



LVI. Description of new Succulent Plants

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cessary and desirable, (if it can possibly be obtained,) that I embrace this opportunity of suggesting what I consider the most likely means of ascertaining this important object.

I recommend the employment of a machine that has not hitherto been of the least use in promoting a knowledge of either the arts or sciences, although numerous adventurous individuals have perished in the attempt to navigate it through the aërial flood, to gratify the idle curiosity of countless multitudes.

If the dip be taken at the place from whence the balloon is intended to ascend, and the same needle (which ought to be of the most perfect construction) be carefully deposited in the car attached to the balloon, any number of observations may be recorded by the aëronaut or his companion, according to the variation or decrease of the dip as the altitude of the observers increases. It will be necessary, in order to insure the accuracy of the experiment, to have a correct set of apparatus, independent of the dipping-needle; as a mountain barometer, a thermometer, &c. to ascertain the altitude and the temperature of the air at the moment when the dip is taken at each observation.

If during an aërial voyage the experimenters (for I consider one person incapable of managing the balloon and making the necessary observations) should be elevated only two or three miles, they, I have not the least doubt, would observe a diminution of magnetic action upon the needle, long before they reached that elevation; or its influence will extend far beyond our atmosphere: and if the distance of two or three miles from the earth's surface would only afford us two or three very minute and progressive variations in the dip, we might be enabled thereby to solve many curious problems in magnetism.*

Holy Green House, Sheffield, Feb. 9, 1827.

LVI. *Description of New Succulent Plants.* By A. H. HAWORTH, Esq. F.L.S. &c.

IN this my ninth Decade of new Succulent Plants, are described ten South-African species; the first five of which were discovered near the Cape of Good Hope, and sent from thence to the royal gardens of Kew, by Mr. Bowie, where

* An experiment on this subject in which the dip appeared to be reversed at the elevation of about 8000 feet, was made by Sacharof and Robertson during their aërial voyage from St. Petersburg, on the 30th of January 1804. See Phil. Mag. vol. xxi. p. 199.—EDIT.

they

they are all now flourishing. They appear to belong to the Linnæan genus *Cotyledon*; at least as it now stands.

They all likewise appear, thus far at least, to be unrecorded species; and belong to two very distinct divisions of the genus, the last of which, *PARVIFLORÆ*, will hereafter, from its included unequal *stamina*, and furfuraceous appearances, become the type of a *new* genus: when we shall become sufficiently acquainted with its component species and fructification; and I propose for it the name *PITUREA*, à voce *πιτρυγοῦ furfur*.

In all probability also, *Cotyledon coccinea* of Cavanilles will be the type of another new genus; and the species allied to *C. umbilicus*, that of a third. But these speculations must at present be relinquished, for want of sufficient specimens.

The species of the first *Section* of *Cotyledon*, in the present *Decade*, are nearly all, very stately plants, with showy terminal dichotomously cymed bunches of large pendulous flowers, of a deep aurora colour, approaching to scarlet, with exerted equal *stamina*, and are produced every summer upon old plants. The species of this division too, are easily propagated from cuttings in the usual way; love sandy earth, and will thrive in any good greenhouse: and indeed, many of them make a fine appearance there; being conspicuous ornaments even when out of bloom, through the great contrast formed by their broad mealy leaves, with the more ordinary foliage of every greenhouse.

And the section of the genus *PARVIFLORÆ*, hereunder further explained, and which I have above proposed to call *PITUREA*, is very interesting, in a philosophical point of view, because some at least of its component species have the remarkable faculty of gradually by day-light opening, and even retrofracting their blossoms, and of again closing them, in the same day; and this for several days successively.

Nor are these plants all, which may hereafter recede generically from the present genus *Cotyledon*, many recorded species of which are at present but little understood.

With respect to the remaining plants which complete this decade; one is a new *Gasteria*, and the remaining three belong to the succulent aphyllous division of the genus *Euphorbia* of Linnæus; and were also discovered in South Africa, by Mr. Bowie, and are now flourishing in the greenhouses of the royal gardens at Kew, where I have made the following descriptions of them.

Chelsea, Dec. 7, 1826.

A. H. HAWORTH.

Decas nona Plantarum Novarum Succulentarum.

Classis et Ordo. DECANDRIA PENTAGYNIA.

Genus, COTYLEDON Linn. &c.

Sectio, GRANDIFLORÆ, Inflorescentia altè pedunculata, *floribus* cymoso-umbellatis terminalibus, plantæ ramos superbè superantibus; *corollis* monopetalis quinquefidis magnis (inter affines) campanulatis, pallidè coccineis, apicem versus revolutis. *Caules* grossi suffruticosi, *foliis* carnosissimis crassis, sæpissimè magnis farinoso-albis, obtusis cum mucronulo, aère aperto margine roseo, sive purpurascente.

Obs. Post florescentiam (ni malè memini) *Flores* erecti sunt.

crassifolia. C. (thick mealy wedge-leaved) farinoso-alba:

1. subsimplex: foliis rhombeo-obcuneatis incrassatis.

Habitat C. B. S.

Obs. *Frutex*, nunc sesquipedalis, erectus succulentus, ramis perpaucis crassis. *Folia* subdistantia decussata opposita, omnium *Cotyl.* cognitarum crassiora, valdè farinosa; supra medium marginibus fusco-purpureis. *Flores* non vidi.

Vigebat in regio horto Kewensi ante A.D. 1824. G. H. 2.

Pone *Cotyl. oblongam* locarem.

viridis. C. (simple, green-leaved) foliis obovato-cuneatis

2. perviridibus, caudice valdè cicatricato.

Habitat C. B. S.

Obs. Bipetalis (tertio anno) erecta, caule caudiceve ferè simplici, foliorum vestigiis maximè cicatricato; cicatricibus lunulæformibus, lunulis obtusissimis, pallidis, dorso jacentibus; magisque quàm in aliis cognitis *Cotyledonibus* profundioribus et conspicuioribus. *Folia* mediocria; macra (inter affines) et semper viridia. Cum prioribus sine floribus vigebat ante A.D. 1824. G. H. 2.

Pone præcedentem locarem.

** PARVIFLORÆ, *floribus* parvis erectis albis roseo-striatis sæpè spicatis; foliis subfurfuraceo-punctatis.

rotundifolia. C. (dwarf round-leaved) foliis rectis confertis

3. rotundatis sordidè viridibus, ramis brevibus decumbentibus.

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Habitat C. B. S.

Obs. *Suffrutex* pygmæus non adhuc semipedalis; ramis sæpè humum versus depressis, vel erectioribus, carnosis. *Folia* plana, subtus convexa, et præcipuè per lentem undique farinoso, crebrè punctata, punctis rotundis minutissimis parùm regularibus; marginibus (foliorum) minutè cartilagineis sine punctulis.

Cotyl. hæmisphericæ affinis, at foliis duplò latioribus, duplòque tenuioribus: ramis minùs erectis, brevioribus, caudice crassiori. *Flores* non vidi. G. H. 2.

cristata. C. (Coxcomb-leaved) foliis petiolatis cuneato-triangularibus, apice crispo-cristatis.

Habitat C. B. S.

Florebat copiosè in regio horto Kewensi, Sept. 1826.

G. H. 2.

Descriptio. *Herba* succulenta foliosa sempervirens, caudice brevi crasso. *Surculi* ramulive perbreves, pilis ramentiformibus rufis respicientibus sive deflexis, densissimè vestiti. *Folia* numerosa erecta subuncialia, sordidè viridia, obsoletè punctatim furfuraceo-puberula crassa, sive pulvinatim tumescentia, apice purpurascencia, sed deorsum in *petiolo* teretes clavatos (folio breviores) pedetentim abeuntia. *Flores* (in *spicas* terminales erectas flexuosas graciles,) parvi sessiles quoque erecti, et horizontaliter aperiens ante horam octavam A.M. atque apud meridiem gradatim usque ad spicam ipsam retroflectentim arcuè adpressi: sed vesperam versus sensim sensimque retrogressi; necnon post solis occasum arctim omninò reclusi, ut ante mirabilem aperiensiam: et in hoc more per varios dies!

clavifolia. C. (club-leaved branny) foliis petiolatis claviformibus incurvantibus, apice subcrispo acuminulato.

Habitat C. B. S.

Florebat cum præcedente in Sept. 1826. G. H. 2.

Descriptio. Priori valdè affinis at abundè distincta videtur. *Folia* subtrientalia, plusquam duplò angustiora, *petiolo* magis incurvo, vix puberula, ramentis caulinis fortè paucioribus; cum eodem modo florendi; at *flores* duplò majores, sæpè binati vel ternati: *corolla* tubo subincurvo robustiore, viridi; laciniis intùs albis, extùs (uno latere) purpureis, et basi undato-sublobulatis ut in priore.

Obs. Sequens est (ni malè memini) alteram descriptionem (alio tempore factam) hujus speciei; vel si non, ultimæ

ultimæ *Cotyledonis*. *Corolla* tubo longo crasso angulatum cylindrico. *Stamina* inclusa, filamenta decem recta alba, horum quinque tubo $\frac{1}{4}$ breviora, eoque usque ad medium adnata: quinque alia alternantia, tubi longitudine, eoque usque ad medium, altius adnata. *Antheræ* pollinosæ, flavæ. *Germina* quinque tubo parum breviora virescentia, cum continuantibus *stylis* parum subulata, *stigmatibus* obtusis inconspicuis. *Squamula* germinis ordinaria subrotundato-quadrata retusa, atque hyalina.

Classis et Ordo. HEXANDRIA MONOGYNIA.

GASTERIA, *Duval*.—et *Nob.* in *Phil. Mag.* Oct. 1825.—*Synops. Pl. Succ. &c.*

bicolor. G. (half-marbled, lightest green) foliis angustè linguiformibus obtusis biconvexis lævissimis pallidis imis, subtus maculato-marmorescentibus.

Obs. *Folia* inter erectiores, nunc pedalia disticha ecarinata, sed fortè non in ætate; omnium pallidissimè virescentia, mucronata, suprà immunia; marginibus supernè cartilagineo-asperiusculis, et intra ipsam marginem margine alià lineari concinnà atro-viridi. *Subtus*, infima *folia* crebrè ac subsordidè et saturantè variè marmorescentia. *Flores* non vidi.

Pone *Gasteriam candicantem* *Nob. Revis. Pl. Succ.* 46. sive *G. ensifoliam* *Nob.* in *Phil. Mag.* in loco suprà citato locarem; quæ ambæ *Gasteriæ* nunc carinantibus foliis gaudent.

Classis et Ordo. DODECANDRIA TRIGYNIA.

EUPHORBIA *Auctorum*.

Sectio, ACULEATÆ, ramis crassissimis nudis angulatis; angulis spinosis; *foliis* minutissimis, citius marcescenti-deciduis seu caducis, in summis ramorum solum (cum floribus ordinariis) visis, et subindè ferè (è parvitate) invisibilibus, sine lente.

Subsectio, FLORISPINÆ, spinis solitariis floriferis.

stellæspina. E. (starry-spined) multangularis: valida: singulis spinis ramoso-stellantibus rufescentibus; mortuis nigris.

Habitat C. B. S. G. H. 2.

Flores fortè affinium; non examinavi. G. H. 2.

Descriptio. *Planta* in regio horto Kewensi (Oct. 2 N 2 1825)

1825) *dodrantalis* est; erecta sub-12-angularis; tres uncias crassa; *spinis* infra *foliola* minuta ordinaria trilineariter linearilanceolata vix lineam lata utrinque attenuata glaucescentia. *Spinæ* quinquelineares expansæ ramulosæ validæ, ramulis (spinarum) duobus alternis, quatuorque aliis subradianter patentibus.

Obs. Distinctissima et præsingularis species. Inter affines multangulares et pone *E. polygonam* Nob. locarem.

Subsectio, STERILISPINÆ, spinis sterilibus.

cærulescens. E. (square blue Cape) articulatum interrupta:

8. erecta: tetragona: ramis basilaribus luridè cærulescentibus.

Habitat C. B. S. G. H. 7.

Obs. Nunc tertio anno, in regio horto Kewensi, subbipedalis est; ramis à radicali base grossa, simplicibus; *spinis* marginalibus, affinium modo digestis, sive oppositè geminatim divaricantibus atro-rufis semuncialibus. *Flores* ut in affinibus sine dubio; at non examinavi.

Obs. *E. canariensi* valdè affinis, at magis articulata, longissimè humilior et duplò gracilior; ramorum subcæruleorum articulis 1—4-uncialibus solùm, spinis quàm in *E. canariensi* duplò longioribus: nec 10—20-pedalis, ramis ramulosis 4—5-angularibus longissimè continuantibus viridibus, cicatricibus annuis annularibus vix impressis solùm notatis, ut in *E. canariensi*. Nihilominus pone eam locarem, cui simillima.

tetragona. E. (slender square light-green) subsimplex: erecta:

9. caulibus subgracilibus continuosis lætè viridibus; spinis patentibus geminatis.

Obs. Nullæ valdè affinis. Nunc subtripedalis firma erecta tetraquetra. Ultimæ affinis at altior, et plusquam duplò triplòve gracilior, spinis minoribus, et valdè distincta. Ambas hasce præsucculentas plantas sine dubio post *E. canariensem* collocarem.

squarrosa. E. (the Chevaux-de-frise) tuberoso-strumosa:

10. ramis simplicibus decumbentibus, squarrosè spinosopinnatisectis.

Obs. Affinis *E. procumbenti* Meerburg, *Rariores*, t. 55. *E. uncinata* DeCandolle. *Radix* strumoso-tuberosa, 2—3 uncias longa. *Rami* capitati pervirides, sive è capite tuberis circulariter erumpentes cæspitosè patentes bilaterati, subsemipedales planiusculi; (*subtus* convexi)

vexi) torquati et quasi pinnatisecti, è spinis geminatis patulis rufo-fuscis marginalibus brevibus insuper pedunculos productos carnosos crassos trilineares, obliquè spiraliè tortos et squarrosè sexfarios insidentibus ; et quasi in apice ramorum in totidem angulis.

Folia ordinaria affinium, in ramorum apicibus habet minutissima subrotundo-cordata, ferè invisibilia citiùs marcescentia, et caduca.

Obs. Plantam hanc mirabilem in propriâ subsectione locarem cum *E. procumbente* Meerburg (quæ est *E. uncinata* DeCandolle, ut suprà :) necnon *E. scopulopendra* Nob. in *Synops. Pl. Succ.* p. 126 ; quæ ultima nunquam cum radice tuberosâ, neque ramis numerosis simplicibus ambientibus vidi : sed cum ramis solitariis, ramuliferis, et duplò majoribus, magisque dilatatim obliquè pallidéque venosis quàm in *E. procumbente*.

LVII. *On the Geology of East Norfolk; with Remarks upon the Hypothesis of Mr. Robberds, respecting the former Level of the German Ocean.* By R. C. TAYLOR, Esq. F.G.S.

[With Engravings.]

To the Editors of the *Philosophical Magazine and Annals of Philosophy*.
Gentlemen,

THE district which is the subject of examination in Mr. Robberds's "Geological and Historical Observations on the Eastern Vallies of Norfolk," noticed in your last Number, having particularly occupied my attention, a perusal of the work has induced me to send you some remarks on this inquiry, and on the validity of the conclusions which the ingenious author has adopted.

Mr. Robberds shows that these valleys, which are now for the most part solid and productive land, yielding rich pasturage to many thousand head of cattle, were "at no very distant period, arms of the sea, navigated by our forefathers."

The proofs of this change are arranged under two heads: Physical and Historical.

Under the first class are enumerated the connection between the valleys and the German Ocean; the resemblance which their outline bears to the forms generally exhibited by æstuaries and inlets of the sea; and the remains of marine shells and exuviæ discoverable along their margins, at the elevation of 40 feet. These beds of shells are stated to have the following striking and peculiar characters.

"1st. None of them, except a few casual specimens, belong to
any