Travel Scholarship Report

A journey through the Western Cape, South Africa: exploring wild flora and Botanical Gardens

Date of travel: 23rd August – 10th September 2014

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Introduction

At the end of August 2014, I set off on a two and a half week long travel scholarship to South Africa. I travelled within the Western and Northern Cape provinces of the country, exploring wild flora within various National Parks and also visited several National Botanical Gardens. Fieldtrips within the National Parks focused on the succulent and annual plant diversity that is prevalent in the spring months, following the winter rains. A trip to the interior of the Western Cape highlighted the seasonality of rainfall within the country, with the western coast receiving winter rains and the more central parts of the country receiving summer rainfall.

Aims and objectives

Several aims of the travel scholarship have been listed with accompanying objectives, which describe the way in which the aim will be achieved.

1 – Aim: To gain practical experience in the field, embarking on several trips to species-rich areas, documenting evidence with photographs and location data and understand further the link between the plants and their habitat.

   Objective: Document both plant species found and their location, including topographical, geological and climatic information. Field guidance will be provided by the staff at the botanical gardens, whom have already shared various ‘hot spot’ areas for plant diversity.

2 – Aim: To see as broader range of vegetation and plant species as possible, ranging from shrubs, to small succulents to vast swathes of annuals.

   Objective: Visit a number of species rich areas including the Knersvlakte and the Richtersveld and visit National Parks (e.g. Karoo and Namaqua National Parks) and document the different types of plant species located in each area.

3 – Aim: To visit a selected number of botanical institutions and observe the succulent plant collections at both Kirstenbosch and Karoo Desert Botanical Garden.

   Objective: Meet with the nursery staff at Kirstenbosch and Karoo Desert Botanical Garden, receiving ‘behind the scenes’ tours of the propagation facilities and viewing the plant collections that are not accessible to general visitors.
4 – **Aim:** To create links and promote information sharing between Kew and staff working at the botanical institutions visited in South Africa.

**Objective:** Meet up with the staff contacts at the various botanical institutions and talk about Kew’s plant collections, offering to answer questions about Kew’s horticultural workings. Receive garden tours at both Kirstenbosch and Karoo Desert Botanical Gardens which have been arranged with staff members.

5 – **Aim:** To return to Kew with valuable information regarding plant cultivation and visual evidence of the trip in the form of pictures and video, which can be shared with horticultural staff members.

**Objective:** Comprise a good quality portfolio of all photographs taken on the trip. Photographs of plants will be of a certain quality, ensuring that they are good enough for identification purposes and they will be accompanied by images of the habitat in which they grow. A Kew Mutual Improvement Society (KMIS) lecture in the third year will present some of the selected images to an audience in the form of a PowerPoint slideshow.

### Itinerary

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Day of week</th>
<th>Description of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23-Aug-14</td>
<td>Saturday</td>
<td>Flight from London Heathrow to Cape Town Airport. Departed at 21:30pm.</td>
</tr>
<tr>
<td>2</td>
<td>24-Aug-14</td>
<td>Sunday</td>
<td>Arrived 09:55am (local time). Collected hire car from Cape Town Airport. Rested for the remainder of the day.</td>
</tr>
<tr>
<td>3</td>
<td>25-Aug-14</td>
<td>Monday</td>
<td>Visited Kirstenbosch Botanical Garden. Tour around the garden with Adam Harrower. Graham Duncan gave a tour of the bulb collection.</td>
</tr>
<tr>
<td>4</td>
<td>26-Aug-14</td>
<td>Tuesday</td>
<td>Tour of the propagation facilities and succulent collections at Kirstenbosch with Adam and Nimama and also viewed the nursery stock beds.</td>
</tr>
<tr>
<td>5</td>
<td>27-Aug-14</td>
<td>Wednesday</td>
<td>Drove to Karoo Desert Botanical Garden in Worcester.</td>
</tr>
<tr>
<td>6</td>
<td>28-Aug-14</td>
<td>Thursday</td>
<td>Tour of the garden, nursery facilities and succulent collections.</td>
</tr>
<tr>
<td>7</td>
<td>29-Aug-14</td>
<td>Friday</td>
<td>Explored the natural vegetation within the botanical garden grounds, following marked trails.</td>
</tr>
<tr>
<td>8</td>
<td>30-Aug-14</td>
<td>Saturday</td>
<td>Drove to Karoo National Park in Beaufort West. Field trip in the Park following the Lammertjiesleegte trail.</td>
</tr>
<tr>
<td>Date</td>
<td>Day</td>
<td>Events</td>
<td></td>
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</tr>
<tr>
<td>1 Aug 2014</td>
<td>Sunday</td>
<td>Extended field trip in the park, following the longer Klipspringerpas trail.</td>
<td></td>
</tr>
<tr>
<td>1 Sep 2014</td>
<td>Monday</td>
<td>Drove to Clanwilliam and rested for the remainder of the day.</td>
<td></td>
</tr>
<tr>
<td>2 Sep 2014</td>
<td>Tuesday</td>
<td>Visited Hantam Botanical Garden, Nieuwoudtville, observing spring bulbs and annuals. Field trip in the quartz fields of the Knersvlakte, focusing on succulent flora.</td>
<td></td>
</tr>
<tr>
<td>3 Sep 2014</td>
<td>Wednesday</td>
<td>Drove to the Skilpad Nature Reserve within Namaqua National Park. Field trip in the park focused on flowering annuals.</td>
<td></td>
</tr>
<tr>
<td>5 Sep 2014</td>
<td>Friday</td>
<td>Drove to the southern Richtersveld region, searching for succulents growing within quartz outcrops.</td>
<td></td>
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<tr>
<td>6 Sep 2014</td>
<td>Saturday</td>
<td>Field trip in the northern corner of Namaqua National Park, again searching for succulent plants.</td>
<td></td>
</tr>
<tr>
<td>7 Sep 2014</td>
<td>Sunday</td>
<td>Drove back to Cape Town from Springbok.</td>
<td></td>
</tr>
<tr>
<td>8 Sep 2014</td>
<td>Monday</td>
<td>Visited Table Mountain National Park, which was accessed by cable car. Studied the mountainous fynbos vegetation.</td>
<td></td>
</tr>
<tr>
<td>9 Sep 2014</td>
<td>Tuesday</td>
<td>Visited Stellenbosch University Botanical Garden. Tour of the garden with the curator, Martin Smit. Visited Harold Porter National Botanical Garden.</td>
<td></td>
</tr>
<tr>
<td>10 Sep 2014</td>
<td>Wednesday</td>
<td>Climbed Lions’ Head, part of Table Mountain National Park. Returned hire car to Cape Town Airport. Flight from Cape Town Airport to London Heathrow departed at 18:55pm. Arrived at London Heathrow 06:40am (Thursday 11th).</td>
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Locations visited

The places I visited during my travel scholarship can be listed under two distinct headings: Botanical Gardens and National Parks. The map pictured below highlights the locations of the places visited.

![Map of South Africa](image)

**Key:**
1. Richtersveld
2. Namaqua National Park
3. Knersvlakte
4. Karoo National Park
5. Goegap Nature Reserve
6. Kirstenbosch National Botanical Garden
7. Stellenbosch University Botanical Garden
8. Karoo Desert National Botanical Garden
9. Hantam National Botanical Garden

Botanical Gardens

Kirstenbosch National Botanical Garden

Located against the eastern slopes of Table Mountain, Kirstenbosch is one of the finest botanical gardens in the world displaying a wide variety of Cape Flora, along with plants from other regions of South Africa. A conservatory also houses plant collections, with over 7,000 species cultivated at Kirstenbosch, including rare and endangered plants. The Kirstenbosch estate is 528 hectares in size, of which 36 acres is the botanical garden itself. The remainder of the estate, which borders Table Mountain National Park, is managed as a nature reserve, supporting natural forest. The recently installed ‘Tree Walkway’ gives rise to stunning views over the gardens and the city of Cape Town.

![Kirstenbosch](image)
Stellenbosch University Botanical Garden

Stellenbosch University Botanical Garden is part of Stellenbosch University and although compact, it houses a large diversity of plants, from indigenous South African plants to introduced plant species. Two glasshouses are dedicated to succulent and xerophytic plant collections and themed gardens, like the Cape Flora Garden, displays plants that can be found in the Cape region and an Asteraceae Garden includes genera from the most represented plant family in the Cape region. Furthermore, long and narrow outdoor pools house various cultivars of *Nymphaea* alongside the impressive *Victoria cruziana*, which are famous for their huge floating leaves. Stellenbosch University is in a unique position, as it isn’t a National Botanical Garden and doesn’t have restrictions on what it can grow within its collections.

National Botanical Gardens are government funded and are therefore restricted to growing plants that are native to southern Africa only, with limited opportunities to display flora from other continents.

Karoo Desert National Botanical Garden

Located 120km north-east of Cape Town, Karoo Desert National Botanical Garden displays a wide variety of desert and semi-desert flora. The 154 hectare garden is found at the foot of the Hexriver Mountain range and only 11 hectares of the garden are cultivated. The remaining 143 hectares boasts natural vegetation, which has several trails leading through the landscape, offering dramatic views of the mountainous surrounds. The Garden was a profusion of spring flowering annuals at the time of visit, with *Gazania krebsiana* dominating the displays. The garden also houses a large succulent collection, which includes a wealth of *Lithops spp.*, *Conophytum spp.* and a very comprehensive collection of *Haworthia spp.*
Hantam National Botanical Garden

Situated at the northern tip of the Western Cape, falling into the territory of the Northern Cape and at 730m above sea level, Hantam Botanical Garden offers fantastic naturalistic displays of seasonal flowering plants from winter through to autumn with various sign posted trails enabling the wild flora to be viewed at close quarters. Similarly to Karoo Desert Botanical Garden, vast arrays of flowering annuals dominated the landscape, along with masses of spring flowering bulbs. Additionally, Nieuwoudtville, the town in which Hantam is located, is commonly known as the bulb capital of the world.

Figure 5: Fields of purple Felicia sp. at Hantam NBG.

Harold Porter National Botanical Garden

Harold Porter National Botanical Garden is located on the south coast of South Africa, approximately 60 kilometers drive eastwards from the centre of Cape Town. The garden is situated within the Kogelberg Biosphere Reserve, which is north of Betty's Bay and consists of 10 hectares of cultivated grounds and 190 hectares of natural fynbos. Trails have been marked through the natural vegetation, which provide scenic views of coastal forest, mountainous terrain and coastline. In addition, the garden is famous for its streams of water that originate from the mountainous surrounds, which lead into amber coloured pools.

Figure 6: Mountainous surrounds at Harold Porter NBG.

National Parks

Richtersveld

The Richtersveld is a mountain desert wilderness, characterised by rugged kloofs (canyon or gorge) and is tucked away in the far north-western corner of the Northern
Cape. Home to approximately 650 different plant species, the Richtersveld boasts the world’s largest diversity of succulents. It is an ever changing landscape from flat, sandy, coastal plains to craggy mountainous slopes of volcanic rock. The Richtersveld region is a harsh place for plants to inhabit, as it receives small amounts of rainfall, which occurs predominantly during the winter months and the summer temperatures can rise to 50°C. With water so scarce, reptilian, mammalian, bird and plant life in the Richtersveld depends on moisture from early morning fogs and dews (commonly known as ‘Ihuries’ or ‘Malmokkies’). In 2007, the “Richtersveld Cultural and Botanical Landscape”, located immediately south of the National Park and an area of equivalent size, was named a UNESCO World Heritage Site.

Namaqua National Park

Located approximately 500km north of Cape Town and situated on the west coast of South Africa, Namaqua National Park was established in 1999 and covers an area of more than 700 km² within the semi-desert Succulent Karoo biome. The Skilpad Nature Reserve, which was formed in 1993, formed the nucleus of the new National Park and plays host to a vast display of spring flowering annuals during the months of August and September. The park experiences hot and dry summers and cold winters with variable, generally sparse rainfall that is most likely to fall between May and August. Approximately 3,500 plant species grow in the Namaqualand region with more than 1,000 species found nowhere else in the world.

Knersvlakte

The Knersvlakte region is part of the Namaqualand and is located in the north-west corner of the Western Cape. The terrain is both hilly and flat and is covered with quartz gravel. The reflective qualities of quartz results in a cooler environment at
ground level, leading to an incredibly diverse presence of succulent flora. Additionally, the Knersvlakte region is isolated from other areas dominated by quartz stones, which has led to a high level of succulent plant endemism. The climate of the region is that of a semi-arid desert, with long dry summers and rainfall occurring in the winter months. In September 2014, the Knersvlakte Nature Reserve was established by CapeNature and the World Wide Fund for Nature to protect the endemic vegetation of the Knersvlakte.

**Figure 9:** *Argyroderma delaetii* was a common site growing amongst the quartz stones in the Knersvlakte.

Karoo National Park

Karoo National Park was founded in 1979 and is a wildlife reserve located within the Great Karoo region of the Western Cape with the nearest town being Beaufort West. It is a semi-desert habitat, covering an area of 750 square kilometres. The Nuweveld portion of the Great Escarpment (major geological formation in southern Africa that encompasses the Drakensburg Mountains) runs through the park with the altitude varying between 850-1900m above sea level within the park. Furthermore, the park is a sanctuary for herds of springbok, gemsbok, Cape mountain zebra, kudu, red hartebeest, ostriches and more recently, lions. The park is a parched, dry landscape in winter, with rainfall occurring primarily in the summer months in the form of short and sharp, thunderous downpours.

**Figure 10:** A large male Kudu roaming the parched land within Karoo National Park.

Goegap Nature Reserve

The Reserve is located 15km south-east of Springbok in the Namaqualand and spans approximately 15,000 hectares. The terrain is dominated by granite peaks and sandy plains, which host close to 600 indigenous plant species, many of which are
short-lived ephemerals that flower in spring after the winter rains. Goegap also incorporates the Hester Malan Wild Flower Garden, which displays succulents endemic to the area. In addition, the name Goegap is derived from the Nama word for waterhole, which refers to the reed-filled water spring that is present within the reserve.

Table Mountain National Park

Located in Cape Town, Table Mountain National Park encompasses Table Mountain itself, as well as the Cape of Good Hope, the most south-western extremity of Africa and covers an area of 221km$^2$. The park runs roughly north-south along the range of mountains that make up the spine of the Cape Peninsula from Signal Hill in the north, through Lion’s Head and Table Mountain, eventually terminating at Cape Point. The park forms part of the Cape Floristic Region and supports a great diversity of flora, featuring many rare and endemic plant species. The main vegetation types present in the park are Peninsula Sandstone Fynbos and Cape Granite Fynbos, both of which are endangered habitats, occurring nowhere else in the world.
Work programme

Day 1: Evening flight to Cape Town from London Heathrow.

Day 2: Landed in Cape Town and rested.

Day 3: Visited Kirstenbosch Botanical Garden. Garden Tour with Adam Harrower and met Graham Duncan, who is in charge of the bulb collection.

The bulb collection is vast at Kirstenbosch, featuring long raised beds full of spring flowering bulb species. Most of the collection has been raised from wild collected seed or bulbous material.

Kirstenbosch displays a huge range of Cape flora with plants from the family Proteaceae dominating. Fynbos (fine bush) is the predominant vegetation surrounding Kirstenbosch, which is reflected in the Garden with beds also displaying fine-leaved Erica species and plants from the family Restionaceae (restios). Annuals and vygies (Afrikaans for mesembs) from the family Aizoaceae are also represented.

![Figure 13: Large glasshouse structure at Kirstenbosch that houses the bulb collections. Selection of spring flowering bulbs: (a) *Moraea aristata*, (b) *Moraea elegans*, (c) *Moraea tulbaghensis*, (d) *Cyanella alba*, (e) *Sparaxis elegans*, (f) *Geissorhiza radians*.](image-url)
on mass and *Pelargonium* species are also displayed within another themed garden. Finally, a sunken area in the centre of the garden, known as the Dell, is planted with an array of cycad species with tall specimens of *Encephalartos woodii* standing proud.

**Figure 14:** Scenes at Kirstenbosch. Top left: *Leucospermum* cultivar. Top right: *Mimetes hirsutus*. Middle left: Mass of vygies. Middle right: Spring annuals. Bottom left: *Leucadendron argenteum* standing tall. Bottom right: Cycad Dell.
Day 4: Tour of the propagation facilities and succulent collections at Kirstenbosch with Adam Harrower and Nimama and also viewed the nursery stock beds.

The succulent collection at Kirstenbosch is very comprehensive. Succulents are grown in asbestos trays, forming small communities, as opposed to growing plants in individual pots. The Botanical Society Conservatory, which is open to the public, displays native succulent species from the different arid regions within South Africa. These arid regions are defined as the Namaqualand, Richtersveld, Namib Desert, Knersvlakte, Little Karoo, Eastern Cape, Bushveld and Nama Karoo.

Figure 15: Succulent collection at Kirstenbosch. Top left: Welwitschia mirabilis on display. Top right: Succulent collection under shade. Middle left: Succulents are cultivated in asbestos trays. Bottom left: Fenestraria aurantiaca. Bottom right: Mature clump of Lithops sp.
New propagation facilities have recently been put to use at Kirstenbosch, with heated raised beds providing bottom heat for the rooting of cuttings and the propagation unit is completed with overhead misting units. Large raised beds filled with a free-draining, sandy growing media are used for germinating seeds that require cool conditions to induce germination e.g. *Protea sp.* In addition, the nursery stock beds are located in a grassy area within the Kirstenbosch estate and are planted with woody shrubs in rows. These plants serve as back-up to the collection, as cutting material can be taken if plants on display in the garden begin to deteriorate. Nursery stock beds are ideal if glasshouse space is limited and they also facilitate decent root growth as the shrubs are planted.

**Figure 16:** Propagation facilities at Kirstenbosch. **Top left:** Raised heated benches. **Middle:** Raised beds for establishing seed grown plants. **Top right:** Trays of Restios that have recently germinated. **Bottom left:** *Erica sp.* collection under shade netting.

**Day 5:** Driving to Karoo Desert National Botanical Garden in Worcester.
Day 6: Tour of Karoo Desert Botanical Garden, the nursery facilities and succulent collections with Shireen Harris.

The gardens are smaller than Kirstenbosch, covering only 11 hectares. Themed beds and displays containing plants found growing in the Namaqualand, Richtersveld and the Karoo make up most of the garden. Newly laid paths have been framed by the planting of the succulent shrub, *Portulacaria afra*, and dirt paths also exist, one of which leads through a modest Quiver Tree (*Aloe dichotoma*) forest.

![Figure 17: Scenes at Karoo Desert NBG. Top left: Vibrant *Dimorphathea sinuata*. Middle: Mazy paths framed by the planting of *Portulacaria afra*. Top right: *Aloe dichotoma* (quiver tree). Bottom left: *Mesembryanthemum* cultivars fully open in the midday sun. Bottom right: Vast swathes of *Gazania krebsiana*.](image)

The propagation facilities at Karoo Desert NBG operate on a small scale, with one heated glasshouse for raising seeds and several unheated display houses. One of the display glasshouses, which are only accessible to visitors as part of a guided
tour, is devoted entirely to *Haworthia* sp. The pictures below show the extreme diversity this genus presents. Similarly to Kirstenbosch, the *Haworthia* collection is grown in trays, allowing space for small communities to develop.

![Haworthia collection at Karoo Desert NBG.](image)

**Figure 18:** *Haworthia* collection at Karoo Desert NBG. (a) *Haworthia springbokvlakensis*, (b) *H. arachnoidea* var. *nigricans*, (c) *H. blackburniae* var. *graminifolia*, (d) *H. truncata*. (e) *H. nigra* var. *nigra* and (f) *H. reinwardtii* var. *brevicula.*
The labelling system for the succulent collection is very informative, with colour coding distinguishing the rainfall areas that the plants inhabit and whether their wild existence is threatened. This ensures water is provided at the correct time of year for each plant.

Day 7: Explored the natural vegetation within the grounds of Karoo Desert NBG, following marked trails.

There are approximately 400 plant species that occur naturally in the 143 hectares of land that aren’t cultivated at Karoo Desert NBG. This area contains two vegetation types: the Worcester-Robertson Karoo and the threatened Breede Shale Renosterveld. There are two trails that enable the wild vegetation to be explored: the Shale Trail is 1km long and passes through rocky hillside terrain and the Grysbokkie Trail explores flatter ground and is 3.4km long.

It was on the Shale Trail that I found my first wild Conophytum species, growing happily in rock crevices.
An observation that I made, which has been well documented, is that many succulent species like to grow underneath small, twiggy shrubs, as they shelter them from the harsh sunlight that is prevalent in such open and exposed habitats. The shrubs are therefore serving as a nursery plant, enabling succulent plant communities to develop beneath their canopies.

**Figure 21**: Wild vegetation at Karoo Desert NBG. **Bottom middle**: Crassula sp. **Bottom right**: Haworthia sp.

**Figure 22**: Community of Haworthia sp. growing beneath the branches of a small, woody shrub.
**Day 8:** Drove to Karoo National Park in Beaufort West. Field trip in the Park following the Lammertjiesleegte trail.

Driving further inland and away from the west coast, the rainfall pattern shifts to predominately summer rainfall, which was clearly visible by the parched springtime landscape that was present within the park. Rain won’t have fallen on these plains for several months, leaving the ground visibly devoid of plant life. Succulent plant diversity isn’t great within the park with grass species dominating, but thickets of shrubs were present, many of which were armed with huge spines to protect their small, reduced leaves from grazing animals.

*Figure 23:* Parched, dry spring landscape at Karoo National Park. **Bottom row:** Different shrub species all armed with large spines to protect their foliage from grazing animals.
Day 9: Extended field trip in Karoo National Park, following the longer Klipspringerpas trail.

This trail took approximately four hours to negotiate by car and offered epic views across the vast, open, savannah-like plains that make up most of the park. The wildlife present within the park is the main attraction for visitors and most of these animals can be seen along this trail.

Day 10: Driving to Clanwilliam in the Western Cape.

Day 11: Visited Hantam Botanical Garden in Nieuwoudtville, observing spring bulbs and annuals and went on a field trip to the Knersvlakte, searching for succulents growing in the quartz fields.
Hantam National Botanical Garden is famous for its profusion of spring bulbs, as well as annuals. Fields of purple *Felicia sp.* and yellow *Ursinia sp.* dominate where livestock has been fenced out and grassland that appears from a distance to be solely populated by tough sedges, is in fact, on closer inspection, littered with hundreds of bulbous plant species. As many as nine dirt trails have been created within the grounds of the garden, allowing the minute details of the bulb flora to be examined at close quarters.

**Figure 25:** Typical scenes at Hantam NBG of flowery meadows and sedge grassland.
The pictures below highlight the huge diversity of plant species found growing at Hantam NBG from annuals to perennial bulbs and short-lived succulents.

Figure 26: Featured flowers at Hantam NBG. (a) *Homeria bifida*, (b) *Felicia australis*, (c) *Lachenalia elegans*, (d) *Hesperantha cucullata*, (e) *Nemesia cheiranthus*, (f) *Sparaxis elegans*, (g) *Arctotis acaulis*, (h) *Romulea sp.* (i) *Diascia tancyeras*, (j) *Phyllobolus sp.* (k) *Ixia rapunculoides* and (l) *Spiloxene serrata.*
The second trip on Day 11 was to the Knersvlakte to look for succulent plants that grow within the quartz fields, which are unique to the region. The first location for plant study was in the southern Knersvlakte. The quartz rock wasn’t as prevalent at this location (pictured below, top left), with the sandy, orangey-brown coloured soil visible at the surface, whereas the second location further north within the Knersvlakte region was dominated by surface quartzite aggregates (pictured below, bottom left). Low growing succulents dominate the vast, open expanses of quartz field due to the rapidly free draining nature of the soil, combined with limited amounts of rainfall.

![Vast quartz plains of the Knersvlakte region](image)

**Figure 27:** Vast quartz plains of the Knersvlakte region. (a) *Ruschia sp.* (b) *Mesembryanthemum brevicarpum*, (c) *Argyroderma delaeitii*, (d) *Oophytum nanum*, (e) *Argyroderma fissum* and (f) *Cephalophyllum spissum.*
Day 12: Drove to the Skilpad Nature Reserve within Namaqua National Park. Field trip in the park focused on flowering annuals.

The annual floral displays at the Skilpad Wild Flower Reserve are heavily dependent on winter rainfall. If there is little in the way of winter rainfall, the ‘en-masse’ display will be muted in its appearance as the vegetative winter growth stage of the spring flowering annuals will be compromised. Luckily, the winter rainfall received earlier this year in the Namaqualand region had been more than sufficient to produce carpets of spring annuals, such as Dimorphotheca sinuata, as far as the eye could see.

Additional floral treasures seen at Skilpad Wild Flower Reserve are featured on the next page.

The spring annuals at Goegap Nature Reserve also rely heavily on winter rainfall. The hazy yellow colour which spreads across the sandy flats is provided by *Cotula sp.* which is a member of the Asteraceae family, and only exhibits disc florets, with ray florets absent, making the bright coloured display even more impressive. The terrain is dominated by hills and rocky escarpments, one of which becomes a small waterfall in the winter months, channeling water from the hilly slopes down to the sandy flats. Hiking trails pass alongside this annual waterfall, and once at the top, the hilly terrain of the northern Namaqualand region is visible for miles into the distance.

**Figure 30:** The winter waterfall at Goegap Nature Reserve, which had dried up by spring.
Hyobanche sanguinea (pictured above) is a fleshy root parasite with scale-like leaves. It is a broad spectrum parasite of shrubby plants, favouring species from the Asteraceae family.

Figure 31: Selection of flowering plants observed at Goegap Nature Reserve. (a) Hyobanche sanguinea, (b) Acanthopsis disperma, (c) Gazania lichtensteinii, (d) Cheiridopsis denticulata (e) Lessertia frutescens (f) Arctotis fastuosa, (g) Nemesia sp. and (h) Peliosotum virgatum.
**Day 14:** Drove to the southern Richtersveld region, searching for succulents growing within quartz outcrops.

Often described as a lunar landscape, the Richtersveld is an arid region at the northern extremity of Namaqualand and is dominated by a jumbled mass of mountains with the predominant geology being quartzite rock. Rainfall is generally low, varying between 50-300mm annually, making it one of the driest regions in South Africa and temperatures can soar to 50°C in summer, making it an even more hostile environment for plant life. The vegetation is very sparse, with ground-hugging, clump forming succulents and short, succulent shrubs being the most common sightings.

![Flora observed in the quartz flats of the southern Richtersveld.](image)

**Figure 32:** Flora observed in the quartz flats of the southern Richtersveld. (a) *Crassula columnaris*, (b) *Lithops marmorata*, (c) *Avonia papyracea*, (d) *Cheiridopsis* sp., (e) *Gladiolus* sp. and (f) *Ferraria variabilis*.

The illusive *Lithops marmorata* was spotted at the base of a twiggy shrub, sheltering itself from the harsh sunlight.
Day 15: Field trip in the northern corner of Namaqua National Park, again searching for succulent plants.

Figure 33: Interesting flora in the northern corner of Namaqua National Park. (a) Anacampseros filamentosa, (b) Apocynaceae species, (c) Gazania leiopoda, (d) Pelargonium triste, (e) Moraea falcifolia, (f) Moraea serpentina, (g) Wahlenbergia sp. and (h) Arctotis sp.
Several rarer succulents, including Anacampseros filamentosus, were found during the day's excursion in Namaqua National Park. The succulent diversity was at its greatest in rocky places with shallow soil substrate, as the succulent plants have a greater competitive advantage over larger woody shrubs, which have a higher water demand and therefore need a deeper soil profile to establish.

**Day 16:** Drove back to Cape Town from Springbok.

**Day 17:** Visited Table Mountain National Park, which was accessed by cable car. Studied the mountainous fynbos vegetation.

The tallest peaks of Table Mountain are just over 1000m above sea level, meaning that the upper portion of the mountain lies within the cloud base and visibility can be obscured to just a few metres when cloud passes over regularly in winter. The moisture held within the cloud cloaks the landscape, creating a foggy, dreary atmosphere. The soil fertility is quite poor on Table Mountain, as nutrient leaching from the shallow substrate and rocky terrain is prevalent. In damp areas carpeted with moss, Drosera sp. were spotted, which further highlights the issue surrounding poor nutrition.

The Flora present on Table Mountain is classified as Cape fynbos of which there are six defined communities: grassy, asteraceous, restioid, ericaceous, proteoid and closed-scrub. Ericaceous fynbos was the main fynbos type present at the location visited, which is defined as a high coverage of small-leaved shrubs – mainly Erica sp. and is associated with areas receiving high levels of winter rainfall.

*Figure 34:* Cloud cascading over the peaks of Table Mountain. Fine-leaved shrubs dominated the rocky terrain.
Below are pictures of the most common sightings during my trip within Table Mountain National Park.

**Day 18**: Visited Stellenbosch University Botanical Garden. Tour of the garden with the curator, Martin Smit. Visited Harold Porter National Botanical Garden.

Founded in 1922, Stellenbosch University Botanical Garden is the oldest of its kind in South Africa. The main function of the garden is education, displaying native plants as well as exotic plants from abroad e.g. *Victoria cruziana* in a long, outdoor pool. Medicinal plants and herbs, as well as important crop plants are planted within a close network of beds that form a parterre-like feature, with narrow paths leading between each bed. Two succulent plant houses display native, South African species, as well as several genera from the family Cactaceae e.g. *Mammillaria*, which are native to the Americas. An Orchid glasshouse also displays native genera such as *Disa*, but also houses many Asian orchid genera e.g. *Coelogyne*.

*Figure 35*: Typical fynbos plant species growing on Table Mountain. (a) *Leucadendron sp.*, (b) *Drosera sp.*, (c) *Erica lutea*, (d) *Berzelia lanuginosa*, (e) *Erica mammosa*, (f) *Adenandra villosa*, (g) *Penaea mucronata* and (h) *Euryops abrotanifolius*. 

![Figure 35: Typical fynbos plant species growing on Table Mountain.](image-url)
A touch of British heritage is displayed within the Garden and it takes the form of a small Rose Garden. Two beds are planted up with South African cultivars of *Rosa*, which again further highlights the broad and global range of plants that Stellenbosch cultivates and displays.

Figure 36: Stellenbosch University Botanical Garden. **Top left:** Water lily display pool. **Top right:** Herb and medicinal plants garden. **Bottom left:** The Fernery. **Middle:** Water lily propagation tank. **Bottom right:** Propagation facilities.
The botanic garden, under the guidance of the new curator, Martin Smit, has made a concerted effort to switch its labelling system. An accessioning system has been introduced, which gives each plant held within the collection a unique code, but even more advanced is the introduction of a barcode. The barcode is unique to each accession and can be scanned using a handheld device and information gathered on the device can be transferred to the main computer database. A huge benefit to this system is the improved efficiency when stock checking display beds or nursery collections. The figure below shows the detail of the new, barcode plant label, and the label it as superseded.

The final botanic garden visited was Harold Porter National Botanical Garden, which is a coastal site, overlooking Betty’s Bay.

The garden is situated within coastal fynbos vegetation and encompasses mountain slopes, heathland, streams, marshes and relict forests, as well as sand dunes adjacent to the beach. In addition, the garden is renowned for its summer display of *Disa sp.*, which are located along the Disa Kloof trail. There is also an example of a conservation effort displayed within the garden, which aims to increase public
awareness of the Limestone Fynbos habitat, which is under threat due to alien plant invasion, intensive agriculture, urbanisation and resort development. Over 100 endemic species are threatened by this potential habitat loss and with only 14% of this habitat currently under protection, the future of this habitats’ existence is uncertain.

Figure 38: Harold Porter National Botanical Garden. **Top left:** Large amber pond at the garden entrance. **Top right:** Smaller amber pool at a higher level in the garden. **Bottom left:** Drifts of *Felicia* sp. **Middle:** The Limestone Fynbos Garden. **Bottom right:** Stream leading down towards the garden entrance.
Day 19: Climbed Lions’ Head, part of Table Mountain National Park.

The last day of my trip was spent climbing Lion’s Head, which is part of Table Mountain National Park, but is set away from the main body of Table Mountain.

Lion’s Head peaks at 669m above sea level and is almost entirely surrounded by housing and strict management by the city authorities has prevented development on the higher slopes of Lion’s Head. The peak is populated by a rich diversity of fynbos vegetation and three vegetation types can be found on the mountain. Most of Lion’s Head is covered by endangered Granite Fynbos, which gradually fades into the critically endangered Peninsula Shale Renosterveld on the lower northern slopes towards Signal Hill. At the summit of Lion’s Head, a tiny patch of Sandstone Fynbos occurs, which is also found on the peaks of Table Mountain. The slopes of Lion’s Head are one of the only places the silver tree (*Leucadendron argenteum*) can be found growing in the wild. Another population can be found on the Kirstenbosch (east) side of Table Mountain.

Figure 39: View of Lion’s Head from Table Mountain. **Left:** Lion’s Head leading to Signal Hill on the right. **Right:** Central focus on Lion’s Head.

Figure 40: Forest of silver trees (*Leucadendron argenteum*) on the lower slopes of Lion’s Head.
The pictures below show the most interesting flowering plants found on the foot slopes of Lion’s Head.

Summary and conclusion

As an overall summary, my travel scholarship to South Africa was a huge success. I travelled thousands of kilometres in unknown territory, and visited all the locations that I set out when planning the trip. I have seen the huge diversity of flora that the Western and Northern Cape has to offer, from the lush fynbos in Cape Town and green, bulb filled pastures of Nieuwoudtville to the parched, dusty plains of Karoo National Park and passed through a transition from a winter rainfall landscape to a summer rainfall landscape. I have studied the flora of the most succulent rich place in world, the Richtersveld, and visited some of the most arid regions in the country:
the Knersvlake and Namaqualand, which also threw up many succulent treasures, including the discovery of a new population of *Lithops marmorata* (the location of this population has been passed on to contacts at Kirstenbosch). The highlight of my trip was the visit to Skilpad Nature Reserve within Namaqua National Park. Having the privilege to view the sheer scale of the world’s largest and most renowned spring display is an experience I will never forget. I also visited some of the country’s leading botanical institutions, and was able to get an insight into how they operate and see some of the most comprehensive succulent plant collections in the world. The focus and passion for growing native flora was clear in all the botanic gardens visited, with many displays themed around native and local habitats or dedicated to a particular native genus.

My knowledge of South African flora has dramatically increased as a result of this travel scholarship. I was naïve to the diversity of plants and habitats that occur within South Africa before I visited, favouring mainly succulent plants, but the trip has broadened my horizons, and I am now developing a passion for Proteaceous plants and flora associated with fynbos vegetation.

**Recommendations**

My trip to South Africa had a very broad focus, which was to see the diversity of spring flora and vegetation types at various locations within the Western and Northern Cape. Further studies could focus on one particular vegetation type or habitat with reference to conservation efforts surrounding these elements, as it was an area of study that I didn’t manage to cover particularly well during my travel scholarship. I personally would like to visit the Western Cape in summer to see the transition from the spring display and search for summer flowering plants. I would also like to study the succulent flora of summer rainfall areas in the interior of South Africa, searching in particular for populations of *Lithops sp.*, a genus I hold close to my heart.

Additionally, as a result of this travel scholarship, I am planning to write my dissertation for the Kew Diploma on how UK botanical gardens display and interpret South African flora, using the gardens visited during my trip as comparative case studies.
Budget breakdown

The budget for the travel scholarship has been broken up into two sections: the funding for the trip and the expenditure.

Travel scholarship funding

I received £1000 from the Stella Ross-Craig Travel Scholarships administered by the Bentham-Moxon Trust.

I also received £500 from the Merlin Trust and £475 from the RHS Coke Trust Bursary Fund.

Total funding received: £1975

Expenditure

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<td>Maps and field guides</td>
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Total expenditure £1973.85

Signed:
Acknowledgements

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Graham Duncan – Botanical Horticulturalist (Bulb collections), Kirstenbosch National Botanical Garden

Martin Smit – Curator, Stellenbosch University Botanical Garden

Shireen Harris – Horticulturalist, Karoo Desert National Botanical Garden

Werner Voigt – Curator, Karoo Desert National Botanical Garden

Others

Andrew Gdaniec – Curator, Gibraltar Botanic Gardens (La Alameda)

References

Printed references:


Electronic references:


Images

Figure 1 (map details added in Paint)


All other photographs taken by the author