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13. An evaluation of the cacti of Charles Plumier (1646–1704)

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An evaluation of the cacti of Charles Plumier (1646–1704)

Roy Mottram Whitestone Gardens, Sutton, Thirsk, North Yorkshire YO7 2PZ, U.K.
mottram.roy@gmail.comm

Paul Hoxey 34, Stonehill Road, Great Shelford, Cambridge, CB22 5JL, UK
paul@hoxey.com

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Summary
The cactus manuscript and drawings left by Charles Plumier at the Paris National Museum of Natural History are reproduced in high resolution, and his texts are translated into English. Current thinking on the identities of his taxa is discussed and taxonomic revisions made where necessary. A folio of watercolour paintings of Antilles flora and fauna by Plumier at the Bibliothèque Nationale de France, Paris, dated 1688, with plates and descriptions of four cacti is also examined and compared. Plants found on visits to six of Plumier's collecting sites in Haiti by Hoxey and Gdaniec in early 2017 and to the islands of the Lesser Antilles in early 2019, are compared with his drawings and descriptions. A visit to the type locality of *Cactus moniliformis* L., the first since it was described by Plumier over 300 years ago, now shows that the name has always been misapplied. *Opuntia testudinis-crus* F.A.C.Weber receives a new combination in *Consolea*. The typification of *Cactus grandiflorus* L. is revised. *Rhipsalis parasitica* (L.) Haw., the correct name for *Rhipsalis baccifera* (J.Mill.) Stearn, is restored.

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Publisher: Roy Mottram
Whitestone Gardens,
Sutton, Thirsk,
North Yorkshire YO7 2PZ, U.K.
Tel: 0044 (0) 1845 597467
Email: mottram.roy@gmail.com

in association with the International Crassulaceae Network
c/o Margrit Bischofberger
Guggenbühlstrasse 20
CH-8355 Aadorf
Switzerland.
Tel: 0041 (0) 52 212 71 72
Fax: 0041 (0) 52 212 71 29
Email: margrit.bischofberger@enersol.ch
url: www.crassulaceae.ch

An evaluation of the cacti of Charles Plumier (1646–1704)

Biography in brief:

Plumier, Charles (1646–1704) Author abbreviation: Plum. (Figure 1)

b. France, Marseille, 20 Apr 1646; d. Spain, Cádiz,Island of Gadis, 20 Nov 1704.

Charles Plumier was a French missionary of the Franciscan Order, explorer and botanist. He was a friend of the botanist Tournefort (1656–1708), with whom he travelled throughout the Midi (southern France and adjacent areas), and was also an acquaintance of Du Tertre (1610–1687), a Dominican Order blackfriar, who was a missionary in the Lesser Antilles in the years 1640–1647 and 1656–1657. Plumier made three visits to the Caribbean. He travelled in 1689–1690 with the Marseille physician Surian, who made herbarium specimens while Plumier made the drawings and descriptions. He was there again in 1693 and 1695–1697. He explored western Hispaniola (now Haiti) in the greater Antilles, and the French possessions of the Lesser Antilles. Travelled to St. Thomas &St. Croix (US Virgin Is.), Martinique, Guadeloupe, St. Christopher (= St. Kitts), Bequia, Carriacou, Canouan and St. Vincent. He died of pleurisy at Cádiz, just as he was about to embark on a fourth voyage.

Lamarck published very abridged French translations of many of Plumier's own Latin descriptions, including some cacti, in his *Encyclopédie méthodique. Botanique* **1**(1) (1783–1785) without really knowing what they were except from Plumier's drawings and descriptions. Until now, English translations have been lacking. Plumier's often difficult-to-decipher handwriting style, coupled with Latin that predates formal 'botanical Latin', and the use of comparisons with objects or plants personally familiar to Plumier himself though not often obvious to us, combine to create pitfalls for standard translation that few are willing to tackle. The English versions given here are as faithful to Plumier's original manuscript texts as possible.

Apart from a few European specimens in Paris, the types of Plumier's American plants are automatically his original drawings, as his specimens were all lost at sea. Further elucidation is provided in the case of some non-cactus plants by J.D. Surian's herbarium at P-JU, and in several cases the Surian plants may be the actual types of Plumier species. They are, however, reported to be in a poor state of preservation.

The around 6000 original drawings of flora and fauna of the Old and New Worlds made by Plumier are presently kept at the Muséum d'Histoire Naturelle, Bibliothèque centrale, and constitute manuscripts 1–37, bound in 30 volumes. Twelve volumes comprise Caribbean plants, amounting to 1657 drawings. On the pages facing each illustration are detailed descriptions in Latin, mostly with exact habitats.

Several copies have been made of the botanical plates. One of these was a set of 508 copies, now at Groningen University library, made by Claude Aubriet for Boerhaave in 1733, and used by Burman for the preparation of his own *Plantarum americanum fasciculus* (1–10) in which 262 of the plates were published. That set was seen by

Figure 1a. Plumier portrait. The only known image.

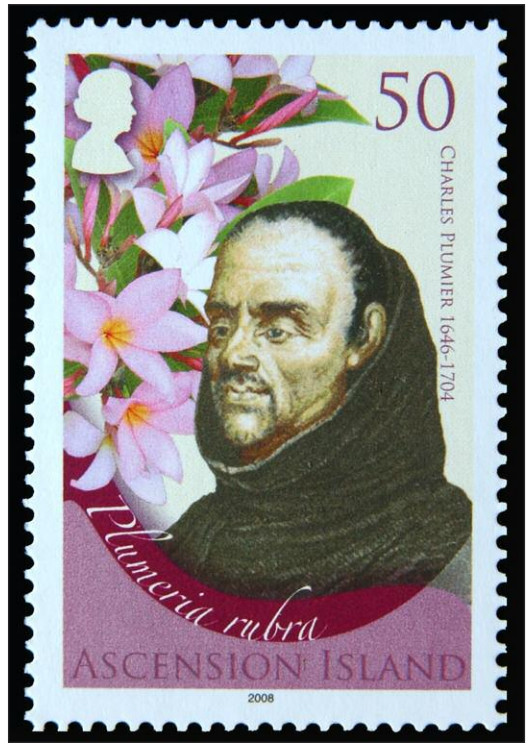


Figure 1b. The same engraving on a 2008 Ascension postage stamp, with the eponymous *Plumeria rubra*.

Linnaeus during his stay in Holland in 1738. Another set of 312 copies was acquired by Lord Bute and is now at the British Museum (bequeathed by Joseph Banks, Banksian ms. 1–5). An uncoloured set of copies of Plumier's drawings together with transcripts of descriptions is at Kew. The cacti from this set were reproduced by Hunt, in *Bradleya* **2**/1984: 39–64. Another set of copies is at Oxford, commissioned by Vaillant.

The standard of Plumier's observation and draughtsmanship is, on the whole, high, but there are some notable lapses where the drawings appear odd. His encounters with his plants were sometimes rather brief. Travel overland was very difficult in those days, and hampered by a much denser vegetation than exists today, so expeditions from his base or the beaten track would have been very short, if only because he did not wish to become disorientated and lost. However, his long distance travel invariably took place by sea.

Plumier's plates 11 (*Consolea moniliformis*), 25 (*Stenocactus heptagonus*) and 26 (*Harrisia divaricata*/*Cereus haitiensis*) are particularly contentious. All appear to have suffered from some sort of damage or mixing of his specimens in whatever *herbier* (botanist's carrying case, later called a *vasculum* by Linnaeus) he was carrying, and using the usual means of transport in those days, horseback, they must have been badly shaken up or even dropped, as Thiéry (1787) graphically described. The delicate flowers would suffer the most from such buffeting and attempting to put them back together would have caused mistakes, and even in the case of t.25 the total loss of parts of the flower. Insects were also often deliberately or inadvertently transported with the plants and these would often eat parts of plants, especially the flowers, also experienced by Thiéry who was trying to keep mealybugs alive on his opuntia cuttings. On his long journey from Oaxaca to Veracruz he lost all but three of his original 50 crates of opuntias to physical damage and insects.

It has recently come to our attention that, in addition to his massive multivolume accumulation of mainly botanical plates and manuscripts at the Muséum d'Histoire Naturelle, there exists a much smaller folio of watercolour paintings by Plumier at the Bibliothèque Nationale de France, Paris, under their reference number FRBNF40351031. It contains 61 plates, of which 4 depict cacti. There is a hand written title page: *Plantes de la Martinique et de la Guadeloupe 1688*. As his first expedition to the Caribbean was in 1689, we assume that he began his portfolio in 1688 with the views and maps of Martinique and Grenada drawn by Père Nicolas de La Grandière-Cornau, then added his own plates

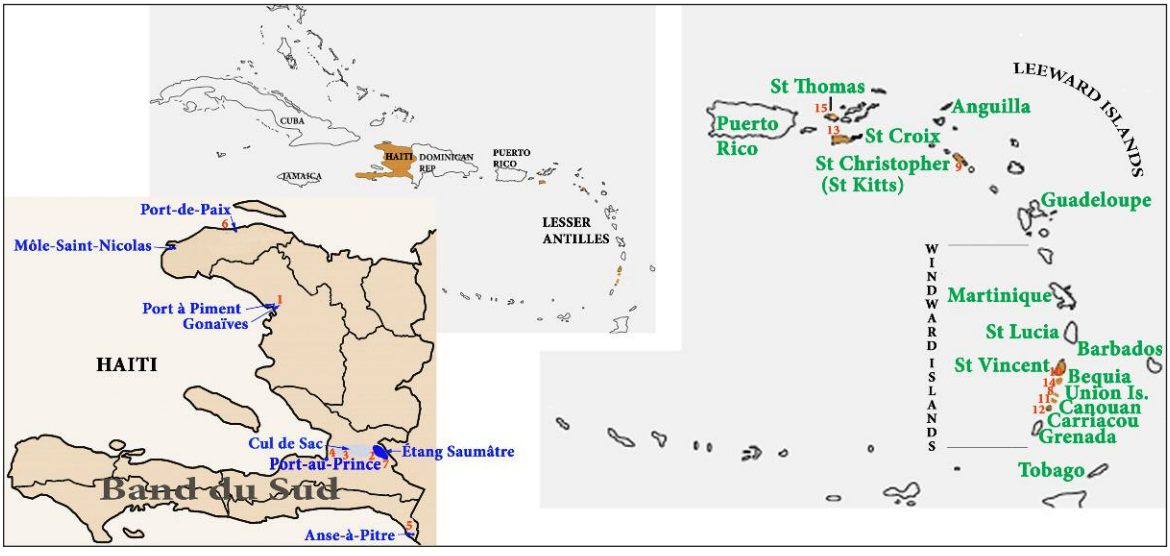


Figure 2a. Map of collecting sites in the Caribbean. **b.** Map of collecting sites in Haiti.

as and when executed later during his time in the Lesser Antilles in 1689–90. There was also a hand written text for each botanical plate in French, sometimes beside the drawing and sometimes on a separate page. English translations of these texts are provided below, and the plates are reproduced from a facsimile made in 1985 that also included a biography of Plumier by Grillon. These long lost plates are very useful to our understanding of the four cactus species involved.

Notes on the cactus collecting sites mentioned by Plumier (Figure 2)

Haiti (Called San Dominica by Plumier).

1. Port à Piment. A bay NW of Gonaïves, Dept. Artibonite, Haiti. *Melocactus lemarii. Consolea testudinis-crus*. This location was seen by Hoxey & Gdaniec in 2017, who confirm the continued presence of these two species. This is not to be confused with another locality of the same name that occurs on the south coast in an area with much higher rainfall.
2. L'Etang Saumache. Now Étang Saumâtre, a brine lake east of Port-au-Prince bay, in the low-lying region known as Le Grand Cul de Sac, Haiti. *Mammillaria prolifera*. This species was observed by Hoxey & Gdaniec in 2017 close to Étang Saumâtre in the Le Grand Cul de Sac area, and is also widespread elsewhere.

3 Le Cul de Sac, or Grand Cul de Sac. This is a low, flat plain only a few metres above sea-level, once the bottom of an old lagoon with coral formations. It is home to two arborescent cacti forming in places a dominant part of the landscape. N to NE of Port au Prince bay, it stretches eastwards to Lake Saumâtre. *Leptocereus paniculatus. Harrisia divaricata*. [This location was seen by Hoxey & Gdaniec in 2017, who confirm the continued presence of these two species].

4. Leogane. Not the Léogâne that is 35km W of Port-au-Prince, Haiti, but probably Port Leogane, only c.9km W of present-day Port-au-Prince city centre at the western end of the Cul-de-Sac area. *Harrisia divaricata*. Seen by Hoxey & Gdaniec in the Cul de Sac region, as close to its type locality as is feasible today. Léogâne to the west and Port Leogane in the environs of Port-au-Prince, are both now heavily cultivated or urban areas. In fact *Harrisia divaricata* may be seen all over Haiti and is the only *Harrisia* present in Haiti today.
5. Band du Sud. *Opuntia moniliformis. Stenocereus heptagonus*. Band[e] du Sud refers to the south-western peninsula, also sometimes called Quartiers du Sud in the early 18th century. Plumier's gatherings are thought to have been made along the south-east coast. Both species were seen by Hoxey & Gdaniec on the south coast in 2017.
6. Le Moustique. Today there is a river feeding into a bay and both river and bay are called Moustique. The area is near Port-de-Paix, Dept. Nord-Ouest, Arrondissement de Port-de-Paix, in the north-west of Haiti. *Dendrocereus undulosus. Pilosocereus polygonus*. Both species were encountered by Hoxey & Gdaniec to the west of Port-de-Paix.
7. Fond du Parisien. At the eastern end of the Grand Cul de Sac, on the south bank of Étang Saumâtre, Haiti. *Pereskia portulacifolia*. This was not found by Hoxey & Gdaniec in 2017, and may now be extinct at its type locality as a

result of the harvesting of its wood for charcoal production.

Lesser Antilles.

8. Union Island. One of the Grenadines, Windward Islands, 200km SW of Barbados. *Pereskia aculeata. Acanthocereus tetragonus. Acanthocereus tetragonus* was found on Union Island and all other islands of the Grenadines by Hoxey & Gdaniec in 2019. *Pereskia aculeata*, however, was not found on Union Island and appears to be absent throughout The Grenadines.
9. Les Salines. A cluster of brine ponds in the SE of St. Christopher Island [= St. Kitts], Leeward Islands. *Melocactus intortus*.
10. Caraibae O'Laiou. Now Layou, St. Vincent. NW of Kingstown. *Melocactus broadwayi.* This species was found by Hoxey & Gdaniec in 2019 growing on vertical coastal cliffs near to Layou.
11 Canouan. An island of the Grenadines, Windward Islands. *Mammillaria mammillaris.* Found by Hoxey & Gdaniec in 2019 on exposed dark grey to black volcanic rocks.
12. L'Anse de la Roche. Anse La Roche Bay, Carriacou Island, Grenadines, Windward Islands. *Mammillaria mammillaris.* Hoxey & Gdaniec failed to find this species on Carriacou in spite of extensive searching, however, it was found on Union Island just 8km to the north and Ronde Island about 16km to the south. As it was also found on Canouan and Bequia it is probably on most of the islands of the Grenadines although infrequent.
13. St. Croix. The largest of the US Virgin Islands. *Selenicereus trigonus. Selenicereus undatus.*
14. Bequia. An island of the Grenadines, Windward Islands. *Cereus plumieri* = *Selenicereus trigonus.* This species was found on Bequia and Saint Vincent by Hoxey & Gdaniec but not elsewhere in the Grenadines.
15. St. Thomas. A small island of the US Virgin Islands. *Consolea rubescens*. Plumier did not differentiate these from *C. testudinis-crus* of Hispaniola and only illustrated the latter.

Glossary of specialist terms used by Plumier:

arista An appendage, usually of wool. Literally an ear of wheat.

aurantia mala 16-17thC name for the bitter orange (*Citrus* ×*aurantium*).

calyx From the Greek, *kalix*, a cup. Applied by Plumier to the floral parts surrounding and protecting the reproductive parts of a flower, which is what we now call the hypanthium, i.e that part of a flower that encloses the ovary and its attached floral tube extension in the case of a cactus flower. Modern botany restricts the application of the term specifically to the ring of outer perianth (sepaloid) segments.

caulis Basal stem or trunk of a tree.

conus Used frequently by Plumier for the apical growing point of a cereiform cactus. Derives from the 16thC word for the crest of a medieval pointed helmet or sallet.

echinus The word *echinus*, from the Greek *echinos*, was in the seventeenth century applied to anything "beset with prickles", and became a name applied to such things as a hedgehog, sea-urchin, puffer-fish, chestnuts, cactus, etc. In the present context, Plumier has applied it to mean any prickly ball.

fimbriatus Derives from the Latin *fimbria*, which was originally applied to the border or hem of a garment, with any sort of edge. This became the root for the late 15thC English *fimbriate*, meaning fringed, an ornamental border of loose threads. The earliest botanical usage of the adjective *fimbriatus* goes as far back as the Roman author Pliny the Elder (23–79), usually translated as 'jagged', to describe the edges of nettle leaves, which are actually serrate, but the present-day botanical sense of a regular fringe of hairs was first formalised by Linnaeus & Giseke in their edition of *Termini botanici* in 1787. Plumier seemed to apply *fimbriatus* to margins that are broken in any way, i.e. not entire.

medulla A term in use at the time for the marrow of bones or the pith of a plant. Today it is a term for the soft internal tissue or pith of a plant, but Plumier used it for both the vascular bundle and its enclosed tissues in cacti.

monopetalus Gamopetalous, i.e. corolla composed of petals united together at their base.

muricatus Muricate. A descriptive term for spines that are arranged in the manner of those of a murex shell, i.e. armed with sharp, subulate prickles. In modern botany, the term has become "rough with short, hard, pointed protuberances".

palmus The width of the palm of a hand. Just over 3 inches, or about 7–8cm.

pollex The length of the first joint of the thumb. About 1 inch or 2.5cm.

scutulum Diminutive of *scutum*, a wooden, leather-covered shield of rectangular or square shape. Because of its resemblance to a small shield or cushion, Plumier adopted this term for the cactus areole.

umbilicus Used by Plumier for any depression or any innermost part of something. Often used for the base of the floral receptacle tube where the nectar chamber is located, or top of the ovary, or the sunken apex of a fruit.

uncia Twelfth part of an inch" or about 2mm. Later the word came to be used for an inch, while *uncia* was changed to *linea.*

Cactus plates from the 37 manuscripts bound in the 30 vols. from:

1689–1697. ***Botanicon Americanum*** *seu historia plantarum in Americanis insulis nascentium*. Manuscript, in Bibliothèque Centrale, Muséum d'Histoire Naturelle, Paris.

Latin transcript of Plumier's text for Vol.2 t.132 Pereskia aculeata, flore alba, fructu flavescente (Figure 3a)

Ruborum aut Rhamnorum nostratum modo fruticat haec planta longissimos ramos producit, arbores ipsos et frutices vicinos scandentes et onerantes, digitum fere crassos, teretes, lignosos, intus medullosos, foris dilute baeticos aculeisque munitos binis et binis positis sed brevibus, validis aduncis etiam dilute baeticis. Inter duos quoslibet aculeos folium exontur nullo aut brevissimo pediculo pollens, cuspidis lanceae forma duos pollices circitur longum, unum pollicem latum, crassiusculum tenerum glabrum, utrinque laete virens, unitum nervulo in longum percurrente praeditum, gustumque acidulum prae se ferens.

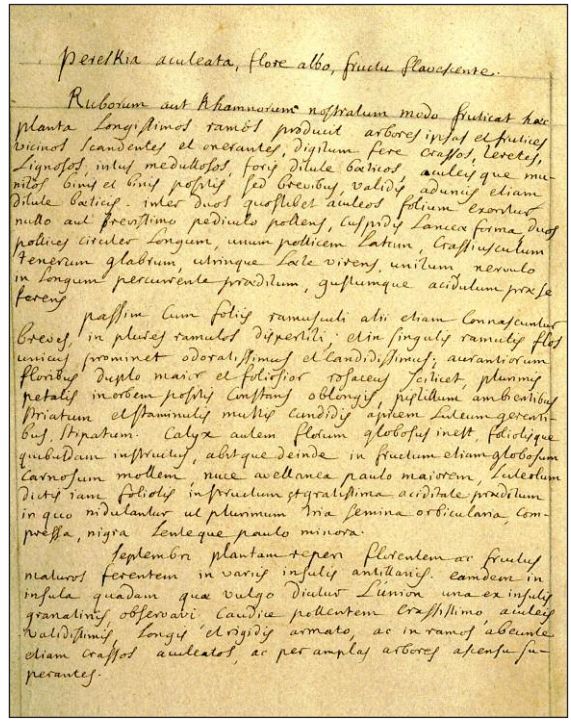
Passim cum foliis ramusculi alii etiam connascuntur breves, in plures ramulos dispersili, et in singulis ramulis flos unicus prominet odoratissimus et candidissimus.

Aurantiorum floribus duplo maior et foliosior rosaceus scilicet, plurimis petalis in orbem positis constans oblongis, pistillum ambientibus striatum et staminalis multis candidis apicem luteum gerentibus stipatum. Calyx autem florum globosus inest, foliolisque quibusdam instructus, abisque deinde in fructum etiam globosum carnosum mollem, nuce avellanea paulo maiorem, luteolum dictis iam foliolis instructum et gratissima aciditate praeditum in quo nidulantur ut plurimum tria semina orbicularia, compressa, nigra lenteque paulo minora.

Septembri plantam reperi florentem ac fructus maturos ferentem in variis insulis antillanis, eamdem in insula quadam quae vulgo dicitur l'union una ex insulis granatinis, observavi caudice pollentem crassissimo, aculeis validissimus, longis et rigidis armato, ac in ramos abeunte etiam crassos aculeatos, ac per amplas arbores ascensu superantes.

English translation:
Vol.2 t.132 Spiny Pereskia, with white flower, yellowish fruit

This plant produces very long branches growing in the manner of our *Rubus* or *Rhamnus*, clambering and invading neighbouring trees and shrubs, nearly as thick as a finger, terete, woody, filled with spongy pith inside, the outside pale tawny brown and armed with spines appearing in pairs but short, bent inwards, also pale tawny brown. A leaf emerges between the two spines, with


Pereskia aculeata, flore albo, fructu flavescente.

Ruborum aut Rhamnorum nostratum modo fruticat haec planta longissimos ramos producit, arbores ipsos et frutices vicinos scandentes et onerantes, digitum fere crassos, teretes, lignosos, intus medullosos, foris dilute baeticos aculeisque munitos binis et binis positis sed brevibus, validis aduncis etiam dilute baeticis. Inter duos quoslibet aculeos folium exontur nullo aut brevissimo pediculo pollens, cuspidis lanceae forma duos pollices circitur longum, unum pollicem latum, crassiusculum tenerum glabrum, utrinque laete virens, unitum nervulo in longum percurrente praeditum, gustumque acidulum prae se ferens.

Passim cum foliis ramusculi alii etiam connascuntur breves, in plures ramulos dispersili, et in singulis ramulis flos unicus prominet odoratissimus et candidissimus; aurantiorum floribus duplo maior et foliosior rosaceus scilicet, plurimis petalis in orbem positis constans oblongis, pistillum ambientibus striatum et staminalis multis candidis apicem luteum gerentibus stipatum. Calyx autem florum globosus inest, foliolisque quibusdam instructus, abisque deinde in fructum etiam globosum carnosum mollem, nuce avellanea paulo maiorem, luteolum dictis iam foliolis instructum et gratissima aciditate praeditum in quo nidulantur ut plurimum tria semina orbicularia, compressa, nigra lenteque paulo minora.

Septembri plantam reperi florentem ac fructus maturos ferentem in variis insulis antillanis, eamdem in insula quadam quae vulgo dicitur l'union una ex insulis granatinis, observavi caudice pollentem crassissimo, aculeis validissimus, longis et rigidis armato, ac in ramos abeunte etiam crassos aculeatos, ac per amplas arbores ascensu superantes.

Figure 3a. Plumier's manuscript describing *Pereskia aculeata* Mill.

or without a very short strong pedicel, having the form of the blade of a spear, about two inches long, one inch broad, moderately thick, soft, hairless, and bright green on both sides, provided with a single nerve running through its length, and tasting sour.

Here and there at the same time small short stems arise with different leaves, interspersed along many branches, and on some branches a single very perfumed and very white flower emerges. Flowers like those of oranges [*Citrus* ×*aurantium*], twice as big and somewhat leafier, rose-like, with numerous rotate oblong petals, surrounding a cavity with pistil and many white stamens topped with deep yellow anthers. The calyx of the flower commences globular, and is surrounded by kinds of leaves [bracts], and thereafter eventually turns into a soft fleshy globular fruit, slightly larger than a hazel-nut, pale yellow, now possessing sorts of leaves, and endowed with a very pleasant sour pulp in which are embedded three to many orbicular, compressed black seeds, a little smaller than a lentil.

I found the plant flowering or bearing mature fruit in September on various islands of the Antilles, the same on the island that is locally called Union Island, one of the Grenadine islands. I have observed a trunk an inch thick, with very strong spines, long and stiffly armed, and emerging branches also with thick spines, and also climbing through to the tops of large trees.

Figure 3b. Plumier's analytical sketch of *Pereskia aculeata* Mill.

Figure 4. *Pereskia aculeata* on a 1993 postage stamp of Barbados.

Vol.2 t.132: **Pereskia aculeata, flore albo, fructu flavescente.** [***Pereskia aculeata*** Mill.] (Figure 3b.)

Cactus Pereskia L. is lectotypified by the plate in Dillenius, *Hortus elthamensis*: 303, t.227, fig. 294. 1732, of a plant whose origin was not recorded but it had been grown in Sherard's garden from 1726.

Pereskia aculeata is common throughout tropical America and especially in the islands of the eastern Caribbean, where it is commonly cultivated and called the Barbados Gooseberry. Figure 4 shows it depicted on a 1993 postage stamp of Barbados. Du Tertre (1667) called it Groselle, derived from the French *groseiller*, a currant bush.

Plumier recorded a plant on Union Island in the Grenadines, but Hoxey & Gdaniec were unable to find it in Feb 2019. They asked many people and showed photographs but no one recognised it. Much of the woodland on Union Island has been cut down for firewood or construction since Plumier's time. Most of what is left is now xeric woodland that is possibly too dry for *Pereskia aculeata* to regenerate.

It is cultivated under glass in Europe and Figure 5 shows an example in the nursery of Chris Pugh in 2003 filling the roof space of his greenhouse, with a trunk 1.5cm thick after only a few years from a cutting.

Figure 5. *Pereskia aculeata* in cultivation at the nursery of Chris Pugh in 2003.

Latin transcript of Plumier's text for Vol.3 t.7–8 Melocactus Indiae occidentalis (C.B. pin. 384) (Figure 6a)

Spectabilis sane planta haec est aphyllos nempe et acaulo quamque peponem aut melonem validissimis aculeis horridum terrae affixum diceres.

Radix eius satis crassa in multos ramos distributa, intus candida lignosa et filamentosa terrae oblique circumsparsa corticeque tenui membranaceo et albicante vestita, ex qua immediata echinus progreditur aut ovatus aut conicus aut globosus, octodecim aut viginti costis eminentibus melonum nostratum in modum profunde satis sulcatus, quae equidem costae non ut in melonibus rotundantur, sed in acutam et flexuosam aristam definunt novem aut decem veluti scutulis ovalis, pollicem circiter ab invicem distantibus discretam. Singulis autem scutulis duodecim circiter astiguntur aculei rigidissimi radiatim dispositi, initio tumescentes et rubicundi deinde candidi, sed inaequales nam qui terram spectant longiores quamqui sursum vergunt, pollicisque circiter longitudinem obtinent, breviores vero quatuor aut quinque uncias tantum. Totum

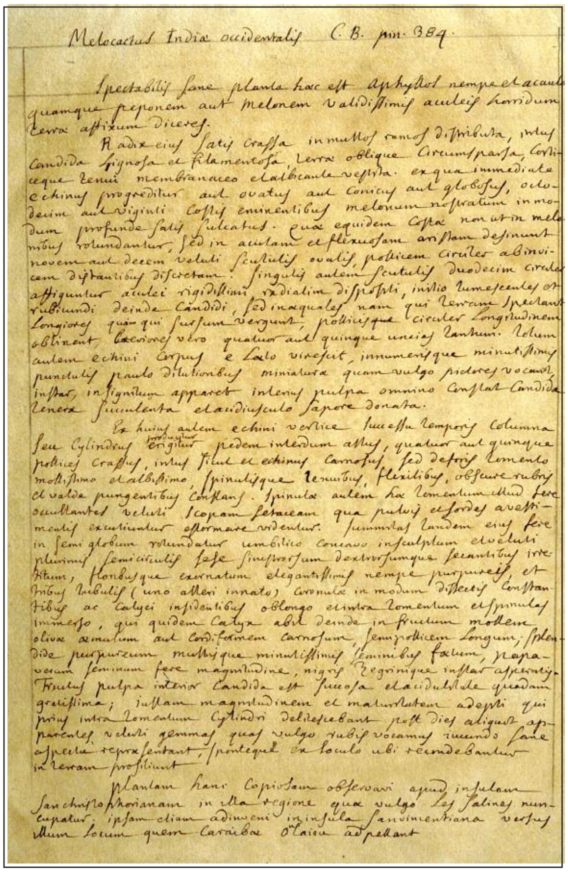


Figure 6a. Plumier's manuscript describing *Melocactus broadwayi* (Britton & Rose) A.Berger, and *Melocactus intortus* (Mill.) Urb.

autem echini corpus e laeto virescet, innumerisque minutissimis punctulis paulo dilutionibus miniaturae quam vulgo pictores vocant instar, insignitum apparet interius pulpa omnino constat candida tenera succulenta et acidiusculo sapore donata.

Ex huius autem echinus vertice successu temporis columna seu cylindricus erigitur (productur) pedem interdum albus, quatuor aut quinque pollices crassus, intus sicut et echinus carnosus sed deforis tomento mollissimo et albissimo, spinulisque tenuibus, flexilibus, obscure rubris et valde pungentibus constans. Spinulae autem hac tomentum illus fere occullantes veluti scopam setaceam qua pulvis et sordes avestimentis excusiuntur astermare videntur. Summitas tandem eius fere in semi globum rotundatur umbilico concavo insculptum et veluti plurimis semicirculis sese sinestrorsum dextrorsumque fecundibus irraditum, floribusque exornatum elegantissimis nempe purpureis, et tribus tubulis (uno asteri innato) coronulae in modum dissectis constantibus ac calyci insidentibus oblongo et intra tomentum et spinulas immerso, qui quidem calyx abit deinde in fructum mollem olivae minutum aut cordiformem carnosum, semipollicem longum, splendide purpureum multisque minutissimis seminibus factum, papaveram seminum fere magnitudine, nigris et Zegrinique instar asperatis. Fructus pulpa interior candida est succosa et acidulitate quadam gracillima, instam magnitudinem et maturitatem adepti qui prius intra tomentum cylindri delitescebant post dies aliquot apparentes veluti gemmas quas vulgo rubis vocamus iucundo sane aspecta repraesentant, sponteque ex loculo ubi recondebantur in terram profiliunt.

Plantam hanc copiosum observavi apud insulam san christophorianum in illa regione quae vulgo Les Salines nuncupatur. Ipsam etiam ad inveni in insula san vincentiana versus illum locum quam caraiba o'laiou adpellant.

English translation:

Vol.3 t.7-8 West Indian Melocactus Caspar Bauhin, *Pinax*: 389

This truly remarkable plant is affixed to the ground, completely leafless and with a stem resembling a pumpkin or melon with very strong fierce spines.

Its quite thick root divides into many branches, white and woody within, and with rootlets spreading obliquely, and the wall is a thin, pale membrane, from which a prickly ball directly emerges, either ovate, conical, or globose, with 18–20 projecting ribs quite similar in form to the furrows of our native melon [*Cucumis melo*], indeed their ribs are not as evenly rounded as in melons, but are marked out by 9 or 10 oval scutula [areoles] with acute and flexuose bristles, with about one inch distance between them. Moreover, each areole bears about 20 very rigid, radiating spines, at first subulate and red, thereafter white, but unequal, for instance those that are pointing towards the ground are longer than those directed upwards, and are about an inch in length, the shortest truly as little as 4 or 5 twelfths of an inch. But the entire body of the prickly ball grows light green, with innumerable tiny points too fine to depict in a sketch, within it is remarkable for it is entirely filled with a white soft succulent and slightly acidic tasting flesh.

However in time, this later forms a prickly column or cylinder, sometimes white at its base, 4 or 5 inches thick, with the same flesh within and bristly, but outside with the softest and whitest tomentum, and densely beset with slender, flexible, very sharp, small red spines. However, the small spines are almost hidden in the tomentum like the dirt and debrise that covers and hides the bristly brush of a star-fish. At length, a concave umbilicus is formed at its hemisphaerical apex and many semicircles radiate out to the left and right, and are

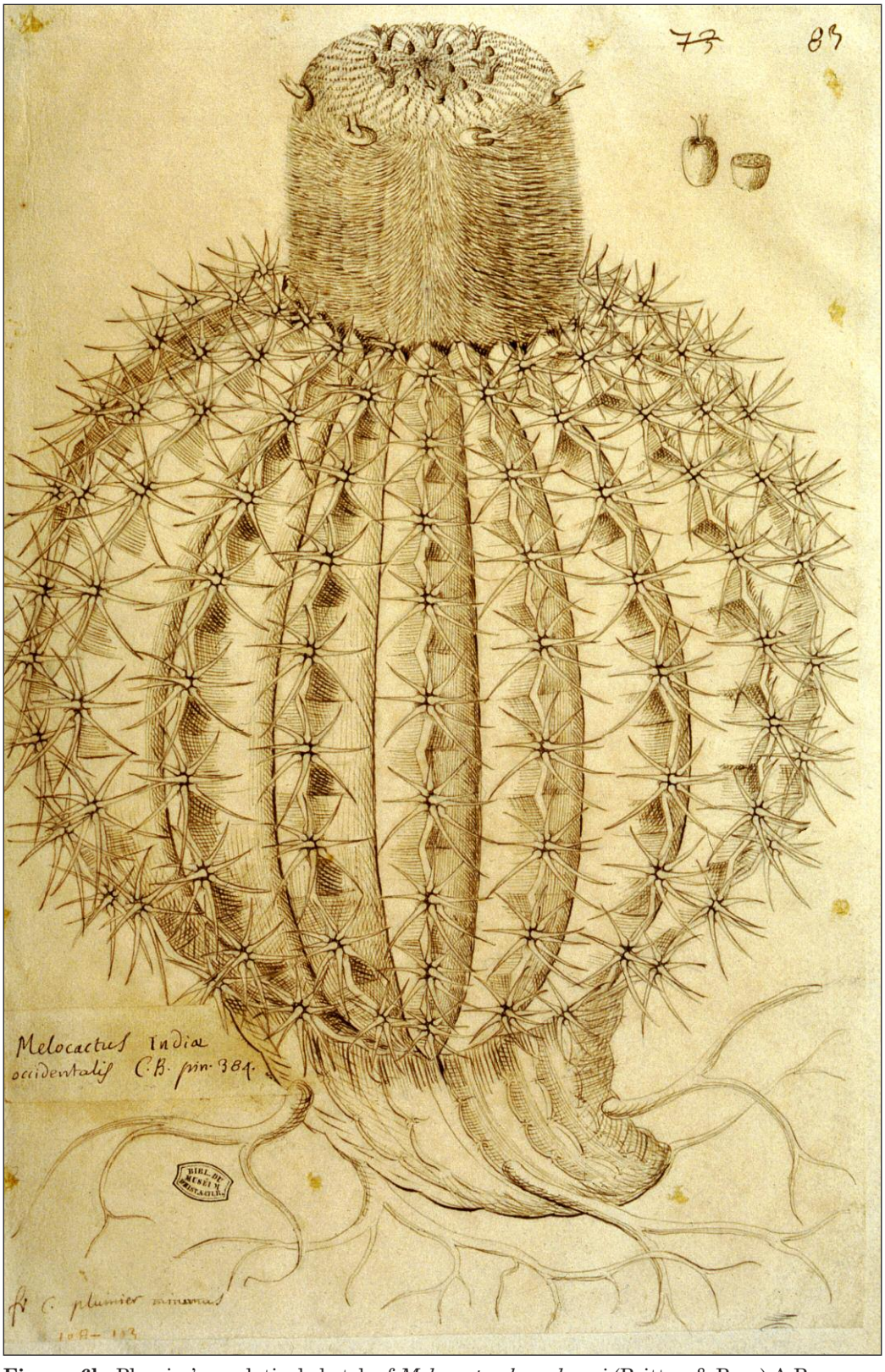


Figure 6b. Plumier's analytical sketch of *Melocactus broadwayi* (Britton & Rose) A.Berger.

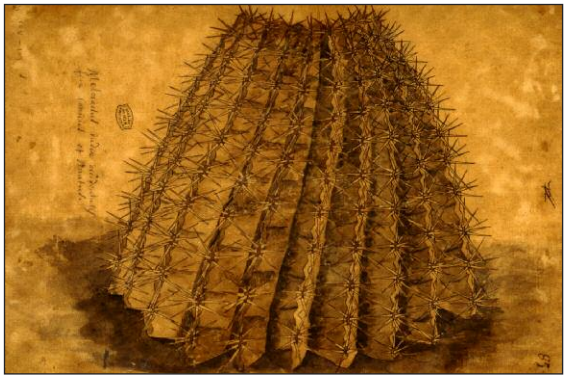


Figure 6c. Plumier's analytical sketch of *Melocactus intortus* (Mill.) Urb. Probably sketched from a dried herbarium specimen, and possibly preserved from the plant shown in Figure 6e.

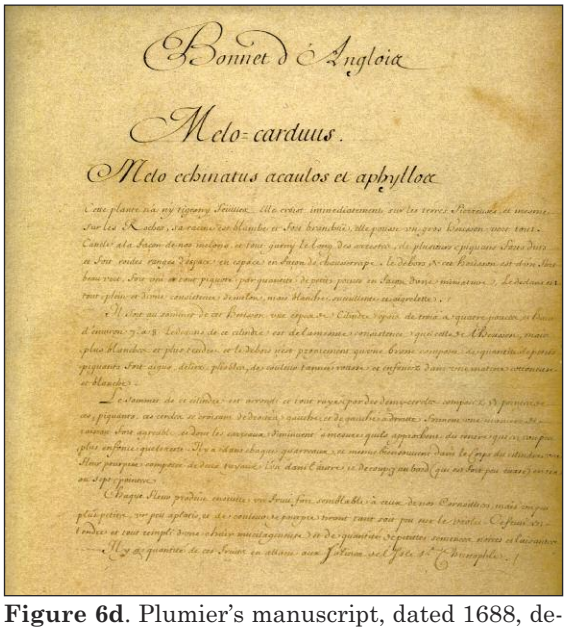


Figure 6d. Plumier's manuscript, dated 1688, describing *Melocactus intortus* (Mill.) Urb. from Grillon (1985).

wreathed with garlands of truly beautiful purple flowers, little spreading trumpets (one star inside another [two series of perianth segments]) with their oblong calyces immersed among the tomentum and spines, whose calyx gives way thereafter to a small soft fleshy olive-like or oviform fruit, half an inch long, of a rich purplish red and possessing many very tiny seeds, almost the size of poppy seeds, black and roughly cigar-shaped. The white fruit pulp inside is juicy and having attained full size and maturity they possess a very particular pleasant sourness. The cylindric fruits are at first concealed within the tomentum but next day some that have just emerged as shining gems with the agreeable appearance of our common blackberry, spontaneously eject from where they

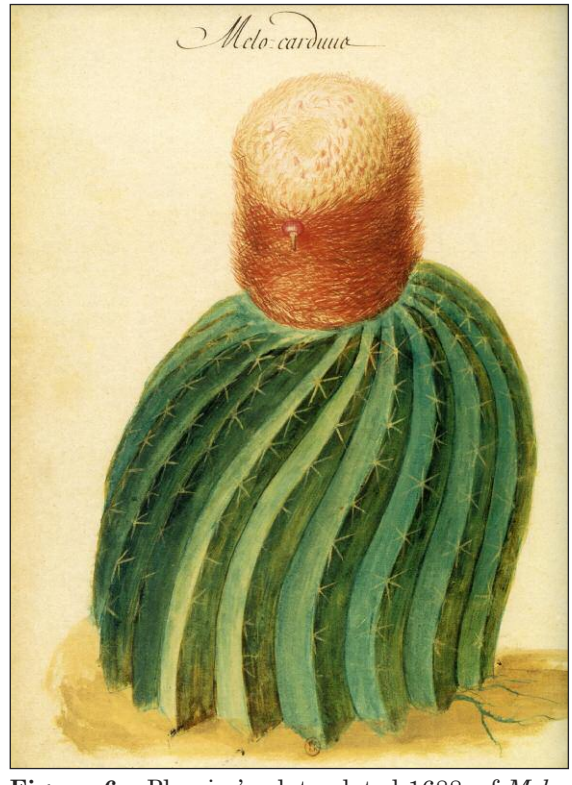


Figure 6e. Plumier's plate, dated 1688, of *Melocactus intortus* (Mill.) Urb. from the island of St. Christopher (= St. Kitts) from Grillon (1985). Shows the same spiralling ribs as in Figure 6c. and as called for in Miller's protologue of *Cactus intortus* Mill. (1768).

were to end up on the ground.

I observed this plant in abundance on the island of St. Christopher [now St. Kitts] in that area which is commonly known as Les Salines [Salt ponds in the SE of the island]. I also came upon it myself on the island of St. Vincent, towards that place that the caribs know as Laiou [now Layou, NW of Kingstown].

Vol.3 t.7-8: **Melocactus Indiae occidentalis (Bauhin 384), & Melocactus Indiae occidentalis fere conicus et striatus.** [t.7 ***Melocactus broadwayi*** (Britton & Rose) A.Berger (Figure 6b), and t.8 *Melocactus communis* Link & Otto (replacement name for *Cactus melocactus* L.) = ***Melocactus intortus*** (Mill.) Urb.] (Figure 6c)

Cactus broadwayi Britton & Rose (1922: 229) is typified by a plant gathered in 1921 from the island of Tobago, Republic of Trinidad & Tobago (Figure 7). Plumier's locality was some 170km north of the type locality on St. Vincent.

Hoxey & Gdaniec also found it in 2019 on St. Vincent, mostly in cliff habitats overlooking the sea usually accessible only by boat (Figure 8b). The

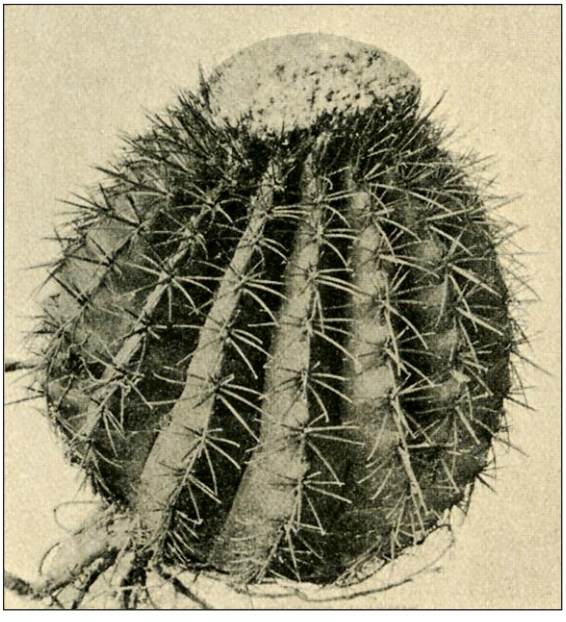


Figure 7. *Melocactus broadwayi* (Tobago) From the type collection gathered 1921 on the island of Tobago by W.G. Freeman, and perhaps the type specimen prior to preservation. Image from Britton & Rose, *The Cactaceae* **3**: 217, fig. 231. (12 Oct) 1922.

Figure 8a. *Melocactus broadwayi* PH11654.01 (St. Vincent, coastal cliff south of Barrouallie). A 15cm juvenile plant. Photograph: Paul Hoxey.

only reachable example (Figure 8a) had not yet developed its cephalium at 15cm. high, but is a good match for the type and Plumier's t.7. It is also reported to occupy similar positions on Bequia, Mustique, Tobago Cays, and Ronde Is. On St. Lucia it may be found on rocky cliffs adjacent to the sea along with *M. intortus* on the cliff tops, always facing the ocean (Kirkbright, 2012: 38–39). It is rather scarce on Granada due to coastal development and on St Vincent due to lack of suitable habitat (most of the island is too wet and not rocky).

Cactus intortus Mill. (Miller 1768: *Cactus* numbered 1 & 2) is the correct name for the common and widespread "Great Melon-thistle" of the east Caribbean islands. Miller treated *Cactus melocactus* and *Cactus intortus* as two distinct species, although he did admit that they might be variants of the same species. All subsequent authors have treated them as the same species, but there has been some confusion about which name to apply. Link & Otto provided a replacement name for the rejected *Cactus melocactus* L., namely *Melocactus communis* (Aiton) Link & Otto (1827), but that has no priority over the earliest available epithet at the rank of species, which is *intortus* (1768).

Miller received both of his plants from Antigua, in the Leeward Islands, and Plumier's locality in St. Kitts is around 100km west of that locality. Presumably Miller's plant of *Cactus melocactus* was

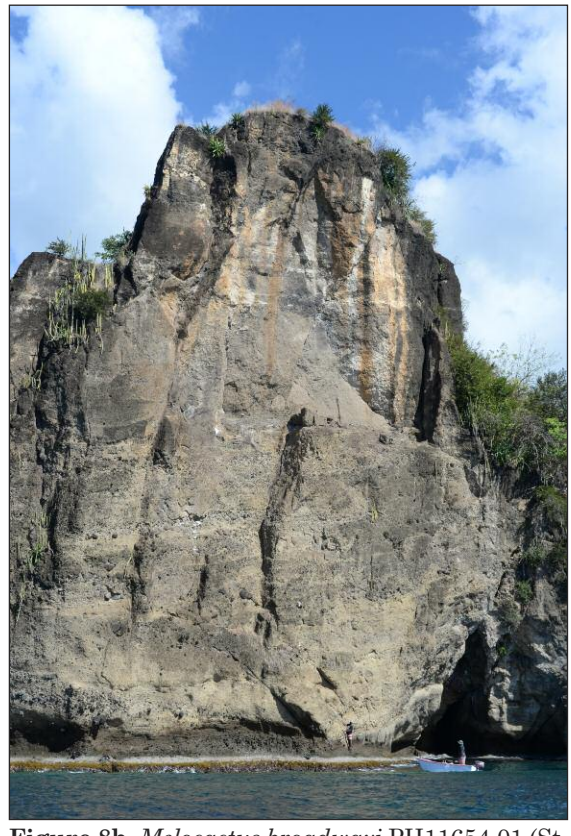


Figure 8b. *Melocactus broadwayi* PH11654.01 (St. Vincent, coastal cliff south of Barrouallie). Cliff face over which *M. broadwayi* is growing in large numbers. Photograph: Paul Hoxey.

straight-ribbed, while his *Cactus intortus* had twisted ribs, giving rise to his choice of epithet for the latter. "The sort with spiral ribs [*Cactus intortus*] as also that with white spines, I received from Antigua, with the common sort [*Cactus melocactus*]".

It seems a strange coincidence that both Plumier and Miller's collectors happened to select spiral ribbed plants from a population that today seems more or less exclusively straight-ribbed. Confirmation that Plumier's St. Kitts melocactus had spiral ribs comes in the form of a plate (Figure 6e) in a folio of Plumier paintings at the Bibliothèque Nationale de France, Paris, dated 1688 but not published till 1985 (Grillon, 1985). His accompanying manuscript with this plate also confirms that it came from St. Kitts. The lengthy text for *Melocactus intortus* from Plumier's 1688 manuscript (Figure 6d), freely translated from the Classical French (*français classique*) of the 17–18thC, says:

"**English Hat. Melocarduus, stemless & leafless.**

This plant has no stalks or foliage. It grows directly in stony ground, and also on rocks. Its root is white and branched. It grows into a large entirely green prickly ball. Ribbed like our melons, and its whole length is furnished at intervals with many prickles spaced out in equidistant rows on the outside edges of hard, strong ribs in the manner of one side of a shoe-hatch [regular pattern formed by threaded shoe laces] and this prickly ball is a beautiful strong green, very uniform and dotted all over with numerous tiny spots. The inside has the uniform consistency of a melon, but white, succulent and sourish.

It emits from the top of the bristly ball a kind of cylinder 3 or 4 inches thick and about 7 or 8 inches high. The inside of the cylinder has the same consistency as that of the prickly ball, but whiter and softer and the outside is an untidy brush composed of numerous small sharp prickles, loose, flexible, the colour of brown tan and immersed in a cottony white material.

The top of the cylinder is rounded and marked by semicircles formed by 13 prickly lines, these circles crossing themselves to the right and left in a manner that I would argue is very remarkable in its regularity, decreasing as it approaches the centre where they vanish abruptly in a point. At certain intervals over the body of the cylinder, there's a purple flower composed of two tubes one inside the other and with spreading (quite strongly recurved) star-like six or seven petals.

Each flower later produces a fruit strongly resembling those of our dogwood [*Cornus* sp.], but a little smaller, slightly flattened, and crimson in colour tending a little towards violet. This fruit is soft and entirely filled with a mucilaginous flesh and numerous black and glossy seeds.

There are many of these thriving abundantly at Les Salines on the island of St. Christopher [St. Kitts]."

Because *Melocactus intortus* and *broadwayi* occur on the coasts of the same group of islands, they are often confused. However, they are rarely seen growing together, probably because *M. broadwayi* prefers places with a higher rainfall than *M. intortus* can survive. The trade winds of the Caribbean are largely from the north-east and the side of the islands facing the north-east gets a much higher rainfall than in the south-east. Also different islands are very variable in their annual rainfall. Therefore, Plumier's depictions of a headless *Melocactus intortus* in plate 8 and the 1688 folio depiction of a complete plant came from the relatively dry St. Kitts, where that melocactus is the only species known to occur. Plumier's gathering was from Les Salines (now called Salt Pond) a salt flat near the south-eastern tip of the island, while his large drawing in plate 7 of *Melocactus broadwayi* must have been seen by him on the other island he specifically mentioned, St. Vincent, which happens to have twice the rainfall of St. Kitts.

Figure 10 shows a field of *Melocactus intortus* at Pointe Doublé, the easternmost tip of the Île de la Désirade, Guadeloupe, depicted on a postcard of about 1910. It is the only place in the archipelago of Guadeloupe where such a large population can be found. The location was visited in 1991 by J.M. Chalet and by J.-M. Moullec in 1998.

Despite being said to be a regionally protected site, both visitors reported disturbance. Moullec estimated only about 50 plants in two hours of searching and no sign of seedlings (Moullec, 2005). The answer to the lack of regeneration is not hard to find because he also reported goats in the area. These shorten the grass which makes the soil drier, altering the soil water balance adversely and making it impossible for seedlings to survive the aridity and grow to maturity, not to mention the tasty morsel that the weakly spined seedlings are for the goats. There should be no place for agricultural practices in conservation areas, as Arizona discovered when it allowed cattle grazing in the Saguaro National Park in the early twentieth century which would have wiped out the carnegias altogether had it been allowed to continue.

Plumier's t.8 of *Melocactus intortus* is heavily tanned, presumably a reaction to the drawing being exposed to light. It shows what appears to be a specimen that has been dried for the herbarium, but has lost its cephalium. Melocactus cephalia become very fragile after drying because the parenchyma tissue supporting it disappears more or less completely leaving just bristles and spines

Figure 9. *Melocactus intortus* on a 1998 postage stamp of Anguilla, 110km N of Plumier's locality.

Figure 10. A field of *Melocactus intortus* at Pointe Doublé, the easternmost tip of the Île de la Désirade, Guadeloupe, 200km SE of Plumier's locality, depicted on a postcard of about 1910.

which easily fragment. The conical shape is also a consequence of drying, something that all melocacti tend to do after their roots have been damaged. Sean Carrington's photo in Figure 11 shows a typical *Melocactus intortus* from Plumier's locality in St. Kitts.

Latin transcript of Plumier's text for Vol.3 t.9 Melocactus purpureus, striis in spiram contortus (Figure 12a)

Huiusve melocacti elegantissima sane species, horrenda simul et iucunda, purpureo nempe nitore tota splendens, aculeisque candidissimis sed validissimis simul horrescens. Varias sicut et praecedens sortitur formas nempe aut ovatam aut conicam aut globosam. Radices eius similis, substantia eadem sed deforis tota purpurea. Striae in spiram contortae, aculeis autem longiores. Eboris instar candidi et paulis per incurvi. Flores ipsi etiam ampliores. Fructus vero paulo minores.

Plantam reperi circa loca quaedam saxosa et maritima versus illam regionem quae vulgo dicitur le port a piment in insula sandominica.

Figure 11. *Melocactus intortus* (St. Kitts). Photograph: Sean Carrington.

English translation:
Vol.3 t.9 Purple melocactus, with ribs twisted into a spiral (Figure 12b)

This good species is perhaps the most elegant of the melocacti, both fierce and delightful, entirely a truly splendid bright glossy purplish and with pure white spines, striking yet fearsome. It and the previous [species] belong to a certain group whose shape is ovate, conical, or globular. Its roots are similar in overall appearance but externally entirely purplish. The ribs are twisted into a spiral, but the spines are longer. These are as white as ivory and slightly incurved. The flowers are also larger. The fruit is in fact slightly smaller.

I found the plant around a certain rocky and coastal place towards that area which is locally known as Le Port à Piment, on the island of San Dominica [Haiti].

Vol.3 t.9: **Melocactus purpureus, striis in spiram contortus.** [***Melocactus lemarii*** Monv. ex Lem.] (Figure 12b)

Plumier's description and coloured illustration indicated that the plant body was reddish purple. Such plants do exist in habitat (Figure 14c), but normally they are straight-ribbed and plain green in colour. Spiral-ribbed variants are also rather rare.

The validating description of *Echinocactus lemarii* was an immature plant in the collection of Baron Hippolyte Boissel de Monville, published at first with "locality unknown" in Lemaire (1838: 17). Its epithet, commemorating Charles Lemaire, is

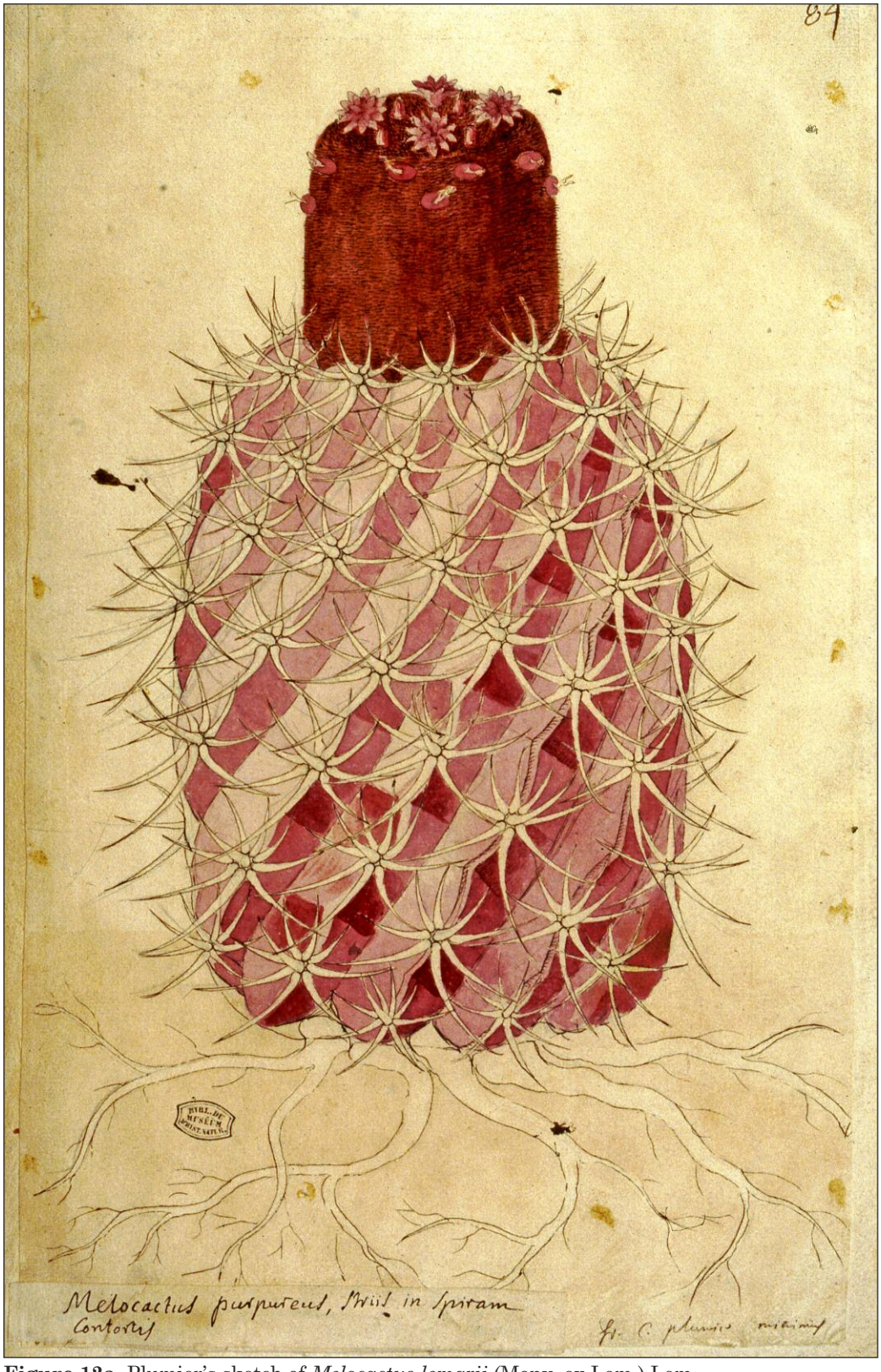
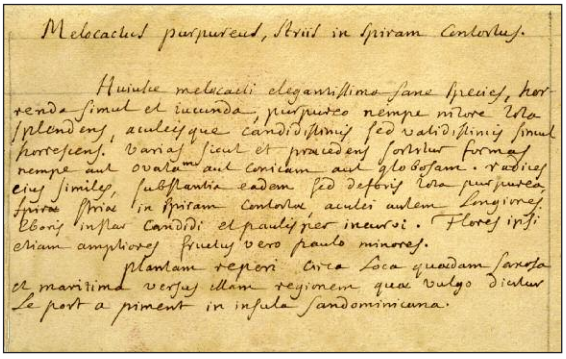


Figure 12a. Plumier's sketch of *Melocactus lemarii* (Monv. ex Lem.) Lem.


Melocactus purpureus, Striis in Spiram Contortis.

Huiusce melocactii elegantissimo sane Specie, horrenda simul et iucunda, purpureo nempe nitore vbique splendens, aculeisque candidissimis sed validissimis simul horrescens. Varias sicut et praecedens formas nempe aut ovatas aut conicas aut globosas. radices eius similes, substantia eadem sed deforis rosea purpurea. Striae in Spiram contortae, aculei autem longiores Cornu instar candidi et paulisper incurvi. Flores insi etiam ampliores pruelly vero paulo minores.

plantam reperi circa Loca quaedam sabulosa et maritima versus illam regionem quae vulgo dicitur Le port a piment in insula sandominicana.

Figure 12b. Plumier's manuscript describing *Melocactus lemarii* (Monv. ex Lem.) Lem.

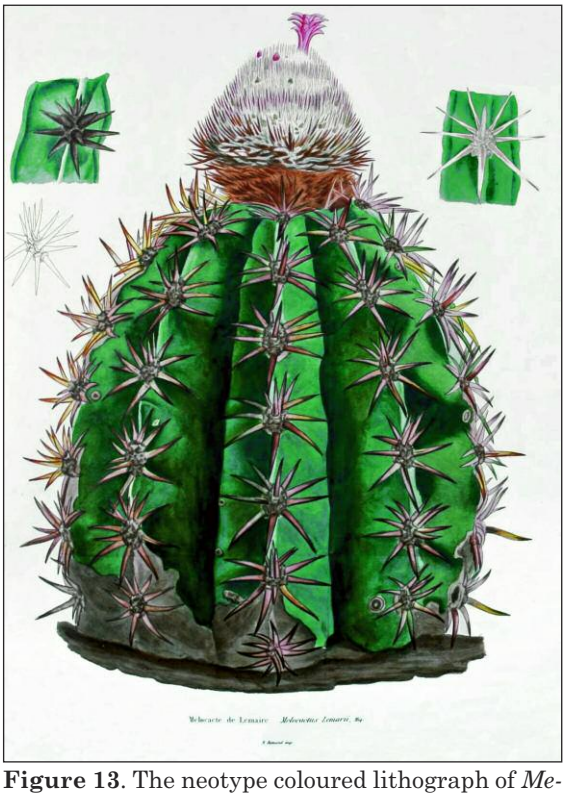


Figure 13. The neotype coloured lithograph of *Melocactus lemarii* (Monv. ex Lem.) Lem. (Haiti, interior) from *L'Horticulteur Universel* **1**: t.35. 1840. Repeated in Lemaire (ed.), *Herbier Général de l'Amateur*, Sér. 2 **2**(36): t.[36]. 1841.

based on the latinised form *lemarius*, but is usually seen 'corrected' to *Echinocactus lemairei* contrary to Art. 60 Rec. 60C.2. It is neotypified by the plate (Figure 13) that accompanied a fuller description in Feb 1840, together with the new information that it had been gathered by *Lorenzo* COURANT in or before 1838 in "insulae St. Domingo terris interioribus" (inland on the island of Santo Domingo = Haiti). Courant was a Grenoble amateur cactus grower who introduced a number of new plants from the Americas into France at that time.

Figure 14a. Habitat of *Melocactus lemarii* PH1289.05 (Haiti, Dept. Artibonite, coastline west of Gonaïves, Petit Port à Piment, 20m, N19°36'19.1" W072°58'08.5").
Photograph: Paul Hoxey.

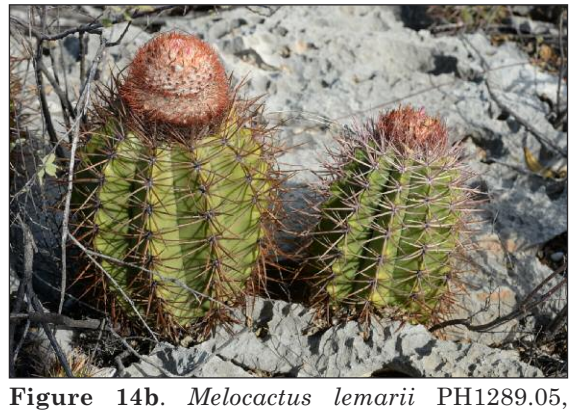


Figure 14b. *Melocactus lemarii* PH1289.05, healthy green-bodied examples.
Photograph: Paul Hoxey.

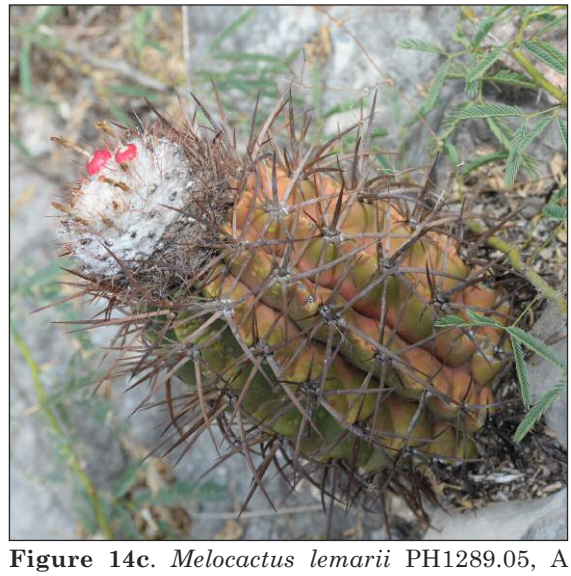


Figure 14c. *Melocactus lemarii* PH1289.05, A plant with reddish tints, similar to that of Plumier's illustration. Photograph: Paul Hoxey.

Figure 14d. *Melocactus lemarii* PH1289.05 with fruits. Photograph: Paul Hoxey.

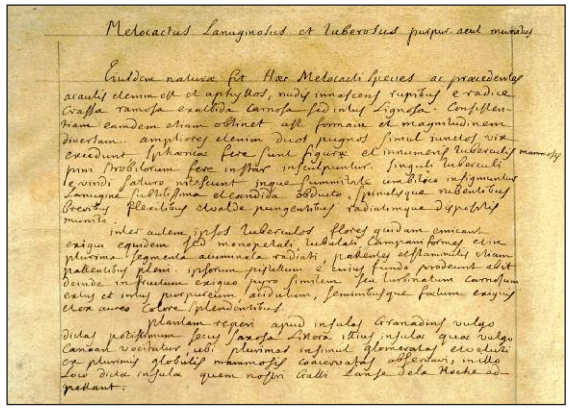


Figure 15a. Plumier's manuscript describing *Mammillaria mammillaris* (L.) Haw.

Latin transcript of Plumier's text for Vol.3 t.11 Melocactus lanuginosus et tuberosus purpur[eis] acul[eis] munitus. [***Mammillaria mammillaris*** L.] (Figure 15a)

Eiusdem naturae sit Haec Melocacti species ac praecedentes acaulis et emin est et aphyllos, nudis innascens rupibus e radice crassa ramosa ex albida, carnosa sed intus lignosa. Consistentiam eamdem etiam obtinet ast formam et magnitudinem diversam. Ampliores et enim duos pugnos simul iunctos vix excedunt sphaericae fere sunt figurae et innumeris tuberculis mammosis primi strobilorum fere instar insculpuntur. Singuli tuberculi e viridi saturo nitescunt inque summitate umbilico insigniuntur lanugine subtilissima et candida obducto, spinulisque rubentibus brevibus flexibilibus et valde pungentibus radiatimque dispositis munito.

Inter autem ipsos tuberculos flores quidam emitant exigus equidem sed monopetali, tubulati, campaniformes et ire plurima segmenta acuminata radiati, pattentes et flammulis etiam pattentibus pleni. Ipsorum pistillum e cuius fundo prodeunt abit deinde in fructum exiguo pyro similem seu turbinatum carnosum extus et intus purpureum, acidulum, seminibusque faetum exiguis et ex aureo colore splendentibus.

Plantam reperi apud insulas Granadins vulgo dictas, potissimum secus saxosa littora illius insulae quae vulgo Canoan vocitatur, ubi plurimas in simul glomeratas et veluti ex plurimis globulis mammosis coacervatas observavi, in illo loco dicta insulae quem nostri Galli Lanse de la Roche adpellant.

English translation:
t.10 Downy and tuberous Melocactus armed with purplish spines

This Melocactus species is of the same nature as the preceding [*Melocactus lemarii*] and is similarly unstalked and leafless, sitting on bare rocks with a thickly branched and white root that is fleshy but woody inside. It also has the same texture, shape and variation in size. They grow almost spherical scarcely larger than a fist and indeed some are joined together in pairs and they are divided into numerous breast-like tubercles in the manner of pine-cones. Single tubercles are glossy grass green and their top and axil are conspicuously covered with the finest white down, and armed in a regular fashion with short, reddish, flexible, very sharp and spreading small spines.

Moreover, the flowers appear between some of these tubercles, but truly small, monopetalous, tubular, campanulate and spreading their numerous, acuminate segments, and slightly spreading to fully patent. A pistil emerges from its throat, then afterwards at the same place appears a small fiery red fruit, fleshy, turbinate, outside and inside purple, slightly acidic, and with seeds embedded, small and of a shining golden colour.

I found the plant on the islands of the Grenadines, principally on the dry, rocky coasts of that island known as Canouan, where I have observed very many spheres growing in one place and just as many gathered into hummocks of many breast-like clumps in a part of the said islands that our Frenchmen call L'Anse de la Roche [Grenada, Carriacou Island, Anse La Roche].

Vol.3 t.11 Melocactus, minimus, lanuginosus et tuberosus. [***Mammillaria mammillaris*** L.] (Figure 15b)

First published by Linnaeus (1753) without preserved material, but with three cited illustrations. His locality "in Americae calidiorioris rupibus" in the protologue was given more specifically as "in rupibus Americae, *Curassaviae*, *aliarumque*." in *Hortus Cliffortianus*: 181. 1737. Thus the type locality was: Venezuela, Netherlands Antilles, Curaçao and elsewhere, in rocky places.

Gmelin (1796: 784) selected Plukenet's

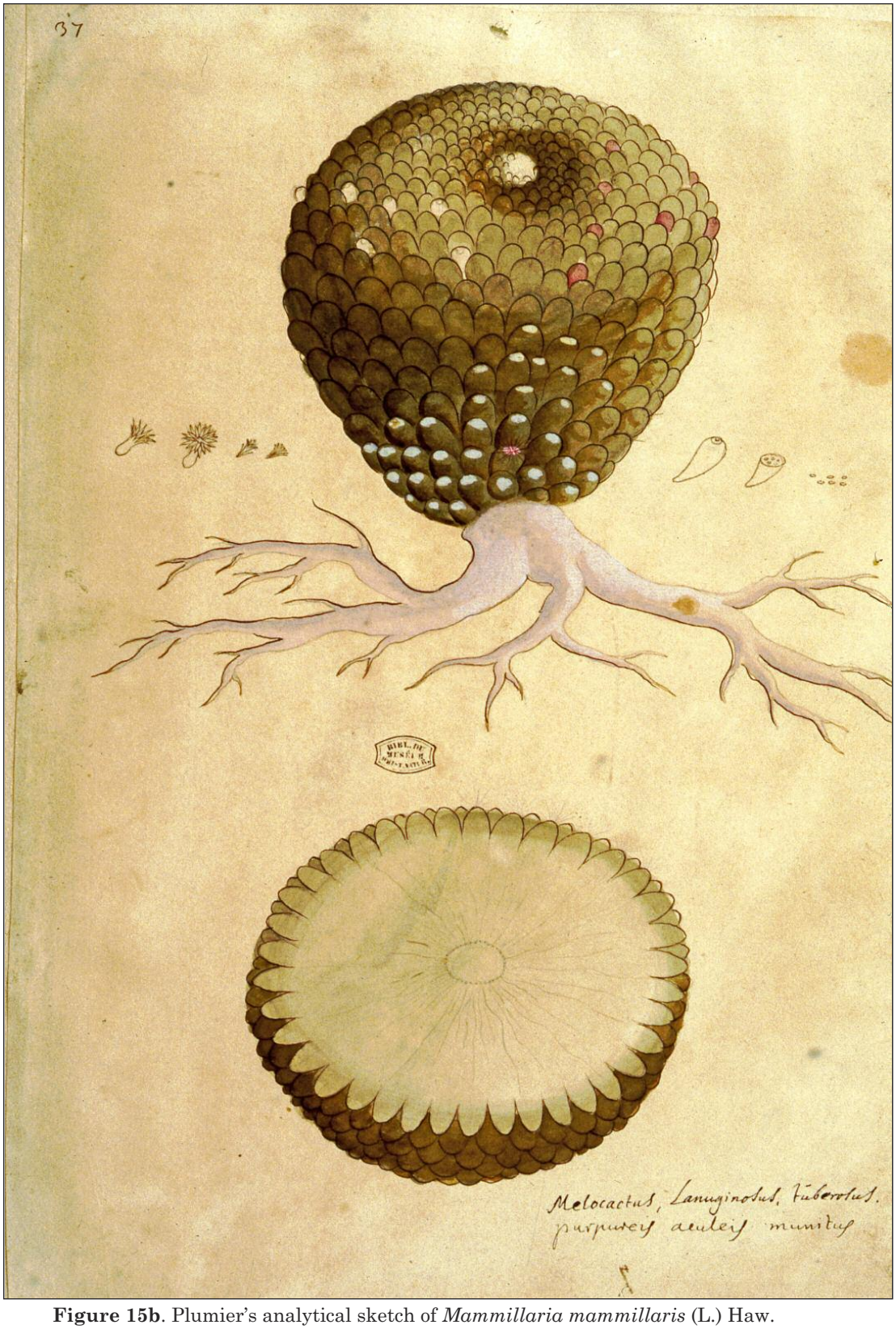


Figure 15b. Plumier's analytical sketch of *Mammillaria mammillaris* (L.) Haw.

Figure 16. *Mammillaria mammillaris* PH1691.03 (Windward Islands, Saint Vincent and the Grenadines, Canouan, 80m) Photograph: Paul Hoxey.

illustration to represent the species, although he also included Plukenet's Figure 2, presumably thinking that it was the same species. This would be a first step lectotypification, but for the fact that Linnaeus had cited only Plukenet Figure 1.

The correct lectotype is that designated by Mottram (*Mammillaria index*: 51. 1980): Plate 29, fig. 1 from Plukenet, *Phytographia* (1691), which shows a plant in the Fulham garden of Henry Compton (1632-1713), Bishop of London.

Indifferent to the earlier lectotypification, a second and different lectotype was designated in 1983 by Wijnands, who selected t.55 from Commelijn, *Rariorum plantarum horti Medici Amstelodamensis* (1697). Linnaeus also listed a third illustration, that of Hermann t.136 from *Paradisus Batavus* (1698). Of the three illustrations, that in Plukenet is the only one to show a hemispherical to globular plant as they occur in nature, very rarely elongating with age. However, under cultivation in Europe with too little light, they readily elongate into an atypical cylindrical shape as they have done in both of the other two later illustrations. Plukenet's drawing represented a recent import that had not been significantly modified by cultivation.

Another inaccuracy with the Commelijn plate is that seeds are shown spilling from fruits which is not what actually happens (seeds are embedded in mucilage and dispersed by the fruits being consumed by birds or other animals, passing through their gut). Moreover, as Blunt (1950: 137) rightly observed: "The engravers [for Commelijn's book], who have taken considerable liberties with the drawings, have not succeeded in giving any idea of the quality of the originals" by Johan and Maria Moninckx. The original colour plates depicting plants growing in Simon van Beaumont's garden, Lieden, from the unpublished *Moninckx Atlas* were not cited or seen by Linnaeus and therefore don't qualify as original material. He only saw the uncoloured copy in Commelijn's book. Hunt (2006: 164) suggested that Mottram's choice should be abandoned, but the author who first designates a lectotype must be followed (Art. 9.19). There is no conflict with the protologue, as Wijnands himself admitted: "The diagnosis is in agreement with all three [illustrations]".

The species is essentially from Venezuela and the Netherlands Antilles, but it also occurs on a few of the southernmost islands of the Grenadines and Grenada. Plumier encountered it on two of these, the islands of Canouan and Carriacou. Hoxey & Gdaniec found this species in early 2019 on Canouan (Figure 16), among coastal black volcanic rocks at low altitude, but not on Carriacou, mainly

as low clusters, although the occasional solitary plant may also be found.. They also observed it on the Grenadine Islands of Bequia, Union and Ronde, all believed to be new first time records. It is likely to be on several more as it typically grows in small localised populations that are easily overlooked.

Latin transcript of Plumier's Vol. 3 t.11 Melocactus, minimus, lanuginosus et tuberosus. [***Mammillaria glomerata*** (Lam.) DC. = ***Mammillaria prolifera*** (Mill.) Haw.] (Figure 17a)

Haec Melocacti varia et sucunda species, mole tantum et figura a praecendenti discrepat. Ovi et emin Gallinacei magnitudinem vix superat, ovique oblongi formam obsinet. Viror es glaucus lanugo candidissima, aculeisque subtilissimi pungentes et purpurei. Flores etiam monopetali, infundibuliformes multifidi et coccinei fructus tandem isdem sed minores, minutissimisque seminibus pleni.

Plurimae glomeratim nasciunter plantae quaelibet tamen esua radice peculiari tenui ramosa et rubente. Rara est planta ipsamque tantum bis observari apud insulam San Dominicanam versus illam regionem illi Lacui (qui vulgo dicitur Lestang Saumache) vicinam, ad partes illius etiam regionis quae vulgo dicitur le grand Cul de Sac.

English translation:

t.11 The smallest, downy and tuberous Melocactus

This variable and succulent species of Melocactus differs from the preceding in size and shape. It is ovate and of similar size to chicken eggs, and oblong in the form of an egg. Its colour is bluish grey with the whitest downy hair, very fine and with sharp and purplish spines. The monopetalous flowers are furthermore funnel-shaped with many parts and after the latter scarlet fruits, filled with the tiniest seeds.

Most plants occur in clumps but always everywhere having an unusual sort of thin, branching & reddening root. The plant is rare and I have personally only observed it twice on the island of San Dominica [Haiti] towards & near the place that is a lake (which is called locally L'Estang Saumache [now Étang Saumâtre = brine pond]), [and] also parts of the same region that is known as the Grand Cul de Sac. [inland from of Port au Prince].

Latin transcript of Plumier's Vol.3 t.11 Melocactus ex pluribus globulis opuntia modo nascentibus conflatus et spinosissimus. [***Opuntia moniliformis*** (L.) Steudel] (Figure 17a)

Admiranda equidem est Haec melocacti species ex multiplice et enim radice fere lignosa et ramosa et rubente singularis innascitur globulus nucis

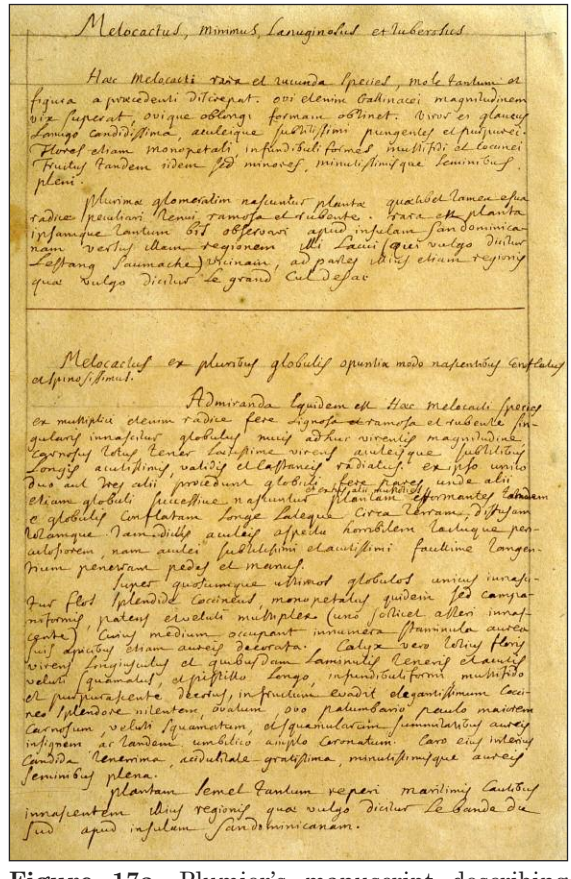


Figure 17a. Plumier's manuscript describing *Mammillaria glomerata* Lam. & *Opuntia moniliformis* (L.) Steud.

adhuc virentis magnitudine carnosus totus tener laetissime virens aculeisque subtilibus longis acutissimus validis et castaneis radiatis. Ex ipso unico duo aut tres alii procedunt globuli fere pares unde alii etiam globuli successine nascuntur et ex his alii munitiet plantam et formantes tandem e globulis conflatam longe lateque circa terram diffusam totamque. Tam dulcis aculeis aspectii horribilem tactiique persecutosiorem, nam aculei subtilissimi et acutissimi facillime tangentium penetram pedes et manus.

Super quosumque ultimos globulos unicus innascitur flos splendide coccineus, monopetalus quidem sed campaniformis patens et veluti multiplex (uno scilicet alteri innascente) cuius medium occupant innumera staminula aurea suis apicibus etiam aureis decorata. Calyx vero totius floris virens longiuscuibus et quibusdam laminulis teneris et acutis veluti squamatus, et pistillo longo, infundibuliformi multifido et purpurescente decorus, instructum evadit elegantissimum coccineo splendore nitentem ovatum, ovo palumbario paulo maiorem carnosum, veluti squamatum, et squamularim summitaribus aureis insignem ac

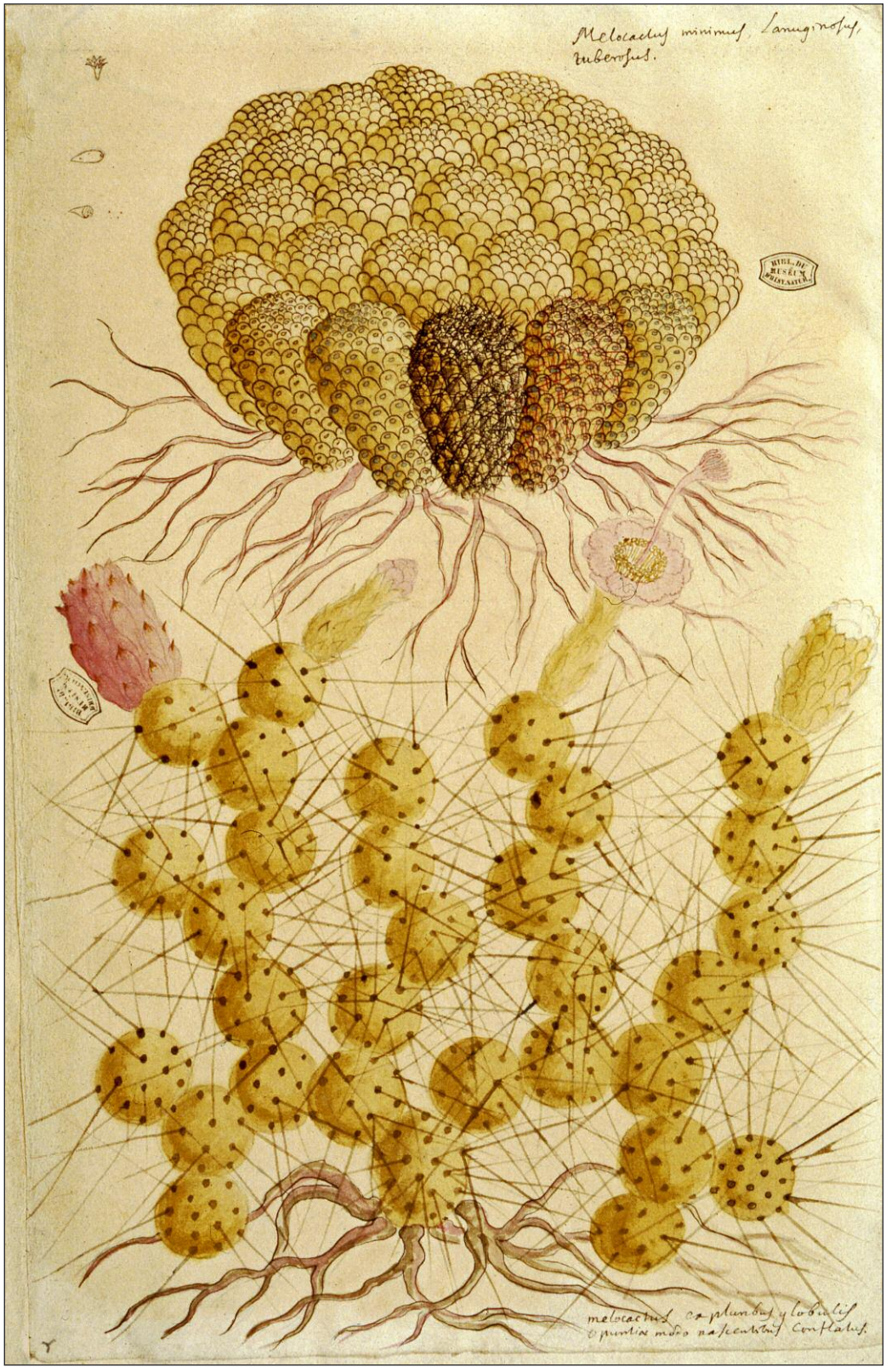


Figure 17b. Plumier's analytical sketches of *Mammillaria glomerata* Lam. & *Opuntia moniliformis* (L.) Steud.

Figures 18a & b. *Mammillaria prolifera* PH1306.04 (Haiti, South of Ganthier, Cul-de-Sac, Ouest, Haiti, 220m). This is quite close to the lake and the Plumier locality. Photographs: Paul Hoxey.

tandem umbilico amplo coronatum. Caro eius interius candida tenerrima, acidulitate gratissima, minutissimisque aureis seminibus plena.

Plantam semel tantum reperi maritimis caulibus innascentem illius regionis quae vulgo dictur le banda du sud apud insulam San Dominicam.

English translation:
t.11 Melocactus arising joined together in the manner of opuntia with many globes and very spiny

This species of melocactus is truly remarkable in its proliferation and moreover arises from just a single woody and branching reddish root, with fresh green spheres [globular segments] the size of a nut with the palest green flesh throughout and also with long, bristly, very acute, strong & chestnut-coloured radiating spines. From each sphere, two or three emerge in bunches almost in succession, whence the plant builds itself, eventually forming a long and broad mass of little spheres joined together and entirely covering the ground. As harmless as the spines may appear they are horrible and painful to touch, as the very fine and very acute spines very easily penetrate the foot and hand.

A splendid scarlet flower arises singly from the top of the uppermost little globes, monopetalous but broad campanulate and just as prolific (sprouting one after the other), whose throat is filled with numerous gold stamens also topped with gold anthers.

The true calyx of the whole flower is green, somewhat long and with just as soft and acute scale-like small lamina, and it has a long pistil, split into a stigma of many spreading lobes and coloured purple, and eventually turning into a very beautiful splendidly shiny red egg-like fruit, the size of a small wood-pigeon's egg [c. 4 × 3cm], fleshy, just as scaly with gold tips and also finally crowned with a large umbilicus. Its flesh inside is white, very soft, pleasantly acidic, and full of tiny golden seeds.

I found the plant only once, growing in coastal woods in that place which is commonly called the Band du Sud on the island of San Dominica [Haiti].

Vol.3 t.11: **Melocactus minimus, lanuginosus et tuberosus**, & **Melocactus ex pluribus globulis opuntia modo nascentibus constatus et spinosissimus.** [***Mammillaria glomerata*** (Lam.) DC. & ***Opuntia moniliformis*** (L.) Steudel = ***Consolea moniliformis*** (L.) A.Berger] (Figure 17b)

Both names provided for these two plants were based entirely on Plumier's descriptions and/or drawings and were not known by the authors of the names themselves.

Lamarck proposed the name *Cactus glomeratus*, chosing an epithet to reflect the proliferous habit of growth. Unfortunately, Lamarck mistranslated the text associating the word *coccinei* with *flores* instead of *fructus*, partly Plumier's fault for writing *fructus* with a capital *F*. Thereafter other authors have followed this mistake, and although they were puzzled by the erroneous "red flowers" description, still happened to come to the right conclusion that it must represent the species that is correctly called *Mammillaria prolifera*.

Hoxey and other explorers have found *Mammillaria prolifera* (Figure 18), known as bombillito in the Dominican Republic, in the Cul de Sac region, where as it happens it is not rare, contrary to Plumier's belief that it was. Also, the spines tend to be yellowish rather than the purplish indicated by Plumier. The type of *Mammillaria glomerata* (Lam.) DC. is automatically Plumier's drawing, but as Lamarck had seen both Plumier's original text and drawing and also the published Burman copy, citing Burman t.201, fig.1, Mottram (2002: 87) selected Plumier's original drawing to represent its lectotype.

Alberto Areces, while searching for cacti in Jan 1996 (Garrido, 2003) reported on an unusual example of camouflage at Cabo Rojo, Pedernales

Prov., Dominican Republic by *Siphonorhis brewsteri*, a bird of the Nightjar family. The downy chick of *S. brewsteri* was hiding in a group of *Mammillaria prolifera*. When disturbed, the chick placed its bill between its legs, squatted, and remained motionless. Its feathers match the spination of the cactus almost exactly in size and colour.

Mammillaria prolifera in Hispaniola is hexaploid, presumably as a survival mechanism in response to the climate being wetter than in its native Mexico.

Linnaeus saw Burman's t.198 of *Cactus moniliformis*. Though not citing it directly in his protologue (1753: 468), he did so in *Systema naturae* (1759: 1054) and the second edition of *Species plantarum* (1762: 669). It is the only original material seen by Linnaeus, so the Burman copy is automatically the type of the name. In the Burman copy, the righthand branch is missing, and the scales of the flower and fruit are exagerated. Linnaeus classified it correctly in his infragen. *Opuntiae*.

Britton and Rose are probably the earliest authors to connect *Cactus moniliformis* with the fruits and joints that may fall to the ground from consoleas and proliferate with numerous small joints that persistently seldom ever mature into the parent plant. Fig 19 shows many examples from Haiti that are a close match to Plumier's drawing. Hoxey & Gdaniec were the first botanical explorers to visit and record this species from its original type locality, 320 years after Plumier found his single plant, and here we show the first photos of it to be published. Britton & Rose illustrated similar such undergrowth as it occurs in Puerto Rico from Desecheo Island off the west coast of Puerto Rico, while Hoxey & Gdaniec found them at two localities on the south coast of Haiti, close to the border with the Dominican Republic. Similar proliferous fruits and stems are reported for other consolea species, though by no means all, and they seem to be homologous with the fruit chains made by the cholla opuntias of North America. But no other populations of consoleas produce moniliform stems as prolifically as *C. moniliformis*. In fact, the only other Haitian consolea at Port à Piment does not produce moniliform plants or stems at all. Moniliform plants develop vegetatively from fallen moniliform joints of old plants, or from fallen sterile fruits.

At its type locality, the mature cladodes of *Opuntia moniliformis* have a distinctly bullate (blistered) rather than reticulate epidermis that is scarcely in evidence in the other more northern populations, such as the large population of consoleas drawn by Plumier from Port à Piment in his t.27–28. *O. moniliformis* of the south coast of Haiti has its counterpart in Cuba with a similar epidermis and southern coast aspect in *Consolea moniliformis* ssp. *guantanamana* Areces (1996), so that now becomes a synonym of *Consolea moniliformis* ssp. *moniliformis*. Bullate surfaces are water repellant which suggests that this is an adaptation to a wetter climate. For the same reason it is also very likely to be a high polyploid. The northern consolea, *Opuntia moniliformis* auct. non (L.) A. Berger, has been measured as 2n = 88.

The Port à Piment plant, *Cactus moniliformis* auct. non L. has no other names at the rank of subspecies, but at the rank of species the theoretically earliest available name is *Opuntia ferox* Willd. (1813). However, that name was based on a cultivated plant of unknown origin and the description is too brief to identify it as a particular species of consolea. The correct specific name for the Port à Piment taxon should therefore be *Opuntia testudinis-crus* F.A.C. Weber (1904), based on Thiéry de Ménonville's 1787 account of that population. See the account for Plumier t.27–28.

Plumier illustrated flowers and fruits don't appear to be very opuntioid. However, his description of the receptacle as green and the presence of a large umbilicus on the top of the fruit are unmistakeable opuntia characters. Hoxey found no signs of any flowers or fruits on the consolea moniliform growth, but the full size cladodes flower freely (Figure 19). Plumier suggested that flowers were plentiful on his moniliform plant, but he may have gathered them from mature cladodes then forgotten that fact at the time of writing it up in his notes.

Latin transcript of Plumier's Vol. 3 t.12 Melocactus repens pentagonus flore albo. [**Selenicereus grandiflorus** (L.) Britton & Rose (Figure 20a)

Mirabilis haec planta foliis omnino destituitur, cauliculis tandem constructa colubrinis longe lateque circa vicinas arbores et frutices serpentibus, quos sane totidem colubros diceres invicem intricatos truncusque arborum complectentes ac veluti spicis suis ligantes. In multos etenim ramos abeunt praelongos dimidium brachium crassos quinque aut sex angulis aut costis striatos virentes, aculeisque subtilibus, nigricantibus, acutissimus radiatis aristarum seu costarum crepidinem per intervalla occupantibus instructos, tota eorum substantia carnosa et tenera suuo plena sed fere insipida. Flos etiam interdum exornant. Flores amplo amaenissimi liliorum candorem aequantes, mono petali equidem et infundibuliformes sed in plurima segmenta divisi longa angusta, acuminata et foliorum liliaceorum instar reflexa. Medium eorum occupant innumera stamina sublilia, candicantia et longa apicibusque aureis decorata; ac pistillus etiam candidus

Figure 19. *Consolea moniliformis*. PH1439.02: Haiti, Sud-Est Dept., Belle-Anse Arrondissement, on the coast west of Anse-à-Pitre, 20m. Photographs: Paul Hoxey.

Figure 19a. A close match for Plumier's plant of *Opuntia moniliformis*.

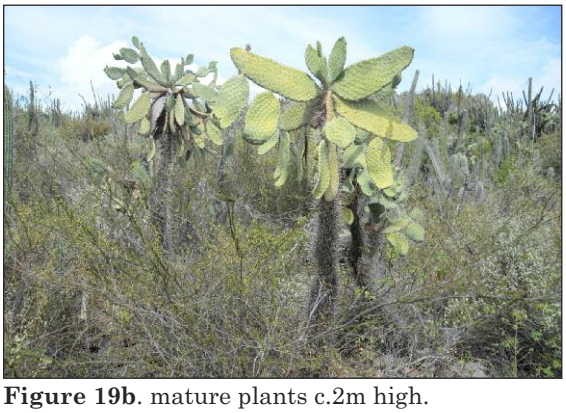


Figure 19b. mature plants c.2m high.

Figure 19c. Mature plant with moniliform branches and joints & fruits rooting on the ground below.

Figure 19d. mature cladodes showing the bullate surface, and flower.

Figure 19e. Another mature stem with a fully open flower.

Figure 19f. Example of a stemmed plant with entirely moniliform growth growing next to another plant with mature cladodes.

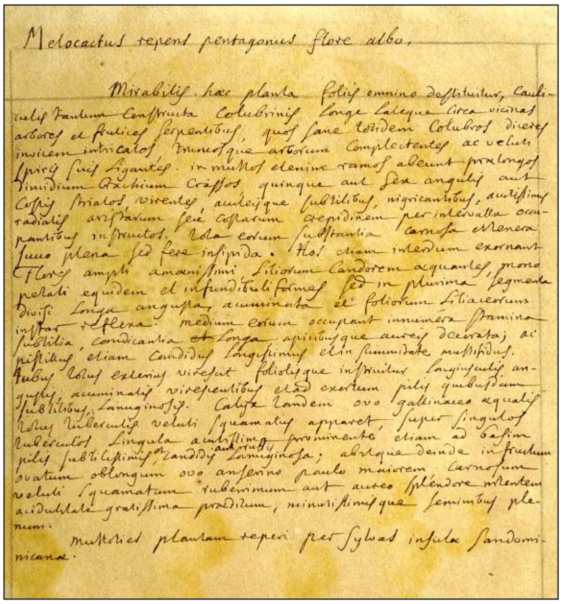

Melocactus repens pentagonus flore albo.

Figure 20a. Plumier's manuscript describing *Selenicereus grandiflorus* (L.) Britton & Rose.

longissimus et in summitate multifidus. Tubus totus exterius virescit foliolique instructur longiusculis angustis, acuminatis virescentibus et ad exertum pilis quibusdam subtilibus, lanuginosis. Calyx tandem ovo gallinaceo aequalis totus tuberculis veluti squamatus apparet, super singulos tuberculos lingula acutissima prominente etiam ad basim pilis subtilissimis, et candidis aut rubis lanuginosa; ab atque deinde infructum ovatum oblongum ovo anserino paulo maiorem carnosum veluti squamatum ruberrimum aut aureo splendore nitentem acidulitate gratissima praeditum, minutissisque seminibus plenum.

Multoties plantam reperi per sylvas insulae sandominicae.

English translation:

t.12 Creeping five-angled Melocactus with white flower

This wonderful plant is devoid of all foliage, eventually comprising of long, twining stalks the length and breadth of a snake, clambering around neighbouring trees and shrubs, such that many of these healthy snake-like stems intricately encircle the trunk of trees embracing and also even strangling them with wiry stems. Many indeed grow very long branches to half a man's forearm thick with 5 or 6 angles or furrowed green ribs, and provided with bristly spines becoming black, very acute, spreading, with strips of awns or ribs [?adventitious roots] from the midrib areas, all of these filled with their fleshy and soft but almost tasteless substance. They are also adorned now and then with a flower. The large flowers equal the very agreeable dazzling whiteness of lilies, truly monopetalous and funnelform, but divided into numerous long, narrow, acuminate segments, and recurving like liliaceous petals. The centre of this is filled with innumerable lily-like stamens, pure white and adorned with long gold upper parts and anthers at the top; the white pistil is also very long and many-branched at the top [stigma]. The exterior tube is entirely green and is furnished with somewhat long, narrow, acuminate, greenish foliar segments, downy, and bearing some fine hairs. Eventually the calyx becomes the size of a hen's egg, wholly tuberculate as well as scaly, with a very acute little tongue-like scale jutting out above each tubercle at the base of which are very fine hairs and white or reddish wool; and from there it also grows an ovate or oblong fruit a little larger than a goose egg, with the brightest red scales, and endowed with glossy shining gold flesh of a pleasant sourness, and filled with the tiniest seeds.

I found the plant many times in woods on the island of San Dominica [Haiti].

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Vol.3 t.12*: Melocactus repens pentagonus flore albo fructu rubro.** [Selenicereus grandiflorus*** (L.) Britton & Rose] (Figure 20b)

Plumier's drawing and description leave no doubt about the identity of his plant, which he encountered several times in Haiti.

Cactus grandiflorus L. happens to be one of the few cacti where Linnaeus (1753: 467) had used an asterisk to highlight a cited element, which he explained as meaning: "In a complete list of synonyms [or rather included elements] it is well to note the originator [*inventor*] by an asterisk" (*Philosophia Botanica*: 255. 1751). This has been interpreted (Stearn, 1957: 162) as meaning the place of a good description. It thus has a particular emphasis as a recommended account selected by the author. In this case, he placed the asterisk after "Cactus scandens, angulis quinque pluribusque obtusis. *Hort. cliff.* 182 *hort. ups.* 121.", which is a direct reference to his own first publication of the phrasename and to his lengthy description of the flower of this plant in *Hortus Cliffortianus* (1738: 182).

A rather mechanical lectotype specimen was designated by Lourteig (1991: 406), from the Clifford (in Banks) Herbarium, that carries the phrasename and reference "Cereus scandens minor, polygonus articulatus. Par. Bat. 120." (Figure 21). That was Hermann's phrasename for *Selenicereus grandiflorus* in *Paradisus batavus* (1698). Perhaps this sheet was among the Hortus Siccus 76 of the Banks Herbarium containing "Plants gathered in several places of the Indies, and supposed to have belonged to Dr. Herman" (Dandy: 138). Someone unknown has later added the binomial "*Cactus grandiflorus*" and the number

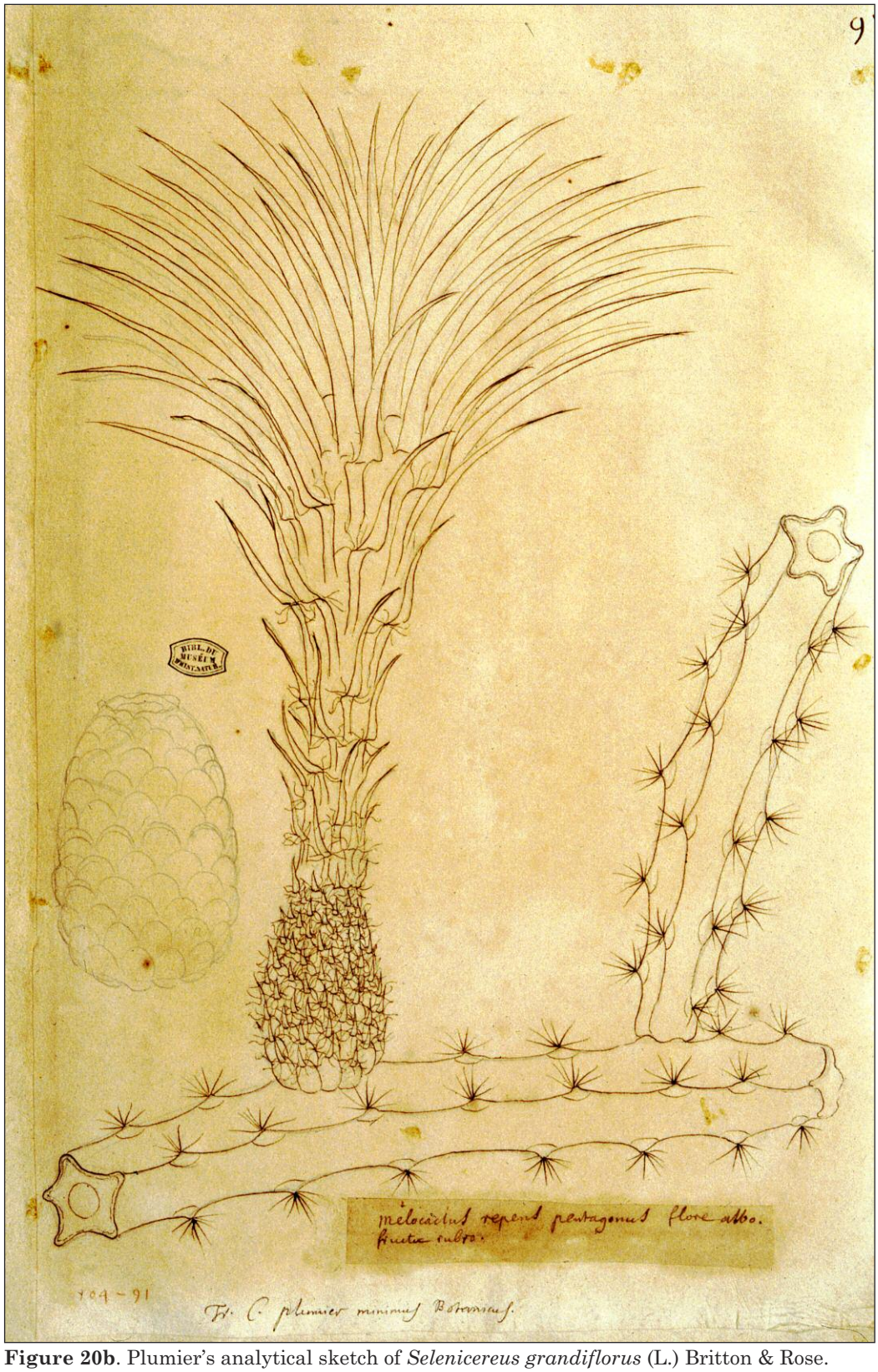


Figure 20b. Plumier's analytical sketch of *Selenicereus grandiflorus* (L.) Britton & Rose.

Figure 21. Cereus scandens minor, polygonus articulatus. Par. Bat. 120 (BM 000628597). Designated as the lectotype of *Cactus grandiflorus* L. by Lourteig in 1991. Its true identity is unknown, but probably *Cereus gracilis* Mill. Photograph: BM.

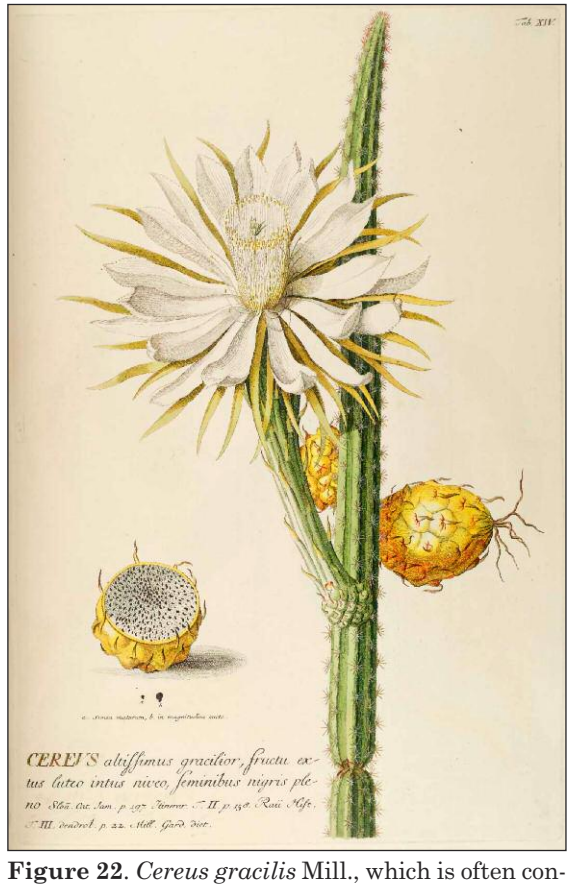


Figure 22. *Cereus gracilis* Mill., which is often confused with *Cactus grandiflorus* L. This illustration from Trew, *Plantae selectae* Dec.2 t.14, the plate by Ehret cited by Linnaeus (1762: 667) under *Cactus repandus* L., and is the only illustration to be attributed by him to this taxon. It actually represents the correct application of the epithet *repandus* until Britton & Rose (1920: 17) suddenly switched the concept for no apparent reason, a mistake that all other authors have slavishly followed ever since.

"10" to the sheet label which indicates Linnaeus's numbering system in *Hortus Cliffortianus*.

Apart from the lack of any date or origin, this sheet has a number of problems that make it unsuitable as a type for *Selenicereus grandiflorus*. It is difficult to interprete, but appears to be two separate flowers, one on the left complete, and two deconstructed parts of another flower with more prominent tube scales on the right. They may well be two different species. Moreover, we don't think that either are *Selenicereus grandiflorus* as we know it. They seem to have too few petals, and the perianth is not clearly organised into inner and outer series of broad inner segments and the thinner but longer outer segments. There is overall too much armament of the receptacle tube, the scales should be much smaller, and there should be some true spines present as well as hairs, particularly on the lower part of the tube and pericarp.

This sheet is most probably what today is called *Harrisia gracilis*, from Jamaica (Figure 22), a species well known to botanists in pre-Linnaean times which has a similar sized flower, but with less prominent outer perianth segments, represented in Clifford's collection and listed in *Hortus Cliffortianus* as number 8, not number 10 as someone has written on the sheet. There was great confusion between these two unrelated species in the 18thC, and some plates of the *Harrisia* can be found incorrectly labelled as *Cereus grandiflorus*. Despite his detailed description in *Hortus Cliffortianus*, Linnaeus himself did not fully understand this species, referring the Burman "Plum. ic. 199, f.1" (1759: 1054) to *grandiflorus*, which is actually *Acanthocereus tetragonus*. The *Harrisia* actually appeared in *Species plantarum* (1753) as *Cactus repandus*, the correct but misapplied name for the last 100 years for what is

Figure 23. Lectotype engraving of *Cactus* (*Selenicereus*) *grandiflorus*, from Volkamer, *Nürnbergische Hesperides* (5) Cap.9: 234. A coloured copy, although the colouring might not be original. Image: NYBG

today mistakenly called *Harrisia gracilis* (Mill.) Britton. The history of botany is, alas, strewn with such incompetences.

The flower of *Selenicereus grandiflorus* described in *Hortus Cliffortianus* called for 20 stigma lobes, while the Clifford specimen is hard to make out from the rather poor image of the British Museum website, but it is more like 12, the approximate number for *Harrisia gracilis*, but nowhere near to 20. Linnaeus's *Hortus Cliffortianus* description is correct for *Selenicereus grandiflorus* as we understand it today, but the same cannot be said for Lourteig's lectotype sheet. This propensity for Linnaean names to be typified with undated, undocumented and hardly identifiable fragments in the Linnaean herbarium, and annotated by unknown hands, is very unhelpful and unscientific - they are neither documented nor mentioned in the Linnaean protologues, criteria that are usually considered essential for non-Linnaean taxa.

Heath (1992: 76) argued that the Volkamer plate (Figure 23) was the only cited original element in Linnaeus's protologue and therefore the autotype, but that cannot be so because the protologue citation of *Hortus Cliffortianus* means

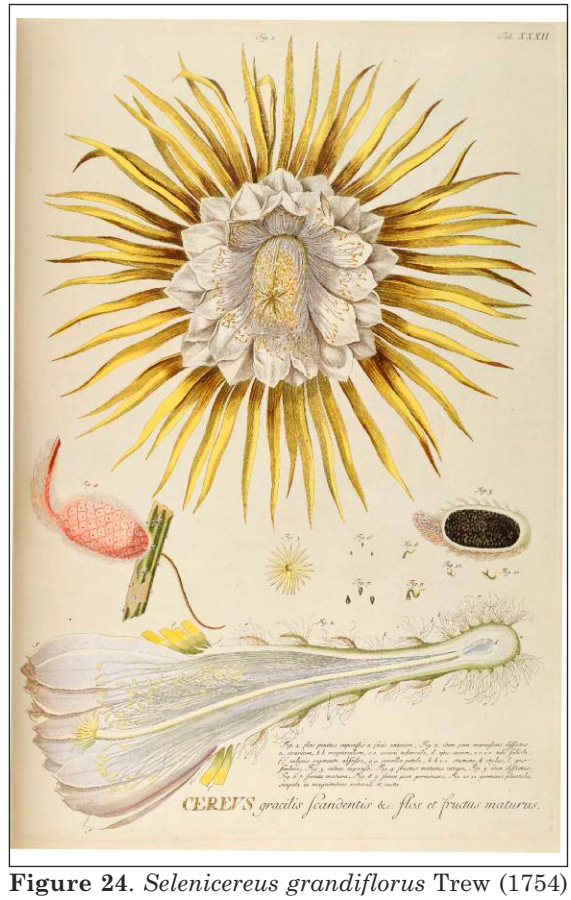


Figure 24. *Selenicereus grandiflorus* Trew (1754) *Plantae Selectae* Dec4 t.32. From the Missouri Botanic Garden copy online. One of the additional illustrations cited by Linnaeus in the second edition of *Species plantarum*.

that the illustrations of Hermann and Plukenet cited in that work are also original material. All of these illustrations are correctly identified as *Selenicereus grandiflorus*, but the one that best leaves no doubt about its identity, despite some inaccuracies due to artistic licence, and the only one to be directly cited in the protologue, is that by Volkamer. By the end of his life, Linnaeus had added two further illustrations to his circumscription, namely those of Trew, *Plantae selectae* t.31-32. 1754 (Figure. 24), and Miller, *Icones* t.90. 1756, both also accurate depictions of the species. Trew's two illustrations were chosen by Gmelin (1796: 785) to represent *Cactus grandiflorus* L., but they were not of course original material, only contemporary.

Consequently, we propose to formally relectotypify the name with the Volkamer illustration:

Lectotype of *Cactus grandiflorus* L. (designated here): *Cereus Americanus serpens,*

Figure 25. *Selenicererus grandiflorus* from the epitype locality (Mexico, Veracruz, Palma Sola).

Figure 26a. *Selenicereus grandiflorus* PH1306.09 (Haiti, Dept. Ouest, South of Ganthier, Cul-de-Sac, 220m, 20 Jan 2017) clambering up a tree trunk. Photograph: Paul Hoxey.

maior, articulatus, flore maximo, noctu sese aperiente et suavissimum odorem spirante. Johann Christophe Volkamer (1708), *Nürnbergische Hesperides* (5) Cap.9: 234, flowering in the garden of Johann George Volkamer in 1705. (Figure 23).

Figure 26b. *Selenicereus grandiflorus* PH1281.06 (Haiti, Dept. L'Artibonite, Johanisse, south of Gonaïves, 70m, 10 Jan 2017) with 4- & 5- angled stems. Photograph: Paul Hoxey.

Supersedes the first lectotypification by Lourteig (1991).

Heath cited the same illustration as holotype, but assumed erroneously that it was an autotype and had not therefore made a selection.

Bauer (2003: 44) designated an epitype for *Selenicereus grandiflorus* (L.) Britton & Rose from Palma Sola, c.100km north of Veracruz, Mexico. Figure 25 is an example of a plant from this locality. The designation was presumably in support of Lourteig's lectotype, because the Linnaean specimen was not positively identifiable. There is no conflict between this selection and our relectotypification, so the same epitype now supports that.

Hoxey and Gdaniec also saw this species frequently in Haiti, but without flowers or fruits at the time (Figure 26). However, they observed it with 4–5 ribs and much variability in spination and wondered if more than one taxon was involved. Plants with short conical spines have been given the name *S. pteranthus*. Hoxey and Gdaniec found these and longer spined plants both growing together in Haiti (Figure 26b). Although *S. grandiflorus* is quite common in Haiti our explorers failed to find it at all in the Dominican Republic. However, they found one sheet in the Jardín Botánico Nacional Dr. Rafael M. Moscosco, Santo Domingo herbarium (JBSD) but that is from quite near the Haitian border.

It is a species that occurs throughout the Caribbean and eastern Mexico, and by its epitype selection has a type locality in Veracruz, Mexico, Linnaeus having said it was from Jamaica and Veracruz. Schumann (1903: 183) mentioned *Cereus grandiflorus* var. *haitiensis* hort. ex K.Schum. with the brief description that it was paler green and yellow spined, but that is probably too brief to be considered a valid name and doesn't distinguish it from other forms of *S. grandiflorus*. The Veracruz

form is predominantly 5-ribbed, and has a weak, bristly spination when juvenile or in poor light, but develops thicker stems, heavily armed with longer subulate spines on stems that climb into the sunlight to flower.

Latin transcript of Plumier's Vol. 3 t.13 Melocactus tetragonus repens fructu rubro. [***Acanthocereus tetragonus*** (L.) Britton & Rose (Figure 27a)

Haec planta praecedentis more nulla obtinet folia, sed ramis longissimis tota constat, dimidium bractium crassis, serpentium longorum instar super vicinas arbores prorepentes quatuor angulis eminentibus per totam longitudinem canaliculatos et super quoscumque angulos aculeis rigidis, acutissimis fuscis et calcitrapae in modum radiatis armatos.

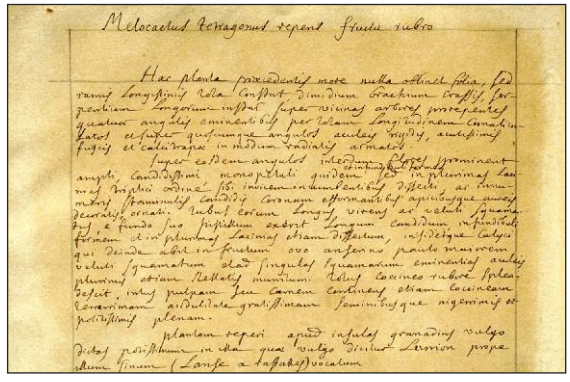
Super eosdem angulos interdum flores prominent ampli, candidissimi monopetali quidem et infundibuliformes sed in plurimas lammas triplici ordine sibi invicem incumbentibus dissecti, ac innumeris stami[ni]sculis candidis coronam efformantibus apicibusque aureis decoratis, ornati. Tubus eorum longus virens ac veluti squamatus, e fundo suo pistillum exerit longum candidum, infundibuliformem et in plurimos lacinias etiam dissectum, insidetque calyci qui deinde abit infructum ovo anserino paulo maiorem veluti squamatum et ad singulas squamarum eminentias aculeis plurimus etiam stellatis munitum. Totus coccineo rubore splendescit, intus pulpam seu carneum continens etiam coccineam tenerrimam acidulitate gratissimum seminibusque nigerrimis et politissimis plenam.

Plantam reperi apud insulas granadins vulgo dictas potissimum in illa quae vulgo dicitur lunion prope illum sinum (lanse a rastalles) vocatum.

English translation:
t.13 Four-angled creeping Melocactus with red fruit

This plant possesses no leaves in the manner of the preceding [*Selenicereus grandiflorus*], and is wholly similar in its very long branches, half a man's forearm thick, long, snake-like, creeping through nearby trees, with 4 wings over its entire length, channelled, and armed with rigid spines along every angle, very acute, dark brown and in the manner of a spreading star-thistle [*Centaurea calcitrapa*].

Now and then flowers appear from the same uppermost wings, large, of the purest white indeed, monopetalous and funnelform, but divided into many petals in 3 alternately arranged overlapping series, and also with innumerable white stamens forming a coronet, and ornately decorated in gold at their apices [anthers]. Its long, white pistil arises from the base of its long, green, and also scaly


Melocactus tetragonus repens fructu rubro

Haec planta praecedentis more nulla obtinet folia, sed ramis longissimis tota constat, dimidium bractium crassis, serpentium longorum instar super vicinas arbores prorepentes quatuor angulis eminentibus per totam longitudinem canaliculatos et super quoscumque angulos aculeis rigidis, acutissimis fuscis et calcitrapae in modum radiatis armatos.

Super eosdem angulos interdum flores prominent ampli, candidissimi monopetali quidem et infundibuliformes sed in plurimas lammas triplici ordine sibi invicem incumbentibus dissecti, ac innumeris stami[ni]sculis candidis coronam efformantibus apicibusque aureis decoratis, ornati. Tubus eorum longus virens ac veluti squamatus, e fundo suo pistillum exerit longum candidum, infundibuliformem et in plurimos lacinias etiam dissectum, insidetque calyci qui deinde abit in fructum ovo anserino paulo maiorem veluti squamatum et ad singulas squamarum eminentias aculeis plurimus etiam stellatis munitum. Totus coccineo rubore splendescit, intus pulpam seu carneum continens etiam coccineam tenerrimam acidulitate gratissimum seminibusque nigerrimis et politissimis plenam.

Plantam reperi apud insulas granadins vulgo dictas potissimum in illa quae vulgo dicitur Lunion prope illum sinum (Lanse a rastalles) vocatum.

Figure 27a. Plumier's manuscript describing *Acanthocereus tetragonus* (L.) Britton & Rose.

funnelform tube, and it is also cut into very many perianth segments, and it is seated on a calyx just as scaly which thereafter turns into a fruit a little bigger than a goose egg, and the axils of each scale are armed with many star-like spine clusters as well. It becomes completely bright scarlet red, containing within very soft, also scarlet pulp or flesh, pleasantly slightly sour, and filled with very black and shiny seeds.

I found the plant on the Grenadine islands mostly in that place commonly called L'Union [Union Island] near that bay called L'Anse a Rastalles.

Vol.3 t.13: **Melocactus tetragonus repens fructu rubro.** [***Acanthocereus tetragonus*** (L.) Hummelinck] (Figure 27b)

Pfeiffer (1837: 99) misapplied *Cactus tetragonus* L. to a columnar cereus, followed later by Britton & Rose (1920: 9), who misapplied another name, *Acanthocereus pentagonus* (L.) Britton & Rose to this taxon, a mistake repeated again by Benson (1982).

A. tetragonus was returned to its original sense and neotypified by Hummelinck (1938: 170). He designated *Hummelinck* 196 (flower) and 170 (fruit), collected in Curaçao, said to be deposited at the University of Utrecht (U). However, he did not specify if these were part of a single gathering. If not, then this typification is ineffective. No reply was received from the University for scans of these specimens, if they exist, in order to make a selection.

The plate in Burman (t.199 fig.1) is lacking a branch with fruit that is present in Plumier's original drawing. Linnaeus had the opportunity to see Burman's copy, but failed to cite it anywhere, so neither drawing can unequivocally be considered as original material.

Plumier found it mainly on Union Island in the Grenadines, but the species is common with an IUCN status of Least Concern, and very

Figure 27b. Plumier's analytical sketch of *Acanthocereus tetragonus* (L.) Britton & Rose.

Figure 28a. *Acanthocereus tetragonus* (a) PH1667.03: Saint Vincent, Baliceaux Island, 40m, 31 Jan 2019. Thicket. (b) PH1677.04: Saint Vincent, Frigate Rock south of Union Island, 60m, 4 Feb 2019. Plumier's locality. Photographs: Paul Hoxey.

widespread from Texas in the north to Colombia in the south. Howard (1952: 47) recorded only *Selenicereus trigonus* on Union Island, but without flowers their stems are very similar, and in the Grenadines the stems of *Acanthocereus tetragonus* are mainly 3-angled.

Hoxey & Gdaniec confirmed the presence of *Acanthocereus tetragonus* on Union Island in abundance in Feb 2019 (Figure 28b), but failed to find any *Selenicereus trigonus*, which suggests that Howard had been confused. Hoxey and Gdaniec did not find hylocerei from south of Bequia all the way to Grenada but *Acanthocereus* is common on all the Grenadine islands. Howard (1952: 106) clearly mistook *Acanthocereus* for *Hylocereus*.

Figure 28c. *Acanthocereus tetragonus* PH1695.02: Grenada, Frigate Island, off the south coast of Carriacou, 70m, 11 Feb 2019. Stem with dried fruit. This was the only evidence of flowering Hoxey & Gdaniec saw on the 100s of this species encountered. Photograph: Paul Hoxey.

Latin transcript of Plumier's Vol. 3 t.14 Melocactus repens trigonus, flore albo fructu coccineo. [**Selenicereus trigonus** (Haw.) S.Arias & N.Korokova] (Figure 29a)

Mirabilis est etiam haec planta, nullis penitus foliis decorata sed clematitum more caules suos serpentinos ad alta provehens et arbores vicinas onustans. Cauliculos itaque in ea tantum cern[u]as dimidium bractium crassos, longissimos, ramosus et perintervalla veluti articulosos, trigonos, virentes, opuntii vulgaris foliorum consistentia, per totam angulorum longitudinem et per intervalla pollicem circiter dissita tribus aut quatuor aculeis brevibus rigidis et cinereis et calcitrapae in modum

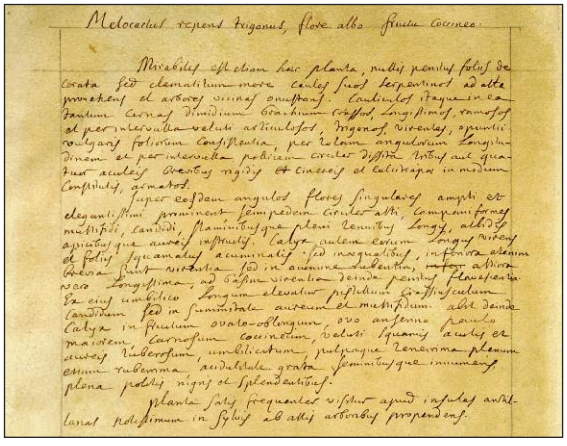


Figure 29a. Plumier's manuscript describing *Selenicereus trigonus* (Haw.) S.Arias & N.Korokova.

constitutis, armatos.

Super eosdem angulos flores singulares ampli et elegantissimi prominent semipedem circiter alti, campaniformes multifidi, candidi, staminibusque pleni tenuibus longis, albidis, apicibusque aureis instructis. Calyx autem eorum longus virens et foliis squamatus acuminatis sed inaequalibus, inferiora etenim brevia sunt virentia sed in acumine rubentia, altiora vero longissima, ad basim virentia deinde penitus flavescentia. Ex eius umbilico longum elevatur pistillum crassiusculum candidum sed in summitate aureum et multifidum. Abit deinde calyx in fructum ovato-oblongum ovo anserino paulo maiorem, carnosum coccineum, veluti squamis acutus et aureis tuberosum, umbilicatum, pulpaque tenerrima plenum etiam ruberrima acidulitate grata seminibusque innumeris plena politis nigris et splendentibus.

Planta satis frequenter visitur apud insulas antillanas potissimum in sylvis ab altis arboribus propendens.

English translation:
t.14 Three-angled creeping Melocactus, with white flower [and] scarlet fruit

This plant is again remarkable, entirely devoid of leaves but with its creeping bramble-like jointed snake-like stems scrambling upwards and invading adjacent trees. Thus stem segments hang down as much as half a man's forearm thick, very long, branching at intervals as well as segmented, 3-angled, green, with the consistency of common opuntia segments [*Opuntia ficus-indica*], angular for the whole length and armed at about every inch with a cluster of 4 short, rigid, and ash-coloured spines and positioned together in the manner of a star-thistle [*Centaurea calcitrapa*].

Special large and beautiful flowers emerge from the ridge of its wings about half a foot high, bell-shaped and cleft into many parts, shining white, and filled by long, white, slender stamens, and bearing golden tips [anthers]. However, its calyx is long, green, and with acuminate and leaf-like scales of irregular sizes, the lowermost are short and green but red-tipped, the uppermost the longest, inner sides becoming yellowish later, green at the base. A long, white, moderately thick pistil arises from its umbilicus, but at the top it is golden and many-branched [stigma]. Thereafter the calyx turns into an ovate-oblong fruit a little larger than a goose egg, with scarlet flesh, also beset with acute, golden and tumid scales, umbilicate, and filled with very soft also very red pulp, pleasantly acidulous, and filled with innumerable shiny black and gleaming seeds.

The plant is to be seen frequently enough in the Antilles islands, chiefly hanging down from tall trees in woods.

Vol.3 t.14: **Melocactus repens trigonus, flore albo fructu coccineo.** [***Selenicereus trigonus*** (Haw.) S.Arias & N.Korokova] (Figure 29b)

Plumier reported this species as being quite common throughout the Antilles, without a specific locality in the description, but with plate annotations "ex insula Sanctae Crucis" [from the island of Saint Croix] and "Jamacaru brasili. Lusilang Cardon. G. Marg. L. 1° C. 12." [Two local names, followed by the literature reference: Markgrave, G., *Historia natural do Brasil* **1**: chapter 12. 1648].

Burman's copy is essentially the bottom half of Plumier's illustration, restricted to a single stem with one fruit only. Again, Linnaeus had the opportunity to see Burman's copy, but made no comment on it.

Haworth (1812: 181) was shown a plant that had been growing at Kew from 1809 that he equated with Burman's t.200 fig.2, and so published the name of *Cereus trigonus* Haw. for it in 1812. The Burman plate was the only included element of his protologue, so it is automatically its lectotype. The type for this species is therefore from Plumier's location in the US Virgin Islands on the island of Saint Croix. He must have seen it in 1695, early in the year that the French West Indian Company finally evacuated the island and it became uninhabited.

In support of the holotype, Bauer (2003: 41) designated the following specimen as an epitype: US Virgin Islands, St. Thomas, Magens Bay; 29 Aug 2000, *Pedro Acevedo-Rodríguez 11250* (US 3408457, in alc.). Photos by the same collector from the neighbouring island of St. John are some c.70km north of Plumier's location (Figure 30).

After extensive research, Bauer (2005: 4–7) decided that *Hylocereus trigonus* could not be distinguished from *Hylocereus triangularis* on the basis that "there seems to be no clear geographic

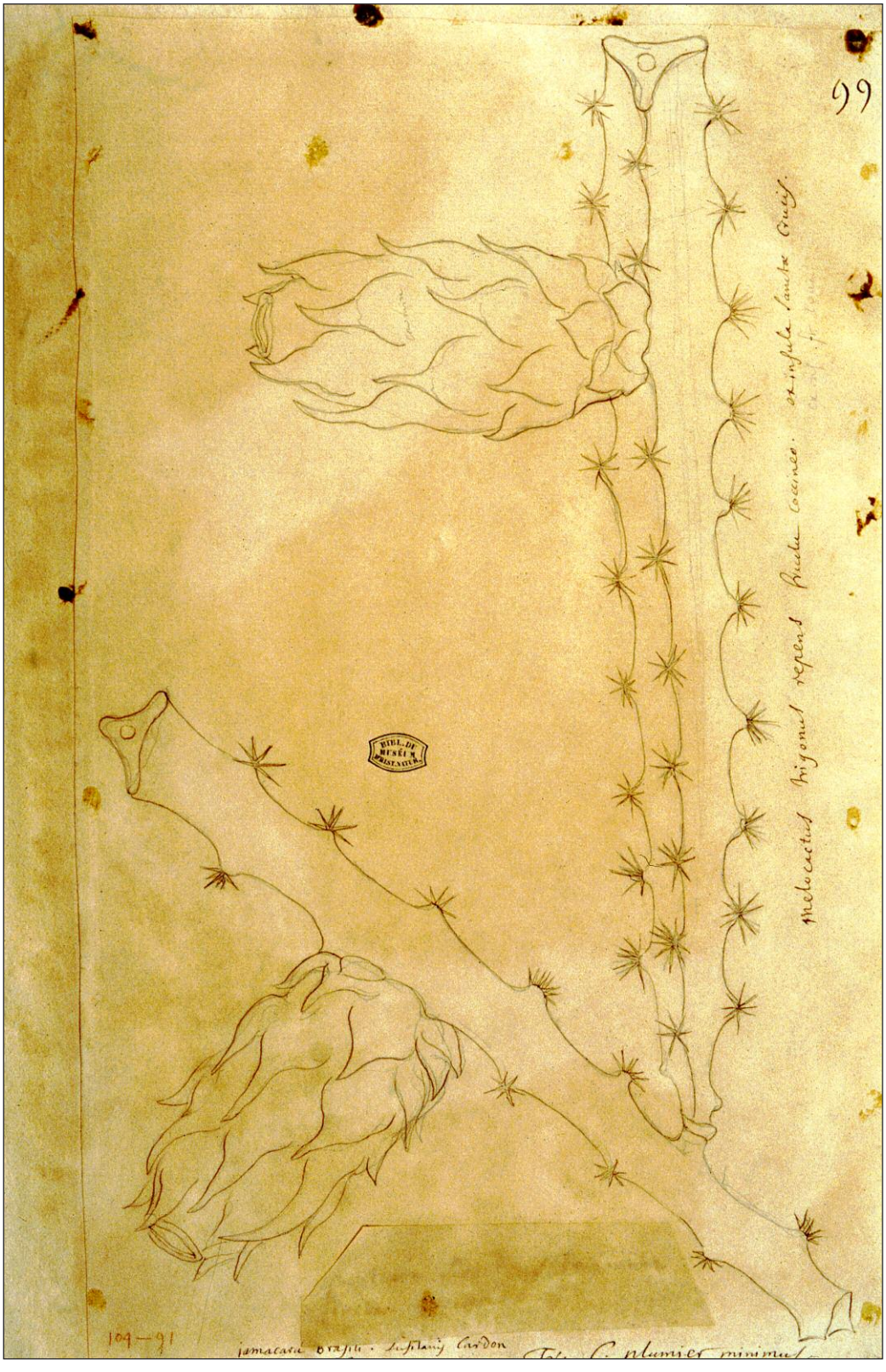


Figure 29b. Plumier's analytical sketch of *Selenicereus trigonus* (Haw.) S.Arias & N.Korokova.

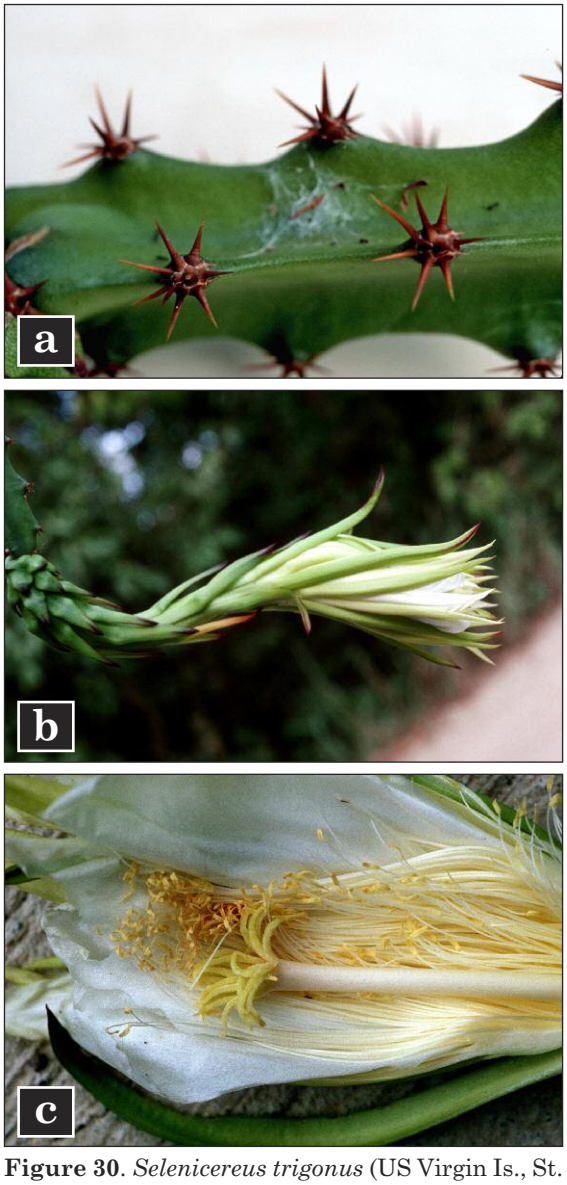


Figure 30. *Selenicereus trigonus* (US Virgin Is., St. John Island, Coral Bay Quarter) **a.** Portion of stem. **b.** Spent flower. **c.** Partial flower section. Photographs: P. Acevedo, © Smithsonian Institution, National Museum of Natural History, Department of Botany, under CC licence.

line to separate two species on the basis of scale-size on the pericarpel". However, whether this ought to be the only criterion, or if confusion is due to hybridisation, is not yet clear.

Hunt (2017: 4, 29–39) proposed the union of *Hylocereus* with *Selenicereus*, a useful step that we are following here.

Latin transcript of Plumier's Vol. 3 t.15 Melocactus trigonus alius repens ex insula Sta. Cruz [***Selenicereus undatus*** (Haw.) D.R.Hunt] (Figure 31a)

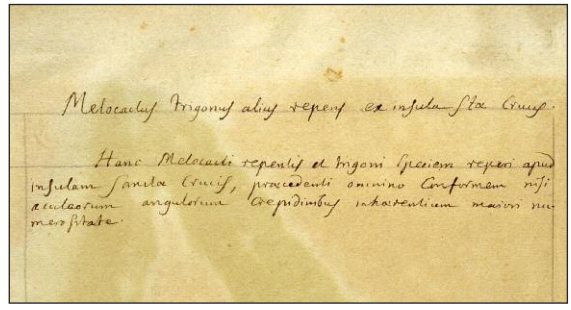


Figure 31a. Plumier's manuscript describing *Selenicereus undatus* (Haw.) D.R.Hunt.

Hanc Melocacti repentis et trigoni speciem reperi apud insulam Sancta Crucis, praecedenti ominino conformem nisi aculeorum angulorum crepidinibus inhaerentium maiori numerositate.

English translation:
t.15 Another creeping 3-angled Melocactus from the island of St. Croix

I found this creeping and 3-angled species of Melocactus on the island of St. Croix, entirely conforming to the preceding except for the more extensive horny ridges of the spiny wings.

Vol.3 t.15: **Melocactus trigonus alius repens fructu rubro, ex insula Sta. Cruz.** [***Selenicereus undatus*** (Haw.) D.R.Hunt.] (Figure 31b)

Plumier made a watercolour plate of this plant among the folio of plates dated 1688 at the Bibliothèque Nationale de France, Paris (Figure 31c), reproduced by Grillon (1985). A much fuller description in French also appears on this plate, together with a reference to its description in the earlier work by Du Tertre (1667). A translation of Plumier's description is reproduced here:

The spiny thistle, is a very particular plant, in the manner of its growth rather than its form; because it does not remain on tree branches, to which it attaches itself by its small root hairs, which only feed on detritus, humidity, or the bark to which it is attached: it creeps further afield over rocks and shrubs, and has no leaves on its stems or branches which are not differentiated. They are 3-winged and each wing is just over an inch high: the tissues are like anacardium [*Anacardium occidentale*], or Joubarde [*Sempervivum*], a uniform, viscous and insipid flesh, and sprinkled all over with small, slender and starlike prickles, like needles. At the end and also the middle of these branches, it produces a white flower not much bigger than that of a nymphaea or waterlily, which float in water. Backing this flower there are a number of other small, very narrow, white and green leaves [outer perianth segments], twice the

Figure 31b. Plumier's analytical sketch of *Selenicereus undatus* (Haw.) D.R.Hunt.

Figure 31c. Watercolour by Plumier & manuscript, dated 1688, depicting *Selenicereus undatus* (Haw.) D.R.Hunt from Grillon (1985)

Figure 32. *Selenicereus undatus* (ex cult. China, imported by the Horticultural Society of London) Plate 1884 from *Curtis's Botanical Magazine* **44** (1817). The neotype illustration designated by Taylor in 1995.

length of the flower [petals], which surrounds the entire perianth of this flower, whose scent is very sweet. It produces a fruit that in time becomes as large as a goose egg. Its skin is coloured crimson, thick and strong almost like leather, on which appear small green leaf-like excressances. It is entirely filled with snow-white flesh in the middle but the outermost flesh close to the wall is stained a little with the colour of the wall [a detail evident in Figure 33g], and this flesh is entirely filled with small black seeds like those of purslane [*Portulaca*]. It is one of the most excellent fruits of the country; it is extremely refreshing; it ripens in the month of April, and takes only a month to mature to its perfection. *Du Tertre, Tom. 2, Traitte 3, Chap. 2, Art. 2.* [A reference to Du Tertre, *Histoire générale des Antilles habitées par les François* (1667)]

This species was cultivated long before it was first described. It is larger in all its parts than any other *Selenicereus* sect. *Hylocereus*, and is characterised by the horny-margined, often wavy angles, frequently spindle-shaped articulations, and produces the large, so-called Dragon fruits of our supermarkets bearing usually large pointed scales at maturity, soon drying but still persisting. Because of its superior fruits, it was cultivated

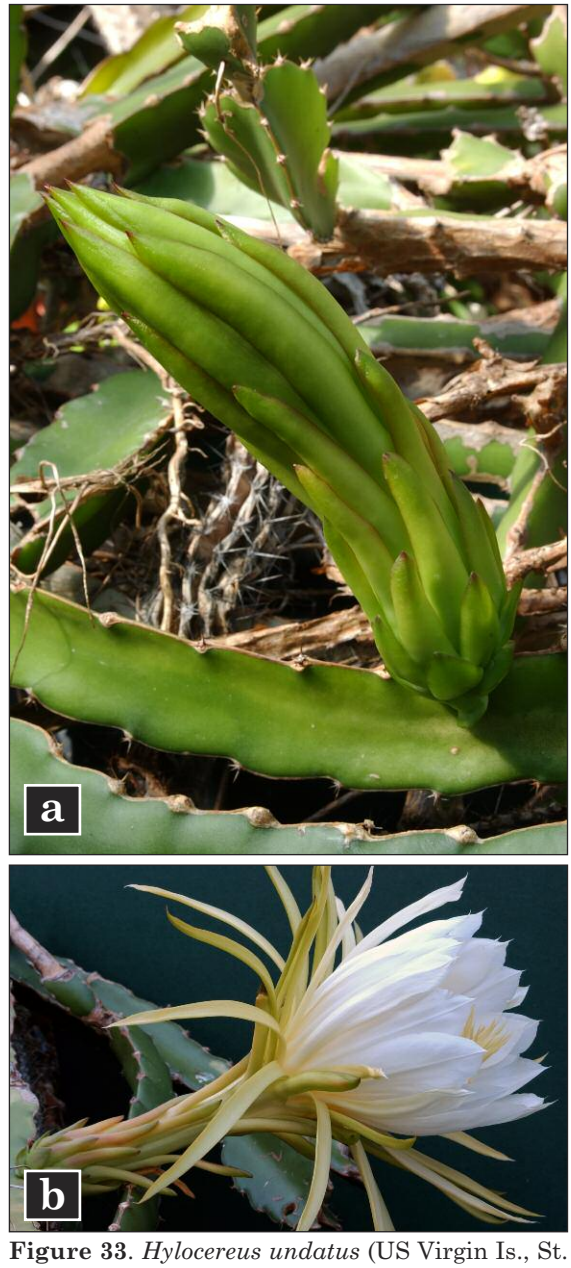


Figure 33. *Hylocereus undatus* (US Virgin Is., St. Croix) collected by Conrad Fleming in 1976.
a. flower bud 17cm long. **b.** open flower 28cm long.

possibly in pre-Columbian times throughout the tropics. Its true habitat remains uncertain, but might be St. Croix. It might even be a selected cultivar.

It became naturalised as part of the Hawaiian and Philippines flora from the earliest trans-Pacific, perhaps pre-Columbian, voyages and was also established in south-east Asia. The earliest reference to it and illustration was in Oviedo (1535: Libro Octavo, fo. lxxxvi Pitahaya). The London Horticultural Society introduced it to England from

Figure 33. *Hylocereus undatus* (US Virgin Is., St. Croix) Collected by Conrad FLEMING in 1976. **c.** open flower throat view, inner perianth 10cm wide, outer perianth 25cm wide, **d.** flower section, 30cm long, **e.** immature fruit 5cm long (without scales) **f.** mature fruit a month later, 5.7cm long, 4.8cm diameter, **g.** fruit section. Each flower weighs 160g.

China in the early years of the 1800s, enabling Kew to be able to feature it as a double-page plate in *Curtis's Botanical Magazine* in 1817 (Figure 32), as *Cactus triangularis* and also providing the stock from which Haworth was able to make his first description of it in 1829–30. This spectacular plate was chosen by Taylor (1995: 119) to represent the neotype of this species.

Plumier's locality was the island of Saint Croix in the US Virgin Islands, where it still occurs today and from where the plant shown in Figure 33 also originated.

Latin transcript of Plumier's Vol. 3 t.16 Melocactus alius trigonus repens fructu e violaceo coccineo [***Cereus plumieri*** Rol.-Goss. = ***Selenicereus trigonus*** (Haw.) S.Arias & N.Korokova] (Figure 34a)

Duabus praecedentibus omnino conformis est haec species. Fructus tamen paulo ampliores, penitus ovati, coccinei quidem sed et amaenissimo colore violaceo splendentes, aculeolisque deforis instructi, intusque pulpa tenerrima candidissima, acore gratissima ac veluti ex vermiculis innumeris compacta pleni, seminibusque innumeris exiguis et nigerrimis facti.

Hanc reperi apud insulas granatinas in illa potissimum insula quam Caraibae Becouia appellant.

English translation:
t.16 Another creeping 3-angled Melocactus with scarlet tinged with violet fruit

This species agrees entirely with the two preceding. However, the fruit is larger, more or less ovate, indeed scarlet but also tinted with an agreeable violet colour, and bearing small spines outside, and inside filled with very soft, very white, pleasantly insatiate pulp, and with innumerable

compacted little worm-like strands [funicular pulp], and making innumerable small and very black seeds.

I found this in the Grenadine islands chiefly on that island called Bequia by the Caribs.

Vol.3 t.16: **Melocactus alius trigonus repens fructu coccineo e violaceo.** [***Cereus plumieri*** Rol.-Goss. Perhaps = ***Selenicereus trigonus*** (Haw.) S.Arias & N.Korokova] (Figure 34b)

This completes Plumier's trio of hylocerei from the Lesser Antilles. Burman's artist in plate 199 omitted a branch bearing a fruit section and Plumier's associated tree-boring longhorn beetle (*Chlorida* sp.), but included the branch that carries a fruit bearing spines in the axils of its scales. Once again, Linnaeus (1759: 1054) saw the Burman copy but put it in the synonymy of his *Cactus triangularis*. Pfeiffer (1837: 117) referred it to *Cereus napoleonis* Graham, a name that was considered a synonym of *S. trigonus* by Howard (1989: 404) and by Bauer (2003: 40).

It was taken up by Roland-Gosselin (1908: 668-669) as a species in its own right under the name of *Cereus plumieri* Rol.-Goss., which was later transferred to *Hylocereus* by Lourteig (1991: 406). But as it has not until recently been recollected, the plant has remained legendary and Plumier's plate has even often been dismissed as fictitious.

Bauer (2003: 42) designated an interpretative epitype for *Cereus plumieri* Rol.-Goss. which is a gathering with 3 spines in the fruit scale axils as follows:

Barbados, *Robinson s.n.* (US 1367210), but no images of this specimen are presently available. This is almost 200km east of Plumier's Bequia island location. However, there is a specimen in Barbados at the herbarium which matches a plant that Hoxey and Gdaniec found growing there in a garden. It has stems with very short conical spines and is not the same as the plants on Bequia. If this is the same as the epitype it should be abandoned. A contact in Barbados said this plant is only known from gardens and is probably not native to Barbados.

Hoxey & Gdaniec found plants on Bequia (Figure 35) with one fruit that exactly matched Plumier's drawing in early 2019. Material gathered will be grown in the Gibraltar Botanic Garden where it is hoped to flower it in order to obtain a better epitype and a proper understanding of its taxonomic status.

According to Howard (1989: 404) and Bauer (2003: 42), plants with fruits having scales with bristly spines in their axils can occur within the circumscription of *Selenicereus trigonus* throughout its range, and it is thus possible that *Cereus plumieri* Rol.-Goss. might also be considered as a synonym of *Selenicereus trigonus*.

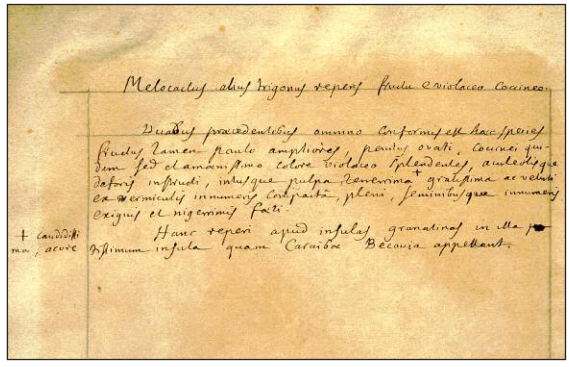


Figure 34a. Plumier's manuscript describing *Cereus plumieri* Rol.-Goss. = *Selenicereus trigonus* (Haw.) S.Arias & N.Korokova.

Latin transcript of Plumier's Vol. 3 t.17-19 Melocactus arborescens trigonus, undulosus, aculeis validis munitus [***Dendrocereus undulosus*** (DC.) Britton & Rose] (Figure 36a)

Arbor est haec planta, elegans mirabilisque aspectu ramos suos qui et ipsamet sunt ipsius arboris folia late expandens ac distundens. Caudex eius humanum corpus breve crassus existit et magis quam humanam altitudinem superat, triplici costa, undulata per totam longitudinem carinatus seu angulatus inque singularum undularum cacuminibus aculeis rigidis, exilibus, duos pollices circiter longis et nigricantibus armatus. Cortex eius crassus, nigricans et rugosus, intus vero subvirens lignum solidum induens durum et dilute ruffescens.

Rami eius etiam foliorum fere vice fungentes crassi sunt ac trigoni multoties in alios ramos divisi seu abeuntes et articulati, late circumquaque distenduntur, quilibet duos pedes aut pedem et semis est longus, semipedem amplius ubi ampliores in tres alas undulatas discretiis spinulis rigidis et nigricantibus ad singulos summitates undularum armatos. Hos nervus percurrit ligneus licet tota eorum substantia corii bubuli modo sit solida opuntia tandem vulgaris foliorum consistentia et colore, luxioriate nempe et laeto virore praedita.

Super ultimorum ramorum alas flores enascuntur elegantissimi ampli candidissimi monopetali quidem et tubulati, campaniformes et patentes, sed in plurima segmenta divisi duplici serie sibi invicem incumbentia. E fundo autem totius floris innumera exsurgunt stamina tenuia, candida apice etiam candido donata, inter quae prominet pistillum e calyce ipso sese exerens candidum crassiusculum et in duodecim radias pattentes in summitate divisum. Totus flos quadantenus suave olet, eiusque tubus qui carnosus crassus viridis et quibusdam squamulis foliatus tuberosus, calyci insidet eiusdem cum ipso substantia. Ille autem calyx abit deinde in fructum

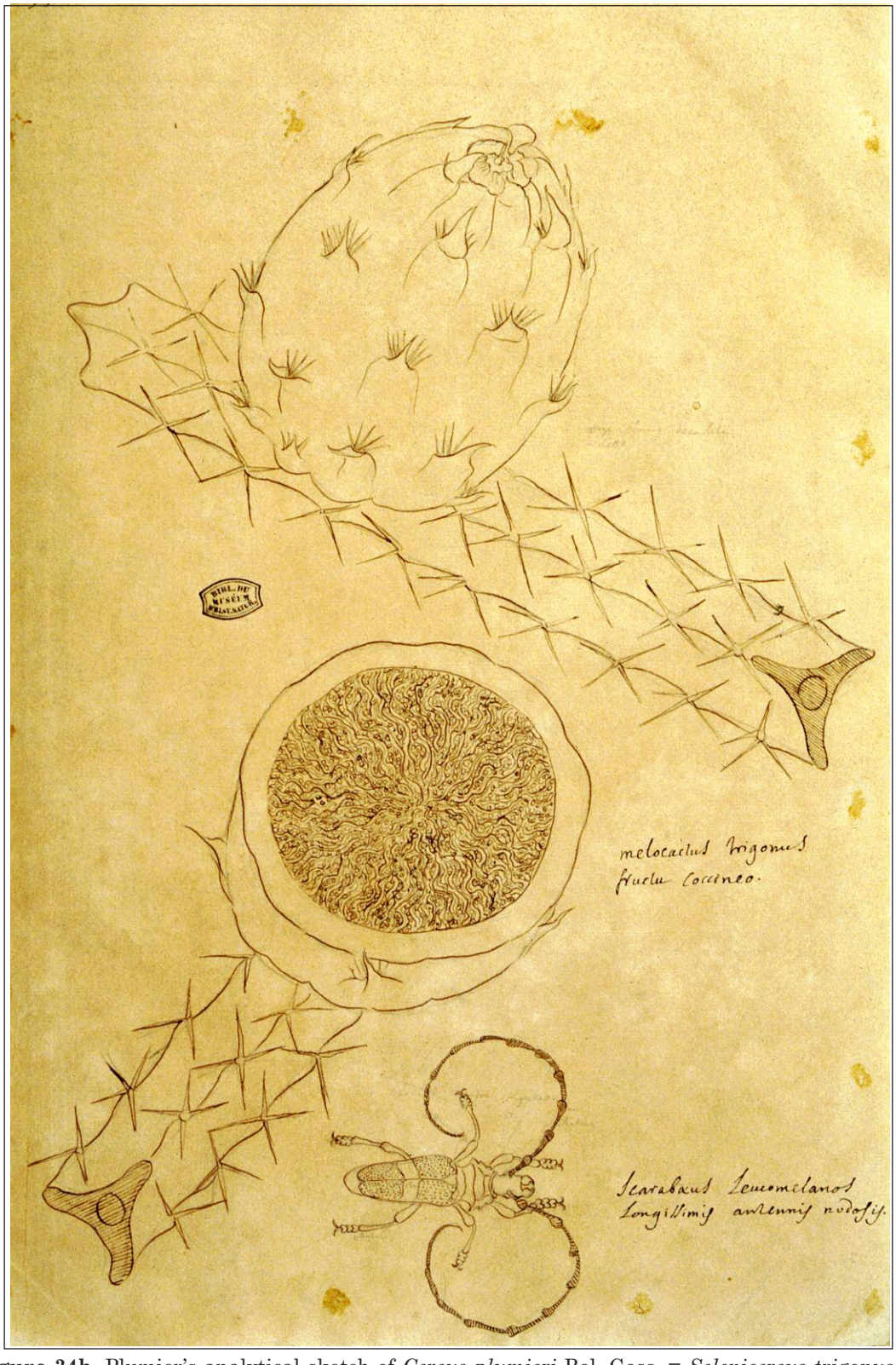


Figure 34b. Plumier's analytical sketch of *Cereus plumieri* Rol.-Goss. = *Selenicereus trigonus* (Haw.) S.Arias & N.Korokova.

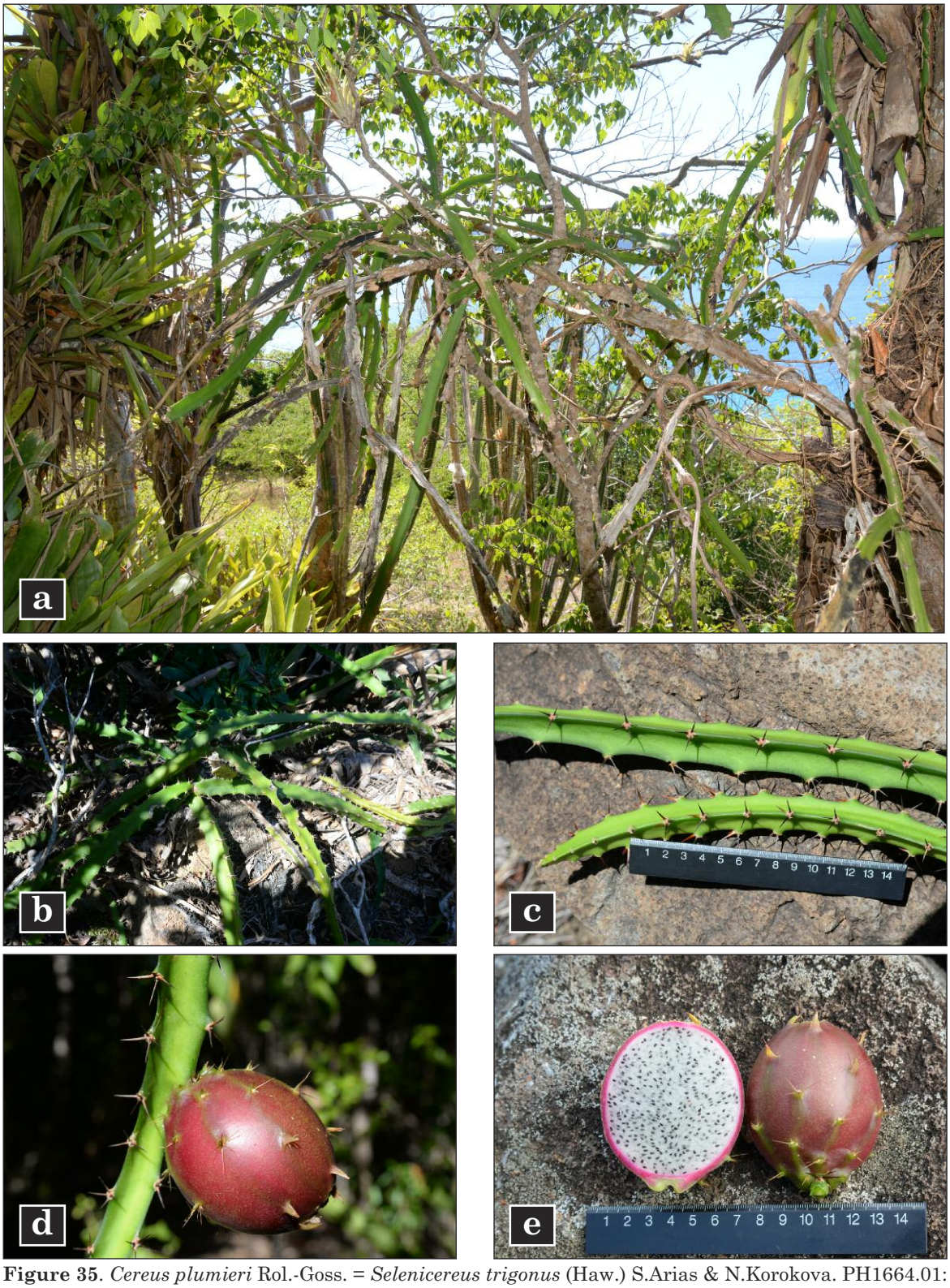


Figure 35. *Cereus plumieri* Rol.-Goss. = *Selenicereus trigonus* (Haw.) S.Arias & N.Korokova. PH1664.01: St. Vincent, Bequia, 120m. **a.** scrambling through vegetation. **b.** on tree trunk. **c.** stem detail. **d.** fruit identical to that drawn by Plumier. **e.** fruit section. Photographs: Paul Hoxey.

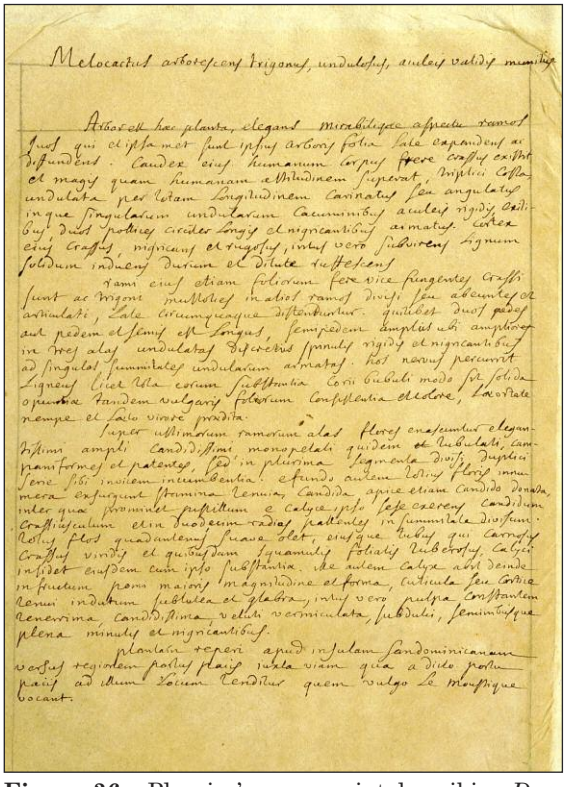


Figure 36a. Plumier's manuscript describing *Dendrocereus undulosus* (DC.) Britton & Rose

pomi maioris magnitudine et forma, cuticle seu cortice terum indatum sublutea et glabra, intus vero pulpa constantem tenerrima, candidissima, veluti vermiculata, subdulci, seminibusque plena minutis et nigricantibus.

Plantam reperi apud insulam sandominicanum versus regionem portus paiis iuxta viam qua a dicto portus paiis ad illum locum tenditur quem vulgo Le Moustique vocant.

English translation:

t.17-19 Three wavy angled tree-like Melocactus, armed with strong spines

This plant is a tree, of fine and extraordinary appearance, whose tree leaves are its very own branches expanding wide and distending. Its short trunk is as thick as a man's body and more than a man's height overall, 3-ribbed, undulate for the whole length, keeled or angled on each undulation and armed at the apex of the wavy ridges with little, rigid spines, about 2 inches long and blackish. Its epidermis is thick, blackish and rough, inside more or less green, surrounding a hard and pale reddish solid wood.

The thick branches are at the same time almost performing the function of leaves, and also the three angled branches extend further on every side by dividing into other separate and jointed branches, any of which may be 2 feet or 1½ feet long, half a foot wide where thickest, in three undulate wings, armed with spreading rigid and black spines from areoles at the top of the undulations. Its woody veins run throughout oxhide-like tissue with the firm consistency and colour of common opuntia [*Opuntia ficus-indica*] cladodes, endowed with a luxuriant and pleasing green.

The flowers emerge from the wings of the uppermost branches, large, very beautiful, pure white, truly monopetalous and tubular, bell-shaped and opening wide, but the many [perianth] segments are divided into two series lying adjacent to each other. Innumerable thin stamens emerge from the base filling the entire flower and also white throughout, with pure white anthers, between which the moderately thick pistil stands out exserted from the calyx and split at the top into 12 widely spreading lobes. The whole flower has a sweet aroma to some extent, and its tube which is fleshy, thick, green, and beset with truly tumid foliar scales, is like the tissues of the calyx [pericarpel] itself. That calyx thereafter turns into a fruit of the shape and slightly larger than an apple, with pale yellow and smooth skin or bark [pericarp] falling to the ground, inside with a uniform, very soft, very white, slightly sweet, worm-like [funicular] pulp, and filled with minute and blackish seeds.

I found the plant on the island of San Dominica [Haiti] next to the Port-aux-Paix road towards the Port-aux-Pais region, abundant at the place that is called Le Moustique locally.

Vol.3 t.17-19: 1689-90 or 1693. Melocactus arborescens trigonus, undulosus, aculeis validis munitus. [***Dendrocereus undulosus*** (DC.) Britton & Rose] (Figure 36b-d)

For the present we uphold the narrowly defined genus *Dendrocereus* with two species. Those from Cuba, first published as *Cereus nudiflorus* Engelm. ex Sauvalle (1869) appear to differ from *Cereus undulosus* DC. (1828: 467) only in its flowers (Figures 37c & 38).

De Candolle based his first description on the Burman copy of Plumier's sketches, so that is automatically the type. Its type locality is in Haiti, Dept. Nord-Ouest, Arrondissement de Port-de-Paix, and said by Plumier to be particularly abundant at the Baie des Moustiques and along the Rivière Moustique that feeds it, which is 13km west of Port-de-Paix city. It was seen by Hoxey and Gdaniec west of Port-de-Paix in 2017 (Figure 37).

Two other names are sometimes associated with this species. Lamarck (1783: 539) resurrected an old name *Cactus pitajaya* Jacq. (1760: 23) that is unidentifiable, but perhaps a superfluous renaming of *Cactus triangularis* L. He then proceeded to

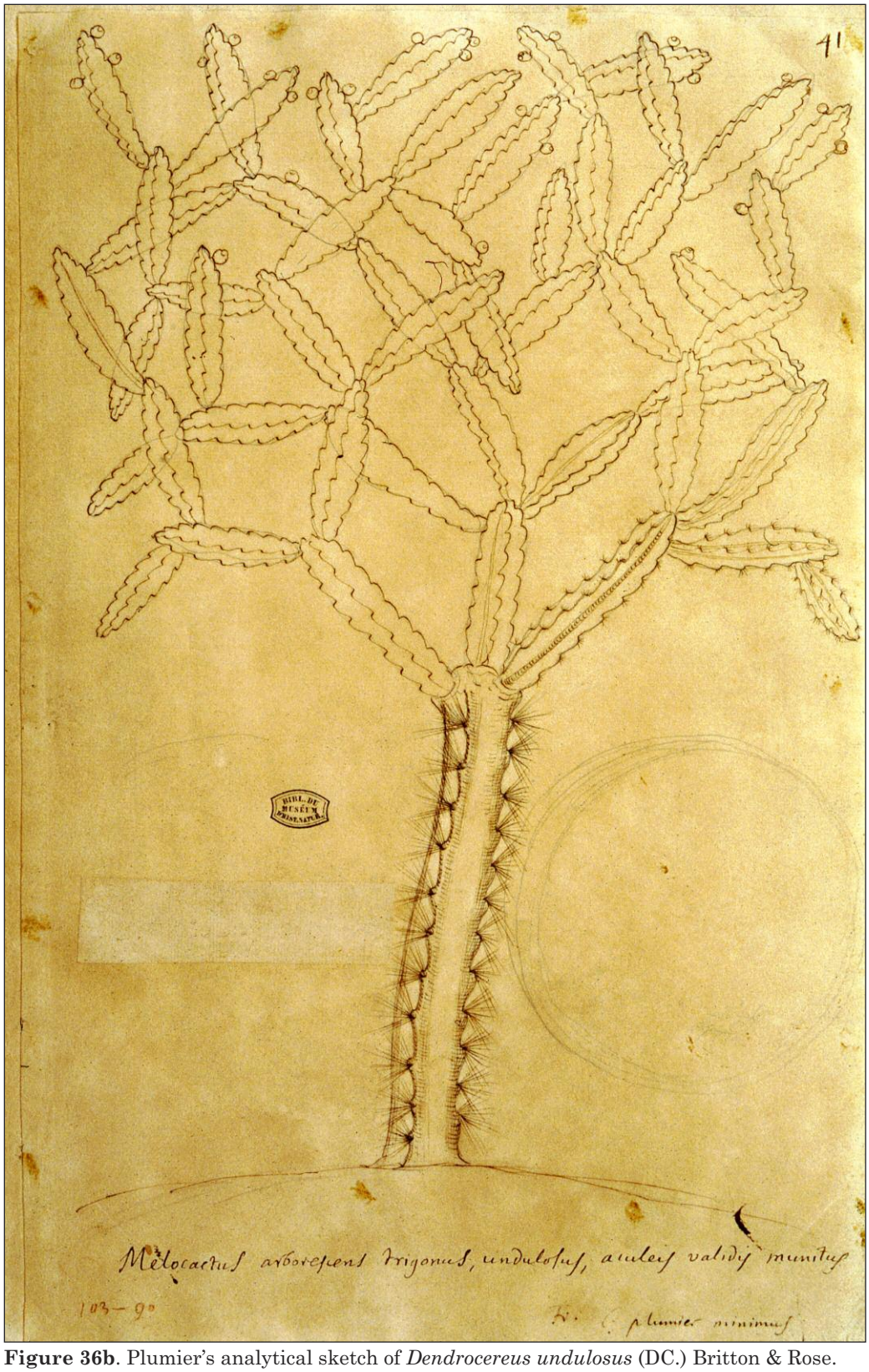


Figure 36b. Plumier's analytical sketch of *Dendrocereus undulosus* (DC.) Britton & Rose.

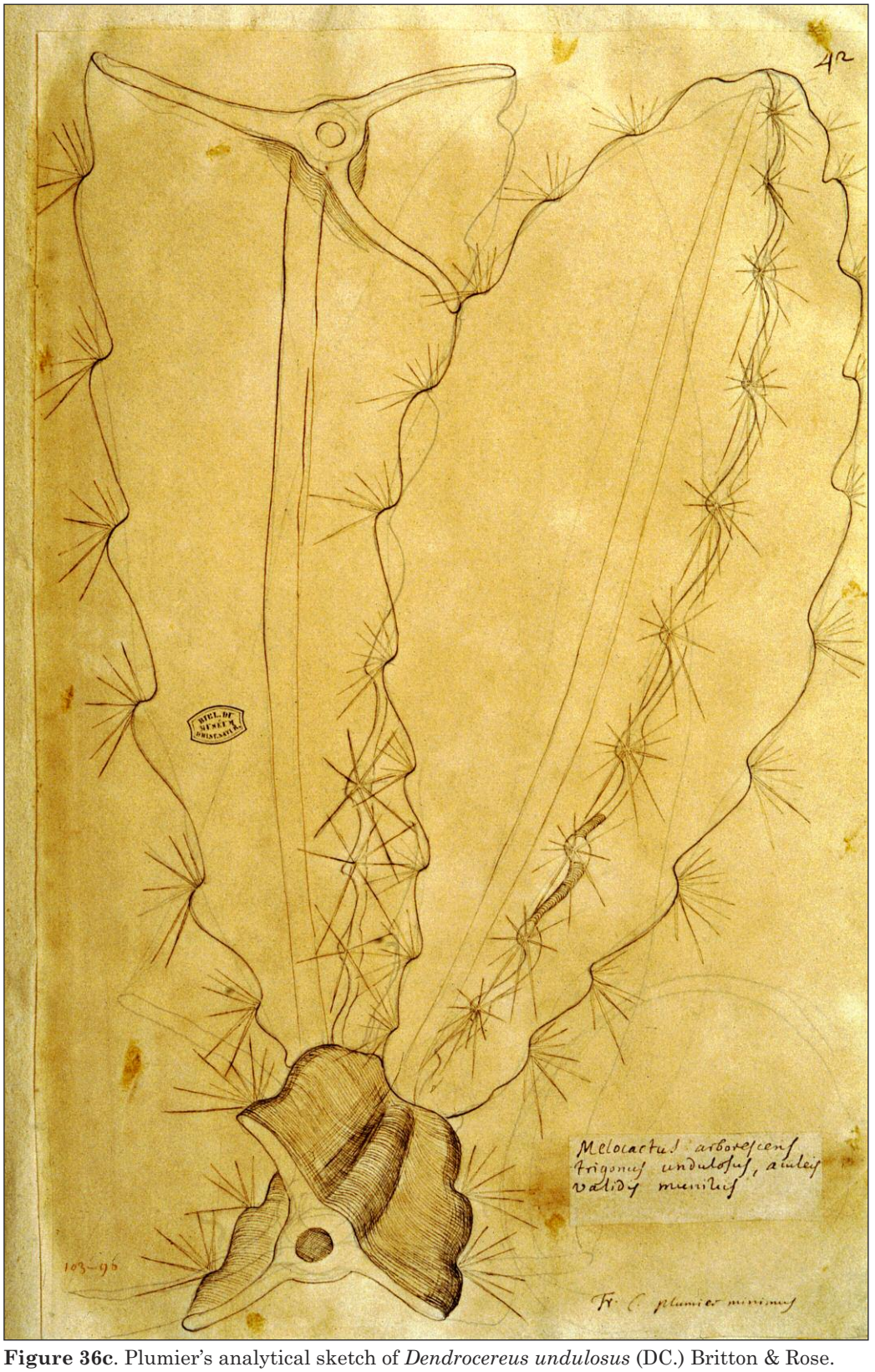


Figure 36c. Plumier's analytical sketch of *Dendrocereus undulosus* (DC.) Britton & Rose.

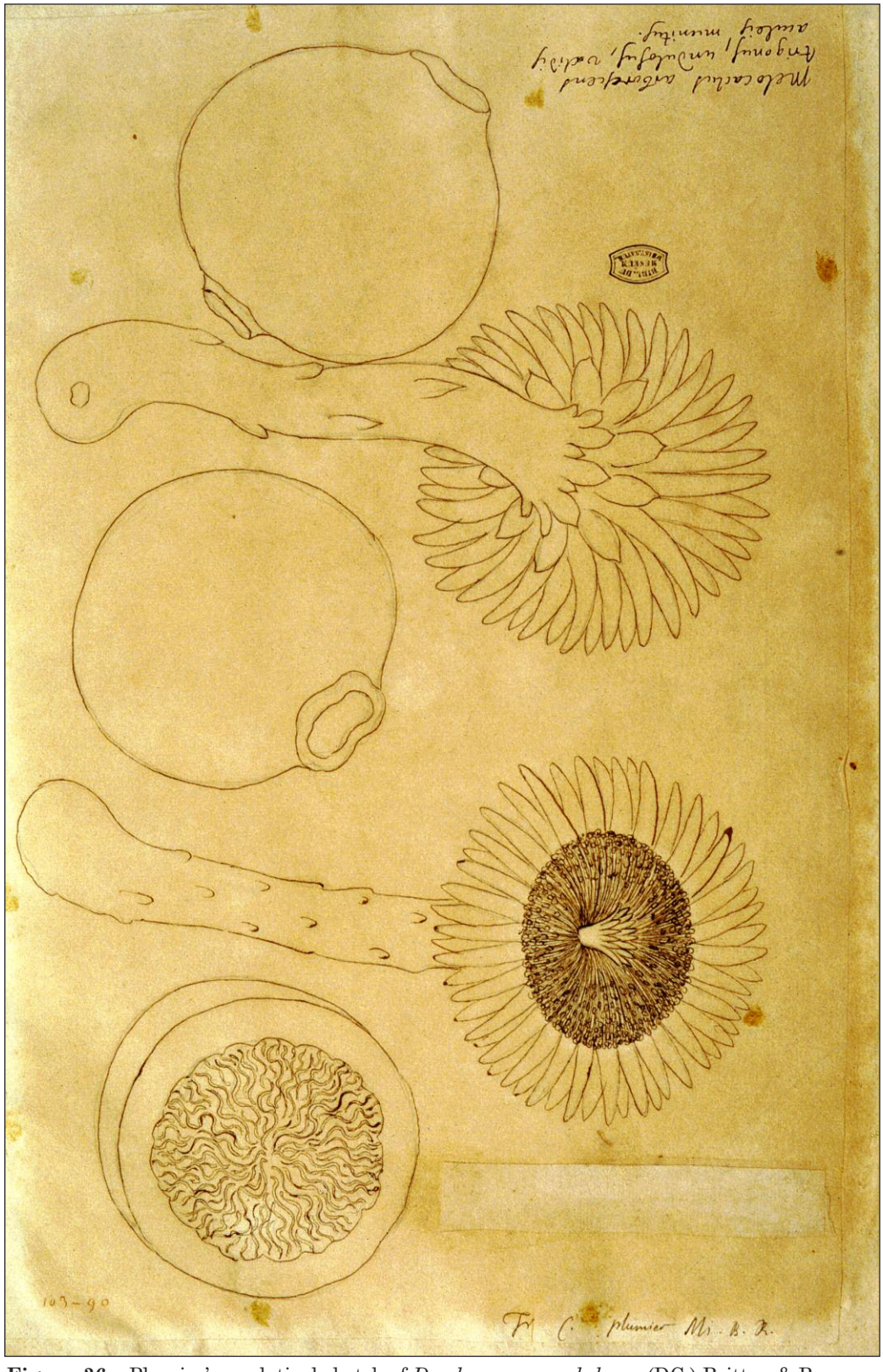


Figure 36c. Plumier's analytical sketch of *Dendrocereus undulosus* (DC.) Britton & Rose.

Figure 37a. *Dendrocereus undulosus* PH1295.01: Haiti, Nord-Ouest Dept., west of Port-de-Pais city, 30m. Mature plants growing with *Pilosocereus polygonus*, overtopping acacia and other surrounding shrubery.
Photograph: Paul Hoxey

Figure 37. *Dendrocereus undulosus* PH1295.01: Haiti, Nord-Ouest Dept., west of Port-de-Pais city, 30m.
b. reaching for the skies.
c. stem with flower bud (cf. Figure 38).
Photographs: Paul Hoxey.

classify Plumier's dendrocereus as an unnamed variety of that. Linnaeus upheld *Cactus pitajaya* Jacq. in subsequent editions of *Species plantarum*, adding the location "Carthagena" (Cartagena, N Colombia), so in that sense it could not have been a *Dendrocereus*.

The other obscure name is *Dendrocereus arboreus* used by Mauseth (1998: 33-36, 40), said to be from Dominican Republic. The name appears nowhere else, so is either an error for *Dendrocereus undulosus* or a provisional name that was never published. The article is, however, of interest in pointing out that epidermal crystal prisms are present in both *Dendrocereus* and *Neoabbottia*, which is unusual in the tribe *Cereeae* Salm-Dyck.

Burman's artist redrew only half the images left by Plumier in a single, abridged plate, t. 194, that is automatically the type of *Cereus undulosus* DC. One omission is the flower sketch in which the perianth is viewed from below that Plumier probably included because it showed the marked transition from receptacle tube to perianth that is one of the plesiomorphic characters of *Dendrocereus*, shared only with *Acanthocereus*. This is one of the reasons why some authors prefer to regard *Dendrocereus* as just an arborescent *Acanthocereus*. The nectar glands just below the tips of the tube scales are another feature that is shared with *Acanthocereus* and with *Epiphyllum* (Figure 38).

Figure 38. Flower of *Dendrocereus nudiflorus*, a specimen from Haiti. Photograph: A. Gdaniec

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Latin transcript of Plumier's Vol. 3 t.20-21 Melocactus seu opuntia arborescens tetragona flore ex albido. [***Leptocereus paniculatus*** (Lam.) D.R.Hunt] (Figure 39a)

Tota huiusve plantae facies consistentia et amplitudo facies, consistentiae et amplitudini ad amussim respondent ita ut eminus conspecta planta, eamdem diceres, sed eam si attenta consideres, deprehenditur diversa cum eius rami non trigoni ut in praecedenti sed quatuor angulis seu potius quatuor costis eminentibus alati. Flores etiam et fructus diversos repertes. Hi etenim pene ovati sunt ovo anserino paulo maiores flavescentes tuberculis quibusdam rubentibus, et spinulis tenuibus in umbilico instructis, veluti squamati. Caro tamen eorum tenerrima est candidissima acidula, innumerisque seminibus e nigro castaneis plena.

Flores tandem monopetali non sunt neque ampli, sed rosacei plurimis scilicet petalis in orbem positis et duplici serie ordinalis constantes. Interioris ordinis petala fere obrotunda sunt ungulum indicis vix superantia, paulisper sinuata, candidissima venulis seu lineolis quibusdam ruberrimis distincta. Exterioris vero his equidem conformia nullatenus tamen sinuata et laeto virore praedita. Calyx eorum coronatus longus tubulatus pollicem fere crassus totusque virens et tumentibus quibusdam eminentiis in summitate spinulas gerentibus veluti striatus. Tota eius interior superficies innumeris staminulis candidis apices etiam candidos gerentibus instructur, pistillumque e fundo demissit longiusculum infundibuliformum candidum inque multos acuminatos apices in summitate dissectum ac veluti fimbriatum. Calycis demum inferior pars instructum evadit tam dictum, in ipso umbilico coronatum.

Septembri plantam observavi florentem ac fructus etiam maturos ferentem in locis quibusdam incultis insulae san dominicana versus illam regionem quae vulgo le cul de sac nominatur.

English translation:
t.20-21 Tree-like 4-angled melocactus or opuntia with whitish flower

The appearance of the form and size of the whole plant, viewed from a distance corresponds exactly with the form and size of the plant that has been [previously] depicted [*Dendrocereus*], but if we look closer, it is noticeably different with its branches not triangular as in the preceding [*Dendrocereus*] but 4-angled or perhaps better 4-ribbed with projecting wings. The flowers and fruits are found to differ as well. These [fruits] are indeed almost ovate, slightly larger than a goose egg,

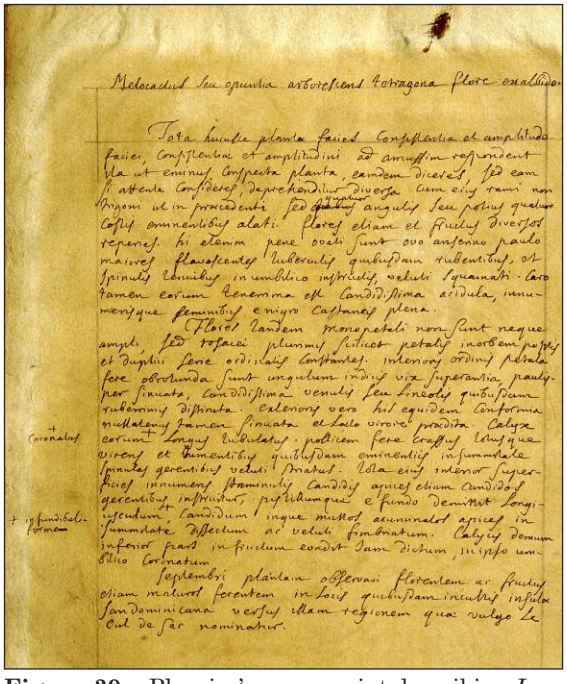


Figure 39a. Plumier's manuscript describing *Leptocereus paniculatus* (Lam.) D.R.Hunt.

covered with yellowish becoming reddish podaria with small spines in the areoles, as well as scales. Its slightly sour flesh is however very soft and very white, and filled with innumerable dark chestnut brown seeds.

The flowers are neither eventually monopetalous nor large, but the rosulate petals are arranged on a circle and in two series side by side [petals & sepals]. Petals of the innermost rank are hoof-shaped, sparingly tipped with indigo, short and wavy, very white, some marked with fine very red veins or lines. The exterior [segments] are indeed similar to these, however not always wavy and a bright green. Its garlanded calyx is a small elongated tube one inch thick, and is entirely green and just as ridged with somewhat swollen podaria bearing small spines at their top. The top of its interior is entirely filled with innumerable little white stamens, topped with equally white anthers, and a white pistil emerging from the base of the somewhat elongated funnel, and further divided at the top into many sharp pointed and somewhat laciniate stigma lobes. Later the lower part of the calyx grows to such a degree that it brings the said [stigma] into the centre of the garland [of stamens].

I have observed the plant flowering and also still bearing mature fruit in September in certain uncultivated places of the island of San Dominica [Haiti] in the direction of that area commonly called Le Cul de Sac.

Vol.3 t.20-21: **Melocactus seu opuntia arborescens tetragona flore exalbido.** [***Leptocereus paniculatus*** (Lam.) D.R.Hunt] (Figure 39b-c)

Linnaeus must have seen the Burman copy, but did not comment anywhere.

Plumier's account became the basis for Lamarck's name *Cactus paniculatus* (1785: 540). It was one of few such names published by Lamarck where he explicitly referred to Plumier's original manuscript: "*Plum. Mss.*" Thus the original drawings are eligible for lectotypification as well as Burman's copy in t.192, an abridged composite of the two Plumier plates. Consequently, Mottram (2002: 90) chose the informative Plumier's t.21 to act as the lectotype. Hunt (2006: 143) appeared to indicate that he had already nominated t.20 as the lectotype in his earlier article (1984: 39), but no such designation could be found there.

Britton & Rose erected a new genus, *Neoabbottia*, for this species (1921). W. L. Abbott and E. C. Leonard explored Haiti in April 1920, and were commissioned by Britton and Rose to gather any cacti they encountered. They saw many species, and among them found *Leptocereus paniculatus* at Plumier's locality on the Cul-de-Sac, the area extending from Port-au-Prince bay westwards to Lake Saumâtre. They found flowers and fruits, which all appear from terminal cephalia at the very tips of the branches, while Plumier depicted them arising both from the tips or near to the tips, which seems to be an error and renders t.20 less suitable as a lectotype.

Hoxey and Gdaniec found it in fruit west of Port-au-Prince in early 2017 (Figure 40), near its type locality.

There seems to be little justification for distinguishing the genus *Neoabbottia* from *Leptocereus* purely on grounds of stature.

Latin transcript of Plumier's Vol. 3 t.22 Opuntia arbor excelsa, cereiformis, flore albo [***Pilosocereus polygonus*** (Lam.) Byles & G.D.Rowley] (Figure 41a)

Trunco assurgit haec planta recto, paulo magis interdum semipedem crasso, decem circiter pedes alto, rotundo equidem sed decem aut duodecim sulcis profundis undulosis etin undularum cacuminibus spinulis multis brevibus et radiatis, instructis, striato. Cortex eius cinereus crassus et tener, contegens signum solidum et quasi duritiem quercinam adaquans, medulla tamen ampla succulenta et virenti praeditum.

E summo trunco rami sursum elevantur, virentes longi, recta assurgentes, paulo magis quam humanum brachium crassi etiam novem aut decem angulis prominentibus canaliculati. Substantia eorum satis tenera, in que ramos alios distenduntur similis naturae et consistentiae tecta

Figure 39b. Plumier's analytical sketch of *Leptocereus paniculatus* (Lam.) D.R.Hunt.

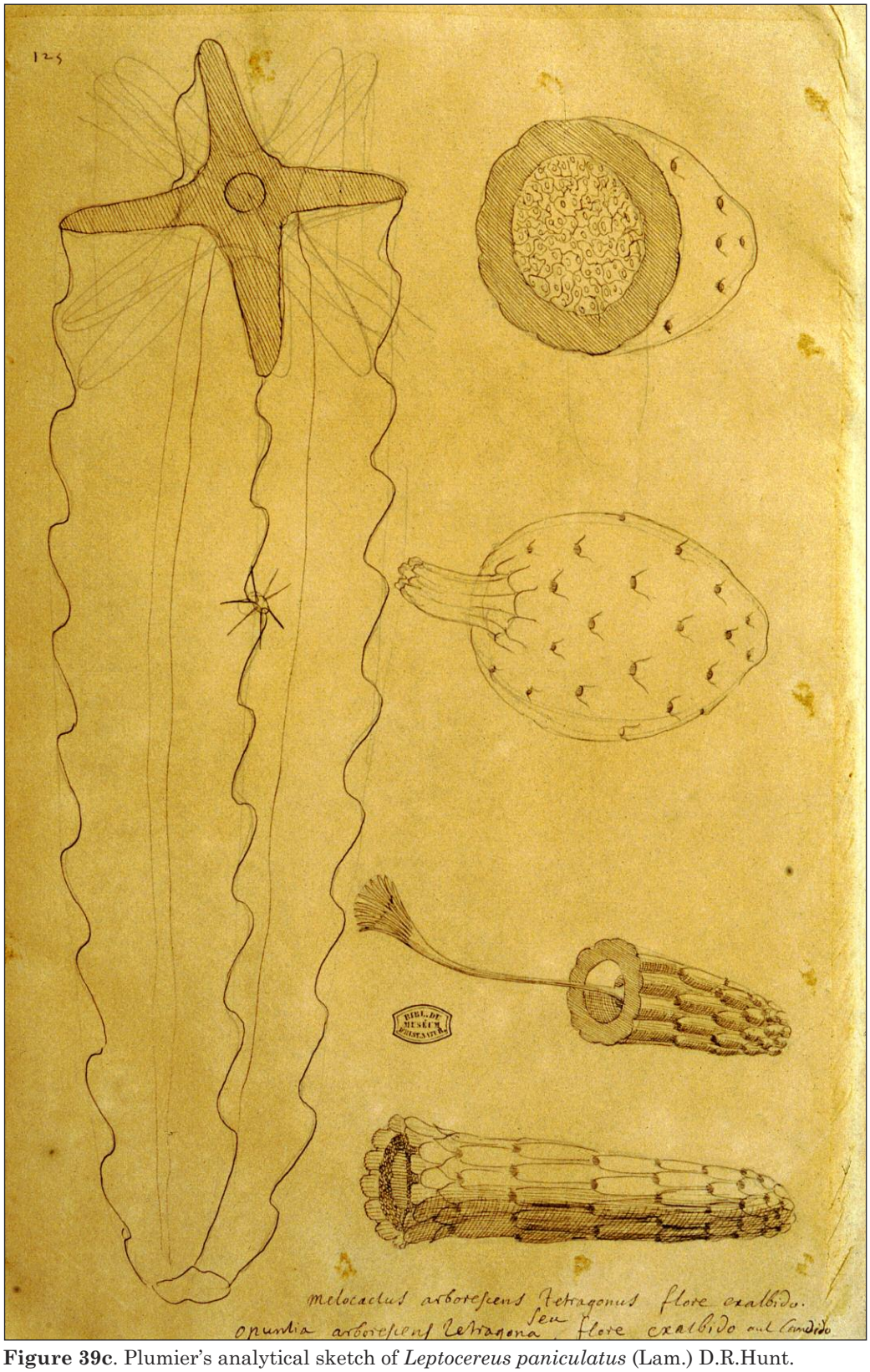


Figure 39c. Plumier's analytical sketch of *Leptocereus paniculatus* (Lam.) D.R.Hunt.

Figure 40. *Leptocereus paniculatus* PH1308.01: Haiti, Plaine du Cul-de-Sac, west side of Étang Saumâtre, 40m. Near the type locality, west of Port-au-Prince.
a. Mature plant dominating the landscape. Photograph: Paul Hoxey

Figure 40.
b. Paul Hoxey beside a 4m high plant.
c. Fruit section 5cm. long, 4.5cm. diameter.
Photographs: Paul Hoxey.

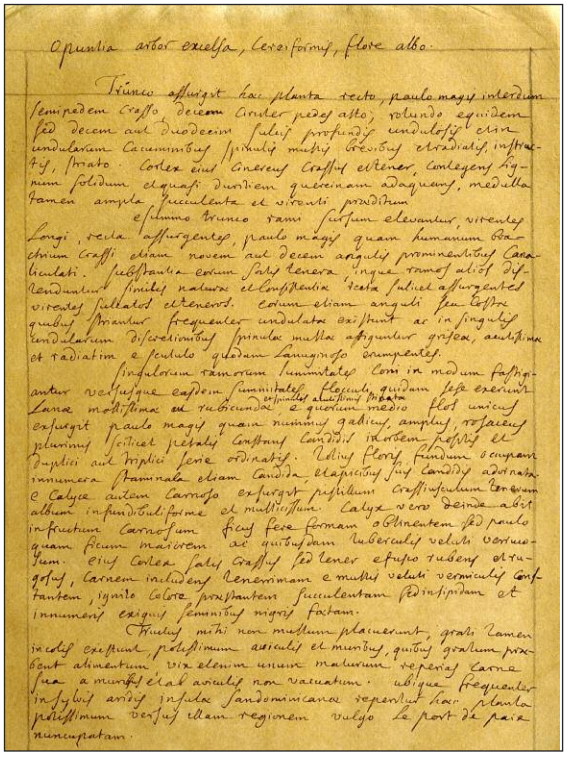


Figure 41a. Plumier's manuscript describing *Pilosocereus polygonus* (Lam.) Byles & G.D.Rowley.

silicet assurgentes virentes sulcatos et teneros. Eorum etiam anguli seu costae quibus striantur frequenter undulatae existunt ac in singulis undularum discretionibus spinulae multae assiguntur griseae, acutissimae et radiatim, e scutulo quodam lanuginoso erumpentes.

Singulorum ramorum summitates coni in modum fastigiantur versusque easdem summitates flocculi quidam sese exerunt lana mollissimae et rubicundae et spinulis acutissimis stipata, e quorum medio flos unicus exsurgit paulo magis quam minimus gallicus, amplus, rosaceus plurimus scilicet petalis constans candidis in orbem positis et duplici aut triplici serie ordinatis. Totius floris fundum occupant innumera staminata etiam candida et apicibus suis candidis adornata. E calyce autem carnoso exsurgit pistillum crassiusculum tenerum album infundibuliforme et multicissum. Calyx vero deinde abit instructum carnosum ficus fere formam obtinentem sed paulo quam ficum maiorem ac quibusdam tuberculis veluti verrucosum. Eius cortex latus crassus sed tener e fusco rubens et rugosus, carnem includens tenerrimam e multis veluti vermiculis constantem, ignito colore praestantem succulentam sed insipidem et innumeris exiguis seminibus nigris faetam.

Fructus mihi non multum placuerunt, grati tamen in colis existunt potissimum aviculis et muribus, quibus gratum praebent alimentum via etenim unum maturum reperias carne sua a muribus et ab aviculis non vacuatum. Ubique frequenter in sylvis aridus insulae sandominicana repentur haec planta potissimum versus illam regionem vulgo le port de paix nuncupatam.

English translation:
t.22 Tall tree opuntia, cereus-like, with white flower

This plant grows with a straight trunk, often slightly over half a foot thick, about 10 feet high, truly cylindrical, ribbed, but with 10-12 deep undulate furrows, and bearing many short and spreading small spines at the apex of the undulations. Its ashy epidermis is thick and soft, concealing a solid core [vascular bundle] and with a sort of hardness that equals oak, yet enclosed within an abundance of succulent and green pith [parenchyma].

Upturned branches sprout from the top of the trunk, a substantial length, growing erect, slightly more than the thickness of a man's arm, and also channelled into 9 or 10 prominent angles. These sprout other branches of a similar nature and consistency with a quite soft-stemmed texture, evidently growing strongly, and the outer layers uniformly ribbed. Also its angles or ribs, which are [transversely] furrowed, often develop podaria and are also beset with many small separate grey spines in each undulation, very acute and spreading, arising from a kind of little downy scutulum [areole]. The apices of each branch are topped with a sort of cone and below these apices themselves certain little tufts appear of very soft and reddish pink wool and are surrounded by very acute small spines, from the centre of which a solitary flower emerges, a little bigger than a small hen's egg, large, rose-like, with numerous prominent white petals arranged in 2 or 3 ranks side by side on a [throat-]circle. Innumerable white stamens occupy the base of all flowers, and adorned white at their apices [anthers]. Moreover, a moderately thick, soft, white pistil arises from the fleshy, funnelform and splendid calyx. Thereafter the true calyx [ovary] swells to form a fleshy fig, almost the same shape but a little larger than [an actual] fig and also with equally warty podaria. It is broad with a thick but soft deep reddish brown and wrinkled epidermis [pericarp], the inner flesh very soft, consisting of many little worm-like structures [funicles], outstanding for its fiery colour but tasteless and spoiled by the innumerable black seeds.

The fruits are not to my pleasure, but nevertheless they are grown in plantations, evidently appreciated by small birds and mice, where they provide welcome food on a journey [if] you find one ripe that has not been cleared of its

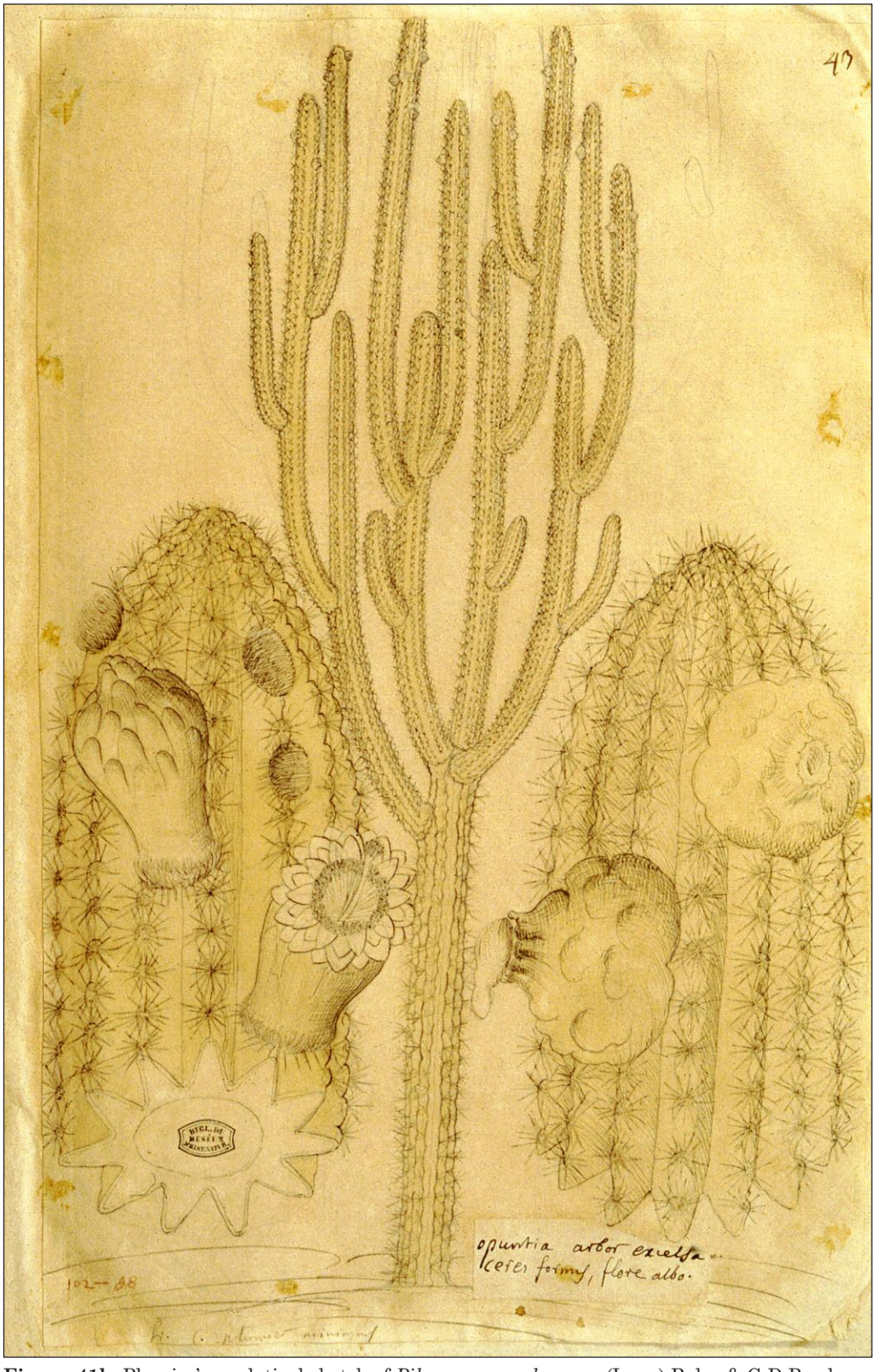


Figure 41b. Plumier's analytical sketch of *Pilosocereus polygonus* (Lam.) Byles & G.D.Rowley.

Figure 42. *Pilosocereus polygonus* PH1295.03: Haiti, Dept. Nord-Ouest, Arrondissement de Port-de-Paix, west of Port-de-Paix, 30m **a.** typical growth habit at the type locality matching that of Plumier's drawing. **b.** Fruiting stem at the type locality. Photographs: Paul Hoxey.

flesh by mice or small birds. I found this plant abundant everywhere, chiefly in the dry woods of the island of San Dominica [Haiti] towards that region commonly called Le Port de Paix.

Vol.3 t.22: **Opuntia arbor excelsa, cereiformis, flore albo.** [***Pilosocereus polygonus*** (Lam.) Byles & G.D.Rowley] (Figure 41b)

The plate copied by Boerhaave's artist in Burman (1758: t.196) has omitted a branch tip with fruits. Lamarck cited the original manuscript as well as Burman's copy, so lectotypification was required. Zappi (1994: 149) designated: "Plumier, Botanicum Americanum, ill. (see Hunt (1984: 56, t.15)." which is a reference to the Kew copy, which Lamarck neither cited nor saw. Moreover, there was also an error in the Hunt reference where he cited Plumier t.88 instead of t.22.

Just to be clear, the correct lectotype is:

Cactus polygonus Lam. Lectotype (designated Mottram, *Bradleya* **20**: 90):

Haiti, Dept. Nord-Ouest, Arrondissement de Port-de-Paix, near Port-de-Paix; Opuntia arbor excelsa, cereiformis, flore albo. Plum., *Botanicum Americanum* **3** t.22. 1689-1697.

Plumier's locality is thus also the type locality of *Pilosocereus polygonus* (Lam.) Byles & G.D.Rowley, just west of Port-de-Paix, where Hoxey and Gdaniec again found it in early 2017 (Figure 42) growing with *Dendrocereus undulosus*, but also report it being widespread thoughout coastal Hispaniola (Figure 43).

Latin transcript of Plumier's Vol. 3 t.23-24 Melocactus cereiformis spinosissimus ramosissimus fructu aureo [*Harrisia divaricata* (Lam.) Backeb.] (Figure 44a)

Huiusve planta truncus paulo magis quam tibiam humanam crassus tres aut quatuor pedes altus, rectus, subis multis et rectis striatus, subvirens, satis durus innumerisque aculeis subtilibus rectis et radiatis horridus. Ex ipso plurimi elevantur rami plurimos alios ramos emittentes nunc supra nunc infra inordinato modo vergentes, et omnes rectos longos striatos, virentes, teneros, infestimissimisque spinulis per totam striarum seu copiarum longitudinem armatos. Eorum etiam summitas in conum desinit versusque eamdem summitatem flores quidam prominens quos sane nusquam potui observare. Unde an

Figure 43. *Pilosocereus polygonus* PH1307.01: Haiti, Dept. Ouest, West side of Étang Saumâtre, north of Ganthier, 100m, 20 Jan 2017. Flowering stem. Photograph: Paul Hoxey

planta melocactus sit an opuntia dubito, inter melocactus tamen recensui pro per praecedentium conformitatem.

Calyx tandem floris infructum avadit carnosum fere globosum, pugno paulo maiorem, totum tuberculatis verucosum singulisque acuminatis ad singula tuberculata instructum. Cortex eius satis tener, coris modo crassus e croceo aureus, pulpam tamen includeris tenerrimam candidissimam, subdoliam innumerisque seminibus exiguus et calicis faetam.

Plantam reperi per quaedam sylvestria loca insula San Dominicana versus illam regionem quae vulgo Le Grand Cul de Sac appellatur, regioni Leogana vicinam.

English translation:

t.23–24 Cereiform, very spiny & very branched Melocactus, with golden fruit

The trunk of this plant is little more than the thickness of a human tibia, 3-4 feet high, straight, with much cork and with straight ribs, more or less green, with moderately hard and numerous unpleasant fine, straight and radiating spines.

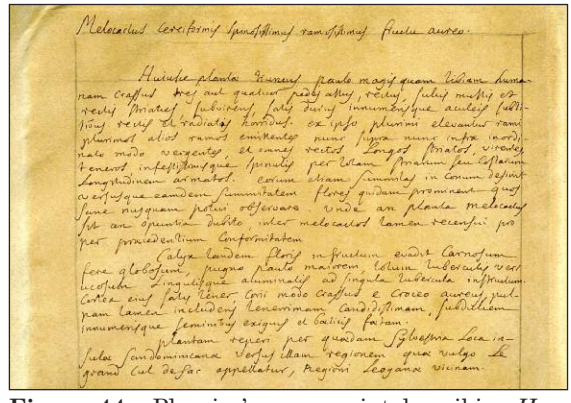


Figure 44a. Plumier's manuscript describing *Harrisia divaricata* (Lam.) Backeb.

From this stem arise many branches of a different nature, some growing directed upwards and some between in all directions, and all bearing straight, longitudinal and green ribs, and armed with very sharp little spines throughout and abundantly along the entire length of the ribs. These [branches] also end at the top in a cone and below these apices flowers appear that I was unable to observe [out of season]. I have doubts whether the plant should be a melocactus or an opuntia, however melocactus conforms with earlier arrangements.

The flower calyx eventually becomes a fleshy globose fruit, lengthening a little with age, entirely covered with tubercles and each prominance tapers to a point. Its pericarp is agreeably soft, but thick-skinned and of a golden saffron yellow, while the pulp within is very soft and pure white, yet spoiled by the innumerable small cryptic seeds shaped like a goblet.

I found the plant in some woody places on the island of San Dominica [Haiti] in the direction of that place commonly called Le Grand Cul de Sac, in the neighbourhood of [Port] Leogane.

Vol.3 t.23–24: **Melocactus cereiformis, spinosissimus, ramosissimus, fructu aureo tuberoso.** [***Harrisia divaricata*** (Lam.) Backeb.] (Figure 44b–c)

Lamarck (1783: 540) based his name *Cactus divaricatus* on Plumier's manuscript accompanying t.23-24, and also cited Burman's plate (t.193), copied in part as a composite of Plumier's two plates. The name reflects the randomly divergent nature of the branches. Plumier was unable to observe the flowers because they were finished at the time he was there, and this accounts for the inaccuracy of their depiction in t.23. There is also a question mark on whether t.23 was actually of *Cereus haitiensis*, with which it grew in places: see notes under t.26.

A lectotype of *Cactus divaricatus* Lam. was first designated by Lourteig (1991: 407, as "MSS 23 et

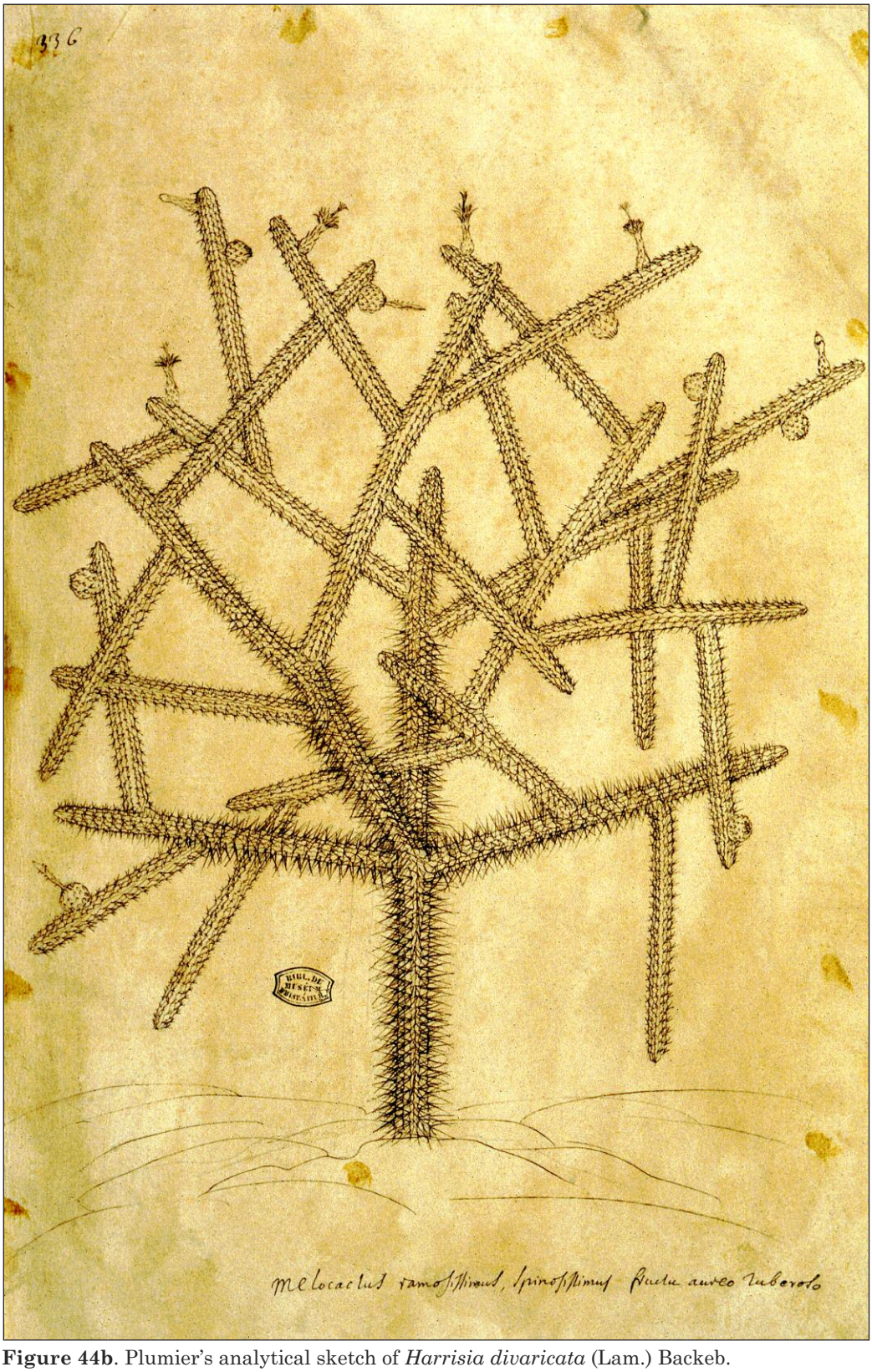


Figure 44b. Plumier's analytical sketch of *Harrisia divaricata* (Lam.) Backeb.

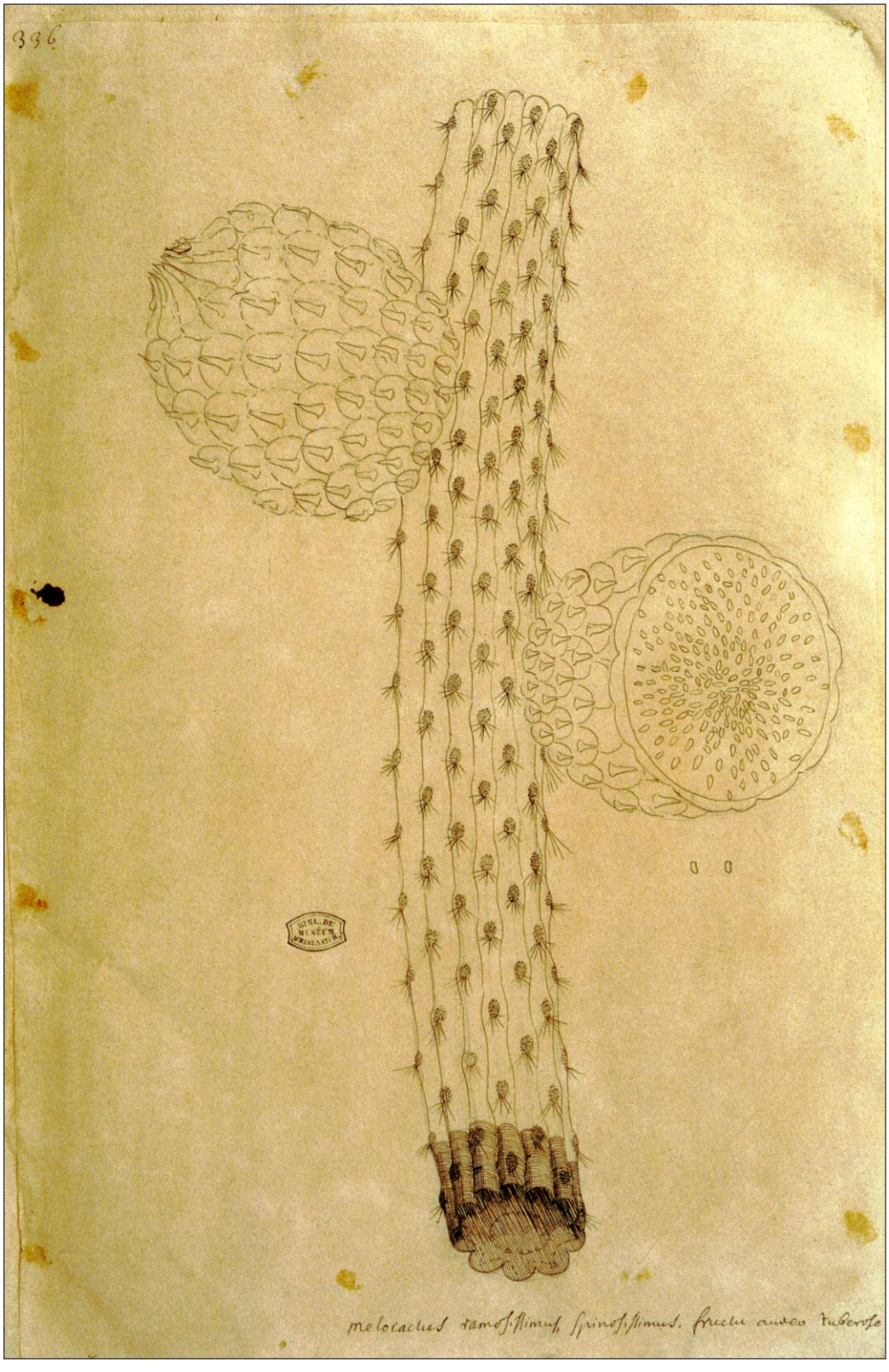


Figure 44c .Plumier's analytical sketch of *Harrisia divaricata* (Lam.) Backeb.

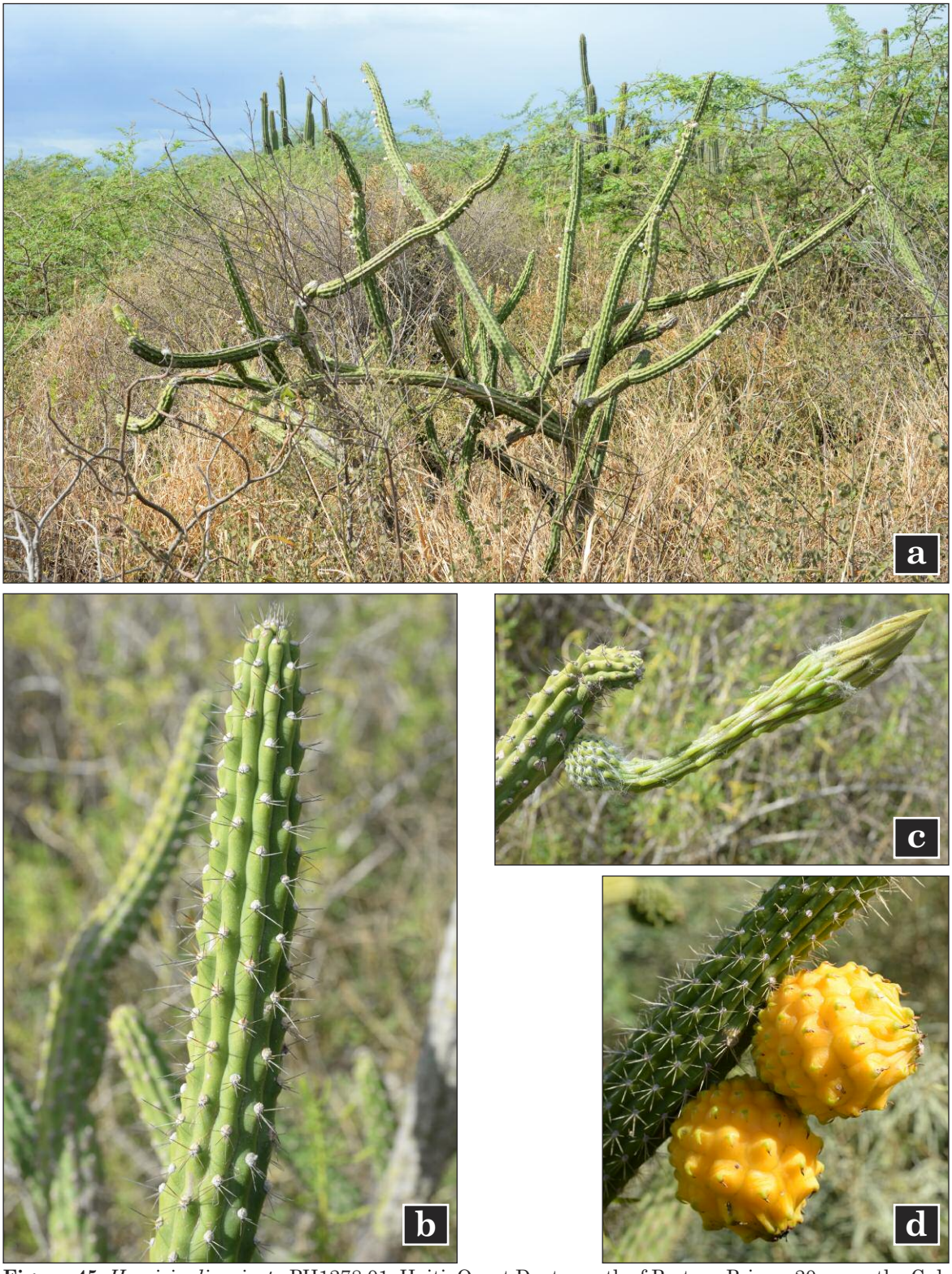


Figure 45. *Harrisia divaricata* PH1278.01: Haiti, Ouest Dept., north of Port-au-Prince, 20m., on the Cul-de-Sac, near the type locality **a.** the typical habit of growth. **b.** stem detail. **c.** flower bud. **d.** PH1292: Môle St. Nicolas, 60m, in fruit. Photographs: Paul Hoxey.

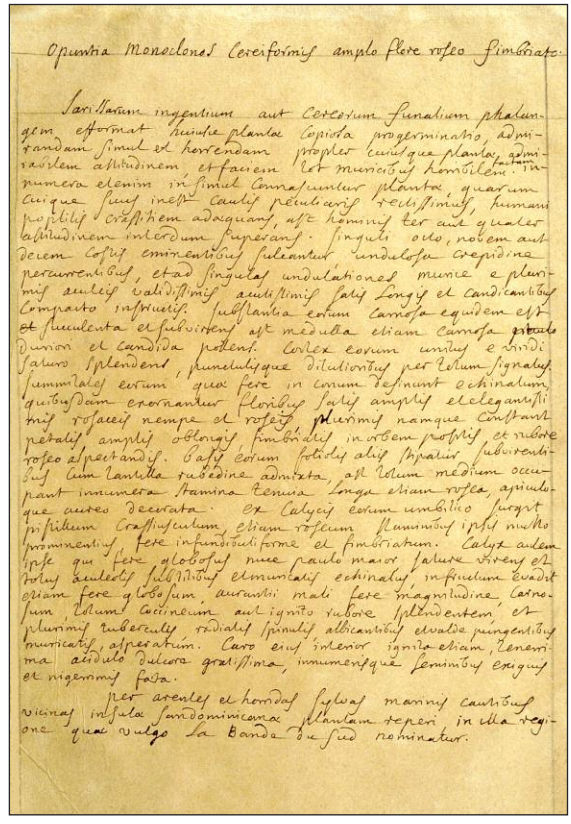
24"), and a second step selection (Art. 9.17) was made by Mottram (2002: 90, as "pl. 24"), because the two plates are almost certainly not the same gathering. Plate 24 shows the rather unique, very strongly tuberculate fruit that is quite diagnostic for this species, while the flowers on plate 23 must have been only guesswork and inaccurate.

Britton & Rose (1920: 151) dismissed Burman's t.193 and Lamarck's description as "cannot be certainly associated with any known cactus", and they used instead Britton's own name for it, *Harrisia nashii*. Hunt (1984: 42) reinstated the correct name, but then (2006: 137) subsumed it under *Harrisia gracilis*, a Jamaican species, to which it is certainly closely related but perhaps not identical.

The type locality is on the Cul-de-Sac, at Port Leogane, where Hoxey and Gdaniec also found it in early 2017 (Figure 45). Hoxey observed that the species is widespread throughout Haiti, while Moscosco (1941: 25–26) recorded it as also abundant in the Dominican Republic.

Latin transcript of Plumier's Vol. 3 t.25 Opuntia monoclonos cereiformis amplo flore roseo fimbriato [***Stenocereus heptagonus*** (L.) Mottram] (Figure 46a)

Sarissarum ingentium aut cereorum funalium phalangem efformat huiusve plantae copiosa progerminatio, admirandam simul et horrendam propter cuiusque plantae admirabilem altitudinem et faciem tot muricibus horribilem factam. Innumera etenim in simul connascuntur plantae quarum cuique suis inest caulis peculiaris rectissimus, humani poplitis crassisiem adaequans, ast hominis ter aut quarter altitudinem interdum superans. Singuli octo, novem aut decem costis eminentibus subeantur undulosa crepidina percurrentibus, etad singulas undulationes murice e plurimis aculeis validissimis acutissimis satis longis et candicantibus compacto instructis. Substantia eorum carnosa equidem est et succulenta et subvirens ast medulla etiam carnosa extento duriori et candida postens. Cortex eorum unitus e viridi saturo splendens, punctulisque dilutionibus per totum signatus. Summitates eorum quae fere in conum desinunt echinatum, quibusdam exornantur floribus satis amplis et elegantissimis rosaceis nempe et roseis plurimus namque constans petalis amplis oblongis fimbriatis in orbem positis et rubore roseo aspectandis. Calis eorum foliolis aliis stipatur subvirentibus cum tantilla rubidine admixta, ast totum medium occupant innumera stamina tenuia longa etiam rosea, apiculoque aureo decorata. Ex calycis eorum umbilico surgit pistillum crassiusculum, etiam roseum fluminibus ipsis multo prominentius, fere infundibuliforme et fimbriatum. Calyx autem ipse qui fere globosus nuce paulo maior sature virens et


Opuntia Monoclonos Cereiformis amplo flore roseo fimbriato.

Sarissarum ingentium aut Cereorum funalium phalangem efformat huiusve plantae copiosa progerminatio, admirandam simul et horrendam propter cuiusque plantae admirabilem altitudinem, et faciem tot muricibus horribilem. Innumera etenim in simul connascuntur plantae quarum cuique suis inest caulis peculiaris rectissimus, humani poplitis crassitiem adaequans, ast hominis ter aut quater altitudinem interdum superans. Singuli octo, novem aut decem costis eminentibus subeantur undulosa crepidine percurrentibus, etad singulas undulationes murice e plurimis aculeis validissimis acutissimis satis longis et candicantibus compacto instructis. Substantia eorum carnosa equidem est et succulenta et subvirens ast medulla etiam carnosa extento duriori et candida postens. Cortex eorum unitus e viridi saturo splendens, punctulisque dilutionibus per totum signatus. Summitates eorum quae fere in conum desinunt echinatum, quibusdam exornantur floribus satis amplis et elegantissimis rosaceis nempe et roseis plurimus namque constans petalis amplis oblongis fimbriatis in orbem positis et rubore roseo aspectandis. Calis eorum foliolis aliis stipatur subvirentibus cum tantilla rubidine admixta, ast totum medium occupant innumera stamina tenuia longa etiam rosea, apiculoque aureo decorata. Ex calycis eorum umbilico surgit pistillum Crassiusculum, etiam roseum fluminibus ipsis multo prominentius, fere infundibuliforme et fimbriatum. Calyx autem ipse qui fere globosus nuce paulo maior sature virens et totus aculeolis subtilibus et muricatis echinatus, infructum evadit etiam fere globosum, aurantii mali fere magnitudine carnosum totum coccineum aut ignito rubore splendentem, et plurimis tuberculis, radiatis spinulis, albicantibus et valde pungentibus muricatis, asperatum. Caro eius interior ignita etiam, tenerrima acidulo dulcora gratissima innumerisque seminibus exiguis et nigerrimis faeta.

Per arentes et horridas sylvas marinis caulibus vicinas insulae sandominicanae plantam reperi, in illa regione quae vulgo La Bande du Sud nominatur.

Figure 46a. Plumier's manuscript describing *Stenocereus heptagonus* (L.) Mottram.

English translation:
t.25 Single cereiform opuntia with a large pink fimbriated flower

The plentiful primary shoots of this plant or cereus produce enormous sarissas [sarissa: a long Macedonian lance], and the remarkable and admirable size of these plants with so much muricate spination is both splendid and at the same time frightful. For indeed countless plant stems were growing together simultaneously rising from their strange, very straight trunk, matching the thickness of a man's knee ham, moreover sometimes for more than 3 or 4 times a man's

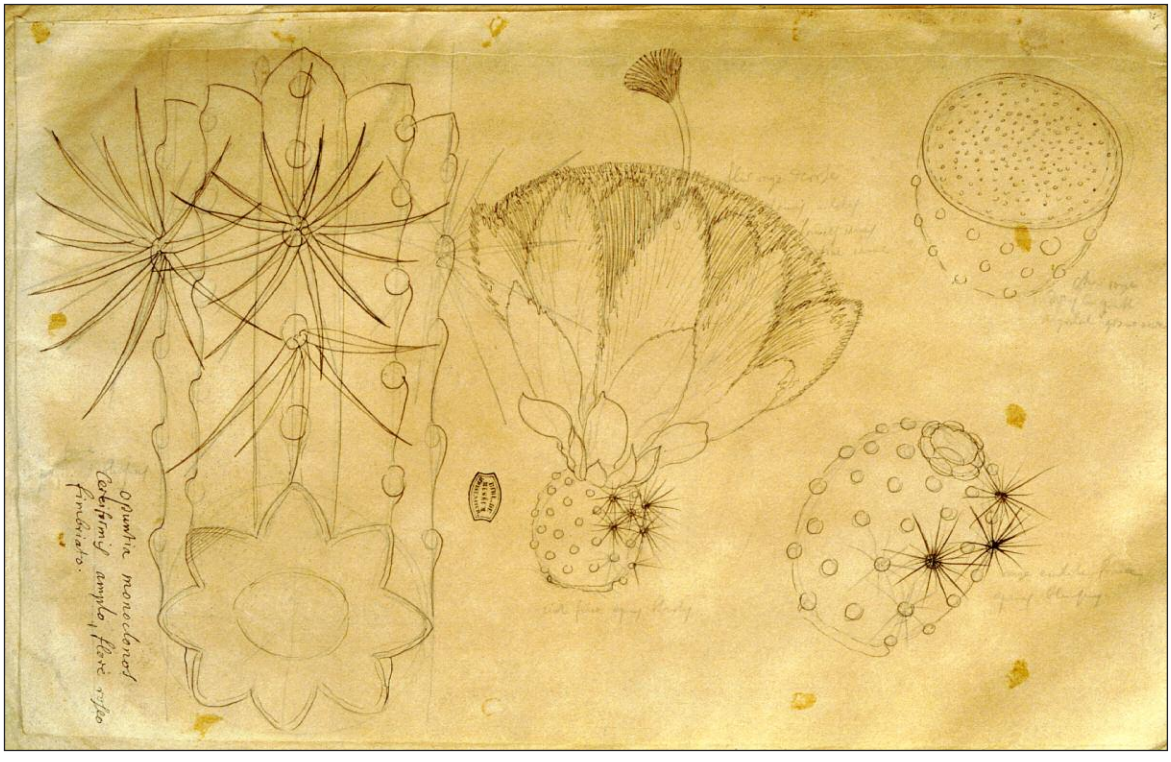


Figure 46b. Plumier's analytical sketch of *Stenocereus heptagonus* (L.) Mottram

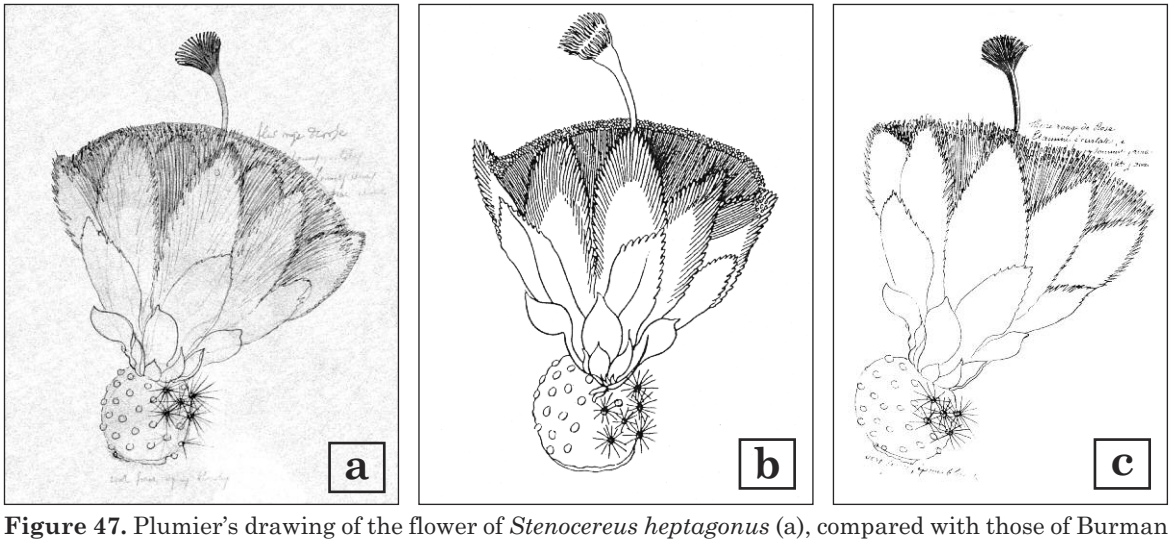


Figure 47. Plumier's drawing of the flower of *Stenocereus heptagonus* (a), compared with those of Burman (b) and Kew (c).

height. Each [stem] supports 8, 9 or 10 prominent ribs with wavy podaria running through them, each prominence bearing a murex [spiny areole] equipped with a bunch of many very strong, very acute, quite long and white spines. Its substance is truly fleshy and succulent and pale green but the pith is also fleshy becoming harder and later white. Its entire epidermis is of a satisfying bright green, and marked all over with faint spots [stomata]. Its top which ends in a more or less spiny apex is adorned at times with quite large and truly very pretty rose-like flowers, and with many large, oblong, firm, fimbriate petals arranged on a circle and of a striking reddish pink. They are united with their other pale green, mixed with slightly reddish, calyx leaves [sepals], and the entire centre is filled with innumerable long, thin, also pink stamens with golden tips [anthers]. The fairly thick pistil

Figure 48a. *Stenocereus heptagonus* PH1313.03: Haiti, Sud-Est Dept., south coast west of Anse-à-Pitre, 30m, scene at the type locality. Photograph: Paul Hoxey

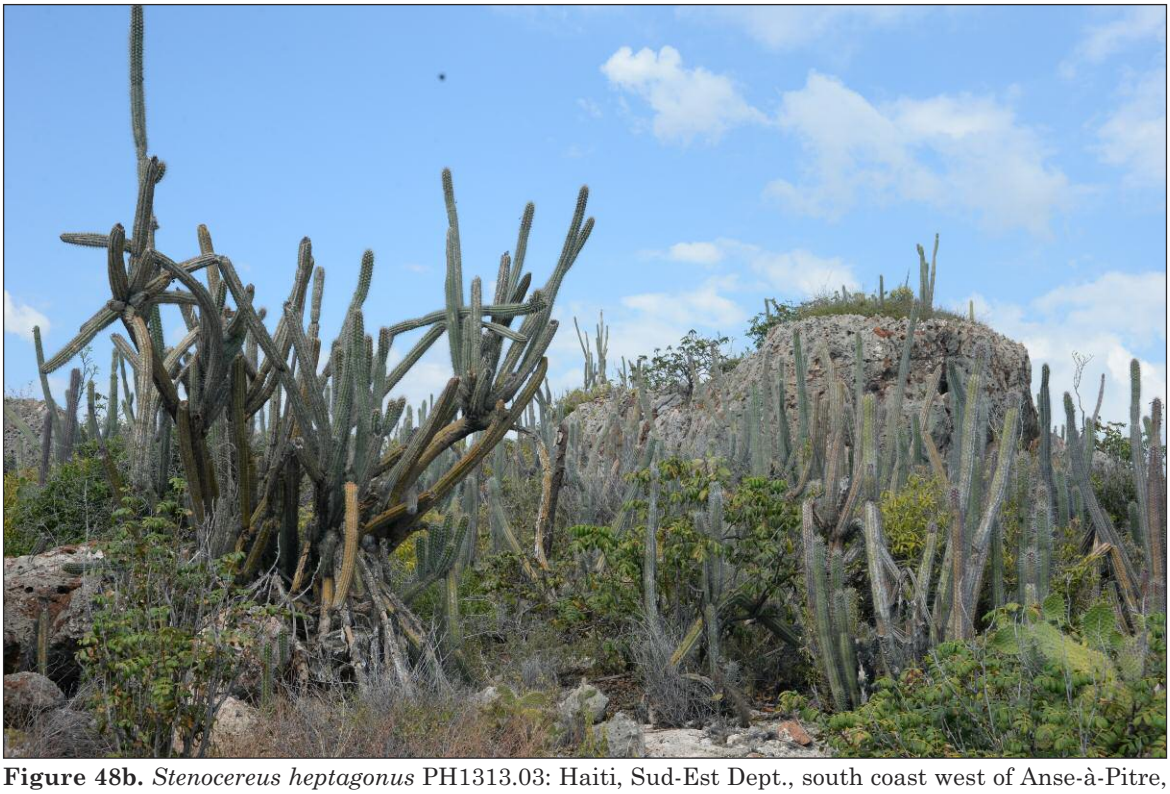


Figure 48b. *Stenocereus heptagonus* PH1313.03: Haiti, Sud-Est Dept., south coast west of Anse-à-Pitre, 30m, Large plants can be massive. Photograph: Paul Hoxey

Figure 48. *Stenocereus heptagonus* PH1313.03: Haiti, Sud-Est Dept., south coast west of Anse-à-Pitre, 30m **c. (left)** single stem with spination approximately matching that of Plumier's drawing. **d. (right)** stem with fruit. Photographs: Paul Hoxey.

Figure 49. *Stenocereus heptagonus* PH1299.02: Haiti, North of Dérac, west of Fort Liberté, 20m. Flower section (not fully expanded).
Photograph: Paul Hoxey.

emerges from the umbilicus of its calyx, also with many pink projections [stigma lobes] flowing from itself, almost forming a funnel and erose. However, the calyx itself, which is almost globose, a little larger than a nut, rich green and covered with small bristly spines and with thorny excrescences, becomes a fruit also more or less globose, almost the size of a bitter orange [*Citrus* × *aurantium*], the entire flesh deep red or a splendid fiery red and with many points [areoles] of spreading whitish little spines, muricate with sharp roughened points. Its flesh inside is also fiery red, with very soft, very agreeable, mildly acidic sweetness, but spoiled by the concealed innumerable and very black seeds.

I found the plant in dry and rough coastal woodland in parts of San Dominica Island [Haiti], in that area that is commonly called La Bande du Sud.

Vol.3 t.25: **Opuntia monoclonos cereiformis amplo flore roseo fimbriato.** [***Stenocereus heptagonus*** (L.) Mottram] (Figure 46b)

The phrase-name used on this plate was modified later by Plumier (1703: 6) to: Opuntia altissima, cerei-formis, aculeis validissimus, flore amplo, fimbriato, replacing "monoclonos" with "very tall, cereiform, with very strong spines". "Monoclonos" normally means single-stemmed or -branched, and must be a reference to its growth from a short trunk.

This is "The Larger Dildo Tree" of Sloane (1696: 198-199, 1725: 157-158) whose phrasename was Cereus crassissimus, fructu intus & extus rubro (The thickest cereus, with a red fruit inside and out). It is common throughout the Caribbean and along the north coast of South America, and is much prized for its large fruits that are red throughout.

The correct name for this plant is *Stenocereus heptagonus* (L.) Mottram. Linnaeus's protologue had no included elements. However, in a note under this taxon in the second edition of *Species plantarum* (1763), Linnaeus said that this and all the other cerei to follow were illustrated by Plumier, the only reference to an illustration of this taxon to be mentioned in any edition. He made no direct reference to the plate number, so it has had to be typified with the Plumier plate that best fits his rather weak description.

Linnaeus's reference to the poor description of a depauperate specimen of *Cactus heptagonus* in Clifford's collection is useless for identification. However, it is fortunate that in the year of his death he left a more expanded though still rather vague description (1778: 621) that enables us to make a reasonable guess of its identity. See Appendix 1 for a comparison of Linnaeus's various descriptions of this taxon.

Plumier made many mistakes in his description and drawing of the flower. He drew lines through the petals perhaps to indicate vascular strands. These were exaggerated on Burman's t.195 copy and in Kew's copy becoming uniform marginal serrations (Figure 47). In reality the petal margins of this species are usually only very minutely ciliate but near enough entire (Figure 49). Plumier's description and drawing of the flower is also erroneous in respect of the lack of a receptacle tube, exserted style, and also the pericarp should be spineless, yet he drew spine clusters matching those of the fruit. Maybe the flower he gathered in his *herbier* (botanical carrying case) had been damaged, perhaps partly eaten by insects and fallen to bits, and his attempt at reconstruction of the jigsaw puzzle went wrong. The hypanthium seems to have been lost completely and its reconstruction pure guesswork. Or maybe he had other unrelated plants with them and got them mixed up. The spiny areoles of the fruit are deciduous and would have parted company from it anyway, and that is probably why he thought they occurred on the pericarpel as well, not knowing where the loose spine clusters had come from.

In view of the above, it seems necessary to ignore the flower drawing, and to make a second-step lectotypification of that proposed by Mottram (2013: 27) as follows:

Cactus heptagonus L. (1753)
LT (**second step designated here**): Haiti, La Bande du Sud, dry and hot coastal woodland; 1689-1697, *Charles Plumier,* as Opuntia monoclonos cereiformis amplo flore roseo fimbriato; drawing of the stem only, in Plumier, *Botanicon Americanum* **3**: t.25. (Figure 46b left)

Lamarck (1789: 539) created the name *Cactus fimbriatus* based on Plumier's manuscript to t.25 and Burman's copy of it in t.195. Lamarck wrote Burman fig. 1 but meant fig. 2. He excluded *Cactus heptagonus* L. as a different species, his Cactier 6, giving only the protologue description for that provided by Linnaeus. See Appendix I. Burman did not see Plumier's description, but interpreted his flower drawing as being "serrate or ciliate".

Plumier reported seeing it frequently along the coast of the Band du Sud, where Hoxey and Gdaniec confirm that it continues to abound (Figure 48), including growing with *Consolea moniliformis* at its type locality. It is also common elsewhere in Haiti and other parts of the western Caribbean, often cultivated as a hedging plant.

Latin transcript of Plumier's Vol. 3 t.26 Melocactus arborescens folio striato spinosissimo, fructu oblongo subluteo [***Harrisia serruliflora*** (Haw.) Lourteig = ***Harrisia divaricata*** (Lam.) Britton & Rose] (Figure 50a)

In vastam et arboream molem exsurgit haec planta cuius caudex humanum fere corpus crassus striatus, spinis acutissimis nigricantibus, et muricatim positis, instructus, lignosus et durus sed medulla carnosa et albicante donatus. Ex ipsius summitate plurimi promanant rami virentes, longi recti, etiam striati et spinosi, alios producentes eiusdem naturae et formae ramos et hi deinceps alios quibusdam floribus adornatos satis amplis, monopetalis quidem campaniformibus et patentibus, sed in plurima segmenta acuminata angusta fimbriata, candidissima et duplici serie ordinata dissectis et innumeris staminibus etiam candidis et apices candidos gestantibus stipatis. Calyx eorum longus crassus, virens foliolisque angustis et acuminatis veluti squamatus, ex umbilico suo longum emittens pistillum crassiusculum candidum, infundibuli-forme et multicissum. Idem autem ipse calyx infructum evadit oblongum seu cucumeriformem, carnosum subluteum, foliolisque acuminatis squamatum. Cuius caro interior candidissima est, moschum ipsum fere redolens, acidulitate gratissima innumerisque seminibus subrotundis et nigrantibus faeta.

Plantam Septembri adinveni per sylvas illas steriles et arescentes insulae San Dominicana regioni illi (quae vulgo Le grand cul de sac adpellatur) vicinas.

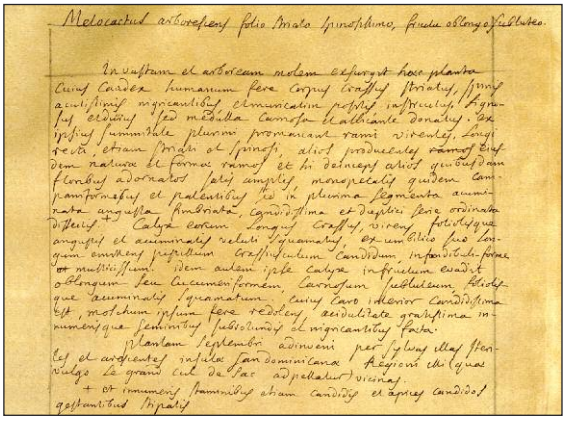


Figure 50a. Plumier's manuscript describing *Harrisia divaricata* (Lam.) Backeb. once again.

English translation:
t.26 Tree-like Melocactus with very spiny ribs, and oblong yellowish fruit.

This plant, whose ribbed trunk is almost as thick as a man's body, grows in wasteland and in stony woodland, beset with very acute spines becoming black and muricately arranged, woody and hard, but enclosing a fleshy, whitish medulla [pith]. Projecting from its top are very many vigorous branches, long, straight, also ribbed and very spiny, in turn producing other branches of a similar nature and form, and all these are adorned with a succession of flowers, opening wide, monopetalous, truly campanulate and patent, differentiated into two series and with numerous narrow acuminate fimbriate pure white segments, and with numerous stamens, also pure white, and bearing white anthers at the top.

Its calyx [pericarpel and receptacle tube] is long and thick, with small green scale-like leaves, narrow and acuminate, with a fairly thick pistil emerging from its ovary, having a funnelform, many-branched stigma. And this same calyx becomes an oblong or cucumber-shaped fruit, fleshy, slightly yellowish, and with leaf-like, acuminate scales. Its flesh within is pure white, emitting an almost musky odour, pleasantly acidic, and filled with numerous, almost round, black seeds.

I found the plant in September, in those barren dry woods on the island of San Dominica [Haiti], in the vicinity of the region known locally as the Grand Cul de Sac.

Vol.3 t.26: **Melocactus arborescens folio striato spinosissimo, fructu oblongo subluteo.** [***Harrisia serruliflora*** (Haw.) Lourteig = ***Harrisia divaricata*** (Lam.) Britton & Rose] (Figure 50b), but with some characters that seem to belong to *Cereus haitiensis* A.R. Franck & B. Peguero]

Having already described *Harrisia divaricata* in t.23-24, Plumier seemed to believe that he had found something different, even though it was from the same vicinity on the Cul-de-Sac. At the time of his earlier gathering flowering had passed but fruits were fully mature. This second encounter is presumably earlier in the season when flowers were at full anthesis, but the available fruits were probably then immature. As the fruits would have looked very different at these two stages, he could have concluded that they were different species. However, we now know that *Harrisia divaricata* grows together in Haiti with a very similar looking plant in places, and without flower or fruit they are hard to distinguish. It is now thought that Plumier took his description and drawings from bits of both. In other words it was a mixed gathering.

Burman's copies of the drawings lettered A–D in his t.195 fig. 1 correspond to Plumier's t.26, while those of fig. 2 lettered E-G correspond to Plumier's t.25. Haworth (1830: 113) provided names for these two Burman copies of Plumier t.25–26, namely *Cereus grandispinus* Haw. (= *Stenocereus heptagonus* (L.) Mottram) for Burman t.195 plate fig.2, and *Cereus serruliflorus* Haw. (*Harrisia serruliflora* (Haw.) Lourteig) for Burman t.195 plate fig.1.

Areces-Mallea (2018: 107-118, Jun 18), gathered a plant in 1998 that he thought was Plumier's t.26 but from a very different locality on the extreme NW coast of Haiti (Figure 51).

Franck & al (2017: 2) had also found it and thought it resembled Plumier's t.26, but concluded correctly that Plumier had drawn a mixed gathering and that only the stem portion could be safely assigned to *Harrisia divaricata* (Lam.) Backeb. (= *Harrisia serruliflora* (Haw.) Lourteig), while the other three elements of the plate, flower and fruit, resembled a different taxon in some respects, namely *Cereus haitiensis* A.R. Franck & B. Peguero (2017: 5). So they made a second-stage lectotypification of the stem in t.26 to which the name *Harrisia serruliflora* (Haw.) Lourteig could be applied. The other three elements on the plate and his description have features of both species.

In another unfortunate twist, the choice of name by Franck & al., *Cereus haitiensis*, had previously been used by Schelle (1907: 89) as a new combination of *Cereus grandiflorus* var. *haitiensis* K.Schum. (1903: 183) but without reference to this basionym and therefore only a name without standing. Schumann's description was itself too brief for identification and its acceptance as validly published has never been ejudicated by the Nomenclature Committee. Schelle's second edition of his book (1925: 120) repeats the name, again without basionym, but this time with Schumann's brief description, thus making it potentially valid. However, this again is only valid if the

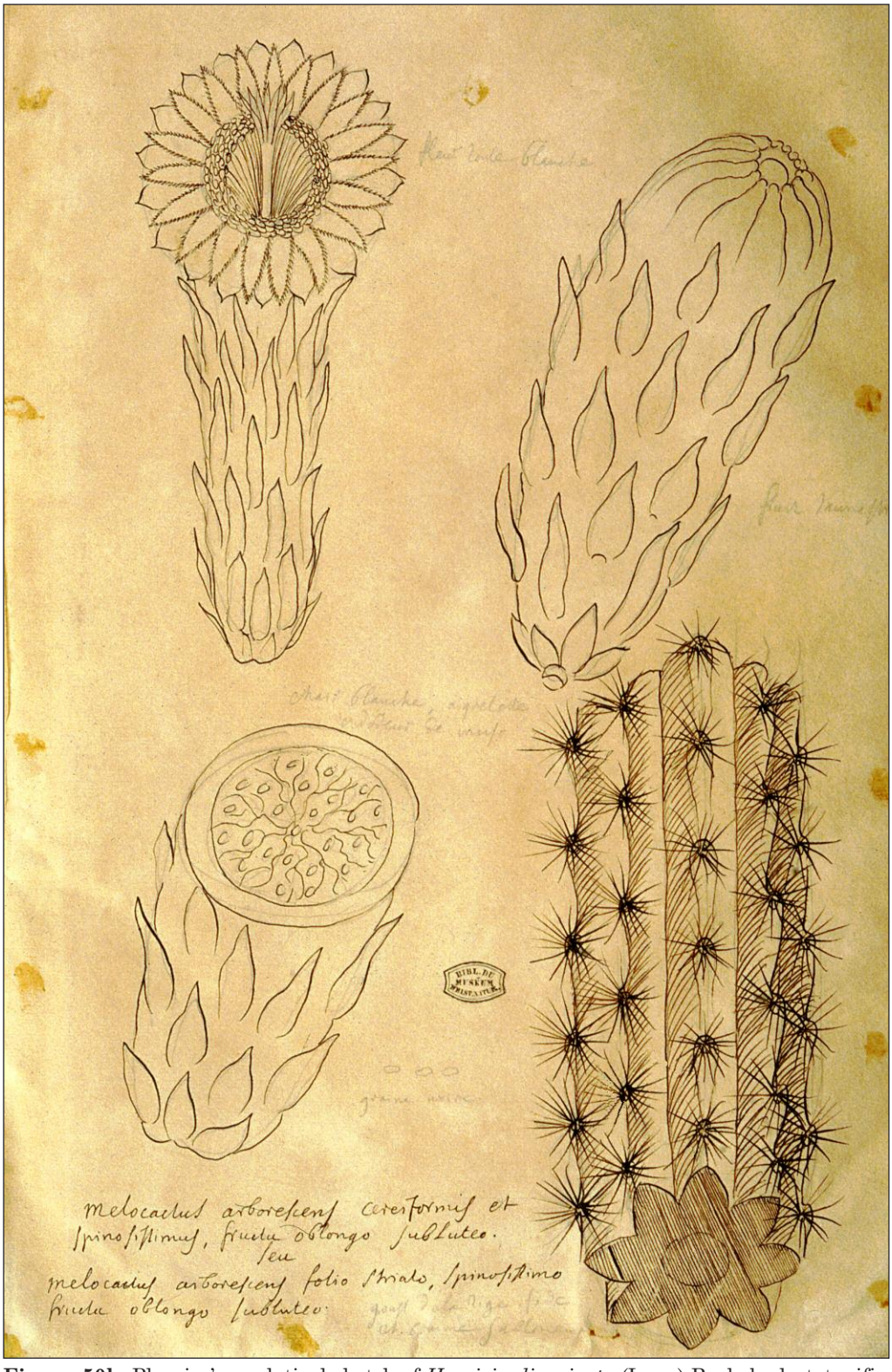


Figure 50b .Plumier's analytical sketch of *Harrisia divaricata* (Lam.) Backeb., lectotypified by the stem only. The other elements have certain characters that have been interpreted as belonging to *Cereus haitensis*, but the receptacle scales definitely belong only to *H. divaricata*.

Figure 51a. *Cereus haitiensis* A.R. Franck & B. Peguero. PH1292.01: Haiti, Môle Saint Nicolas, 60m, flowering plant close to its type locality. Photograph: Paul Hoxey.

Figure 51. *Cereus haitiensis* A.R. Franck & B. Peguero. PH1292.01: Haiti, Môle Saint Nicolas, 60m. **b–c.** fruits at various stages, all immature, **d.** flower, **e.** flower section. Photographs: Paul Hoxey.

circumscription is considered as adequate and so far there is no Nomenclature Committee ruling on this. Backeberg (1959: 780) made reference to the Schumann and Schelle usage of the name, equating *C. haitiensis* hort ex Schelle with *C. grandiflorus* var. *haitiensis* K.Schum., with a direct reference to the basionym. Backeberg, however, did not accept either of these names, so they are not validly published in that place (Art. 33.1, 36.1). Thus replacement of *Cereus haitiensis* A.R. Franck & B. Peguero with *Cereus ayisyen* M.H.J.Vanderm. (2019: 13) cannot yet be accepted, and seems rather unlikely because, apart from being so brief, the chosen characters used do not distinguish it from var. *grandiflorus*.

Plumier described the inner flower petals as having fimbriate margins, which in his sense could have meant broken in a number of ways. However, his drawing shows the inner petal margins to be very minutely fringed with teeth and/or cilia. Burman described the petal edges in Plumier's drawing inappropriately as "crenate" because his artist had inaccurately drawn the margins serrulate but rounded off the teeth. Kew's artist on the other hand had perhaps more accurately interpreted the margins of the inner petals as ciliate.

Lamarck (1785) completely omitted this plate from his treatment, perhaps because he thought it was the same as *Harrisia divaricata*. Haworth (1830: 113) was the earliest author to refer to Plumier's account, but described the inner petals inaccurately as "serrulate", basing his description solely on Burman's misleading copy of the plate. Adopting that as its main diagnostic feature he named it as *Cereus serruliflorus* Haw., which was unfortunate because no harrisias nor *Cereus haitiensis* have serrulate petal margins. Inapproriate names are not, however, correctable (Art. 51.1).

Areces-Mallea (2018) adopted the name *Cereus serruliflorus* Haw. to represent the type of his *Cereus* subg. *Neohaiticereus* Areces, in the belief that Plumier t.26 represented an early encounter with *Cereus haitiensis*. However, since *Cereus serruliflorus* Haw. is now a *Harrisia* based on the priority second stage typification of Franck & Peguero (2017: 5), *Cereus* subg. *Neohaiticereus* Areces becomes nomenclaturally a synonym of *Harrisia* Britton subgen. *Harrisia*.

Wisnev (2018: 222–223, Sep 17) noticed Areces-Mallea's mistake, so proposed a monotypic *Cereus* subg. *Arecesocereus*, but with *Cereus haitiensis* A.R. Franck & B. Peguero as its type and only included species. This stands as validly published.

Guiggi (2018: 1) created a monotypic generic name *Serrulatocereus* and the combination *Serrulatocereus serruliflorus* (Haw.) Guiggi. This again is based on the name of a species of *Harrisia* so is thus a synonym of that.

Plumier wrote pencil notes on his plates at the time of making his original drawings, before inking the outlines. These pencil lines and notes are not visible at low resolution, but on this plate they can be enhanced enough to make them just about legible. His pencil note just above the sectioned fruit tells us: "chaire blanche, aigrelette, à l'odeur de musc" which translates as "flesh white, acidulous, with a musky smell", which agrees well with the Latin description. This confirms that the section drawn was that of a fruit, if indeed there was any doubt.

The other handwritten notes on this plate appear to say:
fleur toute blanche: flower entirely white. [more of a *Harrisia* character]
graine noire: seed black. [with outlines of 3 seeds, not inked]
jante de la tige face est comme sablonneuse: rim [or section] of the stem face is like sand. [or sand-coloured]

For his account, Plumier's fruit has the shape of *Cereus haitiensis*, but has the long scales of the receptacle of *Harrisia divaricata*. As surmised for his last taxon, *Stenocereus heptagonus*, perhaps the specimens he had gathered were knocked about in his vasculum and put together later in the wrong order. Whatever happened, his plate has caused great confusion.

The specimen Ekmann 5377, gathered in 1925 from the Cul-de-Sac area appears to be *Cereus haitiensis*, as Franck pointed out. This suggests that it might once have grown there alongside the *Harrisia*, but Hoxey & Gdaniec had not found it there in 2017. Without flower or fruit, it is, however, cryptic. A more thorough search in the area is planned.

Latin transcript of Plumier's Vol. 3 t.27-28 Opuntia arbor excelsa foliis reticulatis, flore flavescente [***Consolea testudinis-crus*** (F.A.C.Weber) Mottram & Hoxey] (Figure 52a)

Caudex huisve planta interdum humanum corpus crassus sex aut septem pedes altus, rotundus, intus lignosus deforis vero cortice vestibus crasso, nigricante flocculis candicantibus et tomentosis varie distincto, e quibus aculei plurimi procedunt, radiati exiles longi albidi, acutissimi fragiles licet durissimi.

E summitate truncei folia quaedam erumpent oblonga magis quam pedem longa, semipedem vero lata, carnosa et fere digitum lata, eiusdem tandem naturae et longis tensiae quam vulgaris opuntia folia, sed umbilicis exiguis reticulatim dispositis et sulculis rete et formantibus exasperata et exarata, spinulisque in ipsis umbilicis radiatim nascentibus et griseis hispida. Ex ipsis primis foliis alia exsurgunt folia et ex his iterum atque iterum alia

longe lateque arboris superficiem extendentia. Super tandem extremorum foliorum summitates flores quidam prominent ut in ceteris opuntiis rosacei, plurimus scilicet petalis in orbem positis constantes subrotundis initio luteis dein aut rubicundis aut omnino purpureis. Medium autem floris multa ocupant staminula etiam luteis, apicibus quoque luteis donata. Eius tandem petala calyci insident vasculoso intra umbilicum embryonis infixo. Ille autem embryo instructum deinde evadit ovatum ovi gallinacei fere magnitudine carnosum, veluti reticulatim squamatum, spinulis etiam praeditum, primum virentem, deinde e fusco flavescentem, gustu acidum, seminibusque pluribus duris et asperatis foetum.

In sylvis sicis et aridis frequentissima repentur haec planta apud insulam Sandominicanum et insulam Sancti Thomae ditioni Danorum subiectam. Nullibi tamen copiosiorem vidi quam in illa regione insulae Sandominicanae quae vulgo dicitur le port a piment, ubi prae aquae penuria equi sylvestres vulgo les chevaux marrons foliis eius depascuntur sitis extinguenda causa. Nostri pattes de Tortue plantam appellant, propter eam quam cum palmis el pedibus testudinum marinarum habent conformitatem et similitudinem.

English translation:

t.27-28 Lofty tree opuntia with reticulate leaves [cladodes]**, with yellowish flowers**

The trunk of this plant is six or seven feet high, more or less as thick as a man's body, cylindric, woody inside, with true bark outside, covered with thick, white and blackening wool and scarcely distinct tomentum, from which numerous spines project, long, slender, whitish, spreading, very acute, fragile but very stiff.

Oblong cladodes emerge from the top of its trunk more than a foot long, fully half a foot wide, certainly of the same character and full length of the leaves of the common opuntia [*ficus-indica*], but finely etched in a reticulate pattern and a network of grooves and creating a roughened and furrowed surface, and with spreading and small grey bristly spines in its depressions. Cladodes emerge from earlier cladodes and in this manner the length and breadth of the tree extends itself. At length flowers appear at the top of the extreme uppermost edges of the cladodes themselves, as in other opuntias rose-like, however with many more petals, arranged close together on a circle, almost round, at first deep yellow then generally either reddish or entirely purple. Moreover, the centre of the flower is occupied by many stamens, also deep yellow, with anthers again deep yellow. At length, the leaves of the calyx protect a cavity with ovules buried beneath its umbilicus. And that embryo

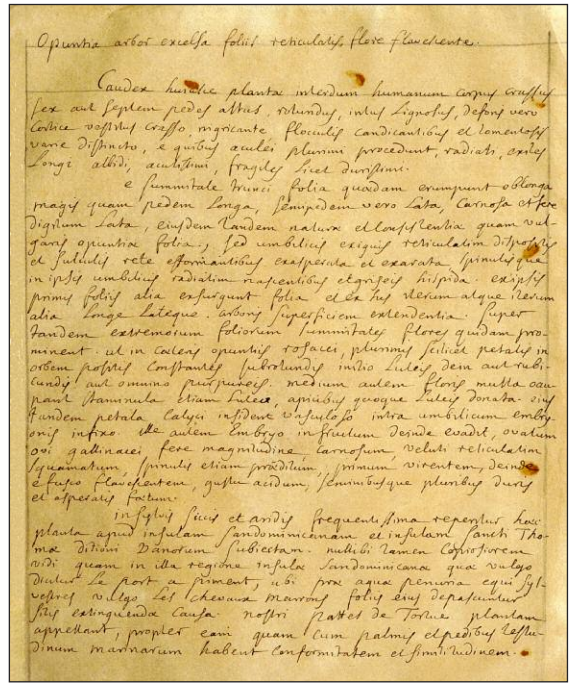


Figure 52a. Plumier's manuscript describing *Consolea testudinis-crus* (F.A.C.Weber) Mottram & Hoxey.

then becomes a fleshy ovate egg, the size of a hen's egg, just as reticulate and scaly, also beset with small spines, at first green, then of a yellowish brown, tasting sour, and filled with many hard and rough seeds.

This plant occurs very frequently in dry and arid woods on the island of San Dominica [Haiti] and the rich Danish administered island of St. Thomas. However, nowhere is it seen more abundantly than in that part of the island of San Dominica [Haiti] which is commonly called Port à Piment, a bay NW of Gonaïves, Dept. Artibonite, Haiti, where at times of water shortage wild horses, 'les chevaux marrons' ['the chestnut horses'], commonly eat their cladodes for the purpose of quenching their thirst. Our countrymen call the plant 'Pattes de Tortue' [Tortoise Paddles], because they have the form and similarity to a surprising degree with the paddles of marine turtles.

Vol.3 t.27-28: **Opuntia arbor excelsa foliis reticulatis, flore flavescente.** [***Consolea testudinis-crus*** (F.A.C.Weber) Mottram & Hoxey] (Figure 52b-c)

Plumier reported these consoleas from Port à Piment, a bay NW of Gonaïves, Dept. Artibonite, Haiti, where they were and are still abundant. This is quite some distance from where he found his spherical-jointed *Cactus moniliformis* on the south coast of the Band du Sud, which we now consider to be a different species. The next available name for

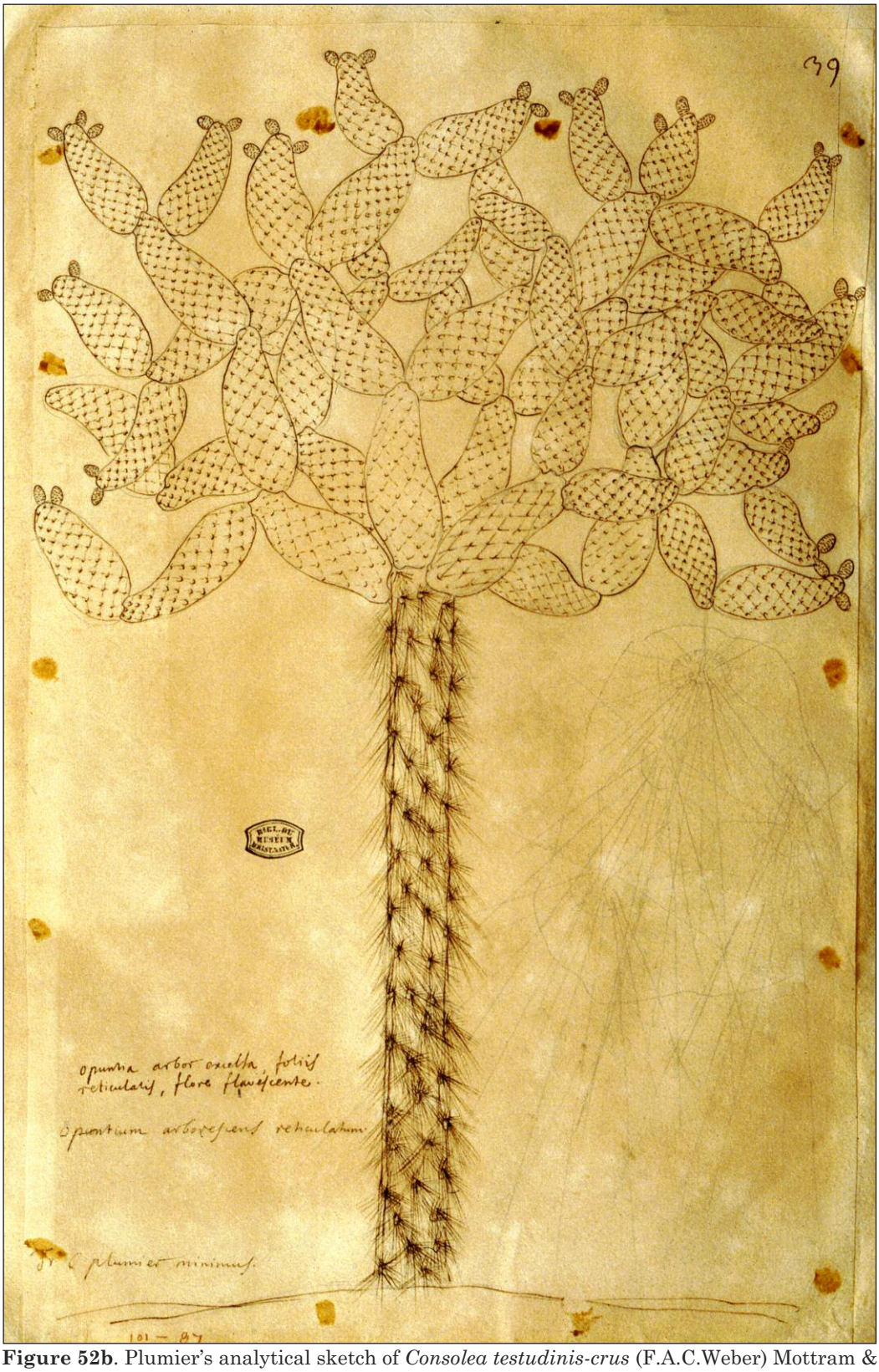


Figure 52b. Plumier's analytical sketch of *Consolea testudinis-crus* (F.A.C.Weber) Mottram & Hoxey.

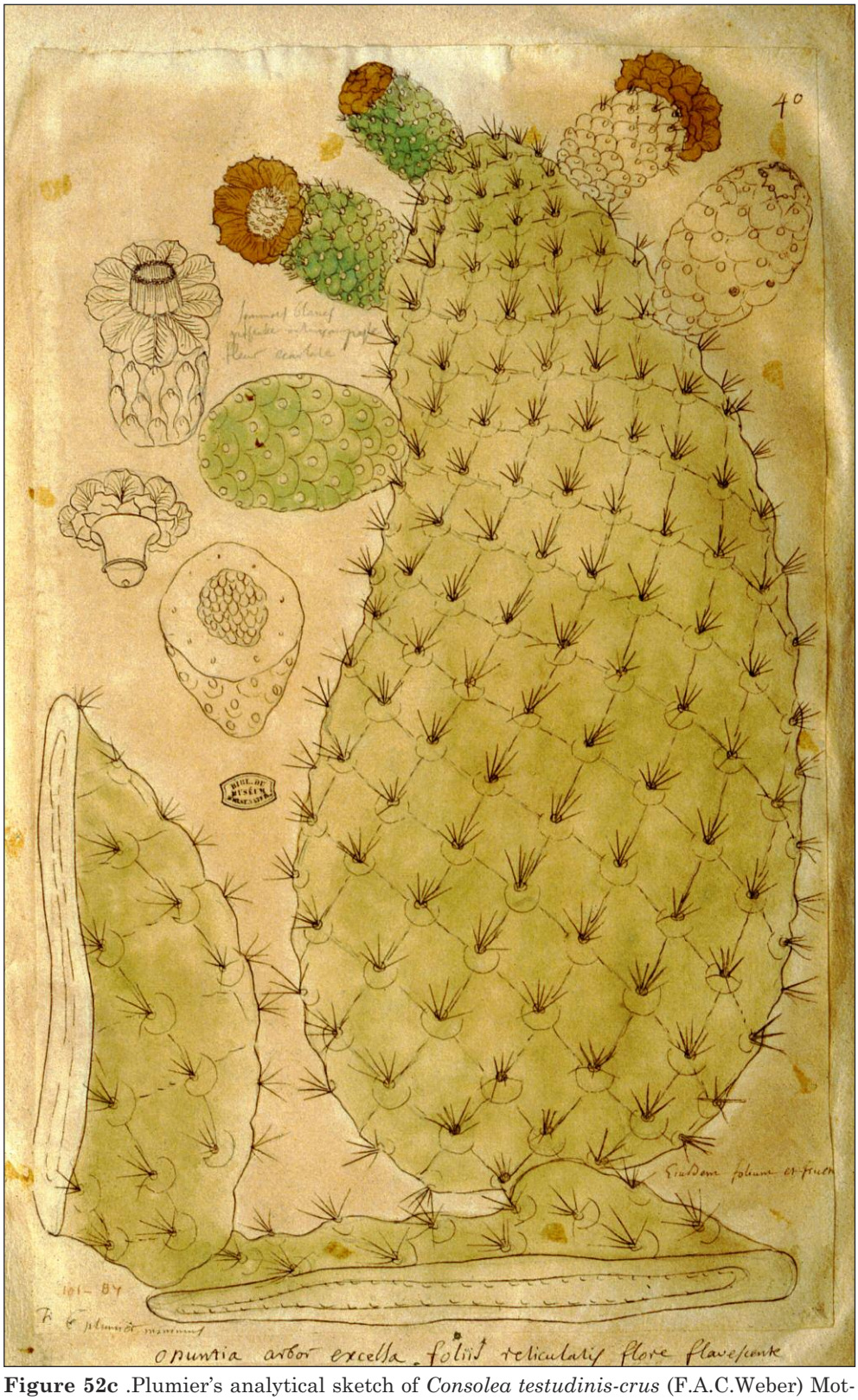


Figure 52c .Plumier's analytical sketch of *Consolea testudinis-crus* (F.A.C.Weber) Mottram & Hoxey.

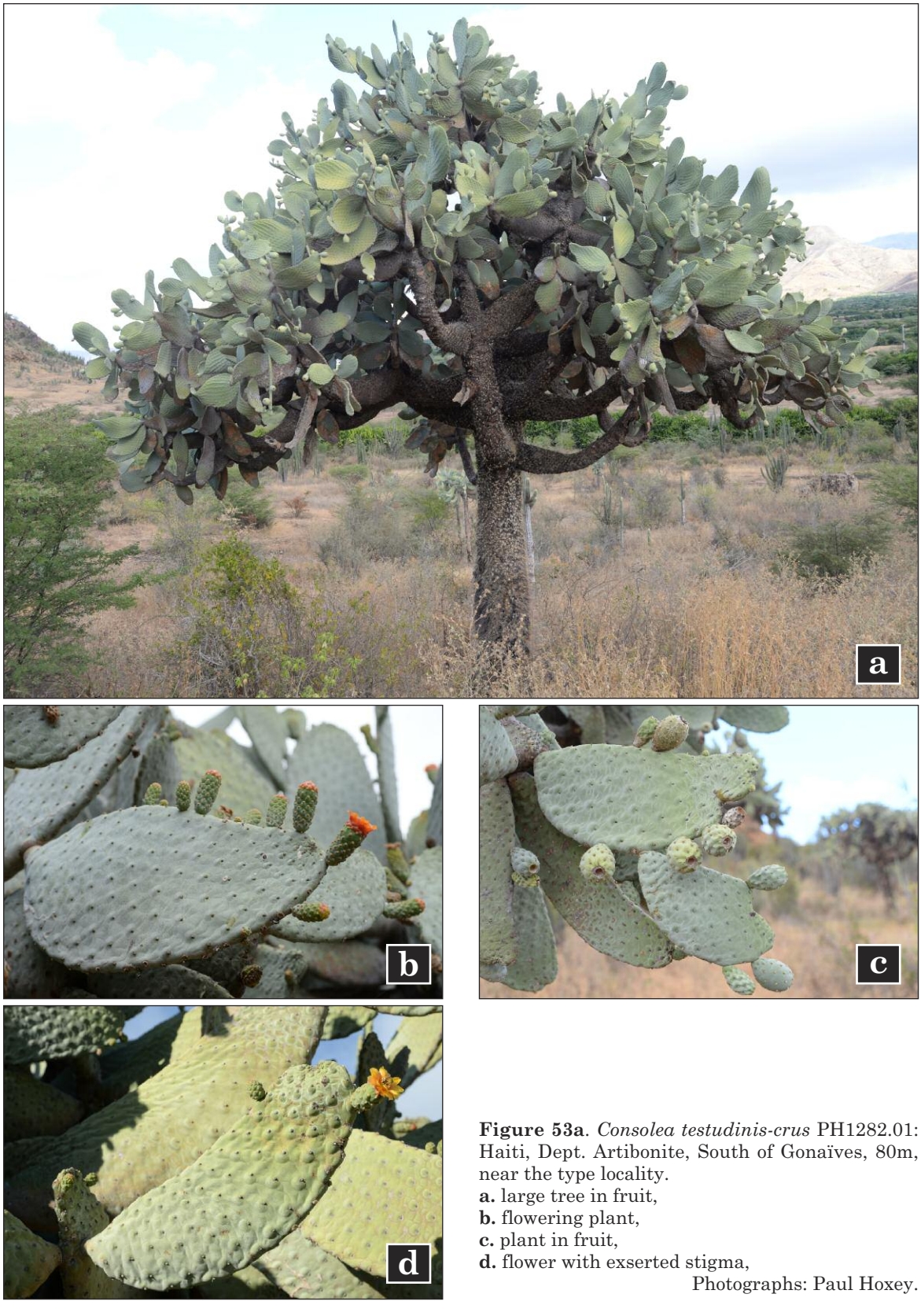


Figure 53a. *Consolea testudinis-crus* PH1282.01: Haiti, Dept. Artibonite, South of Gonaïves, 80m, near the type locality.
a. large tree in fruit,
b. flowering plant,
c. plant in fruit,
d. flower with exserted stigma,
Photographs: Paul Hoxey.

Figure 53e. PH1289B.01: Haiti, Dept. Nord-Ouest; east of Lagon Petit Paradis (N19°39'13.2", W073°07'32.2") 10m. forest of *Consolea testudinis-crus*. Photograph: Paul Hoxey.

this tree-like consolea is said to be *Cactus ferox* Willd. (1814: 30, 35), *Opuntia ferox* (Willd.) Haw. or *Consolea ferox* (Willd.) Lem. However, this is not a taxon that can be identified with any certainty. It is evidently a consolea, but it has no original material, locality, or type, and its description was insufficient to ascribe it to a particular species.

The consolea was known at the time of Thiéry de Ménonville (1739-1780) as Péreschia, or La Patte de Tortue á Saint-Domingue. Thiéry supplied the earliest post-Linnaean description under these local names, which Weber, in Roland-Gosselin (1904: 389), later latinised to validate the name as *Opuntia testudinis-crus* F.A.C.Weber. Weber cited *Cactus testudinis crus* Thiéry de Mén. in synonymy, but Thiéry himself is not known to have used that binomial. Descourtilz (1829: 274-276) mentioned Thiéry, and the population at Port à Piment, but had still not provided a name for this plant. Weber's name means tortoise paddle, based on the vernacular name, so is an indeclinable noun in apposition. A combination in *Consolea* does not yet exist, so is proposed here:

Consolea testudinis-crus (F.A.C.Weber) Mottram & Hoxey **comb. nov.**
Basionym: *Opuntia testudinis-crus* F.A.C.Weber, in Roland-Gosselin, R. (ed.) Oevres posthumes de M. le Dr. Weber, 1. Plantes inédites. *Bull. Mus. Hist. Nat.* (Paris) **10**(6): 388. 1904.
≡ *Opuntia haitiensis* Britton, in Britton & Rose, A preliminary treatment of the *Opuntioideae* of North America, *Smithsonian Miscellaneous Collections* **50**(4): 513. 1908.
T: Haiti, Dept. Artibonite, Port à Piment [data from Plumier and Thiéry]. Not known to be preserved, and there are no known contemporary illustrations.
NT (**designated here**): Haiti, Dept. Artibonite, xerophytic region Gonaïves towards Plaisance, 15m.; 16 Aug 1905, *G.V. Nash* 1766 & *N. Taylor* (NY 396052, http://sweetgum.nybg.org/science/vh/specimen_details.php?irn=59095, as *Opuntia haitiensis* Britton [holo.]). An isotype is also in the NY spirit collection, and type material was in cultivation at NYBG.

Thiéry de Menonville in 1777 smuggled cochineal insects out of Mexico, at great risk to his life, and farmed them on opuntia hosts in the garden he established in Port au Prince, Haiti, which he named *Jardin du Roi* in honour of King Louis XVI of France. By the time of his death in 1789, the plantation had grown to 4000 cochineal host plants of *Opuntia ficus-indica*, and then sadly went into decline. His 1787 two volume book, published posthumously, includes an informal description of the Patte de Tortue opuntia population at Port à Piment (Thiéry de Ménonville 1787 **1**: 347–358), the earliest such account after Plumier.

Hoxey and Gdaniec found extensive forests of

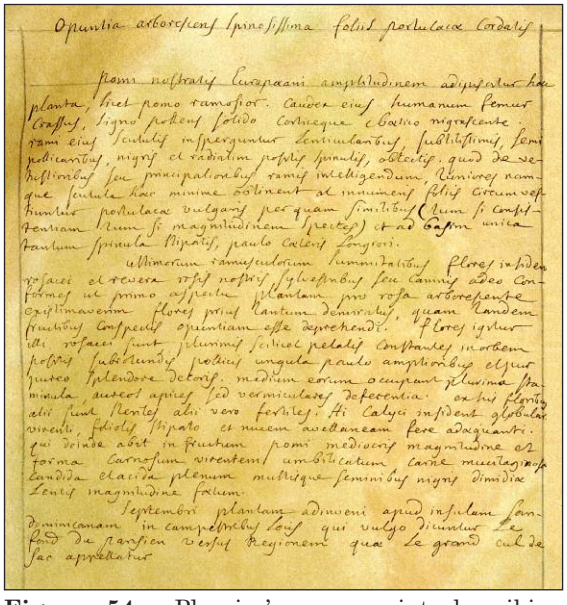


Figure 54a. Plumier's manuscript describing *Pereskia* (*Leuenbergeria*) *portulacifolia* (L.) Lodé.

this species (Figure 53) at the place indicated by Plumier and Thiéry. Plumier described and illustrated a plant with short bristly spines. Usually they are spineless but on younger plants they can be spiny to varying degrees. The flowers and fruits have glochids but seem to be always spineless.

Plumier also encountered what he considered to be the same species on the island of St. Thomas in the US Virgin Islands, but that is *Consolea rubescens* (Salm-Dyck ex DC.) Lem., a different species. This is a similar tree-like species where the reticulate lines on the cladodes are only indistinct. Juvenile plants are spineless and dark reddish, and it is these characters that have made them popular as small house plants in Europe. Hoxey and Gdaniec report finding a cultivated example in Granada with proliferating fruits but they do not drop off the plant and form vegetative growths as *C. monilifomis* does, while *C. testudinis-crus* never forms proliferating fruits or fallen fruits rooting on the ground. Plumier's illustrations agree much better with the Hispaniola plants.

The chromosome number for *Consolea testudinis-crus* counted by Majure & al. in 2012 for plants of unknown origin grown in cultivation at Long Key, Monroe Co., Florida was 2n = 88. (Majure & al. 2012: 73). The majority of consoleas for which chromosome numbers have been counted are either hexaploid or octoploid (Negrón-Ortiz, 2007). Hexaploids predominate in Cuba, the apparent centre of distribution, while octaploids occur in the more outlying islands and reach their highest level of ploidy in Guadelupe, where they are 2n = 132. They appear to have evolved from one or more allopolyploid events involving *Brasiliopuntia*, from which they inherit their hairy seeds, combining with opuntia species such as *O. dillenii*.

All *Consolea* are subdioecious or cryptically dioecious (Strittmatter & al. 2017). Flowers are usually either devoid of pollen and thus male sterile, or lacking stigmas and female sterile, an obligate out-breeding system, but probably just due to a fertility failure as a result of incomplete gene matching rather than a selected evolutionary step.

Latin transcript of Plumier's Vol. 3 t.29 Opuntia arborescens spinosissima foliis portulacae cordatis [*Pereskia portulacifolia* (L.) DC. or *Leuenbergeria portulacifolia* (L.) Lodé] (Figure 54a)

Pomi nostratis Europaani amplitudinem adipiscitur haec planta, licet pomo ramosior. Caudex eius humanum femur crassus, ligno pollens solido corticeque e bassico nigrascente rami eius scutulis insperguntur scuticularibus, subtilissimis, semipolicantibus, nigris et radiatim positis spinulis, obtectis quod de vetustionibus seu principalioribus ramis intelligendum, tenuiores namque scutula haec minime obtinent ac innumeris foliis circumvestiuntur portulacae vulgaris per quam similibus (tum si consistentiam tum si magnitudinem spectis) et ad basim unica tantum spinula stipatis, paulo caeteris longiori.

Ultimorem ramusculorum summitatibus flores insideret rosacei et revera rosis nostris sylvestribus seu caninis adeo conformes ut primo aspectu plantam pro rosa arborescente existimaverim flores prius tantum demiratus, quam tandem fructibus conspectis opuntiam esse deprehendi. Flores igitur illi rosaces sunt plurimis scilicet petalis constantes inorbem positis subrotundis pollicis ungula paulo amplionibus et purpureo splendore decoris. Medium eorum occupant plurima staminata aureos apices sed vermiculares deferentia. Ex his floribus alii sunt steriles alii vero fertiles. Hi calyci insident globulari virenti, foliolis stipato et nucem avellaneam fere adaequanti qui deinde abit in fructum pomi mediocris magnitudinae et forma carnosum virentem umbilicatum, carne mucilaginosa candida et acida plenum multisque seminibus nigris dimidiae lentis magnitudine foetum.

Septembri plantam adinveni apud insulam sandominicanam in campestribus locis qui vulgo dicuntur le Fond du Parisien versus regionem quae le grand cul de sac appellatur.

English translation:
t.29 Very spiny tree-like Opuntia with the cordate leaves of Portulaca

This plant surpasses our European apple tree in size, although the apple tree has more branches.

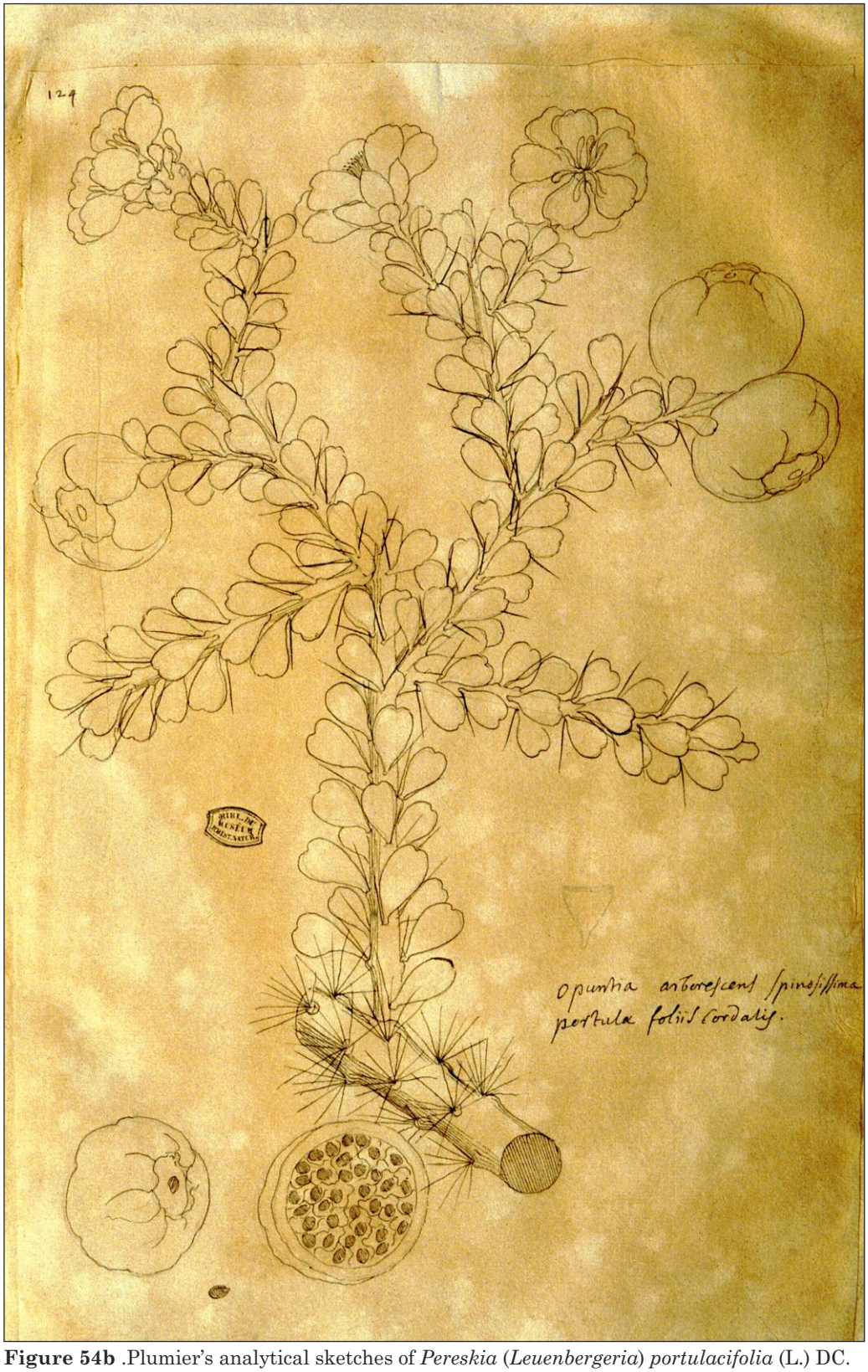


Figure 54b .Plumier's analytical sketches of *Pereskia* (*Leuenbergeria*) *portulacifolia* (L.) DC.

Its trunk is as thick as a man's thigh, with its strong solid wood, cylindrical branches and blackish epidermis at the base beset with areoles with whip-like, bristly, half-inch, black and spreading little spines, which understandably protects the oldest or main branches, for it is the thinner that possess the smallest areoles clothed with innumerable leaves that are similar to the common portulaca [*Portulaca oleracea*] (resembling it both in substance and in size) and grouped with a single little thorn at their base, a few slightly longer.

The flowers at the top of the highest branches are rose-like and truly resemble our wild or dog rose [*Rosa canina*], indeed at first glance the plant can be judged as just as wondrous as the aforesaid rose bush in flower, although remarkably related to opuntia. The flowers that are thus evidently rose-like have many hoof-shaped petals a little larger than an inch, arranged uniformly in an almost circular fashion and of a beautiful shiny purple. Its centre is filled with numerous stamens with golden tips, but different flowers have little worms [filaments only: staminate flowers]. Those flowers are all sterile and the rest truly fertile. This [corolla] is seated on a globular, green calyx, with perianth leaves persisting and most resemble a hazelnut which thereafter becomes a fruit the size and shape of an average apple, fleshy, green, umbilicate, filled with mucilaginous, white and acidulous flesh, and with many black seeds half the size of a lentil.

I encountered the plant in September on the island of San Dominica [Haiti] in plains that are locally called Fond du Parisien towards the area that is known as Le Grand Cul de Sac. [On the SW bank of the Étang Saumâtre, on Rte.8, 35km ESE of Port-au-Prince]

Vol.3 t.29: **Opuntia arborescens spinosissima foliis portulaca cordatis.** [***Pereskia portulacifolia*** (L.) DC. = ***Leuenbergeria portulacifolia*** (L.) Lodé] (Figure 54b)

This is another taxon validated by Linnaeus (1753: 469) based entirely on the Burman illustration, t.197, a quite faithful reproduction of Plumier **3**: t.29, seen by Linnaeus in 1737. The Linnaean protologue did not directly refer to the Burman copy, only citing p.6 of the Plumier catalogue of 1703, with the typographical error "Pluk." instead of "Plum."

The Burman copy is the lectotype, designated by Leuenberger (1986: 93), but was not a part of the protologue and not mentioned by Linnaeus until the second edition of *Species plantarum* (1762). However, it was of course original material.

As Plumier observed, the species has imperfect unisexual flowers on separate plants, and a very abbreviated style, both rare features shared with the related *L. zinniiflora* and *L. quisqueyana*. Leuenberger illustrated a pistillate flower in his fig. 14G and a staminate flower in fig. 37A (1986: 28, 96).

Plumier's type locality was on the Grand Cul-de-Sac at Fond Parisien, Haiti, which is on the SW bank of the Saumâtre salt pond. Hoxey and Gdaniec could not find it there, so it might now be extinct in that area as a result of burning its wood for charcoal production, although it was found and gathered from the type locality by Holdridge in 1941. It also occurs over the border in the Dominican Republic and to the north near Gonaïves, in lowland dry forests.

Although considered as vulnerable by the IUCN, this probably understates the potential threats from wood burning.

Latin transcript of Plumier's Vol. 3 t.30 Melocactus monoclonos, fructu atropurpureo, cereiformis [***Pilosocereus royeni*** (L.) Byles & G.D.Rowley] (Figure 55a)

Sarissarum aut cereorum altissimorum et spinis horrentium faciem obtinet tota planta, multae simul nempe connascentes sylvulam efformant aspectu horrendam simul et iucundum. Quae libet planta suo et ipso unico, seu singulari et nullatenus ramoso pollet caudice rectissimo, interdum ter humanam altitudinem superante licet vix tibiam humanam crasso. Tota eius longitudo octo novem interdum decem sulcis profundissimis striatur quorum arista rotunda, undosa et ad singularum undularum verticem scutatae et aculeis rigidis, tenuibus nigricantibus, semipollicem fere longis et radiatim calcitrapae in modum adunatis instructae. Tota caudicis substantia carnosa est subamara, granulis lapideis interdum plena deforis, laete virescens, intus vero subcandida et meditullo carnoso traiecta summitas esus in conum striatum definit, floribusque quibusdam exornatur monopetalis, campaniformibus, patentibus sed in plurima segmenta subrotunda et multiplici serie collocalix dissectis. Dimidium palmae manus singuli obtinent amplitudinem candidissimi sunt staminibusque innumeris pleni tenuibus candidis et apicibus flavescentibus aut candicantibus instructis. Eorum calyx carnosus est et oblongus tomento et spinulis acutissimis ad basim circumvallatus abitque deinde in fructum carnosum pomo similem, umbilicatum leviter striatum sature purpureum, pulpaque etiam purpurea plenum tenerrima, subdulci innumerisque exiguis seminibus nigris et lucidis faeta. Ex ipsius calycis umbilico exurgit pistillum longiusculum album fere infundibuliforme et in multas lacinias in summitate divisum.

Plurimis in locis potissimum saxosis insularum Antillanarum reperitur haec planta quam propter

cum cereis conformilatem vulgo cierges espineux appellant.

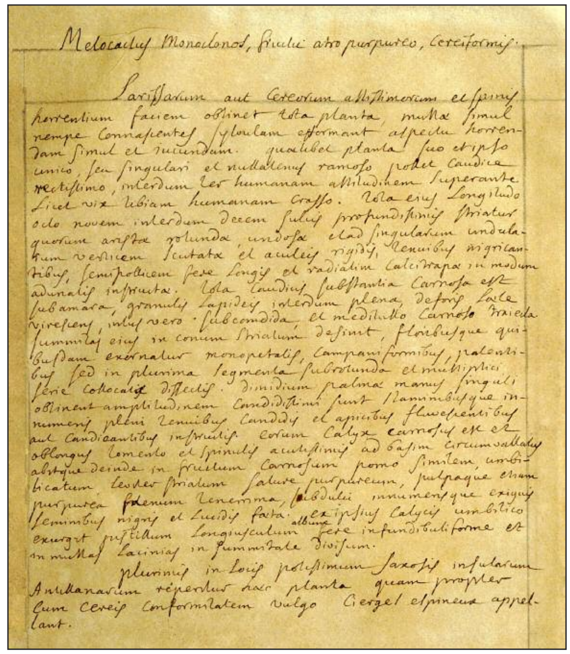
English translation:
t.30 Single melocactus, with deep purple fruit, with the form of a cereus

The whole plant consists of sarissas [sarissa: a long Macedonian lance] or very tall cerei, bristling with spines, many growing together to form small groups of truly daunting but at the same time agreeable aspect. The plant pleases whether it be solitary or its stems are united on a strong very straight trunk, [overall] sometimes surpassing three times the height of a man and almost the thickness of a human tibia. Its entire length is ribbed with 8, 9, or occasionally 10 very deep grooves which are studded with rounded tufts, wavy and with each vertical undulation armed with stiff spines, blackish and thin, nearly half an inch long and spreading in the uniform manner of a caltrop [Red Star-thistle (*Centaurea calcitrapa* L.)]. The entire substance of the stem is fleshy and somewhat bitter, sometimes full of stony granules [?crystalline inclusions], bright green, inside truly off-white and in the middle fleshy, terminating at the top in a ridged cone, adorned at a certain time with monopetalous flowers, campanulate, the corolla is not only patent but divided into very many almost round [perianth] segments and the neck of the calyx into multiple series. Each very white [flower] reaches half the palm of a hand in size [c.4cm], and they are filled with innumerable slender white stamens and tipped with yellowish or whitish apices [anthers]. Its calyx [pericarpel and receptacle] is fleshy and oblong and surrounded at the base with tomentum and a fortification of very acute little spines, and it thereafter turns into an apple-like, fleshy fruit, umbilicate, slightly furrowed, rich purple, and also filled with very soft, purple pulp, slightly sweet, and concealing innumerable tiny black and glossy seeds. From the base of the almost funnelform calyx itself the moderately long white pistil rises up and at its top divides into many lobes [stigma].

This plant is found abundantly mainly in rocky places of the islands of the Antilles where, because of the similarity to a candle, it is commonly called Cierge Épineux.

Vol.3 t.30: **Melocactus monoclonos, fructu atropurpureo, cereiformis.** [***Pilosocereus royeni*** (L.) Byles & G.D.Rowley] (Figure 55b)

Plumier, in his *Catalogus plantarum Americanarum* (1703: 6) used the same phrasename, with the omission of "cereiformis", and in its synonymy referred to Tournefort, *Inst. r. herb.* 653 (1700), where Tournefort's phrasename was actually "Melocactus Americanus, monoclonos flore albo, fructu atro-purpureo." Plumier's own


Melocactus Monoclonos, fructu atro purpureo, Cereiformis.

Sarissarum aut Cereorum altissimorum et spinis horrentium faciem obtinet tota planta, multa simul nempe connascentes sylvulam efformant aspectu horrendam simul et jucundam. quaelibet planta suo et ipso unico, seu singulari et nullatenus ramoso prodit caudice rectissimo, interdum ter humanam altitudinem superante licet vix tibiam humanam crasso. Tota ejus longitudo octo novem interdum decem sulcis profundissimis striatur quorum aristae rotundae, undosae et ad singularum undularum verticem scutatae et aculeis rigidis, tenuibus nigricantibus, semipollicem fere longis et radiatim calcitrapae in modum adunatis instructae. Tota caudicis substantia carnosa est subamara, granulis lapideis interdum plena, deforis laete virescens, intus vero subcandida, et meditullio carnoso traiecta summitas ejus in conum striatum desinit, floribusque quibusdam exornatur monopetalis, campaniformibus, patentibus sed in plurima segmenta subrotunda et multiplici serie collocatis dissectis. dimidium palmae manus singuli obtinent amplitudinem candidissimi sunt staminibusque innumeris pleni tenuibus candidis et apicibus flavescentibus aut candicantibus instructis. Eorum calyx carnosus est et oblongus tomento et spinulis acutissimis ad basim circumvallatus abitque deinde in fructum carnosum pomo similem, umbilicatum leviter striatum saturo purpureum, pulpaque etiam purpurea plenum tenerrima, subdulci innumerisque exiguis seminibus nigris et lucidis farta. ex ipsius calycis umbilico exurgit pistillum albumque longiusculum fere infundibuliforme et in multas lacinias in summitate divisum.

plurimis in locis potissimum saxosis insularum Antillanarum reperitur haec planta quam propter cum cereis conformitatem vulgo Cierges espineux appellant.

Figure 55a. Plumier's manuscript describing *Pilosocereus royeni* (L.) Byles & G.D.Rowley.

earlier choice of phrasename had been: Cereus spinosus, seu opuntium cerciforme altissimum (Spinous cereus, or tallest cylindric opuntia) for his description and plate in the folio of plates dated 1688 at the Bibliothèque Nationale de France, Paris, (Figure 55c-d), reproduced by Grillon, *Plantes de la Martinique et de la Guadeloupe* (1985), with the description below that carries a bit of extra information about the fruit:

"The Thorny Candle is an admirable kind of plant; because a large solitary sprout grows from its root like an 8-angled or -edged arm, entirely covered with little stars [spiny areoles] like those of the star thistle [*Centaurea*] and this stem which is known to reach five or six feet high, all straight, branching from its ribs: The one or two other branches are all similar, and those others are also branched, which because it is strongly erect, give it the name Thorny Candle, it has a violet brown fruit, which stains the hands, and is of a very bland taste."

This was another species named and validated by Linnaeus (1753: 467) without any elements for typification. However it is one of the species in the second edition of *Species plantarum* (1763) said to have been depicted by Plumier: "The history of the angular cacti [nr.] 3-14, remains somewhat obscure but they mostly appear in the illustrations of Plumier where they are skilfully delineated for the benefit of travellers to the Indies". Thus it is wholly appropriate to have been neotypified by Mottram (2013: 44) with Burman's copy in t.191 of Plumier's t.30, and might even be thought of as a

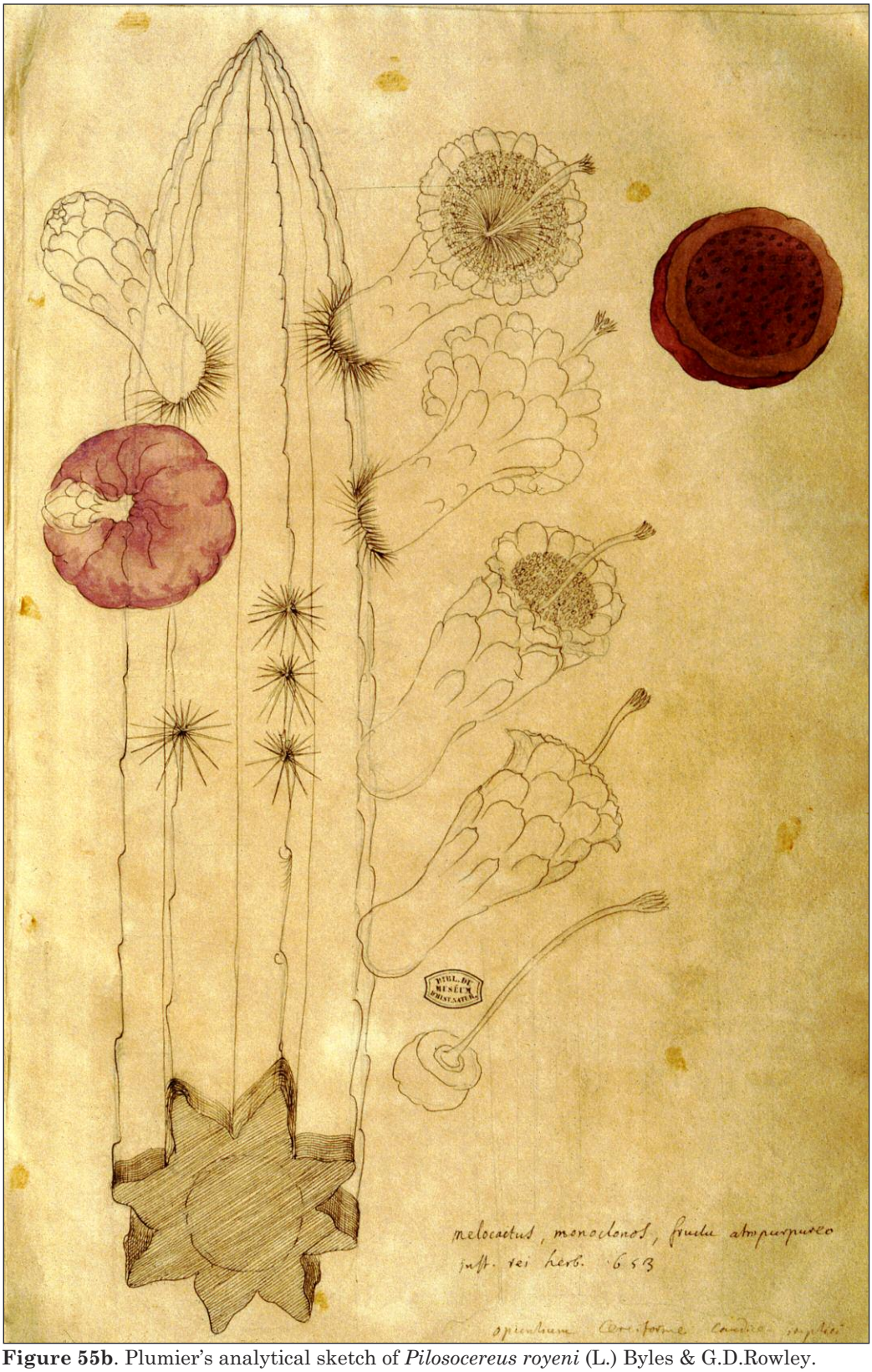


Figure 55b. Plumier's analytical sketch of *Pilosocereus royeni* (L.) Byles & G.D.Rowley.

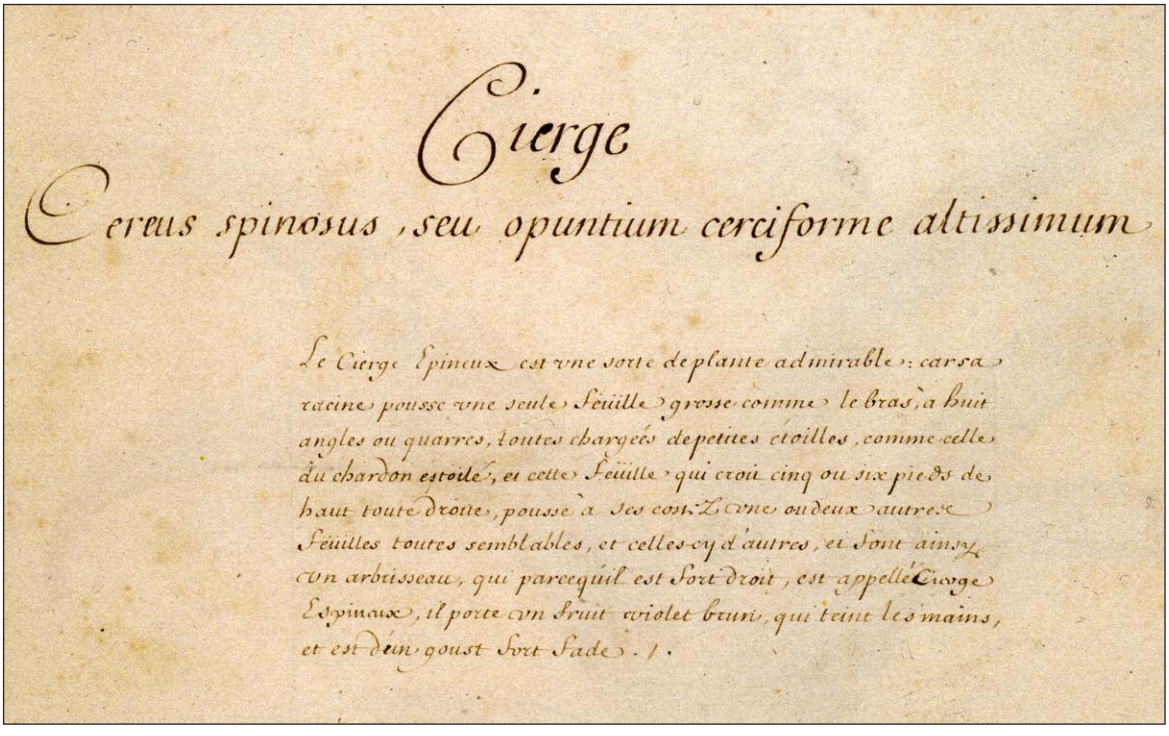


Figure 55c. Plumier's manuscript, dated 1688, describing *Pilosocereus royeni* (L.) Byles & G.D.Rowley from Grillon (1985).

Figure 55d. Plumier's plate, dated 1688, of *Pilosocereus royeni* (L.) Byles & G.D.Rowley.

Figure 56. British Virgin Islands postage stamp 1991. From a set of native flora featuring *Pilosocereus royeni*.

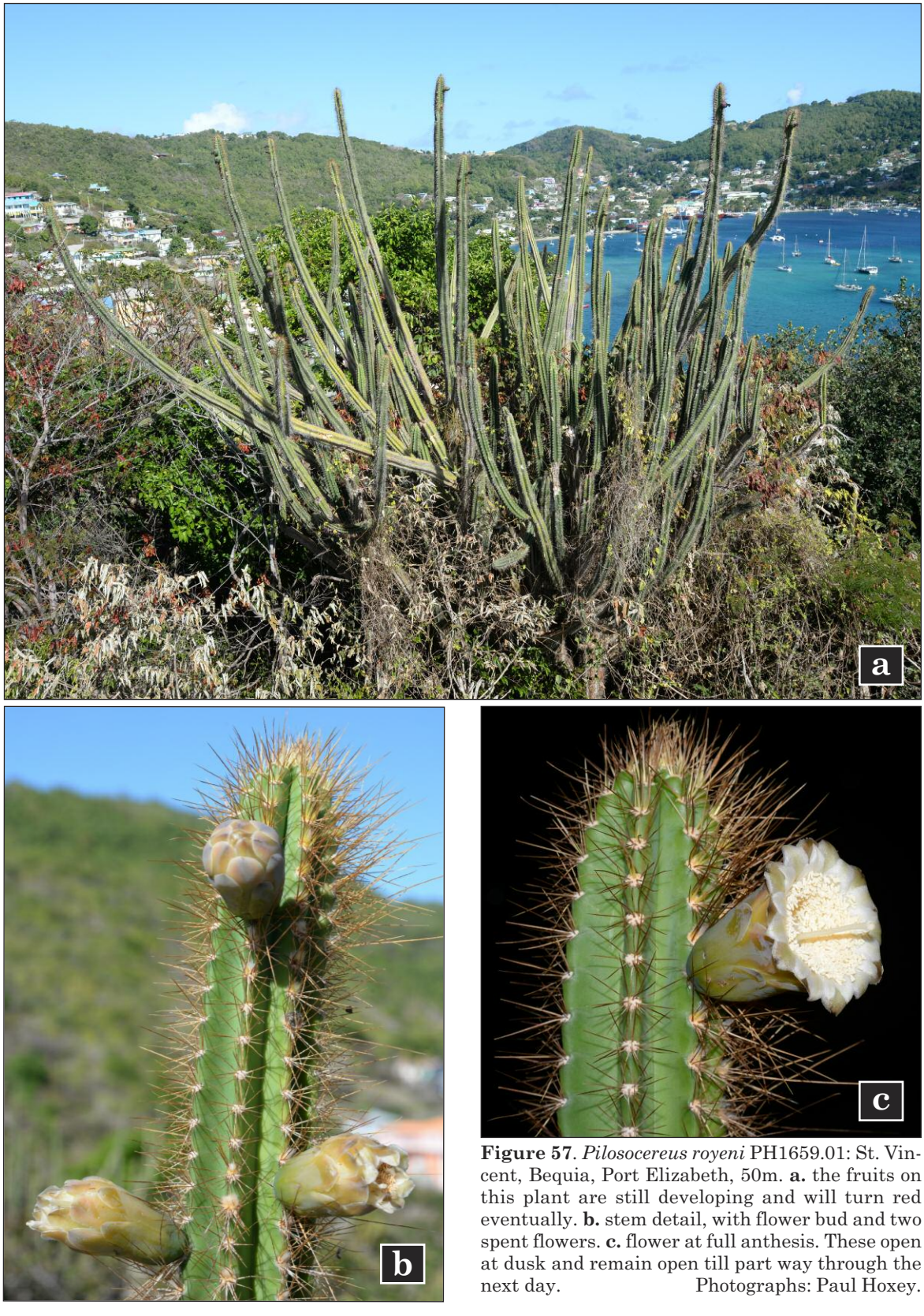


Figure 57. *Pilosocereus royeni* PH1659.01: St. Vincent, Bequia, Port Elizabeth, 50m. **a.** the fruits on this plant are still developing and will turn red eventually. **b.** stem detail, with flower bud and two spent flowers. **c.** flower at full anthesis. These open at dusk and remain open till part way through the next day. Photographs: Paul Hoxey.

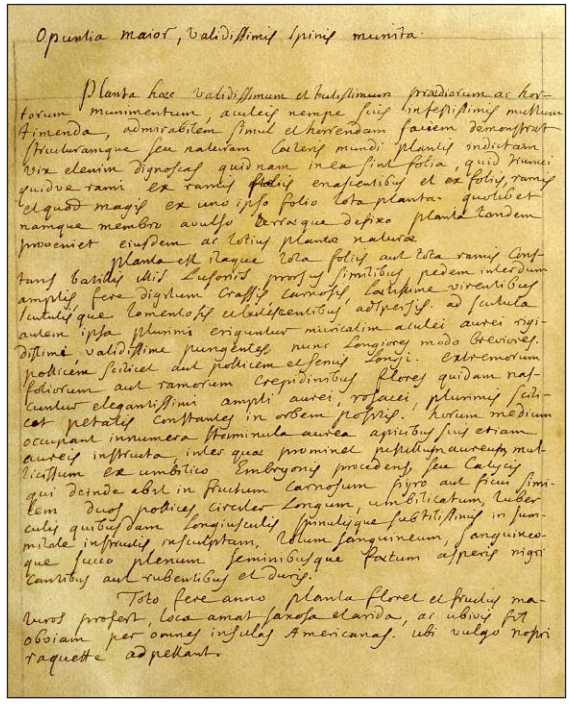
lectotypification because the plate was extant and known to have been seen by Linnaeus in 1737. The plates of Plumier agree fully with current usage of the name *Pilosocereus royeni* (L.) Byles & G.D.Rowley, except Franck *et al* (2019: 170–172), who call Plumier's plant *Pilosocereus curtisii* (Pfeiff.) A.R. Franck.

Plumier's reference to the common name Cierge Épineux was perhaps not as helpful as it might seem, because that sobriquet was in use for any spiny, columnar cactus at the time.

Linnaeus (1759: 1054) added the Burman copy of this plate to the synonymy of his *Cactus peruvianus*, a taxon already typified by L'Obel's plate. The exact identity of L'Obel's plate is uncertain, but the conclusion of Mottram (2013: 42-43) that it was *Cactus grandiflorus* now seems very unlikely. The English free translation of L'Obel's text in Gerard's *Herbal* (1597: 1015-1016) also referred directly to the illustration of L'Obel. That account goes on to describe the fruits as filled with red, juicy pulp that stains the hands. Only *Pilosocereus royeni* and *Stenocereus heptagonus* among Caribbean cerei have such fruits, so *Cactus peruvianus* must have been one of these two species. See Appendix 2 for further discussion.

De Candolle (1828: 464) took Burman's t.191 as the basis for a new name *Cereus monoclonos* DC., which is thus a superfluous obligate synonym of *Pilosocereus royeni* (L.) Byles & G.D.Rowley.

The species occurs throughout much of the Caribbean (Figure 56), and Plumier mentions it being found in rocky places of the islands of the Antilles. It is, however, not reported from Hispaniola, where it is replaced by *Pilosocereus polygonus*. Hoxey & Gdaniec photographed it on Bequia, one of the islands visited by Plumier (Figure 57)


Opuntia maior, validissimis spinis munita

Planta haec validissimum et tutissimum praediorum ac hortorum munimentum, aculeis nempe suis infestissimis multum timenda, admirabilem simul et horrendam faciem demonstrat structuramque seu naturam caeteris mundi plantis indictam vix etenim dignoscas quidnam inea sint folia, quid truncei quidve rami ex ramis foliis enascentibus et ex foliis, ramis et quod magis ex uno ipso folio tota planta. Quolibet namque membri avulso terraque defixo planta tandem proveniet esusdem ac totius plantae naturae.

Planta est itaque tota folius aut tota ramis constans basillis illis lusoriis prorsus similibus pedem interdum amplis fere digitum crassis, carnosis, laetissime virentibus scutulisque tomentosis et lactescentibus adspersis ad scutula

Figure 56a. Plumier's manuscript describing *Opuntia dillenii* (Ker Gawl.) Haw

autem ipsa plurimi eriguntur muricatim aculei aurei rigidissimi validissime pungentes, nunc longiores modo breviores, pollicem scilicet aut pollicem et semis longi. Extremorum foliorum aut ramorum crepidinibus flores quidam nascuntur elegantissimi ampli aurei, rosacei, plurimis scilicet petalis constantes in orbem positis. Horum medium occupant innumerosa staminula aurea apicibus suis etiam aureis instructa, inter quae prominet pistillum aureus multicissum ex umbilico. Embryonis procedens, seu calycis qui deinde abit in fructum carnosum pyro aut ficus similem duos pollices circiter longum, umbilicatum, tuberculis quibusdam longiusculis spinulisque subtilissimis in summitate instructis insculptam, totum sanguineum, sanguinea que succo plenum seminibusque faetum asperis nigricantibus aut rubentibus et duris.

Toto fere anno planta floret et fructis maturos profert. Loca amat saxosa et arida, ac ubivis sit obviam per omnes insulas americanas, ubi vulgo nopri raquette adpellant.

Latin transcript of Plumier's Vol. 3 t.74 Opuntia maior, validissimis spinis munita [*Opuntia dillenii* (Ker-Gawl.) Haw.] (Figure 58a)

Planta haec validissimum et tutissimum praediorum ac hortorum munimentum, aculeis nempe suis infestissimis multum timenda, admirabilem simul et horrendam faciem demonstrat structuramque seu naturam caeteris mundi plantis indictam vix etenim dignoscas quidnam inea sint folia, quid truncei quidve rami ex ramis foliis enascentibus et ex foliis, ramis et quod magis ex uno ipso folio tota planta. Quolibet namque membri avulso terraque defixo planta tandem proveniet esusdem ac totius plantae naturae.

Planta est itaque tota folius aut tota ramis constans basillis illis lusoriis prorsus similibus pedem interdum amplis fere digitum crassis, carnosis, laetissime virentibus scutulisque tomentosis et lactescentibus adspersis ad scutula

English translation:

t.74 Greater opuntia, armed with the strongest spines

This plant is the strongest and most protective fortification [boundary hedge] of farms or gardens, with its truly dangerous, very fearsome spines, and its form and structure is both admirable yet formidable yet it is distinguished from the rest of

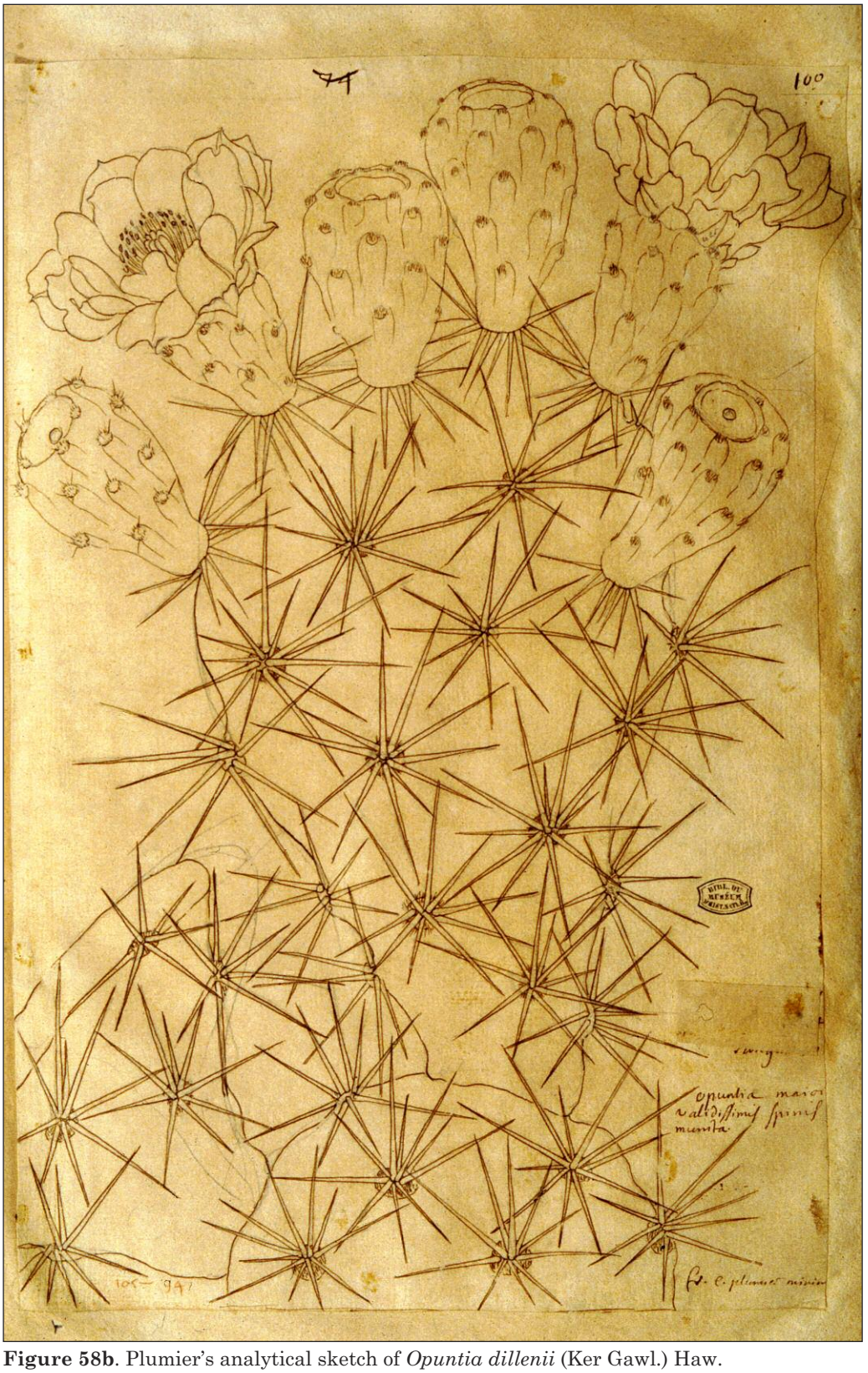


Figure 58b. Plumier's analytical sketch of *Opuntia dillenii* (Ker Gawl.) Haw.

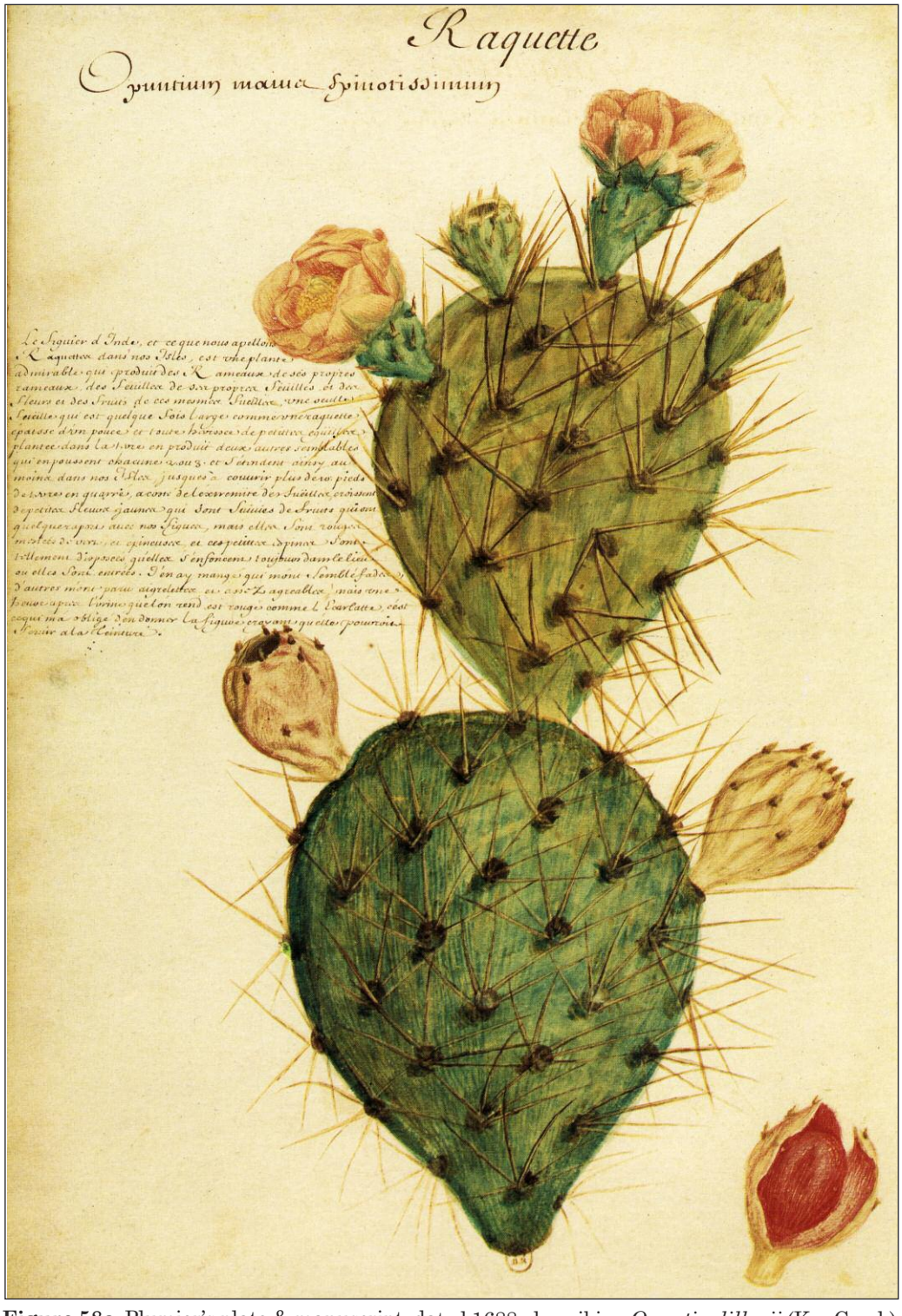


Figure 58c .Plumier's plate & manuscript, dated 1688, describing *Opuntia dillenii* (Ker Gawl.) Haw. from Grillon (1985).

Figure 59. The earliest illustration of *Opuntia dillenii* from Oviedo (1535).

the worlds plants by appearing to be nothing but leaves, in fact they are at first scarcely recognisable as leaves, which arise from either the trunk or from any emerging branch leaves or the leaves themselves, and the whole plant sprouts branches from what is effectively just a single leaf [cladode]. Withersoever you please, the plant emerges as a strange growth and fastened to the ground by a single point and yet an entirely natural plant.

Therefore the plant is entirely consisting of leaves or branches arising from a small pedestal like a thick finger that rises upwards by sometimes nearly a foot, fleshy, very bright green and with tomentose areoles and sprinkled with milk [?extrafloral nectaries or sap exudation] but to the areole itself are attached very many muricate, golden, very stiff, very strong, sharp spines, at maturity the longer barely measuring more than the shorter, certainly an inch or inch and a half long. Certain very pretty, large golden flowers appear with bases seated upon the outermost edges of the leaves or branches [cladodes], rose-like, with many petals afixed of course in circular fashion. Its centre is occupied with numerous small yellow stamens, these also tipped golden yellow at the top [anthers], between which a golden many-branched pistil arises from the umbilicus [base of tube]. The embryonic calyx develops thereafter into a fleshy pear- or fig-shaped fruit, about 2 inches long, umbilicate, with sort of small elongated podaria and very bristly spines embedded at the top, entirely blood-red, filled with red [flesh] that is juicy and concealing rough, black or reddish and hard seeds.

The plant flowers and produces ripe fruits almost throughout the year. It loves rocks and aridity, and also wherever you will it is to be met throughout the American islands, where it is commonly called Nopal Raquette.

Vol.3 t.74: **Opuntia maior, validissimis spinis munita.** [***Opuntia dillenii*** (Ker-Gawl.) Haw.] (Figure 58b)

Also called Opuntium maiua spinosissimum by Plumier in the folio of plates dated 1688 at the Bibliothèque Nationale de France, Paris (Figure 58c), reproduced by Grillon, *Plantes de la Martinique et de la Guadeloupe* (1985), with the description below in English translation:

"**The larger spiniest Opuntia.**

The Indian Fig, and we call this Raquette ([tennis] Racket) within the islands, is an admirable plant which grows branches from its own branches, leaves [cladodes] from its own cladodes, and flowers and fruits from the same cladodes, one cladode alone may sometimes be as wide as a [tennis] racket [and] as thick as an inch and entirely bristling with little needles, when planted in the earth it produces two others the same which in turn grow another 2 or 3 and also may be divided, so as to create hedges of more than two feet at the boundaries of land in our islands, crowned at the ends of the cladodes with yellow flowers which are followed by fruits that are like our figs, but they are red, green when unripe, and thorny and its small spines are so disposed that they will pierce the mouth and stick in place. I have eaten it but while some seem to me to have a blandness, others seemed to me sourish but also pleasant, but an hour later the urine that is passed is red like Scarlattea [*Lychnis sativa*]: it is necessary that I should give the real story because some may be deceived by a prankster."

Despite being exceedingly common throughout the Caribbean and illustrated as early as 1535 by Oviedo (Figure 59), this taxon had to wait until 1818 to receive its binomial. The plate accompanying the protologue of a cultivated plant of unknown origin (See *Bradleya* **14**: 118) was designated as lectotype by Benson in 1969, and its name commemorates John Jacob Dillen (1684-1747) who flowered and illustrated a plant in the Eltham garden belonging to Sherard in SE London in 1732, also of unknown origin. Plumier likewise stated no precise location for the plant in his drawing, but his folio account does suppose an origin from one of the Antilles French possessions.

The earliest account of its fruit dye passing through the digestive system and staining urine was by Oviedo (1526, 1535). His account in English translation by Sterling Stoudemire (1959: 102) was as follows:

"After one eats three or four of them (or better, more), if the one who has eaten them stops to

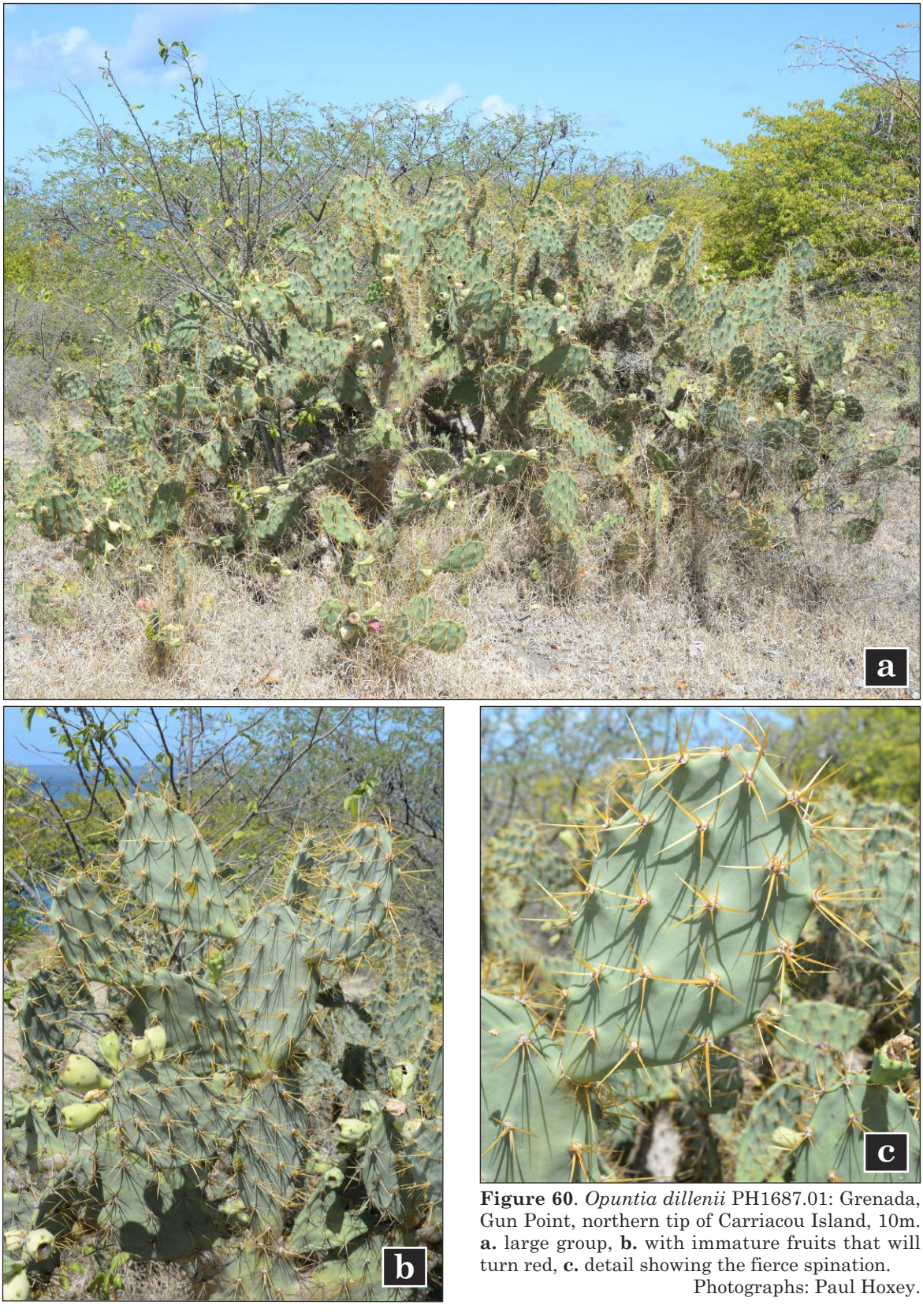


Figure 60. *Opuntia dillenii* PH1687.01: Grenada, Gun Point, northern tip of Carriacou Island, 10m. **a.** large group, **b.** with immature fruits that will turn red, **c.** detail showing the fierce spination. Photographs: Paul Hoxey.

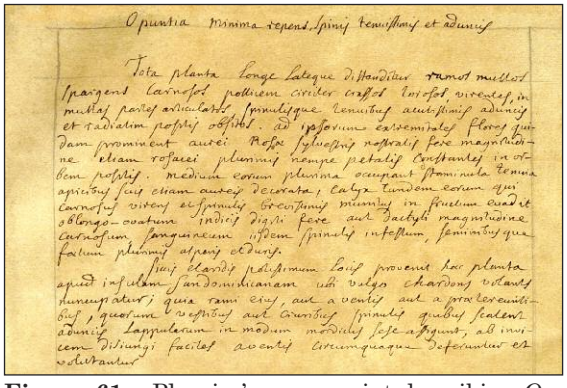


Figure 61a. Plumier's manuscript describing *Opuntia curassavica* (L.) Mill.

urinate it is as red as real blood. This happened to me the first time I ate them. After an hour I wanted to urinate (this fruit is very conducive to such), and when I saw the colour of the urine, I was in grave fear as to the condition of my health. I was sorely afraid that some serious malady had come upon me. Indeed my imagination could have caused me much grief if persons of more experience and of longer time in that area had not informed me of the cause."

As Oviedo was given to occasional flights of fancy, the London Royal Society of Arts in 1757 asked Dr. Alexander Garden of Charlestown to conduct experiments. Garden reported as follows:

"As you desired I tried the effects of the Prickly Pear in colouring the urine. A few days after receiving your letter I went down to one of the islands and gathered some of the fruit and gave four of the pears to a child of 3 years of age and six pears to one of 5 years of age. Next morning I examined both their urine and it appeared of a very lively red colour as if faint wine had been mixed with clear water. The eldest's urine was the deepest coloured but of a darker look. The youngest's (who naturally always made pale clear urine) was of a more lively and beautiful red. Next day I gave six to a negro wench who gave suck, and strictly forbid her to suckle her child for six or eight hours, and then upon taking some of her milk in a tea cup and putting it by for some hours, the cream had a reddish lustre tho' it was very faint. I was led to this last experiment from an observation which I made on the milk of cows who had fed in an indigo field. The indigo had not only tinged their urine blue but the cream of their milk was of a most beautiful blue and it had a radiated appearance from the center. The milk underneath was as clear and white as usual." (Berkeley, 1969: 95-96).

Opuntia dillenii was seen by Hoxey and Gdaniec in many localities throughout Haiti, and also very commonly in the Grenadines (Figure 60). It has been cultivated for so long that its natural habitat is unknown.

Latin transcript of Plumier's *Vol. 3 t.75* Opuntia minima repens, spinis tenuissimis et aduncis

[***Opuntia curassavica*** (L.) Mill.] (Figure 61a)

Tota planta longe lateque distenditur ramos multos spargens carnosos pollicem circiter crassos torosos, virentes, in multos partes articulatos spinulisque tenuibus acutissimis aduncis et radiatim positis obsitus. Ad ipsorum extremitates flores quidam prominent aurei rosae sylvestris nostratis fere magnitudine etiam rosacei plurimis nempe petalis constantes in orbem positis. Medium eorum plurima occupant staminula tenuia apicibus suis etiam aureis decorata. Calyx tandem eorum qui carnosus virens et spinulis brevissimis munitus in fructum evadit oblongo-ovatum indicis digiti fere aut dactyli magnitudine carnosum sanguineum iisdem spinulis infestum, seminibusque faetum plurimis asperis et duris.

Siccis et aridis potissimum locis provenit haec planta apud insulam sandominicam ubi vulgo chardons volants nuncupatur, quia rami eius, aut a ventis aut a praetermisibus, quorum vestibus aut cruribus spinulis quibus scatens aduncis disiungi faciles a ventis circumquaque deferuntur et volutantur.

English translation:

t.75 Small creeping Opuntia, with the smallest and barbed spines

The entire plant stretches many fleshy spreading branches far and wide, with stems about one inch thick, green, articulated into many parts [cladodes] and covered with little, slender, very acute, barbed and spreading spines. Some golden yellow flowers project from its furthest ends, almost the size of our wild rose [*Rosa canina*], certainly also rose-like with many petals inserted close together in a circle. Its centre is occupied by many small slender stamens also a pleasing golden yellow at their tips [anthers]. At length its calyx, which is fleshy, green and armed with very short spines, develops into an oblong-ovate fruit, almost the size of a fore-finger or a grape, fleshy, blood-red, possessing the same unpleasant spines, and concealing many rough and hard seeds.

This plant comes chiefly from dry and arid places on the island of San Dominica [Haiti], where it is commonly called Chardons Volants [Flying Thistles], because its branches, either by wind or by being unnoticed attached by their barbed spines to anyone's clothes or shins they are carried away and roll around easily in the wind.

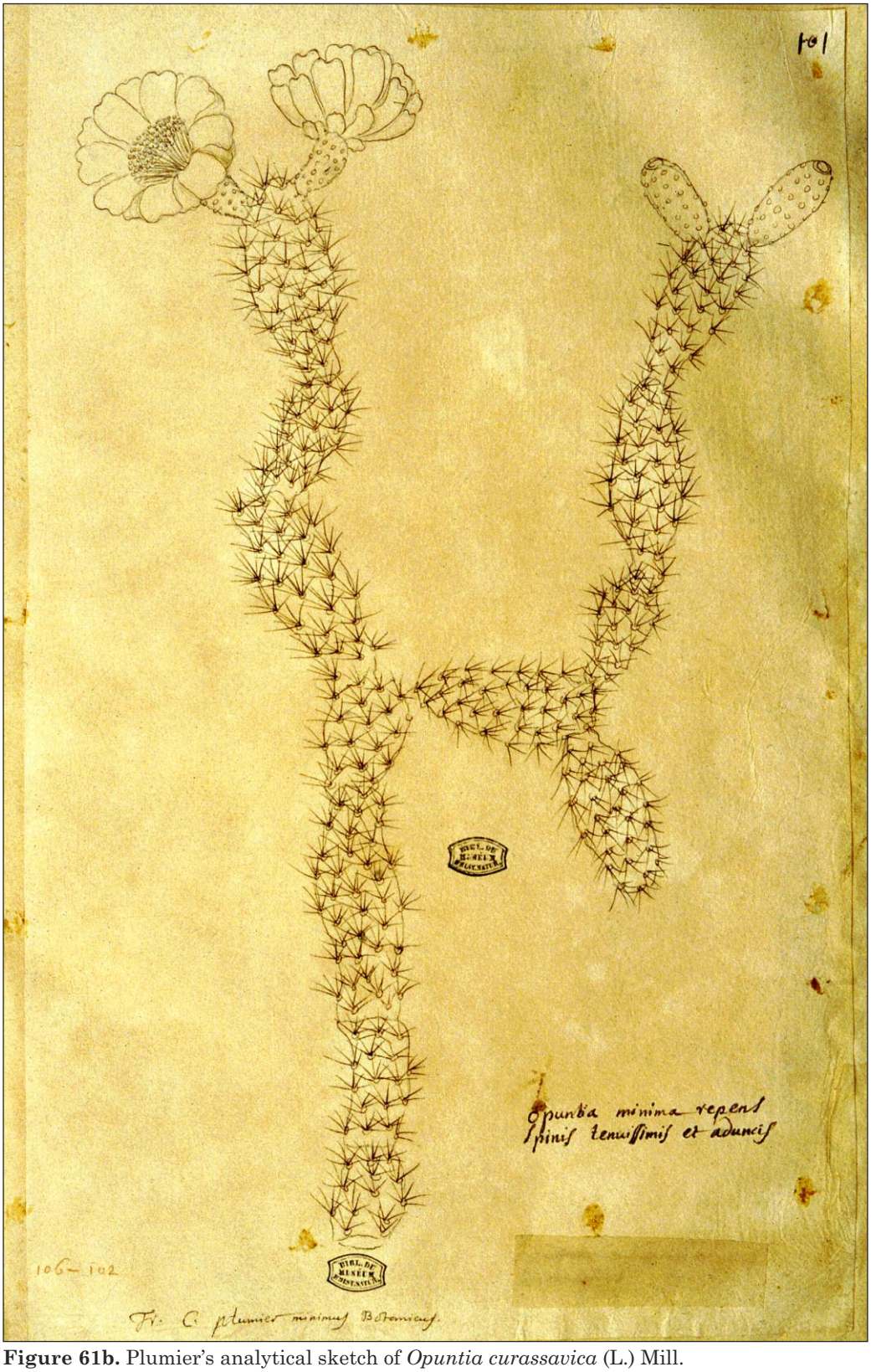


Figure 61b. Plumier's analytical sketch of *Opuntia curassavica* (L.) Mill.

Figure 62. *Opuntia curassavica*. **a.** PH1281.04: Haiti, Dept. Artibonite, Johanisse, south of Gonaïves 70m. **b.** PH1298.04: Haiti, Dept. Nord-Ouest; North of Bassin Bleu, 160m. Photoraphs: Paul Hoxey.

Vol.3 t.75: **Opuntia minima repens, spinis tenuissimus et aduncis.** [***Opuntia curassavica*** (L.) Mill.] (Figure 61b)

Its name, *Cactus curassavica* L., tells us that it was first known from Curaçao, but it is frequent throughout most of the Caribbean. Phenotypic as well as genotypic variability has resulted in several superfluous names according to the habitat where they are found. It is ground-hugging, spiny and brittle, so propagates itself readily by clinging to roaming animals, and joints may be ellipsoidal or oblong, and flattened or more or less terete.

In poor light, the segments elongate excessively, and it is in this state that it was drawn for Jan Commelijn by an unknown artist (1697: t.56). That plate was one of two cited by Linnaeus (1753: 469) and selected as lectotype by Wijnands (1983: 57). The second Linnaean element, in Plukenet, *Almagestum* t.281, was more natural looking and would have been the better selection.

Plumier found it in Haiti in many places, where it is often known under the name *Opuntia taylorii* Britton & Rose. Hoxey and Gdaniec reported in 2017 that it is very common there (Figure 62). The variety of segment size and shape have lead to a number of unnecessary segregate names: *O. pubescens* Pfeiff., *O. repens* Bello, *O. taylorii* Britton & Rose, *O. triacantha* (Willd.) Sweet, and *O. antillana* Britton & Rose (a possible hybrid with *O. dillenii* (Ker Gawl.) Haw.).

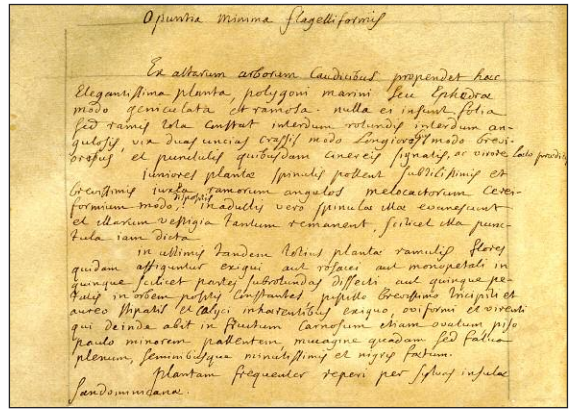
In the Lesser Antilles, Howard (1989: 412) reported finding it on the islands of St. Eustatius and Redonda. Hoxey and Gdaniec were unable to find any small opuntioids between St. Vincent and Grenada in 2019.

Latin transcript of Plumier's Vol. 3 t.76 Opuntia minima flagelliformis. [***Rhipsalis parasitica*** (L.) Haw.] (Figure 63a)

Ex altarum arboreum caudicibus propendet haec elegantissima planta, polgoni marini seu Ephedrae modo geniculata et ramosa. Nulla ei insunt folia sed ramis tota constat interdum rotundis interdum angulosis vix duas uncias crassis modo longioribus modo brevioribus et punctulis quibusdam cinereis signatis, ac virore laeto praeditis.

Iuniores plantae spinulis pollent subtilissimis et brevissimis iuxta ramorum angulos melocactorum cereiformium modo dispositis, inductis vero spinulae illae evanescunt et illarum vestigia tantum remanent, scilicet illa punctula iam dicta.

In ultimis tandem totius plantae ramulis flores quidam astiguntur exigui aut rosacei aut monopetali in quinque scilicet partes subrotundas dissecti aut quinque petalis in orbem positis constantes, pistillo brevissimo tricipiti et aureo stipatis et calyci inhaerentibus exiguo, oviformi et


Opuntia minima flagelliformis

Ex altarum arborum caudicibus propendet haec
Elegantissima planta, polygoni marini seu Ephedrae
modo geniculata et ramosa. nulla ei insunt folia
sed ramis tota constat interdum rotundis interdum an-
gulosis, vix duas uncias crassis modo longioribus modo brevi-
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formium modo dispositis, inductis vero spinulae illae evanescunt
et illarum vestigia tantum remanent, scilicet illa punc-
tula iam dicta.
In ultimis tandem totius plantae ramulis flores
quidam astiguntur exigui aut rosacei aut monopetali in
quinque scilicet partes subrotundas dissecti aut quinque pe-
talis in orbem positis constantes, pistillo brevissimo tricipiti et
aureo stipatis et calyci inhaerentibus exiguo, oviformi et viri-
renti qui deinde abit in fructum carnosum etiam
ovatum piso paulo minorem pallentem, mucagine
quaedam sed fatua plenum, seminibusque
minutissimis et nigris faetum.
Plantam frequenter reperi per sylvis insulae
sandominicanae.

Figure 63a. Plumier's manuscript describing *Rhipsalis parasitica* (L.) Haw..

English translation:
t.76 Small whip-like Opuntia

This elegant plant hangs from the trunks of tall trees of coastal inlets, knotted and branched in the manner of *Ephedra*. It is itself without leaves but entirely composed of stems, sometimes rounded sometimes angular, scarcely 2 twelfths of an inch* [c.4mm.] thick, sometimes longer, sometimes shorter, and marked with some ashy pits [areoles], and also bright green in colour.

Juvenile plants have strong, very bristly and very short spines arranged near to the angles of the stems in the manner of cereiform melocacti, true spines that disappear later and small traces of them remain, evidently now as small pits.

Ultimately at length, some flowers are scattered over the small branches of the whole plant, small, either rose-like or monopetalous, evidently 5-partite, more or less circular, cut into 5 petals firmly attached in a circle, with a very short, 3-headed [stigma] and golden yellow pistil, compressed and a small attached calyx, egg-shaped and green which thereafter becomes a fleshy fruit, also ovate, slightly smaller and paler than a pea, somewhat filled with mucilage but insipid, and concealing minute and black seeds.

I encountered the plant frequently in woods of the island of San Dominica [Haiti].

*"uncia" normally translates as a inch, but that would make no sense here. Besides, Plumier generally used "pollex" for an inch. Cooper's 1573 Thesaurus translates "uncia" as "an ounce; an inche; the twelfth parte of the whole." and gives an example of usage in the sense of any

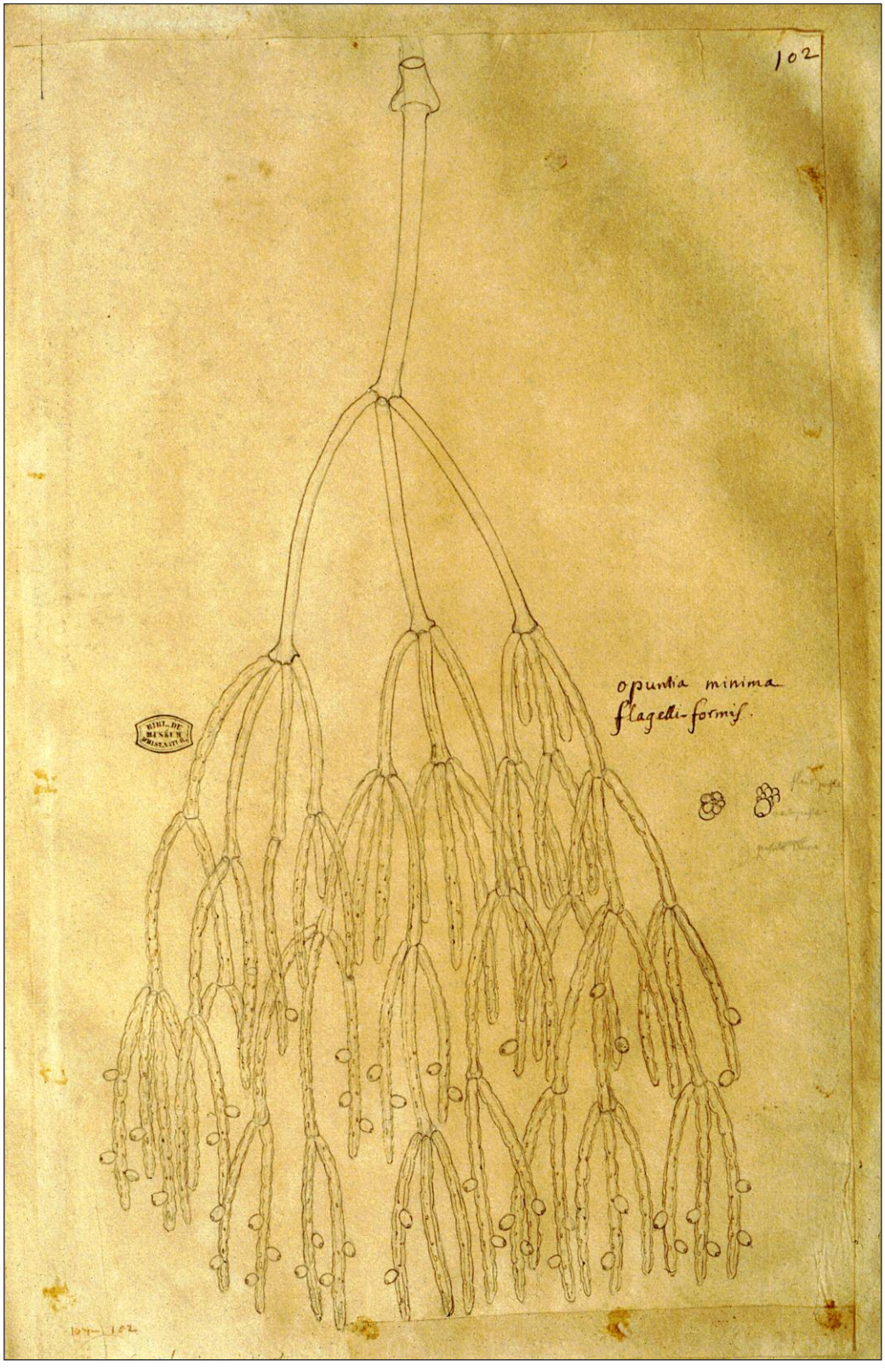

Figure 63b. Plumier's analytical sketch of *Rhipsalis parasitica* (L.) Haw.

Figure 64. *Rhipsalis parasitica*. PH1301.01: Haiti, Nord Dept., La Citadelle, above Milot, 800m. **a.** Hangs like a curtain from trees. **b.** Detail of stems. Photographs: Paul Hoxey.

twelfth part, and another example when used for an inch. We therefore surmise that Plumier was using "uncia" to mean "twelfth part of inch" or about 2mm., which makes perfect sense here.

Vol.3 t.76: **Opuntia minima flagelliformis.** [***Rhipsalis parasitica*** (L.) Haw.] (Figure 63b)

This epiphytic species has the widest distribution of any cactus occurring throughout the tropical Americas, Africa, Madagascar and Sri Lanka, and is often the subject of debate as to how it could have crossed the oceans. Avian distribution is the most likely answer.

There was a copy of Plumier's plate 76 made for Burman in fig.2 of t.197, but it was badly drawn with articulated stems and upside down. Linnaeus (1759: 1054; 1762: 668) eventually noticed the Burman copy and cited it under his *Cactus flagelliformis* α *parasiticus* L. (1759: 1054 nr. 12A), elevated to *Cactus parasiticus* (L.) L. in the second edition of *Species plantarum* (1762-63 **1**: 886). This taxon was mixed and included an element that had been drawn by Sloane resembling a rhipsalis, but was in fact an orchid. This action causes the displacement of *Cassyta baccifera* J.Mill. (1771), the basionym for the much better known name *Rhipsalis baccifera* (J.Mill) Stearn. Barthlott & Taylor (1995: 73) said that they would propose *Cactus parasiticus* L. for rejection, but that has never materialised and Linnaean taxa are seldom ever considered for rejection anyway.

As it happens, Linnaeus (1762–63: 668) had replaced Sloane's orchid element with a reference to the description in Browne (1756: 238) of the rhipsalis in Jamaica, and the only remaining original element was Burman's copy of Plumier's plate, for *Cactus parasiticus* (L.) L. Therefore, this can be regarded as an effective lectotypification, giving the epithet *parasiticus* priority over *baccifera* already.

Stearn (1939: 107) did not say why he had rejected the earlier *Cactus parasiticus* L., which was not included in his synonymy, but he referred readers to further synonymy in Schumann (1898) and Britton & Rose (1923), both of whom had used *Rhipsalis cassutha* Gaertn. (1788) as their basionym for this taxon. Schumann included *Cactus parasiticus* L. in the synonymy of *Rhipsalis cassutha* with a question mark, while Britton & Rose were unaware of the 1759 and 1762-63 Linnaean usage and descriptions of *Cactus parasiticus* L.

These confused treatments and the power of Stearn's authority has detered other authors from challenging this unfortunate error, but it is very clear that in 1939 he had completely overlooked the earlier Linnaean name. Perhaps they have also been influenced by the inappropriate epithet, because rhipsalis are never parasitic, but that is not a reason to ignore the priority rules of nomenclature. This oversight is formally corrected here, and the correct name is restored as follows.

Rhipsalis parasitica (L.) Haw., *Synopsis plantarum succulentarum*: 187. 1812.
Basionym: *Cactus flagelliformis* α *parasitica* L., *Systema naturae*, ed.10 **2**: 1054. 1759. [= *Cactus parasitica* (L.) L. (1762-63)]
Linnaean protologue: Cactus repens teres striatus muticus. Sloan. Jam. 224 f.3,4 Plum. ic. 197. f.2. [Cactus creeping, terete, furrowed, blunt].
Etym: The source of the epithet *parasitica* must have come from Browne's description, because Sloane and Plumier never claimed it to be parasitic, but was a part of Browne's phrase name.
T: America.
LT (**designated here**): Haiti, in woods; 1689-1690 or 1693, *Charles Plumier* in Burman, Cactus inermis, aphyllus, ramosus, *Plantarum Americanarum fasciculus 8*: t.197 fig.2. (20 Jun) 1758. Copied upside down from Opuntia minima flagelliformis in the unpublished archive of Plumier, *Botanicon Americanum* **3**: t.76. 1689-1697 at Muséum National d'Histoire Naturelle, Paris).

Plumier found it frequently in the woods of Haiti. Today it still thrives in the remaining woods (Figure 64), which are unfortunately becoming fewer and fewer as they are being steadily displaced by a globally expanding human population. Haiti is said to have lost well over half of its wooded areas in the past 50 years.

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Appendix 1

Translations of Linnaeus's various descriptions for ***Cactus heptagonus***: „erect, longish and seven-angled."

1737 (cited in the 1753 protologue with an asterisk to indicate that the taxon originated with this description)

„Known in America. Our plant is precisely ovate, cut into 7 deep angles; others say they have seen it retain its form for one and two feet, however ours has kept its same size for many years, and it has not grown well or changed shape."

from Linnaeus, *Hort. Cliff.*: 181., translated by Roy Mottram.

1763

"The history of the angular cacti 3–14, remains somewhat obscure but they mostly appear on the illustrations of Plumier where they are skilfully delineated for the benefit of travellers to the Indies."

[The reference "3–14" is to the species numbers for all the cacti in *Sp. Plant.* ed.1–3, under his grouping of "Cerei *angulati erecti"* (3–10), "Cerei *repentes radiculis lateralibus"* (11–13), and *Cactus moniliformis* (14)]

from Linnaeus, *Sp. Plant*. ed. 2 **1**: 666–667, translated by Roy Mottram.

1778

"It is also native in America; and Linnaeus wishes that its history as well as that of the following eleven species* - a still mostly deficient history - will be described henceforth in detail by those travelling in their native country and having the chance to observe them there.

From their root, they are growing a single stem, sometimes also several stems, which are always green, woody only in the centre, however all around is soft and succulent [parenchymous tissues], erect, thick and sometimes very tall; these stems along their entire length have some strong angles covered with spines, and usually are simple, however at times on the side or at the end they are divided into some arm-like branches which however presumably are outgrowths rather than true branches because in European greenhouses the plants produce such branches or outgrowths only when they are cut or otherwise injured. On the sides of the stem on and off single beautiful and large flowers are produced which however are short-lived, usually not flowering much longer than 12 hours; the flowers are followed by roundish or elongate, smooth or scaly fruits which contain lots of seeds and a sweet edible flesh, and in some species they are as big as French nuts or apples, in others as big as melons."

[*The reference „following 11 species" is to species nr. 4–12, i.e. all his „Cerei *angulati erecti*" (nr. 3–10), and the first two „Cerei *repentes radiculis lateralibus"* (nr. 11–12)]

from Linnaeus, *Ritters Carl von Linné …* : 623 [collected works, edited] translated from the German by Margrit Bischofberger.

Appendix 2

Original descriptions accompanying the image that is the lectotype of *Cereus peruvianus* L., and an attempt to prove its identity

Translation of an extract from **Pena, Pierre & L'Obel, Matthias**, ***Nova stirpium adversaria*** (1576) Christopher Plantin, Antwerp, 26 Jul 1576.

Latin transcript:
"**CEREXUS.**

Huius penè portentosa elegantia, Naturae Genius omnem provocavit in nostratibus plātis admirationé: nam mirabilitatis opplet spectantis animum & oculos, huius rarissimae venustatis plantae spectaculum. Eam plebecula effigiei argumento, Cereum vernaculè vocavit: hastas enim surrigit quaternas & quinas, novemdecim & vicenûm cubitorum, virgatis & ad normá directis striis, canulatas: in externis extantibus striarum angulis obtusis exeruntur stellulae, corneis stilis radiatim è suo centro quoquoversum minacibus, uno dumtaxat prominulo horsum, eque directo longiùs: tota quandam effigiaturam, & concolorem superficiem Echinomelocacti praesert, sed brachium aequabili ductu aequáte: Columellae, aut Cerei Funalis praelongi instar. Eius è medio & striarú dorsis, ansatim, angustiore cervice, cucumeris ventre, surriguntur brachia terna, quasi folia terétia crassa, eundé cômensum proportionis & figuram sortita. Intus torulus ligneus, praedurus, carpi crassitie, obductus est, callosa carne, & succo Aloes: gummeo enim turget, perquàm amaro lentore: flores in fastigio summo promit, referéte qui attulit, Digitalis purpureae: fructns hilari purpura miniata rubet, ficus ferè effigie, gustu non insipido."

English translation:

In this almost miraculous touch of elegance, the Guardian Spirit of Nature arouses all our senses in sheer admiration: for the vision of this very rare lovely plant lifts the spirit & feasts the eyes. For its likeness to the subject [Cerexus (= candles)], local people call it by the vernacular name Cereus: it indeed throws up spears four or five at a time, of nineteen to twenty cubits [8–9m high], with strips

[ribs] & furrows directed at right angles, with grey hair: along the outer edges of the obtuse ridges are inserted little stars [areoles], with horny, spreading, menacing spines radiating from its centre, just one slightly projecting outwards, long and straight: the whole presenting a certain image resembling Echinomelocacti in aspect and colouring, but with branches that resemble the main stem: a short column, or like a very long wax-torch Cereus. The branches arise in threes from its main stem & outer ribs, handle-like, with narrow neck, fat as a cucumber, like thick round leaves, whence the resulting proportions & the drawing to scale. Inside a ring of very hard wood, the thickness of a wrist, is a layer of solid flesh, & juicy Aloes: indeed filled with gum, an extremely bitter stickiness: The flowers are produced from the apex in a bunch, opening to reveal a Digitalis purple [flower colour]: the fruit is almost like a fig, with glossy bramble-like purplish saturn-red flesh, not unpleasant to taste.

The text below from **Gerard, J.**, ***The herball***: 1015–1016. 1597 accompanied the same image in that work. The London publisher brought in L'Obel to correct some of Gerarde's errors (over 1000 *fide* L'Obel), so perhaps we can assume that L'Obel approved of the following description. Parts of Gerard's translation can be recognised as being from L'Obel's original Latin, but in places there are inaccuracies. There are also important additions, such as the way that hands are stained by the juice of the fruit.

Caption: ***Cereus Peruvianus spinosus L'Obelii.*** **The torch, or thornie Euphorbium.**

Description:

"There is not amongst the strange and admirable plants of the worlde any one, that giveth more cause of marvell, or more mooveth the minde to honor and laud the Creator, than this plant, which is called of the Indians in their mother tongue *Vragua*, which is as much to say, a torch, taper, or waxe candle, whereupon it hath been called in Latine of those that understoode the Indian tongue, *Cereus*, or a torch. This admirable plant riseth up to the height of a speare of 20 foote long, although the figure expresse not the same; the reason is, the plant when the figure was drawne came to our viewe broken; it hath divers bunches and valleies, even as is to be seene in the sides of the Cucumber, that is furrowed, guttered, or chamfered alongst the same, & as it were laid by a direct line, with a welt from one end unto the other; upon which welt or linedo stande small starlike Thistles, sharpe as needles, & of the colour of those of the Melon Thistle, that is to say, of a browne colour: the trunke or bodie is of the bignes of a man's arme, or a cable rope; from the middle whereof thrust foorth divers knobbie elbows of the same substance, & armed with the like prickles that the body or truncke is set withall: the whole plant is thicke, fat, & full of the fleshie substance, having much juice like that of Aloes, when it is hardned, and of a bitter taste: the flowers or fruit we have no certaine knowledge of, onely saith my author, the flowers growe at the top or extreme point of the plant, after which followeth fruite in shape like a figge, full of a reddish juice, which being touched, staineth the hands of the colour of red lead: the taste is not unpleasant."

Critical examination of the description by L'Obel (1571 & 1576: 453–454) points to *Cereus peruvianus* (L.) Mill. being *Stenocereus heptagonus* (L.) Mottram. The flowers in a bunch at the apex of stems is not usually the habit of *Pilosocereus royeni*. The strong spine arrangement with a single stronger central described by L'Obel is also more in agreement with *Stenocereus heptagonus*.

Linnaeus (1759: 1054) added "Plum. ic. 191" to the synonymy of *Cactus peruvianus*, which suggests that he thought it was *Pilosocereus royeni* as we undertand it. Lunan (1814 **2**: 236) described two cerei from Jamaica, calling one of them *Cactus repandus* but giving it the description of *Stenocereus heptagonus* as we understand it. The other he called *Cactus peruvianus* but its description happened to be that of *Harrisia gracilis*, the Lesser Dildo, or *Cactus repandus* L. & auct.

The Scottish botanist Macfadyen (1850: 174) used the name *Cereus peruvianus* to apply to *Stenocereus heptagonus* as we know it, and in this respect he seems to have been the only author for a century to have used the name correctly in our opinion. Unfortunately the stock of the volume containing his account was not distributed after his death, so his viewpoint was not available to most other botanists. Thankfully, internet sources have now made it available again from the few surviving copies.

Schumann (1897) and other contemporary authors applied the name *Cereus peruvianus* in a completely different sense, arguing that it ought to be typified by something from Peru, in view of its name, seemingly unaware that the name originated at a time in history when Peru was a vaste geographical area of South America long before it became the name of the country today. Britton & Rose (1920) followed suit, and these monographers sealed the fate of anyone trying to understand the proper application of the name from then on. Britton & Rose made a similar error in misapplying the name *Cereus repandus*, which has also persisted.

Fawcett & Rendle (1926: 279) rejected Britton & Rose's concept of *Cereus peruvianus*, returning it to its rightful place with its origin from Jamaica. However, they too were confused and their concept of *Cereus peruvianus* was mixed, as it included elements of both *Stenocereus heptagonus* and *Pilosocereus royeni*.

Kiesling (1982: 443–453) became aware of the confusion surrounding *Cactus peruvianus* L. and reinstated the name to displace *Stenocereus hystrix* (Salm-Dyck) Buxb.: one of the synonyms of *Stenocereus heptagonus* (L.) Mottram. Kiesling believed that Miller had misunderstood *Cactus peruvianus* L. and applied his name to something different. Had he been correct in assuming they were different, then his new combination of Miller's name, *Stenocereus peruvianus* (Mill.) R.Kiesling, would have been validly published.

However, Linnaeus's taxon *peruvianus* had only one included element, the illustration of L'Obel, which is now interpreted as a *Stenocereus*, possessing fruits with deciduous spine clusters. Miller's concept was also the same plant, but he corrected the mistake of Linnaeus in citing descriptions of spineless fruited species referrable to *Pilosocereus* in its synonymy, by swapping Hermann's description of Cereus erectus fructu rubro non spinoso on p. 114–115 for the same author's Cereus erectus maximus fructu spinoso rubro on p. 113–114 of his *Paradisus batavus* (1698). Linnaeus's taxa were frequently mixed, but the name must be applied to the type of the species.

Because *Stenocereus peruvianus* R.Kiesling excluded the type of *Cactus peruvianus* L., he is deemed to have created a valid new taxon (spec. nov.) based on the description of Miller with a new type. The type of *Stenocereus peruvianus* R.Kiesling is Rose 18501 (NY) from Kingston, Jamaica, and the new taxon is to be considered a synonym of the name *Stenocereus heptagonus* (L.) Mottram. Although the type was indicated as a neotype, under Art. 9.9 that is to be considered as an error to be corrected, in this case to the status of holotype. Meanwhile, *Cereus peruvianus* in the sense of Miller was a new combination of *Cactus peruvianus* L. and as such its type is that of Linnaeus's name, whether Miller altered the circumscription from that of Linnaeus or not.

In summary, the description of L'Obel can only be applicable to *Stenocereus heptagonus* (L.) Mottram, a conclusion already reached long ago by the hapless Macfadyen (1850: 174). This is really a happy ending because it means that the name *Cactus peruvianus* L. can now be reduced to synonymy under *Cactus heptagonus* L. (*Stenocereus heptagonus* (L.) Mottram). This won't stop the widespread use of the appellation *Cereus peruvianus* hort. non L. to forms of *Cereus hexagonus* (L.) Mill. in cultivation, but commercial horticulture uses names informally that have little or no bearing to their botanical usage.