The Blue Ground Beetle Glass Project 2024-25

KT Yun

Blue Ground Beetle ‘Carabus Intricatus, photo ©John-Walters

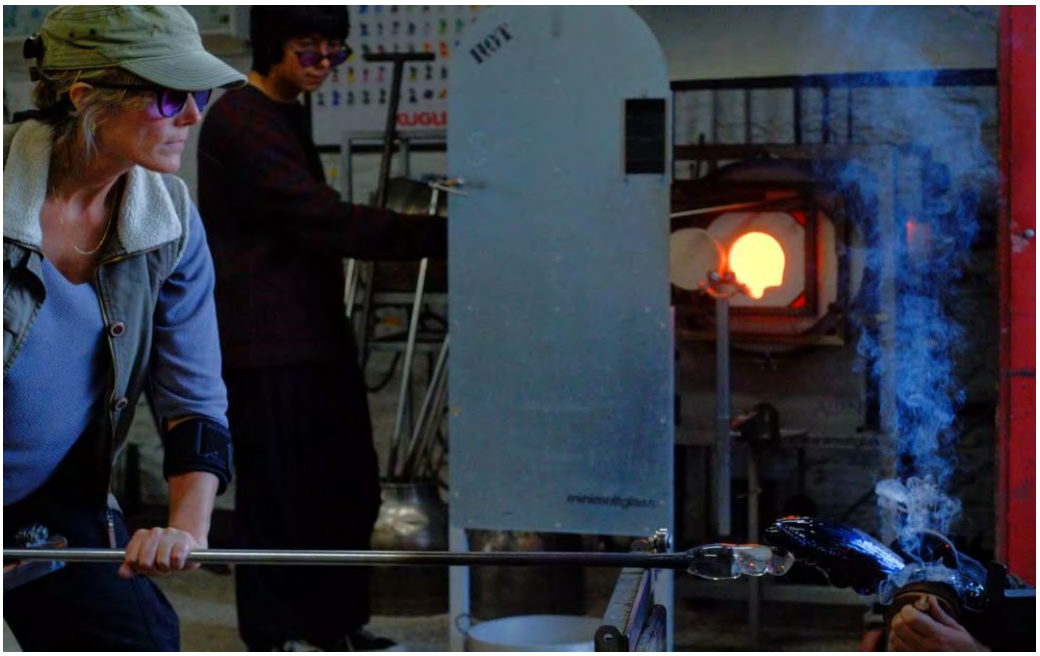
In 2023 I was awarded a scholarship from The Queen Elizabeth Scholarship Trust (QEST). As an artist and educator, specialising in glass for over thirty-five years, I was delighted to be awarded funds that would cover twenty full days of glassmaking training. I used the opportunity to study and improve my skills in four different types of glassmaking, with four master glassmakers. The project centred around the creation, in glass, of The Blue Ground Beetle. This is my journey so far.

Contents

- About the Project
- The Four Processes
- Process in Detail
- Hot Glass
- Kiln Formed Glass
- Flameworking
- Cold Working & Finishing
- Project Realisation
- About KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun



\

About the Project

In 2023, I was awarded a scholarship from the Queen Elizabeth Scholarship Trust (QEST) to research and train in glass processes so that I could learn to make a beetle from glass. Having been fascinated by insects since my early childhood and discovering my love for glass at seventeen, it has been a long-held ambition of mine to integrate these areas of art and science. Over the years I've constantly been trying to work out how I could best design insects in glass. This project was fuelled by my desire to allow others to see these extraordinary, magnificent and beautiful creatures magnified in scale, into large glass sculptures.

It was hard to decide which insect to study, as there are over 24,000 species to choose from. I chose a beetle because they exhibit a broad range of colours and textures, and because of the delicacy of their appendages. There are over 4,000 species of beetle in the UK, and I honed in on the ground beetle. Finally, out of the 350 species of UK ground beetle, I landed on one that had an almost celebrity status: The Dartmoor Blue Ground Beetle – 'Carabus Intricatus'.

As well as being Britain's largest and one of its rarest ground beetles, the Dartmoor Blue is also fairly local to me. I immediately fell in love with its iridescent dichroic blue colour, visually similar to a type of blue dichroic glass, and its long, delicate legs. Once thought to be extinct, these elusive creatures live primarily in the temperate rainforests of Dartmoor, though have also been found recently in Cornwall and Wales. They live on slugs by injecting a venom into their bodies which liquifies them—nasty, but efficient.

The Blue Ground Beetle Glass Project 2024-25

KT Yun

As with many other species of insects, The Blue Ground Beetle faces the disruption and destruction of their specialist environments. Part of my goal in this project was not only to capture the other-worldly beauty of this insect, but also to make clearer than ever the critical need for conservation of our wildlife.

I must thank several people for their expertise, knowledge and enthusiasm that made this project possible: entomologist, John Walters; Louis Lofthouse, Oxford University Museum of Natural History (OUMNH), Florin Feneru, Angela Marmont Centre at the Natural History Museum, London; and the television presenter and entomologist, George McGavin.

For years, Florin Feneru has been so welcoming as I came to study ants and ground beetles at The Natural History Museum. He found the only Blue Ground Beetle specimen in the facility, and helped me take some stacking images of it, while I also made sketches and thrived in this special and fantastic resource of the museum. I was allowed access to specimens, microscopes, stackers and solitude away from work and a busy life.

Sketch by KT Yun made at the AMC (Natural History Museum) in 2024

The Blue Ground Beetle Glass Project 2024-25

KT Yun

I was lucky enough to meet George MacGavin at a dinner who made a call to John Walters and asked him if he could donate a real specimen of a Blue Ground Beetle. George also gave me a great piece of advice—to save up and buy a Leica microscope. Both factors gave me the opportunity to study the beetle from home. From there came drawings, plasticine models and the ability to refer back to the real thing during my research.

The QEST scholarship was mapped out over a year, and had to be squeezed in alongside work and family, meaning it happened at weekends, evenings and any time I had in holidays. After twenty years of teaching, without the opportunity to make my own art, this has been the most absorbing and fantastic year for me; realising my dream has shown me exactly what I now want to do for the rest of my life. It was the most precious and fulfilling time.

left: Photo of the Blue Ground Beetle taken by Kt Yun assisted by Florin Feneru at the Natural History Museum

below: The Blue Ground Beetle. Photo by John Walters.

The Blue Ground Beetle Glass Project 2024-25

KT Yun

The Four Processes

Having spent many years studying insects and practicing prototype insect sculptures, I've realised that there are specific techniques in glassmaking that are suited to making specific parts of an insect. Each stage of my training as part of the scholarship allowed me to develop the skills to create different parts of the beetle.

The project was broken down into a year-long schedule of training with four master glassmakers, whose patience and expertise helped me to achieve my goals. Each master specialised in a different glass process. They were:

- Helga Watkins-Baker - kiln forming and fusing training
- Steve Frey - design and coldworking
- Scott Benefield - hotshop skills and making sheet glass (rondels)
- Andrea Spencer - lampworking in borosilicate glass
- I also had the amazing opportunity to work with hot glass sculptors, Sadhbh Molds and Theo Brooks.

With **Helga Watkins-Baker**, my mission was to learn how to make a blue textured glass for the elytra, thorax and the head of the beetle, therefore separating the 'armoury' of the exoskeleton from the main black body and legs. This was achieved by cutting and fusing glass and using mould-making techniques. I wanted to replicate the chitin fibres of the ground beetle's exoskeleton, which to the human eye looks like glass.

In April and September 2024, I spent two separate weeks at the studios of **Scott Benefield** and **Andrea Spencer** in Northern Ireland. Scott helped me to blow black rondels, used as my basic sheet glass, for the texture. He also showed me how to pick up the elytra, and how to cut and carve basic shapes to be picked up on the back of the thorax and the abdomen. Across these two stages of training, I settled on a unique process of using dichroic extract on the black sheet glass to create the beetle's iridescence. Andrea trained me in manipulating borosilicate glass, flameworking, using various torches. This was to create all the delicate but essential parts of the insect, including the legs, mandibles, palps, antennae and eyes.

Back in the UK, I also studied with **Steve Frey** who helped me to design the structure, composition and display of the beetle. He showed me how to drill, glue, pin and mount the beetle, once all its various parts—all twenty of them—were made to scale. There were many methods of assembling the parts and it took plenty of trial and much error along the way.

The Blue Ground Beetle Glass Project 2024-25

KT Yun

Process in detail

1. Hot Glass

Glass Blowing - Making Rondels
Hot glass training involves working with molten glass that is gathered from the furnace at 1100 degrees. It is then shaped, formed and blown or sculpted. For this project I focused on the following in the hot shop (glassblowing studio): glass blowing, hot glass sculpture, and ‘pick-ups’. Glass can be a very unstable material and joining different types of glass together is tricky, with cracking and breakages during cooling all too common. After much testing and compatibility issues, I discovered that instead of simply buying sheet glass (which often had incompatible additive), I could make my own flat glass using compatible glasses, thus reducing the prospect of cracking. I had always loved making large plates and bowls, but now I had a chance to study the ancient tradition of making rondels, as they were made in the 16th century onwards for windows.

I learned how to blow the glass solo, applying even thick solid colour bar, trying to get an even thickness, and mastering how to detach from the punty with minimal effort.

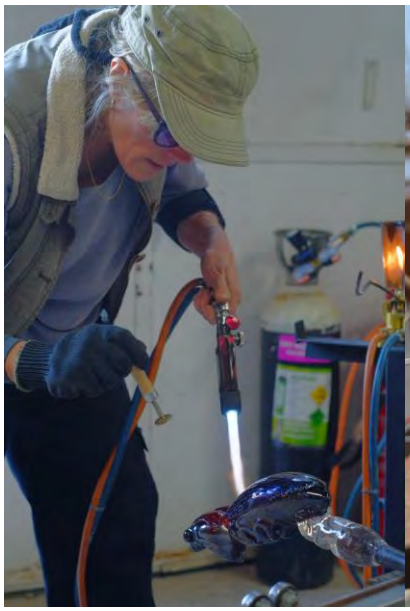
I came out with lovely hand-made round panels of black sheet glass. The rondels were then cooled slowly in a kiln, a process known as annealing, and marked up with a pen - detailing where the ‘cold work’ would be applied. The cold work would come later, out of the hot shop and involve cutting and carving out shapes from the rondels for the thorax, the elytra and the head ready to be coloured and textured.

Hot glass sculpture.
This is where I manipulate glass into something that resembles an object, using heat, gravity, tools, torches and movement. Turning molten glass that's cooling quickly, into something representational is no easy feat, but I somehow had to learn how to describe the head, thorax and body. These three parts were made separately and then joined. In the hot shop I learned how to make:

The abdomen, creating the segments of the body, the Coxa, (where the legs are attached), and all the marks and lines that are represented in the underside. I also applied the coloured and textured elytra hot, heating and folding this over like a jacket. This needed my larger Minimelts, toploaders, kilns and pastorellis, and a large sculpting torch.

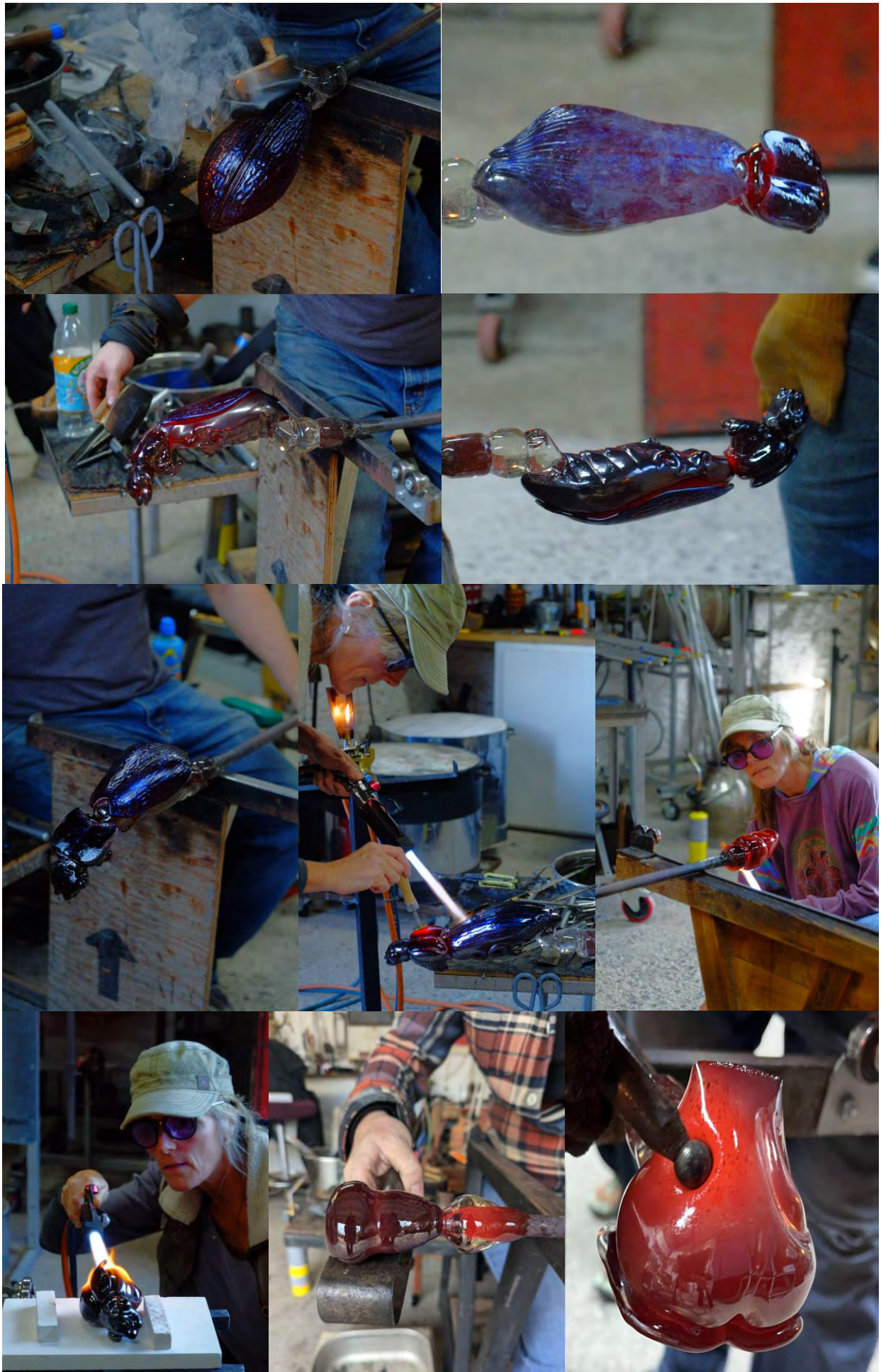
The head, though small, is the biggest challenge, the eyes being very pronounced, the wrinkles and colour in the head, and the flare and dips and tucks of the face features. I also had to leave room to drill holes (cold working) to fit 2 antennas, 4 palps and 2 mandibles. As anyone who has tried hot sculpture knows, if you get the eyes wrong, it's hard to continue. Through much trial and error, I'm beginning to like what I make, and understand this complex process. This sculpting process in molten glass is helped by working things out in plasticine first, to get a sense of pressure, mark making and tool choice. For the sculpture I used a smaller glass furnace and then a small Smiths torch, working delicately and sculpting on the bench with constant flashing (running over with a flame to keep everything warm, see photos). The head is to be made with no parts as these are all so delicate, they would be melted with every heat in the furnace. When finished the head is held at 500 degrees, ready to be attached onto the thorax.

The Thorax is the joining part. It’s the very first part to start with. I had to make the thorax “armoury” first, using kiln forming. This gave me the size to work with, and a key to getting the proportions of the other parts right. With the head sitting in the kiln, I then begin gathering, colouring and manipulating the glass into a shape that's almost triangular, sculpting and then switching axis with punties, until the form is ready. Then the coloured shell is attached, the joining part taken out and the head pushed into place. The piece must not get too hot now or it will lose definition.



The Blue Ground Beetle Glass Project 2024-25

KT Yun



The Blue Ground Beetle Glass Project 2024-25

KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun

2. Kiln Formed Glass

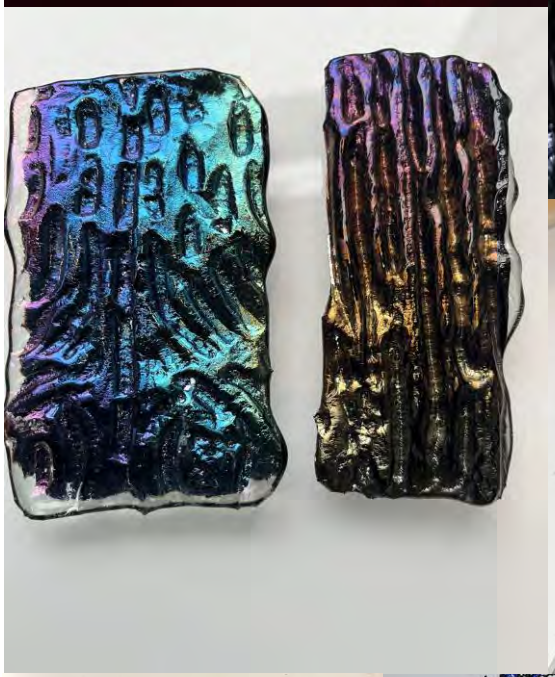
Colour: Here I travelled into very unfamiliar territory. Having worked alongside glass fusing and kiln-forming, I never really studied it or used it. I had much to learn, and so therefore a lot of experimenting and exploring happened. My first mission was to test and try out different brands of glasses, examining their harmony with each other. This would prove what brands I could rely on and limit the risk of cracking. Although some of the best colours were in Bullseye glass, I was to be making my rondels from Glasma glass. I did try matching a similar Oceanside glass but there were always strain points. To achieve the colour took much experimenting and finally I discovered one that brought me close enough to the ground beetle's shimmering blue, with hints of aqua and purple.

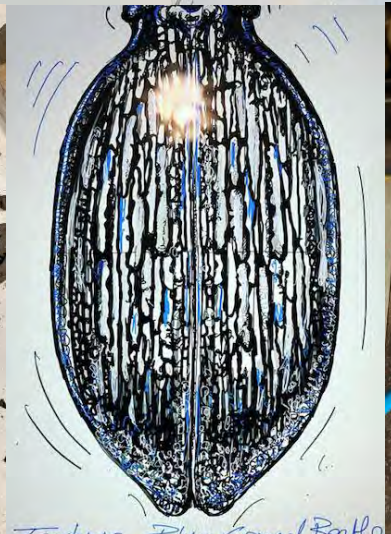
Texture: Through mark making into clay and also mark making into plaster, I made casts of texture so that I could lay my sheet glass over it, and fuse in a texture. I enjoyed learning this so much, it reminded me of cooking, with all the mixing bowls and ingredients. I had first studied the texture, drawn it, and then marked it in clay. From the clay I then made a negative in plaster, flint and fiberglass. The glass is then fused into this to recreate the positive texture in glass. Taking the coloured sheet glass up to a temperature of 795, I could get the specific texture that I wanted for the beetle's elytra.

Casting: I made the decision not to use this technique for this specific project, I did learn how to bury the abdomen into plaster to create a back onto which we folded the elytra over, using just the heat of the kiln. I learned how to cut circles in glass; how to fuse flat and textured; and how to slump the glass into a bowl shape. Many of the techniques were tried and tested, and if not used in this project, I have the knowledge of them now, to use in future work.

The Blue Ground Beetle Glass Project 2024-25

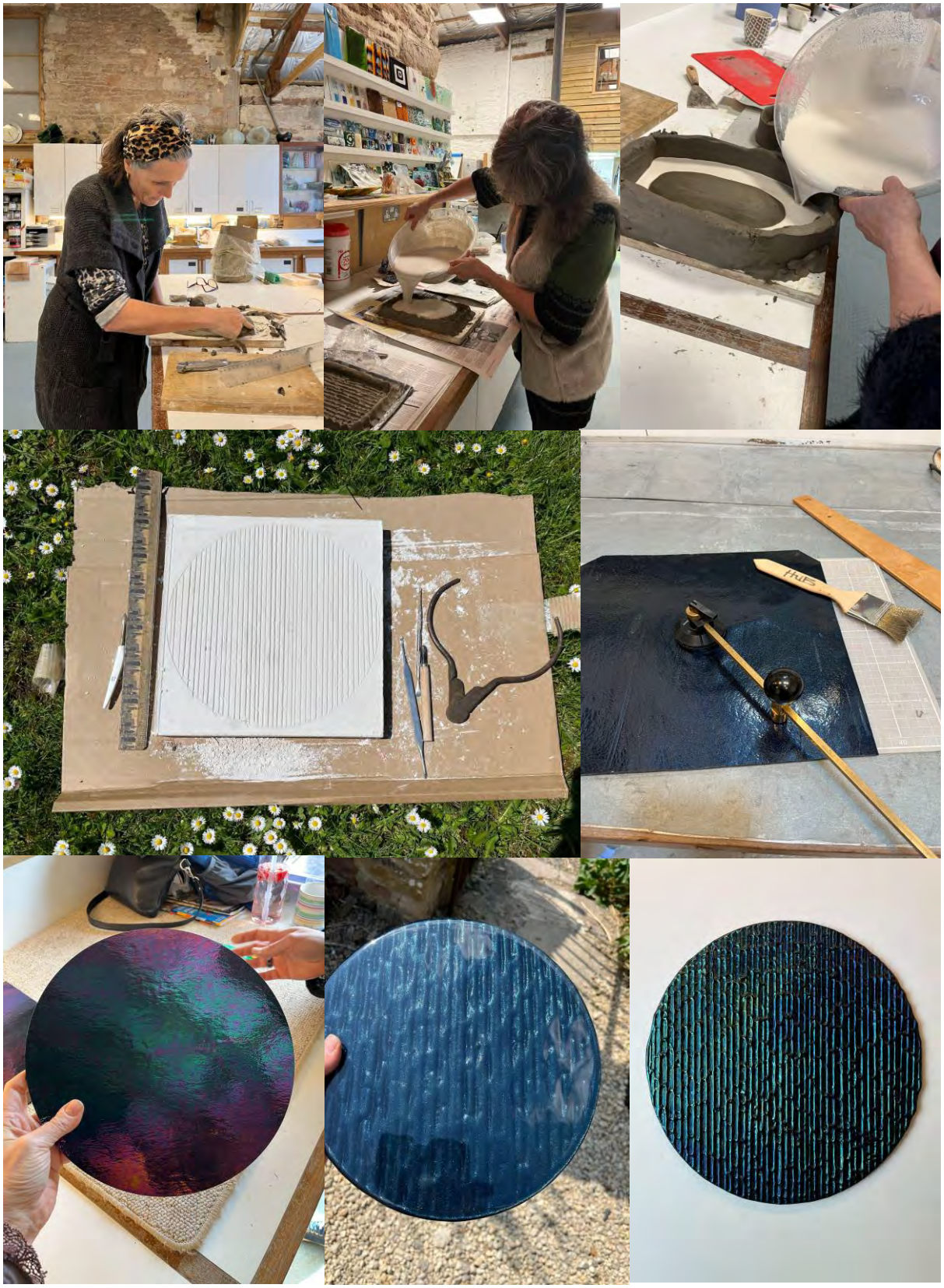
KT Yun





The Blue Ground Beetle Glass Project 2024-25

KT Yun



The Blue Ground Beetle Glass Project 2024-25

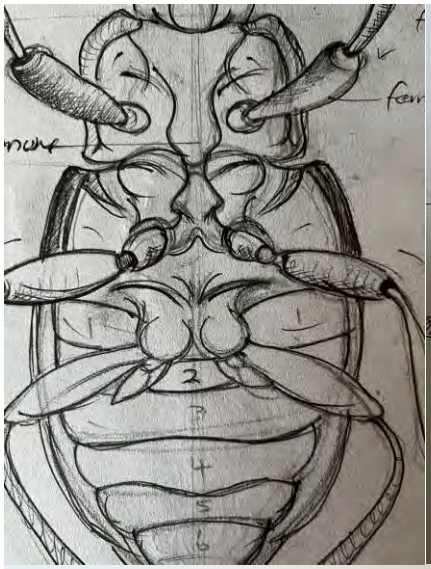
KT Yun

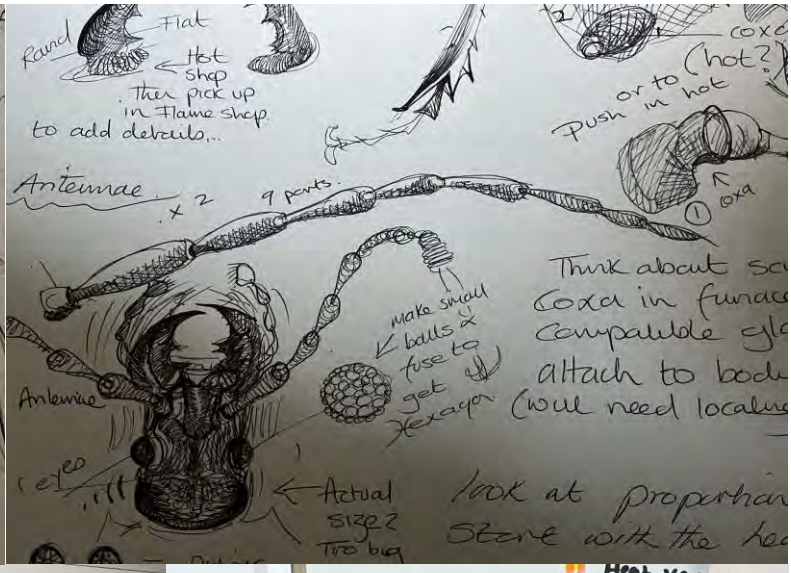
3. Flameworking

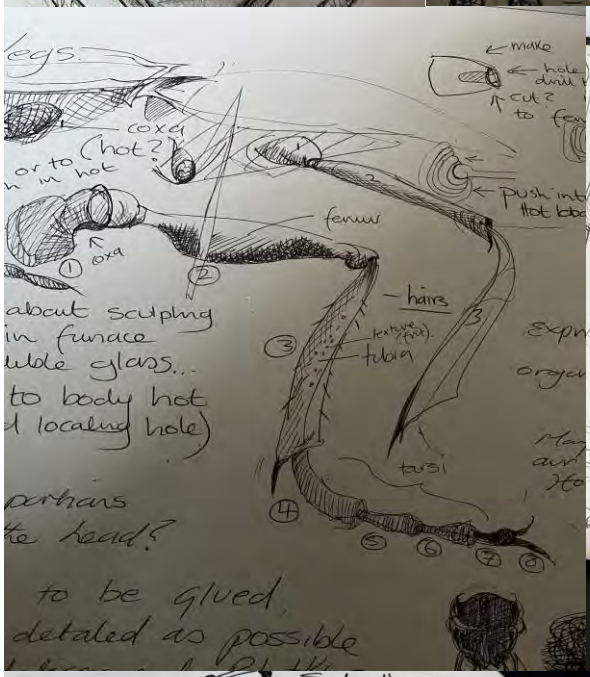
For the legs, antennae, palps, eyes and mandibles of the beetle, I needed a glassmaking process that was finer and more accurate than that of glassblowing. I studied flameworking, to create sculptural objects in the flame with Borosilicate glass. This process uses ready-made rods of glass and applying heat and gravity to manipulate glass in the flame. I learned methods and techniques to bend, stretch, sculpt and carve the hot and flexible glass into all the different appendages of the insect. On the legs, for instance, there are nine separate joints. There are eleven on the antennae. Each part was made with connecting ball to fit exactly into the desired socket, that was drilled or carved out of the head and body. Borosilicate glass is perfect for this particular job as small parts can be joined and altered and melted together. The finished attachments though having some strength will still break if bashed or knocked. This is why building a nice glass enclosure or case for this beastie is critical!

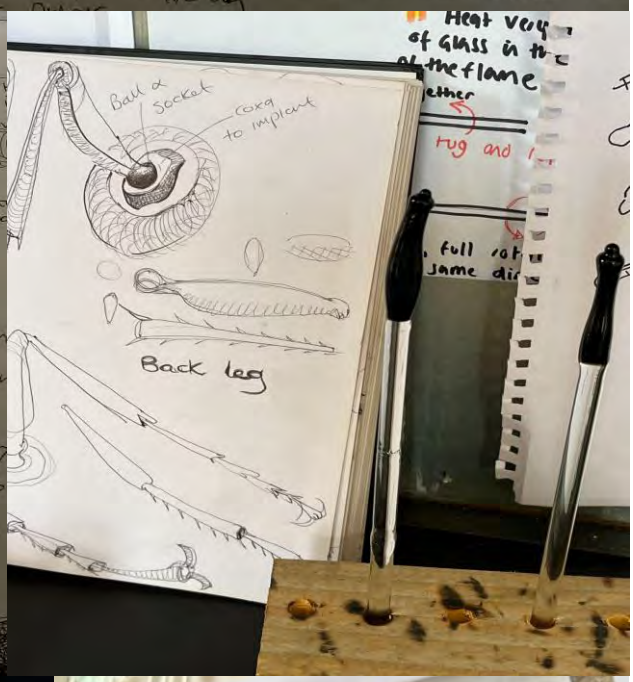
The Blue Ground Beetle Glass Project 2024-25

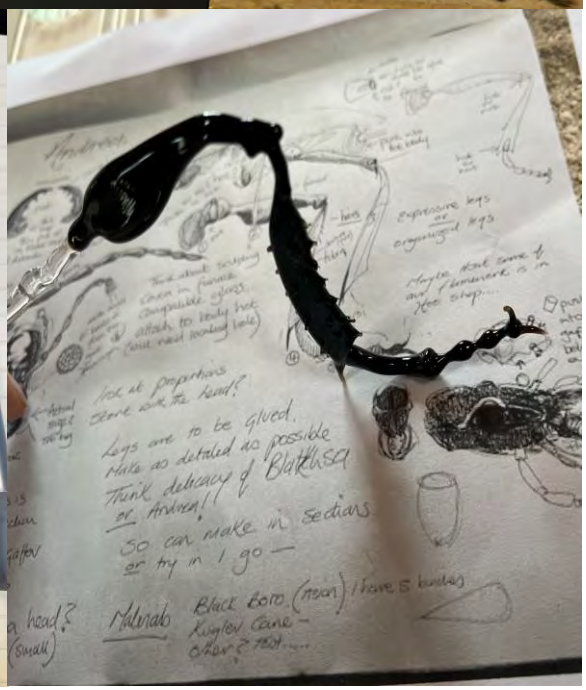
KT Yun











The Blue Ground Beetle Glass Project 2024-25

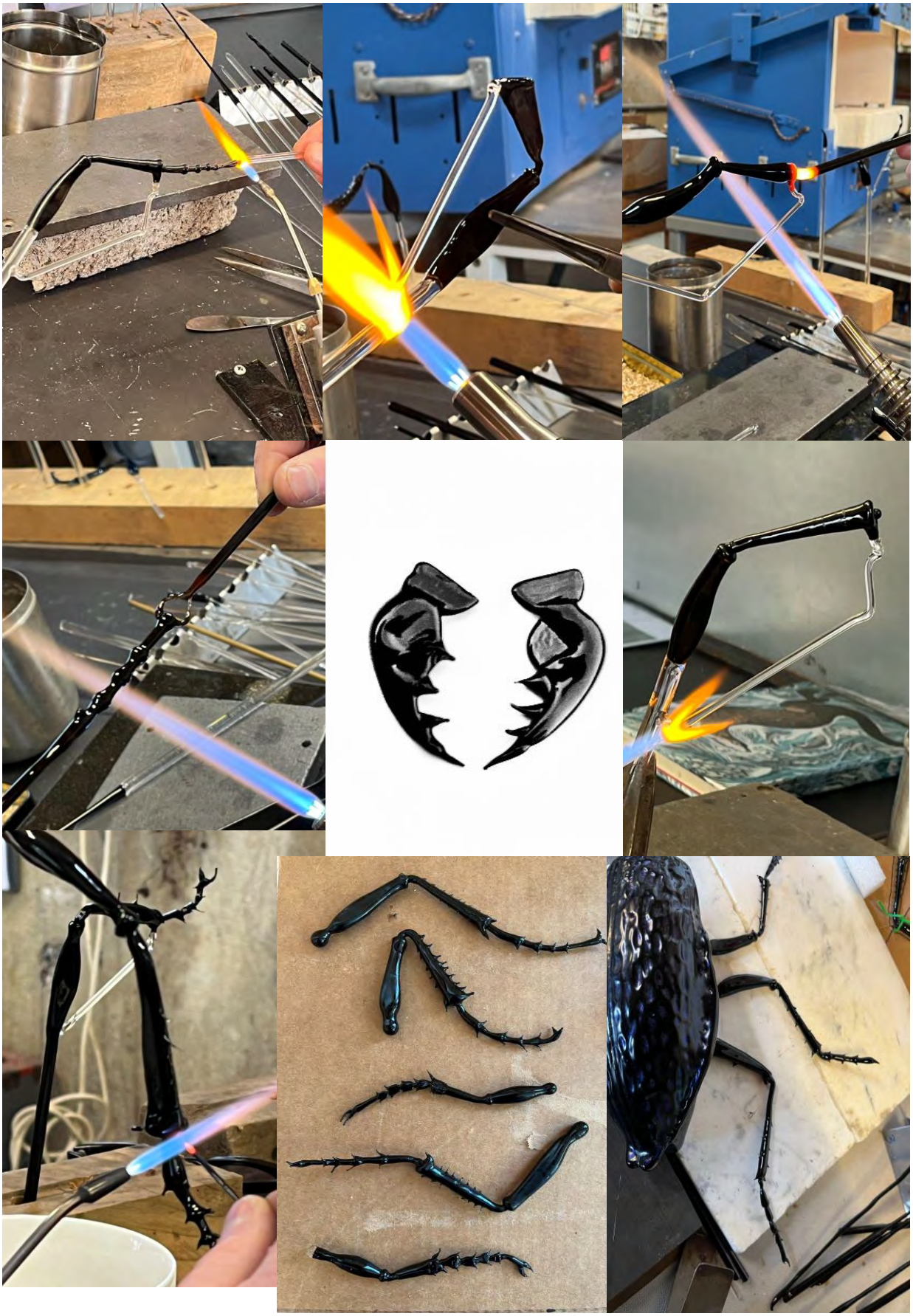
KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun



4. Cold Working and Finishing

Although the other processes physically create the parts of the work, of the beetle, what makes it all come together is the cold finishing. This is a skill that involves grinding, polishing, drilling, linishing, carving and assembling the insect.

All the holes for the legs and antennae are made roughly with a tool when hot but then need to be drilled and carved out to create a location point for the appendages to be inserted and eventually glued into place. The abdomen also needs to be drilled to fit a locating pin upon which the insect will sit and be free standing, allowing the legs to stick out, up or down and be safe from touching any surface. The abdomen needs to be glued to the body , and then the whole object needs to be designed so as it sits in case or is mounted flat up on a wall. A case is critical either way, as this object will be extremely delicate. Although designed to be viewed by the public, it shouldn’t be handled. It must be housed in a glass museum case, that in turn, needs to be designed and created.

The Blue Ground Beetle Glass Project 2024-25

KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun

The Blue Ground Beetle Glass Project 2024-25

KT Yun

Project Realisation

In order to complete the project, and perfect the Blue Ground Beetle in glass, I will use my existing glass skills and take on further training in glass techniques, learning one-to-one with master glassmakers to fast track my skills. To achieve the vision that I hold in my imagination, I need to practice and refine these learned skills and processes.

Before and during the making, I'm continually referring to drawings, images and notes, as there is little time to stop and reflect once the iron is dipped into the liquid glass. Without the fantastic and welcoming resources of The AMC at The Natural History Museum, I would never have looked into a microscope and may never have started this project.

Now, this project is almost complete, the texts and images here hopefully shed some light on the experiments, research and processes I have used on my journey. The beetle, when finished, will be approximately 35 cm long and is expected to be completed this year (2025).

My goal going forward is to create three-dimensional life-like insects for kids and adults alike to wonder at. Entomology has always been close to my heart, as a child, and then again through my child who also loves insects. I feel that they are ignored because of their size, but when studied close up, are the most beautiful and sometimes terrifying creatures of such complexity and the result of millions of years of evolution. The Blue Ground beetle, once thought to be extinct, is now a success story thanks to Buglife, The Woodland Trust, and pioneers like John Walters. However, this insect is still not safe from extinction. I would love to work on more species of insects, bringing their often-unseen beauty into public light and highlighting the need to protect them and the biodiversity that they depend on.

The Blue Ground Beetle Glass Project 2024-25

KT Yun

About the Artist

KT Yun is a hot glass artist using traditional techniques with contemporary and graphic designs. Born and raised in the Scottish Highlands, KT's first memory is searching for beetles and ants. After a childhood of horses and wilderness, KT discovered hot glass at art school in England when she was seventeen. She has worked with glass ever since – specialising in glassblowing.

After a decade of apprenticeships, a degree, and traveling around the world learning more about glass, KT taught glassblowing at UCA Farnham. She created and built her first small home furnace that was to become the 'Minimelt' in 1997 and in 2000 she co-founded The Liquid Glass Centre, a school for glassmaking where she stayed until 2006. After leaving Liquid Glass, she spent six years taking glassblowing to the road with her mobile Minimelt furnace, teaching at schools and performing at events across the UK.

In 2012 she co-founded The Glass Hub in Wiltshire, her second glassmaking school, alongside fellow glassmaker, Helga Watkins-Baker. KT also started to manufacture furnaces and small glass blowing studios. Setting up her company 'Minmelt Glass' with the aim of creating a way for people to blow glass at home for a fraction of the running costs of a full-scale studio. Minimelt furnaces are still used almost daily at the Glass Hub today.

KT has since been awarded a scholarship from QEST to pursue her primary passion of entomology and combines multiple techniques to create large glass sculptures of insects.

KT's work is informed by her keen attention to natural structures and textures, and her passion for entomology. Her recent work on insects consolidates decades of study and experience, culminating in a project that allows KT, through the medium of glass, to shine a light on the world of insects and the conservation of the UK's insect wildlife.