it — get up early and go and experience it! And from a career point of view, try and get as much practical experience as you possibly can. Your magazine is a great example! You can volunteer everywhere — wildlife hospitals, the RSPB — for all of these kinds of places, volunteers are really important. Keep talking to each other, keep having those conversations and don't underestimate the power of your voice!

Photograph by Megan George

Expedition to the Urban Jungle

In search of Britain's scorpions

By George Fulton

The Isle of Sheppey, in an often overlooked corner of Kent, with its forests of concrete and brickwork and rusty old anchors, is hardly the kind of place you would expect to be a wildlife hotspot. However, there are an estimated 10 to 15 thousand yellow–tailed scorpi–ons inhabiting the dock wall in Blue Town, in the north–west corner of the island. The only way to catch a glimpse of them is to visit the dock wall in the dark and use an ultraviolet torch, which turns the little critters a bright turquoise colour. As we drove across three counties to reach our cliff top campsite, our thoughts were exclusively scorpion–focussed.

At 9pm, it was time for bed and we were soon snoring away like gruffalos. After a few snatched hours of sleep, we were roused by the alarm. Trepidatiously, we headed off to Blue Town. We got to the dock wall at the stroke of midnight: there it was — long, dark and infamous, looming out of the night. And there we were, scouring the wall with a beam of ultraviolet light, looking for that elusive neon–blue sheen. Was that a claw tucking into that crack or a sting being stowed away into that crevice? After many false alarms, we finally saw something: a good six feet up the wall was a pair of bright blue claws grop–ing into the darkness. After a few moments though, they were hurriedly retracted with a scuttling of legs.

At one point, whilst straining our eyes into the darkness, we spotted another glowing circle of purple some way away. What was this, another ultraviolet torch? Yes, it must be! And slowly appearing out of the night was a dark and cloaked figure (ok not cloaked, but you get the picture). What was this? Another scorpion seeker? His large and powerful UV flashlight meant that he was spotting the hidden treasure with ease. Compared to his beacon, our torch was no more than a spark! After exchanging a few midnight–scorpion–seeking pleasantries, we carried on with our independent search.

After yet more false alarms and near sightings, at long last we spotted another smaller pair of bright claws, this time only a few feet off the ground. We were just about to examine the claws more closely when our new ally called us over to where there was a round, shallow metal plate embedded into the wall. Our eyes fell on this glistening brown body and wick–ed sting of a scorpion! Shooting forwards, our trepidations gone, we shone our ultraviolet rays on to its now neon body. It was probably the most incredible thing I have ever seen, more amazing than our other scorpion sightings so far! When it was gently nudged it teleported (I say teleport as it was so fast you could hardly see it) to the other side of the metal plate. It was absolutely awe inspiring to behold. Once it had been thoroughly pho–tographed and observed from every angle, we drove off into the small hours to return to our encampment and steal a few more hours of contented sleep…

Yellow–tailed scorpions (Euscorpius flavicaudis) arrived by boat in the UK two hundred years ago. Most of the population can be found on the Isle of Sheppey in Kent. They tend to be found near dockyards and have also been seen in Hampshire and Devon. The population is visible all year around and can be seen from dusk with a UV torch. The scorpions can live up to two years and grow to be about two inches long. They eat small invertebrates and, due to their metabolic rate, only need to eat three to five times a year! Rather than actively hunting, they wait for their prey to come nearby. The yellow–tailed scorpion has a sting, for most people this sting is not dangerous but some people may be allergic to the venom. It is recommended that, if you find a yellow–tailed scorpion, you do not handle it.

Photograph by George Fulton

The Penpont Project

By Rose Fulton

Recently, I met up with some young people from the Penpont Project when they were on a research visit to learn about grassland restoration at the Old Lands estate in Monmouthshire. The Penpont Project is based on an upland estate in the Brecon Beacons National Park, Wales. The project started in 2019 with a view to becoming the "first youth-led nature restoration project of its kind". Action for Conservation (AfC) is a charity facilitating bringing the young people to Penpont Estate. AfC works with secondary schools seeking to inspire students to become the next generation of conservationists.

Sam Bosanquet, who co-directs Old Lands, was giving a fascinating talk on meadow conservation and how they are slowly converting Old Lands fields from monoculture rye-grass back to flower- and insect-rich hay meadows. Sam explained why taking a longer view of things (building back from what has survived rather than introducing new species that often get the headlines) might be a good idea. After the talk, I asked the young members of the Penpont Project youth leadership group some questions about their project, as I was keen to know more.

The Penpont Project has a unique governance structure, effectively empowering teenagers to make decisions alongside the estate owners and tenant farmers to decide what management to use on an area of land near Brecon. The young people have visited the Knepp Estate in West Sussex to learn about process-led conservation or 'rewilding' and hosted a range of experts on-site at Penpont, including Matt Sutton from Wyndrush Wild (who has helped the project through a range of baseline botanical surveys) and Derek Gow (who has coped with the land from a rewilding perspective). Cadi, 15, particularly enjoyed the educational trip to the Knepp Estate and learning about natural processes and the development of more complex vegetation structures. She was amazed to see a "pig nest", where one of Knepp's Tamworth sows had recently given birth to some piglets amongst the thorny scrub.

Photograph by Jamie Curtis Hayward

Forrest, the project manager, said the Penpont Project is "the first youth-led nature restoration project of its kind". He went on to explain that the project is a collaborative venture involving landowners, tenant farmers and a group of twenty-six young people aged thirteen to eighteen. The project members are all working together in partnership to trial nature friendly farming and forestry, restore natural processes and increase biodiversity. They are aiming to demonstrate how nature can "bounce back" in upland environments and to try giving nature "space to thrive" on the 450 acres of the Penpont Estate. The project is also enabling groups of people (like the youth leadership group) to have a chance to participate in the conservation sector to "enact real change" and "give their voices a chance to be heard".

Forrest explained that Wales has an innovative piece of legislation called the Well-being of Future Generations Act. He elaborated that the Act essentially states that all statutory bodies and public authorities in Wales must consider future generations when making decisions, including those concerning public transport, the environment, health and community issues. At the Penpont Project, it is important to the participants that the project is intergenerational. By making the project youth-led, they aim to ensure they are meeting the needs of future generations too.

Gwen, 17, felt that the collaboration between generations means that the young people's "imaginations can run wild" and that their ideas can, with support from more experienced adults, be "harvested and taken further". Gwen felt the project can create "a generation of people who know more about nature conservation". Emily, 13, said she believes that young people care more than adults about the future as they are, in a sense, "the ones that are going to live in that future".

Penpont is home to some beautiful ancient woodlands alongside commercial forestry plantations.

Forrest, 33, believes that “the emergence of Greta and the school climate strikes have shown how much young people care about the future and the health of our environment. My hope is that the Penpont Project can be just one example of many where the voices of young people are not only listened to, but acted upon – a place where young people can put their energy and passion into the land at a scale that matters to nature”.

When I asked what the project’s objectives are, Ellen, 14, told me that the project has three main aims: to bring back nature to the site through a range of nature friendly farming and conservation practices, to develop Penpont as an education hub for young people to learn about the importance of the natural world, and lastly, to demonstrate the power of involving young people via intergenerational partnership.

Education is also a big part of the project and the young leaders hope that the Penpont Project can continue to develop as an educational site where young people can be involved. As the project is relatively new (it began in 2019), the participants have had to be creative in negotiating the impact of Covid 19 on their progress. As a result, plans for the educational site are still being explored.

For individuals involved in the project, there are many opportunities for learning and self–development. The 26 young leaders have formed four sub–committees that work on all aspects of the project, including writing funding proposals, publishing newsletters and conducting research. The entire Penpont Project team are hoping to meet this summer for the first time since the pandemic started. I, for one, will be watching how this group of young people use their skills and enthusiasm to support the Penpont Project in restoring some of our wonderful Welsh countryside to its former glory.

Find out more about the Penpont Project at:
www.actionforconservation.org/penpont

You can find information about Action for Conversation at:
www.actionforconservation.org

Photographs by Jamie Curtis Hayward

Regenerative agriculture has a big role to play in not only food security but also for wildlife and ecological health (above).
Some members of the Youth Leadership Group (below).

The Butterfly with Wings of Sunset

By Libby Greenhill

Wings spread, the great colour of the sunset bouncing and shining upon them. Up and down, they flew, like a leaf in the autumn breeze. Delicate as a sheet of tissue, they open and close in perfect flying formation.

Inking the sunset wings, are splodges of night, black bleeds into the orange.

Dark and sunset meet.

Suddenly, wings fold in, transformation comes upon the butterfly, you see it turn from sunset, to dead and fallen leaf. Each rippling texture is at one with the wings. You watch it, seemingly dead but filled with life. Your gaze rises up, away from the wings, towards the flickering antennae. They bloom. They spout. Rising up to the sun, just like the budding stems of delicate flowers.

As the beauty flies, you see that sunset flapping in and out of existence, it rises high and higher still, presenting its butterfly beauty carried on its wings and within. It flies off towards to sun. Light spreads evenly between them.

You relish the moment, hold it deep in your heart, each tiny detail of the butterfly pressed into the centre of your memory, never to be forgotten. Always to be the light in darkness.

Illustration by Rose Fulton

The Lost Words

The Lost Words and The Lost Spells are two incredible books by Robert Macfarlane and Jackie Morris. The books are all about the beauty of nature, and through the form of fantas–tical acrostic poems and beautiful illustrations, it shows us the importance of letting nature thrive.

I love these books because they tell nature's story. They let the readers know what nature truly means. After reading these books, I understand nature in a way I had never dreamt of. I felt like instead of reading these books, I was chanting their spells, I was learn–ing their magic. I wasn't just looking at Jackie Morris' illustrations, I was experiencing their scenes coming to life within my imagination. And I know that every person who reads these books can experience these wonders of magic, just like I did.

From the Lost Words and the Lost Spells came Spell Songs, the incredible musicians who took Robert Macfarlane's poems and transformed them into breathtaking songs. I fell in love with the songs after watching the beautiful concert they performed at the Natural History Museum to raise money for the Urban Nature Project, the concert even included an appear–ance of Jackie Morris, who painted two breathtaking paintings.
After watching the concert, I found the album on Spotify, and listened to it on loop. I then decided to learn one of the songs, and through this process I managed to get in touch with part of the team and was kindly given the backing track.

I really feel like these poems, illustrations and songs have truly impacted me, and I hope you can experience the same thing.

Layout, illustrations and reviews by Libby Greenhill

Words on Lost Words

Lost is a place to float on the flowing words. It is a place to drift through the pictures and live among the brush's strokes. Under the fall of words breaks the sadness, the unknown splash of dark – a submerging voice calling to the wind for help but nothing comes. But then this book, it guides you. It takes you on a journey to discover things lost from before; it leads you through the beauty on a river made of gold.

Over the breeze, a calm breath of peace, this wonder dusts its power – a subliminal protest to fight for a world where words, magnificent words, glide between our lips.

Spells. Enchantments. The magic of words that conjure witchy dances of existence, with the words of the chant you bring back the life, the lost, the forgotten, the unknown. Images of glory casting the spell to understand the reality of it all.

Transforms the world. With a touch and a slip, the string turns to flowering ivy, the rocks turn to cliff.

Wonders lost, but found again, slipped right back into the home. Into the spotlight, the shine of day. The hope that's never taken away.

Other worldly experiences. A tracing finger shimmering letters to gold, conjuring up the imagery, strengthening powerful rays of beauty.

Realise that hope is never lost. Wonder always fills us. This book takes the lost and gives them a home. It pulls in the unwanted and tells them they're needed. Wherever it goes it sprinkles a stardust, one full of hope and joy.

Dancing wishing, omnipresent, never misses a chance to bring love into world. This book brings those wishes, with great rhythm given, bringing a voice to the words not near.

Safety given, a landscape to be lost in, to be brought into a world we could live. Sadness, never, happiness, forever, sweet little chirps of liberty behind it all.

An interview with Jackie Morris

By Libby Greenhill

Have you always been interested in the natural world?

I think I have, though I was born in Birmingham and then grew up in Evesham. It's a small market town and a river bows around the land, and I loved as a child to walk along the river. There were water voles, kingfishers, swans and herons. And a beautiful weeping willow tree whose leaves hung down like curtains. I loved to step into the green room they made, shut out the world.

What made you want to pursue a career in art?

I looked around and realised it was necessary to 'make a living'. I wanted to spend my time, my life, doing something that I enjoyed, so I decided to see if I could earn enough to feed, clothe and house myself from art. At first I was just an illustrator, but as I grew I began to write. Now I write for other illustrators. I think in both image and word.

To begin with it was really hard, but so long as I had paint, food and clothes and was warm enough that was enough. I did part time jobs to support my art, then eventually just paint–ing.

Who has influenced you as your career developed?

Every book I have ever read, painting, photograph I have looked at. I loved the work of Tunnicliffe as a child. Also Agnes Miller Parker, Chagall, Jane Ray, Mary Fedden, Elizabeth Blackadder, Giotto, Fra Angelico, artists who painted on the walls of caves, worked in manuscript paintings, artists from Alaska, Africa, Australia, who drew and sang the land, Durer, who taught me to really look at the shape of grasses, and painted one of my favourite images ever, Durer's Hare.

Why do you think it is essential to express the importance of nature, and do you think art can help convey its significance?

Because it is life. Without Nature we have nothing. We are a very small part of an incredible and complex ecosystem and we need to get a bit smarter and realise our own place in that system.

Art is a medium for communication, whether that is word, paint, sculpture or song. Music always seems to take the message deeper.

Photographs by Seven Fables Dulverton

What inspired you to create The Lost Words with Robert Macfarlane?

It's a long or a simple story. The short version is that it came to light, in various ways , that the language of nearby, common natural things was slipping away, and Robert and myself wanted to find a way to celebrate the things we loved, in word and image, to help to bring them into the light.

Of the poems in The Lost Words, which was your favourite to illustrate?

That's a hard question. I love herons, but newt was a hard won image, and loved painting my giant water dragon. Also I like the complexity of moths, and the tiny goldfinch feather. But it was all hard work, and nothing is worth doing if it is too easy.

Which animal (or group of animals) do you find most fascinating to illustrate?

I'm working on birds at the moment and birds have always been my heart's delight. Next I think it will be trees, and I find trees so hard to draw.

Do you paint from photographs or real life?

I agree with David Hockney, that you use whatever you can to make it work. Artists are like magpies. Everything we have ever seen informs how we work. I work from life, from taxidermy, from observation, from photographs (which help so much to see flight).

When and how did you learn to paint so well?

Thank you for saying I paint well. I am still learning. I've been painting for about 40 years now, mostly watercolour. I am beginning to understand it though different paints and different papers speak in different dialects. It is, like all things, about practice, although those who don't paint will tell you it is about talent. Musicians understand. They are the same. To play well you need to put in hours to begin to understand your instrument.

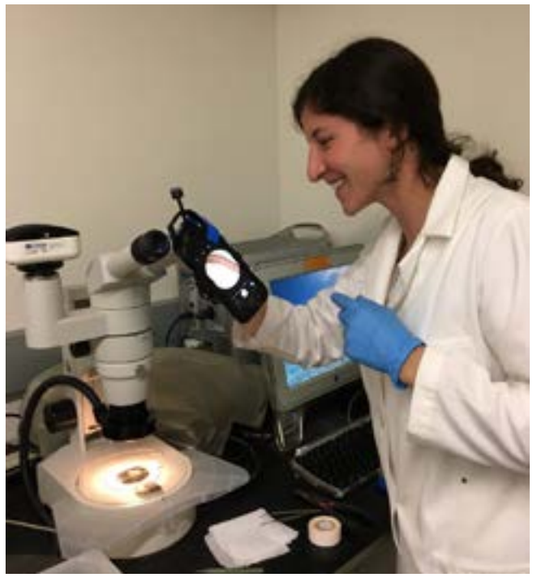
What advice would you give to a young naturalist who is interested in becoming an artist?

Always carry a notebook with you. When you walk, don't do it with headphones on, shutting out the world. Listen. Listen and look all the time. Even in the centre of a city you will find there is green life, wild life, non–human. Look to the skies, and be always open to the wonder of the world.

An interview with

Anja Malawi Brandon

By The Green Fuse Editorial Team



What sparked your interest in science and the environment?

It's a great question. I was always interested in science and always outdoorsy, but when I was in fifth grade my class took a field trip to the Seattle aquarium. And I was like, I was hooked! We can all see the ocean, but it's so cool to get the chance to see what's underneath the surface! The ocean was a habitat that I just knew so very little about, despite being really close to it. I absolutely fell in love with oceans and ocean exploration and science, and you can't do that without realising all the problems facing our oceans, including plastic pollution. That's really what started me down this whole path.

Do you consider yourself a conservationist, an environmentalist or a scientist?

First and foremost, I consider myself a scientist. I think that's a really big part of both my personality and how I approach the world. Along with that, I definitely consider myself an environmentalist and a conservationist.

What is your current job?

I'm currently a Congressional Science Fellow, so I work in the US Senate as a science policy advisor for a member of Congress. It's a particular fellowship designed to get scientists and engineers interested in science policy so that we have more scientists and people with STEM [science, technology, engineering and maths] backgrounds interested in science policy and engaged in making policy decisions about science so that we have best available science practices when we're making all of these really important decisions.

What led you to work with mealworms?

Right, super random. Mealworms. We had some collaborators that we were working with in China who noticed that mealworms — they're a pest insect, they're kind of everywhere —kept getting into kitchens and they would eat through food storage containers, little plastic bags and things like that, and our colleagues didn't notice the plastic coming out at the other end. You know, usually you see little bits of plastic or traces of it somewhere and they just didn't really notice any.

They're like, "oh, that's funny. What's going on here?". You know, very typical scientists, like "this seems funny to me. How do I investigate this?" So our collaborators are the ones who first discovered that these mealworms were capable of eating at least one type of plastic polystyrene, also called styrofoam. Then they gave that product to me and said, "hey, could you figure out what else is going on here — could these mealworms be eating anything else? In terms of other types of plastic? How are they managing that? What can we learn from these little insects?".

Although this next one seeming very similar, did you discover that mealworms can eat plastic by accident? Or did you have a theory beforehand? Did you try any other insects?

Well, we had these collaborators who first had this curiosity about mealworms, and we had a theory that they would be able to eat other types of plastic, perhaps because we knew they could eat or integrate at least one type of plastic. You know, we have multiple types of plastic out there in the world, one of the big challenges is how can we handle all of these types of plastics together? When we try to recycle them, it gets really messy because you have different types of plastic. It'd be great if we could have one system that could manage multiple types of plastic. So we had a theory and we tested it, and it turns out that these mealworms are capable of handling multiple types of plastic, so that was great. They have tested other insects similar to mealworms and have found that they can eat and degrade plastics as well. So there's kind of this group of insects, which is so cool. There are all these insect larvae and they're ubiquitous, they're found everywhere, and they kind of eat whatever. And so we think, big picture, there's this group of insects which evolved to eat things like wax and bees wax and things like that, that can also help translate directly to being able to eat and break down plastic, which, chemically, is kind of like a sturdier form of wax.

What can be done about the chemical additives from the plastic that pass through the meal?

That's such a great question. So we know that when these mealworms eat and degrade plastic, and when they do that a little bit of the plastic comes back out as partially degraded plastic, and along with that come some of these chemical additives — flame retardants, plasticizers and so on — and we know that those are also bad for the environment. So What can be done? I think, you know, the best case is that you collect all of those, and they become a little bit easier to do another form of treatment on. We wouldn't want to send mealworms out into the world knowing that they're going to leave behind all these chemical additives, even if they're eating some of the plastic. But you know, I think another cool opportunity and something we've worked on is, we know it's the bacteria inside the mealworms that are doing this work, so what else can we train these bacteria to do? Can we isolate them? Can they work alongside other types of bacteria? So maybe the first group of bacteria eats a plastic and the second group can handle the plasticizers and other chemical additives. And then you're kind of taking mealworms out of the picture entirely and just working with the bacteria, which is something that we try to do in engineering a lot — get to the simplest possible setup, you know, just the bacteria, really clean set-ups — which means you don't have to worry about the insects so much.

Is your work still continuing? And have you had any further developments?
I'm no longer doing the work in my current job, but people in my old lab are still working on this and there's a growing field of scientists who are interested in this, so I definitely think that the work is still continuing. I don't have any updates to share just yet, but hopefully there'll be a lot more exciting stuff coming down in the future.

Do you think enough effort has been put into changing our behaviour and therefore plastic production use rather than looking at alternatives?
This is a tricky question because it's obviously so important for each of us to try to do our part and, you know, buy second-hand, buy in bulk, buy food using reusable containers instead of single use, you know, bringing your water bottle every time — things like that are also important. But it's also important to remember that it's not on you for how much plastic is being used for all of these products, it's on plastic producers and manufacturers that are individually wrapping cucumbers and then re-wrapping them with other things. It's on all of these big companies that are prioritising convenience and disposability over sustainability. I think it's really important for each of us, through our individual actions and as consumers, to say "hey, we don't want that anymore! We want you to prioritise sustainability!". It's also on policymakers and regulators to go to those companies and say, "you have been causing this problem and not paying for the solution". So all of these big manufacturers who produce all these plastic bottles, all this single use wrapping, they don't have to pay for recycling, or landfilling, or picking up the plastic pieces — that's on all of us when we pay for our recycling to be picked up. So one of the things that we're working on is, how can we get it so that these big companies are responsible for paying for cleaning up their mess, so that it incentivizes them to make less of a mess in the first place? If you have to go back and pay for everything you're actually trying to clean up?

Are there any good alternatives to plastic and why do you think these alternatives aren't being used that much?
I think there are some biodegradable plastics or compostable plastics that are out there now that are good alternatives for those moments when we absolutely need plastic to help reduce food waste or other situations like that. Do I think they're perfect? No, a lot of the ones that are out there on the market today don't compost as quickly as they should and they're not as widely used because of that. In the next few years, I imagine there will be even better kinds of bioplastic alternatives coming to market. You know, there's a whole class of plastics called polyhydroxyalkanoates or PHAs. These are plastics that I'm really excited about because bacteria produce them naturally, they produce them in their own bacteria cells, kind of like fat cells, like an energy storage mechanism. Your body produces fat for winter and that's why animals hibernate, that's why they eat all that food before they hibernate. So these bacteria cells basically do the same thing, they just happen to produce this polymer. It's actually a pretty useful polymer and, because of that, a lot of bacteria know how to break it down already because they've been seeing it naturally in the world for so long. So that's really, really exciting. PHAs do have some challenges, they're not as good as current plastics, you can't do all of the things you do with plastics right now. It's going to take a little bit more work before it's widely available but PHAs are one of the ones I'm really excited about.

Do you think mealworms could help us get rid of existing plastic? How can we put a stop to the production of new plastic?
The second part of your question is the big important part — how can we put a stop to new plastic production? We want to get to a circular economy, that's really important, but to do that, we also need to put a stop to all this new plastic. Separate from that, do we have the capability of getting rid of some of the plastic waste that exists already? I think the important part there is, you know, it kind of depends on which type of plastic waste we're talking about. There's some plastics that can do really well recycled, and there's some plastics that can't be well recycled, so it's about making sure that we're using different techniques and technologies to meet the need there.

Do you think it's possible to set up a mealworm plastic-processing compost system in our own homes to manage our own plastics? Obviously, it's not as good as not having plastics in the first place. But if it was possible, how would you go about it? What would you need to do?
I think it's a really interesting idea. I think it's a little bit too soon, we're still looking at some of the science there and one of the things we still need to figure out is, what do we do with all this other stuff, the chemical additives and the other pieces? So I don't think I would say we should set them up in our homes just yet. But I can see putting something like this in recycling centres that could handle some of this waste at an industrial or larger scale.

Are the bacteria that mealworms use to break down the plastics lost when the mealworms pupate into darkling beetles, or do the bacteria stay in them?
That's such a great question. Not all of the bacteria is lost but we do know that the gut microbiome changes as they pupate. We don't have the answer to that just yet, but you guys are clearly thinking in the right direction.

Would it be possible to use different types of mealworm for plastic decomposition? Like supergiant mealworms?
I think one of the things that's most exciting about the mealworm system is that we don't necessarily need to use different types of mealworms to handle different types of waste. So in theory, the same mealworms could handle different types of plastic waste, which makes it pretty exciting. I think the biggest appeal is that you could handle different types of waste all together, which is one of the bigger challenges of plastic waste management in general.

We ask everyone we interview for one amazing fact — do you have one amazing fact for our readers?
That is a great question, you put me on the spot! The only fact I can think of is about one of my favourite animals, which is an octopus, and that is that octopuses have three hearts, which I think is bonkers and super cool! That's not related to my science whatsoever, but I still think it's really fun.

You know, there's some very daunting facts out there in the world of plastics. We've been making plastic since about the 1950s and half of all the plastic we've ever made has been made since 2015, which just shows how exponential our plastic usage has been in the last fifteen years (see https://www.theatlantic.com/science/archive/2017/07/plastic-age/533955/).

What can young people like ourselves do to help address the growing problem of plastic pollution?

I think I'm so excited by your generation and your passion for the environment and for problem solving. What can young people do today? Talk to your friends, talk to your parents, you're really influential. And you know, maybe you don't yet have the chance to vote for policies that will make things better, or maybe you don't have as much money to decide which products you're buying, but if you can, talk to the adults in your life and say, "hey! This is important!" and, you know, teach them what they need to understand. You all know this issue really well. Now, I think what's really important is being that little nagging voice that keeps telling adults, "No! This is an issue! This is an issue! This is an issue!" The other thing is going directly to talk to people in positions of power, the people who are representing you in government, whether it's the city council or the parliament. This is me embarrassing myself, because I don't know if Wales has a parliamentary system or not! Go and talk to those people, I can tell you first-hand, it's so powerful. When we have young people coming and talking to us and saying, "We care about these issues, even though we might not be able to vote for you right now! But we will one day! We can talk to our parents who will vote for you!" You know, it's a really powerful signal. So I definitely think, keep using your voice in all of these ways.

Are there any campaigns you think our readers may be interested in to promote alternatives to plastic, or to stop reliance on plastics?

I think the one that comes to mind first is the Break Free from Plastic Pollution campaign in the US (https://www.breakfreefromplastic.org/pollution-act/). It has some international work as well, it's this big coalition of people who are all interested in advancing better policies for reducing plastic and better products that aren't made out of plastic. I'm really holding these big companies responsible for the plastic they're producing, the greenhouse gas they're emitting when they produce all this plastic — the communities and the people they're impacting with all of their waste. I would certainly check out Break Free from Plastic Pollution.

What advice do you have for a young naturalist?

Follow your passion and stick with your curiosity! I think that's what makes for a good scientist, a good environmentalist, a good naturalist — staying curious about the world, following what makes you happy and joyful and doing that. Along the way you'll figure out what you can best do to help the environment through that process. But I think, as long as you just keep asking questions, you'll always have something to keep following up on, and I think that's a great way to go through life.

Readers' Page

The Sea shore

By Gwen George (9)

The crashing of the waves,
the low tide and the high,
the seashells that you can collect,
the fish in the sea, that swim freely.

Photograph by Megan George

Zoom In

We have a challenge for you! Try and look for an interesting insect and take a photo of it, don't feel you can only take one! Take as many as you like, it can be any insect, butterfly, beetle, bee… Anything! Please send your photo (or photos) to thegreenfusemagazine@gmail.com and it may very well get into the next issue!

Photographs by Megan George

It's really fascinating how gastropods grow their hard outer shell. The best way to see it is to make your own shell cross-section. Here's how you do it:

First, get a shell from the beach (making sure nothing is living inside it). Now get some sandpaper or a sander and start sading the shell on both sides until you have a shell cross-section. Watch your fingers on the sandpaper or you will become a cross-section too!

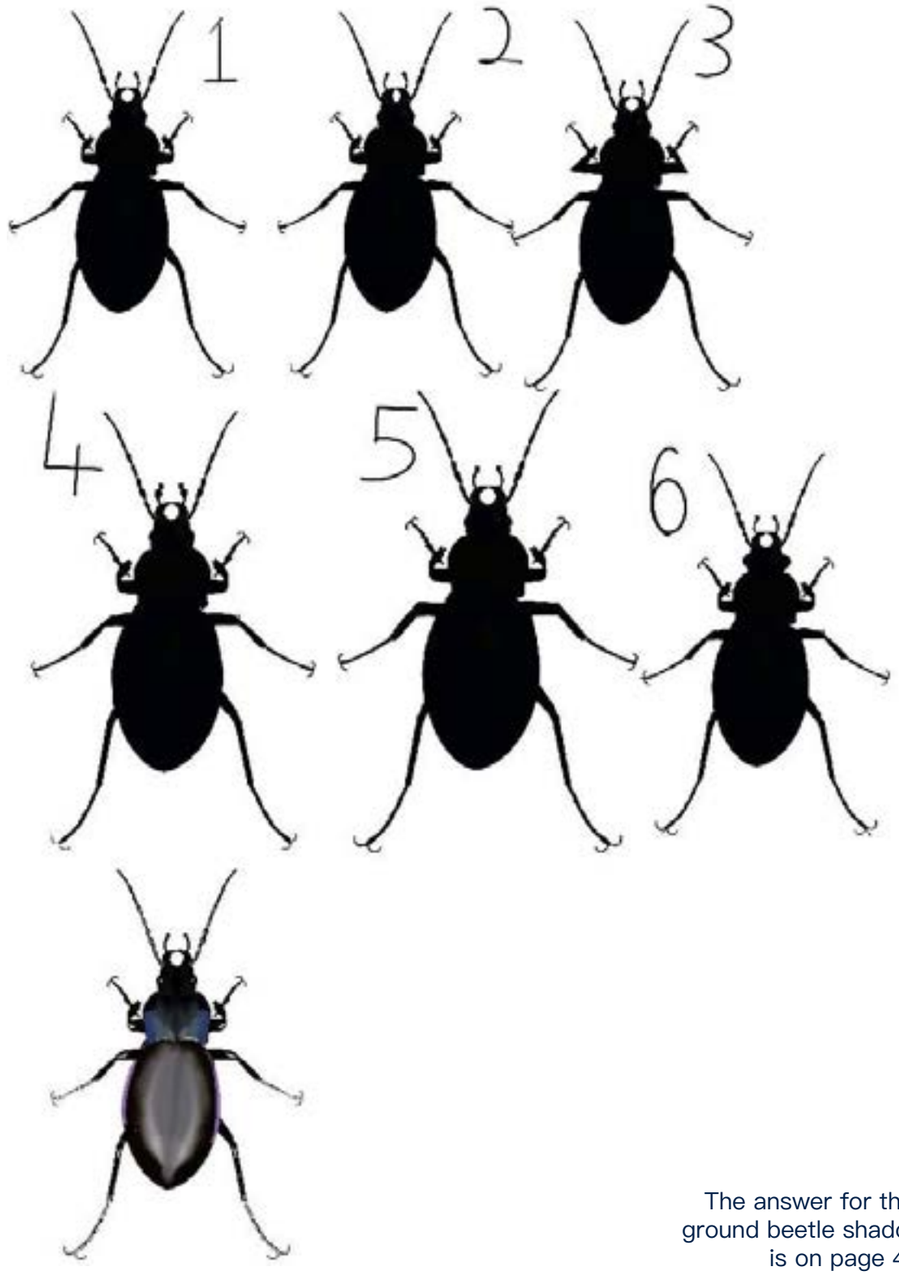
Shell Craft

By Megan George

Violet Ground Beetle Shadow Match

See if you can find the beetle's shadow!

By George Fulton



The answer for the violet ground beetle shadow match is on page 41

Young Photographers

My name is Miller Kew-Moss and I've always been really into nature and wildlife so, for my 13th birthday (2 weeks before the first Covid-19 lockdown), my parents got me a second-hand DSLR Camera. During the pandemic, in between home-learning, I taught myself how to use the camera by going out every day and experimenting with it. By that summer I was already saving up for a longer lens because I was loving photographing birds, plants, animals but especially insects! Over time I've learnt, by observing, some of the habits of local animals. I really enjoy photographing insects as they are a challenge because they're so small and hard to spot! I love them so much though because of the variety- there's so many different species and they are all unique and so beautifully engineered! Photography has been a really rewarding hobby to get into and I find it incredibly peaceful being in nature and looking out for different species. I think it's been especially so since the whole world was in lockdown and nature was flourishing!

Photograph and arcticle by Miller Kew-Moss

Photography is a relatively new interest for me but one that I really enjoy. I was given a SONY DSC-HX400V last Spring. The choice of camera was inspired by Megan George (TG FM's main photographer) who has taken many amazing photos with her SONY. I was entranced by the way she manages to capture birds in mid-flight and immortalize them in a single image. I realise that you have to have a lot of patience to get those lucky shots, but I think that is the part I enjoy most. At the end of the day, it isn't the actual photos that make me happy (although there is an element of that), it is the waiting I love, waiting for the wildlife to come so I can press the button, hear the shutter click and be proud of the result. If I just want to get a good photo rather than spending my life waiting for the right moment to come, my favorite place to go is The Wetland and Wildfowl Trust (https://www.wwt.org.uk/wetland-centres/llanelli/) in Llanelli as the abundance of wildlife there gives me a greater chance of taking a photo I'm pleased with, but even then there is no guarantee that I will press the button. I feel truly happy when I am with my camera in the middle of nature. Sometimes just being there is enough.

Photograph and article by Rose Fulton

Five top tips for any new wildlife photographer:

By Megan George

1. Learn about your camera and its settings and practise with any equipment before you go out so you don't miss the perfect wildlife moment.

2. Start off with easy subjects such as insects or plants or visit a wildlife centre to get you start.

3. Setting up branches near your bird feeding stations will give you a lovely natural back–ground to your photos without the feeders in the shots.

4. Use a hide or wear natural colour clothing to give you camouflage while photographing animals in the wild.

5. Join local groups or chat to other wildlife enthusiasts to find out about good wildlife sites where you are likely to find particular species.

Photograph by Megan George

Photograph by Miller Kew–Moss

Photograph by Miller Kew–Moss

The answer for the violet ground beetle shadow match is 1

To find out more about The Green Fuse Magazine please visit:

www.thegreenfusemagazine.com