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14. The misunderstood
Crassula pubescens Thunb.
(*Crassulaceae*) and its
typification.



ORIGINAL RESEARCH PAPERS ON
A MISCELLANY OF TOPICS ON
THE SUBJECT OF SUCCULENT
PLANTS AUTHORED AND
EDITED BY ROY MOTTRAM (except
where stated)

Taxonomy
Botanical History
Databases

The misunderstood *Crassula pubescens* Thunb. (*Crassulaceae*) and its typification.

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17 Jan 2021

No new taxa are created in this paper.

Summary

Much material in cultivation and illustrations in the literature purporting to be *Crassula pubescens* Thunb. are wrongly named, and this article attempts to clarify the sense in which the name should be applied.

Crassula pubescens was first described by Carl Peter Thunberg in 1778. His original material comprises a single sheet of exsiccata of Thunberg 7784a at UPS that is accepted as the holotype. There are three separate branches on this sheet, but the well known *Crassula* monographer, Helmut R. Tölken (1977: 515) thought that this was a mixed gathering and lectotypified *Crassula pubescens* with one of the three specimens. That step is now believed to be superfluous.

In order to clarify the application of the name, a new epitype is designated here that compares very closely with Thunberg's type and is gathered at a place thought to be within some 100km of his route through Cannaland.

The routes of Thunberg's journeys through South Africa are added in an Appendix, highlighting the occasions on which it is thought that he made his *Crassula* discoveries.

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The misunderstood *Crassula pubescens* Thunb. (*Crassulaceae*) and its typification.

Taxonomic history of *Crassula pubescens* Thunb.

Crassula pubescens Thunb., Crassulae Generis XXVIII: Novas species in Capite bonae spei detectas & descriptas, *Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur.* **6**: 330, 340. 1778.

Globulea pubescens (Thunb.) P.V.Heath, A check-list of *Globulea* Haworth, *Calyx* **5**(2): 47. 1995.

Etym: From the present participle of the Latin *pubescere*, arriving at the age of puberty. In botany it refers to being covered with soft hair or down.

T: South Africa, Western Cape, Cannaland [central Klein Karoo]; Oct 1773 or Jan 1774, *THUNBERG 7784a*. Thunberg & Masson travelled through the eastern edge of Cannaland on their way to the Eastern Cape and would have gathered this plant on 20 Oct 1773 just north of Witberg in the Attakwas mountains, north of Mossel Bay, or on the return journey at the same place in early Jan 1774.

HT: UPS: THUN 7784a. Comprises 3 specimens. (Fig. 1)

LT(design. Tölken 1977: 515): Thunberg 7784a (specimen on left of sheet). This selection presupposes that the other two specimens are not representative. However, the present author

has no difficulty in accepting all three specimens as part of the type population, and the following specimen is here designated as an epitype of a plant of known location, to support the type and clarify the strict application of the name.

ET (design. here): South Africa, Western Cape, Central Karoo Distr., farm nr. Vleiland, at the foot of the Klein Swartberg along the R323, 15-20km NNE of Ladismith (approx. 33°22'S, 21°11'E); Apr 1987, *VAN DER MERWE* in *LAVRANOS 25278*. (UPS: BOT:V-944259). (Fig. 2) The large envelope contains additional supporting text plus two photos. The small envelope contains a flowering “head” and a basal part of a plant that broke away. All parts of this species, both before and after drying are very fragile and break at the slightest touch.

Transcript of first description of *Crassula pubescens* Thunb. (1778):

p.330: 25. *Pubescens*: foliis ovato-triquetris, villosis integris.
p.340: *Crassula pubescens*, foliis connatis, ovato-subulatis, villosis, caule ramoso; floribus corymbosis.

Crescit in Carro prope Cannaland.

Floret Novembri, Decembri.

Radix perennis.

Caulis filiformis, frutescens, ramosus, erectus, ruber, glaber, spithameus.

Rami subverticillato-terni, ramulosi, pubescentes.

Folia connata, tereti subulata, carnosa, crassa, villosa, patentia, longitudine internodiorum, lineam longa, supra planiuscula, subtus gibba.

Flores corybosi.

Corymbus compositus, trichotomus.

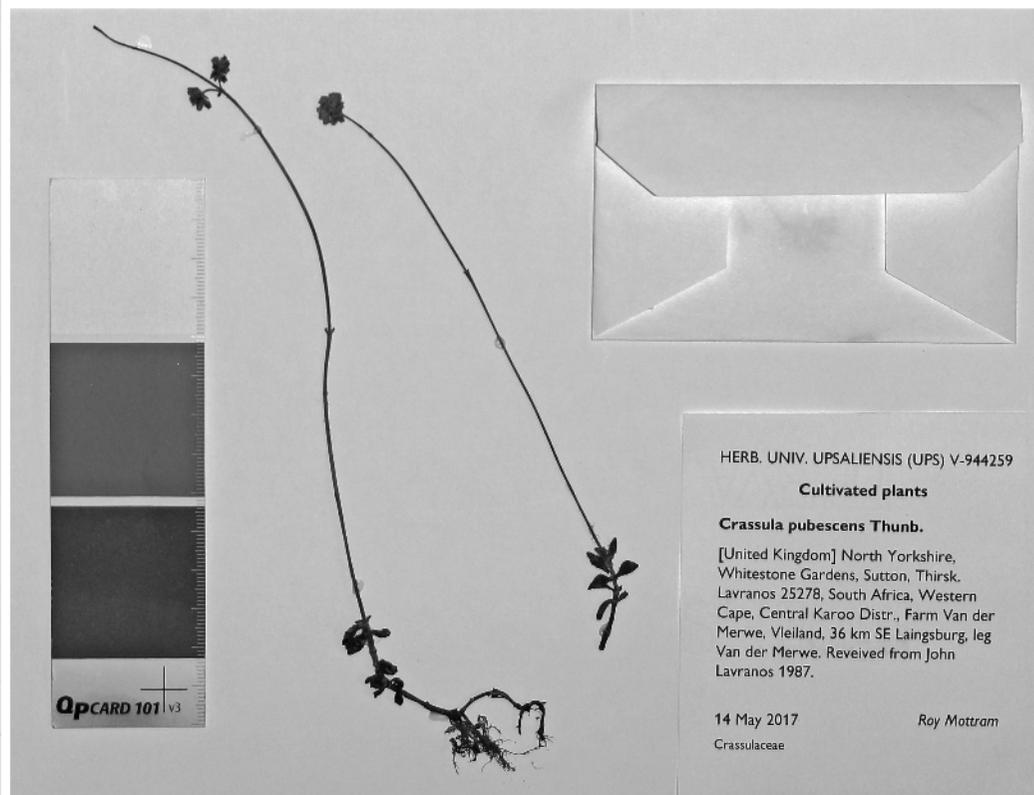
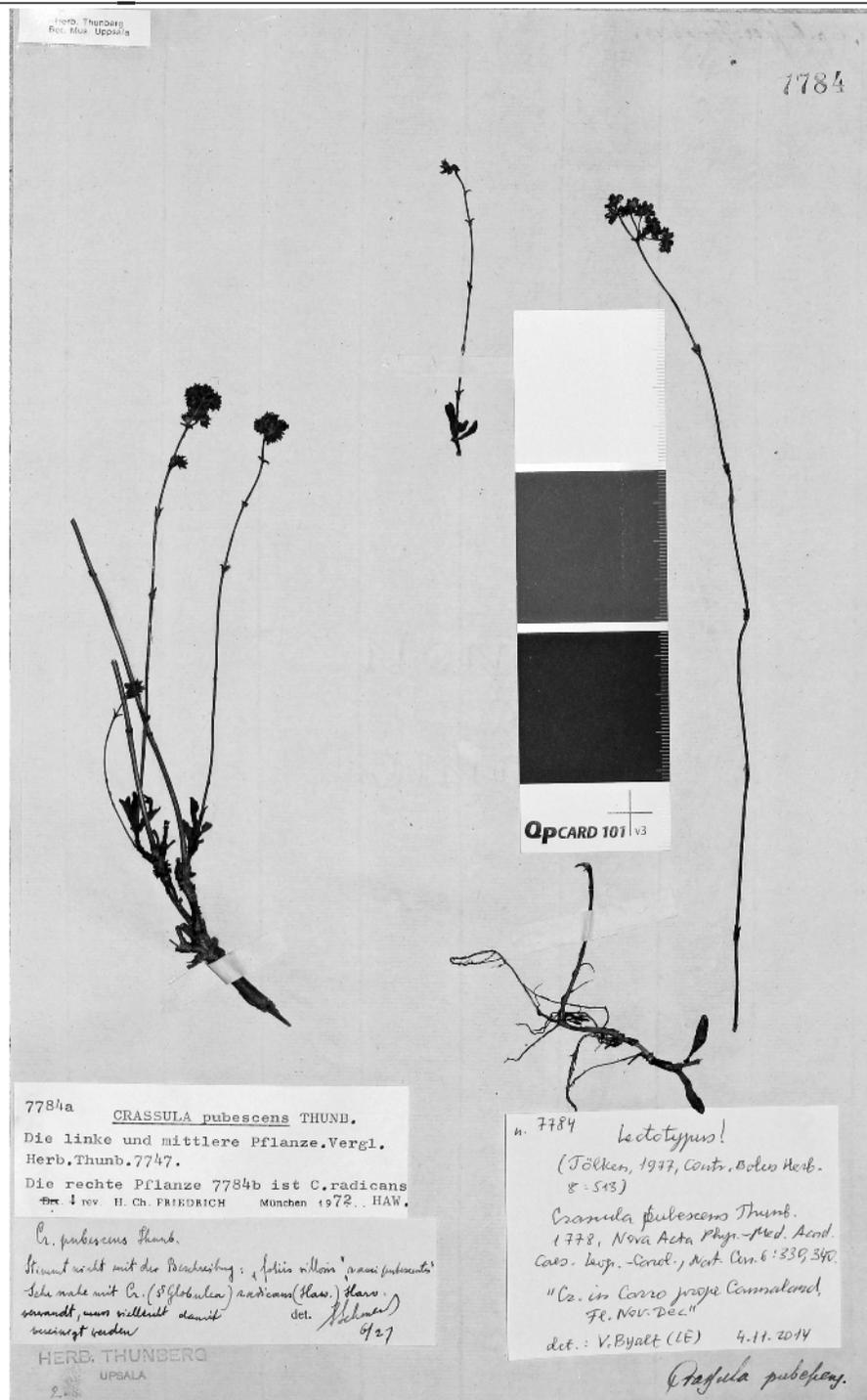


Fig. 1 The holotype gathering of *Crassula pubescens* by Thunberg in the herbarium at Uppsala.

Fig. 2 Sheet of *Crassula pubescens* LAVRANOS 25278. (UPS: BOT:V-944259) preserved by the author on 14 May 2017 and mounted by Mats Hjertson, which is a close match with the holotype and selected as epitype in support of the holotype.



Fig.3a *Crassula pubescens* LAVRANOS 25278 (25 Feb 2020).
Leaves to 2.2cm long, 9.3mm broad, 6mm thick.
Inflorescence to 11cm above the uppermost leaves, 1.0-
1.9mm thick.

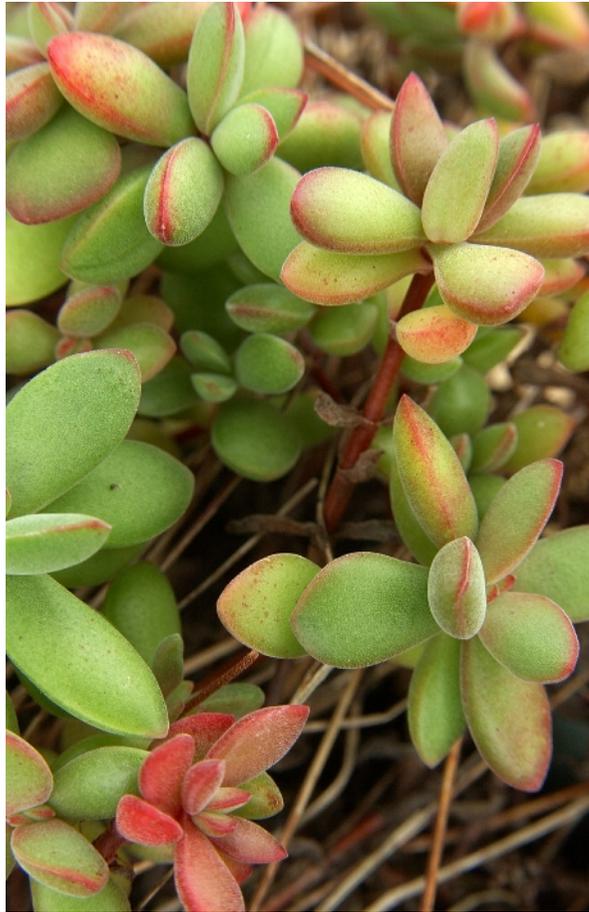


Fig.3b *Crassula pubescens*
LAVRANOS 25278 (28 Aug
2017). Leaves to 1.4cm long,
5.5mm broad, 3.5mm thick.

Flowers appear in November or
December in habitat, but adapt to
flowering in May in cultivation in
England.

Fig.3c *Crassula pubescens* LAVRANOS
25278 (1 Aug 2016). Leaves to 1.7cm long





Fig.3d *Crassula pubescens* LAVRANOS 25278 (14 May 2017). **Epitype gathering.** Inflorescences 10-15cm long, 1.0-1.3mm thick, pale red, 1-3 branched near the top. Flowers 3mm long, 1.2mm diam., scarcely opening. Sepals light green, 2.5mm long, covered with white hairs 0.1-0.2mm long. Petals 5, 2mm long, translucent white, with slightly erose margins, with 0.5mm white globe attached to the back of the petal tip by a relatively thick column, and overtopping the petals. Carpels 1.3mm long, up to 0.5mm diam. Stigmatic surface yellow, 0.4mm long. Pollen pale yellow, almost colourless, translucent.



Fig.3e *Crassula pubescens* LAVRANOS 25278 (4 May 2016). Tray of flowering plants.



Fig.3f *Crassula pubescens* LAVRANOS 25278 (16 Dec 2012). Leaves to 1.7cm long, 9mm broad, 5mm thick.



Fig.3g *Crassula pubescens* LAVRANOS 25278 (2 Sep 2015).
Plant in pot with spent inflorescences.



Fig.3h *Crassula pubescens*
LAVRANOS 25278 (May
2014). Tray of
flowering plants.

English translation of first description of *Crassula pubescens* Thunb. (1778):

p.330: Leaves ovate, three-angled, entirely villous. (See Appendix II).

p.340: Crassula with leaves connate (united at their base), ovate with acute tip, villous (covered with soft hairs), stem branched; with corymbose (clustered) flowers. Occurs in the Karoo near Cannaland (W Cape, Klein Karoo). Flowers in November or December. Perennial. Stem filiform (thread-like), shrubby, branching, erect, red, hairless, up to 20cm. Branches almost whirling ternate (in threes), with many branchlets, pubescent (downy with short soft hairs). Leaves connate (united at their base), cylindric with acute tip, fleshy, villous (covered with soft hairs), patent (widely spreading), at internodes along the length, a line long (c. 2mm), slightly flattened above, gibbous (swollen) below. Flowers corymbose (clustered). Cluster composite (compound), divided in threes.



Fig.4a *Crassula pubescens* LAVRANOS 25278. $\times 10$. Close-up of a leaf showing the barely visible tiny hairs. Photo:

The epitype clone is well established in cultivation and is here further supported by a selection of illustrations. (Fig.3a-h) The main diagnostic feature of the species is a complete covering of the leaf epidermis with a minute soft pubescence, so small that the individual trichomes are invisible to the naked eye (Fig. 4).

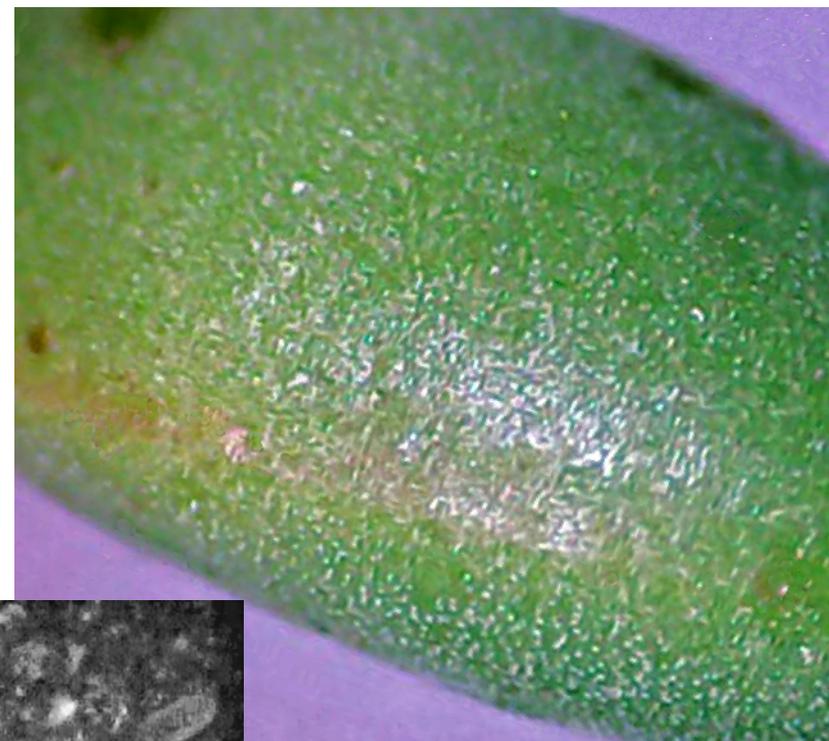


Fig.4b $\times 15$.



Fig. 4c. $\times 100$.

Thunberg's location & travels

Thunberg's account of his second journey mentions Cannaland after travelling through Hartequas Kloof to Zaffraan Kraal [by the Saffran river] on 20 Nov 1773 "when we got into a more plain and level country, called Cannaland." A day later they passed Cannas Hoogte (= Heights of Canna) [The steep W bank of the Kandelaars River, at the farm now called Sebrasfontein, according to Forbes (1986: 218, note 280), which is to the south of Oudtshoorn].

The Ensign to the Dutch East India Company, August Friedrich [Frederick] Beutler, was the earliest author to mention Cannaland, and he variously referred to it as the Canas Land, Canna Land, Cannaland or Cannas Land in his log of April 1752 (Crampton & al 2013: 43, 45, 51, 81). Thunberg's travelling companion, Francis Masson, thought that "it might rather be called the Land of Sorrow; for no land could exhibit a more wasteful prospect." Burchell based his information for his own map on those of Thunberg and Sparrman.

Cannaland itself is a region in the south of the Little Karoo, immediately north of the eastern part of the Langeberg range. Cannaland should not be confused with the present day Kannaland Local Municipality, which is a much larger area and centred further north of Cannaland, although still within the boundary of the Klein Karoo. *The Reader's Digest Atlas of Southern Africa* (1984: 88-89) shows the position of the region correctly.

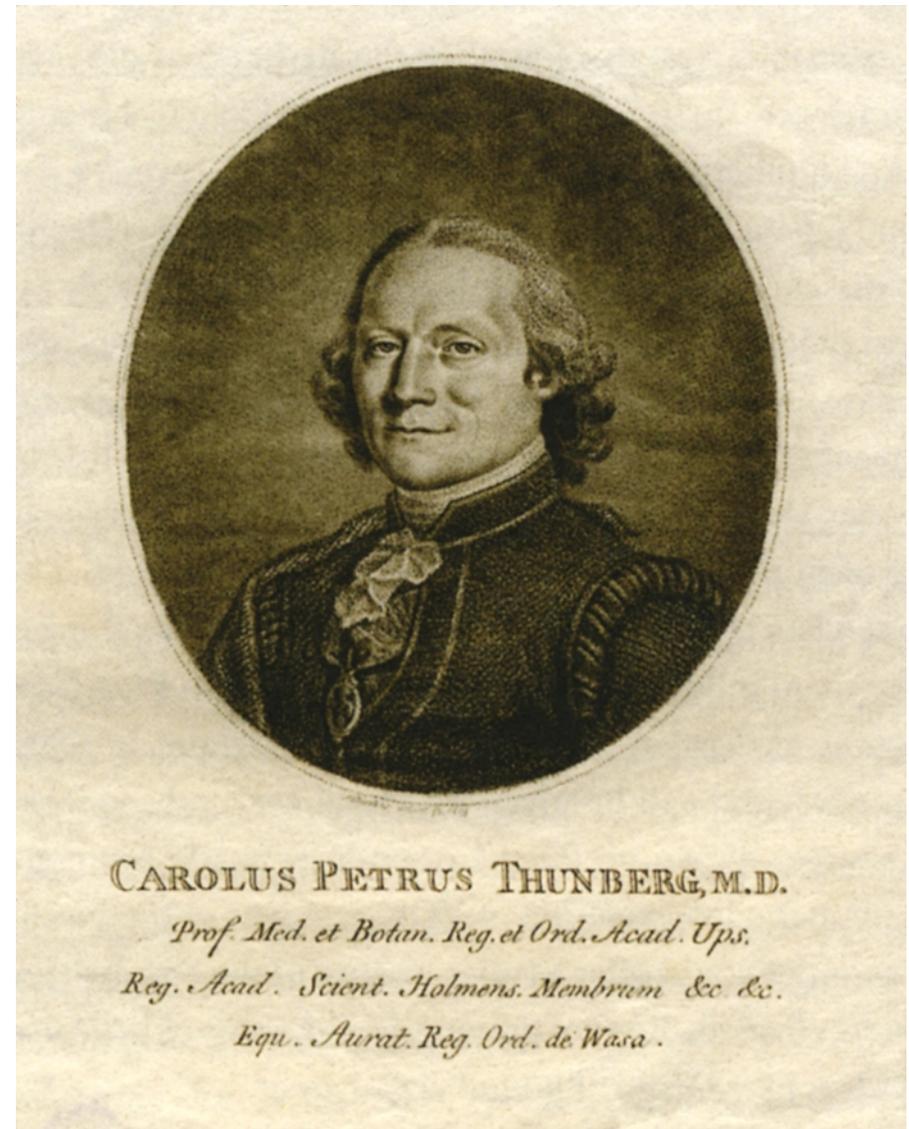


Fig.5 1801 copper engraved portrait of Carl Peter Thunberg by Anton Ulrik Berndes at the Uppsala University Library.

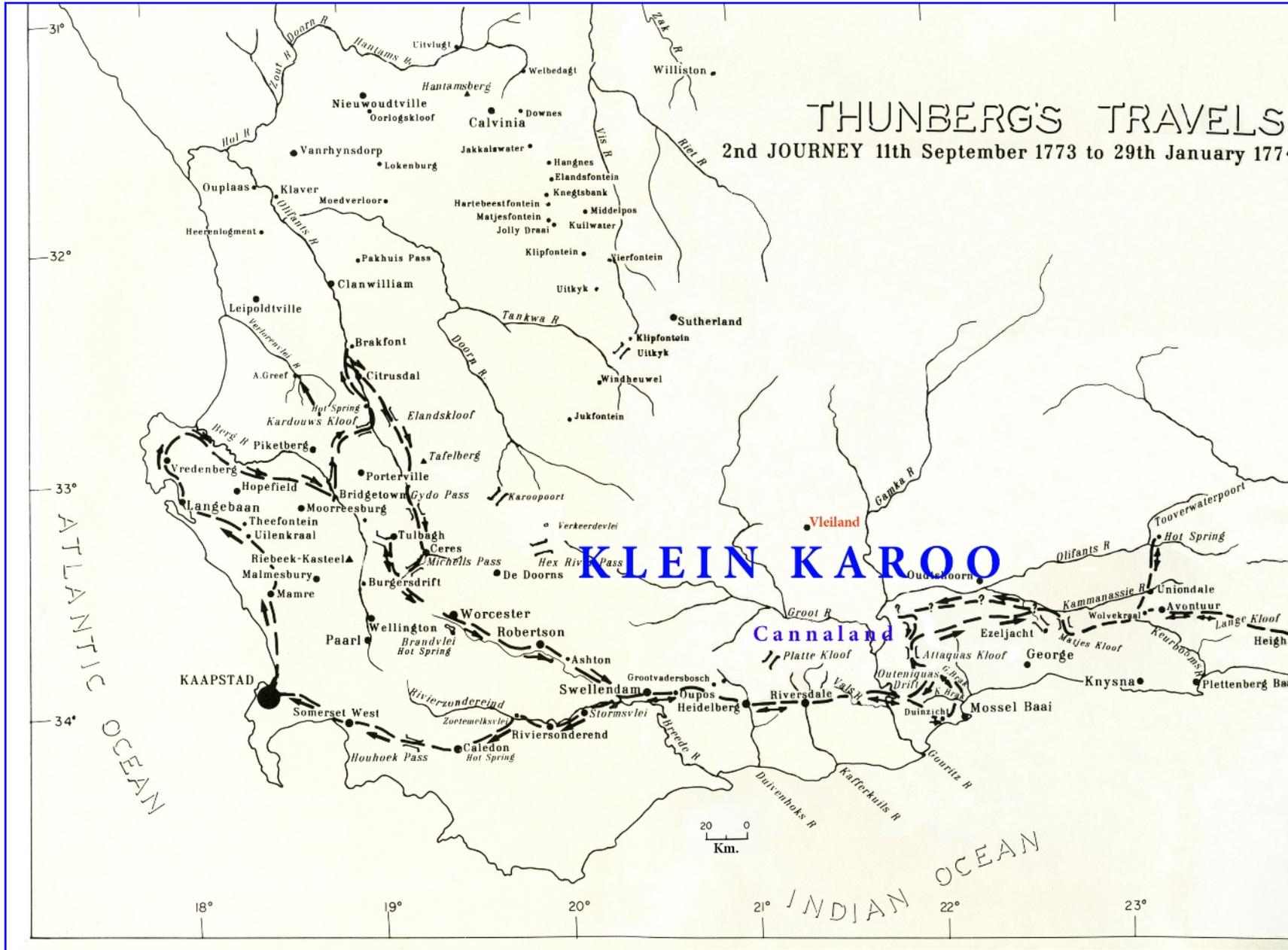


Fig.6
Route of
Thunberg's second
journey [adapted
from Forbes & al.
(1986)].

Its name derives from the Khoekhoen word for the kanna plant, a species of *Sceletium*, which are trailing mesembs with narcotic properties that are chewed when dried, pulverised and fermented to relieve pain or thirst or intoxicate by the Hottentots.

Thunberg's second journey (Fig. 6) took him into the south-eastern edge of Cannaland, just south of present day Oudtshoorn. The epitype, Lavranos 25278, was gathered around 100km northwest of this route on the northern edge of the Klein Karoo. Gatherings have been made that are closer to Thunberg's type locality, but Lavranos 25278 has the advantage of being readily available as live material as well as being preserved.

Taxa often included in *Crassula pubescens*.

radicans (Fig. 7)

Globulea radicans Haw., III. Decas quarta novarum plantarum succulentarum, *The Philosophical Magazine and Journal* 66(332): 27-28. (31 Dec) 1825.

Crassula radicans (Haw.) D.Dietr., *Synopsis plantarum* 2: 1031. 1837.

Crassula radicans var. *typica* Schönland, Materials for a critical revision of *Crassulaceae*. (The South African species of the genus *Crassula* L. emend. Schönl.), *Transactions of the Royal Society of South Africa* 17(3): 271-272. 1929 nom. inval. (Art. 24.3, 26.2).

Crassula pubescens ssp. *radicans* (Haw.) New taxa and new combinations in the genus *Crassula*, *Journal of South African Botany* 41(2): 115. 1975.

Etym: From the present participle of the Latin *radicare*, to take root.

T: South Africa, E. Cape; James BOWIE. Material received from Kew in 1823 and flowered in Haworth's garden in 1824-25. According to the itinerary of Bowie outlined by Gunn & Codd (1981: 101), probably gathered in Dec 1820 or Jan 1821.

NT (design. Toelken 1975: 115): South Africa, E. Cape, nr. Grahamstown; Peter MACOWAN 836.

rattrayi

Crassula rattrayi Schönland & Baker f., New crassulas from South Africa, *Journal of the Botanical Society of London* 40: 290. 1902.

Crassula pubescens ssp. *rattrayi* (Schönland & Baker f.) Toelken, New taxa and new combinations in the genus *Crassula*, *Journal of South African Botany* 41(2): 116. 1975.

Globulea pubescens var. *rattrayi* (Schönland & Baker f.) P.V.Heath, A check-list of *Globulea* Haworth, *Calyx* 5(2): 47. 1995.

Etym: Named for its collector, George Rattray (1872-1941).

T: South Africa, E. Cape, Graaff-Reinet; George RATTRAY 30.

HT: GRA.

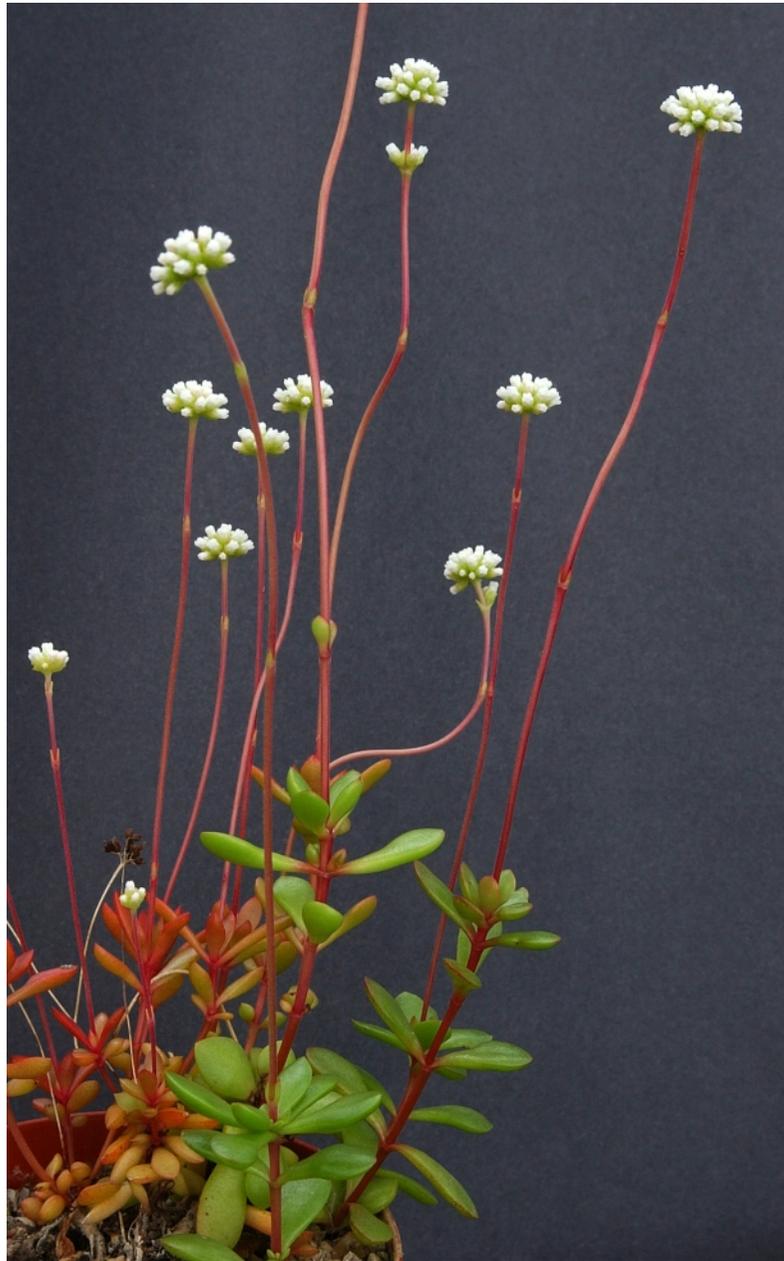


Fig.7a-c *Crassula radicans*
'Tesco Seaspray' (4 May
2020). Stems 4.5-7cm
high, 9-13mm thick.
Inflorescence 3-18cm
high, 1.3-2.5mm thick.
Capitulum up to 1.5cm
diam. Flowers 4.5mm
long, 1.7mm diam.
Globes almost spherical,
0.7mm long, 0.65mm
diam.

History & discussion:

Harvey (1894) recognised *Crassula radicans* but made no mention of *Crassula pubescens*.

Schonland (Jun 1927) saw the type sheet of *Crassula pubescens* and left a note attached to it to the effect that it lacked hairs on the leaves and branches. In reality the hairs are so short and ephemeral that they don't survive the drying process. He went on to say that it is very close to *Crassula radicans* and should be merged with it.

Like Harvey, Berger (1930) recognised *Crassula radicans* but made no mention of *Crassula pubescens*.

Friedrich (1972 in sched.) thought that the Thunberg gathering was mixed and determined that the specimen on the right was *Crassula radicans*, but he did not follow this up by making a lectotype designation.

Tölken (1975: 115-116; 1977: 513-518) treated *radicans* and *rattrayi* as subspecies of *Crassula pubescens*. He also considered that the typification of the species “represents some difficulty”. In his opinion, the specimen on the right of the sheet “has glabrous leaves and almost spherical petal appendages, and must be identified as the subspecies *radicans*.” Consequently, he chose the larger specimen on the left side of the sheet as the lectotype of *Crassula pubescens*.

According to Tölken (1977: 514-515) ssp. *pubescens* is distinguished from the other two varieties by the lack of adventitious roots and the “elongate petal appendages which are about twice as long as broad.” However, *LAVRANOS 25278* does make adventitious roots from the undersides of prostrate branches and the petal appendages of *LAVRANOS 25278* are more or less globular in shape, so Tölken's assertion cannot be universally true of the Klein Karoo population. As *LAVRANOS 25278* now shows, the shape of the petal appendages is not diagnostic, at least in this population. Either that, or the material from which he drew his description and sketch (1985: 217-218) was not *Crassula pubescens*. His illustration is not of documented material, so may have been of cultivated origin and also bears little resemblance to either Thunberg's type or *LAVRANOS 25278*.

The Tölken subspecies *radicans* and *rattrayi* are both from the Eastern Cape, at locations that Thunberg did not quite reach, so they could not have found their way onto his herbarium type sheet. There are no reasons to think that all three specimens on his type sheet of *Crassula pubescens* were not gathered from the same population in or around the region known as Cannaland, as cited in the protologue. It also follows that lectotypification of the lefthand specimen by Tölken was superfluous.

This plant is so variable in habit and leaf shape through the seasons that no single herbarium specimen can help much in arriving at a positive identification.

The photos supplied here of the epitype gathering at various stages of growth should, however, make determination much easier. The leaf fine pubescence is diagnostic, but it does not survive drying. The trichomes are unicellular and homologous with root hairs that likewise disappear on the drying that is necessary for exsiccata preparation. *Crassula pubescens* comes closest in character and relationship to *Crassula mollis* Thunb., which is also similarly finely pubescent, and also a denizen of the Klein Karoo, but these two species are generally regarded as distinct.

The two Eastern Cape (sub)species differ morphologically from *Crassula pubescens*, mainly in being glabrous and are larger and shrubbier in their habit of growth. They do have some similarities and must be related somehow, but otherwise exist disjunctly with no known intermediates. Moreover *Crassula radicans* is a tetraploid ($2n = 28$, Friedrich 1973: 63) and believed to be of allopolyploid origin, probably combining with *Crassula cultrata*. This extra DNA enables it to survive in the wetter regions of the Eastern Cape, where *Crassula pubescens* could not be expected to persist. Thus, although species or infraspecies rank has been purely a matter of personal conviction in the past, all the evidence indicates that *C. pubescens* and *C. radicans* ought to be treated as distinct taxa at species rank.

Acknowledgements

Mats Hjertson is thanked for neatly mounting the epitype specimen in fig.2 and supplying photos of it. Margrit Bischofberger is thanked for her advice and excellent proof-reading skills.

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“There are both good and considerate people, as well as such as have nothing human but the shape.” (Thunberg, Jun 1773)

APPENDIX I

Summary of Thunberg's travels in South Africa, and the locations of his crassulas

30 Dec 1771 Set sail for the Cape.

16 Apr 1722 Arrived at the Cape.

30 Jun 1722 Visited Farm Paradise, below Table Mountain.

1 Jul 1772 At Constantia.

Aug 1772 Started preparations for a 4-month journey at the East India Company's expense, including cartridge paper for the drying of plants. The cavalcade was to include a saddle-horse [later referred to as "saddle-horses"], a covered wagon, and 3 yoke of oxen. Travelling companions would be Auge, the gardener, Immelman, a youth, son of an army lieutenant, Leonhardi, a sergeant who wanted to shoot animals & birds, and 2 domesticated Hottentots, one driving & the other leading the oxen.

7 Sep 1722 Set out. "The sandy and low plains, which we traversed, abounded at this time in bulbous plants, besides others which were now spring up in consequence of the heavy rains that had fallen during the winter, and which with their infinitely varied flowers decorated these otherwise naked heaths." Route: Eland's Fontein (= Elk's Fountain), Riet Valley, Farm Mostert, Braksfontein, Groene Kloof (= Green Valley). At the last place, 8 hours from the Cape, remained a week.

14 Sep 1772 Oranie Fontein (= Orange Fountain).

15 Sep 1772 Reached Saldahna Bay, via Uyle Kraal (= Owl's Valley), Thé Fontein (= Tea Fountain), Eland's Fontein (= Elk's Fountain). Crossed the harbour in a vessel to the Company's Post, where they stayed for several days.

25 Sep 1772 Left Thé Fontein and ferried over Berg-Rivier (= Mountain River) [7km S of Picketberg].

26 Sep 1772 Reached the Four and Twenty River [nr. Tulbagh], via Ribeck Castle Mtn. [Riebeeck Kasteel] & Picketberg, and Honingbergen, to reach Farm Griling by evening. Crossed the river and came to Farm Arnhem [5km N of Saronsberg (fide Forbes 1986: 62)], then to Little Mountain River and through Roode Zands Kloof (= Red Sand Valley). [The valley in which Tulbagh now lies was first called Roodezand in 1699 and later the Land of Waveren, which however became ousted by its original name (fide Rawer: 101, Forbes: 62).]

Lodged with De Vett (Jacobus de Wet, French descendent. 5km W of Tulbagh). *Ornithogalum thyrsoides* grows here. Mounted gathered plants.

28 Sep 1772 Set out on excursion across the cataract and the mountains to a saddler's named Swerger.

29 Sep 1772 Went on to a man named Olivier, with whom they left their horses, then ascended the mountain on foot.

1 Oct 1772 Excursion over Mount Witsen via a cleft in the mountain to the plateau [via Kogmanskloofpas?].

6 Oct 1772 Passing by Slangenkop (=Serpent's Head Mtn.), penetrated into the country over several rivers, such as Hartebeest's Rivier (first night lodging with Michael de Ploy [Ploi]), Hex Rivier, Breede Rivier, and so on to Matties valley and Brandsberg, and crossing Matjies kloof, arriving at the house of Peter de Wett, near the hot bath, and visiting the neighbouring mountains. [Following N1 through to Majiesfontein] Mention of *Mesembryanthemum edule* growing here in abundance, especially in the sandy plains, where it is called Hottentots vygen (= Hottentots figs).

9 Oct 1772 Passed over Maurice's Heights, a schist slate mountain, to Koree Rivier. On the other side of this eminence could be seen the Carrow Plains [Klein Karoo], which are very dry, sterile and bare of grass, with a great multitude of succulent plants only, and bushes.

14 Oct 1772 Crossed the Koree Rivier (twice), then passed over Zand rivier (= Sand River) to Riet Fontein (= Reed Fountain), and further over Clas Vogt's Rivier to Farm Le Roux.

15 Oct 1772 Passed by Gert's house, then crossed a very deep river on the way to Philip Bota's, and thence past Droski's house to Jacob Bota's.

[approx route: Laingsburg – Ladismith – Calitzdorp – Oudtshoorn - Uniondale]

17 Oct 1772 Passed by Bruynties Rivier and Leeuwe Rivier (= Lion River) to Keureboom's Rivier [= Keurboom River], named for the trees (*Sophora capensis*) which grow near it in abundance. [S of Uniondale, rising in the Langkloof and flowing SE along the R340 road towards Plettenberg Bay. Passes De Vlucht and the Prince Alfred Pass.]

[Now travelling north-west as far as Avontuur, from where they turned east again]

18 Oct 1772 Passed Puspas Valley & Rivier [Swellendam Division], arriving at Zwellendam [Swellendam], the residence of one of the Company's land-drosts, M. Mentz, whose jurisdiction extended over all the interior part of the country that lay beyond that spot, and whose office is in some respect, though not absolutely, similar to that of the governor of a province. Continued the journey across the broad river known as Buffeljagt's Rivier to the Company's post called Riet Valley ([Farm] Reed Valley) [Cape Winelands District, 1000m], where they stayed for several days.

The post furnishes the Company with large timber from Grootvader's Bosch (= Grandfather's Wood) [E of Swellendam]. This was reached via the farmhouse Rietkeul, arriving at a very deep valley at Duyvenhoek's Rivier, a place known locally as Helle (= Hell), where the forest was very

Left the cart at the Company's post and replaced it with a large covered waggon with ten fresh oxen, to continue the expedition to the Coast.

23-24 Oct 1772 Crossed the Krakous Rivier and Krakous Hoogt (= Krakous Heights), arriving at noon at Vett Rivier, afterwards crossing this river and passing by several farmhouses.

“In these plains the aloe-tree (*Aloe perfoliata*) from the leaves of which the gum aloe distils, grew in greater abundance than I ever observed it to do in any other place.” [*Aloe ferox*]

25 Oct 1772 Visited Martin Lagrans at Palmit Rivier (= Palmiet River, N of Kleinmond), a farmer. Thence crossing Zoet-melks Rivier (= New-milk River), passing by Zwarte Valley (= Black Vale), arrived at Farm Wel te Vrede (= Farm Well Satisfied) near Valse Rivier (= False River).

27 Oct 1772 Passing by Groote Valley (= Great Valley) [Groot Brakrivier], and crossing the broad Goud's River [Klein Brakrivier?], arrived at Daniel Pinard's.

28 Oct 1772 Passed by Honing Klip (= Honey Rock), to reach a farmhouse situated near Attaquas Kloof “a vale of such length that it requires almost a day's journey to pass through it”. [R328, Mossel Bay].

29 Oct 1772 Sent one waggon with Immelman through Attaquas Kloof, with the rest making a round trip on horseback through the verdant and woody country of the Hautniquas [Groot Vaders-Bosch where holotype of *Galopina circaeoides* was gathered], which lay to the right and extended to the sea-shore. Afterwards crossing the mountains in another place to join the waggon in Langekloof. Passed by the Klein & Groot Brackriviers, came to Zoutfontein, a farm belonging to Vivier. Thence rode through a woody dale, past a Hottentot colony to arrive at Kleinfontein (= Little Fountain), near Wittel's Rivier.

30-31 Oct 1772 Continued past two or three colonists' houses to George Bota, Farm Sandvliet, near the Keerom Rivier [Kaaimans River, near George.]

2 Nov 1772 Crossed Quaiman's Drift [now Kaaiman's River] which rises and falls with the tide [river estuary]. Eventually reached Magerman's Kraal, a colony or grazing farm, belonging to Frederick Seelf [shown as Seele in the German edn.]

3 Nov 1772 Set off at dawn, crossing several rivers: Krakekou, Ao, Koukuma, & Neisena. Arrived at Koukuma Rivier in the afternoon and crossed by a ford, heading for the farm of Helger Muller.

4 Nov 1772 In the evening reached Peter Plant's farm, Melkhout Kraal [Knysna], having crossed several rivers west of Knysna.

5 Nov 1772 Crossed Pisang River [Keurboomsrivier?] to Farm Pisangrivier owned by Jacob Bota, a grazing farm not far from the sea shore. [Plettenberg Bay]. Stayed here for several days. [Furthest point east of the expedition]

"At the foot of the mountains were flat rocks, on which seals lay sleeping in the sun" which gives the name of Robbeberg (= Seal Mountain) to the hill that projects a great way into the sea. [Robberg Nature Reserve]

10 Nov 1772 Passed by another farm belonging to Bota and crossed two rivers to Malagass kraal, and afterwards proceeded up Keureboom's rivier to Jackall's kraal. Rode further over the mountains beyond Keureboom's Rivier to Peter Jager's farm.

11 Nov 1772 Passed over the very lofty mountains that lead to Lange Kloof [160 km long valley, lying between Herold, a small village NE of George, and The Heights - just beyond Twee Riviere. The R62 runs the length of the valley], on the way to farmer Matthew Zondag's. [Matt Zondagh Estate, Langkloof valley] "In Lange Kloof it is very cold in the winter and snow falls."

13 Nov 1772 Paid a visit to Peter Frere, Farm Misgunst (= Envy), on the banks of the Diep Rivier (= Deep River).

16 Nov 1772 Passed by another of his farms near Aapies Rivier, on the way to Klipp-drift. Then across Krakeel Rivier to Mathew Streidung's. [Eden Distr., Garden Route]

17 Nov 1772 Passing Peter Nickert's Farm Onverwagt, crossed Waageboom's Rivier to Hendrick Krüger's.

18 Nov 1772 Arrived at Thomas Frere's, near Kromme Rivier (= Crooked river). "The country as far as here gradually sank lower and lower as it proceeded towards the sea-shore."
"The ridge of mountains, which at Roodezand we had on our left hand, and afterwards in the Lange kloof on the right, and which were continued quite from Witsenberg, now terminated here before it reached the sea-shore; whereas the ridges on our lefthand were continued farther, and had the Carrow [Karoo] plains behind them."

19 Nov 1772 Arrived at Essebosch, a fine forest in almost a plain and level country.

20 Nov 1772 Rode on to Diep Rivier, Leuwebosch Rivier, & on to Zee-ko rivier [Sea-cow river, where the holotypes of *Iris compressa* L.f. & *Lythrum hyssopifolium* L. were gathered]. [*Crassula tetragona*; *Thunberg 7800*]. "The *Crassula tetragona*, as being somewhat of an astrigent nature, boiled in milk, in the quantity of a handful, is used as a remedy for the diarrhoea."

22 Nov 1772 Arrived at Jacob Kock's ("now visited for the second time in the course of our journey"), near the mouth of the Sea-cow river [Hippopotamus river], not far from the sea-shore. Stayed for several days to put in order what had been collected. During this time made a journey to Cabeljauw Rivier, and then to Camtour's Rivier, which is very broad and deep, and by which Looris Rivier empties itself into the ocean.

1 Dec 1772 "Directed our course back again..."

6 Dec 1772 Returned to Matthew Zondag's. [Langkloof valley. At Avontuur fide Forbes: 106]

7 Dec 1772 Arrived at Wolfekraal. [6km W of Avontuur]

8 Dec 1772 Proceeded to Diep Rivier, having crossed Keurbooms Rivier.

10 Dec 1772 Came to Ganse Kraal (= Goose Pen). [Lies by the stream of the same name, 24km W of the great bend of the former Keurbooms River, fide Forbes: 106]. "Behind the low mountains lay Camenassie Land." [Presumably the drainage basin of the Kammanassie River from Oudtshoorn to beyond Uniondale in the east, fide Forbes: 106] Came to Ezelsjagt [now Eseljag (Zebra Hunt), situated by a small tributary of the Brakke River, 20km N of George]

11 Dec 1772 On to Dorn Rivier (= Thorn river) [now Doring River, tributary of the Kammanassie River, then to Groote Dorn Rivier "keeping always to the right, and leaving Attaquas kloof to the left." [now Groot-Doring River, tributary of Kandalaars River].

13 Dec 1772 Crossed the barren Carrow [Karoo] plain to visit Gert van Nimwegen, where the sheep feed on *Mimosa nilotica*. "A *Mesembryanthemum*, with white flowers, was chewed by the Hottentots, for the purpose of quenching their thirst, after it had been suffered to putrify, and been properly prepared." [Probably *Sceletium tortuosum*, "said to have narcotic properties which alleviate fatigue and feelings of thirst" (Forbes: 107)]

14 Dec 1772 (evening) Arrived at Gert Clute's farm, at Slange Rivier (Snake river). [10km ENE of Uitspan, a ford of the Gouritz River, fide Forbes: 107]

In the evening passed several large rivers with wooded banks. Arrived in the early hours at a deserted house situated on the side of the mountains to the left. "Here we saw quickset hedges of the *Aloe succotrina*." [fide Forbes: 107, probably *Aloe arborescens*]

15-16 Dec 1772 Proceeded to the farms of Welgevunden [foot of N slopes of the Langeberg, c.long. 21°31', fide Forbes: 108], Watervall [8km further W], and Muysen kraal [Muiskraal, below Garcias Pass on the road to Ladismith [R323], fide Forbes: 108] [Heading N from Riversdale]

17 Dec 1772 Arrived at the farm of Smidt. [not identified]

18 Dec 1772 After crossing the mountains, went through Platte kloof. [N side of Langeberg]

20-21 Dec 1772 Passed several farms on the way to the Company's post at Riet Valley, and the forest at Grootvader's Bosch. [Last visited on 18 Oct]

24 Dec 1772 Forded Breede-Rivier (= Breede River) & ferried across Rivier Zonder end (= River without end).

25-26 Dec 1772 Passed the Company's post at Tigerhook, then proceeded along the Rivier Zonder end to another post at Zoete melk's valley. [16km WNW of the village of Riviersonderend on the N side of the stream of the same name]

27 Dec 1772 Arrived at the warm bath of Zwarte Berg, or Bath agter de berg (= Bath behind the mountain), which is a spring arising at the foot of the mountain, to the W of it. [Now in the town of Caledon] The mountain above it is called Zwarte-berg (= Black-mountain).

28 Dec 1772 Visited [C. H.] Badenhorst, owner of the first farm beyond Caledon.

29-30 Dec 1772 Left the farm to cross Booter Rivier [Kleyne Boter-Rivier in the German edn., now Bot River], near the sea-shore. Passed through the little Houthoek [farm Kleine Houthoek, centred 4km NE of Houhoek].

29-30 Dec 1772 Went over great Houthoek [Groote Houthoek pass], and through Hottentot Holland's Kloof [prior to 1830 the old Gantouw (Eland's path) of the Hottentots, now circumvented by the adjacent Sir Lowry's Pass]

“This mountain [pass] is very high, and on the Cape side there is a road over it, that on account of its precipices has a most dreadful appearance. This, and the road however, that, goes over Roode Zand, are almost the only, at least, the most common roads, by which all the inhabitants of the country must pass with their large and heavy loaded waggons. At the foot of the mountain lie several pretty farms, which, any more than the mountains and the sea-shore, I did not leave unvisited.”

1 Jan 1773 “Here we kept New year's day, and, together with almost all the inhabitants of the neighbourhood, went down to the sea-side to pass the whole day in mirth and pleasure.”

2 Jan 1773 Arrived back in Cape Town.

“The following months I passed as I had done the last year, in botanizing in the environs of the Cape, and in making short excursions into the country, as well as in examining and arranging my collections, and in making descriptions of such of them as were new and before unknown.”

mid-Jan 1773. Visited Table Mountain. “One may ascend and descend Table Mountain in several places, in front, behind, and at the sides, all which paths I reconnoitred this and the following years, in the fifteen times that I went up to the summit in the course of my three years abode in the neighbourhood.”

“During my stay in town, I visited several times the Leeuwve-kop (= Lion's head), a mountain that stands to the westward of Table Mountain.”

13-19 May 1773 Excursion on foot round the mountains between the Cape and False Bay in the company of Major Robert Jacob Gordon (1743-1795) and Francis Masson (1741-1805), gardener at Kew Gardens and the first plant collector to be sent out by Kew.

[False Bay is the body of water in the Atlantic Ocean between the mountainous Cape Peninsula and the Hottentots Holland Mountains in the extreme south-west of South Africa. The mouth of the bay faces south and is demarcated by Cape Point to the west and Cape Hangklip to the east.]

Ascended Table Mountain, through Bavianskloof (Baboon's Ravine), to Hout Bay. Thence over the mountains to Noord Hoek [now a village].

Masson had already made an excursion into the country accompanied by Franz Oldenburg (1740-1774), a soldier in the service of the Company, who acted as guide and interpreter.

Jul 1773. “The American Aloe (*Agave Americana*) imported from the botanic gardens of Europe, was now common on the hills near the town, and blossomed finely every year, without attracting such a great concourse of spectators as it does at Amsterdam.”

Start of 2nd journey

11 Sep 1773 Set out on the second north and eastward journey, in the company of Masson and Oldenburg, and 4 Hottentots. Penetration into the country was to be similar to that of the first expedition but this time as far east as the Snow Mountains [now Sneeuberg], a range to the N & NE of Graaff-Reinet in the Great Karoo, some of which is in the Eastern Cape.

Arrived first at the Company post called Jean Basis Kraal, on the W bank of the Diep River, and thence to Farm Riet Valley. The route then passed between the Tygerberg on the right and the Blaauwberg on the left. In the evening arrived at Mrs. Müller's farm.

13 Sep 1773 Arrived at the Company's post at Groenekloof after passing the Burger's-Post mountain range [now Dassenberg]. Rested here a few days, continuing on horseback through Gansekraal to the sea. Visited the salt-pan centred 5km NE of Yzerfontein Point.

19 Sep 1773 Left Groenekloof, with the Burger's-post mountain chain [now Dassenberg] to the right and the Groenekloof mountain to the left. Having passed the mountains, the country was level with views of Riebeeck Casteel, Four and Twenty Rivers Mountain [N-S range E of Porterville], and Picketberg. Passed Papenkuyls Fountain [immediately E of the Contreberg] & Uylekraal [roughly midway between Darling & Hopefield], to reach the farm belonging to Jan Slabbert.

22 Sep 1773 Arrived at Saldanha Bay. [*Crassula retroflexa* in Swartland, Saldanabay, regionibus St. Helenaebay, prope Bergrivier, in Rode Sand montibus, prope Winterhuck. Floret Septembri, Octobri (3 varieties); *Thunberg 7789*]

28 Sep 1773 Continued to Witteklipp, the estate of Tobias Mostert, which received its name from a little mountain, Witklip [= White Rock, on the outskirts of Vredenburg, and consists of Cape Granite intrusive into the Malmesbury Formation].

30 Sep 1773 Arrived at Honingklip, a farm belonging to Nicholas Klein. [now Henning Klip (Honey Rock), 4km NNE of Vredenburg]. Passed Parrysberg [= Partridge Mountain], to reach Farm Rosendal, belonging to Peter Losper.

1 Oct 1773 Visited another homestead on the same farm.

2 Oct 1773 Could not reach the estate of Melk because of the winter rains, so were obliged to proceed to Brandt's house on the Zout Rivier (= Salt River) [joins the Berg River from the S], and thence to another estate of his son near to Matjiesfontein.

3 Oct 1773 Arrived at the estate of Floris Fisher [at Klipgat, 16km NW of Mooresburg, in the Zwartland].

5 Oct 1773 Traversed along and beyond the Zwarte-berg [Zwartberg, 10km N of Moorreesburg] to Stoffel Smidt's. "The sand-hills vanished by degrees, and the country became both more lofty and of a firmer nature." [*Crassula cordata* prope Swartkopps Zoutpan, in silvula. Floret Novembri, Decembri; *Thunberg 7742*]; [*Crassula cotyledonis* prope Swartkopps Zoutpan, in silva. Floret Decembri; *Thunberg 7743*]; [*Crassula perforata* in silva prope Swartkopps Zoutpan. Floret Decembri; *Thunberg 7779*]

6 Oct 1773 Arrived at the farm of young Slabbert [Johannes Slabbert fide Forbes: 189], where Picketberg was behind them to the left. Proceeded further to the farm of Cornelis Gosen, a saddler. At the Great Mountain River, Berg Rivier, rains had swelled so that the usual fording place was impassable.

7 Oct 1773 Crossed to Pit Juber's farm on the ferry, which supplements his income, and on to Johannes Liebenberg's where fruit trees and vineyards are cultivated.

8 Oct 1773 To Christian Liebenberg's farm [at Pampoenkraal, 18km ESE of Picketberg].

9 Oct 1773 To Gert Kemp's, near Dassie Klip [Dasklip, 10km S of Cardouw or Kardouws Kloof], then to Frederick Liebenberg's. Crossed the difficult passage of Khartous [Kartouw] Kloof to Wilhelm Burger's. [Cardouw or Kardouws Kloof crosses Olifantsriversberg at Farm Cardouw, 10km S of the hot spring at The Baths. This dangerous pass has been disused for over 150 years.]

10 Oct 1773 Set out to Skalk Burger's [1km SE of The Baths], crossed the Olifants River, which thereafter lay to their left.

11 Oct 1773 Rode past Andrew Lubbe's to the farm belonging to Peter Gaus [?Pieter Gous].

12-13 Oct 1773 Proceeded along the valley towards Barent Lubbe's farm, past Pickenier's Kloof [Pikeman's Pass or Greys Pass, 5km SW of Citrusdal].

14 Oct 1773 Arrived at the farm rented by Barent [Barend Frederik] Lubbe [Brakkefontein, 10km N of Citrusdal, fide Forbes: 194].

15 Oct 1773 Meant to proceed over the mountains [probably via the Pakhuis Pass fide Forbes: 194] to Kis Koopman's farm, and thence to Spannenberg's over the River Dorn [now Doring River], eventually to reach Clas Losper's farm in the lowermost Bokkeveld [Bokkeveld Mtns., where Nieuwoudtville now stands]. However, the cart over-turned and broke a shaft, so could not proceed further.

It turned back through Pickenier's Kloof and through Roode Zand's Kloof to Roode Zand.

Made a tour on horseback with Masson back into the valley to Gaus's farm, and passed through the long vale called Eland's Kloof [16km SE of Citrusdal, but then considered to extend S to the broad valley of the Leeurivier, fide Forbes: 195], across the mountain's to Bernard Forster's in the Koude Bokkeveld (= Cold Bucks'-field).

"The Cold Bokkeveld is nearly as broad as Olyfant's Kloof, surrounded by high mountains on all sides, which close together to the north westward, leaving only a narrow passage to a small plain, situate on the other side of it." [No satisfactory interpretation of this passage can be suggested, fide Forbes: 196]. [*Crassula alpestris* in rupibus koude Bockefeld, Boeckland, Roggefelf. Floret Octobri; Thunberg 7727]

18 Oct 1773 Rode to Isaac Visage's.

19 Oct 1773 Passed Nicholas Jansen's farm, on the way to Carl Van der Merwell.

20 Oct 1773 Travelled on to William Pretoris's farm. Afterwards travelled past two farms belonging to Jan Rasmus and Van Heere to reach the farm of Jacob Pinard.

21 Oct 1773 Arrived Skalk van Heere's farm. "Here commenced the Warm Bokkeveld which was screened from the cold by high mountains and hills, some of which were very steep, and which we had this day descended. The Warm Bokkeveld is a small tract of land, neither very broad nor very long, but rather of a round form, and encircled by mountains." Rode through a great part of the Warm Bokkeveld, and arrived before evening at the farm of Peter Funere [adjoining the N boundary of Ceres].

22 Oct 1773 Set off via Mostertshoek, fording several rivers such as Brug-drift, Stroom-drift, Else-Rivier, and Diep-drift. Arrived at De Wett's in Roode Zand. "Roode Zand is nothing but a valley between high mountains."

28 Oct 1773 Crossed Breede Rivier. Reached Jan Slabbert's farm.

29 Oct 1773 Came to Philip Plaisir's near Saffran's Kloof [Philippus du Plessis, 3km N of the entrance to Bains Kloof] "a place where there is a foot-path across the mountains, along which one may go on horse-back". Arrived at Jan de Toi's [Johannes du Toit (1731-1787)]. The foot-path continues through Toi's Kloof [Du Toits Kloof, now with a developed road] over the mountains to Drakenstein, directly opposite Paarl. Level flat country called Goudena [now Goudini, where Worcester now stands] has the Breede Rivier to the right, and the plain is at times inundated by it. Further on is the Brand Valley, opposite to which, on the other side of the mountain, stands Stellenbosch.

30 Oct 1773 Rode past De Ploi's farm [Michael du Plooy, with whom he had previously spent the night on 6 Oct 1772], and over the Hex Rivier, to Keyser's Estate. "The field was here of the Carro kind [entrance to the Robertson Karoo], where sheep were said to feed on the succulent plants, the mesembryanthemums (vygebosches)".

31 Oct 1773 Arrived at Alowen Smidt's farm [Alewyn Smit, bapt. 1736], opposite Hottentot's Holland. [here before on 9 Oct 1772].

2 Nov 1773 Rode over one of the ridges to Mrs. Bruel's farm [Johanna (Anna) Maria van der Merwe, bapt. 1731. The farm is centred 5km SW of Robertson]. "The mountains to the left now took a somewhat different direction, and ran more to the ESE."

Further on, came to Philip Bota's [Philip Rudolph Botha, bapt. 1747], situated behind the mountains that project out from the Hottentot's Holland mountains, opposite to the Company's Tygerhoek Post.

After this, passed Clas Vogt's Rivier, who was a colonist trampled to death by an elephant [Klaasvoogds River, 10km E of Robertson].

On the same day, continued to Gert Nel's farm, near Kockman's Kloof [now Cogmans Kloof] & Rivier.

3 Nov 1773 Set out for Droski's farm [Godfried Drosky, East Prussia, at Farm Sarahsrivier, 10km SE of Ashton, fide Forbes: 73, 206].

4 Nov 1773 Arrived at Jacobus Bota's [farm].

5 Nov 1773 Went to Jurgen Botas's, passing Blankenberg's farm, on the way to Rock's at Keureboom's Rivier. [Johan Christoffel Rog, waggonmaker from Neustad on the Dosse River, E of the Klip River & NW of Swellendam, fide Forbes: 208]. Then on to Swellendam and thence to the Company's post near Buffeljagts Rivier [Riet Valley]. "A mountain called Potteberg was seen directly opposite the farm, near the sea shore, which was said to be about twenty-four miles distant [40km]."

10 Nov 1773 Passed Peter Bota's farm [Petrus Botha], called Rietkuyl [centred 22km SE of Swellendam]. Crossed Kerremelk's and Slange rivers to reach the widow Fore [widow of Louis Fourie (1703-1767)], near Duyvenhoek's Rivier. Observes that all the way from the Hex Rivier, all the river banks are planted with the very prickly tree, *Mimosa nilotica*. From Swellendam, the mountains are running due E-W.

11 Nov 1773 Went down to Duyvenhoek's Rivier, a short distance from the farm.

Passing by Christopher Lombart's farm [Christoffel Lombard, bapt. 1726. Farm centred 7km NW of Riversdale]. Arrived before evening at the farm of Daniel Plaisir [Daniel du Plessis on the Vet Rivier].

12 Nov 1773 Went to Clas Bruyn's farm [7km NE of Riversdale].

13 Nov 1773 To Peter de Wett's farm [Petrus Johannes de Wit (1716-1779). W of the Gouritz River]. "The whole of this tract produced aloe bushes in abundance, which in some places entirely covered the hills and sides of the mountains, where they appeared at a distance like a numerous army. The bushes are of the height of a man, with their stems quite bare below, and a crown at the top of broad, thick, and fleshy leaves." [*Aloe ferox*]. Describes the manner in which the juices are extracted from the leaves to make a solid gum.

15 Nov 1773 Proceeded to Daniel Pinard's, across Gouds Rivier. "This river is one of the largest in this country" with extremely steep banks on the W side. Proceeded as far as Didelof's farm [Johan Christoffel Dietloff, Farm De Leeuwenkuyl, where Farm Leeuwin now stands].

16 Nov 1773 Rode past several estates such as those of Dirk Marcus [Dirk Marx. Die Kleine Berg, 22km W of Mossel Bay], Bernard the son and the younger Plant, and hastened on to Muscleybay [Mossel Bay] to the farm of old Bernard [Adam Bernard (bapt. 1714), now 14km W of Cape St. Blaize].

18 Nov 1773 Visited the sea coast and its sandy hills. Rode past Class Meyer's [Nicolaas Meyer, bapt. 1747], and Jacobus Tunisson Bota's [Jacobus Johannes Botha, bapt. 1741] estates. Then returned to Dirk Marcus, whose home was at Hagel Kraal.

19 Nov 1773 Travelled up towards the mountains, and entered Hartequas Kloof [Attaquas Kloof, now Attakwaskloof Pass] to a resting place at Grootte Paardekraal [Soutspan on the farm Perdekop where the pass makes a right-angle]. Camped in the open air for the first time on this journey.

20 Nov 1773 Explored the surrounding mountains on all sides, and later continued through Hartequas Kloof to Zaffraan Kraal [by the Saffran river] “when we got into a more plain and level country, called Cannaland [Applied mainly to southern parts of the Little Karoo. West and east limits of Cannaland remain uncertain, fide Forbes: 218], by some Canaan’s Land [“... which the new inhabitants name Cannan’s Land; though it might rather be called the Land of Sorrow; for no land could exhibit a more wasteful prospect.” fide Masson: 289, Forbes: 218]. At the same time passed Cannas Hoogte (= Heights of Canna) [The steep W bank of the Kandelaars River, at the farm now called Sebrafontein, fide Forbes: 218] [*Crassula capitella* in Carro inter Cannaland and Olyfantsrivier. Floret Decembri, Januario; Thunberg 7732a]; [*Crassula pubescens* in Carro prope Cannaland. Floret Novembri, Decembri; Thunberg 7784a]

21 Nov 1773 Passed Aker Hein’s farm [Ockert Heyns, by the present Groot-Doring River, 7km WSW of Zebra railway siding, fide Forbes: 218]. Took up quarters in the evening near the Klipp Rivier [A stream now followed by the railway between George and Oudtshoorn]. The land between the mountains is the Little Karoo, “very dry like the Carro, and much higher than Houtniquas Land that lay on the other side of it. That piece of land, which lay on the other side of the mountains to the left, was called Kankou [Kango or Cango].”

22 Nov 1773 Crossed Brack Rivier [the river that flows through Eseljagpoort] and Matjies Drift [N end of the River Matjes valley]. Going through Matjies Kloof, where the Lange Kloof begins, rode past Helbeck’s farm to Van Stade’s [Hendrik van Staden, Ganse Kraal (= Goose Pen), previously visited on 10 Dec 1772]. “In this country we noticed more bushes and trees than usual, but not forests.”

23 Nov 1773 Passed Buy’s homestead [at Eensaamheid by the stream of the same name] on the way to Gert van Roijen’s [6km W of the ford over the former Keurbooms River], at Diep Rivier.

24 Nov 1773 Arrived at Tunis Bota’s farm. Proceeded to Hannes Olofson’s farm [Johannes Oelofse, bapt. 1731, between Keurboom River and Avontuur]. “Here was a carriage road that led to Camenassie Land and Olyfant’s hot bath [followed this track five weeks later on a side trip to the hot spring on the return journey].

25 Nov 1773 Rode through the Lange Kloof to Mat Zondag’s. “The land in Lange Kloof is bare, and without any shrubs or bushes, but abounds much in grass. The cold in winter is very severe in this vale, and snow sometimes falls here which lies on the ground three or four days.” [The valley floor exceeds 900m altitude]. “As the year before I had pretty narrowly examined this spot, and had gathered a few plants that grew upon it...”

Crossed the present day boundary into the Eastern Cape

26 Nov 1773 Set out for Peter Frere’s.

27 Nov 1773 Passed Stephanus Frere’s [Stephanus Ferreira, bapt. 1746] to reach Matthew Streidung’s.

28 Nov 1773 Passed Peter Nyckert’s to reach Andrew de Pre’s [Andries du Preez, Farm Elandsfontein, at Heights]. “Kouka [valley of the Kouga River] lay directly opposite on the left hand, and was a narrow piece of land between the mountains.”

29 Nov 1773 Arrived, towards evening, at Thomas Frere’s after a very troublesome day on which many gatherings were soaked and spoiled.

30 Nov 1773 Proceeded to Essebosch, a pretty neat little wood [near Essenbos railway siding, c.30km W of Humansdorp].

1 Dec 1773 Went down Kromme Rivier (= crooked river), a valley whose river meanders through it, and is a continuation of Lange Kloof. Rode past Vermaak's estate [Cornelis Tobias Vermaak, bapt, 1750]. Arrived at Isaac Meyer's farm [Izaack Meyer, bapt. 1723, vicinity of Rondebos, 5km N of Humansdorp]. Rested and stayed for several days at Kok's farm, near Zeekoe (= Sea Cow) Rivier estuary. [Jacob Kok]. *Crassula spatulata* [in silvula juxta exitum Zeekorivier. Floret Januario; Thunberg 7795]

9 Dec 1773 Took the road to Kabeljaus Rivier to the farm belonging to Van Rhenen [Jacob van Reenen], a rich burgher at the Cape, then tended by a servant.

10 Dec 1773 Crossed Camtous Rivier, which marked the easternmost boundary of the Colony. Proceeded further to Looris Rivier. [*Crassula crenulata* prope Lurisrivier. Floret Decembri; Thunberg 7745]

11 Dec 1773 Passed Galgebosch (= Gallow's Wood) where they lodged for the night, on the way to Van Stade's Rivier [Van Staden's River].

12 Dec 1773 Reached Van Stade's Rivier [Van Staden's River] in the morning, and arrived at two large villages of round huts.

13 Dec 1773 Reached the country called Krakakamma [Promontory between the Van Staden's & Zwartkops rivers]. Travelled down the Krakakamma valley to the sea shore [at Port Elizabeth].

15 Dec 1773 Set out for Zwartkop's Rivier [using the ford between Perseverance and Despatch], and the Salt-Pan not far distant from it [4km NNE of Perseverance]. [*Crassula ramosa* in Carro prope Swartskopps rivier; alibi. Floret Decembri; Thunberg 7788]; [*Crassula adscendens* in Carro prope Swartkoppsrivier; alibi. Floret Decembri] Arrived in the evening at Kuka [now Coega] where the stream was just a stagnant puddle of brackish water. Camped here.

16 Dec 1773 Proceeded to the great Sondag Rivier [Zondags River = Sundays River], where the usual fording places are between Addo and Sunlands. Decided to turn back for the Cape at this, the most eastern part of the journey. They had intended to travel as far as the Sneeuwberg, which would have involved crossing part of the arid eastern Karoo. [*Crassula thyrsiflora* inter Soendags & Vischrivier. Thunberg 7801]

Furthest point east: The point where he turned back was about 60km NE of the Groote Visch Rivier (= Great Fish River), the river then considered to be the eastern boundary of the Cape Colony.

Investigated the plants to be found near Kukakamma [Coega River], then set off on the homeward journey.

20 Dec 1773 By a different route to the outward journey, they arrived at Van Stade's Rivier, and from thence to Zeeko Rivier.

21-24 Dec 1773 Passed a few days before Christmas with Jacob Kok, where they dried and prepared the "thick-leaved and succulent plants that had been gathered in their last expedition up the country."

25-26 Dec 1773 Proceeded up towards Kromme Rivier and Lange Kloof.

28 Dec 1773 Arrived at Hannes Olofson's farm [Johannes Ölofse, bapt. 1741]. Rode north over the mountains to Anders Olofson's near Riet Valley in Camenassie Land [now Uniondale]. Mentions 2 zygophyllums poisonous to sheep: *Z. herbaceum repens* [*microphyllum*] & *Z. sessilifolium*.

29 Dec 1773 Rode from here to Peter Jordan's estate, located near Olyfant's hot spring and the river called (the Eastern) Elephant's River, via a tract that he said was "Carro field all over, exhibiting a few bushes, no grass, and very little water." [*Crassula hemisphaerica*

in montibus Roggefeld, in Carro juxta Olyfants rivier orientalem, & prope eiusdem rivuli thermas. Floret Decembri; Thunberg 7759]; [*Crassula pyramidalis* juxta Olyfantsrivier orientalem prope thermas. Floret Octobri; Thunberg 7787]

Mentions *Mesembryanthemum emarcidum* [*Sceletium*] here, a trailing succulent with narcotic properties that is chewed when dried, pulverised and fermented to relieve pain or thirst or intoxicate by the Hottentots.

30 Dec 1773 Visited the hot spring [4km E of the southern entrance of Tooverwater (Toorwater) Poort at the foot of Slypsteenberg, part of the Groot Swartberg range].

Refers to a plant of the “dry Carro-veld” called ku, with a large and succulent root [*Fockea edulis* fide Forbes: 251].

1 Jan 1774 Arrived at Jan van Stade’s farm. Afterwards passed the estate and farmhouse of Gert van Royen [perhaps at Doring River, 15km W of Ezelsjagt, fide Forbes 252].

Early Jan 1774 Followed a route over the dry Carro on horseback but lost their way with no tracks to follow and spent the night camped in the open air. Meanwhile the wagons and crew took the conventional route and they met up again at Hartequas Kloof [Attaquas Kloof, last visited on the outward journey on 19 Nov. 1773].

“Near Hartequas Kloof, a new range or ridge of mountains commences, which joins the former, the cleft serving as a band of connection between them. So that the Carro-veld can be seen behind the first ridge, when one rides into the cleft through the next range of mountains near Groote Pardekraal.” [*Crassula mollis* juxta introitum in Cannaland ad Lange Kloof. Floret Januario; Thunberg 7766; *Crassula spicata* in Carro. Floret Decembri, Januario; Thunberg 7796; *Crassula tecta* in Carro, trans Hartequas Kloof. Floret Decembri; Thunberg 7799]

Stayed a day at Gouds Rivier [last there on 15 Nov 1773].

Continued to the Riet Valley Company post.

14 Jan 1774 Paid another visit to Groot Vader’s Bosch. “As I had no hopes of ever visiting this place again, I made a point now of collecting and laying in dry branches with leaves of every species of tree, and at the same time of becoming perfectly acquainted with the use they made in this country of each species.”

18 Jan 1774 Passed through Swellendam to Stein’s farm.

19 Jan 1774 Crossed the Breede River where it unites with Zonder End Rivier [Rivierzondereind]. Then went over Hessaquas Kloof and past Gyllenhuysen’s estate to Vollenhovens [Hendrik Anthonie Vollenhoven, bapt. 1736], and Avontuur [where Stormsvlei now stands].

20 Jan 1774 Passed Melk’s farm [where Riviersonderend now stands] to the Company’s post at Tigerhoek [Tygerhoek]. Passed Jurjin Linde’s farm [Hans Jurgen Linde, Farm Ganzekraal, 10km WNW of Riviersonderend], and arrived at a post of the Company’s near Zoete-melks valley..

24 Jan 1774 Passed the Ziekenhuys (= hospital), a small Company post. Went forward to Groenewal’s farm, and afterwards to Gyllenhuysen’s near Zwart-rivier (= Black River).

25 Jan 1774 Travelled to Badenhorst’s & Beyer’s estates, near Booter Rivier.

26 Jan 1774 Passed over the rivers Groote Houthoek, Palmit’s [Palmiet] and Steenbrasems to arrive at Hottentot’s Holland Mountain.

Finally, we went down the mountain, over its steep hills, and then over the level plain to the Cape.

29 Jan 1774 **Returned to Cape Town**, having covered c. 2300km in 4½ months.

The **third journey** to Roggeveld in the Northern Cape was made 29 Sep 1774 to 29 Dec 1774, also accompanied by Francis Masson.

29 Sep 1774 Crossed Zout Rivier & Mosselbank's Rivier, to arrive at Vischershoek [Vissershok = fisherman's shack], a Company cornfarm occupied by the Governor.

30 Sep 1774 Rode past Engelaar's farm [Jurgen Hendrik Engels, Farm Adderley] to Math. Greef's [Matthys Greef], [left bank of the] Mosselbank's Rivier [4km WNW of Klipheuwel station].

2 Oct 1774 Crossed Mosselbank's Rivier to Jurgen Kutse's [Jan Jurgen Kotze, Brouwerskloof (below W slope of the Paardeberg, now Perdeberg)] and from thence proceeded to Abraham Bosman's. "The Paarl Diamonds were two very large, bare, steep, and almost conic mountains." [actually 3 granite domes that shine when wet].

5 Oct 1774 Proceeded to Hannes van Aarde's [Johannes van Aarde, Staart van de Paardeberg].

7 Oct 1774 To Losper's estate.

8 Oct 1774 Came to Dreyer's estate, near Riebeek Casteel, a large mountain, which Thunberg & Masson climbed. Found *Lachenalia aloides* (Thunberg sheet 8557, UPS) while climbing down a crevice.

12 Oct 1774 Arrived at Wilhelm Burger's grazing farm, near Matje's Drift and Rivier.

14 Oct 1774 Arrived at Hanekamp's grazing farm [10km NE of where Piketberg now lies].

Mentions *Stapelia incarnata* [*Quaqua*] in the vicinity of the mountains near Picquetberg, but scarce.

Vogelvalley [40km N of Paarl], a marshland, lay at the foot of the mountain opposite Paarl. N of Picquetberg stood Captain Kloof's Mountain [now just a hamlet name in the mountain-surrounded valley of Boesmans River, 23km NW of Piketberg].

Further on they came to Carrelspeck's farm [Johannes Karnspek, bapt. 1731], then to Gerdt Smidt's [Gerrit Smit, bapt. 1745, 8km W of Eendekuil], and on to Dirk Kutse's [Dirk Coetzee, bapt. 1753], and finally to And. Greef's [Andries Greeff, bapt 1732, farm Verlooren Vlei].

Camped for several days along the banks of the Verloorenvalley River [now Verlorevlei].

Travelled along Langevalley River [parallel with and 16km N of Verlorevlei]. Then traversed a very long and dry Carroveld to a place called the Gentlemen's Hotel (Heerenlogement) in a vale between the mountains.

25 Oct 1774 Found *Codon royeri* on the way to the Heerenlogement, but only one shrub.

26 Oct 1774 Arrived after dark at Peter van Seele's [Pieter van Zyl, 7km WNW of Klawer at Ouplaas on the left bank of Olifants River]. "The Bokkeveld Mountains also ended near the sea-shore, on the other side of Olyfant's Rivier; they are of a considerable height, and do not go off with a gradual slope."

30 Oct 1774 Rode along the foot of Windhoek Mountain, and Maskamma Mountain [now Marsikamma, a bold flat-topped promontory crowned with red cliffs, 10km SSE of Vanrhynsdorp]. Arrived at Farm Trutru belonging to Ras [Johannes Ras, Farm Troe-Troe, the name of the farm and watercourse on which Vanrhynsdorp stands]. Found Hottentots Watermelon [*Fockea edulis*] on some of the lesser hills here.

Saw the Bokkeveld Mtns. [Bokkeveldberge] to the E. [This is topped by a plateau that Thunberg called Bokkeland or Lower Bokkeveld, where Nieuwoudtville now stands].

31 Oct 1774 Proceeded across the dry desert now called the Knersvlakte over the next 3 days. Arrived the first night at a place called Enkelde [Single] Dornbooms Rivier [perhaps Halfppad River, 21km NE of Vanrhynsdorp].

To their left was a ridge of not very high mountains that ran along the sea-shore. “In this Carro-land grew the most singular mesembryanthemums, and those in the greatest quantity; on the other hand but very few crassulas, euphorbias and cotyledons.”

2 Nov 1774 Rode up the Bokkeland Mountains [either directly by what is now a 4-wheel drive track, or at Die Hel, Farm Perdekraal, or behind the escarpment SSW from the Doring River to Swellengrebelfontein on the summit, fide Forbes: 287]. Discovered *Aloidendron dichotomum* here.

[*Crassula montana* in summo monte Bockland. Floret Octobri, Novembri; Thunberg 7767]

Arrived at Clas Losper’s farm [Nicolas Laubscher, bapt. 1717. Farmed at Groenerivier where Nieuwoudtville now stands]

“From Bokkeland we saw the Roggeveld Mountains to the eastward, and , nearer hand, the Hantums Mountains to the northward.”

Mention of *Amaryllis disticha* (*Boophane*) used chiefly for poisoning arrows by the Hottentots.

On the following days rode along Bokkeland to Hantum [region around the Hantamsberg].

[*Crassula tomentosa* in Hantum. Floret Octobri, Novembri; Thunberg 7803]

In Hantum passed Van Rhen’s grazing farm, near Rietfontein [By the Klein Toring River, 32km WNW of Calvinia]. Then to Hendrik Lau’s grazing farm [Hendrik Louw, bapt. 1740, Farm Grootevlakte, 21km NW of Calvinia].

[*Crassula barbata* in rupibus montium Hantum prope villam Grootrivier, in Roggefild. Floret Octobri, Novembri; Thunberg 7731] And then to Abraham Van Wyk’s farm [at Uitvlugt (Escape), the name of 2 farms near the confluence of Hantams and Teronje rivers, fide Forbes: 295] [*Crassula deltoidea* in Carro prope Olyfantsrivier, Hantum; Thunberg 7754]; [*Crassula turrita* in Carro prope Olyfantsrivier; Thunberg 7801]

Found here the fungus *Hydnora africana*, growing on the roots of a terete euphorbia, probably *Euphorbia mauritanica*.

13 Nov 1774 Proceeded to Christian Bock’s [Christiaan Bock, bapt. 1736, by the Hantams River, 22km NNE of Calvinia].

14 Nov 1774 To Rhonnoster Rivier [Renoster River, an Orange River basin tributary, crossed at Louwsdrif]. Mentions a farmer named Korff [Heinrich Korff, Farm De Brakkerivier near source of Zak River, c. 40km E of Thunberg’s route]. Went to Daunis, where the settlement had been destroyed by fire by the Bushmen.

“Directly before us lay the Roggeveldberg.” [*Crassula corallina* in campi siccis Hantum inter Daunis & Roggefildsberg. Floret Novembri; Thunberg 7741]

15 Nov 1774 Rode along the Drooge Rivier [Turned abruptly eastward at Jakkalswater up the Drooge/Droë River, fide Forbes: 297].

16 Nov 1774 Travelled along the foot of the Roggeveldberg [Southwards up the Drooge River valley, passing where Hangnes is now mapped, fide Forbes: 297]. Thence to the Port [Poort] Gorge near the head of the Droë River [Now mapped as the Oorlogskloof River]. Then up the mountain to Wilhelm Stenkamp’s farm [Wilhelm Steenkamp, at Elandsfontein, near the head of the Oorlogskloof/Droë River]. The country here was called the Lowermost Roggeveld, lowermost meaning that it lies furthest from the Cape. “The whole country is destitute of wood, and has only a few small bushes of the mesembryanthemum [*Lampranthus* & *Ruschia* fide Forbes: 297], pteronia, stoebe kinds, and a few others, such as othonnas, & c.” [*Crassula columnaris* in Onderste Roggefild in Bockland. Thunberg 7740]; [*Crassula rupestris* in rupibus Onderste, Roggefild, dronte montis Bockland, montibus Hexrivier. Floret Octobri, Novembri, Decembri; Thunberg 7792]; [*Crassula vestita* in Onderste Roggefild locis lapidosis siccissimis. Floret Novembri, Decembri; Thunberg 7807]

18 Nov 1774 Proceeded to Jacob Laue’s [Jacobus Adriaan Louw, bapt. 1750, Farm Hartebeestfontein].

20 Nov 1774 To Adrian Laue’s farm. [Same place as the last].

27 21 Nov 1774 Came to Gert van Wyk’s.

23 Nov 1774 Arrived at Thomas Nel's farm, and afterwards to Adrian van Wyk's. This is near the edge of the top of the mountain, where an awesome descent to the Carro still exists to this day and known as the Ouberg's Pass, 16km SSE of Uitkyk.

Here mentions *Stapelia articulata repens* [*Pectinaria articulata*] as being eaten by the Hottentots after pickling like cucumbers.

24 Nov 1774 Camped by a spring [possibly Vierfont, which would have meant that they had retraced their steps from Uit Kyk. At Vierfont they turned abruptly ESE, fide Forbes: 301].

25 Nov 1774 Crossed the Droëberge to Paul Kerste's near Kreutsfontein [Farm Kruisfont, where Meintjesplaas now stands, by the Kruis River on the E slopes of the Droëberge]. Reached the start of the Middle Roggeveld, divided from the former with a few mountainous ridges.

26 Nov 1774 Arrived at Cornelius Kutse [Cornelis Coetzee, bapt. 1742, with farm at Koorlandskloof on the Visrivier].

29 Nov 1774 Rode along Visch Rivier (= Fish River) passed Olivier's farm [Gerrit Hendrik Olivier, Farm Kruisrivier, 10km S of Koorlandskloof] to Jacobus Theron's.

1 Dec 1774 Travelled to Esterhuysen's farm [Farm Uyt Kyk (Lookout), now Farm Klipfont].

3 Dec 1774 Set off down the mountains in the morning through a ravine, Mauritius Gat, situated on the farm of the same name, fide Forbes: 305. Stayed the night at the foot of the mountain at Meyburg's farm [probably Albertus Johannes Myburgh (1742-1790), Farm Langedogt, fide Forbes: 305].

4 Dec 1774 Came to Goudblom's Kloof, named for the gold composite flowers growing there [6km SW of Thyskraal by the Brak River].

5 Dec 1774 On to Ongelucks Rivier (= River of Misfortune), where they rested for 2 days.

7 Dec 1774 Pressed on overnight across what is today called the Tanqua Karoo. Reached a rivulet that ran before a small and solitary mountain called Paardeberg [now Perdeberg, 20km NE of Karooport].

8 Dec 1774 Continued past the Paardeberg to reach the Dorn Rivier [Now Doring River, which flows through Karooport past the Perdeberg].

9 Dec 1774 Left Dorn Rivier along the road through the valley formed by the mountains between Carro and Bokkeveld [Karooport valley, between the Wittebergen mountains]. Arrived at the settlement and farm of Van der Mervel's widow.

11 Dec 1774 Arrived at Verkeerde Valley (Verkeerdevelei), a pleasant area of grass and swamp, where they stayed a few days.

14 Dec 1774 Passed through a kloof called Straat (= Street) to De Vos's farmhouse near the Hex River.

16 Dec 1774 Rode past Jordan's farm [where De Doorns village now lies] to Van der Mervel's widow's farmhouse. [Jacob van der Merwe (1699-1769), Farm Vendutiekraal].

17 Dec 1774 Through Hex Rivier's Kloof [10km long gorge between Sandhills & De Wet] to Roode Zand. Followed the track through the Nieuwe Kloof where at one point the track is over 33m above the river.

29 Dec 1774 Arrived at the Cape, having travelled 900km in 3 months, via Riebeek Castle, Paardeberg through Koopmans Rivier, through Burger's Drift, across Berg Rivier, and past Elsis Kraal.

Unlocated taxa:

[*Crassula cephalophora* no data; *Thunberg 7737*]

[*Crassula argentea* culta in hortis Societatis ad Cap & Rondebosch. Floret Augusto; *Thunberg 7730*]

APPENDIX II

The meaning of *pubescens* and *villosus* in the Linnaean era.

Thunberg (1743-1828) was a pupil of Linnaeus who actively collected plants on three continents, including three years of daring and dangerous exploration of the flora of the Cape Colony in South Africa on behalf of the Dutch East India Company.

That was a time when the language of botany was still in its infancy, but Linnaeus had put it on a firm footing with his many handbooks on natural history, including at least two well known glossaries of terms.

Students of the genus *Crassula* have generally overlooked the fact that language tends to drift in its meanings over the course of time, and this certainly applies to *villosus*, one of the key words associated with the *Crassula pubescens* protologue.

Pubescens is the active present participle of the verb *pubescere*, to reach the age of puberty or to become pubescent, referring specifically to the hair that appears on the bodies of young men as they mature. This hair is downy, soft and uniformly distributed, and botany has retained that description for the hairs that occur on leaves and other plant parts. From Linnaeus to today the definition of “downy with very short, weak, soft hairs” has applied throughout, with ‘very short’ being the only reference to its actual length. Usually they are long enough to be visible to the naked eye, but in the case of *Crassula pubescens*, they are too small to be seen without a magnifier.

Villosus, or villous in English, on the other hand, is applied today to anything shaggy, or covered with fairly long weak but straight

hairs. This is correct, in the sense that the origin of the word *villus*, meant exactly that in classical Latin.

However, this was not the case for the botanical definitions of *villosus* in the sense of Linnaeus and Thunberg. Linnaeus only ever applied *villosus* to stems rather than leaves, and defined it as “*Pilis mollibus pubescens*” [soft pubescent hair] in *Philosophia botanica* (1755: 40). By the 1787 edition of *Termini botanici*, it had become “*Pili molles copiosi*” [soft abundant hairs].

Thomas Martyn (1735-1825) formalised Linnaean terminology in his *The language of botany* (1793), and he included many different types of pubes and pubescence under his definitions.

However, for *villosus*, he wrote: “*Pilis mollibus pubescens*. Pubescent or covered with soft hairs. As the stem in *Tomex* and *Rhus*. The leaf in *Ulex europeus* or Furze, *Primula villosa*, & c. The stigma.” In both of these leaf examples the hairs are extremely short. In fact, William Curtis commented that Jacquin, in his *Flora Austriaca* 5: 41-42, described *Primula villosus*, “which we adopt, though with us it is so slightly villous as scarcely to deserve that epithet” (Curtis, *Bot. Mag.* 1: t.14).

For *villus*, Martyn said “In Linnaeus’s idea, it seems to be soft close hairs, forming a fine nap or pile like velvet.”

These definitions and examples show that Thunberg’s usage of the term *villosus* was more or less apt for *Crassula pubescens* at that time.