

RIGHT PLANT, RIGHT PLACE: A STUDY OF THE HORTICULTURAL USE AND MANIPULATION OF MICROCLIMATES IN CORNWALL

By
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I would like to thank all the horticulturists I met on this trip for their generosity and knowledge sharing.

Thanks also go to Sue Whittaker, Alison Lamont and Emma Tilley, whose support and attention to detail have been invaluable in the writing of this report.

Last but not least, I would like to thank Natasha Furey for sharing her insider's knowledge of Cornwall, its steep gradients and parking places.

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INTRODUCTION

Who am I?

I am Jennifer Whittaker, a horticultural apprentice at RHS Garden Wisley. I have enjoyed gardening from a young age and believe passionately that it is our responsibility as the horticulturists of the future to ensure that our gardening practices are as environmentally sustainable as possible. There are many ways that horticulturists can and do minimise the resources that are needed to produce and maintain ornamental and productive gardens, and thus minimise the impact that our industry has on the planet. One of the key areas I am interested in is the phrase Beth Chatto coined: "right plant, right place" (Beth Chatto's Plants and Gardens, 2020). Simply put, this means that it is important to take into account what growing conditions a plant needs in order to flourish, and equally to know the growing conditions that your patch of land provides. One year into my apprenticeship, I have realised that there are many factors to take into account when attempting to garden by this seemingly simple phrase, from soil type to climate. This inspired me to observe and better understand the implications of microclimates in garden planning and maintenance.

Aims and objectives

- To learn about the various microclimates of Cornwall from fellow horticulturists;
- To gain a greater understanding of how horticulturists make use of and manipulate microclimates;
- To build relationships with fellow horticulturists.

Having met these aims and objectives, I will be more able to intelligently manipulate microclimates and have a deeper understanding of what it means to grow the right plant in the right place.

Why Cornwall?

With its rich history of horticulture, its extended growing season and its mild coastal climate, Cornwall ticked all the boxes for my research trip! Having established which gardens were open under Covid-19 restrictions, and which of those were in season (many of Cornwall's gardens are spring gardens featuring Magnolia, Rhododendron and Camellia species), I contacted horticulturists at gardens which exemplified the range of growing conditions present in Cornwall. For example, Tresco Abbey Garden's island growing conditions would provide an interesting comparison with the inland clay pit location of the Eden Project, while the windswept Minack Theatre gardens contrast to the sheltered fern glad of Trewidden Garden only a few miles away. This variety of growing conditions in a relatively small area makes Cornwall the perfect location for a Covid-safe bursary trip. I was able to stay in a self-catering caravan and make all the journeys as day trips in my own car. Following an easing of lockdown restrictions, I planned my trip for early October 2020, departing on Saturday 3rd and returning on 10th. The climate of Cornwall enables gardens to have a "rich range of plants whose wealth encourages visitors from around the world" (Gardiner in Hubbard, 2017:7). Within this climate, pockets of microclimates create opportunities for a wealth of ecological diversity.

What is a microclimate?

Prior to my trip I researched my key terms, climate and microclimate, to understand the theory behind the practices I would be discussing with horticulturists in Cornwall.

Climate refers to the general weather conditions and average temperatures that prevail in a large area over a long period of time (Bluestein, 2020). The overall climate is comprised of collections of sub-climates, namely: macroclimates (such as the climate of a continent), mesoclimates (such as in mountains, deserts, plains), local climates (such as forests or large cities) and microclimates (such as the top of a hill or bottom of a valley).

The exact scale of climate to which the term microclimate refers is contested. However, for the purposes of this research trip, several definitions are useful. As an introduction, microclimate is defined by the Met Office as “the distinctive climate of a small-scale area” (Met Office, 2019:3). To expand on this, I found the definition of microclimatology by Barry and Blanken: "Microclimatology is the study of climates near the ground and in the soil, the factors that affect them, and the relationships and interactions between plants, insects, and other animals and their local environment" (Barry and Blanken, 2016:1). I found this second definition useful as it illustrates the complexity and inter-relational nature of microclimates, which I went on to learn about and see demonstrated in the gardens I visited on this trip.

With their relatively small size, microclimates are particularly exciting to the horticulturist as they enables us to grow plants that enjoy different growing conditions within the same garden. For example, a garden may have frost pockets, shady corners and bright sunny warm walls for different plants to inhabit. The Encyclopaedia Britannica (2020) identifies the following as defining factors of microclimates:

temperature humidity wind dew frost heat balance evaporation

These defining factors are influenced by the following - please note this list is not exclusive. I use these as key examples particularly relevant to horticulturists:

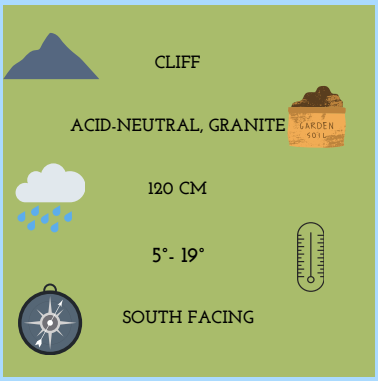
Topography - impacts humidity through affecting air pressure which in turn affects rainfall.
Soil type - impacts temperature through either retaining or reflecting the heat from the sun.
Vegetation - impacts evaporation through transpiration and temperature through insulating the soil, creating a more stable temperature.
Buildings - impact temperature through absorbing and/or reflecting heat.
All the horticulturists I met on this trip were acutely aware of the various microclimate influencers, often using them to their advantage.

Report Structure

For each garden featured in this report, I shall include:

1. A general introduction to the garden.

2. A microclimate box containing information on the following (see right):
Topography: the geographical context of the garden
Soil type: The bedrock on which the garden rests, or other key soil influencing factors
Rainfall: The average yearly rainfall
Temperature: The temperature range for the garden
Aspect: Which way the garden faces.
I have excluded wind from the microclimate box as the prevailing wind is south-westerly for the whole of Cornwall (Met Office, 2019:4). The information for each box is provided by either the horticulturists I met, or the Met Office records of the weather station nearest that garden (Met Office, 2021).



3. Details of the gardening practices discussed with a horticulturist, or my own garden observations when it was not possible to speak to a gardener.

4. Conclusions, including key things learned about the gardens and their microclimates.

Itinerary and Contacts

Sunday 4th October: Tremenheere Sculpture Gardens

Monday 5th October: Tresco Abbey Garden
Contact: Mike Nelhams (Curator) and Andrew Lawson (Head Gardener)

Tuesday 6th October: The Minack Theatre
Contact: Claire Batten (Co-Head Gardener)

Wednesday 7th October: Eden Project
Contact: Julie Kendall (Living Landscapes Garden Manager)

Thursday 8th October: The Lost Gardens of Heligan
Contact: Alasdair Moore (Head of Gardens and Estate) Chris Kersey (Ornamental sections supervisor)

Friday 9th October: Trewidden Garden
Contact: Dave Hamilton (Gardener)

Saturday 10th October: Trebah Garden
Contact: Darren Dickey (Head Gardener)

In my original itinerary I had booked to visit St Michael's Mount. However, there were strong gales that day so there was no access to the island. I altered the order of my original itinerary and visited Tremenheere Sculpture Gardens on Sunday instead, which freed up Friday for a tour of Trewidden Garden.

TREMENHEERE SCULPTURE GARDEN

Introduction

Tremenheere Sculpture Garden is situated on a south-facing hillside just east of Penzance. Spanning 22 acres, the garden is in the "Golden Mile," a stretch of land known for its good soil and a mild microclimate (Tremenheere, 2020a). Looking west from the top of the hill, I could see St Michael's Mount and the glittering sea. Though only beginning its development into a garden in 1997, the history of this site has affected the microclimates and growing conditions present today. I later learned from Tresco Curator Mike Nelhams that the head gardener at Tremenheere is a full time GP - "not surprising you couldn't get in touch with him!" Nevertheless, this was a really interesting first garden of the trip, providing a very clear introduction to the role of topography and site history in the creation of microclimates.

Dicksonia antarctica

Garden observations

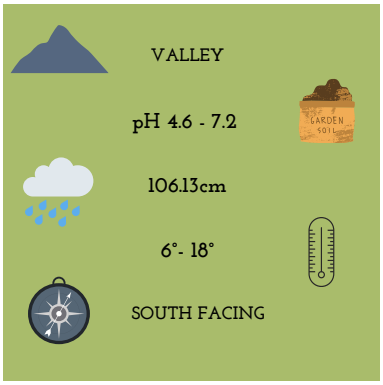
Contrasting microclimates: the woodland walk and the hilltop

Owner Neil Armstrong's design for this garden has been "largely dictated by the natural landscape" (Tremenheere, 2020b), which was immediately clear as I entered the garden. The damp, sheltered woodland at the bottom of the valley has been planted with a range of tree ferns, while a host of succulents and palms adorn the exposed, dry hilltop. This contrast of planting palettes clearly showed the difference topography can make to a microclimate.

Cyathea medullaris

The woodland walk runs along the bottom of the hill, so is naturally sheltered from winds from one side, and trees and shrubs create a windbreak on the other. Filtered light came through the canopy of deciduous woodland. To either side, occasional clumps of bamboo added shelter. Various mosses covered the tree trunks, and *Asplenium scolopendrium* (heart's tongue fern) could be seen rooted in the trunks of various *Dicksonia* species. I was particularly excited to see a *Cyathea medularis* growing outdoors: we grow these in the Glasshouse at Wisley as they are too tender for us to grow outside. The path winds up the hill where the shady, moist woodland gives way to various species of palm trees. These in turn are replaced by a range of succulents at the hilltop. This site is windy, free draining and exposed to the midday sun. I could see plants such as *Xanthorrhoea glauca*, another Glasshouse resident at Wisley, thriving outdoors along with *Aloes* and *Agaves*. The successful growth of tender species in both locations shows how the whole garden benefits from the overall mild microclimate, while the varied topography of the land and natural features such as the woodland stream create opportunities for moisture-loving as well as drought tolerant planting.

Moss on tree trunk



Sheltered pond in the woodland

Me and my new friend

Shelter and soil from the past

While at first sight the landscape at Tremenheere seems perfectly natural, it in fact tells the story of a wealth of human intervention. The woodlands at the north and west of this site were added to circa 1830 by Seymore Tremenheere, who planted a mix of *Fagus sylvatica*, *Quercus* spp, *Ilex* spp and *Castana sativa* (Hubbard 2017:92). This addition created the next generation of woodland, effectively extending its life and thus continuing to protect what is now the garden from north westerly winds. This shelter is still felt today, with new additions of *Pinus radiata* and *Curpressus* increasing the shelter belt's longevity. I was also interested to learn that the pH of the soil is much lower in the woodland than in the rest of the garden, which was farmed throughout the 1900s (Hubbard, 2017:94). As soil pH affects the range of plants that can be grown, this is another example of how the history of the land impacts the growing conditions of today.

Conclusions

This garden clearly presented contrasting microclimates on a large scale. I was struck by how different the planting was at the top of the hill compared to the sheltered, peaceful woodland walk at the bottom of the hill. This was an excellent route in to spotting microclimates, as following gardens, such as the Minack, operated on the scale of relatively small rocks, not large hills. As with so many coastal gardens I encountered on this trip, Tremenheere's shelter belts are a key component of its microclimate: without them, the wind would create much harsher growing conditions. The varying soil pH due to past farming on this site was a good introduction to the concept that as gardeners, we are constantly interacting with the past, in the present, while gardening for the future.

Hilltop view: looking across the gardens to the sea

Musa basjoo

X. glauca and *Agave*

Fasicularia bicolor

Aeonium in full sun

TRESCO ABBEY GARDEN

Introduction

Tresco Abbey Garden is situated on Tresco of the Isles of Scilly, 30 miles south west off the coast of Lands End. On a south facing hill, the garden is protected from northerly winds. However, the south of the garden runs almost directly down to the seashore. With high sea gales, frosts being a rarity and a twelve month growing season, I was excited to learn how horticulturists on Treso manipulate and use these growing conditions to their advantage. Following a twenty minute flight across the Atlantic in a 16 seater plane to St Mary's and a choppy sea crossing, I was met at the pier by Head Gardener Andrew Lawson who gave me a guided tour of Tresco Abbey Garden. Unlike many other gardens I visited on this trip, this garden has been owned by the same family for five generations (Nelhams, 2006). This continuity can be seen in the garden's cohesion and maturity, despite enduring damage from several major storms; the snow of 1987 and the hurricane of 1990. The garden was completely different to any I had seen before, brimming with plants I had never encountered, seen at that size, or known to grow beyond the confines of a glasshouse. To do the garden justice in this report would not be possible. I will therefore pull out my key findings regarding the microclimate, and look forward to future visits to this unique garden.

View across the garden

Luma apiculata

Gardening practices

Diverse shelter belt

The very first topic of my three hour garden tour was the shelter belt, fittingly, as it was the first thing planted by the founder of Tresco Abbey Garden, August Smith. Smith began the creation of the garden in 1834 (Nelhams, 2007:1). The warmth from the Gulf Stream on the island shores means that frosts are extremely rare, and Smith saw the potential of the island as a good place to grow plants unsuited to the climate of mainland Britain. However, the harsh sea gales and salt spray made survival difficult for anything other than indigenous plants such as gorse and heather. Smith therefor created a shelter belt of salt-tolerant, fast growing *Cupressus macrocarpa* and *Pinus radiata* companion planting the young saplings with gorse for protection while they established. These quickly formed a small woodland that extended over the north and west sides of the hill, protecting the garden from wind and salt spray on the south side of the hill, allowing him to begin planting up the garden.

View to the sea

As we hurtled through this woodland in our golf buggy, Andrew explained that the hurricane of 1990 destroyed 90% of the entire shelter belt of *Cupressus* and *Pinus* planted by Smith between 1870 and 1890. The team decided to replant with a more diverse range of trees so that if disaster strikes in future, in the form of extreme weather or disease, there is a stronger chance that more will survive.

Is this still England?

As well as *Cupressus* and *Pinus*, the shelter belt now includes a mix of UK native woodland trees, all of mixed ages. I was particularly excited to hear that *Ulmus* were included in this mix, as Dutch Elm disease did not make its way across the Atlantic to the Scilly Isles. Head Gardener Andrew assured me that although the garden can feel sheltered, none of it is guaranteed gale free.

Respond to the topography

The gardeners' attentive use of the topography is at the heart of this garden's success. Andrew described the microclimates presented by the topography of the south facing hill by dividing the hill into layers from the bottom up.

Layer 1: moist soil - thanks to the presence of the lake to the east of the garden, and the shade provided by trees.

Layer 2: shady - again, thanks to trees.

Layer 3: 1 foot topsoil, 2 foot subsoil, granite

Layer 4: 1 foot of topsoil, granite

Layer 5: granite - this is the most exposed area to wind and sun, as it is the top of the hill.

The gardeners have made the most of these microclimates, planting accordingly. A mixed fern glade including *Dicksonia antarctica* and *Cyathea medullaris* collected from Logan Botanic Garden in Scotland thrive in the damp, shady sheltered conditions of Layer 1. Andrew explained that, while this is the least exposed to the wind, in the winter, the lake which is to the east of the garden expands and can be as close as two feet from the fern glade. In contrast, the most exposed areas at the top of the hill (Layers 4 and 5) are planted with a plethora of sun loving, drought tolerant plants, including Australian *Banksia* and South African *Erica*.

Replanting after storm

In January 1987, snow settled on Tresco. This was followed by a drop in temperature to -8°, and a wind chill factor to as low as -30° from a 25 knot easterly wind. The plants in this garden are all from Mediterranean regions of the world and this was far too cold for them. 80% of the garden's plants died (Nelhams, 2006:47). To replenish the collection, Andrew and curator Mike Nelhams visited many gardens around the British Isles, including Logan Botanic Garden in Scotland. Although approximately 300 miles apart, Tresco Abbey Garden and Logan Botanic Garden share a very similar microclimate due to the Gulf Stream. The key difference is that Logan receives double the annual rainfall of Tresco's 72cm per year (Nelhams, 2006:51).

Water use

Although mainly on free draining soil, through planting in accordance with the growing conditions the gardeners rarely need to water. For example, species of *Puya*, *Banksia* and *Protea* are drought tolerant and flourish in poor, free draining soil. This makes them perfect for the microclimate of Tresco's upper layers. Andrew explained that the only irrigation needed in the garden is for the 45 large pots which are situated throughout the more formal areas. The gardening team also waters any newly planted trees and shrubs during their first year in the ground.

Ferns in Layer 1

Banksia seedhead

South African *Erica*

Protea cynaroides

This differs significantly from Wisley, where water is needed during the spring and summer to maintain the lawns and established plant collections such as *Hygrangea*.

Conclusions

Being on an island and a good 5° warmer than mainland Cornwall, Tresco Abbey Garden was unlike any other gardens on my trip. Looking down across the gardens from the Top Terrace, I felt like I was in another country. The palm strewn tree line definitely didn't look like anywhere I'd been in England! As a young horticulturist who has only worked in mainland England, it was like uncovering a whole new world of plants. I think that, had I had a greater knowledge of Mediterranean plants, I would have been able to understand the planting and its relevance to the garden's microclimates to a greater extent. This highlighted the role of plant knowledge in engaging with microclimates: understanding one opens a gateway to understanding the other.

Andrew's break down of the garden into layers demonstrated how gardeners who are well acquainted with their areas divide up the space based on the microclimatic conditions and work with them without necessarily using the label "microclimate." It was also really interesting to learn that microclimates can be so similar when so many hundreds of miles apart, especially as many other different microclimates lie between Logan and Tresco.

Leucadendron argenteum

View through *Watsonia*

THE MINACK THEATRE

Introduction

Being only thirty miles from the Isles of Scilly, I was very interested to see how the microclimate of the Minack Theatre differs from that of Tresco Abbey Gardens. The garden is on a granite cliff face, exposed to the sea winds from the south and the east, while sheltered from westerly winds by large rocks. Spanning 1.5 acres, the vibrant gardens contrast greatly to the windswept heather and bare rock of the surrounding cliffsides. I was met by Claire Batten who, together with Jeff Rowe, took on the role of Head Gardener at the beginning of 2020.

The history of the Minack Theatre is a showcase of dedication to detail, a tenet which is carried through in the tending of its gardens today. It was built almost entirely by hand by Rowena Cade, who bought the Minack headland for £100 in 1920, and her gardener. Construction began as a result of a successful open-air production of *The Tempest* on her land, and continued until her death in 1983. There are accounts of Rowena carrying sand up from the beach to make cement for the theatre seats, in which she etched beautiful designs with a screwdriver (The Minack Theatre, 2021a). The Minack gardens began in 1998 as a small planting project around the new café and was so successful that now raised beds flank every pathway down to the theatre seating (The Minack Theatre, 2021b). While first and foremost a theatre, Claire is keen to put the Minack on the horticultural map, and with such unique growing conditions, I am excited to see this unfold.

Claire laid out the two major microclimates of the garden. At the bottom of the cliff, the beds experience the baking heat of the midday sun, and are very exposed to wind. At the top of the cliff, the growing conditions are fractionally cooler, and the wind is not quite as strong. As the garden is on a steep gradient, these two microclimates gradually blend into each other in the middle. This provides many challenges, one being that the tender plants that might grow happily in the warmer temperatures provided in the lower beds would not appreciate the wind exposure there. However, innovative use of nooks and crannies in the rocks that line the beds, as well as employing various other horticultural tricks, mean that a range of plants are thriving in this extreme location.

Sea-gazing *Aeoniums*

Lampranthus cascades

Limonium vulgare

Looking up to the Minack from the beach

Cacti & Euphorbia myrsinites

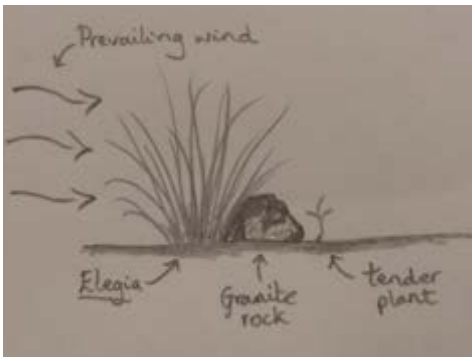
Gardening practices

Use the bedrock

The garden is on granite rock, which naturally retains heat. This shifts the soil temperature up by a few degrees meaning that, while the general temperature might drop to a point too low for certain tender plants to survive, the higher temperature around and just above the root zone may be enough to see them through cold snaps (see diagram).

Companion planting

Hardy plants that are wind and salt tolerant such as *Hebe*, *Oleria* and *Restios* (members of the *Restionaceae family)* are used to create shelter for more tender specimens. See diagram showing *Elegia* from the *Restionaceae* family.



Plant placement

On a site like this, even a few inches of protection from the wind in the crevice of a rock can make a huge difference to the microclimate.

Good general plant husbandry

Claire listed a few examples: maintaining good air circulation between plants by dead-heading; removing dying plant material; and ensuring that there is space between each plant. This is particularly important as with the high level of rainfall, any decaying plant material may begin to rot and affect the health of living plants. Claire explained that air circulation and less dense planting has led to massive savings in the plant budget, as plants were dying from overcrowding; her predecessor would replant the whole garden each year.

Timing

Claire and Jeff carry out most new planting in March and April instead of in the late autumn as is recommended for gardeners in the South East. This is because from October onwards the weather can be too extreme for plants to successfully establish; winter winds may cause plants to rock too much, salt can damage the plants and intense rain may wash plants away.

Size

As plants here need to adapt to a very windy environment, all new plants introduced to the garden are from 9cm pots and no larger. This means that the plant will be able to adapt itself to this harsh environment putting on slower, stronger growth from a young age.

Work with your conditions

Even though every bed is slightly raised to enhance drainage, runoff from the concrete pathways creates miniature 'streams' through certain through the beds, making these much damper than other areas. Instead of trying to correct this, Claire and Jeff plant accordingly, placing plants that like or can tolerate more moisture in these damper areas.

Aeonium, Cacti and *Aloe*

Massive *Agave*

Mixed planting

Lithops against granite

"Follow the family that works"
Claire and Jeff monitor their plants closely, keeping those that do well, and removing those that do not. I enjoyed Claire's mantra for experimental planting: "Follow the family that works." The theory is that if certain genera of a family are doing well in the Minack's growing conditions, other genera from that family may also thrive. This way, the gardeners can diversify the collection of plants growing at the Minack. So far, Claire's top three plant families performing well at the Minack are: *Crassulaceae* (genus *Aeonium*), *Asphodelacea* (genus *Aloe*) and *Aizoaceae* (genera *Lampranthus* and *Delospermum*). Having acknowledged the success of the *Aeonium*, Claire added another member of the *Crassulaceae* family, *Crassula* to the garden, which has also been doing well. These experiments are planted among a "hardy backbone" of tried and tested plants, such as *Convolvulus cneorum*.

Diversify for a changing climate
Climate change is bringing wetter, windier weather to the Minack, and harsh storms are becoming more common. While the temperature is generally mild, fluctuations can occur. In 2008 the garden was at -8° for three nights. This was disastrous for the plants, and many died, including all the *Leucodendron argenteum* that used to line the entrance to the theatre gardens. I was sad to hear this, as I had really enjoyed the beauty of the *L. argenteum* on Tresco. Ensuring against losses such as this is now part of Claire and Jeff's remit. Claire explained that through using the above listed techniques they hope to diversify the planting of the garden, which will make it more resilient to extreme weather.


Lampranthus


Various *Aeonium*

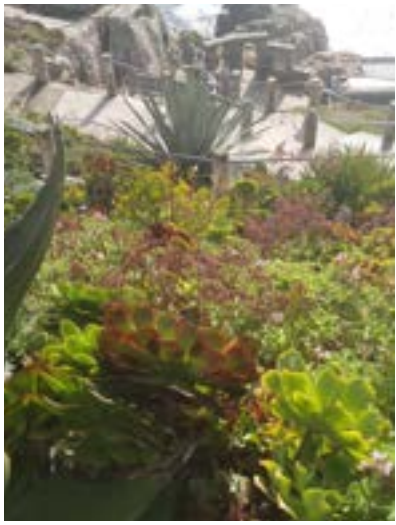

Crassulaceae

Conclusions

Key things I will take away from this visit are the importance of plant diversity and good plant husbandry. My visit to the Minack Theatre definitely helped me to gain a greater understanding of how horticulturists make use of and manipulate microclimates. I was excited to see how these techniques are extending the range of plants at the Minack while simultaneously building the gardens' resilience to extreme weather. Hardy plants ensure against a repeat of the 2008 decimation by frost, while drought tolerant species thrive in the increasingly dry summers. This sensitive use of microclimates also saves resources, as new plants are trialled gradually and good plant husbandry maintains conditions conducive to plant success. I will also take away the importance of horticultural curiosity; like Andrew on Tresco, Claire also has a list of new plants to trial, namely *Crassula alba* and *C. cordata*, as *C. coccinea* is doing so well in the garden.


Bare soil allowing air circulation


Looking east


View to the stage

THE EDEN PROJECT

Introduction

The Eden Project is situated in an old mining clay pit just north west of St Austell, about two miles from the sea. Dreamt up by Tim Smit in 1994 (Elworthy and Lowe, 2018:45), the garden's ethos is 'plants and people,' and was opened in 2000. The clay pit is 60 meters deep, so much of the garden is fairly sheltered, and unlike at The Minack and Tresco, plants do not need to adapt to sea winds. I was met by Garden Manager Julie Kendall, who oversees the 30 acre Outer Landscape that now fills the clay pit. As we stood on the viewing platform looking down into the garden, she described the 83,000 tonnes of topsoil that were brought in to cover all surfaces to a depth of 75cm so that the plants would have something in which to grow. At the heart of the garden are two Biomes. Resembling two large bubbles, the Biomes are constructed of steel frames containing hexagonal and triangular 'pillows' of an almost transparent material known as ETFE (ethylene tetrafluoroethylene copolymer) (Eden Project, 2021). The Biomes here could be seen as the pinnacle of manipulated microclimates, and therefore add another interesting layer of comparison to the other gardens I visited. I was interested to hear about the challenges of growing in these conditions, as well as the challenges of growing outdoors on, in some cases, almost vertical surfaces!

Rainforest Biome

Hexagonal ETFE 'pillows'

Gardening practices: The Biomes

Geothermal construction

The Biomes were designed by Grimshaw Architects to make use of the natural heat provided by the sun (Eden Project, 2021). To this end, they are south facing, making the most of the sun's heat at the peak of its midday strength. They back into the south slopes of the clay pit which naturally retains the heat from the day and releases it at night.

Clay wall of Biome

Constant monitoring

Julie explained that the Biomes' garden team perform daily tree checks as the lack of wind means that plants grow up brittle, not needing to develop strength in resistance to wind rock. In contrast, the trees in the outdoor garden areas are checked monthly, or after storms.

Replanting

As the microclimate of the Biomes is so conducive to the plants' needs while simultaneously eliminating competition such as animals, plants outgrow their space very quickly. Julie explained that in the 20 years that Eden has been open, the plants have already hit the roof once so they are on their second generation of trees.

Biome's *Musa basjoo*

Balancing commercial and horticultural interests

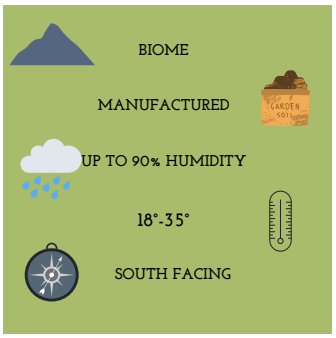
While the plants in the Rainforest Biome were thriving in their microclimate, the decision was made to reduce the humidity, as visitors were struggling in the conditions. This is a key example of the careful balance horticulturists need to strike, and epitomises the 'plants and people' ethos of Eden.

Mimicking ecosystems
I was excited to meet the Biome's biological pest control, the roul rouls (*Rollulus rouloul*). These birds roam the Rainforest Biome, along with lizards and frogs! This reduces the need for chemical intervention, and helps to mimic the ecosystem of the rainforest.

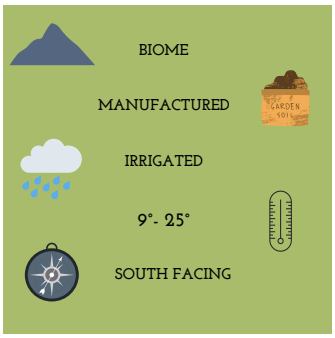
Responding to climate change
I asked Julie whether, as the climate warms, the outside planting would begin to resemble that of the Mediterranean Biome. She said that there was some friendly rivalry between the Biome and Outdoor teams, and that they are all working to see what plants they can get away with growing as the climate warms. Currently, the plants in the outside areas tend to be about one month behind the same types grown in the Mediterranean Biome.

Outer Landscape

Rainforest Biome



Mediterranean Biome



Gardening practices: The Outer Landscape

As it is situated in a clay pit, all parts of the garden receive sun at different times, making certain areas such as the south-east facing slope ideal for experiments with South African planting, while more sheltered and shady areas are planted with tree ferns. The planting schemes covered in the Outer Landscape include the temperate regions of the Korean peninsula, New South African veldt, Japan and American Prairies, as well as high altitude plants such as Proteas. A fun range of edible crops surround the cafe, including a small brewing and distilling garden!

Planting for the future
As they are having to adapt to growing on an almost vertical slope with topsoil prone to subsidence, small plants establish better. This was exemplified by a bed of small trees (no more than 60cm tall), that we walked past. They have been planted in their in final spacing, Julie explaining that it doesn't matter that the bed isn't a "wow" now.

Tough love
Self-described as a "hard gardener," Julie throws plants to her team rather than delicately passing them. The rationale here is that they need to be tough to survive in the harsh growing conditions of the sloped Outer Landscape.


Aloe in Med. Biome


Ensete and *Bougainvillea*


Anigozanthos, Med. Biome


Grevillea in Med. Biome

Soil mixes
As all topsoil is brought in, the gardeners can create their own soil mixes. This can be a real asset when growing plants that thrive in a specific soil pH. A particularly exciting soil mix is Julie's peat free growing medium for carnivorous plants using coir, pine mulch and chipped Christmas trees.

Soil retention
Julie explained that during the construction of the garden, scaffolding boards were placed strategically in beds to prevent subsidence. Furthermore, rather than removing old tree roots or roots of shrubs that are no longer wanted in the beds, the gardeners cut the shrubs to the base and drill into them to discourage regrowth. This practice means that the roots continue to stabilise the banks of the clay pit, and reduces the risks of subsidence during replanting before new plants are established. The importance of this was highlighted when a flood caused by high rainfall ran through the visitor centre and down into the garden. The plant damage and bank subsidence was minimal: the roots held well.

Soil care
Worms were bought in to create a healthy soil ecosystem, and a mulch of composted green waste from the garden is added on a regular basis.

Specialist kit
Hedge pruning and planting on such steep slopes is a challenge and a lot of the pruning is carried out on three-legged henchmen ladders. In certain particularly vertical areas, the planting is carried out with the gardeners attached to rope with carabiners. "Equipment's a biggy," Julie concluded.

Water management
The bog garden doubles up as an attenuation pond for a building. The building's roof is designed with channels that lead to water collection points, directing rainwater into the bog garden.
Without intervention the middle of the garden, formerly the bottom of the clay pit, would be constantly submerged in water as it lies 15 meters below the water table. Pumps work constantly to redirect the water for use in the bathrooms and garden irrigation (Kendall, Garden Brochure).

Balancing commercial and horticultural interests
Eden is used for ice skating, as a concert venue, and is much closer to a living plant museum than a botanical garden. As Julie phrased it, this is a "hard worn garden" which attracts heavy footfall and with that the need for plant repair. Furthermore, as a lot of the plants are grown to demonstrate our interaction with and dependance on plants, certain areas are tricky to manage. For example, the mono-crop areas demonstrating our dependance on grains are particularly difficult to maintain.


Sloping Outer Landscape


This would be submerged


Water catchment on roof


Attenuation pond

Conclusions

The Eden Project is an example of a human-created microclimate. Before the clay pit was dug, the topography of the land would have been completely different. Without the constant pumping of water, the bottom of the garden would be a lake. Without the addition of topsoil, most of the plants would not be able to grow here. As this microclimate has been born out of human intervention, it requires constant attention to be maintained. It was particularly interesting to see how gardeners work within this engineered environment.

I was excited to hear Julie's plans for her garden areas, and by her ethos of planting for the future, as opposed to feeling the need to have all areas of the garden looking at their best now. The harsh slopes of this garden mean that, in a similar way to the Minack, good plant establishment is key. The practice of leaving old roots in the banks means I will also take away the importance of acknowledging the function of plants no longer wanted for their aesthetic.

View across Eden

THE LOST GARDENS OF HELIGAN

Introduction

The Lost Gardens of Heligan are situated across a 200 acre estate, taking in a valley which leads to an estuary. They were first created in the Edwardian era, and were planted with hybrids of *Rhododendron ponticum* and *R. arboreum*, as well as *Dicksonia antarctica*. The *Rhododendron* grew a lot more quickly than their counterparts in the Himalayas, as there is minimal frost and snow at Heligan compared to the harsh winters of the mountains. However, between 1973 and 1990, the garden was left untended and the *Rhododendron* grew into each other, creating a shady forest (Hubbard, 2017:53). In February 1990, Tim Smit and his friend John Willis decided to return the kitchen and walled gardens to their former glory, creating paths through the well established fernery and *Rhododendron* walks, without losing that sense of a "lost" garden. The gardens have been open to the public all year round since 1992, and I was particularly interested to visit The Jungle, brimming with tree ferns and bananas!
The garden contains many microclimates: the Walled Gardens, The Jungle (situated in a valley), *Rhodoendron* walks, and woodland walks, to mention but a few. I was met by horticulturist Chris Kersey who began our garden tour by outlining a few key factors affecting Heligan's microclimate. As a narrowing peninsula, Cornwall becomes milder and less frosty the closer you travel to the tip of the peninsula. This means that Heligan is more likely to experience frost and colder weather than the likes of the coastal Tremenheere and Minack gardens. Also, the Heligan Estate receives a lot more rain than other parts of Cornwall due to its close proximity with Bodmin Moor. "I can leave my house in West Cornwall on a dry day and by the time I reach work it's raining." As we meandered through the gardens, Chris highlighted another interesting microclimate fact: the areas that get baked in the summer are also frost pockets in winter.

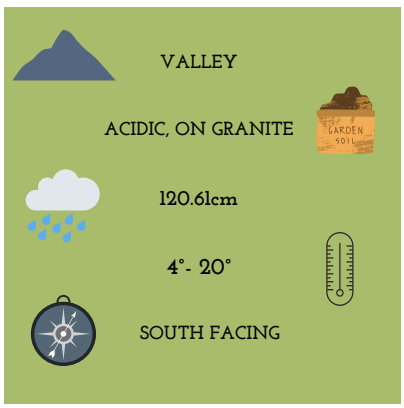
Rhododendron walks

Rhododendron

Dicksonia antarctica

Gardening practices

Light touch
Chris explained that the remit of the garden requires a particular aesthetic, to give the impression that the garden has only just been discovered. This requires gardening with a "light touch", which serves a technical purpose as well as an aesthetic one. As the *Rhododendron* have grown and adapted to their intertwined environment, any drastic pruning will disrupt the microclimate, affecting the exposure to wind and increasing the risk of *Rhododendron* falling.



Old *Rhododendron*

Responsive

I was struck by how responsive the team are to their garden. Chris explained that old *Rhododendron* can fall, drastically altering light levels overnight. A spot that was in deep shade yesterday is today in full sun. The gardener's response has been to replant the area with specimens that will thrive in the newly created microclimate, slowly introducing different aesthetics, rather than recovering the lost conditions.

Water management

Rhododendrons suffer from drought stress and struggle with the stronger winds brought about by climate change. This is a concern, as Chris noted they are considered "the backbone of Heligan." Currently, there is too much water in winter and not enough in the summer. The team are in the process of designing a water capturing system that feeds back to their borehole so that they can use winter rain during summer droughts.

Plant protection

Over winter, the *Musa basjoo* at the ticket office will be wrapped up to protect against frosts. The *M. basjoo* in The Jungle are less exposed to cold winter winds as they are in the protection of a valley, so do not need to be wrapped. This is a really clear example of how the varying microclimates within one garden can affect plant growth and the horticultural techniques employed as a result.

Construction

The walls of the productive gardens are slightly curved to maximise the amount of sunlight inside the walls. The walls also act as a windbreak and help to reduce temperature fluctuations in the productive gardens.

Pineapple House

I was lucky enough to meet Katie, a member of the team in charge of the productive gardens, who showed me the Pineapple House. The Pineapple House is the pinnacle of a horticulturally created microclimate. Designed by the Victorians, the structure resembles a long, brick cold frame, flanked by two shorter brick structures which run the length of either side of the cold frame. These two structures would be filled with horse manure which would emit heat as it decomposed. This heat would travel through gaps in the upper brickwork of the cold frame and create a mild growing environment for pineapples. The Heligan gardeners keep up this practice today.

The Jungle

Ensete and *Hedychium*

D. antarctica in The Jungle

Sheltered Jungle valley

Conclusions

The wide plant range at Heligan really shows how the gardening team have explored the affects that geography and topography can have on a garden. That being said, it was also clear from the planting that we were in a colder location than the more south-westerly gardens. Unlike Tremenheere and Tresco, where *Cyathea* species thrive outdoors, Chris explained that Heligan's microclimate could accommodate only the most hardy of tree ferns, *Dicksonia antarctica*. As Heligan is in east Cornwall, where the peninsula is much wider than south west Cornwall, this is a clear example of the affect of a narrowing peninsula on microclimate.

Musa basjoo in The Jungle

Despite being in such a rainy location, with almost double Wisley's annual rainfall, there is a major concern over the risk of an impending water shortage. This really struck me, as I had wrongly assumed that water supply was a problem mainly for gardens in the South East of England.
The *Rhododendron* at Heligan show clearly how plants develop in response to the microclimate around them, and that our interactions as horticulturists can have a profound impact on the growing conditions of that plant. This introduced the importance of the element of time in microclimate manipulation - it is necessary to alter the microclimate at a pace any remaining specimens can tolerate. While exemplified here by the gardeners' "light touch" philosophy. This made me reflect on the other interactions we have on plants' growing conditions, and how we affect a plant's resilience. A topical element of this at the moment is water use: if we irrigate a plant over its whole life, it will adapt to need and rely on that water.

Towering *D. antarctica*

TREWIDDEN GARDEN

Introduction

Trewidden Gardens is situated 1.5 miles from the coast but is fairly sheltered, thanks to mixed native trees and the south westerly prevailing wind. It is 25 acres and privately owned. I was met by gardener Dave Hamilton, who explained that the prevailing wind is from the tip of Cornwall, so has some land to cross before it reaches the garden. Therefore, unlike at the Minack Theatre, salt damage is not a concern. Indeed, the garden boasts some of the tallest trees in the area due to the relatively reduced wind. As Dave put it, "I can pick out Trewidden from my house". As well as *Camellia*, *Rhododendron* and the first flowering *Magnolia* of the year (Trewidden Bell), the garden boasts a beautiful collection of *Dicksonia antarctica* which, according to the garden's website, is considered one of the finest collections of this plant in the northern hemisphere (Trewidden, 2020). The gardens have been open to the public since 2002 but this is the first year that they have remained open beyond *Camellia* season, prompting discussions of how the garden can be planted for year-long interest. Currently, the garden is at its peak between February and May. When I met the Head Gardener, Richard Morton, he recommended coming back in late March.

Propped *D. antarctica*

Magnolia buds

Aeonium in walled garden

D. antarctica in old pit

Garden Observations

Shelter belt renewal

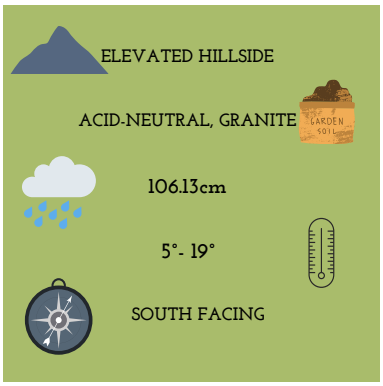
Dave explained that the shelter belt of 1948 was mainly *Cupressus* and *Pinus radiata*. The storm of 1990 brought down many of these trees, highlighting the need for constant renewal of the shelter belt. As a result, the garden team planted a mix of native trees in 1990 and continually add to the shelter belt.

Steady and selective plant removal

Much of the garden was used to grow stock plants for *Camellia* breeding, which were then left to their own devices. This means that the growing conditions have changed from light and windy to dark and sheltered, and the gardeners are in the process of sensitively opening up the woodlands, selectively removing the densely planted *Camellia* specimens to let in more light for more diverse plantings.

History affecting microclimates

The Burrows are a series of narrow, moss-lined paths sheltered by mixed trees, *Camellia*, *Rhododendron* and *Magnolia*. Dave explained that the pathways were once tracks cleared for tin mining. I felt a distinct temperature difference between the cool, damp shade of The Burrows and the warmth of the exposed walled garden. The Burrows lead to a large pit about 5 metres deep, and it is in this moist, shady position that a group of *Dicksonia antarctica* thrive. Initially established in 1902, these tree ferns tell a story of histories coinciding to make the perfect growing conditions for a plant half the world away from home.



During the Roman occupation of Britain, the pit where the *Dicksonia antarctica* thrive today was dug to form an open cast tin mine (Hubbard, 2017:101-102). Fast forward to the late 1800s, and Trewidden owner Thomas Bolitho and his team of gardeners stabilised that pit with rails from his family's mine to house their new specimens from Cornwall's first plant Nursery, Treseders of Truro. Established in 1839, Treseders of Truro supplied many of the Cornish estates with exotics. Bolitho's tree ferns were collected from Australia in 1898, making it to their final destination in their pit in 1902. The ferns that stand today are a mixture of the original plants from Australia and their offspring. Another factor affecting the growth of these tree ferns was the nearby planting of what have become two Champion *Magnolia* (*M. dawsoniana* and *M. sargentiana* var. *robusta*). The dappled shade provided by these large trees, combined with the moisture retentive bowl of the stabilised mining pit, provides a microclimate forged through time. The conditions certainly seemed perfect for the tree ferns, as they have been readily self-seeding, spores spreading to a nearby wall!

It was interesting to compare Trewidden's tree ferns with those at Heligan. Some looked a similar size, although it looked like the gardening techniques used to care for them had been different: at Trewidden, fallen ferns were propped up with large stakes, while in Heligan they had been left to lie on the ground. This could be another example of how a garden's history affects its current state, as Trewidden's tree ferns have been tended to since their planting in 1902, while Heligan was brought back from an overgrown state in 1990. Some of Heligan's tree ferns had fallen but gradually grown back upwards towards the light, creating a scene that seems untended by horticulturists.

Self-seeded *Dicksonia*

A clearing in the Burrows

Lichen on *Magnolia*

Tree fern selfie!

Conclusions

The importance of the cycle of plant removal and renewal in the maintenance of microclimates was really clear in this garden. The shelter belt must be maintained through regular planting so as to protect the plants within the garden from wind and salt damage. However, if left untended, the growth of plants within the garden can lead to altered growing conditions, as I saw with the *Camellia* collection blocking the light and thus cooling the microclimate. This calls for plant removal to allow light into the area once more. Dave's practice of removing the *Camellia* sensitively, selectively and gradually struck me as really important. As with the *Rhododendron* care at Heligan, clearing plants too rapidly can result unwanted plant death as the drastic change to the microclimate surrounding the remaining specimens may be too great for them to tolerate; a specimen may have adapted to the shelter of a neighbouring shrub, and exposure to wind in the shrub's absence may prove fatal.

TREBAH GARDEN

Introduction

Further north than Trewidden, but still south of Eden, Trebah is a south facing valley garden leading down to the Helford estuary, about a mile from the point where the river meets the sea. First planted almost 200 years ago, Trebah Garden now contains 5,000 plant species from around the world (Hubbard, 2017:68). I was very interested to compare the plant selection here to those in the other gardens and to see what thrives in the relatively sheltered growing conditions so close to the sea. At the time of my visit, Head Gardener Darren Dickey was on holiday but he kindly arranged a complimentary ticket for me to wander the garden at my leisure.

The "Bamboozle"

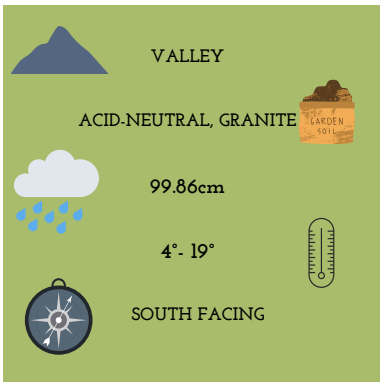
Garden Observations

This was a really lovely way to end my trip, as the garden contained many key plants that I'd seen throughout my travels: *Luma apiculata*, *Aeonium*, *Echium*, *Fasicularia*, *Rhododendron*, *Camellia*, *Dicksonia antarctica*, and *Gunnera*. There was also a stunning collection of *Hydrangea*, which were only just going over, and an internationally important collection of bamboo, the "Bamboozle" (Hubbard, 2017:75). I was also interested to see a few fairly young looking *Cyathea medullaris*. These ferns were too tender for the more northerly garden of Heligan, but thrive at Tresco Abbey Garden. There was also a larger one in the sheltered woodlands of Tremenheere. Of the gardens I visited, these *C. medullaris* in Trebah look to be the most northerly specimens growing outside. Interested to know how the team care for these *C. medullaris*, I wrote to Darren. Darren explained that the gardeners do not routinely protect the *C. medullaris* over Winter but will fleece them to protect the crowns if there is a particularly "cold snap." This is tricky, as the unfurling new fronds have a tendency to push the fleece away.

Cyathea medullaris

Trunk of *D. antarctica*

Having thoroughly enjoyed my garden visit, I set about reading and discovered that history and networking were at the heart of how this garden looks today. The Trebah Estate can be traced back to 1065, but its horticultural interest began in 1838 when it was bought by Charles Fox. Charles Fox was the manager of the Perran Iron Foundry and a keen horticulturist with excellent connections: his brother was a good friend of Joseph Hooker who went on to be the Director of Kew Gardens (1865-85) (Hubbard, 2017:68-71). This meant Fox had access to seeds and plants new to England arriving from around the world, including a large collection of *Rhododendron* from Tibet, Nepal and Bhutan. About seven years ago I visited Trebah in the spring and enjoyed the beauty of the *Rhododendron* in full bloom.



Sheltered stream

As with so many coastal gardens I have seen on this trip, the shelter belt is a key factor in this garden's survival. Charles Fox recognised the importance of creating a sheltered microclimate for his new arrivals, and set about planting *Pinus radiata* and *Quercus ilex* either side of the valley. Interestingly, he then planted a second shelter belt of *Fagus sylvatica* and *F. sylvatica purpurea* below the first. These trees are still standing today and I enjoyed taking in the view of the valley garden stretching out below while being sheltered form the prevailing wind by their large canopies. By surrounding the garden with this double shelter belt, Fox created a feeling of consistency and symmetry which contrasted to Tremenheere, which clearly had a windswept open section and a more sheltered woodland. In correspondence with head gardener Darren, I learnt that the current policy for the shelter belt is to replace trees as they fall or succumb to disease on a like-for-like basis.

Conclusions

I was particularly struck by the impact of historical planting on this garden's microclimate. So much of the garden's shelter rests on the planting of trees that are now over 150 years old. Had that planting not have taken place, the garden would be very different: so many of the plant species present would not be able to grow here. As well as naturally occurring factors such as topography and bedrock, the history of a garden is important and profoundly impacts the microclimates found today. Equally, our actions as horticulturists now will impact the growing conditions and microclimates of the future.

Hydrangea were first planted at Trebah in the 1950s for the cut flower market, and were sent on night trains to London for sale (Hubbard, 2017:68). Above the blooms, the banks of the valley are lined with mixed trees, *Pinus radiata* just visible are the top.

Seedling in tree fern

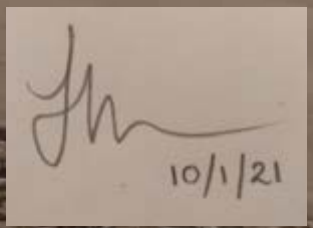
More "Bamboozle"

Acacia pravissima

Dicksonia stand

BUDGET

Expenses	Subcategory	Total
Travel		
	Fuel	£119.92
	Scilly plane	£146.00
	Taxi on Scilly	£8.50
	Boat (St Mary's to Tresco)	£10.00
	Parking	£6.90
Lodging		
	Self-catering caravan	£370.00
Subsistence		
	Own supply	£20.00
	Bought	£45.60
Garden entry		
	Tremenheere	£7.00
	Minack Tour	£21.00
Total		£754.92
Bursary Fund		£710
Personal Contribution		£44.92



CONCLUSION

Summary

In this report I have documented the week I spent in Cornwall in October 2020, visiting seven gardens and researching them through the lens of microclimates. I met curators, head gardeners, garden managers and garden staff who all gave their time generously. For that I am extremely grateful. The locations of the gardens visited ranged from coastal to clay pit, cliff face to sheltered valley, and have contained plants from around the world.

Have the aims and objectives been met?

Recap of the aims and objectives:

- To learn about the various microclimates of Cornwall from fellow horticulturists;
- To gain a greater understanding of how horticulturists make use of and manipulate microclimates;
- To build relationships with fellow horticulturists.

This report demonstrates that I have met all three aims and objectives on this research trip. I have certainly learned a lot about the various microclimates of Cornwall thanks to the horticulturists I met. Natural phenomena including the bedrock, topography, the effect of a narrowing peninsula and the presence of the gulf stream play a large role. It was a pleasure to witness the effects of these *in situ*; from the relevance of rainy Bodmin Moor from Chris Kersey of The Lost Gardens of Heligan, to the extra few degrees of warmth provided by granite rock from Claire Batten of the Minack Theatre. A main takeaway when it comes to gardening by the sea is the necessity to maintain the garden's shelterbelt, as exemplified by Mike Nelhams of Tresco Abbey Garden: "The woodland and hillside shelterbelt is the single most important feature in terms of garden preservation and without it the garden could not exist with the collections in its present form" (Nelhams, 2006:64).

In order to make use of these microclimates, good plant knowledge, as well as a clear understanding of the growing conditions presented by the microclimate are key. There were so many intricacies in each garden I visited, and the horticulturists are continually gathering a bank of information about their particular growing conditions. Any manipulation needs to be done with a sensitivity to the effects that these changes may have on neighbouring plants. Manipulation of microclimates to help a plant thrive in otherwise difficult growing conditions is an exciting horticultural challenge, and one exemplified by the windy conditions of the Minack. I really enjoyed meeting fellow horticulturists, and have already been using this new network to enhance my current role as an apprentice at RHS Garden Wisley.

Reflections

I have definitely gained a lot from this trip as a developing horticulturist. Microclimates come in many shapes and sizes, and their presence allows us to plant a diverse range of plant species within a relatively small space. While horticulturally exciting, this is also key to building a garden's resilience, safe guarding against unusual natural events as well as the impending water shortage brought on by climate change.

From the horticulturists I have met I have taken away the following:

- Keep learning - every gardener had a list of new ideas or plants they were hoping to trial.
- Acknowledge the importance of what has come before as it may be key to the growing conditions of the present.
- Even a few centimetres or degrees can be the difference between plant death or survival.
- Good plant establishment is key to its survival, and as plants develop in accordance with their growing conditions, it is good to establish them in their final position as early in their life as possible.

From a horticultural perspective this trip has already directly impacted my work as I have been able to apply my knowledge of the importance and subtleties of microclimates to an experimental *Cyclamen* project at RHS Wisley, planting out tender *Cyclamen* in a free draining, south facing bed that is protected from the prevailing winds and northerly winds by a heated display house. Microclimate factors and techniques employed:

Rain shadow: the alpine display house casts a rain shadow over the back half of the bed, so this is almost completely dry. I chose to put the three *Cyclamen* that need a completely dry summer dormant here.
Wall: The walls of the display house run along the back of the border and along the left hand side. This created a warmer pocket in the back left corner. I used this corner for the most tender *Cyclamen*, *C. cyprium*.
Orientation: The border faces due south, so is baked in the summer, and still receives good light in winter.
Growing media: The soil in the bed is mixed with grit, and is therefore very free-draining.
Other plants: *Limonium*, *Daphne*, *Forsythia*, *Sedum spathulifolium* and *Dianthus erinaceus*. These will provide shade and act as wind barriers.
Other elements: Rocks - I used these to create planting pockets for the *C. cyprium*, which do not like to be baked in the summer. The pockets will provide a barrier between the plant and the direct sunlight. Gravel mulch - I used this over the whole bed, for neatness, but also to help water to drain away from the crowns of the corms to help to prevent corm rot.

I recognise that my findings from this trip reflect only a small slice of what there is to know about microclimates, their uses and their benefits to horticulture and the wider world. A good accompaniment to this trip would be a study of the plants that are found thriving in the microclimates of Cornwall. This would allow further understanding of the the "right plant, right place" tenet. The network I have begun to develop is already bringing exciting prospects for the future. I will be sowing the *Xeronema callistemon* seeds I brought back from Andrew Lawson of Tresco Abbey Garden in Wisley's propagation facilities, and am also in contact with Julie Kendall from Eden as her peat free growing mix for carnivorous plants is of interest to the head of the Alpine Team at Wisley. This trip has helped me to develop my own horticultural practices while working at RHS Garden Wisley; I plan to keep a record of growing conditions presented by particular microclimates I encounter, to take time to learn about the site I'm working on, to consider the total environment in which a plant is growing, and think about the long-term impact of planting choices.

Through observing these seven gardens in Cornwall through the lens of microclimates I have witnessed how, as horticulturists, we are part of a fine balance of a garden's past, present and future. Our interactions with the land such as in soil cultivation, shelter belt maintenance and the removal and renewal of plants, affect the microclimates. Gardening is a constant, continual process involving weather, climate, plants, land and humans. I have seen examples of how microclimates allow plants to grow in otherwise unexpected situations, which is hugely relevant for the future success of horticulture in a changing climate, as well as for the sustainable regeneration of landscapes in agriculture and the wilderness. I thoroughly enjoyed this opportunity, and would like to thank the RHS Bursary Committee wholeheartedly for making this trip possible.

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