SKETCH

OF THE

FLORA OF SOUTH AFRICA

BY

HARRY BOLUS, F.L.S.

(*Off-print from the "Official Handbook of the Cape of Good Hope,"* 1886.)

CAPE TOWN:
W. A. RICHARDS & SONS, PRINTERS, CASTLE STREET.
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Dr Asa Gray
with high esteem, from the Author.

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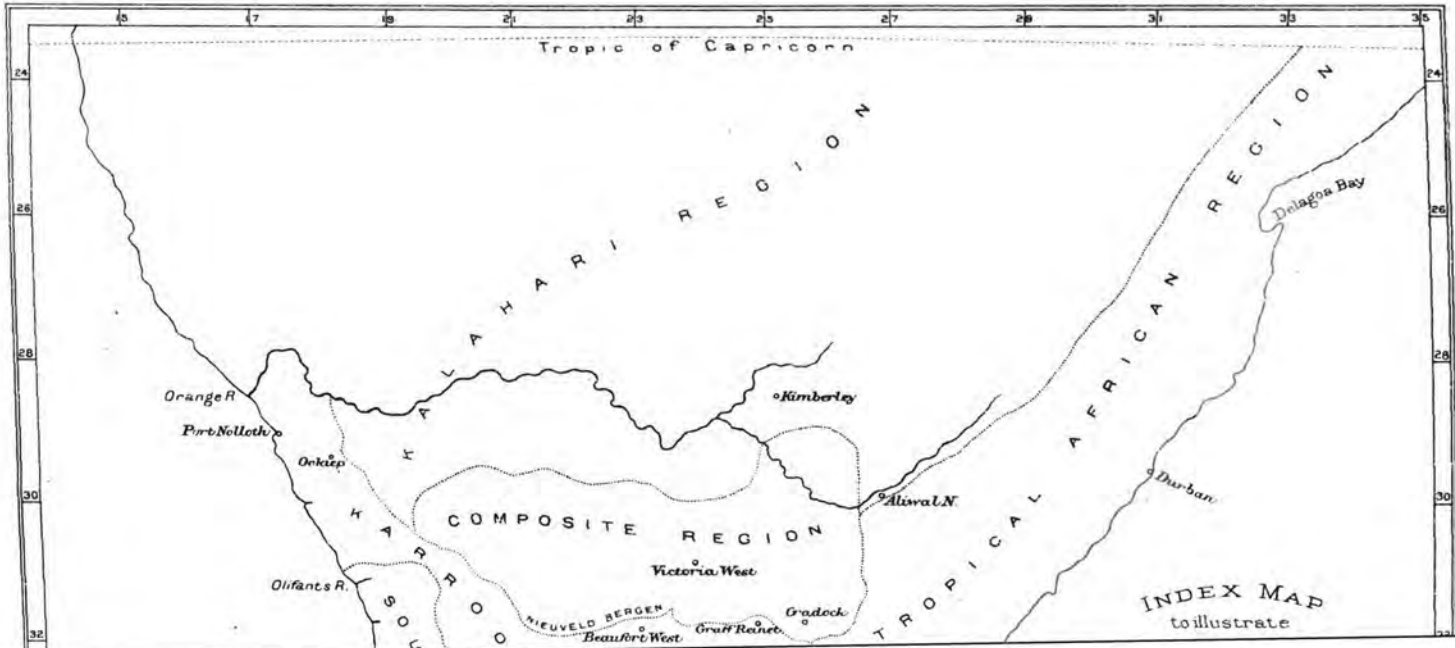

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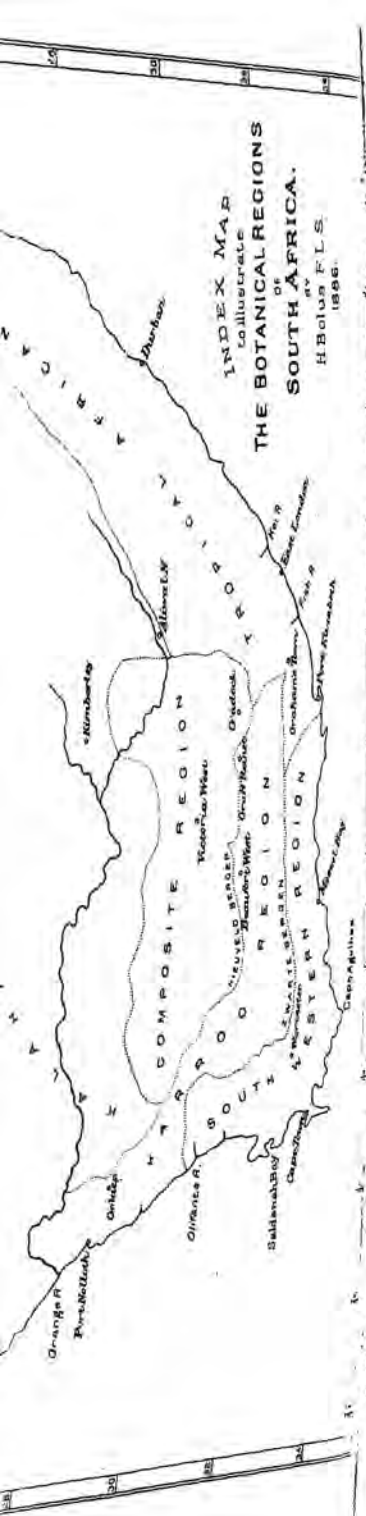

SKETCH OF THE FLORA OF SOUTH AFRICA.

By Harry Bolus, F.L.S.

I have been asked to contribute to this Handbook an account of the Flora of South Africa. I willingly comply; but I desire it to be understood that, since the time and space placed at my disposal are restricted within narrow limits, I cannot give more than the merest outlines of a great subject, and but a small part of a large mass of observations made during many years.

RICHNESS OF THE SOUTH AFRICAN FLORA.

Ever since the time of its first settlement the Cape has been a constant source of pleasure and delight to the botanist and the gardener. Though Cape plants have somewhat gone out of fashion of late years, it is still probably true that no single country in the world has contributed so largely to European conservatories and gardens as the Cape of Good Hope. The despatch of plants, indeed, began before the settlement by Van Riebeek, for we find that one Heurnius, a missionary *en route* to the East, had sent to his brother at Leyden, several curious plants which were figured by Stapel in his edition of Theophrastus' History of Plants, published at Amsterdam in 1644. These are the earliest known figures of Cape plants, and amongst them was the well known *Orbea variegata* of the Lion's Rump, which was called a Fritillary, and an Oxalis which, with equal reason, was styled a Trifolium! But those were the days before Linnaeus had arisen with master mind to reduce to order the rapidly increasing stores of vegetable forms. In 1772 came Thunberg, the Father of Cape Botany; in 1810, Burchell; in 1825—1834, Ecklon, Zeyher and Drège. All these made journeys of thousands of miles, and of several years in duration, exploring the vegetation of the country. Besides them were others of less note, and a host of gardeners and collectors of seeds and living plants. From 1775 to 1835, Cape plants may be said to have been quite the rage. The conservatories, temperate houses, and gardens of England and the continent teemed with the Pelargoniums, Heaths, Proteas and other handsome flowering shrubs, and the lovely bulbous plants of Irideae, Amaryllideae and Liliaceæ; and the pages of the Botanical Magazine and other similar periodicals were filled with figures and descriptions of them.

The public taste of that day was amply justified. Perhaps the recently increasing exportation of flowering bulbs may be taken as an indication that the fashion will be revived. But though fashion in flowers may be variable, the interest of science is more permanent; and notwithstanding the diligent exploration of the country

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for the last hundred years, the con
even up to the present day, has la
systematic botanists.

Without the means, in the prese
precisely comparing the relative nu
plants in this, and any other portion
is known to enable us to say that So
richest of regions. But if we ascer
groups called Genera and Orders, v
approach to accuracy. These may
First, for the sake of the general rea
South Africa (and by the term Soutl
that I mean always Africa South of t
be compared with the known total
latter is taken from Bentham and
(Journal of Botany xxi, 156) :—

Whole World	Orders	2
South Africa	,,	1

Secondly, we may compare South Afr
the same hemisphere, for the most part
and of which the Flora is about as w
Africa, *e.g.*, Australia.

I take the figures for the latter fr
known Essay: *On the Flora of Australi*
have the following result :—

Australia	Orders	152
South Africa	,,	142

The area, however, of Australia is fi
extra-tropical South Africa ; and what i
fact that its eastern coast line runs up in
10th degree of S. latitude. It will
much richer in variety of forms, relative
extremity of the African continent, than

There is another interesting point
genera in each area, that is, of genera ex
country. In Australia these are about
Africa 446.

Why South Africa should be so rich
question which cannot yet be fully ans
appear to be

(1) The meeting and partial union
distinct Floras of widely differe
(2) A highly diversified surface of t
(3) A climate with much sunlight
tion which seems everywhere f
cation of forms.

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hundred years, the constant discovery of ne
he present day, has largely occupied the at
tanists.

ne means, in the present state of our kno
paring the relative number of species of
and any other portion of the earth's surface
able us to say that South Africa ranks am
ns. But if we ascend to those higher gr
Genera and Orders, we can speak with
ccuracy. These may be compared in tw
ike of the general reader, the number of
nd by the term South Africa let it be un
ays Africa South of the Tropic of Capric
ith the known total for the whole worl
from Bentham and Hooker's *Genera P*
ny xxi, 156) :—

World	Orders 200:	Genera 7569
Africa	„ 142:	„ 1255

y compare South Africa with another cou
ere, for the most part in the same tempera
Flora is about as well known as that of
alia.

res for the latter from Sir J. D. Hooker's
the Flora of Australia (*London*, 1859). A
result :—

lia	Orders 152:	Genera 1300
Africa	„ 142:	„ 1255

er, of Australia is five times larger than
Africa; and what is of more importance
coast line runs up into the tropics to near
latitude. It will be evident, therefore,
ty of forms, relatively to area, is the Sou
ican continent, than that of Australia.
interesting point in the number of end
hat is, of genera exclusively restricted to a
ia these are about 520 (Hooker); in So

should be so rich in vegetable forms,
t yet be fully answered. Proximate cau

and partial union of two (perhaps thre
s of widely different age and origin.
rsified surface of the land and of soil.
much sunlight (or little cloud); a cond
ms everywhere favourable to the multip

No one could form an adequate or accurate conception of the Flora of South Africa who should regard it as a single Region. Meyer and Drège (*Comment. de Plant. Afr. Austr. Lipsiae*, 1835) divided the Colony south of the Orange River and Natal, into five Regions, and numerous districts and sub-districts. The value of Drège's observations cannot be over-estimated, and form the necessary basis of all later investigations; but the divisions were too numerous, and broad distinctions were over-loaded with a mass of subordinate detail. Grisebach (*Vegetation der Erde, Leipzig* 1872) regarded the Colony proper as far eastward as the Kei River, as forming one Region: the "Cape"; Eastward of this he brought down the continuation of his vast "Soudan Region," and north of the Orange River, he constitute l his "Kalahari Region" out of Great Namaqualand, Damaraland, Bechuanaland, &c. As far as they go, and except for the error in supposing the Orange River to be a floral boundary, these Regions appear to me to be natural. But Grisebach's "Cape Region" cannot possibly be regarded as one; it must be divided into two at least; and perhaps with more propriety into three. The Flora of the Karroo of the Cape may probably prove to be more distinct from that of the South-western portion of the Colony, than is the latter from that of Australia.

I propose, therefore, to regard South Africa as including five natural Regions, two of which extend beyond its limits, while the others are included within them. These are:—

(1) The South Western Region		
(2) The Tropical African	„	(Grisebach's "Soudan")
(3) The Karroo	„	
(4) The Composite	„	
(5) The Kalahari	„	(Grisebach)

The South Western Region.

It is the South Western Region which has for the most part furnished that large quantity of garden plants which I have referred to above, and which is the home of what has been for the last hundred years popularly known as the Cape Flora. It is an angular littoral strip, bounded on the west coast by the Olifant's River and the mountains near it, but including properly the mountain range from Cedarbergen up to the Khamiesbergen; on the east by the Van Staden's mountains; and inland by considerable mountain chains under various names. Its greatest width does not exceed eighty miles, and probably averages not more than fifty miles. The inland mountain chains referred to may average 4,000 feet in height, attaining sometimes (Great Winterhoek) 6,800 feet. The surface of the Region is extremely diversified; sandy and bushy tracts alternating on the coast with grassy downs, and vast mountain slopes of the most barren

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appearance when lying a short distance i
immense variety of small plants.

The soils are varied, the exposed r
clayslate (Malmesbury beds: Silurian
Mountain Sandstone: Devonian); with
tertiary deposits are absent, occurring
shallow depths. Throughout South Af
upon the distribution of plants appears
that of climate and exposure.

Rivers are few, and badly supplied wi
practically, none of them are navigable.

The mean annual temperature of Cape
Fahr.); of the six summer months 20°
months 12°5 C.; the mean annual humidit
per cent.; the mean annual rainfall in
inches; but in the suburbs it reaches in so
Further inland the temperature is high
and the humidity and rainfall much les
about 60 miles from Cape Town, the m
rises to 16·93 C.; the humidity is 54
average rainfall is 12·47 inches. About
rainfall takes place during May, June, Ju
months of January to April are usuall
rainfall of this Region attains its maxi
and diminishes rapidly as we proceed nort

The prevailing aspect of the vegetation
Regions, thus of the whole Cape Colony
region, is that of a number of low-growi
dark or blueish green hue. With consid
nevertheless, the appearance which most
Almost everywhere the "bush" is presen
called the "Boschjesveld" (bush country)
this appearance. There, the chief bush i
(*Elytropappus rhinocerotis*); but these are i
and in general they belong to the most va
usually very small leaves, or of greyish gre
with a dull coloured indument, as to p
generally sombre aspect. On the coast
ranging from 4 to 8 feet. The following
which by their abundance largely contribu
landscape:—Mundtia, Pelargonium, Agat
sine, Phylica, Rhus, Cyclopia, Borbonia,
Berzelia, Brunia, Staavia, Tetragonia, A
Metalasia, Erica, Simocheilus, Myrsine, Eu
mon, Salvia, Penæa, Passerina, Leucade
spermum, Serruria, Myrica, &c. Intersp

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numerous plants of the orders Orchideæ, Irideæ, Amaryllideæ, Liliaceæ, with scattered tufts of Restiaceæ, sedges, and grasses.

In the deep ravines of the mountain sides are dwarf trees, growing closely, with dark foliage. Few indigenous trees attain a greater height than 25 to 30 feet; and amongst these is the Silver Tree (*Leucadendron argenteum*), peculiar to the Cape Peninsula. Forests are only met with towards the Knysna and Zitzikamma. These are chiefly composed of species of Podocarpus (Yellow-wood), Ocotea (Stinkwood), Ptæroxylon (Sneezewood), Olea (Olive), Elæodendron (Saffronwood), Cunonia (Rood Els), Virgilia (Keurboom), Olinia (Ironwood), Cussonia, Ficus, Grewia, Curtisia, Sideroxylon (Milkwood), Rhus, &c., &c. Those of which the vernacular names are quoted yield excellent timber. Trees of the Podocarpus occasionally attain a height of 50 to 60 feet; but few of the others exceed 25 to 30 feet.

There is little change in the aspect of the vegetation even at greatly varying heights on the mountains; and near the coast especially it is much less affected by altitude than is the case in Europe. On Table Mountain some species are found from the bottom to the top, having thus a vertical range of 3,500 feet; and there are many with a range of from 1,000 to 2,500 feet.

The flowering season begins about the end of May immediately after the first winter rains. The numerous species of Oxalis first made their appearance, and these are soon followed by great numbers of Irideæ, Amaryllideæ, Liliaceæ, and other bulbous plants besides Mesembryanthemums and various Compositæ. On the mountains the flowering begins later and continues longer; but though few plants may be found in flower in March and April, yet they are never wholly absent. The imported oak has shed its leaves for a period of six or eight weeks only (during May and June) before the new growth begins. Everything points to the fact that the true winter, the period of rest, is here the dry season, viz., March—May; as soon as rain falls even the winter temperature is sufficient, and vegetable life is at once aroused to activity.

A few of the most beautiful, striking, or curious vegetable forms of the region may here be mentioned, the majority of the examples being taken from the highly representative and rich flora of the Cape Peninsula, lying on its western extremity. The palm of beauty must be awarded to the *Disa grandiflora*, the grandest of southern terrestrial orchids, as *Cypripedium spectabile* is of the northern hemisphere. This is abundant on the streams of Table Mountain, and is found also on the Hottentot's Holland mountains, thirty to forty miles inland. Other fine orchids are *Satyrium corifolium*, a brilliant orange, *S. carneum* and *S. erectum*, *Disa longicornis*, a lovely blue, *D. secunda*, the delicate white *D. fasciata*, and others; *Pterygodium acutifolium*, a fine deep golden yellow, *Ceratandra*

chloroleuca, and *C. Harveyana*; *graminifolia* (long known as *venusta*, and *D. purpurascens*; a fringed spider-like *Bartholina* upon these presses the so-called with its pure white spathe,—alm moist low-lying ground as the com English ditches. The Proteas a and few things can surpass *P. c* involucres, *P. speciosa*, *P. coccinea*, *Leucadendron argenteum*, or Silver the mountains about Cape Town. names would be legion. The mos largest flowers, are denizens of the Hottentot's Holland range and t especially abundant about Caledon Mountain, *Erica cerinthoides*, *E. ma* and *E. hirta* are amongst the finest, whole mountain side glow with its probably 350 species of true heaths Amongst Compositae, *Gazania* h *Helichrysum vestitum*, *Helipterum*, *lifera*, are amongst the showiest the heads of the first-named bein ported in large quantities to Europe *annua* has gay white rays, and, with s the fields look bright in spring. In t *Podalyria calyptrata*, with its large lead the list, and *Virgilia Capensis*, *obcordatus*, and the wide spread amongst the few handsome plants of its beauty in this Region, but which c inconspicuous shrublets. The Acacias a occurring sparingly in the drier parts goniums are abundant, and several *betulinum*, &c., are very handsome. O yellow flowers, stud the fields in ear species of the tribe Diosmeae, includin of which as *B. crenulata*, &c., furnish Agathosma, Adenandra, &c., are mostly The attractive *Rochea coccinea*, is one Table Mountain; while the Cotyledo most curious plants of the Region, espe its smooth, thick, swollen tree-like sten neighbourhood of Worcester and Hex R Waterfall occurs the rare and pretty *L*

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...C. Harveyana; the brilliant blue ... long known as *H. coelestis*) and the ... *D. purpurascens*; and, finally, the small ... er-like *Bartholina pectinata* and *B. ...* ...sses the so-called "Arum," the *Richardia* ... white spathe,—almost as common an ornament ... ground as the common dock is an accompaniment ... s. The Proteas are universal objects of ... s can surpass *P. cynaroides*, with its ... *speciosa*, *P. coccinea*, and a few others. ... *rpuleum*, or Silver Tree, is a striking ... about Cape Town. Next come the ... e legion. The most beautiful, and the ... are denizens of the mountains lying ... land range and the town of Swellendam. ... nt about Caledon and Genadendal. ... *erinthoides*, *E. mammosa*, *E. coccinea*, ... mongst the finest, the latter sometimes ... de glow with its warm pink tints. ... rs of true heaths found in this Region. ... itae, *Gazania* has some fine species, ... *m*, *Helipterum*, spp., and *Phaenocoma* ... t the showiest of the everlasting ... first-named being gathered, dried, ... tities to Europe as *immortelles*. *Diosma* ... rays, and, with some species of *Arctotis* ... in spring. In the large Order, Leguminosæ, ... with its large rosy flowers, may, ... *irgilia Capensis*, *Cyclopia* spp., *Hypocalyptus* ... wide spread *Sutherlandia frutescens* ... ome plants of an Order not remarkable ... n, but which consists for the most ... The Acaciss are deficient; only *A.* ... the drier parts of the Region. The ... and several species, *P. cuculliata* ... handsome. *Oxalises* with white, red, ... fields in early spring. The numerous ... neae, including *Diosma*, *Barosma*, ... , &c., furnish the Buchu of medicine. ... &c., are mostly confined to this Region. ... *cinea*, is one of the chief ornaments ... he Cotyledons contribute some of ... Region, especially *C. fascicularis*, ... ree-like stem; very abundant in the ... r and Hex River. Near the Tulbagh ... nd pretty *Ixianthes retzioides*, and ...

the same neighbourhood, the curious *Roridula dentata*, a shrubby Droseraceous plant with extremely viscid leaves, which the farmers hang up in their houses in order to catch flies. The showy *Polygala*-like *Bartholina pectinata* and *B. ...* *P. oppositifolia* and *P. myrtifolia* are both widely distributed. Plants parasitic on the roots of others take a prominent position in our Flora. They include several handsome Harveyas, white, purple, and orange; and in other orders the *Cytinus dioicus*, the curious *Hydnora africana*; the foul smelling *Sarcophyte sanguinea* and *Mystropetalon* spp. Labiatæ are not plentiful, but *Salvia paniculata* and *S. nivea* are fine species. Turning to the *Monocotyledons*, Orchideæ have already been mentioned, Irideæ are abundantly represented in handsome species of Romulea, Geissorhiza, Ixia, Gladiolus, Watsonia, Babiana, etc.; Amaryllideæ in *Amaryllis Belladonna*, Nerine, Brunsvigia, Vallota, etc.; Scitamineæ in the peculiar and noble Strelitziæ. Liliaceæ are very varied and numerous. The most conspicuous are the Aloes,—*A plicatilis* with an arborescent trunk, attaining a height on the western mountains of 12 to 15 feet; the beautiful blue Agapanthus; the star-like Ornithogalums; *Kniphofia alooides*, and many others. *Prionium Palmita* is a remarkable plant with the flower of a Juncus, and the habit of a pine-apple, which in some parts fills the beds of certain western rivers, and reaches a height of eight or ten feet. Some Restiaceæ and Cyperaceæ attain to six or seven feet, and often form a striking feature in the landscape. Ferns are not very abundant, chiefly occurring in the deep ravines, where the arborescent *Hemitelia Capensis* is found several feet in height; and *Todea africana* forms a handsome plant. *Osmunda regalis* is sparingly met with, while *Pteris Aquilina* is more commonly scattered on the open hillsides.

It is in the orders and genera of plants exclusively or chiefly found here that the most striking differences are to be found between this and the other Regions of South Africa. An immense mass of observations has been collected, but has not yet been tabulated. It must suffice to say that this Region is distinguished by the comparative abundance of the Orders: Rutaceæ, Bruniaceæ Ericaceæ, Penaeaceæ, Proteaceæ, Irideæ and Restiaceæ; by the tribe Stilbeæ of the Order Verbenaceæ; and by the large proportionate number of the following Cape genera, of those richest in species, belonging to other Orders: Pelargonium, Oxalis, Phylica, Aspalathus, Cliffortia.

The following list of the sequence of Orders according to the numbers of species of each is chiefly based upon Drège's collections which were very large and general. He, however, or rather Ernst Meyer, considerably over estimated the number of species both of Restiaceæ and Irideæ; and to follow his results implicitly would be misleading. I have therefore framed the following list in which the position of those Orders has been reduced:—

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1. Compositæ
2. Leguminosæ
3. Ericaceæ
4. Proteaceæ
5. Irideæ
6. Geraniaceæ
7. Gramineæ

The fact of five such Orders as E
Geraniaceæ, and Restiaceæ, occupyi
sufficient to stamp this Region wit
its own.

Very remarkable is the deficiency
which is the fifth natural Order of th
India, does not only not find a place in
constitutes less than one per cent. of th
ing large Orders are also very poorl
Aroideæ (each 1 species); Laurinea
Labiatæ and Asclepiadeæ.

No trustworthy calculation of the num
the Region is available. Drège collect
estimate the total at about 4,500 specie
localities is very great. On the Cape
about one-fourth larger than the Isle o
eighty species of Erica, and nearly
Orchideæ; and the total number of spe
probably nearly two thousand.

The affinities of the Flora of this Regi
especially of South Western Australia, a
already been shewn by Sir J. D. Ho
Australian point of view.

Two very distinct Orders: Protea
abundant in both regions, and, except f
occur in any other countries: yet they h
only two or three genera, in common, o
form the third Order of the Australian
this Region. Diosmeæ, a large tribe o
this Region, find a counterpart in Aust
nieæ of the same Order. The tribe Erice
has over 400 species in this Region al
Australia, but the place of the tribe is t
Epacrideæ, closely allied to it, and wh
Australia.

The following table of the nine larg
taken from the same source, and is comp
list of the Orders of this Region. I carry
not being quite sure of the sequence of the

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Australia.	*S. W. Region, S. Africa.*
1. Leguminosæ.	Compositæ.
2. Myrtaceæ.	Leguminosæ.
3. Proteaceæ.	Ericaceæ.
4. Compositæ.	Proteaceæ.
5. Gramineæ.	Irideæ.
6. Cyperaceæ.	Geraniaceæ.
7. Epacrideæ.	Gramineæ.
8. Goodenovieæ	Cyperaceæ.
9. Orchideæ.	Restiaceæ.
	Liliaceæ.
	Orchideæ.
	Rutaceæ.

The number of identical genera in the foregoing orders is extremely small. Of species, not one is known to be common to both Regions. There is no genus of Rutaceæ or Proteaceæ; and only three of Restiaceæ (Restio, Leptocarpus, Hypolaena), common to both Regions. In other Orders the number of identical genera, if we except those of world-wide distribution, is extremely small. The following in Compositæ have been pointed out by Bentham (*Linn. Soc. Journ.* xiii, 552) :—

Brachycome	1	South African	36	Australian species
Helipterum	12	,,	30	,,
Helichrysum	137	,,	52	,,
Cassinia	1	,,	13	,,
Athrixia	6	,,	5	,,
Cotula	22	,,	9	,,

besides the cosmopolitan genera Senecio and Gnaphalium. Not all of these South African genera belong to this Region, nor any of them exclusively so; but Helipterum is very nearly restricted to it, while Helichrysum is widely distributed over the whole of Tropical as well as Southern Africa, though chiefly abundant in the latter. On this subject Bentham remarks (*l.c.* 553) :—"This approximation of the Compositæ of Australia and South Africa may possibly date from times less ancient than those in which they established a communication between the New and the Old World; and it may even have been less remote than the period in which flourished the common parents of Australian and South African Proteaceæ and Restiaceæ, or of Australian Epacrideæ and South-African Ericeæ; for it is exemplified not in tribes only, but also in identical genera and sections." Amongst Liliaceæ may be mentioned the recent discovery in this Region of Nanolirion, a close ally of Herpolirion hitherto only found in similar alpine situations in Australia, Tasmania, and New Zealand.

The following Orders, charact
abound most, after Australia,
Haemodoraceae, Droseraceae (H
approach is found in the remark
of the widely diffused Orders, Rub

On the other hand there are cer
pointed out in the following list, ta
J. Hooker's Essay before quoted.

The following Orders are represe
but are either comparatively rare o

Fumariaceae, absent in Australia	
Geraniaceae.	
Caryophylleae.	
Rosaceae (Cliffortia).	
Bruniaceae, absent	
Crassulaceae.	
Dipsaceae, ditto	
Campanulaceae.	

Temperate Australia contains the
or absent in this Region:—

Dilleniaceae, absent in S. Africa	
Magnoliaceae, ditto	
Tremandreae, ditto	
Stackhousieae, ditto	
Sapindaceae.	
Haloragieae.	
Myrtaceae (1 species)	
Caprifoliaceae, absent	
Stylidieae, ditto	
Goodenovieae, (1 species)	

It is also noteworthy that whereas i
it is the tribes Vandeae and Neottieae
(Ophrydeae being restricted to two
Vandeae are few, and Neottieae complet
abound.

Sir J. Hooker conjectures the prob
of the Australian and South African Fl
inhabiting a vast antarctic continent, of
been submerged. In connection wit
remarkable that geologists tell us tha
Region consists of the older rocks whi
South Africa; the most recent being t
stone, which seems to be generally reg
this hypothesis must be understood as re
portion of South Africa which is includ

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g Orders, characteristic of Australia
after Australia, in South Africa
. Droseraceae (Hooker); and another
nd in the remarkable deficiency in le
ifused Orders, Rubiaceae, Laurineae, e
hand there are certain remarkable dis
he following list, taken with modificat
ay before quoted.

Orders are represented in the Flora of
nparatively rare or absent in Australia

nt in Australia	Ericeae, absent in Aus
	Selagineae, ditto
	Stilbeae (tribe *Verb*
ia).	Penaeaceae
t	Podostemaceae
	Cytinaceae
	Piperaceae
	Aloineae (tribe *Lili*

alia contains the following orders that
gion:—

in S. Africa	Epacrideae, absent in S.
ditto	Loganiaceae
litto	Myoporineae,
litto	Monimiaceae,
	Casuarineae,
	Cupuliferae,
ies)	Coniferae
	Johnsonieae (tribe of *Li*
to	Xerotеae (tribe of *Junc*
s)	

that whereas in the Orchideae of Aus
e and Neottieae which most largely
icted to two species), in this Reg
ottieae completely absent, while Ophr

ures the probability of a common
th African Floras, derived from ano
e continent, of which the greater pa
nnection with this it is not a
s tell us that the surface of the
er rocks which are known to exi
ecent being the Table Mountain Se
generally regarded as Devonian.
erstood as referring exclusively to
ich is included in the Region I a

now treating of. The affinities of this Region with that of other countries are more obscure, are certainly very slight and have not hitherto been elucidated.

On the eastern boundary the Flora of this Region passes gradually into that of the Tropical African Region, and on the north, where, however the boundary is much sharper and more defined, into that of the Karroo Region.

The foreign vegetation naturalised in the Region demands a brief notice. I have made a list of about 158 species, of which the great majority are wide-spread European plants, with a few American and Indian species, which have been recorded as more or less naturalised throughout South Africa. The observations are imperfect as regards the eastern region, and the whole number would probably be nearer 200 species. Of these about 130 may be found within ten miles of Cape Town. Yet only the following can be said to occur in sufficient number in that locality to attract attention:—*Fumaria officinalis*, *Sisymbrium officinale*, *Brassica nigra*, *Raphanus Raphanistrum*, *Trifolium angustifolium*, *Serpicula repens*, *Sonchus oleraceus*, *Solanum Sodomaeum*, *Datura Stramonium*, *Nicotiana glauca*, *Rumex acetosella*, *Panicum sanguinale*, *Briza maxima*, *Pteris aquilina*. A species of prickly pear, *Opuntia Tuna?* which is very abundant and troublesome in the Karroo Region, occurs also in the drier eastern portions of this Region. *Pinus pinea* (the stone pine) *Pinus pinaster*, and *Quercus pedunculata*, have been largely planted, but cannot be said to grow spontaneously; although when once sown, the first named is one of the few introduced plants which can contend successfully against the indigenous undergrowth, in which the seed may be deposited without clearing, and which it at length overtops and finally destroys. Few of the introduced plants are found far from roadsides or human habitations, and it is remarkable how small upon the whole is the influence they exert upon the aspect of the vegetation, and how weak (with the sole exception of the *Opuntia* referred to) is their aggressive power as against the indigenous Flora.

THE TROPICAL AFRICAN REGION.

This Region occupies almost the whole portion of the continent which lies between the tropics. Owing to the warm and moist climate caused by the currents of the Indian Ocean, the Flora retains a sub-tropical character to an extent very much greater than that of the west coast; and the Region puts forth an arm, which reaches about as far south as Port Elizabeth, and the Van Staden's mountains. From the Zitzikamma forest on the one side, to the ending of the Zuurberg range near Graham's Town on the other, may be regarded as a debateable territory, where the present Region overlaps and intermingles with the South Western Region.

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Generally speaking, its inland boundary
range of mountains which, under various
quite continuously, run parallel with t
Kagaberg, Winterberg, Stormbergen,
Drakensbergen, &c. Thus it includes
Uitenhage and Somerset (in part), Alban
Peddie, Queen's Town, King William's
all the Transkeian territories, Natal,
tropic. The width of the Region ranges
to 100 miles.

The physical features of the country n
if it be remembered that a lofty moun
5,000 to 10,000 feet in height, slopes dow
sending down numerous rivers which cut
try by their deep valleys. The surface of
varied; large tracts of bush alternating
grass and bush sometimes intermingle
In the western portion (the Addo and Fi
thickets of bushes 10 to 15 feet high; fur
ward these become forests, and in many
mountains facing the sea are covered with

The general aspect of the country is
luxuriant than that of the South Western

The climate of a Region stretching fro
of course, in some respects very differen
At King William's Town, 1,300 feet a
annual temperature is about 18·9 C (66° F
26 in.; further inland the rainfall diminish
temperature gradually rises, and the rainf
At Pietermaritzburg, in Natal, at an eleva
the sea, the mean annual temperature was
the rainfall 30·23 inches; the humidity of
(9 *years' observations, Dr. Mann*). But the
between the climate of this and the South
fact that the one has chiefly summer, t
rains.

The gradual transition from the South
Flora is noticeable in the bordering distric
Cycadaceous Encephalartos (Kaffir bread)
along the ridges of the Zuurberg as far we
Salt Pan's Neck. Leguminous plants begi
the bush *Schotia speciosa* (Boer boon) a deci
the same dry tracts are occupied by a succul
angled thorny stems, *E. tetragona* (Noor
near the coast, from the Knysna eastward,
to occur (Polystachya, Angræcum and My

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longing to Malvaceæ, Sterculiaceæ, Rubiaceæ, Asclepiadeæ, and Acanthaceæ, become more numerous, both in individuals and species. The only *Sterculia* hitherto known in the Colony, *S. Alexandri*, occurs in the Van Staden's Mountains, but has been found nowhere else. *Sanseviera thyrsiflora* covers the hill-sides over large tracts, and affords excellent fibre, at present the subject of experiments in rope manufacture. The beautiful *Calodendron Capense* (Wild Chestnut) a tree of the Order Rutaceæ, occurs throughout the Region; it has been met with on the Zambesi, and even on the Kilimanjaro Mountain, a few degrees south of the equator. The number of trees of handsome foliage and showy flowers might almost be said to characterise the Region. I can only mention a few of them occurring in the Colony, Kaffraria and Natal:—*Boscia Caffra*, *Oncoba Kraussiana*, *Dombeya* (3 species), *Sparrmannia Africana*, *S. palmata*, *Turraea obtusifolia*, *Acridocarpus natalitius*, *Millettia caffra*, *M. Sutherlandi*, *Erythrina caffra*, *E. latissima*, *Sophora nitens*, *Calpurnia spp.*, *Schotia speciosa*, *S. brachypetala*, *S. latifolia*, *Gardenia spp.*, *Pavetta* (many species), *Burchellia Capensis*, *Alberta magna*, *Tricalysia Capensis*, &c. The number of flowering shrubs is also very considerable amongst Malvaceæ, Sterculiaceæ, Rubiaceæ, Asclepiadeæ, Scrophularineæ, Acanthaceæ, and many others. *Greyia Sutherlandi* is a curious Sapindaceous tree, with handsome crimson flowers, which extends from Kaffraria to Natal; it is allied to the endemic genera Melianthus, Aitonia and Erythrophysa, the two latter belonging, however, to the Karroo Flora. *Oldenburgia arbuscula*, a singular looking composite of dwarf arboreous habit and very large flower heads, occurs along the Zuurberg range, but must rather be regarded as an outlier from the South Western Region, where it has two congeners, *O. Papionum* and *O. paradoxa*. Vernonia, which is almost entirely absent from the latter Region, begins to abound here, and increases in species as we proceed towards the tropic. The "everlastings" are well represented in many fine species of Helichrysum; and even the *Elytropappus rhinocerotis* (the Rhenoster bush) has pushed up as far as Graham's Town. The Euphorbiaceæ begin to occur in considerable numbers in Albany and as will be seen presently, occupy a very important position in this Region. Amongst the succulent species is the noble *E. grandidens*, which attains a height of 30 feet or more in favourable situations, and forms a very characteristic feature in the the wooded ravines of the Region. The Coniferæ are not better represented than in the western districts—two Podocarpi (Yellow Woods), and the same *Widdringtonia cupressoides*, being all that occur. The Cycadaceæ have been mentioned already, but besides several species of Encephalartos there is the curious *Stangeria paradoxa* which comes down as far south as Lower Albany; and here it may be mentioned that the same genial climatic influences bring a

Palm within our limits, *Phœnix reclinata* bei
of the Kap River in the same district, t
extreme boundary on the western side.

Amongst the Monocotyledons the Orchid
mentioned. The difference between the S
and the present one is here again evidence
species of the tribe Ophrydeæ largely predomi
here, the proportions are reversed. In Natal
and *Polystachya*, are abundant in species, an
Disæ and Satyria of the west. *Calanthe nat*
found as far south as the Perie Bush, near K
The *Strelitziæ* are found as far north as
beyond that country. Some of the finest
Region, especially the Gladioli, *G. psittacinu*
dersii, &c. Amongst Amaryllideæ may be
species of Crinum, Brunsvigia, Hæmant
Liliaceæ the noble *Aloe Bainesii*, a tree of f
height, and by far the largest and finest
species of Gloriosa, Sandersonia, and Littonia.
Gramineæ, as will be seen hereafter, yield a
of species; *Prionium Palmita* occurs in
amongst the latter Panicum and Eragrosti
beyond the statement that a large part of
land, (if that may be so called which is really
downs) between the mountains and the coa
tracts, I have no information as to the predon
genera or species in individuals.

Coming now to the composition of the sys
prevalent in and characteristic of the Regio
considerable collections. That made by Dre
ago, included 2,278 entries of flowering plant
over the whole area of the three Districts in
the Region. Many of the entries are, however,
collected twice, or even thrice; so that it is o
as a whole, and even then upon the assumptio
of species collected more than once, in each C
proportion to the whole. Secondly, a list of 1,
in Albany district, mostly round Graham's T
Professor MacOwan, and which he has kindly
purpose. Lastly, a list of 1,320 species collected
in and near the Inanda, not far from Durban,

A few explanations are necessary respectin
It is true that the broadest result would hav
amalgamating them; but this would have
than is available to me. The collection of
over the widest area, should be the most repre

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certain that the Orchideæ were neglected by him. In MacOwan's collection there are 46 distinct species of Orchids; in Drege's only 41 entries over the whole area, including duplicate entries of the same species. In Wood's collection the Orchids probably occupy too high a place; many in his list were not named; I counted them, necessarily, as distinct species, when doubtless some were repetitions of the same species. On the other hand, the Cyperaceæ and Gramineæ in his list, reaching to only 2·2 and 1·4 per cent. respectively, have clearly been collected much below the average. With these remarks, I think it will be better to give the three lists, side by side; and in some respects, it will be more instructive, since a comparison of Wood's and MacOwan's well illustrates the known increase, as we proceed nearer to the tropic, of the Orders Rubiaceæ, Euphorbiaceæ and Acanthaceæ, and the decrease of Ficoideæ and Geraniaceæ:—

Drege's List. *General.*	Per cent.	MacOwan's List. *Local.*	Per cent.	Wood's List. *Local.*	Per cent.
Compositæ ..	14·	Compositæ ..	17·5	Compositæ ..	13·1
Leguminosæ ..	9·9	Leguminosæ ..	7·6	Leguminosæ ..	8·4
Gramineæ .	7·7	Gramineæ	6·9	Liliaceæ ..	5·
Cyperaceæ ..	4·5	Orchideæ	3·8	Orchideæ ..	4·2
Asclepiadeæ ..	3·1	Scrophularineæ ..	3·1	Rubiaceæ ..	4·
Labiatæ ..	3·	Asclepiadeæ ..	3·1	Euphorbiaceæ ..	4·
Euphorbiaceæ	2·8	Cyperaceæ ..	3·	Asclepiadeæ ..	3·9
Rubiaceæ ..	2·7	Grassulaceæ ..	2·9	Acanthaceæ ..	3·1
Scrophularineæ	2·6	Geraniaceæ ..	2·4	Irideæ	2·8
Liliaceæ ..	2·6	Euphorbiaceæ ..	2·	Scrophularineæ	2·2
Acanthaceæ ..	2·4	Irideæ	2·	Cyperaceæ ..	2·2
Malvaceæ ..	2·2	Liliaceæ	2·	Labiatæ	2·2
Irideæ ..	2·	Ficoideæ	2·	Celastrineæ ..	1·8
Orchideæ ..	1·8	Rubiaceæ	1·8	Gramineæ ..	1·4
Anacardiaceæ	1·5	Umbelliferæ ..	1·8	Malvaceæ ..	1·3

The difference between any one of these lists and that of the South-Western Region will be apparent at a glance: Ericaceæ, Proteaceæ, Restiaceæ, and Rutaceæ do not appear in the former at all; and Geraniaceæ in only one of them, viz., that one collected nearest to the South-Western Region; while the position of the other Orders common to both, excepting Compositæ and Leguminosæ, is widely different. Wood's list includes 2 Rutaceæ, 7 Ericæ, 2 Proteaceæ; Bruniaceæ and Restiaceæ are entirely absent from it. About Graham's Town, however, MacOwan found 6 Rutaceæ, 1 Bruniacea, 8 Ericæ, 6 Proteaceæ, 6 Restiaceæ. The two Regions appear to overlap widely; a few Ericaceæ have been found on the mountain tops nearly up to the tropic, and one or two Proteæ occur in the Transvaal; while outliers of a tropical type penetrate the South Western Region as far as the Knysna forests, and even a little beyond.

I have not sufficient data of the Fl
mass, to attempt to trace the affinities
Western Region. So far as that po
cerned which stretches south of the act
the subject of the present sketch, there is
Compositae and Leguminosae occupy
second place amongst the Orders of each
the Orders of the whole World. This i
in mind the undoubted affinity which e
Tropical Africa and that of India, bec
the Orders Leguminosæ and Rubiaceæ
place. The similarity, in other respects,
pare the sequence of Orders in India w
list :—

INDIA (*Hooker*)

Leguminosæ
Rubiaceæ
Orchideæ
Compositæ
Gramineæ
Euphorbiaceæ
Acanthaceæ
Cyperaceæ
Labiatæ

If it be remembered that, as I have s
certainly unduly deficient in Gramineæ
should probably be included in the abo
the two lowest orders, it will be seen th
agreement between the two.

The lists of Drège, MacOwan, and Wo
comparatively few naturalized foreign p
infer that they exist only in such proporti
tion is, in fact, wanting. My own per
the Region is somewhat limited, extendi
miles of its south-western extremity. I
introduced plants, excepting *Opuntia Tuna*
western parts of the Uitenhage district, *
sionally, and *Nicotiana glauca*, are few in ind
very small influence upon the aspect of th
appear to differ much in character from
referred to under the South-Western Re
however, there are certain tropical weed
expected, do not occur in the older Colon

THE KARROO REGION

This Region includes on the west sid
Namaqualand lying between the mountai

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ve n ot sufficient data of the Flora of tropical Afri
o attempt to trace the affinities between it and the
rn Region. So far as that portion of the former
which stretches south of the actual tropic, and com
ject of the present sketch, there is an agreement in the
ae and Leguminosae occupy respectively the fir
place amongst the Orders of each Region, as they do
rs of the whole World. This is important when w
the undoubted affinity which exists between the F
Africa and that of India, because in the latter
ers Leguminosæ and Rubiaceæ take the first and
The similarity, in other respects, will be shewn if w
sequence of Orders in India with that of Wood's N

India (*Hooker*)	Natal (*Wood*)
Leguminosæ	Compositæ
Rubiaceæ	Leguminosæ
Orchidæ	Liliaceæ
Compositæ	Orchideæ
Gramineæ	Rubiaceæ
Euphorbiaceæ	Euphorbiaceæ
Acanthaceæ	Asclepiadeæ
Cyperaceæ	Acanthaceæ
Labiatæ	Irideæ

remembered that, as I have said above, Wood's lis
unduly deficient in Gramineæ and Cyperaceæ, wh
doubly be included in the above, and would throw
west orders, it will be seen that there is a considera
between the two.

s of Drège, MacOwan, and Wood, given above, cont
dy few naturalized foreign plants; yet we may s
hey exist only in such proportion; and exact inform
tact, wanting. My own personal acquaintance w
is somewhat limited, extending only for about l
south-western extremity. In the parts I have se
lants, excepting *Opuntia Tuna* (?), in some of the dis
s of the Uitenhage district, *Xanthium spinosum* occ
Nicotiana glauca, are few in individuals, and exert but
fluence upon the aspect of the Flora. They do no
ffer much in character from those that have bee
nder the South-Western Region. In Wood's lis
re are certain tropical weeds which, as might b
not occur in the older Colony.

THE KARROO REGION.

n includes on the west side the coast strip of
lying between the mountains and the sea. How far it may extend north of the Orange River is unknown. Southward it stretches between the Khamiesbergen and the sea, and thence passes over by tracts little known botanically, to the south and west slopes of the Roggeveld mountains. Here it widens out and includes all that large tract known colonially as the Karroo; bounded on the north by the Roggeveld, Nieuwveld and Sneeuwberg mountains, on the east by the mountains fringing the Fish River; on the south by the Zwarteberg range, Kamanassiebergen, and finally the Zuurbergen, and on the west by the mountains of the Warm and Cold Bokkeveld.

Speaking broadly, it is a vast, shallow basin, surrounded by mountains; but the mountains, while always loftier on the northern side, are sometimes a mere rim on the southern. Its height above the sea ranges from 1,800 to 2,500 feet. But for the purposes of floral computations I have reckoned all plants collected on the southern slopes of the northern mountains, up to a height of about 3,750 feet, as belonging to this Region. Above that height, in certain localities, at least, the vegetation changes, and belongs to the next (the Composite) Region.

It is traversed by numerous river-beds or torrents, mostly dry or nearly so, except when filled by the summer thunderstorms, when the beds suddenly fill, carry off a vast quantity of muddy water for a few days, and soon again become dry. But water, generally, is scarce, and springs are infrequent.

The country has been subjected to long ages of denudation by rains and rivers, and exhibits its traces everywhere. It is probable that since the interference of man, which, by sheep pasturage has killed much vegetation and loosened and opened the soil, this denudation has proceeded more rapidly, and in some places enormous gullies have been formed where previously moist and fertile valleys existed. The surface consists chiefly of vast plains of light, reddish soil, which, when irrigated, is extremely fertile; in other parts it is more sandy, and in some places the soil is shaly, hard and barren. The plains are, however, broken by hills or mountains, sometimes with flat tabular tops. Everywhere the exposed rock is sandstone in beds, of varying colours and hardness, which have been regarded by Wyley and Dunn as belonging to the carboniferous measures. In the north eastern portion these are traversed by frequent doleritic dykes, which are sometimes vertical, and sometimes lateral, forming cappings to the sandstone hills.

The climate is one of great dryness and extremes of heat and cold. The following observations have been recorded at Graaff-Reinet, a town on the northern edge of the region, 2,476 feet above the sea:—Mean annual temperature 18° C. (64·41 Fahr.); mean of greatest range on any one day 3°·26 C. (37°·88 Fahr.); extreme limits of temperature (Dec. 20) 40°·55 C. (105° Fahr.);

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June 21, 3·56° C. (28° Fahr.); rain
two-thirds fell during the six sum
are from three years' observations.
vations give an average of 14·5 in.
of rainfall for other stations in the
are:—Prince Albert, 7·71 in.; Beau
more, 7·40 in.; Aberdeen, 12 in.; J
bok (Namaqualand), 8·05 in. The
(1883) observations only:—Port Nol
Station, 8·86 in.; Matjesfontein, 10·2
the rains take place during the summer
in the Eastern portions, a strong south
rain, but this is rare, the clouds being
intervening mountain ranges which divi
coast Regions, and intercept its rains.

During periods of drought nothi
desolate and mournful than the appeara
soil is rarely covered, bare patches of
vening between shrubs and bushes. The
by drought as if they had been killed
indeed almost the only trees are the
(Doornboom) which line the banks of t
fringe; and occasionally, on the high
other trees of shrubby habit occur. Fo
are scattered, and range from 5 to 8
vening shrublets of 1 to 2 feet. Yet a
be changed within a week or two, as if
apparently dead bushes put forth b
shrublets are covered with flowers oft
seen; bulbous plants, which may not
years previously, send up their scapes
and annual flowering herbs and grasses a
formerly all was bare and barren.
exhibits this phenomenon to the most
amazed on visiting that desert country a
July, 1883, to see tracts, hundreds of acr
sheets of living fire, or glowing purple,
distance, caused by the beautiful Com
nothing is more singular than to see this
with the black or white branches of dead s
droughts, standing like ghostly intruders
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I proceed to speak of a few of the chief p
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:—Prince Albert, 7·71 in.; Beaufort West, 9·19 in.
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Namaqualand), 8·05 in. The following are from
3 observations only:—Port Nolloth, 2·66 in.; Tou
on, 8·86 in.; Matjesfontein, 10·21 in. The greate
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e Eastern portions, a strong south-east wind brings u
but this is rare, the clouds being usually discharge
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te and mournful than the appearance of the vegetation
rarely covered, bare patches of greater or less exte
between shrubs and bushes. These are frequently bl
ght as if they had been killed by fire. The larg
almost the only trees are those of the *Acacia*
boom) which line the banks of the dry river beds a
; and occasionally, on the higher mountain sides,
s of shrubby habit occur. For the most part the
tered, and range from 5 to 8 feet in height; with
shrublets of 1 to 2 feet. Yet after copious rains
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ack or white branches of dead shrubs killed by previ
andling like ghostly intruders on a scene of merrim
These charming displays pass away all too rapidly,
or two little that is beautiful remains.

to speak of a few of the chief plants of the Region m
either from their beauty, singularity, or from the
ed to, or peculiarly characteristic of it. I am le

quainted with the Karroo of the Graaff-Reinet district, partly
th that of Namaqualand, and for the rest have only passed
rough it as a rapid traveller. Several species of Heliophila are
remely bright in spring, especially in the west; and the
notypic *Palmstruckia Capensis*, which had only been gathered
fore by Thunberg, has just been re-discovered in Namaqualand.
adaba juncea with its dark crimson flowers is a singular and
aracteristic plant both of this and the next Region; while
pparis oleoides (the Witgat boom) standing generally alone, 10
15 feet high, with its white trunk which has given its vernacular
me, is a prominent feature of many of the Karroo plains; the
ung buds are nearly or quite as good for culinary purposes as
ose of the Caper of Southern Europe. The Portulaceæ occupy a
ominent place chiefly by the well-known *Portulacaria afra* (the
ek boom, or fat tree), a large shrub with fleshy acid leaves and
anicles of small pink flowers. This occupies the hill sides, often
rowing sub-socially in great masses and affording the most
vourite food for live-stock of all kinds. It also occurs, though
ss abundantly, in the Tropical Region. In addition there are
veral species of Anacampseros, one of Talinum, and one of
ortulaca besides the ubiquitous *P. oleracea*. *Tamarix usneoides*
curs in Namaqualand, where it is used as fuel, and is the only
lant of the Order in our Region; it is recorded also by Drege as
om the central and eastern Karroo. Amongst Malvaceæ are
our species of Hibiscus, one of the most curious of which is *H.*
rens, which looks at a short distance so much like a plant of the
ourd family that every botanist is astonished to find upon it the
lowers of a Hibiscus. Burchell says his Hottentots called it
Wilde Kalabas (Wild Calabash). Of Sterculiaceæ, the genera Her-
mannia and Mahernia, are represented by 10 and 5 species re-
spectively. The large Order Sapindaceæ includes *Puppea Capensis*
the Wild Plum) a shrub of 15 or 20 feet frequent on mountains
sides; *Aitonia Capensis*, also a shrub, the curious pendulous papery
capsules of which look like miniature Chinese lanterns hung on a
Christmas tree; the allied and even handsome *Erythrophysa undulata*,
of Namaqualand; and several species of Melianthus. The Gera-
niaceæ are a numerous Order. The curious candle-bush, *Sarco-
caulon Patersoni* is here, besides numerous species of Pelargonium.
The latter are especially frequent in individuals, and much diversified
in structure, those with succulent stems and leaves constituting a
marked feature of the Flora. These include *P. oblongatum*, a hand-
some species from Namaqualand, with yellow flowers, lately figured
in the Botanical Magazine (t. 5996), *P. flavum*, *P. carnosum*, *P. crith-
mifolium*, *P. ferulaceum*, *P. pulchellum*, *P. sericeum*, *P. quinatum*, the
very curious and rush-like, almost leafless, *P. tetragonum*, *P. peltatum*,
P. echinatum, and many others. The Oxalideæ, though numerous,

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and often brilliant, are less
Region. The Rutaceae are c
found but one species in the
of Namaqualand, evidently a
ther South. The Zygophyllu
succulent leaves; of the same
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places, with thick terete leaves
Phylica, so common in the Sou
one or two species hover on
mountains, but they are scarcel
diaceæ are only represented b
dozen species. The Legumin
nent a place here as elsewh
species of Lotononis, Lebeckia,
distributed *Sutherlandia frutes*
this Region only. *Schotia specios*
occurs sparingly. *Acacia horr*
within our limits, is scattered
river beds, the timber is largely
tanning. The almost complet
remarkable. Of Rosaceæ ther
while Cliffortia and Rubus are
important constituent of the Re
numerous both in species and
Ficoideæ, however, that we may
the Region. Mesembryanthemu
the annual herb to the shrub
and curious shapes, with
and reds of many shades.
are covered with *M. spinosum* g
exclusion of anything else. In
resembling *M. crystallinum*, but
the larger flowered species are
spicata and *C. paniculata* are trees
geners spread over the whole Colo
S. W. Region, remarkably deficie
species occurring near Graaff-Rei
genera are Pteronia, Pentzia, H
Euryops. Those most abundant i
Chrysocoma tenuifolia, *Adenachaena*
P. globosa, *Eriocephalus glaber*, He
are very aromatic, and, excepting t
for live stock. In Namaqualand
spinosum, is used as a substitute fo
by all animals. Several species of A

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and often brilliant, are less common than in the South
Region. The Rutaceæ are conspicuous by their absence
found but one species in the Region, a Diosma, on the
of Namaqualand, evidently a straggler from their great
ther South. The Zygophyllums are frequent and
succulent leaves; of the same family is *Augea Capensis*,
typic genus peculiar to the Central Karroo and abundant
places, with thick terete leaves like those of a Mesembry
Phylica, so common in the South Western districts, is he
one or two species hover on the boundary line of so
mountains, but they are scarcely members of this Region.
diaceæ are only represented by Rhus, of which there are
dozen species. The Leguminosæ do not occupy nearly so
ment a place here as elsewhere. There are, however,
species of Lotononis, Lebeckia, Indigofera, Rhynchosia, th
distributed *Sutherlandia frutescens*; and *Sylitra biflora*,
this Region only. *Schotia speciosa*, an outlier of the Tropical
occurs sparingly. *Acacia horrida*, the only species of th
within our limits, is scattered widely, but especially
river beds, the timber is largely used for fuel, and the
tanning. The almost complete absence of Aspalathus
remarkable. Of Rosaceæ there are but two species of G
while Cliffortia and Rubus are both absent. Crassulaceæ
important constituent of the Region, Crassula and Cotyledo
numerous both in species and individuals. It is the
Ficoideæ, however, that we may regard as the one most ty
the Region. Mesembryanthemums are met with everywhere
the annual herb to the shrub with leaves of the most
and curious shapes, with flowers of white,
and reds of many shades. In some portions vast
are covered with *M. spinosum* growing sub-socially almost
exclusion of anything else. In Namaqualand is a huge
resembling *M. crystallinum*, but as large as a cabbage. So
the larger flowered species are extremely brilliant. *C.*
spicata and *C. paniculata* are trees of the order Araliaceæ with
genera spread over the whole Colony. Rubiaceæ are here, as in
S. W. Region, remarkably deficient, not more than half a d
species occurring near Graaff-Reinet. Of Compositæ the
genera are Pteronia, Pentzia, Helichrysum, Senecio, Othon
Euryops. Those most abundant in individuals are *Aster filif*
Chrysocoma tenuifolia, *Adenachaena parvifolia*, *Pentzia virgata*,
P. globosa, *Eriocephalus glaber*, Helichrysum spp.; most of th
are very aromatic, and, excepting the second, furnish excellent
for live stock. In Namaqualand a large species of Didelta,
spinosum, is used as a substitute for spinach, and is eaten greed
by all animals. Several species of Arctotis, Venidium, Gorteria, d

exceedingly brilliant, and make a great display after rains.
icaceæ are entirely absent. *Olea verrucosa* is one of the few
es of the Region occurring sparingly in mountain ravines, and
rnishing the most useful wood for fencing poles and for fuel.
the order Ebenaceæ there are several species of Royena and
nclea. Some genera of Asclepiadeæ seem to indicate an affinity
th the Tropical Region and India. Such are Gomphocarpus,
rcostemma, Ceropegia. Of the genus Stapelia there are many
ecies, thinly scattered, besides Huernia, Piaranthus, Decabelone,
d the remarkable Hoodiæ of Namaqualand. *Adenium Nam-
quanum* (or Elephants' Trunk) is a curious Apocynaceous plant
the same country. Gentianeæ are almost, if not entirely, want-
g. Scrophularineæ occupy a comparatively poor place,—
hascia, Nemesia, Lyperia being the chief genera, with some of the
ot parasites Alectra, Striga, and *Hyobanche sanguinea*. *Rhigozum
ichotomum* is a handsome Bignoniaceous shrub. Acanthaceæ are
ry deficient and probably constitute less than one per cent of the
hole Flora. Selagineæ are also few; *Selago leptostachya* (*Aar-
oschje*) is one of the good stock food plants. The ashes of
alsola aphylla (*Kanna-bosch*) are used for soap making; and
triplex Halimus and *A. Capensis* (*Vaal-boschje*) are considered
ost valuable food plants for sheep and goats. *Hydnora Africana*
ccurs in the eastern, and *H. triceps* in the western Karroo. San-
alaceæ are represented in *Osyris compressa*, the leaves of which
ere and in the two preceding Regions, are very generally in
se for tanning; there are also several species of Thesium.
Euphorbiaceæ are chiefly confined to succulent Euphorbiæ, in
many forms,—melon shaped, 4-angled, many-angled, and club-
haped, in some tracts immensely abundant in individuals. Dur-
g severe droughts *E. Caput-medusæ* (*Fingerpoll*) is in some
laces cut up as food for cattle; as is also a spinous species
(*Euphorbia sp.*) after the spines have been previously burnt off.
Several species of Viscum, and a few Loranthi occur; *Forskohlea
candida* seems to be peculiar to the Region. There are one
or two species of Ficus; and the widely distributed *Salix Capensis*
occurs along many of the river banks. Coniferæ are entirely
absent.

Orchideæ are scarce. In the whole eastern Karroo I found
but one species, *Habenaria arenaria*; but in Namaqualand on the
mountains where the average rainfall does not exceed seven inches
yearly, I saw a Holothrix, *Satyrium pustulatum*, *Pterygodium
Volucris*, *and Disperis purpurata* var. Of Hæmodoraceæ, *Sanseviera
thyrsiflora* is common on many hill sides, but rarely flowers. It
may here be mentioned that this is a common condition of many
of the Karroo Monocotyledons. They pass years in a dormant
state: not until rain and temperature coincide suitably to their

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need will they flower. I
mountain side, and then fir
falcata; or one may wat
falcata in leaf for ten years
flower. Irideæ and Am
abundant in species or indiv
include Aloe (of which the
of Namaqualand being on
Ornithogalum, Albuca, &c.,
also many Asparagi. *Test*
known and most curious
scarce; Cyperaceæ also bu
Of Restiaceæ, also, none ha
what rich in species, and
the Orders of the Region
tufts, and rarely except in
anything like turf be see
amongst which may be nam
and Eragrostis.

Of Ferns there are perhaps
These are chiefly Cheilanthes,
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Lady Barkly, are found in Na

The predominating feature
tion of its vegetable life to me
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include thickened roots, stems
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The following list of the chief
a list of 611 flowering plants c
Reinet, all below 3,750 feet above
collection of the plants within tw
are added 66 others collected b
parts of the Region, further sou
clude plants from Namaqualan
generally. Substantially, it is a
Karroo; but I think it probabl
collection would reduce the pos
Ficoideæ and Geraniaceæ, and i
first twelve.

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need will they flower. Hence one may live ... mountain side, and then first see it nearly covered ... *falcata*; or one may watch the numerous bulbs ... *falcata* in leaf for ten years, as I have done, and ... flower. Irideæ and Amaryllideæ are neither ... abundant in species or individuals. Liliaceæ are ... include Aloe (of which there are many fine species ... of Namaqualand being one of the largest) Haw... Ornithogalum, Albuca, &c., in great variety and bea... also many Asparagi. *Testudinaria elephantipes* is ... known and most curious plants of the Region ... scarce; Cyperaceæ also but few, while Carex is ... Of Restiaceæ, also, none have been found. Grami... what rich in species, and occupy the second p... the Orders of the Region; yet they occur chiefl... tufts, and rarely except in some specially favour... anything like turf be seen. They belong to ... amongst which may be named Panicum, Andropog... and Eragrostis.

Of Ferns there are perhaps 8 or 10 species in the wh... These are chiefly Cheilanthes, Pellaea, and Nothochlæ... them are peculiar to the Region, and five at least, a... Lady Barkly, are found in Namaqualand only.

The predominating feature of this Region is the pecul... tion of its vegetable life to meet the severe conditions ... and hot climate and soil. Succulence, which may here ... include thickened roots, stems or leaves, is displayed i... diverse Orders. At Graaff-Reinet, on the north-eastern bo... Region, and where the climate is far less severe than fur... I counted thirty-one per cent. of all flowering plants as ... less succulent. In the central and western Karroo the p... would be much larger. The prevalence of thorny plant... very noticeable.

The following list of the chief Orders of the Region is tak... a list of 611 flowering plants collected by me mostly near ... Reinet, all below 3,750 feet above the sea, and being nearly a co... collection of the plants within twenty miles of that centre; t... are added 66 others collected by Drège, and by myself, in ... parts of the Region, further south and west. But it does no... clude plants from Namaqualand, nor from the western Ka... generally. Substantially, it is a fair representation of the ea... Karroo; but I think it probable that a fuller and more gen... collection would reduce the position of Gramineae, raise th... Ficoideæ and Geraniaceæ, and introduce the order Irideæ into ... first twelve.

CHIEF ORDERS—EASTERN KARROO.

	Per cent.
1. Compositæ	17·1
2. Gramineæ	9·2
3. Ficoideæ	6·8
4. Liliaceæ	6·5
5. Crassulaceæ	5·3
6. Leguminosæ	3·8
7. Geraniaceæ	2·9
8. Scrophularineæ	2·9
9. Asclepiadeæ	2·5
10. Sterculiaceæ	2·5
11. Solanaceæ	2·2
12. Cyperaceæ	2·

The Flora shows but weak affinities with either of the two preceding Regions, and these are chiefly exhibited in widely distributed genera common to the whole of Southern Africa. From the South Western Region it differs in the complete absence of Rutaceæ, Bruniaceæ, Ericaceæ, Proteaceæ, Penaeaceæ, and Restiaceæ, the six most characteristic orders of that Region; further, in the scarcity of Leguminosæ; and in the almost complete absence of the following large genera which are so abundant in and characteristic of that Region: Muraltia, Phylica, Aspalathus, Cliffortia, Athanasia, Arctotis, Gnidia, Struthiola. There is a point of approach in the abundance of Geraniaceæ; and there is a common scarcity of Rubiaceæ and Acanthaceæ. From the Tropical Region it is distinguished by abundance in Ficoideæ and Crassulaceæ; and by its paucity of Leguminosæ, Rubiaceæ and Acanthaceæ; to these might perhaps be added Malvaceæ, and Euphorbiaceæ, for these occur chiefly in the eastern Karroo, where it borders on the Tropical Region. It may hereafter be found that the affinities of this Region, together with the succeeding one, are greater with the Kalahari Region than with any other, if indeed they might not be regarded as an extension of it. But at present our knowledge of the Kalahari is too imperfect to enable us to form a judgment.

With respect to the naturalized foreign plants of the Region, it may readily be supposed that the heat and drought of the climate would be unfavourable to European colonists. The number is indeed few, and chiefly confined to weeds of cultivation, which is here synonymous with irrigation; or to a few wayside weeds. The number known to me does not exceed twenty-five. Those of American origin are more prominent. *Opuntia Tuna* (?) already mentioned, has a branched stem with obovate articulated joints, covered with tufts of strong prickles; the flowers are yellow, and the fruit much eaten by the natives and colonists. Drège does not mention this plant, so that it must have been introduced, or, at least, have spread, since his visit (1826-1834). It is now a most troublesome pest, growing in some places sub-socially, and killing

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out the native vegetation. So tenacious of life is it t
stem of a few square inches dropped upon the surf
dry soil, will take root and grow readily. Cattl
driven to browse upon it by drought, suffer by the
their mouths, and fall off in condition. Its eradi
and laborious, needing either to be completely bur
The *Xanthium spinosum* is also a troublesome weed
hooked achenes becoming entangled in the wo
Nicotiana glauca springs up immediately wherever
opened; *Argemone Mexicana* has fairly established
not yet abundant; and *Amsinckia angustifolia*, fro
been found in Namaqualand.

THE UPPER REGION, OR REGION OF COMPOSI

This Region is bounded on the west by the Hantam
veld mountains; southward by the continuation of th
range; the Nieuwveld, the Sneeuwberg range; thence
Boschberg and by the mountains about Daggaboer's
the north-western flanks of the Great Winterberg
eastward by the watershed which separates the waters
River from those of the Kei, so as to include the
Tarkastad and Albert, to the Orange River. I
boundary is in part unexplored. I am informed by
Dunn, F.G.S., who has travelled through that part of
for the purpose of exploring its geology, that the boun
the northwest is well marked and co-incident with the
Dwyka Conglomerate and the Karroo Beds, the fo
covered by the Twa-grass (*Arthratherum brevifolium*) so cl
of the Kalahari Region, while the latter bear the stu
peculiar to this Region. This line would begin near
kouw mountain, thence it extends in a curve towards H
where it is certainly existent about thirty miles south of
It then runs northward, crossing the Orange River.
boundary in the Orange Free State is unknown to me
probable that it takes a wide curve eastward between
tein and Smithfield, and again cuts the Orange R. so
Aliwal North. It is thus an elevated country sloping g
the southern edge towards the Orange River, at an aver
tion of from 5,000 to 4,000 feet above the sea. I have
in the Region that part of the districts of Middelburg, Cr
Tarkastad, which is formed by the basin of the Great F
above Dagaboers Neck. Is it uncertain whether this
Drège regarded this tract as belonging to the Karroo Re
he passed rapidly through it (as I have also done) an
collected anything. His view would have this consiste
it would make the waters of the whole Upper Region ru

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native vegetation. So tenacious of life is it that a
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l, will take root and grow readily. Cattle and
o browse upon it by drought, suffer by the lacera
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THE UPPER REGION, OR REGION OF COMPOSITES.

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on that part of the districts of Middelburg, Cradock an
which is formed by the basin of the Great Fish Rive
boers Neck. Is it uncertain whether this is correc
ded this tract as belonging to the Karroo Region; bec
idly through it (as I have also done) and scarcely
thing. His view would have this consistency: tha
e the waters of the whole Upper Region run into th

Orange River; and those of the whole Karroo Region into the Southern Ocean. But the tract in question is somewhat more elevated than the rest of the Karroo, and appeared to me from its deficiency in succulents to belong rather to the present Region. The matter must be decided by further evidence, since no collections, so far as I know, have been made there.

The general aspect of the country is that of a vast treeless plain, interspersed at great distances by a few isolated and flat-topped mountains, or short ranges; or lower, and then very rugged rocky hills. On these hills or in the few ravines of the monotonous mountain sides, may be found a few stunted bushes. In fertile shallow vallies ("vleis"), grassy patches, with more luxuriant bushes 6 to 8 feet high, may be seen; but trees never, except such few as have been planted by the hand of man; or except the few (chiefly *Salix capensis*) which fringe the banks of the Orange River, where it flows through this Region; and the predominant and constantly prevailing aspect of the country is that of a heathy tract, or dry elevated moorland, covered with small shrublets of a dull green hue, the few intervening plants of different growth which occur being too small or too few to alter or modify the general appearance above described.

Respecting the climate of this Region no observations for any considerable length of time, excepting of the rainfall, have been made. The extremes of temperature are considerable, the summer maximum being nearly as high as in the Karroo Region although the summer nights are always cool; while the winter temperature is much lower. Severe frosts are common, with occasional snows in winter and hailstorms in summer. The rains are almost entirely in the summer months, and usually accompanied by thunderstorms. The following list of stations at which the rainfall has been observed for a period of five years or more is taken from the Report of the Meteorological Commission for 1883. I take the stations in their order from west to east:—Fraserburg, 6·11 inches; Carnarvon, 7·78; Victoria West, 9·82; Richmond, 11·64; Hanover, 13·77; Middelburg, 14·17; Colesberg, 15·82; Cradock, 13·19; Tarkastad, 17·08.

The following remarks on the plants chiefly characteristic of this Region are based upon collections of 507 species of flowering plants made by myself chiefly on the loftier portions of the Graaff-Reniet district (above 3,750 feet above the sea) with a few in the districts of Murraysburg, Richmond, Hanover and Colesberg; of 331 (other) species collected by Drège in the same districts, together with Albert and Aliwal North; and of 135 (other) species collected by Mr. W. Tyson, chiefly in the district of Murraysburg; being a total of 973 species. These lists and the calculations upon them, which will be found on page 313, were made some time ago. I have

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since doubted whether the higher mountai
Sneeuwberg, and of Aliwal, should not r
as outlying tracts of the Tropical Region;
greater moisture favouring the extension of
do not occur in the immediately contiguous
same conditions have permitted the lodgment o
western types. The result is to make the R
rich in forms than it otherwise would be, to the
15 per cent. of the species, and 6 per cent. of t
so far to increase the appearance of its affinities
African Region. I regret that time does not
of the list, and that this statement must suffice.

The Geraniaceæ are fairly numerous, but do
either as to singularity of form, or in respect of
dividuals, the same prominent position they hold
Regions. One Rutacea, *Barosma rennsta*, occurs
Mountain, at about 6,000 feet; also two Phyl
tains near Graaff-Reinet. The species of Rhu
numerous, 13 being recorded in our list. Legum
small and inconspicuous shrublets of the genera L
lobium, Indigofera, and Lessertia. *Lessertia a*
have poisonous effects upon cattle. The only ha
the Order, which has here 19 genera and 52 spe
spread *Sutherlandia frutescens*. *Acacia horrida*, the
Order, and the only species of that genus occurrin
hardly belongs strictly to it, being found only spari
valleys of the Sneeuwbergen, &c. A few species
outliers of the South-western type growing only
mountains. Crassulaceæ, similarly, though our
species, are found very sparingly everywhere ex
southern border of the Region; and are few
Guthrica capensis is a curious Passifloraceous plant
of a Primrose, only found hitherto upon the high
Sneeuwbergen. Ficoideæ are very deficient in in
the majority of those in our lists belong to the warm
Murraysburg. Rubiaceæ have 11 species only, chie
permum, Rubia, and Galium. It is in Compositæ th
great strength of this Region, there being not less t
with 231 species. The largest genera are Helichr
species; Senecio with 35 species; Berkheya, 11;
Pentzia and Gazania each 8 species. The species m
in individuals are *Chrysocoma tenuifolia*, a small shr
or no value for stock, covering vast tracks in the centr
Region not indeed sociably, but intermingled with ot
the most part, Compositæ; *Helichrysum hamulosum*,
glaber, and other species; *Pentzia globosa*, *P. Burchell*

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Sneeuwberg, and of Aliwal, should not rather b
as outlying tracts of the Tropical Region; the
greater moisture favouring the extension of eastern
do not occur in the immediately contiguous lower
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d other species; *Pentzia globosa*, *P. Burchellii*, *P. Cou*

good stock plants; *Othonnopsis cluytiaefolia* and *O. pallens*; *Senecio spp.*; *Gamolepis trifurcata*; *Tripteris leptoloba*, *T. spinescens*; *Arctotis stoechadifolia*, &c. Five species of Ericaceæ are found on the highest mountains only. Ebenaceæ have five species of Royena and Euclea, usually stunted rigid bushes. *Olea verrucosa* (the Olive) is sparingly distributed, and grows very poorly. In Asclepiadeæ there are twelve genera and 27 species. Three species of Lycium are scattered, and one of them is a characteristic shrub of the bleak and dreary Roggeveld. Scrophularineæ are well represented in 20 genera and 38 species, of which the beautiful deep blue flowers of *Aptosimum depressum*, and the sky blue *Heliostomum origanoides*, alone deserve notice, and are worthy of cultivation. *Rhigozum trichotomum* is a Bignoniaceous shrub with handsome yellow flowers, belonging to this as well as to the Karroo Region. Acanthaceæ are deficient, having only 5 species; Plantagineæ, 15; Labiatæ, 18; Thymeleæ only 7, of which *Arthrosolen polycephalus*, a useless wiry shrub, grows almost sociably in some spots. *Salix Capensis* is only found in a few sheltered valleys in the lowest part of the Region, or on the banks of the Orange River.

Amongst the Monocotyledons Orchideæ have four species all of the higher mountains. Irideæ are greatly diversified, having 12 genera and 20 species. Amaryllideæ are nearly as many, *Brunsvigia multiflora* being one of the handsomest, and there are several species of Hypoxis mostly from the eastern mountains. Aroideæ are entirely absent. Liliaceæ are numerous; Aloes are very few; and there are several species of Kniphofia (4); Scilla (4); Ornithogalum (4); Bulbine (5); Asparagus (7); in all 20 genera with 47 species. Of Restiaceæ, 3 have been found on the highest mountains, outliers from the S.W. Region. Cyperaceæ have 22 species, including 2 Carices. Gramineæ occupy a high position with 37 genera and 78 species. Though thus highly diversified they do not occupy a prominent place in the landscape of the country, everywhere occurring in isolated tufts, usually far apart from each other. Those most abundant in individuals appear to be *Andropogon marginatus*, *Anthistiria ciliata*, *Aristida vestita*, &c., *Danthonia disticha*, *D. villosa* and others, *Eragrostis brizoides*, *E. striata*, *Melica dendroides* (*Dronkgras* of the Colonists, from its apparently intoxicating effects upon cattle which feed upon it), *Festuca scabra*, &c., but I speak only of those parts of the country which I have actually visited.

The following list of the sequence of Orders according to their number in species is prepared from the collections already mentioned :—

COMPOSITE REGION (EASTERN PO

1. Compositæ	..	..	..	..
2. Gramineæ	..	..	..	..
3. Leguminosæ		..	..	..
4. Liliaceæ	..		..	..
5. Scrophularineæ		..	..	..
6. Crassulaceæ	..	..	..	..
7. Asclepiadeæ	..	..	..	..
8. Geraniaceæ	..	..	..	..
9. Ficoideæ	..	..	..	..
10. Cyperaceæ	..	..	..	..
11. Irideæ	..	..	..	..
12. Amaryllideæ		..	..	..

It will at once be seen that the abundance most striking characteristic of the Region. ponderance of individuals is immensely in ex proportion of species.

As in the Karroo Region, Rutaceæ, Eric practically absent; Bruniaceæ, Penaeaceæ, a lutely so. In comparison with the Karroo Fl Ficoideæ occupy a much lower position; whil the reduced proportion of species by no m paucity of individuals. Notwithstanding th relations with the Karroo Region are consi genera and species; in a similar deficiency of Ru Verbenaceæ and Aroideæ; and it may hereafte to treat the two Regions as sub-divisions of one

With respect to the Tropical African Reg Western Region the differences are more mark by a comparison of the predominating Orders o

The naturalised plants of foreign origin ca Those from Europe are confined to a few waysi of cultivation. *Xanthium spinosum* is a troublesо *Mexicana* and *Datura Metel* have established th Orange River. The *Opuntia Tuna* (?) so annoy Region, is here little seen, only a few individuals warmer vallies of the mountains on the sout Region.

THE KALAHARI REGION.

This Region extends but a slight distance into since our knowledge of its Flora excepting th still comparatively small, I shall make but few re it. Grisebach (loc. cit.) has carefully collected al up to 1872, and the reader is referred to his pages than can be given here.

The northern boundary begins on the coast at thence runs nearly due east, until it reaches al

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COMPOSITE REGION (EASTERN PORTION).

1. Compositæ	..
2. Gramineæ	..
3. Leguminosæ	..
4. Liliaceæ	..
5. Scrophularineæ	..
6. Crassulaceæ	..
7. Asclepiadeæ	..
8. Geraniaceæ	..
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It will at once be seen that the abundance of Co... most striking characteristic of the Region. Here ... toleration of individuals is immensely in excess of ... proportion of species.

As in the Karroo Region, Rutaceæ, Ericaceæ, ... practically absent; Bruniaceæ, Penæaceæ, and Pro... ly so. In comparison with the Karroo Flora, Cru... Ficoideæ occupy a much lower position; while in th... the reduced proportion of species by no means ... rosity of individuals. Notwithstanding this cir... lations with the Karroo Region are considerable ... era and species; in a similar deficiency of Rubiaceæ, ... riaceæ and Aroideæ; and it may hereafter be fo... treat the two Regions as sub-divisions of one.

With respect to the Tropical African Region and ... stern Region the differences are more marked, as ... a comparison of the predominating Orders of each. The naturalised plants of foreign origin call for lit... se from Europe are confined to a few wayside weeds ... ultivation. Xanthium spinosum is a troublesome pest ... ana and Datura Metel have established themselves ... ge River. The Opuntia Tuna (?) so annoying in th... n, is here little seen, only a few individuals straggl... er vallies of the mountains on the southern edg... n.

THE KALAHARI REGION.

Region extends but a slight distance into the Co... ur knowledge of its Flora excepting the eastern ... mparatively small, I shall make but few remarks on ... sebach (loc. cit.) has carefully collected all that wa... 72, and the reader is referred to his pages for more ... be given here.

rthern boundary begins on the coast at about 18° ... ns nearly due east, until it reaches about 30° ... tude, when it turns south to the Orange River, crosses this ... Hope Town, runs westwardly along the river and south of it ... rminously with the boundary of our Composite Region, until ... aches the neighbourhood of the Kabiskouw Mountain; thence ... herly along the east side of the Namaqualand mountains to ... Orange River. Where it touches the coast again is unknown. ... us includes Great Namaqualand, Damaraland, Ovampoland, ... unaland, and great part, if not the whole, of the Transvaal, and ... Free State.

The surface of the country is mostly very sandy, and generally ... king surface water is everywhere very scarce, and springs in... ment. Nevertheless, when they do occur they are sometimes ... ng and copious, and there is every reason to believe that im... se stores of underground water exist at no great depth over a ... e part of the Region.

The climate is not yet well known. The heat in summer is ... t, the nights cool, and even frosty in winter, and the rain... which does not seem to be inconsiderable, is entirely one of ... mer thunderstorms. In the colonial Karroo the soil being ... ed, a large part of the rain runs off to the sea; here, on account ... the sandy nature of the soil, the greater part is retained, and, ... the case of heavy falls, goes to increase the underground stores. ... e coast strip from 16° S. down to the Orange River mouth, and ... nded by the interior mountains, is even more dry and rainless ... n that of Little Namaqualand, and probably should be joined ... h the Karroo Region of the Colony.

The Kalahari is essentially a grass country interspersed with ... lated shrubs or trees. Towards the northern boundary, which ... re corresponds with the southern limit of palms, these trees are ... uped in dense forests. Further south the country is open. ... ter the summer rains the grasses, which do not grow con... uously like turf, but in tufts like stooling wheat, shoot up ... idly and acquire a height of three or four feet, sometimes even ... five and six feet. East of the copper mines of Namaqualand ... y have frequently been cut by the natives, and brought in loads ... sale as fodder. Species of Aristida (Twa-gras) are the most ... ndant, but there are others coarser, and some of spinous growth. The trees appear to be chiefly Acaciæ of several species, of which ... *giraffae* (the *Kameel doorn*), is one of the most widely dis... buted; others are armed with formidable thorns. These occur also ... ough sparingly, on the southern side of the Orange River; and ... m their existence, from the abundance of Twa grass, the presence ... certain genera which do not occur further south and the absence ... the composite shrubs, we may infer that this tract, known as ... shmanland, belongs to the Kalahari Region. The much ... ntroverted point as to whether the Orange River forms the floral

boundary of the Colony, may now be regarde
negative.* The Olive of the Colony (*Olea re*
here, and a number of smaller shrubs as
Grewia, Rhus, Tarchonanthus, Vangueria,
Lycium, &c. The Mesembryanthemums of t
succulent Ficoideæ, as also Crassulaceæ, appea
though not entirely absent. A species of Atr
valuable for stock in Bechuanaland. As ver
known respecting the plants found in this Regi
following list of genera mentioned by Burchel
yond Litakun, collected by Dr. Muskett nea
found by myself near Kimberley and Barkly, i
part of the Region: Clematis, Cissampelos, S
phila, Senebiera, Lepidium, Cleome, Cadaba, Ca
Polygala, Anacampseros, Talinum, Sida, Sph
Melhania, Hermannia, Maherina, Grewia, Co
Celastrus, Zizyphus, Aitonia, Rhus, Crotalari
Psoralea, Indigofera, Bolusia, Sesbania, Vigna,
Elephantorrhiza, Vahlia, Cotyledon, Myriophy
Combretum, Mesembryanthemum, Tetragonia,
naceum, Vangueria, Vernonia, Pteronia, Ni
Chrysocoma, Tarchonanthus, Helichrysum, G
Senecio, Othonnopsis, Osteospermum, Wahle
Royena, Euclea, Menodora, Olea, Raphionacm
Gomphocarpus, Dæmia, Barrowia, Ceropegia,
Trichodesma, Heliotropium, Lithospermum, Ipom
Evolvulus, Falkia, Solanum, Lycium, Aptosimu
Nemesia, Rhigozum, Pterodiscus, Harpagophy
Barleria, Justicia, Bouchea, Ocimum, Salvia, S
Boerhaavia, Celosia, Hermbstaedtia, Sericocoma, A
Oxygonum, Arthrosolen, Loranthus, Euphorbia
Salix, Laneria, Cyanella, Babiana, Gladiolus, Crin
Buphane, Asparagus, Aloe, Bulbine, Eriospermu
Tulbaghia, Dipcadi, Ornithogalum, Cyperus, Andr
tiria, Aristida.

On the west coast near Walwich Bay is the v
Welwitschia mirabilis, (Tumboa) of the Order Gne
singular Cucurbit, *Acanthosicyos horrida*, the fruit
by the natives.

Towards the eastern edge of the Region, includ
Transvaal, and the Free State the Flora passes gradu
of the Tropical African Region, and is especially
types in the neighbourhood of the well-known M

* On this point I am indebted for valuable information to Mr. E
to Dr. E. B. Muskett of Hope Town, who first pointed out to me t
on this subject of Burchell, usually so accurate, were mistaken.

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b undary of the Colony, may now be regarded as
negative.* The Olive of the Colony (*Olea verrucosa*)
here, and a number of smaller shrubs as Capparis,
Grewia, Rhus, Tarchonanthus, Vangueria, Euclea,
Lycium, &c. The Mesembryanthemums of the Cap
succulent Ficoideæ, as also Crassulaceæ, appear to be
though not entirely absent. A species of Atriplex is
valuable for stock in Bechuanaland. As very little is
known respecting the plants found in this Region, I
following list of genera mentioned by Burchell, who
and Litakun, collected by Dr. Muskett near Hope
and by myself near Kimberley and Barkly, in the s
part of the Region: Clematis, Cissampelos, Sisymbri
..la, Senebiera, Lepidium, Cleome, Cadaba, Capparis
P..ygala, Anacampseros, Talinum, Sida, Sphæralcea
M..ania, Hermannia, Maherina, Grewia, Corchorus
..astrus, Zizyphus, Aitonia, Rhus, Crotalaria, Arg
..ralea, Indigofera, Bolusia, Sesbania, Vigna, Cassia
..antorrhiza, Vahlia, Cotyledon, Myriophyllum,
..bretum, Mesembryanthemum, Tetragonia, Aizo
..um, Vangueria, Vernonia, Pteronia, Nidorella,
..ysocoma, Tarchonanthus, Helichrysum, Geigeria,
..ecio, Othonnopsis, Osteospermum, Wahlenbergia,
..na, Euclea, Menodora, Olea, Raphionacme, Pachy
..phocarpus, Dæmia, Barrowia, Ceropegia, Sebæa,
..odesma, Heliotropium, Lithospermum, Ipomæa, Conv
..vulus, Falkia, Solanum, Lycium, Aptosimum, Peli
..esia, Rhigozum, Pterodiscus, Harpagophytum, S
..ria, Justicia, Bouchea, Ocimum, Salvia, Stachys,
..haavia, Celosia, Hermbstaedtia, Sericocoma, Atriplex,
..onum, Arthrosolen, Loranthus, Euphorbia, Croton,
, Lanaria, Cyanella, Babiana, Gladiolus, Crinum, Brun
..ine, Asparagus, Aloe, Bulbine, Eriospermum, Anthe
..ghia, Dipcadi, Ornithogalum, Cyperus, Andropogon,
Aristida.

The west coast near Walwich Bay is the very rem
..chia mirabilis, (Tumboa) of the Order Gnetaceæ;
r Cucurbit, *Acanthosicyos horrida*, the fruit of which
natives.

..rds the eastern edge of the Region, *including part of*
..l, and the Free State the Flora passes gradually over to
Tropical African Region, and is *especially rich in*
the neighbourhood of the well-known Magaliesberg

*..ent I am indebted for valuable information to Mr. E. J. Dunn, and
Muskett of Hope Town, who first pointed out to me that the state
of Burchell, usually so accurate, were mistaken.*

..e collections in the Transvaal have been considerable, but I do ..t treat of them here chiefly because of their intermediate ..racter.

European Plants in the Cape Colony.

The following remarks on the European plants found in the ..ape Colony apply to all those parts of the several Regions I ..ve visited; but not to Kaffraria and Natal, which I do not ..ow, except from the reports of others. I have already referred .. the fact that such plants are seldom found at any con..derable distance from human habitations, or from waysides. ..e may walk for a whole day over mountain-sides, or even plains, ..d scarcely see a European plant. On Table Mountain, which, .. everyone knows, is close to Cape Town, the resort of Europeans ..r 200 years past, if the observer leaves the low vallies, where, up .. 500 feet, the common species I have named above on page 296 ..ay be found* together with such plants as *Verbena officinalis*, *..erbascum virgatum*, *Phytolacca decandra*, *Sanicula Europaea*, *..ypochaeris glabra*, *Anagallis arvensis*, &c., he will find little or ..othing beyond. In fact I can remember no plant at an elevation ..f 1,000 feet except *Bartsia Trixago*, and even that is by no means ..equent. It is almost the same on the plains when one has left ..ouses and roads a few miles away. By some watercourse or ..ream, *Epilobium hirsutum*, *Lythrum hyssopifolium*, *Cotula corono..folia*, or some other water-loving plants may be met with, but ..ttle else. Nor is the case different in other parts of the Colony ..d on the higher mountains. On the highest parts of Compass..erg (8,500 feet ?) and on the Winterhoeksberg (6,500 feet) I did ..ot find a single European species, or indeed any foreign species. .. is true the situation was there unfavourable for many plants, ..eing steep, rocky and sometimes dry. Yet the first named has ..ummer thunderstorms and winter snows, and the latter regular ..inter rain and snow, and it might have been expected that some ..ardy alpine species could here have found a lodgment. On ..he lower mountains of the Eastern Region may be found *..halictrum minus*, *Agrimonia Eupatoria*, *Bartsia Trixago*; I can ..ecollect no others. On the Sneeuwberg mountains the first-named ..nd *Blitum virgatum*.

These facts seem to show that the arrival of the majority of the ..troduced foreign plants in South Africa is of comparatively recent ..ate; of the great bulk of them probably contemporaneous with ..hat of civilized man.

The subject of European genera found within the Colony is a ..uch wider one; but I am unable to enter upon it here.

* I have there omitted *Erigeron Canadense*, a common wayside weed.

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Summary.

Speaking generally, and disregarding exceptio
the Regions of South Africa is distinguished :—

1. By its highly differentiated character.
2. By its want of luxuriance of growth (but
   Tropical Region must be excepted).
3. By the narrow distribution area of each spe
4. By the deficiency of trees.
5. By the paucity of sociable plants.
6. By its power to resist the aggression of fore

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SKETCH

OF THE

FLORA OF SOUTH AFRICA

BY

HARRY BOLUS, F.L.S.

(*Off-print from the "Official Handbook of the Cape of Good Hope,"* 1886.)

CAPE TOWN:
W. A. RICHARDS & SONS, PRINTERS, CASTLE STREET.
1886.

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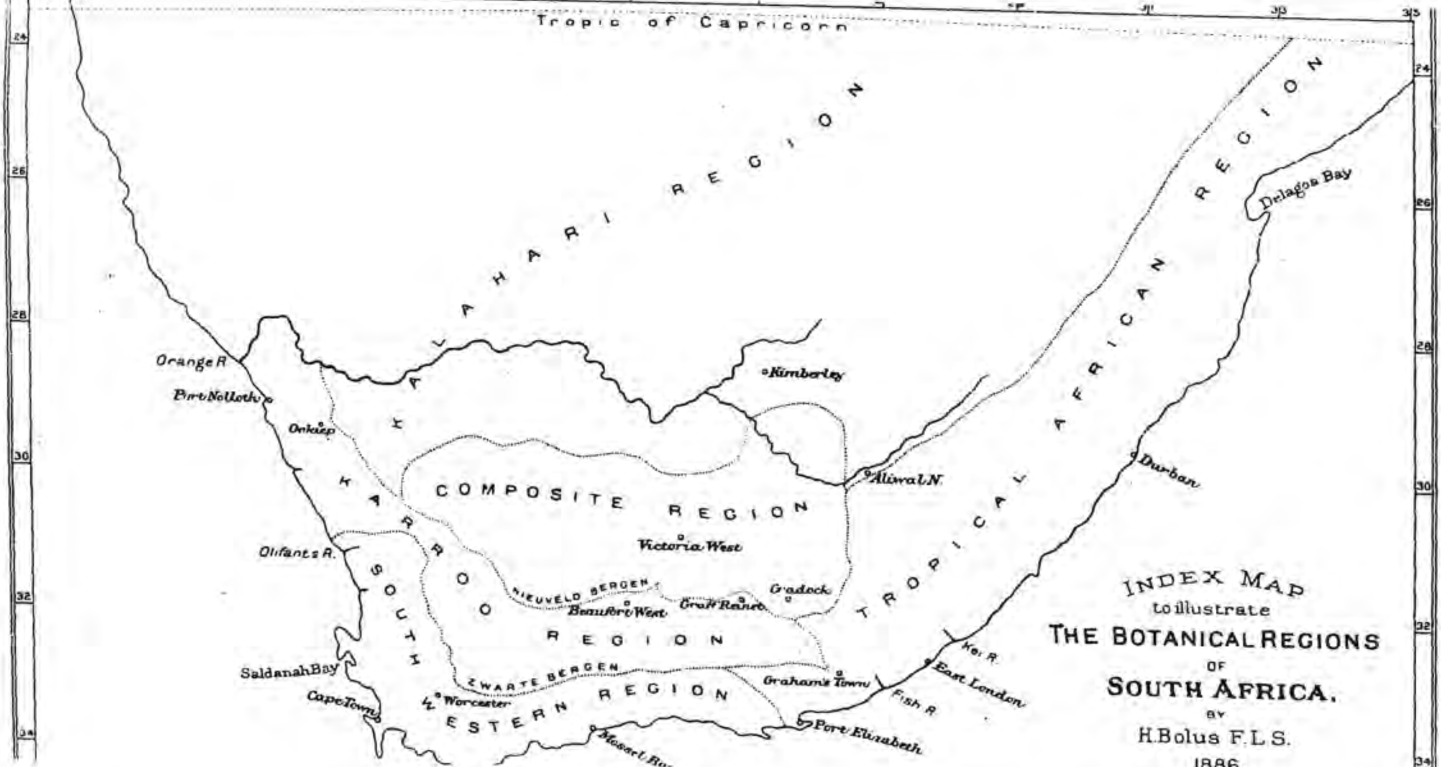
Tropic of Capricorn
KALAHARI REGION
TROPICAL AFRICAN REGION
Delagoa Bay
Orange R.
Port Nolloth
Okiep
Kimberley
Aliwal N.
Durban
COMPOSITE REGION
Victoria West
KARROO REGION
Olifants R.
NIEUVELD BERGEN
Beaufort West
Graff Reinet
Cradock
SOUTH WESTERN REGION
ZWARTE BERGEN
Grahams Town
Saldanah Bay
Cape Town
Worcester
Port Elizabeth
Fish R.
Kei R.
East London
INDEX MAP
to illustrate
THE BOTANICAL REGIONS
OF
SOUTH AFRICA.
BY
H.Bolus F.L.S.
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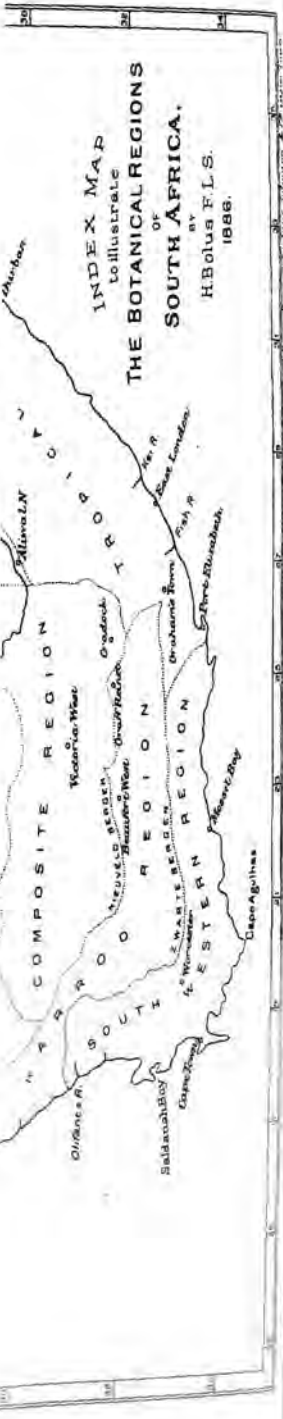

SKETCH OF THE FLORA OF SOUTH AFRICA.

By Harry Bolus, F.L.S.

I have been asked to contribute to this Handbook an account of the Flora of South Africa. I willingly comply; but I desire it to be understood that, since the time and space placed at my disposal are restricted within narrow limits, I cannot give more than the merest outlines of a great subject, and but a small part of a large mass of observations made during many years.

RICHNESS OF THE SOUTH AFRICAN FLORA.

Ever since the time of its first settlement the Cape has been a constant source of pleasure and delight to the botanist and the gardener. Though Cape plants have somewhat gone out of fashion of late years, it is still probably true that no single country in the world has contributed so largely to European conservatories and gardens as the Cape of Good Hope. The despatch of plants, indeed, began before the settlement by Van Riebeek, for we find that one Heurnius, a missionary *en route* to the East, had sent to his brother at Leyden, several curious plants which were figured by Stapel in his edition of Theophrastus' History of Plants, published at Amsterdam in 1644. These are the earliest known figures of Cape plants, and amongst them was the well known *Orbea variegata* of the Lion's Rump, which was called a Fritillary, and an Oxalis which, with equal reason, was styled a Trifolium! But those were the days before Linnaeus had arisen with master mind to reduce to order the rapidly increasing stores of vegetable forms. In 1772 came Thunberg, the Father of Cape Botany; in 1810, Burchell; in 1825—1834, Ecklon, Zeyher and Drège. All these made journeys of thousands of miles, and of several years in duration, exploring the vegetation of the country. Besides them were others of less note, and a host of gardeners and collectors of seeds and living plants. From 1775 to 1835, Cape plants may be said to have been quite the rage. The conservatories, temperate houses, and gardens of England and the continent teemed with the Pelargoniums, Heaths, Proteas and other handsome flowering shrubs, and the lovely bulbous plants of Irideae, Amaryllideae and Liliaceæ; and the pages of the Botanical Magazine and other similar periodicals were filled with figures and descriptions of them.

The public taste of that day was amply justified. Perhaps the recently increasing exportation of flowering bulbs may be taken as an indication that the fashion will be revived. But though fashion in flowers may be variable, the interest of science is more permanent; and notwithstanding the diligent exploration of the country

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for the last hundred years, the constant discovery of new
even up to the present day, has largely occupied the atte
systematic botanists.

Without the means, in the present state of our knowle
precisely comparing the relative number of species of flo
plants in this, and any other portion of the earth's surface, e
is known to enable us to say that South Africa ranks amon
richest of regions. But if we ascend to those higher syst
groups called Genera and Orders, we can speak with a
approach to accuracy. These may be compared in two
First, for the sake of the general reader, the numbers of t
South Africa (and by the term South Africa let it be unde
that I mean always Africa South of the Tropic of Capricorn
be compared with the known total for the whole world.
latter is taken from Bentham and Hooker's *Genera Pla*
(Journal of Botany xxi, 156) :—

Whole World	Orders 200 :	Genera 7569
South Africa	„ 142 :	„ 1255

Secondly, we may compare South Africa with another count
the same hemisphere, for the most part in the same temperate
and of which the Flora is about as well known as that of
Africa, *e.g.*, Australia.

I take the figures for the latter from Sir J. D. Hooker's
known Essay: *On the Flora of Australia* (*London*, 1859). A
have the following result :—

Australia	Orders 152 :	Genera 1300
South Africa	„ 142 :	„ 1255

The area, however, of Australia is five times larger than t
extra-tropical South Africa ; and what is of more importance
fact that its eastern coast line runs up into the tropics to nearl
10th degree of S. latitude. It will be evident, therefore,
much richer in variety of forms, relatively to area, is the Sou
extremity of the African continent, than that of Australia.

There is another interesting point in the number of end
genera in each area, that is, of genera exclusively restricted to
country. In Australia these are about 520 (Hooker) ; in S
Africa 446.

Why South Africa should be so rich in vegetable forms,
question which cannot yet be fully answered. Proximate ca
appear to be

(1) The meeting and partial union of two (perhaps th
distinct Floras of widely different age and origin.
(2) A highly diversified surface of the land and of soil.
(3) A climate with much sunlight (or little cloud) ; a co
tion which seems everywhere favourable to the multi
cation of forms.

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No one could form an adequate or accurate conception of the Flora of South Africa who should regard it as a single Region. Meyer and Drège (*Comment. de Plant. Afr. Austr. Lipsiae*, 1835) divided the Colony south of the Orange River and Natal, into five Regions, and numerous districts and sub-districts. The value of Drège's observations cannot be over-estimated, and form the necessary basis of all later investigations; but the divisions were too numerous, and broad distinctions were over-loaded with a mass of subordinate detail. Grisebach (*Vegetation der Erde, Leipzig* 1872) regarded the Colony proper as far eastward as the Kei River, as forming one Region: the "Cape"; Eastward of this he brought down the continuation of his vast "Soudan Region," and north of the Orange River, he constitute l his "Kalahari Region" out of Great Namaqualand, Damaraland, Bechuanaland, &c. As far as they go, and except for the error in supposing the Orange River to be a floral boundary, these Regions appear to me to be natural. But Grisebach's "Cape Region" cannot possibly be regarded as one; it must be divided into two at least; and perhaps with more propriety into three. The Flora of the Karroo of the Cape may probably prove to be more distinct from that of the South-western portion of the Colony, than is the latter from that of Australia.

I propose, therefore, to regard South Africa as including five natural Regions, two of which extend beyond its limits, while the others are included within them. These are:—

(1) The South Western Region
(2) The Tropical African ,, (Grisebach's "Soudan")
(3) The Karroo ,,
(4) The Composite ,,
(5) The Kalahari ,, (Grisebach)

The South Western Region.

It is the South Western Region which has for the most part furnished that large quantity of garden plants which I have referred to above, and which is the home of what has been for the last hundred years popularly known as the Cape Flora. It is an angular littoral strip, bounded on the west coast by the Olifant's River and the mountains near it, but including properly the mountain range from Cedarbergen up to the Khamiesbergen; on the east by the Van Staden's mountains; and inland by considerable mountain chains under various names. Its greatest width does not exceed eighty miles, and probably averages not more than fifty miles. The inland mountain chains referred to may average 4,000 feet in height, attaining sometimes (Great Winterhoek) 6,800 feet. The surface of the Region is extremely diversified; sandy and bushy tracts alternating on the coast with grassy downs, and vast mountain slopes of the most barren

appearance when lying a short distance inland, but clothed w immense variety of small plants.

The soils are varied, the exposed rocks being chiefly gr clayslate (Malmesbury beds: Silurian?) and sandstone (Mountain Sandstone: Devonian); with insignificant excep tertiary deposits are absent, occurring only in low places a shallow depths. Throughout South Africa the influence of upon the distribution of plants appears to be less im ortant that of climate and exposure.

Rivers are few, and badly supplied with water except in wi practically, none of them are navigable.

The mean annual temperature of Cape Town is 16°25 C. (Fahr.); of the six summer months 20° C., and on the six w months 12°5 C.; the mean annual humidity of the atmosphere per cent.; the mean annual rainfall in the city itself is inches; but in the suburbs it reaches in some localities to 60 in Further inland the temperature is higher, the extremes gre and the humidity and rainfall much less. At Worcester, si about 60 miles from Cape Town, the mean annual temper rises to 16·93 C.; the humidity is 54·40 per cent.; and average rainfall is 12·47 inches. About two-thirds of the w rainfall takes place during May, June, July and August; and months of January to April are usually very dry. The w rainfall of this Region attains its maximum near Cape To and diminishes rapidly as we proceed northward up the west c

The prevailing aspect of the vegetation of this and the two Regions, thus of the whole Cape Colony except the eastern region, is that of a number of low-growing scattered shrubs dark or blueish green hue. With considerable exceptions thi nevertheless, the appearance which most commonly meets the Almost everywhere the "bush" is present. There are vast tr called the "Boschjesveld" (bush country), from the uniformit this appearance. There, the chief bush is the "Rhenosterbus (*Elytropappus rhinocerotis*); but these are intermingled with oth and in general they belong to the most various Orders. All h usually very small leaves, or of greyish green colour, or so cove with a dull coloured indument, as to produce at a distance generally sombre aspect. On the coast the bushes are larg ranging from 4 to 8 feet. The following genera are some of th which by their abundance largely contribute to make up the flo landscape:—Mundtia, Pelargonium, Agathosma, Celastrus, C sine, Phylica, Rhus, Cyclopia, Borbonia, Aspalathus, Cliffor Berzelia, Brunia, Staavia, Tetragonia, Aster, Athanasia, Stoe Metalasia, Erica, Simocheilus, Myrsine, Euclea, Lycium, Lobos mon, Salvia, Penæa, Passerina, Leucadendron, Protea, Leu spermum, Serruria, Myrica, &c. Interspersed among these

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orbonia, Aspalathus, Cliffortia,
nia, Aster, Athanasia, Stoebe,
sine, Euclea, Lycium, Lobostemon,
Leucadendron, Protea, Leuco-
Interspersed among these are

numerous plants of the orders Orchideæ, Irideæ, Amaryllideæ, Liliaceæ, with scattered tufts of Restiaceæ, sedges, and grasses.

In the deep ravines of the mountain sides are dwarf trees, growing closely, with dark foliage. Few indigenous trees attain a greater height than 25 to 30 feet; and amongst these is the Silver Tree (*Leucadendron argenteum*), peculiar to the Cape Peninsula. Forests are only met with towards the Knysna and Zitzikamma. These are chiefly composed of species of Podocarpus (Yellow-wood), Ocotea (Stinkwood), Ptæroxylon (Sneezewood), Olea (Olive), Elæodendron (Saffronwood), Cunonia (Rood Els), Virgilia (Keurboom), Olinia (Ironwood), Cussonia, Ficus, Grewia, Curtisia, Sideroxylon (Milkwood), Rhus, &c., &c. Those of which the vernacular names are quoted yield excellent timber. Trees of the Podocarpus occasionally attain a height of 50 to 60 feet; but few of the others exceed 25 to 30 feet.

There is little change in the aspect of the vegetation even at greatly varying heights on the mountains; and near the coast especially it is much less affected by altitude than is the case in Europe. On Table Mountain some species are found from the bottom to the top, having thus a vertical range of 3,500 feet; and there are many with a range of from 1,000 to 2,500 feet.

The flowering season begins about the end of May immediately after the first winter rains. The numerous species of Oxalis first made their appearance, and these are soon followed by great numbers of Irideae, Amaryllideae, Liliaceae, and other bulbous plants besides Mesembryanthemums and various Compositae. On the mountains the flowering begins later and continues longer; but though few plants may be found in flower in March and April, yet they are never wholly absent. The imported oak has shed its leaves for a period of six or eight weeks only (during May and June) before the new growth begins. Everything points to the fact that the true winter, the period of rest, is here the dry season, viz., March—May; as soon as rain falls even the winter temperature is sufficient, and vegetable life is at once aroused to activity.

A few of the most beautiful, striking, or curious vegetable forms of the region may here be mentioned, the majority of the examples being taken from the highly representative and rich flora of the Cape Peninsula, lying on its western extremity. The palm of beauty must be awarded to the *Disa grandiflora*, the grandest of southern terrestrial orchids, as *Cypripedium spectabile* is of the northern hemisphere. This is abundant on the streams of Table Mountain, and is found also on the Hottentot's Holland mountains, thirty to forty miles inland. Other fine orchids are *Satyrium coriifolium*, a brilliant orange, *S. carneum* and *S. erectum*, *Disa longicornis*, a lovely blue, *D. secunda*, the delicate white *D. fasciata*, and others; *Pterygodium acutifolium*, a fine deep golden yellow, *Ceratandra*

chloroleuca, and *C. Harveyana;* the brilliant blue *Disa* (Hers *graminifolia* (long known as *H. coelestis*) and the all *venusta*, and *D. purpurascens;* and, finally, the small beau fringed spider-like *Bartholina pectinata* and *B. Ethelae.* upon these presses the so-called "Arum," the *Richardia a* with its pure white spathe,—almost as common an ornamen moist low-lying ground as the common dock is an accompanin English ditches. The Proteas are universal objects of admi and few things can surpass *P. cynaroides*, with its flesh-co involucres, *P. speciosa*, *P. coccinea*, and a few others. The si *Leucadendron argenteum*, or Silver Tree, is a striking ornam the mountains about Cape Town. Next come the Heaths, names would be legion. The most beautiful, and those wit largest flowers, are denizens of the mountains lying betwee Hottentot's Holland range and the town of Swellendam, especially abundant about Caledon and Genadendal. On Mountain, *Erica cerinthoides*, *E. mammosa*, *E. coccinea*, *E. sp* and *E. hirta* are amongst the finest, the latter sometimes mak whole mountain side glow with its warm pink tints. Ther probably 350 species of true heaths found in this Region Amongst Compositae, *Gazania* has some fine species, *Helichrysum vestitum*, *Helipterum*, spp., and *Phoenocoma lifera*, are amongst the showiest of the everlasting flo the heads of the first-named being gathered, dried, and ported in large quantities to Europe as *immortelles*. *Dimorph annua* has gay white rays, and, with some species of *Arctotis*, n the fields look bright in spring. In the large Order, Legumin *Podalyria calyptrata*, with its large rosy flowers, may, per lead the list, and *Virgilia Capensis*, *Cyclopia spp.*, *Hypocal obcordatus*, and the wide spread *Sutherlandia frutescens*, amongst the few handsome plants of an Order not remarkabl its beauty in this Region, but which consists for the most pa inconspicuous shrublets. The Acacias are deficient; only *A. hor* occurring sparingly in the drier parts of the Region. The P goniums are abundant, and several species, *P. cucullatum*, *betulinum*, &c., are very handsome. Oxalises with white, red, yellow flowers, stud the fields in early spring. The nume species of the tribe Diosmeae, including Diosma, Barosma (s of which as *B. crenulata*, &c., furnish the Buchu of medici Agathosma, Adenandra, &c., are mostly confined to this Reg The attractive *Rochea coccinea*, is one of the chief ornament Table Mountain; while the Cotyledons contribute some of most curious plants of the Region, especially *C. fascicularis*, w its smooth, thick, swollen tree-like stem; very abundant in neighbourhood of Worcester and Hex River. Near the Tulba Waterfall occurs the rare and pretty *Ixianthes retzioides*, and

the brilliant blue *Disa* (Herschel's *H. coelestis*) and the allied ... and, finally, the small beautiful ... *pectinata* and *B. Ethelae*. C... "Arum," the *Richardia africana*, ... most as common an ornament ... ommon dock is an accompaniment ... are universal objects of admiration ... *cynaroides*, with its flesh-colour... *ca*, and a few others. The singular ... er Tree, is a striking ornament ... rn. Next come the Heaths, which ... most beautiful, and those with the ... the mountains lying between the ... the town of Swellendam, between ... lon and Genadendal. On Table ... *mammosa*, *E. coccinea*, *E. spumosa* ... st, the latter sometimes making ... its warm pink tints. There are ... ths found in this Region alone ... has some fine species, which ... *n*, spp., and *Phoenocoma prolifera* ... st of the everlasting flowers ... being gathered, dried, and ex... pe as *immortelles*. *Dimorphotheca* ... h some species of *Arctotis*, make ... n the large Order, Leguminosæ ... ge rosy flowers, may, perhaps ... *sis*, *Cyclopia spp.*, *Hypocalypta* ... d *Sutherlandia frutescens*, an ... of an Order not remarkable for ... h consists for the most part of ... as are deficient; only *A. horrida* ... rts of the Region. The Pelar... al species, *P. cucullatum*, *P.* ... Oxalises with white, red, and ... early spring. The numerous ... ling Diosma, Barosma (some ... ish the Buchu of medicine), ... tly confined to this Region. ... ne of the chief ornaments of ... dons contribute some of the ... specially *C. fascicularis*, with ... tem; very abundant in the ... x River. Near the Tulbagh ... *Ixianthes retzioides*, and in ...

the same neighbourhood, the curious *Roridula dentata*, a shrubby Droseraceous plant with extremely viscid leaves, which the farmers hang up in their houses in order to catch flies. The showy *Polygala oppositifolia* and *P. myrtifolia* are both widely distributed. Plants parasitic on the roots of others take a prominent position in our Flora. They include several handsome Harveyas, white, purple, and orange; and in other orders the *Cytinus dioicus*, the curious *Hydnora africana*; the foul smelling *Sarcophyte sanguinea* and *Mystropetalon* spp. Labiatæ are not plentiful, but *Salvia paniculata* and *S. nivea* are fine species. Turning to the *Monocotyledons*, Orchideæ have already been mentioned, Irideæ are abundantly represented in handsome species of Romulea, Geissorhiza, Ixia, Gladiolus, Watsonia, Babiana, etc.; Amaryllideæ in *Amaryllis Belladonna*, Nerine, Brunsvigia, Vallota, etc.; Scitamineæ in the peculiar and noble Strelitziæ. Liliaceæ are very varied and numerous. The most conspicuous are the Aloes,—*A plicatilis* with an arborescent trunk, attaining a height on the western mountains of 12 to 15 feet; the beautiful blue Agapanthus; the star-like Ornithogalums; *Kniphofia alooides*, and many others. *Prionium Palmita* is a remarkable plant with the flower of a Juncus, and the habit of a pine-apple, which in some parts fills the beds of certain western rivers, and reaches a height of eight or ten feet. Some Restiaceæ and Cyperaceæ attain to six or seven feet, and often form a striking feature in the landscape. Ferns are not very abundant, chiefly occurring in the deep ravines, where the arborescent *Hemitelia Capensis* is found several feet in height; and *Todea africana* forms a handsome plant. *Osmunda regalis* is sparingly met with, while *Pteris Aquilina* is more commonly scattered on the open hillsides.

It is in the orders and genera of plants exclusively or chiefly found here that the most striking differences are to be found between this and the other Regions of South Africa. An immense mass of observations has been collected, but has not yet been tabulated. It must suffice to say that this Region is distinguished by the comparative abundance of the Orders: Rutaceæ, Bruniaceæ Ericaceæ, Penaeaceæ, Proteaceæ, Irideæ and Restiaceæ; by the tribe Stilbeæ of the Order Verbenaceæ; and by the large proportionate number of the following Cape genera, of those richest in species, belonging to other Orders: Pelargonium, Oxalis, Phylica, Aspalathus, Cliffortia.

The following list of the sequence of Orders according to the numbers of species of each is chiefly based upon Drège's collections which were very large and general. He, however, or rather Ernst Meyer, considerably over estimated the number of species both of Restiaceæ and Irideæ; and to follow his results implicitly would be misleading. I have therefore framed the following list in which the position of those Orders has been reduced:—

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1. Compositæ
2. Leguminosæ
3. Ericaceæ
4 Proteaceæ
5. Irideæ
6. Geraniaceæ
7. Gramineæ
8. Cyperaceæ
9. Restiaceæ
10. Liliaceæ
11. Orchideæ
12. Rutaceæ
13. Scrophularineæ

The fact of five such Orders as Ericaceæ, Proteaceæ, Ir Geraniaceæ, and Restiaceæ, occupying so high a positio sufficient to stamp this Region with a character pecu its own.

Very remarkable is the deficiency of Rubiaceæ. This C which is the fifth natural Order of the World, and the 2n India, does not only not find a place in the above list, but act constitutes less than one per cent. of the total Flora. The fo ing large Orders are also very poorly represented: Myrt Aroideæ (each 1 species); Laurineæ (3 sp.); Acantha Labiatæ and Asclepiadeæ.

No trustworthy calculation of the number of species occurrin the Region is available. Drège collected 2,914 species; I sh estimate the total at about 4,500 species. The richness of ce localities is very great. On the Cape Peninsula alone, an about one-fourth larger than the Isle of Wight, I have colle eighty species of Erica, and nearly one hundred species Orchideæ; and the total number of species of flowering plan probably nearly two thousand.

The affinities of the Flora of this Region with that of Austr especially of South Western Australia, are very striking, and l already been shewn by Sir J. D. Hooker (loc. cit.), from Australian point of view.

Two very distinct Orders: Proteaceæ, and Restiaceæ, abundant in both regions, and, except for a few outliers, do occur in any other countries: yet they have no single species, only two or three genera, in common, out of many. Protea form the third Order of the Australian Flora, and the fourth this Region. Diosmeæ, a large tribe of Rutaceæ abundant this Region, find a counterpart in Australia, in the tribe Bo nieæ of the same Order. The tribe Ericeæ of the order Ericac has over 400 species in this Region alone; not one occurs Australia, but the place of the tribe is taken by the large Or Epacrideæ, closely allied to it, and which is almost confined Australia.

The following table of the nine largest Australian Orders taken from the same source, and is compared with the preced list of the Orders of this Region. I carry the latter up to twel not being quite sure of the sequence of the smaller orders:—

Australia.	*S. W. Region, S. Africa.*
1. Leguminosæ.	Compositæ.
2. Myrtaceæ.	Leguminosæ.
3. Proteaceæ.	Ericaceæ.
4. Compositæ.	Proteaceæ.
5. Gramineæ.	Irideæ.
6. Cyperaceæ.	Geraniaceæ.
7. Epacrideæ.	Gramineæ.
8. Goodenovieæ	Cyperaceæ.
9. Orchideæ.	Restiaceæ.
	Liliaceæ.
	Orchideæ.
	Rutaceæ.

The number of identical genera in the foregoing orders is extremely small. Of species, not one is known to be common to both Regions. There is no genus of Rutaceæ or Proteaceæ; and only three of Restiaceæ (Restio, Leptocarpus, Hypolaena), common to both Regions. In other Orders the number of identical genera, if we except those of world-wide distribution, is extremely small. The following in Compositæ have been pointed out by Bentham (*Linn. Soc. Journ.* xiii, 552) :—

Brachycome	1	South African	36	Australian species
Helipterum	12	,,	30	,,
Helichrysum	137	,,	52	,,
Cassinia	1	,,	13	,,
Athrixia	6	,,	5	,,
Cotula	22	,,	9	,,

besides the cosmopolitan genera Senecio and Gnaphalium. Not all of these South African genera belong to this Region, nor any of them exclusively so; but Helipterum is very nearly restricted to it, while Helichrysum is widely distributed over the whole of Tropical as well as Southern Africa, though chiefly abundant in the latter. On this subject Bentham remarks (*l.c.* 553) :—"This approximation of the Compositæ of Australia and South Africa may possibly date from times less ancient than those in which they established a communication between the New and the Old World; and it may even have been less remote than the period in which flourished the common parents of Australian and South African Proteaceæ and Restiaceæ, or of Australian Epacrideæ and South-African Ericeæ; for it is exemplified not in tribes only, but also in identical genera and sections." Amongst Liliaceæ may be mentioned the recent discovery in this Region of Nanolirion, a close ally of Herpolirion hitherto only found in similar alpine situations in Australia, Tasmania, and New Zealand.

The following Orders, characteristic of Australian veget abound most, after Australia, in South Africa: Thym Haemodoraceae, Droseraceae (Hooker); and another poi approach is found in the remarkable deficiency in both cou of the widely diffused Orders, Rubiaceae, Laurineae, and Aro

On the other hand there are certain remarkable divergenci pointed out in the following list, taken with modifications fro J. Hooker's Essay before quoted.

The following Orders are represented in the Flora of this Re but are either comparatively rare or absent in Australia:—

Fumariaceae, absent in Australia	Ericeae, absent in Australi
Geraniaceae.	Selagineae, ditto
Caryophylleae.	Stilbeae (tribe *Verben.*) dit
Rosaceae (Cliffortia).	Penaeaceae dit
Bruniaceae, absent	Podostemaceae dit
Crassulaceae.	Cytinaceae dit
Dipsaceae, ditto	Piperaceae dit
Campanulaceae.	Aloineae (tribe *Liliac.*) dit

Temperate Australia contains the following orders that are or absent in this Region:—

Dilleniaceae, absent in S. Africa	Epacrideae, absent in S. Af
Magnoliaceae, ditto	Loganiaceae
Tremandreae, ditto	Myoporineae, ditto
Stackhousieae, ditto	Monimiaceae, ditto
Sapindaceae.	Casuarineae, ditto
Haloragieae.	Cupuliferae, ditto
Myrtaceae (1 species)	Coniferae
Caprifoliaceae, absent	Johnsonieae (tribe of *Liliac.*)
Stylidieae, ditto	Xeroteae (tribe of *Juncac.*)
Goodenovieae, (1 species)	

It is also noteworthy that whereas in the Orchideae of Austr it is the tribes Vandeae and Neottieae which most largely pre (Ophrydeae being restricted to two species), in this Region Vandeae are few, and Neottieae completely absent, while Ophryd abound.

Sir J. Hooker conjectures the probability of a common orig of the Australian and South African Floras, derived from ancest inhabiting a vast antarctic continent, of which the greater part h been submerged. In connection with this it is not a lit remarkable that geologists tell us that the surface of the S. Region consists of the older rocks which are known to exist South Africa; the most recent being the Table Mountain San stone, which seems to be generally regarded as Devonian. B this hypothesis must be understood as referring exclusively to th portion of South Africa which is included in the Region I a

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now treating of. The affinities of this Region with that of other countries are more obscure, are certainly very slight and have not hitherto been elucidated.

On the eastern boundary the Flora of this Region passes gradually into that of the Tropical African Region, and on the north, where, however the boundary is much sharper and more defined, into that of the Karroo Region.

The foreign vegetation naturalised in the Region demands a brief notice. I have made a list of about 158 species, of which the great majority are wide-spread European plants, with a few American and Indian species, which have been recorded as more or less naturalised throughout South Africa. The observations are imperfect as regards the eastern region, and the whole number would probably be nearer 200 species. Of these about 130 may be found within ten miles of Cape Town. Yet only the following can be said to occur in sufficient number in that locality to attract attention:—*Fumaria officinalis*, *Sisymbrium officinale*, *Brassica nigra*, *Raphanus Raphanistrum*, *Trifolium angustifolium*, *Serpicula repens*, *Sonchus oleraceus*, *Solanum Sodomaeum*, *Datura Stramonium*, *Nicotiana glauca*, *Rumex acetosella*, *Panicum sanguinale*, *Briza maxima*, *Pteris aquilina*. A species of prickly pear, *Opuntia Tuna?* which is very abundant and troublesome in the Karroo Region, occurs also in the drier eastern portions of this Region. *Pinus pinea* (the stone pine) *Pinus pinaster*, and *Quercus pedunculata*, have been largely planted, but cannot be said to grow spontaneously; although when once sown, the first named is one of the few introduced plants which can contend successfully against the indigenous undergrowth, in which the seed may be deposited without clearing, and which it at length overtops and finally destroys. Few of the introduced plants are found far from roadsides or human habitations, and it is remarkable how small upon the whole is the influence they exert upon the aspect of the vegetation, and how weak (with the sole exception of the *Opuntia* referred to) is their aggressive power as against the indigenous Flora.

THE TROPICAL AFRICAN REGION.

This Region occupies almost the whole portion of the continent which lies between the tropics. Owing to the warm and moist climate caused by the currents of the Indian Ocean, the Flora retains a sub-tropical character to an extent very much greater than that of the west coast; and the Region puts forth an arm, which reaches about as far south as Port Elizabeth, and the Van Staden's mountains. From the Zitzikamma forest on the one side, to the ending of the Zuurberg range near Graham's Town on the other, may be regarded as a debateable territory, where the present Region overlaps and intermingles with the South Western Region.

Generally speaking, its inland boundary appears to be the high range of mountains which, under various names, and not alw quite continuously, run parallel with the coast—the Boschbe Kagaberg, Winterberg, Stormbergen, Quathlamba mountai Drakensbergen, &c. Thus it includes the Colonial districts Uitenhage and Somerset (in part), Albany, Bedford, Fort Beauf Peddie, Queen's Town, King William's Town, East London, a all the Transkeian territories, Natal, and Zululand, up to t tropic. The width of the Region ranges in this portion from to 100 miles.

The physical features of the country may be easily underst if it be remembered that a lofty mountain chain, reaching fr 5,000 to 10,000 feet in height, slopes down gradually to the s sending down numerous rivers which cut up the intervening cou try by their deep valleys. The surface of the country is extreme varied; large tracts of bush alternating with open grassy dow grass and bush sometimes intermingled in park-like stretch In the western portion (the Addo and Fish River) there are den thickets of bushes 10 to 15 feet high; further eastward and nort ward these become forests, and in many parts the slopes of t mountains facing the sea are covered with woods to the summi

The general aspect of the country is much greener and mo luxuriant than that of the South Western Region.

The climate of a Region stretching from the tropic to 34° S i of course, in some respects very different in different localitie At King William's Town, 1,300 feet above the sea, the mea annual temperature is about 18·9 C (66° Fahr.), the rainfall abou 26 in.; further inland the rainfall diminishes; towards Natal th temperature gradually rises, and the rainfall is somewhat greate At Pietermaritzburg, in Natal, at an elevation of 2,096 feet abov the sea, the mean annual temperature was 18·25 C (64°·83 Fahr) the rainfall 30·23 inches; the humidity of the air 70·30 per cent (*9 years' observations, Dr. Mann*). But the most striking differenc between the climate of this and the South Western Region is th fact that the one has chiefly summer, the latter chiefly winte rains.

The gradual transition from the South Western to the Tropical Flora is noticeable in the bordering districts already named. The Cycadaceous Encephalartos (Kaffir bread) pushes one of its species along the ridges of the Zuurberg as far west as the pass known as Salt Pan's Neck. Leguminous plants begin to abound, especially the bush *Schotia speciosa* (Boer boon) a decidedly eastern type; and the same dry tracts are occupied by a succulent Euphorbia with four angled thorny stems, *E. tetragona* (Noorsdoorn). In the woods near the coast, from the Knysna eastward, epiphytic orchids begin to occur (Polystachya, Angræcum and Mystacidium). Genera be-

longing to Malvaceæ, Sterculiaceæ, Rubiaceæ, Asclepiadeæ, and Acanthaceæ, become more numerous, both in individuals and species. The only *Sterculia* hitherto known in the Colony, *S. Alexandri*, occurs in the Van Staden's Mountains, but has been found nowhere else. *Sanseviera thyrsiflora* covers the hill-sides over large tracts, and affords excellent fibre, at present the subject of experiments in rope manufacture. The beautiful *Calodendron Capense* (Wild Chestnut) a tree of the Order Rutaceæ, occurs throughout the Region; it has been met with on the Zambesi, and even on the Kilimanjaro Mountain, a few degrees south of the equator. The number of trees of handsome foliage and showy flowers might almost be said to characterise the Region. I can only mention a few of them occurring in the Colony, Kaffraria and Natal:—*Boscia Caffra*, *Oncoba Kraussiana*, *Dombeya* (3 species), *Sparrmannia Africana*, *S. palmata*, *Turraea obtusifolia*, *Acridocarpus natalitius*, *Millettia caffra*, *M. Sutherlandi*, *Erythrina caffra*, *E. latissima*, *Sophora nitens*, *Calpurnia spp.*, *Schotia speciosa*, *S. brachypetala*, *S. latifolia*, *Gardenia spp.*, *Pavetta* (many species), *Burchellia Capensis*, *Alberta magna*, *Tricalysia Capensis*, &c. The number of flowering shrubs is also very considerable amongst Malvaceæ, Sterculiaceæ, Rubiaceæ, Asclepiadeæ, Scrophularineæ, Acanthaceæ, and many others. *Greyia Sutherlandi* is a curious Sapindaceous tree, with handsome crimson flowers, which extends from Kaffraria to Natal; it is allied to the endemic genera Melianthus, Aitonia and Erythrophysa, the two latter belonging, however, to the Karroo Flora. *Oldenburgia arbuscula*, a singular looking composite of dwarf arboreous habit and very large flower heads, occurs along the Zuurberg range, but must rather be regarded as an outlier from the South Western Region, where it has two congeners, *O. Papionum* and *O. paradoxa*. Vernonia, which is almost entirely absent from the latter Region, begins to abound here, and increases in species as we proceed towards the tropic. The "everlastings" are well represented in many fine species of Helichrysum; and even the *Elytropappus rhinocerotis* (the Rhenoster bush) has pushed up as far as Graham's Town. The Euphorbiaceæ begin to occur in considerable numbers in Albany and as will be seen presently, occupy a very important position in this Region. Amongst the succulent species is the noble *E. grandidens*, which attains a height of 30 feet or more in favourable situations, and forms a very characteristic feature in the the wooded ravines of the Region. The Coniferæ are not better represented than in the western districts—two Podocarpi (Yellow Woods), and the same *Widdringtonia cupressoides*, being all that occur. The Cycadaceæ have been mentioned already, but besides several species of Encephalartos there is the curious *Stangeria paradoxa* which comes down as far south as Lower Albany; and here it may be mentioned that the same genial climatic influences bring a

Palm within our limits, *Phœnix reclinata* being found in the v of the Kap River in the same district, this being probabl extreme boundary on the western side.

Amongst the Monocotyledons the Orchideæ have already mentioned. The difference between the South Western Re and the present one is here again evidenced. In the former species of the tribe Ophrydeæ largely predominate over the Vanc here, the proportions are reversed. In Natal, *Eulophia*, *Lissoch* and *Polystachya*, are abundant in species, and take the place of Disæ and Satyria of the west. *Calanthe natalensis* has lately b found as far south as the Perie Bush, near King William's To The *Strelitziæ* are found as far north as Natal, and may oc beyond that country. Some of the finest Irideæ belong to Region, especially the Gladioli, *G. psittacinus*, *G. papilio*, *G. Sa dersii*, &c. Amongst Amaryllideæ may be mentioned several species of Crinum, Brunsvigia, Hæmanthus and Clivia; Liliaceæ the noble *Aloe Bainesii*, a tree of from 40 to 60 feet height, and by far the largest and finest of the genus; a species of Gloriosa, Sandersonia, and Littonia. The Cyperaceæ a Gramineæ, as will be seen hereafter, yield a considerable numb of species; *Prionium Palmita* occurs in Lower Albany; a amongst the latter Panicum and Eragrostis predominate. B beyond the statement that a large part of the intervening tal land, (if that may be so called which is really a country of slopi downs) between the mountains and the coast, consists of gras tracts, I have no information as to the predominance of particul genera or species in individuals.

Coming now to the composition of the systematic groups mo prevalent in and characteristic of the Region, we possess thr considerable collections. That made by Drege, some fifty yea ago, included 2,278 entries of flowering plants, and was collecte over the whole area of the three Districts into which he divide the Region. Many of the entries are, however, of the same specie collected twice, or even thrice; so that it is only available for us as a whole, and even then upon the assumption that the numbe of species collected more than once, in each Order, bore an equa proportion to the whole. Secondly, a list of 1,193 plants, collecte in Albany district, mostly round Graham's Town, by my frien Professor MacOwan, and which he has kindly given me for thi purpose. Lastly, a list of 1,320 species collected by Mr. J. M. Woo in and near the Inanda, not far from Durban, Natal.

A few explanations are necessary respecting these collections It is true that the broadest result would have been obtained by amalgamating them; but this would have required more time than is available to me. The collection of Drege, being made over the widest area, should be the most representative; but it is

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certain that the Orchideæ were neglected by him. In MacOwan's collection there are 46 distinct species of Orchids; in Drege's only 41 entries over the whole area, including duplicate entries of the same species. In Wood's collection the Orchids probably occupy too high a place; many in his list were not named; I counted them, necessarily, as distinct species, when doubtless some were repetitions of the same species. On the other hand, the Cyperaceæ and Gramineæ in his list, reaching to only 2·2 and 1·4 per cent. respectively, have clearly been collected much below the average. With these remarks, I think it will be better to give the three lists, side by side; and in some respects, it will be more instructive, since a comparison of Wood's and MacOwan's well illustrates the known increase, as we proceed nearer to the tropic, of the Orders Rubiaceæ, Euphorbiaceæ and Acanthaceæ, and the decrease of Ficoideæ and Geraniaceæ:—

Drege's List.		MacOwan's List.		Wood's List.	
General.		*Local.*		*Local.*	
	Per cent.		Per cent.		Per cent.
Compositæ ..	14·	Compositæ ..	17·5	Compositæ ..	13·1
Leguminosæ..	9·9	Leguminosæ ..	7·6	Leguminosæ ..	8·4
Gramineæ ..	7·7	Gramineæ.. ..	6·9	Liliaceæ ..	5·
Cyperaceæ ..	4·5	Orchideæ	3·8	Orchideæ ..	4·2
Asclepiadeæ..	3·1	Scrophularineæ ..	3·1	Rubiaceæ ..	4·
Labiatæ ..	3·	Asclepiadeæ ..	3·1	Euphorbiaceæ ..	4·
Euphorbiaceæ	2·8	Cyperaceæ ..	3·	Asclepiadeæ ..	3·9
Rubiaceæ ..	2·7	Grassulaceæ ..	2·9	Acanthaceæ ..	3·1
Scrophularineæ	2·6	Geraniaceæ ..	2·4	Irideæ	2·8
Liliaceæ ..	2·6	Euphorbiaceæ ..	2·	Scrophularineæ	2·2
Acanthaceæ..	2·4	Irideæ	2·	Cyperaceæ ..	2·2
Malvaceæ ..	2·2	Liliaceæ	2·	Labiatæ.. ..	2·2
Irideæ ..	2·	Ficoideæ	2·	Celastrineæ ..	1·8
Orchideæ ..	1·8	Rubiaceæ	1·8	Gramineæ ..	1·4
Anacardiaceæ	1·5	Umbelliferæ ..	1·8	Malvaceæ ..	1·3

The difference between any one of these lists and that of the South-Western Region will be apparent at a glance: Ericaceae, Proteaceae, Restiaceae, and Rutaceae do not appear in the former at all; and Geraniaceae in only one of them, viz., that one collected nearest to the South-Western Region; while the position of the other Orders common to both, excepting Compositae and Leguminosae, is widely different. Wood's list includes 2 Rutaceae, 7 Ericæ, 2 Proteaceae; Bruniaceae and Restiaceae are entirely absent from it. About Graham's Town, however, MacOwan found 6 Rutaceae, 1 Bruniacea, 8 Ericæ, 6 Proteaceæ, 6 Restiaceæ. The two Regions appear to overlap widely; a few Ericaceae have been found on the mountain tops nearly up to the tropic, and one or two Proteæ occur in the Transvaal; while outliers of a tropical type penetrate the South Western Region as far as the Knysna forests, and even a little beyond.

I have not sufficient data of the Flora of tropical Africa mass, to attempt to trace the affinities between it and the Western Region. So far as that portion of the former is cerned which stretches south of the actual tropic, and const the subject of the present sketch, there is an agreement in the fac Compositae and Leguminosae occupy respectively the first second place amongst the Orders of each Region, as they do amo the Orders of the whole World. This is important when we in mind the undoubted affinity which exists between the Flo Tropical Africa and that of India, because in the latter cou the Orders Leguminosæ and Rubiaceæ take the first and sec place. The similarity, in other respects, will be shewn if we c pare the sequence of Orders in India with that of Wood's N list:—

India (*Hooker*)	Natal (*Wood*)
Leguminosæ	Compositæ
Rubiaceæ	Leguminosæ
Orchideæ	Liliaceæ
Compositæ	Orchideæ
Gramineæ	Rubiaceæ
Euphorbiaceæ	Euphorbiaceæ
Acanthaceæ	Asclepiadeæ
Cyperaceæ	Acanthaceæ
Labiatæ	Irideæ

If it be remembered that, as I have said above, Wood's list certainly unduly deficient in Gramineæ and Cyperaceæ, whi should probably be included in the above, and would throw o the two lowest orders, it will be seen that there is a considerab agreement between the two.

The lists of Drège, MacOwan, and Wood, given above, conta comparatively few naturalized foreign plants; yet we may n infer that they exist only in such proportion; and exact inform tion is, in fact, wanting. My own personal acquaintance wit the Region is somewhat limited, extending only for about 15 miles of its south-western extremity. In the parts I have see introduced plants, excepting *Opuntia Tuna* (?), in some of the dri western parts of the Uitenhage district, *Xanthium spinosum* occ sionally, and *Nicotiana glauca*, are few in individuals, and exert but very small influence upon the aspect of the Flora. They do n appear to differ much in character from those that have bee referred to under the South-Western Region. In Wood's lis however, there are certain tropical weeds which, as might b expected, do not occur in the older Colony.

THE KARROO REGION.

This Region includes on the west side the coast strip o Namaqualand lying between the mountains and the sea. Ho

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far it may extend north of the Orange River is unknown. Southward it stretches between the Khamiesbergen and the sea, and thence passes over by tracts little known botanically, to the south and west slopes of the Roggeveld mountains. Here it widens out and includes all that large tract known colonially as the Karroo; bounded on the north by the Roggeveld, Nieuwveld and Sneeuwberg mountains, on the east by the mountains fringing the Fish River; on the south by the Zwarteberg range, Kamanassiebergen, and finally the Zuurbergen, and on the west by the mountains of the Warm and Cold Bokkeveld.

Speaking broadly, it is a vast, shallow basin, surrounded by mountains; but the mountains, while always loftier on the northern side, are sometimes a mere rim on the southern. Its height above the sea ranges from 1,800 to 2,500 feet. But for the purposes of floral computations I have reckoned all plants collected on the southern slopes of the northern mountains, up to a height of about 3,750 feet, as belonging to this Region. Above that height, in certain localities, at least, the vegetation changes, and belongs to the next (the Composite) Region.

It is traversed by numerous river-beds or torrents, mostly dry or nearly so, except when filled by the summer thunderstorms, when the beds suddenly fill, carry off a vast quantity of muddy water for a few days, and soon again become dry. But water, generally, is scarce, and springs are infrequent.

The country has been subjected to long ages of denudation by rains and rivers, and exhibits its traces everywhere. It is probable that since the interference of man, which, by sheep pasturage has killed much vegetation and loosened and opened the soil, this denudation has proceeded more rapidly, and in some places enormous gullies have been formed where previously moist and fertile valleys existed. The surface consists chiefly of vast plains of light, reddish soil, which, when irrigated, is extremely fertile; in other parts it is more sandy, and in some places the soil is shaly, hard and barren. The plains are, however, broken by hills or mountains, sometimes with flat tabular tops. Everywhere the exposed rock is sandstone in beds, of varying colours and hardness, which have been regarded by Wyley and Dunn as belonging to the carboniferous measures. In the north eastern portion these are traversed by frequent doleritic dykes, which are sometimes vertical, and sometimes lateral, forming cappings to the sandstone hills.

The climate is one of great dryness and extremes of heat and cold. The following observations have been recorded at Graaff-Reinet, a town on the northern edge of the region, 2,476 feet above the sea:—Mean annual temperature 18° C. (64·41 Fahr.); mean of greatest range on any one day 3°·26 C. (37°·88 Fahr.); extreme limits of temperature (Dec. 20) 40°·55 C. (105° Fahr.);

June 24, 3·56° C. (28° Fahr.); rainfall 13·19 in., of which two-thirds fell during the six summer months. The fore are from three years' observations. Twenty-three years' o vations give an average of 14·5 in. of rain. Other observa of rainfall for other stations in the region for at least five are:—Prince Albert, 7·71 in.; Beaufort West, 9·19 in.; Wi more, 7·40 in.; Aberdeen, 12 in.; Jansenville, 9·44 in.; Sp bok (Namaqualand), 8·05 in. The following are from one y (1883) observations only:—Port Nolloth, 2·66 in.; Touws I Station, 8·86 in.; Matjesfontein, 10·21 in. The greater par the rains take place during the summer thunderstorms; occasion in the Eastern portions, a strong south-east wind brings up ge rain, but this is rare, the clouds being usually discharged in intervening mountain ranges which divide this Region from the coast Regions, and intercept its rains.

During periods of drought nothing can be imagined m desolate and mournful than the appearance of the vegetation. soil is rarely covered, bare patches of greater or less extent in vening between shrubs and bushes. These are frequently blacke by drought as if they had been killed by fire. The largest indeed almost the only trees are those of the *Acacia hor* (Doornboom) which line the banks of the dry river beds as wit fringe; and occasionally, on the higher mountain sides, a other trees of shrubby habit occur. For the most part the shr are scattered, and range from 5 to 8 feet in height; with int vening shrublets of 1 to 2 feet. Yet after copious rains all v be changed within a week or two, as if by magic. Many of apparently dead bushes put forth bright green leaves; shrublets are covered with flowers often before leaves can seen; bulbous plants, which may not have flowered for seve years previously, send up their scapes with incredible rapidi and annual flowering herbs and grasses are everywhere seen whe formerly all was bare and barren. Namaqualand, perha exhibits this phenomenon to the most striking extent. I w amazed on visiting that desert country after the rains of June July, 1883, to see tracts, hundreds of acres in extent, covered wi sheets of living fire, or glowing purple, visible from several mil distance, caused by the beautiful Compositæ in flower; a nothing is more singular than to see this luxuriance intermingle with the black or white branches of dead shrubs killed by previo droughts, standing like ghostly intruders on a scene of merrime and joy. These charming displays pass away all too rapidly, an in a month or two little that is beautiful remains.

I proceed to speak of a few of the chief plants of the Region mo noteworthy, either from their beauty, singularity, or from the being confined to, or peculiarly characteristic of it. I am be

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quainted with the Karroo of the Graaff-Reinet district, partly with that of Namaqualand, and for the rest have only passed through it as a rapid traveller. Several species of Heliophila are extremely bright in spring, especially in the west; and the monotypic *Palmstruckia Capensis*, which had only been gathered before by Thunberg, has just been re-discovered in Namaqualand. *Radaba juncea* with its dark crimson flowers is a singular and characteristic plant both of this and the next Region; while *Capparis oleoides* (the Witgat boom) standing generally alone, 10 to 15 feet high, with its white trunk which has given its vernacular name, is a prominent feature of many of the Karroo plains; the young buds are nearly or quite as good for culinary purposes as those of the Caper of Southern Europe. The Portulaceae occupy a prominent place chiefly by the well-known *Portulacaria afra* (the *Spek boom*, or fat tree), a large shrub with fleshy acid leaves and panicles of small pink flowers. This occupies the hill sides, often growing sub-socially in great masses and affording the most favourite food for live-stock of all kinds. It also occurs, though less abundantly, in the Tropical Region. In addition there are several species of Anacampseros, one of Talinum, and one of Portulaca besides the ubiquitous *P. oleracea*. *Tamarix usneoides* occurs in Namaqualand, where it is used as fuel, and is the only plant of the Order in our Region; it is recorded also by Drege as from the central and eastern Karroo. Amongst Malvaceæ are four species of Hibiscus, one of the most curious of which is *H. surens*, which looks at a short distance so much like a plant of the Gourd family that every botanist is astonished to find upon it the flowers of a Hibiscus. Burchell says his Hottentots called it *Wilde Kalabas* (Wild Calabash). Of Sterculiaceæ, the genera Hermannia and Mahernia, are represented by 10 and 5 species respectively. The large Order Sapindaceæ includes *Pappea Capensis* (the Wild Plum) a shrub of 15 or 20 feet frequent on mountains sides; *Aitonia Capensis*, also a shrub, the curious pendulous papery capsules of which look like miniature Chinese lanterns hung on a Christmas tree; the allied and even handsome *Erythrophysa undulata*, of Namaqualand; and several species of Melianthus. The Geraniaceæ are a numerous Order. The curious candle-bush, *Sarcocaulon Patersoni* is here, besides numerous species of Pelargonium. The latter are especially frequent in individuals, and much diversified in structure, those with succulent stems and leaves constituting a marked feature of the Flora. These include *P. oblongatum*, a handsome species from Namaqualand, with yellow flowers, lately figured in the Botanical Magazine (t. 5996), *P. flavum*, *P. carnosum*, *P. crithmifolium*, *P. ferulaceum*, *P. pulchellum*, *P. sericeum*, *P. quinatum*, the very curious and rush-like, almost leafless, *P. tetragonum*, *P. peltatum*, *P. echinatum*, and many others. The Oxalideae, though numerous,

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and often brilliant, are less common than in the South W
Region. The Rutaceae are conspicuous by their absence. I
found but one species in the Region, a Diosma, on the mou
of Namaqualand, evidently a straggler from their great hom
ther South. The Zygophyllums are frequent and mostly
succulent leaves; of the same family is *Augea Capensis*, a n
typic genus peculiar to the Central Karroo and abundant in
places, with thick terete leaves like those of a Mesembryanthe
Phylica, so common in the South Western districts, is here ab
one or two species hover on the boundary line of some o
mountains, but they are scarcely members of this Region. An
diaceæ are only represented by Rhus, of which there are ab
dozen species. The Leguminosæ do not occupy nearly so pr
nent a place here as elsewhere. There are, however, se
species of Lotononis, Lebeckia, Indigofera, Rhynchosia, the wi
distributed *Sutherlandia frutescens*; and *Sylitra biflora*, foun
this Region only. *Schotia speciosa*, an outlier of the Tropical Reg
occurs sparingly. *Acacia horrida*, the only species of this g
within our limits, is scattered widely, but especially fringes
river beds, the timber is largely used for fuel, and the bark
tanning. The almost complete absence of Aspalathus is
remarkable. Of Rosaceæ there are but two species of Grieli
while Cliffortia and Rubus are both absent. Crassulaceæ are
important constituent of the Region, Crassula and Cotyledon be
numerous both in species and individuals. It is the O
Ficoideæ, however, that we may regard as the one most typica
the Region. Mesembryanthemums are met with everywhere, fr
the annual herb to the shrub with leaves of the most dive
and curious shapes, with flowers of white, yell
and reds of many shades. In some portions vast tr
are covered with *M. spinosum* growing sub-socially almost to
exclusion of anything else. In Namaqualand is a huge spec
resembling *M. crystallinum*, but as large as a cabbage. Some
the larger flowered species are extremely brilliant. *Cusso*
spicata and *C. paniculata* are trees of the order Araliaceæ with c
geners spread over the whole Colony. Rubiaceæ are here, as in t
S. W. Region, remarkably deficient, not more than half a doz
species occurring near Graaff-Reinet. Of Compositæ the larg
genera are Pteronia, Pentzia, Helichrysum, Senecio, Othonn
Euryops. Those most abundant in individuals are *Aster filifoli*
Chrysocoma tenuifolia, *Adenachaena parvifolia*, *Pentzia virgata*, a
P. globosa, *Eriocephalus glaber*, Helichrysum spp.; most of the
are very aromatic, and, excepting the second, furnish excellent fo
for live stock. In Namaqualand a large species of Didelta,
spinosum, is used as a substitute for spinach, and is eaten greedi
by all animals. Several species of Arctotis, Venidium, Gorteria, &c

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exceedingly brilliant, and make a great display after rains. caceæ are entirely absent. *Olea verruçosa* is one of the few s of the Region occurring sparingly in mountain ravines, and nishing the most useful wood for fencing poles and for fuel. the order Ebenaceæ there are several species of Royena and lea. Some genera of Asclepiadeæ seem to indicate an affinity h the Tropical Region and India. Such are Gomphocarpus, costemma, Ceropegia. Of the genus Stapelia there are many cies, thinly scattered, besides Huernia, Piaranthus, Decabelone, l the remarkable Hoodiæ of Namaqualand. *Adenium Namaquanum* (or Elephants' Trunk) is a curious Apocynaceous plant the same country. Gentianeæ are almost, if not entirely, want-g. Scrophularineæ occupy a comparatively poor place,—ascia, Nemesia, Lyperia being the chief genera, with some of the t parasites Alectra, Striga, and *Hyobanche sanguinea*. *Rhigozum chotomum* is a handsome Bignoniaceous shrub. Acanthaceæ are y deficient and probably constitute less than one per cent of the ole Flora. Selagineæ are also few; *Selago leptostachya* (*Aarschje*) is one of the good stock food plants. The ashes of lsola *aphylla* (*Kanna-bosch*) are used for soap making; and *triplex Halimus* and *A. Capensis* (*Vaal-boschje*) are considered st valuable food plants for sheep and goats. *Hydnora Africana* curs in the eastern, and *H. triceps* in the western Karroo. Santaceæ are represented in *Osyris compressa*, the leaves of which re and in the two preceding Regions, are very generally in e for tanning; there are also several species of Thesium. uphorbiaceæ are chiefly confined to succulent Euphorbiæ, in any forms,—melon shaped, 4-angled, many-angled, and club-aped, in some tracts immensely abundant in individuals. Dur-g severe droughts *E. Caput-medusæ* (*Fingerpoll*) is in some aces cut up as food for cattle; as is also a spinous species *Euphorbia sp.*) after the spines have been previously burnt off. everal species of Viscum, and a few Loranthi occur; *Forskohlea ndida* seems to be peculiar to the Region. There are one two species of Ficus; and the widely distributed *Salix Capensis* ccurs along many of the river banks. Coniferæ are entirely bsent.

Orchideæ are scarce. In the whole eastern Karroo I found ut one species, *Habenaria arenaria*; but in Namaqualand on the ountains where the average rainfall does not exceed seven inches early, I saw a Holothrix, *Satyrium pustulatum*, *Pterygodium olucris*, and *Disperis purpurata* var. Of Hæmodoraceæ, *Sanseviera yrsiflora* is common on many hill sides, but rarely flowers. It ay here be mentioned that this is a common condition of many f the Karroo Monocotyledons. They pass years in a dormant tate: not until rain and temperature coincide suitably to their

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need will they flower. Hence one may live seven years
mountain side, and then first see it nearly covered with *Hespe*
falcata; or one may watch the numerous bulbs of *Amm*
falcata in leaf for ten years, as I have done, and never see th
flower. Irideæ and Amaryllideæ are neither by any
abundant in species or individuals. Liliaceæ are much riche
include Aloe (of which there are many fine species, *A. dich*
of Namaqualand being one of the largest) Haworthia, A
Ornithogalum, Albuca, &c., in great variety and beauty; ther
also many Asparagi. *Testudinaria elephantipes* is one of the
known and most curious plants of the Region. Juncaceæ
scarce; Cyperaceæ also but few, while Carex is entirely ab
Of Restiaceæ, also, none have been found. Gramineæ are s
what rich in species, and occupy the second place amo
the Orders of the Region; yet they occur chiefly in isol
tufts, and rarely except in some specially favoured spot
anything like turf be seen. They belong to many ge
amongst which may be named Panicum, Andropogon, Aris
and Eragrostis.

Of Ferns there are perhaps 8 or 10 species in the whole Reg
These are chiefly Cheilanthes, Pellaea, and Nothochlaena; mos
them are peculiar to the Region, and five at least, according
Lady Barkly, are found in Namaqualand only.

The predominating feature of this Region is the peculiar adap
tion of its vegetable life to meet the severe conditions of the
and hot climate and soil. Succulence, which may here be taken
include thickened roots, stems or leaves, is displayed in the m
diverse Orders. At Graaff-Reinet, on the north-eastern border of
Region, and where the climate is far less severe than further we
I counted thirty-one per cent. of all flowering plants as more
less succulent. In the central and western Karroo the proporti
would be much larger. The prevalence of thorny plants is al
very noticeable.

The following list of the chief Orders of the Region is taken fro
a list of 611 flowering plants collected by me mostly near Graa
Reinet, all below 3,750 feet above the sea, and being nearly a comple
collection of the plants within twenty miles of that centre; to whi
are added 66 others collected by Drège, and by myself, in oth
parts of the Region, further south and west. But it does not i
clude plants from Namaqualand, nor from the western Karr
generally. Substantially, it is a fair representation of the easte
Karroo; but I think it probable that a fuller and more gener
collection would reduce the position of Gramineae, raise that
Ficoideæ and Geraniaceæ, and introduce the order Irideæ into t
first twelve.

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CHIEF ORDERS—EASTERN KARROO.

	Per cent.
1. Compositæ	17·1
2. Gramineæ	9·2
3. Ficoideæ	6·8
4. Liliaceæ	6·5
5. Crassulaceæ	5·3
6. Leguminosæ	3·8
7. Geraniaceæ	2·9
8. Scrophularineæ	2·9
9. Asclepiadeæ	2·5
10. Sterculiaceæ	2·5
11. Solanaceæ	2·2
12. Cyperaceæ	2·

The Flora shows but weak affinities with either of the two preding Regions, and these are chiefly exhibited in widely distrited genera common to the whole of Southern Africa. From the uth Western Region it differs in the complete absence of utaceæ, Bruniaceæ, Ericaceæ, Proteaceæ, Penaeaceæ, and Resceæ, the six most characteristic orders of that Region; further, the scarcity of Leguminosæ; and in the almost complete absence the following large genera which are so abundant in and aracteristic of that Region: Muraltia, Phylica, Aspalathus, iffortia, Athanasia, Arctotis, Gnidia, Struthiola. There is a point approach in the abundance of Geraniaceæ; and there is a comon scarcity of Rubiaceæ and Acanthaceæ. From the Tropical egion it is distinguished by abundance in Ficoideæ and Crassuceæ; and by its paucity of Leguminosæ, Rubiaceæ and Acanaceæ; to these might perhaps be added Malvaceæ, and Euphoriaceæ, for these occur chiefly in the eastern Karroo, where it borers on the Tropical Region. It may hereafter be found that the finities of this Region, together with the succeeding one, are reater with the Kalahari Region than with any other, if indeed hey might not be regarded as an extension of it. But at present ur knowledge of the Kalahari is too imperfect to enable us to form judgment.

With respect to the naturalized foreign plants of the Region, it may readily be supposed that the heat and drought of the climate would be unfavourable to European colonists. The number is indeed few, and chiefly confined to weeds of cultivation, which is here synonymous with irrigation; or to a few wayside weeds. The number known to me does not exceed twenty-five. Those of American origin are more prominent. *Opuntia Tuna* (?) already mentioned, has a branched stem with obovate articulated joints, covered with tufts of strong prickles; the flowers are yellow, and the fruit much eaten by the natives and colonists. Drège does not mention this plant, so that it must have been introduced, or, at least, have spread, since his visit (1826-1834). It is now a most troublesome pest, growing in some places sub-socially, and killing

out the native vegetation. So tenacious of life is it that stem of a few square inches dropped upon the surface dry soil, will take root and grow readily. Cattle a driven to browse upon it by drought, suffer by the lac their mouths, and fall off in condition. Its eradicatio and laborious, needing either to be completely buried, The *Xanthium spinosum* is also a troublesome weed ow hooked achenes becoming entangled in the wool *Nicotiana glauca* springs up immediately wherever qua opened; *Argemone Mexicana* has fairly established itsel not yet abundant; and *Amsinckia angustifolia*, from C been found in Namaqualand.

THE UPPER REGION, OR REGION OF COMPOSITES.

This Region is bounded on the west by the Hantam and veld mountains; southward by the continuation of the R range; the Nieuwveld, the Sneeuwberg range; thence acro Boschberg and by the mountains about Daggaboer's Nek, the north-western flanks of the Great Winterberg m eastward by the watershed which separates the waters of t River from those of the Kei, so as to include the dis Tarkastad and Albert, to the Orange River. Its boundary is in part unexplored. I am informed by Mr Dunn, F.G.S., who has travelled through that part of the for the purpose of exploring its geology, that the boundary the northwest is well marked and co-incident with the line Dwyka Conglomerate and the Karroo Beds, the forme covered by the Twa-grass (*Arthratherum brevifolium*) so chara of the Kalahari Region, while the latter bear the stunted peculiar to this Region. This line would begin near the kouw mountain, thence it extends in a curve towards Hope where it is certainly existent about thirty miles south of that It then runs northward, crossing the Orange River. The boundary in the Orange Free State is unknown to me, bu probable that it takes a wide curve eastward between Blo tein and Smithfield, and again cuts the Orange R. south Aliwal North. It is thus an elevated country sloping gentl the southern edge towards the Orange River, at an average tion of from 5,000 to 4,000 feet above the sea. I have in in the Region that part of the districts of Middelburg, Crado Tarkastad, which is formed by the basin of the Great Fish above Dagaboers Neck. Is it uncertain whether this is c Drège regarded this tract as belonging to the Karroo Region he passed rapidly through it (as I have also done) and s collected anything. His view would have this consistency it would make the waters of the whole Upper Region run in

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:d, which is formed by the basin of the Great Fish River
:agaboers Neck. Is it uncertain whether this is correct.
:garded this tract as belonging to the Karroo Region; but
:l rapidly through it (as I have also done) and scarcely
anything. His view would have this consistency: that
make the waters of the whole Upper Region run into the

Orange River; and those of the whole Karroo Region into the Southern Ocean. But the tract in question is somewhat more elevated than the rest of the Karroo, and appeared to me from its deficiency in succulents to belong rather to the present Region. The matter must be decided by further evidence, since no collections, so far as I know, have been made there.

The general aspect of the country is that of a vast treeless plain, interspersed at great distances by a few isolated and flat-topped mountains, or short ranges; or lower, and then very rugged rocky hills. On these hills or in the few ravines of the monotonous mountain sides, may be found a few stunted bushes. In fertile shallow vallies ("vleis"), grassy patches, with more luxuriant bushes 6 to 8 feet high, may be seen; but trees never, except such few as have been planted by the hand of man; or except the few (chiefly *Salix capensis*) which fringe the banks of the Orange River, where it flows through this Region; and the predominant and constantly prevailing aspect of the country is that of a heathy tract, or dry elevated moorland, covered with small shrublets of a dull green hue, the few intervening plants of different growth which occur being too small or too few to alter or modify the general appearance above described.

Respecting the climate of this Region no observations for any considerable length of time, excepting of the rainfall, have been made. The extremes of temperature are considerable, the summer maximum being nearly as high as in the Karroo Region although the summer nights are always cool; while the winter temperature is much lower. Severe frosts are common, with occasional snows in winter and hailstorms in summer. The rains are almost entirely in the summer months, and usually accompanied by thunderstorms. The following list of stations at which the rainfall has been observed for a period of five years or more is taken from the Report of the Meteorological Commission for 1883. I take the stations in their order from west to east:—Fraserburg, 6·11 inches; Carnarvon, 7·78; Victoria West, 9·82; Richmond, 11·64; Hanover, 13·77; Middelburg, 14·17; Colesberg, 12·82; Cradock, 13·19; Tarkastad, 17·08.

The following remarks on the plants chiefly characteristic of this Region are based upon collections of 507 species of flowering plants made by myself chiefly on the loftier portions of the Graaff-Reniet district (above 3,750 feet above the sea) with a few in the districts of Murraysburg, Richmond, Hanover and Colesberg; of 331 (other) species collected by Drège in the same districts, together with Albert and Aliwal North; and of 135 (other) species collected by Mr. W. Tyson, chiefly in the district of Murraysburg; being a total of 973 species. These lists and the calculations upon them, which will be found on page 313, were made some time ago. I have

since doubted whether the higher mountain regi
Sneeuwberg, and of Aliwal, should not rather b
as outlying tracts of the Tropical Region; the e
greater moisture favouring the extension of eastern t
do not occur in the immediately contiguous lower l
same conditions have permitted the lodgment of a very
western types. The result is to make the Region a
rich in forms than it otherwise would be, to the extent
15 per cent. of the species, and 6 per cent. of the gen
so far to increase the appearance of its affinities with t
African Region. I regret that time does not allow t
of the list, and that this statement must suffice.

The Geraniaceæ are fairly numerous, but do not h
either as to singularity of form, or in respect of the nu
dividuals, the same prominent position they hold in the
Regions. One Rutacea, *Barosma venusta*, occurs on the
Mountain, at about 6,000 feet; also two Phylicae on
tains near Graaff-Reinet. The species of Rhus (*Tau*
numerous, 13 being recorded in our list. Leguminosae
small and inconspicuous shrublets of the genera Lotonoi
lobium, Indigofera, and Lessertia. *Lessertia annularis*
have poisonous effects upon cattle. The only handsom
the Order, which has here 19 genera and 52 species, is
spread *Sutherlandia frutescens*. *Acacia horrida*, the only
Order, and the only species of that genus occurring in th
hardly belongs strictly to it, being found only sparingly in
valleys of the Sneeuwbergen, &c. A few species of Cli
outliers of the South-western type growing only on th
mountains. Crassulaceæ, similarly, though our list in
species, are found very sparingly everywhere except
southern border of the Region; and are few in in
Guthriea capensis is a curious Passifloraceous plant with
of a Primrose, only found hitherto upon the highest pa
Sneeuwbergen. Ficoideæ are very deficient in individ
the majority of those in our lists belong to the warmer pa
Murraysburg. Rubiaceae have 11 species only, chiefly of
permum, Rubia, and Galium. It is in Compositae that we
great strength of this Region, there being not less than 6
with 231 species. The largest genera are Helichrysum
species; Senecio with 35 species; Berkheya, 11; Euryo
Pentzia and Gazania each 8 species. The species most n
in individuals are *Chrysocoma tenuifolia*, a small shrublet
or no value for stock, covering vast tracks in the central pa
Region not indeed sociably, but intermingled with others,
the most part, Compositæ; *Helichrysum hamulosum*, *Erio*
glaber, and other species; *Pentzia globosa*, *P. Burchellii*, *P.*

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...ubted whether the higher mountain regio... Sneeuwberg, and of Aliwal, should not rather b... as outlying tracts of the Tropical Region; the ... greater moisture favouring the extension of eastern ty... do not occur in the immediately contiguous lower le... ...ditions have permitted the lodgment of a very ... ...stern types. The result is to make the Region ... ...h in forms than it otherwise would be, to the extent of ... 15 per cent. of the species, and 6 per cent. of the gene... so far to increase the appearance of its affinities with the ... African Region. I regret that time does not allow the ... ...the list, and that this statement must suffice.

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good stock plants; *Othonnopsis cluytiaefolia* and *O. pallens*; ...ryops spp.; *Gamolepis trifurcata*; *Tripteris leptoloba*, *T. spines*...*ns*; *Arctotis stoechadifolia*, &c. Five species of Ericaceæ are ...nd on the highest mountains only. Ebenaceæ have five species ... Royena and Euclea, usually stunted rigid bushes. *Olea verru*...*sa* (the Olive) is sparingly distributed, and grows very poorly. ... Asclepiadeæ there are twelve genera and 27 species. Three ...ecies of Lycium are scattered, and one of them is a characteristic ...rub of the bleak and dreary Roggeveld. Scrophularineæ are well ...presented in 20 genera and 38 species, of which the beautiful ...eep blue flowers of *Aptosimum depressum*, and the sky blue *...eliostomum origanoides*, alone deserve notice, and are worthy of ...ltivation. *Rhigozum trichotomum* is a Bignoniaceous shrub with ...andsome yellow flowers, belonging to this as well as to the ...arroo Region. Acanthaceæ are deficient, having only 5 species; ...elagineæ, 15; Labiatæ, 18; Thymeleæ only 7, of which *Arthro*...*olen polycephalus*, a useless wiry shrub, grows almost sociably in ...ome spots. *Salix Capensis* is only found in a few sheltered ...alleys in the lowest part of the Region, or on the banks of the ...range River.

Amongst the Monocotyledons Orchideæ have four species all of ...he higher mountains. Irideae are greatly diversified, having ...2 genera and 20 species. Amaryllideæ are nearly as many, *Brunsvigia multiflora* being one of the handsomest, and there are ...everal species of Hypoxis mostly from the eastern mountains. ...roideæ are entirely absent. Liliaceæ are numerous; Aloes are ...ery few; and there are several species of Kniphofia (4); Scilla ...4); Ornithogalum (4); Bulbine (5); Asparagus (7); in all 20 ...enera with 47 species. Of Restiaceæ, 3 have been found on the ...ighest mountains, outliers from the S.W. Region. Cyperaceæ ...ave 22 species, including 2 Carices. Gramineæ occupy a high ...position with 37 genera and 78 species. Though thus highly ...iversified they do not occupy a prominent place in the landscape of the country, everywhere occurring in isolated tufts, usually far ...apart from each other. Those most abundant in individuals ...ppear to be *Andropogon marginatus*, *Anthistiria ciliata*, *Aristida ...estita*, &c., *Danthonia disticha*, *D. villosa* and others, *Eragrostis ...rizoides*, *E. striata*, *Melica dendroides* (*Dronkgras* of the Colonists, from its apparently intoxicating effects upon cattle which feed upon it), *Festuca scabra*, &c., but I speak only of those parts of the country which I have actually visited.

The following list of the sequence of Orders according to their number in species is prepared from the collections already mentioned:—

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COMPOSITÆ REGION (EASTERN PORTION).

	Per c
1. Compositæ	
2. Gramineæ	
3. Leguminosæ	
4. Liliaceæ	
5. Scrophularineæ	
6. Crassulaceæ	3
7. Asclepiadeæ	2
8. Geraniaceæ	2
9. Ficoideæ	2
10. Cyperaceæ	2
11. Irideæ	2
12. Amaryllideæ	1

It will at once be seen that the abundance of Com most striking characteristic of the Region. Here a ponderance of individuals is immensely in excess of th proportion of species.

As in the Karroo Region, Rutaceæ, Ericaceæ, Re practically absent; Bruniaceæ, Penaeaceæ, and Prot lutely so. In comparison with the Karroo Flora, Cras Ficoideæ occupy a much lower position; while in this the reduced proportion of species by no means rep paucity of individuals. Notwithstanding this circu relations with the Karroo Region are considerable genera and species; in a similar deficiency of Rubiaceæ, Verbenaceæ and Aroideæ; and it may hereafter be fou to treat the two Regions as sub-divisions of one.

With respect to the Tropical African Region and Western Region the differences are more marked, as by a comparison of the predominating Orders of each.

The naturalised plants of foreign origin call for lit Those from Europe are confined to a few wayside weed of cultivation. *Xanthium spinosum* is a troublesome pest *Mexicana* and *Datura Metel* have established themselve Orange River. The *Opuntia Tuna* (?) so annoying in Region, is here little seen, only a few individuals stragg warmer vallies of the mountains on the southern ed Region.

THE KALAHARI REGION.

This Region extends but a slight distance into the C since our knowledge of its Flora excepting the easte still comparatively small, I shall make but few remarks it. Grisebach (loc. cit.) has carefully collected all that up to 1872, and the reader is referred to his pages for m than can be given here.

The northern boundary begins on the coast at about thence runs nearly due east, until it reaches about 3

COMPOSITE REGION (EASTERN PORTION).

	Per cent.
1. Compositæ	.. 21
2. Gramineæ	.. 9
3. Leguminosæ	.. 5
4. Liliaceæ	.. 4
5. Scrophularineæ	.. 3
6. Crassulaceæ	.. 3
7. Asclepiadeæ	.. 2
8. Geraniaceæ	.. 2
9. Ficoideæ	.. 2
10. Cyperaceæ	.. 2
11. Indeæ	.. 2
12. Amaryllideæ	.. 1

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Ficoideæ occupy a much lower position; while in this
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to 1872, and the reader is referred to his pages for more
an can be given here.

The northern boundary begins on the coast at about 18° S
nce runs nearly due east, until it reaches about 30° o

gitude, when it turns south to the Orange River, crosses this
r Hope Town, runs westwardly along the river and south of it
terminously with the boundary of our Composite Region, until
eaches the neighbourhood of the Kabiskouw Mountain; thence
rtherly along the east side of the Namaqualand mountains to
Orange River. Where it touches the coast again is unknown.
thus includes Great Namaqualand, Damaraland, Ovampoland,
chunaland, and great part, if not the whole, of the Transvaal, and
Free State.

The surface of the country is mostly very sandy, and generally
aking surface water is everywhere very scarce, and springs in-
quent. Nevertheless, when they do occur they are sometimes
ong and copious, and there is every reason to believe that im-
nse stores of underground water exist at no great depth over a
rge part of the Region.

The climate is not yet well known. The heat in summer is
eat, the nights cool, and even frosty in winter, and the rain-
ll which does not seem to be inconsiderable, is entirely one of
mmer thunderstorms. In the colonial Karroo the soil being
ked, a large part of the rain runs off to the sea; here, on account
the sandy nature of the soil, the greater part is retained, and,
the case of heavy falls, goes to increase the underground stores.
he coast strip from 16° S. down to the Orange River mouth, and
unded by the interior mountains, is even more dry and rainless
an that of Little Namaqualand, and probably should be joined
ith the Karroo Region of the Colony.

The Kalahari is essentially a grass country interspersed with
olated shrubs or trees. Towards the northern boundary, which
ere corresponds with the southern limit of palms, these trees are
couped in dense forests. Further south the country is open.
fter the summer rains the grasses, which do not grow con-
nuously like turf, but in tufts like stooling wheat, shoot up
pidly and acquire a height of three or four feet, sometimes even
five and six feet. East of the copper mines of Namaqualand
ey have frequently been cut by the natives, and brought in loads
r sale as fodder. Species of Aristida (Twa-gras) are the most
undant, but there are others coarser, and some of spinous growth.

The trees appear to be chiefly Acaciæ of several species, of which
A. giraffae (the *Kameel doorn*), is one of the most widely dis-
ibuted; others are armed with formidable thorns. These occur also
nough sparingly, on the southern side of the Orange River; and
rom their existence, from the abundance of Twa grass, the presence
f certain genera which do not occur further south and the absence
f the composite shrubs, we may infer that this tract, known as
Bushmanland, belongs to the Kalahari Region. The much
ontroverted point as to whether the Orange River forms the floral

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boundary of the Colony, may now be regarded as
negative.* The Olive of the Colony (*Olea verrucos*
here, and a number of smaller shrubs as Cappa
Grewia, Rhus, Tarchonanthus, Vangueria, Euc
Lycium, &c. The Mesembryanthemums of the Ca
succulent Ficoideæ, as also Crassulaceæ, appear to be
though not entirely absent. A species of Atriplex is
valuable for stock in Bechuanaland. As very little
known respecting the plants found in this Region, I
following list of genera mentioned by Burchell, who
yond Litakun, collected by Dr. Muskett near Hop
found by myself near Kimberley and Barkly, in the s
part of the Region: Clematis, Cissampelos, Sisymbr
phila, Senebiera, Lepidium, Cleome, Cadaba, Capparis,
Polygala, Anacampseros, Talinum, Sida, Sphæralce
Melhania, Hermannia, Maherina, Grewia, Corchoru
Celastrus, Zizyphus, Aitonia, Rhus, Crotalaria, Ar
Psoralea, Indigofera, Bolusia, Sesbania, Vigna, Cassia
Elephantorrhiza, Vahlia, Cotyledon, Myriophyllum,
Combretum, Mesembryanthemum, Tetragonia, Aizo
naceum, Vangueria, Vernonia, Pteronia, Nidorella,
Chrysocoma, Tarchonanthus, Helichrysum, Geigeria
Senecio, Othonnopsis, Osteospermum, Wahlenbergia
Royena, Euclea, Menodora, Olea, Raphionacme, Pac
Gomphocarpus, Dæmia, Barrowia, Ceropegia, Sebæa,
Trichodesma, Heliotropium, Lithospermum, Ipomæa, Co
Evolvulus, Falkia, Solanum, Lycium, Aptosimum, Pel
Nemesia, Rhigozum, Pterodiscus, Harpagophytum,
Barleria, Justicia, Bouchea, Ocimum, Salvia, Stachys
Boerhaavia, Celosia, Hermbstaedtia, Sericocoma, Atriple
Oxygonum, Arthrosolen, Loranthus, Euphorbia, Croto
Salix, Laneria, Cyanella, Babiana, Gladiolus, Crinum, B
Buphane, Asparagus, Aloe, Bulbine, Eriospermum, An
Tulbaghia, Dipcadi, Ornithogalum, Cyperus, Andropogo
tiria, Aristida.

On the west coast near Walwich Bay is the very re
Welwitschia mirabilis, (Tumboa) of the Order Gnetaceæ;
singular Cucurbit, *Acanthosicyos horrida*, the fruit of whic
by the natives.

Towards the eastern edge of the Region, including pa
Transvaal, and the Free State the Flora passes gradually ov
of the Tropical African Region, and is especially rich in
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b…ndary of the Colony, may now be regarded as th… native.* The Olive of the Colony (*Olea verruco…* here, and a number of smaller shrubs as Cappar… Grewia, Rhus, Tarchonanthus, Vangueria, Eucle… Lycium, &c. The Mesembryanthemums of the Cap… succulent Ficoideæ, as also Crassulaceæ, appear to be … though not entirely absent. A species of Atriplex is … valuable for stock in Bechuanaland. As very little … known respecting the plants found in this Region, I … following list of genera mentioned by Burchell, who … yond Lattakun, collected by Dr. Muskett near Hope … found by myself near Kimberley and Barkly, in the … part of the Region: Clematis, Cissampelos, Sisymbr… …ula, Senebiera, Lepidium, Cleome, Cadaba, Capparis … …gaia, Anacampseros, Talinum, Sida, Sphæralcea … M…ania, Hermannia, Mahernia, Grewia, Corchorus … Celastrus, Zizyphus, Aitonia, Rhus, Crotalaria, Arg… Psoralea, Indigofera, Bolusia, Sesbania, Vigna, Cassia … Elephantorrhiza, Vahlia, Cotyledon, Myriophyllum, … Combretum, Mesembryanthemum, Tetragonia, Aizo… …eram, Vangueria, Vernonia, Pteronia, Nidorella, … Chrysocoma, Tarchonanthus, Helichrysum, Geigeria, … Senecio, Othonnopsis, Osteospermum, Wahlenbergia, … Royena, Euclea, Menodora, Olea, Raphionacme, Pach… Gomphocarpus, Dæmia, Barrowia, Ceropegia, Sebæa, … Tr…desma, Heliotropium, Lithospermum, Ipomæa, Conv… Evolvulus, Falkia, Solanum, Lycium, Aptosimum, Peli… Nemesia, Rhigozum, Pterodiscus, Harpagophytum, Se… Barleria, Justicia, Bouchea, Ocimum, Salvia, Stachys, … Boerhaavia, Celosia, Hermbstaedtia, Sericocoma, Atriplex, … Oxygonum, Arthrosolen, Loranthus, Euphorbia, Croton, … S…, Lanaria, Cyanella, Babiana, Gladiolus, Crinum, Brun… B…phane, Asparagus, Aloe, Bulbine, Eriospermum, Anthe… …naghia, Dipcadi, Ornithogalum, Cyperus, Andropogon, … …ria, Aristida.

On the west coast near Walwich Bay is the very remark… *…witschia mirabilis*, (Tumboa) of the Order Gnetaceæ; an… …gular Cucurbit, *Acanthosicyos horrida*, the fruit of which is … the natives.

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…e collections in the Transvaal have been considerable, but I do …t treat of them here chiefly because of their intermediate …aracter.

European Plants in the Cape Colony.

The following remarks on the European plants found in the …ape Colony apply to all those parts of the several Regions I …ave visited; but not to Kaffraria and Natal, which I do not …now, except from the reports of others. I have already referred … the fact that such plants are seldom found at any con…derable distance from human habitations, or from waysides. …ne may walk for a whole day over mountain-sides, or even plains, …nd scarcely see a European plant. On Table Mountain, which, …s everyone knows, is close to Cape Town, the resort of Europeans …r 200 years past, if the observer leaves the low vallies, where, up … 500 feet, the common species I have named above on page 296 …ay be found* together with such plants as *Verbena officinalis*, *…erbascum virgatum*, *Phytolacca decandra*, *Sanicula Europaea*, *…ypochaeris glabra*, *Anagallis arvensis*, &c., he will find little or …othing beyond. In fact I can remember no plant at an elevation …f 1,000 feet except *Bartsia Trixago*, and even that is by no means …requent. It is almost the same on the plains when one has left …ouses and roads a few miles away. By some watercourse or …tream, *Epilobium hirsutum*, *Lythrum hyssopifolium*, *Cotula corono…ifolia*, or some other water-loving plants may be met with, but …ttle else. Nor is the case different in other parts of the Colony …nd on the higher mountains. On the highest parts of Compass…erg (8,500 feet ?) and on the Winterhoeksberg (6,500 feet) I did …ot find a single European species, or indeed any foreign species. …t is true the situation was there unfavourable for many plants, …eing steep, rocky and sometimes dry. Yet the first named has …ummer thunderstorms and winter snows, and the latter regular …inter rain and snow, and it might have been expected that some …ardy alpine species could here have found a lodgment. On …he lower mountains of the Eastern Region may be found *Thalictrum minus*, *Agrimonia Eupatoria*, *Bartsia Trixago*; I can recollect no others. On the Sneeuwberg mountains the first-named …nd *Blitum virgatum*.

These facts seem to show that the arrival of the majority of the introduced foreign plants in South Africa is of comparatively recent date; of the great bulk of them probably contemporaneous with that of civilized man.

The subject of European genera found within the Colony is a much wider one; but I am unable to enter upon it here.

* I have there omitted *Erigeron Canadense*, a common wayside weed.

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Summary.

Speaking generally, and disregarding ex
the Regions of South Africa is distinguishe

1. By its highly differentiated characte
2. By its want of luxuriance of growt
   Tropical Region must be excepted)
3. By the narrow distribution area of e
4. By the deficiency of trees.
5. By the paucity of sociable plants.
6. By its power to resist the aggression

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2. By its want of luxuriance of growth (but from t
   Tropical Region must be excepted).
3. By the narrow distribution area of each species.
4. By the deficiency of trees.
5. By the paucity of sociable plants.
6. By its power to resist the aggression of foreign inv

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