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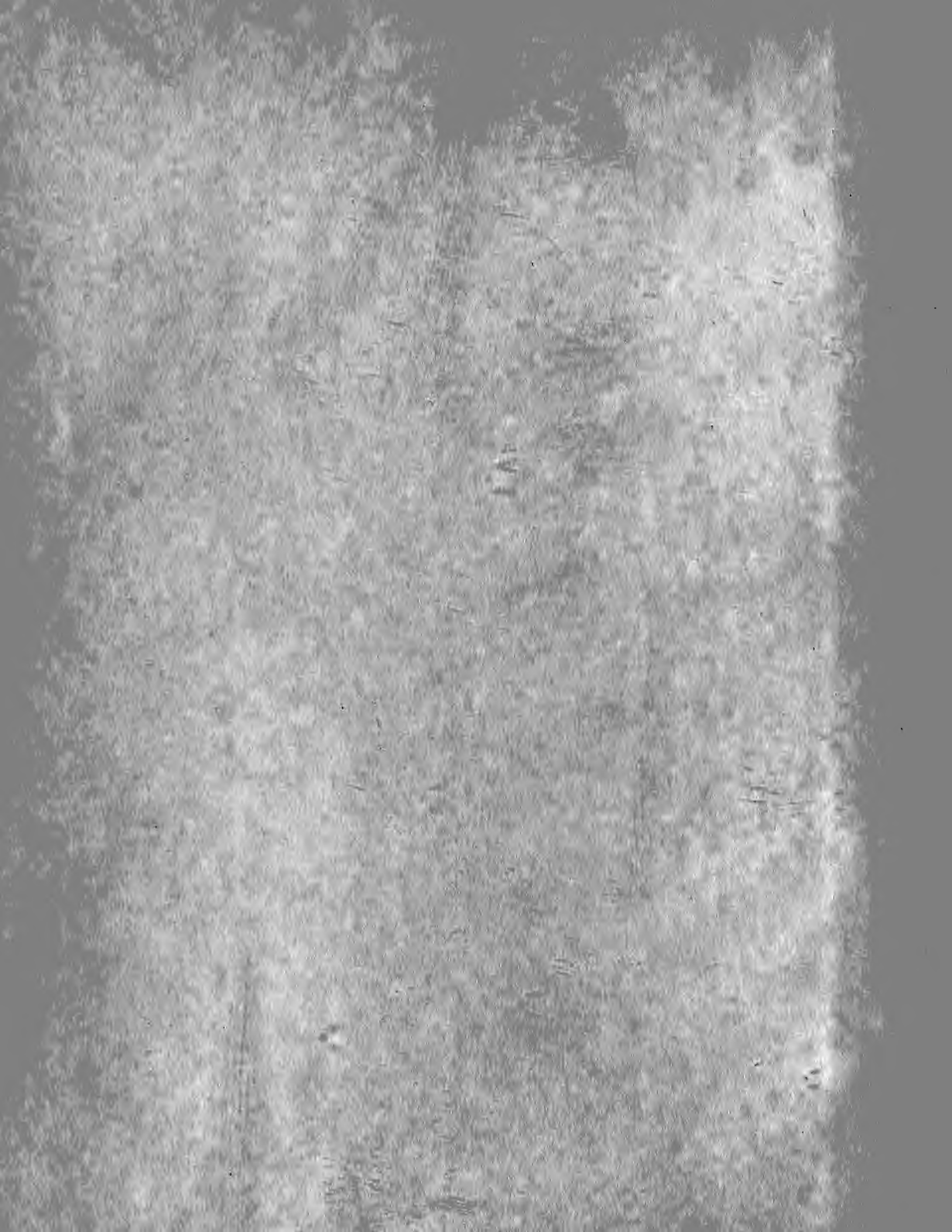
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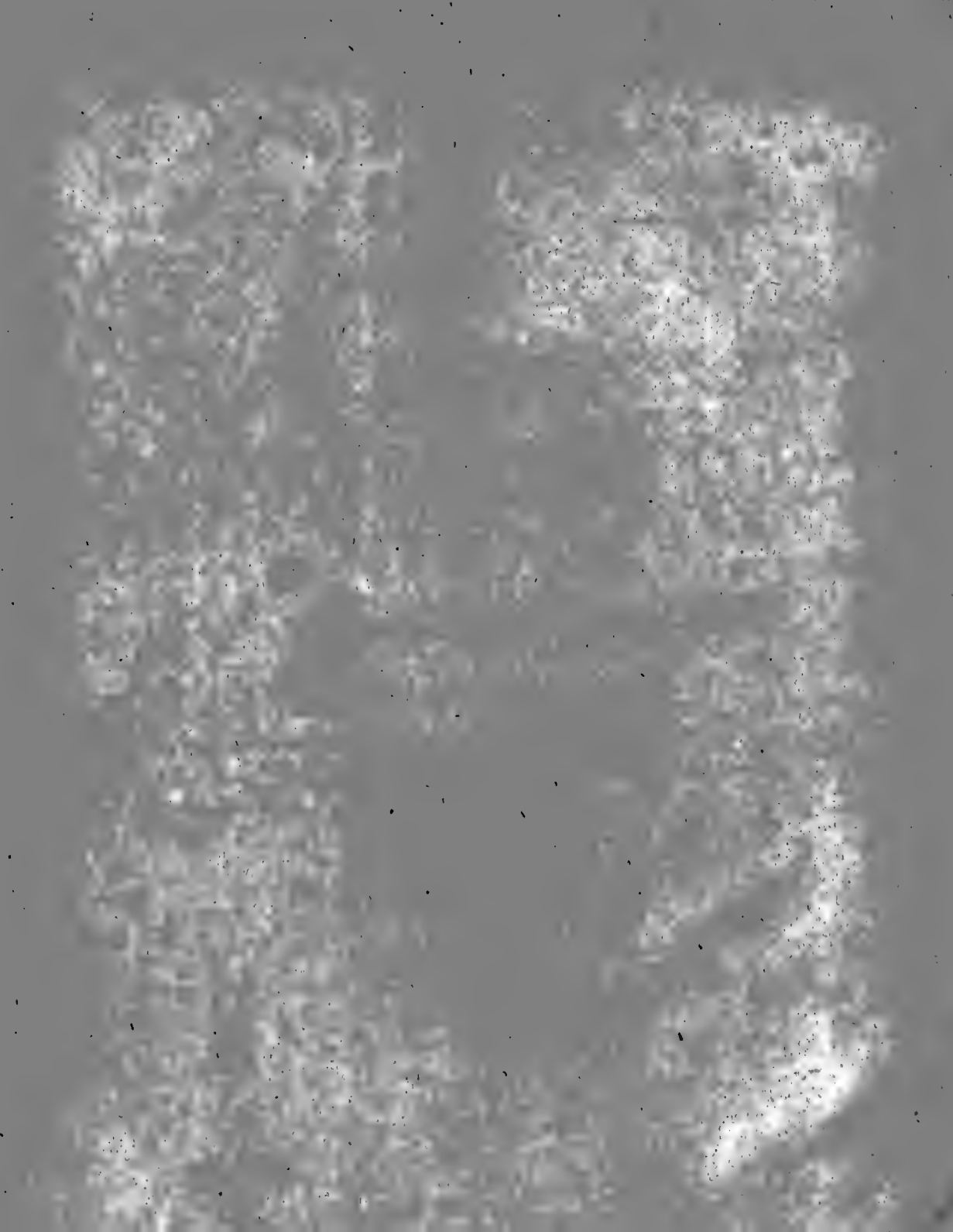












TRANSACTIONS

OF THE

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VOLUME VI.



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TRANSACTIONS

OF THE SOCIETY OF ARTS

AND MANUFACTURES

FOR THE YEAR 1851

IN TWO VOLUMES

VOLUME THE SECOND

LONDON

PRINTED BY RICHARD CLAY AND COMPANY

PRINTERS, BUNYARD COURT, LONDON

1851

BY APPOINTMENT TO HER MAJESTY

THE QUEEN

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TRANSACTIONS

OF THE

LINNEAN SOCIETY.

- I. *A Dissertation on two Natural Genera hitherto confounded under the name of Mantis. By Anthony Augustus Henry Lichtenstein, D. D. F. M. L. S. Translated from the German by Thomas Young, M. D. F. R. S & L. S.*

Read April 4, 1797.

WHEN I first took up Fabricius's System of Entomology, I was much struck with these words in the preface:—"The science of entomology is as yet in its cradle: it is scarcely so far advanced as botany was at the time of Cæsalpinus." I was then inclined to think that this gentleman, whose excellent moral character I have only since that time had an opportunity, by personal acquaintance, to know and esteem, had at least exaggerated the truth, and done injustice to Linné and the rest of his predecessors. But since I have had an opportunity of observing with accuracy, and of comparing with many descriptions and plates, a large number of insects, chiefly foreign, in the extensive collection of Mr. Holthuyfen, I am convinced that this great systematist did not, in making that assertion, go much too far; for what a mass of information has been

added to our knowledge of insects within these twenty years by himself and other active naturalists! And yet we are still very far from having a proper natural arrangement and description of all the orders and genera. I shall say nothing of the species; for here, especially through the imperfection and frequent incorrectness of the synonyms, so much confusion prevails, that it is often difficult to ascertain to what species of Linné or Fabricius a perfectly common indigenous insect belongs. If a genus be truly natural, or, as logicians call it, a *genus proximum*, a single characteristic is almost always sufficient to determine with certainty to what species an individual of this genus is to be referred. The present attempt may serve as a specimen of the manner in which I conceive that still greater genera ought to be treated according to the natural distinctions; fixing the natural genera where the system has not already done it, and placing the species in order under appropriate subdivisions taken from essential differences; describing them with accuracy, and particularly adding the synonyms as completely and correctly as possible.

The idea of separating from the proper *Mantes* those species feeding on plants, that have no falciform fore-feet, but have all their legs formed for running, and making a new genus of them, is by no means of my invention. Caspar Stoll has already proposed it, but has not at all carried it systematically into effect. The splendid work which this zealous entomologist had begun to publish at Amsterdam in 1787 with a Dutch and French text, under the title of *Natuurlyke, en naar't leeven nauwkeurig gekleurde Afbeeldingen, en Beschryvingen der Spooken, Wandelnde Bladen, Zabelspringhanen, Krekels, Trekspringhaanen en Kakkerlakken*, in quarto, fold by J. C. Sepp, was interrupted by death, which cut off this gentleman (who, with many peculiarities, had yet undeniably great merit) in the middle of his career. Had he lived longer, this work on the *Ulonata* of Fabricius
would

would have been as classical as that for which we are indebted to him on the *Rhynchota*. He would thus have thrown light on all the *Hemiptera* of Linné, and have done as much as a systematic writer for this order of insects, as Pallas has for the unguiculated quadrupeds among the *mammalia*. No one will deny, unless from an absurd prejudice he despise every thing that is Dutch without further examination, that the late Stoll was a very diligent and fortunate observer. His penetrating eye, incredibly experienced and ready in distinguishing objects at first sight, comprehended the whole habit so happily in one fixed point of view, that he discriminated the natural genera as if by internal feeling. The collection of Holthuyzen, which he had chiefly arranged, was divided almost universally into the same genera which Fabricius has adopted in his *Entomologia Systematica*. Stoll died before this work was published, and Fabricius saw that collection only cursorily in Hamburgh, when his book was all completed but the appendix. This agreement, therefore, between two persons thinking quite independently of each other, shows clearly that entomology is not so uncertain and inconstant as many believe; and that both of these gentlemen were in search of truth, and knew how to find it. Systematical order, indeed, is not to be expected in the writings of Stoll; for, as he had no learned education, he was totally unprovided with that artificial logic which is more useful to men of letters in general than they often think proper to allow. Although the idea of this monograph was borrowed from Stoll, yet one acquainted with the subject will soon discover that I have not copied from him, but that I have bestowed much labour of my own on this dissertation.

I shall, in the first place, show that the Spectre of Stoll, or the *Phasma*, is truly different from the *Mantis*, and must be separated from it as a distinct genus; in the next place, treat of both in general, going systematically through their species, and ascertaining the synonyms;

4. Dr. LICHTENSTEIN'S *Dissertation on two Natural Genera*

then describe at large the species omitted or newly discovered; and, lastly, enumerate briefly those which I cannot place under their proper genus, because I am only acquainted with them from imperfect descriptions.

Stoll shows the essential difference between the two genera very correctly by the following comparison of the parts and characteristics.

PHASMA. "Laubschrecke."

MANTIS. "Fangschrecke."

- | | |
|---|---|
| <p>1. <i>Antennæ</i> setaceous with longish divisions.</p> <p>2. The <i>head</i> large and oval-round; the mouth with moveable jaws and four palpi.</p> <p>3. Small reticulated <i>eyes</i> on the forehead.</p> <p>4. Three clear <i>stigmata</i> in a triangle between the eyes.</p> <p>5. The <i>body</i> linear, almost cylindrical.</p> <p>6. Six <i>legs</i> for running.</p> <p>7. The <i>tarsi</i> consist of five joints.</p> <p>8. The <i>hemelytra</i> [<i>deckflügel</i>] skinny, very short, so that they scarcely cover a third part of the abdomen. The wings at the external margin membranous, about as long as the abdomen.</p> | <p>1. <i>Antennæ</i> filiform.</p> <p>2. The <i>head</i> nodding, heart-shaped, with jaws and palpi.</p> <p>3. Two large prominent <i>eyes</i> on the sides.</p> <p>4. In most species two clear <i>stigmata</i> between the roots of the antennæ.</p> <p>5. The <i>thorax</i> narrow, on the back somewhat carinated, at the margin compressed.</p> <p>6. Six <i>legs</i>, the foremost with falciform hands, and a thumb of five joints at their side; the rest slender and unarmed.</p> <p>7. The <i>tarsi</i> have five joints.</p> <p>8. The <i>hemelytra</i> folded crosswise together, of the length of the wings beneath them, covering almost the whole abdomen.</p> |
|---|---|

Besides these distinctions taken from the different parts of the body, Stoll appeals, with reason, to the remarkable difference of the mode of life. His Spectres, which I name *Phasmata*, live solely on vegetable food. They lay their eggs, like grasshoppers, in the earth, the females being furnished with a small stile or instrument for depositing them, of an ensiform figure, and covered by three leaflets, which are found on the last division of the abdomen. The *Mantes*, on the contrary, confine themselves entirely to food taken from the animal kingdom; their falciform hands serving them to catch and carry to their mouths. flies, and other insects, which they devour. As to what concerns their procreation and metamorphosis—they never lay their eggs in the earth, but fix them on a twig, straw, or blade of grass, and this in rows and regular masses, as Roefel has very correctly described. *Insectenbel.* pt. 4. p. 89. sq. and t. 12. Compare also *Merian. Surin. Inf.* p. 66. *Geoffr. Inf.* t. 1. p. 399. and *De Geer Inf.* pt. 3. p. 399.

It will not be superfluous to add some remarks which Stoll has omitted, and which set the difference between the two genera still more out of doubt. The antennæ of the *Phasmata* are situated on the sides of the head, far apart, and are inserted near the eyes: those of the *Mantes*, on the contrary, are placed on the forehead near together, between the eyes. The difference of the organs of feeding I shall explain more at large in the systematic description of the genera. The thorax, in the first subdivision or family of *Phasmata*, is always extended and cylindrical: sometimes set with little thorns, sometimes without thorns; but in the second family, which in general more resembles the *Mantes*, it is somewhat flattened, and almost marginated. The *Mantes*, on the other hand, have all a more or less carinated thorax: all those of the first family and some small species of the second family have a roundish thorax; but in most of the second family

family it is marginated, and in the fore part extended more or less in breadth, but behind linear.

The abdomen in the *Phasmata* differs in different families. Those of the first family have a rounded cylindrical abdomen, of ten nearly equal divisions, which, within its trifoliated extremity, contains a tail in which the parts of generation are concealed. The second family has the abdomen pressed flat, often even membranous, without any leaflets at the tail. In the *Mantes* the abdomen is very various, but always agrees with the character of the family.

The hemelytra of the *Phasmata* are often entirely wanting; when present they are membranous; in the first family, especially in the males, they are very short, taper at the base, and toward the middle furnished with a small thorn, which is sometimes blunt, sometimes sharp. In the females they are mostly half as long as the wings, rounded off towards the tips, ribbed, and without thorns. In the second family the males have short and very narrow lancet-formed hemelytra; those of the females are broad, veined, and nearly of the length of the abdomen.

The *Mantès* have transparent thin hemelytra, with a broad, membranous, often grooved rib at the outer margin; which are seldom shorter than the wings or abdomen.

The wings of the *Phasmata* are broad, inwards plaited and transparent, with a broad membranous rib at the outer margin, and shorter than the abdomen. In some species of the first family, and in the female of the *Phasma siccifolium*, which is of the second family, and has very large and broad hemelytra, they are entirely wanting.

The *Mantes* have transparent, often colourless wings, more finely plaited, with only a narrow rib at the outer margin, and nearly of the length

length of the abdomen. Only one species of this genus is entirely without wings.

The legs of the *Phasmata* are all formed for running, and like to each other; the fore legs are placed so near to the head that they are excavated near the base to make room for the head between them. This is a very certain natural distinction, by which one may know whether even an imperfect specimen is a *Phasma* or a *Mantis*. The *Phasmata* of the first family have very long and narrow fore feet, frequently with triangular and thorny legs. Those of the second family have shorter fore legs, with broad margins.

The *Mantes* have, instead of fore legs, arms, with nearly scissor-formed hands; the upper arms and elbows are, according to the families, either narrowly or widely dentated or fringed. The four hind legs are for running; mostly plain, more rarely adorned with foliated margins on the thighs, and still more rarely on the tibiæ.

This comparison shows sufficiently that the *Phasma* and *Mantis* are two very distinct genera.

Before I begin the systematic description in the manner of Fabricius, I must speak of the families or divisions of the genera. The primary divisions I have taken from Stoll. They depend in both genera on the rounded or more flattened structure of the whole body, with which also the length of the fore legs agrees. The *Phasmata* of the first family, that is the rounded ones, I divide again into wingless and winged; the flat *Phasmata* require no further subdivision.

The *Mantes* of the first family, that is, (following the same order as in the *Phasmata*, although Stoll takes them last,) the rounded ones, I divide into wingless and winged. The last again according to their eyes, which are either angular or round. The family of the flat *Mantes* may be separated into two companies; the gouty ones, with leaves on their legs, and the round-legged ones, without them.

These companies I divide, lastly, according to the eyes, each into two parties; of which the first contains those with round eyes, the second those with angular eyes. This apparently trifling minuteness or pedantry gives so useful a thread to guide us to the determination of each species of phasma or mantis that occurs, and makes it so easy to any one who will pay the least attention to investigate if and where such an insect has been described, that I do not consider the time and trouble as lost which I have spent on the discovery of these subtilities. True systematical proficients in entomology, who love truth and order, will richly repay this *laborem in tenui* by the approbation which they may be pleased to bestow on it. I will not here attempt a prolix vindication of my having been obliged to alter entirely the description of the genus *Mantis*, and compose new ones of *Phasma* and of *Mantis*, nor of the great difference frequently to be found between my descriptions of the species and those of Linné or Fabricius. True judges will themselves discover my reasons. Such as regard only authority I can assure, that Fabricius approves of my innovations. Amateurs and sharp-sighted observers, who are not fond of the technical and scholastic language, I refer to Stoll, whom I have accurately quoted; to Fûëilly's *Archives*, and to the Figures which I have here given; but especially to natural specimens. Perhaps many persons will be reconciled to me on examining a well-stored collection, who on the bare reading of the following Latin descriptions will have shaken their heads, or secretly condemned me as an unauthorized pedantic innovator. In these insects the colours often deceive; partly because they are frequently destroyed by the spirits in which the specimens had at first been preserved; partly, because the hemelytra frequently become spotted from thin drops of pus being thrown out and adhering to them when they are stuck through with pins. Hence, the *puncta sparsa elytrorum*, to which one must never trust, unless they agree precisely on both hemelytra. *Sapientia sat.*

119—20. PHASMA:

Palpi inæquales depressi; antici quadriarticulati; postici triarticulati, articulo extremo longissimo, ovato lanceolato.

Labium ascendens bipartitum, laciniis fissis, pinnis æqualibus.

Antennæ fetacæ, articulis oblongis.

* *Teretia*, pedibus anticis longissimis tenuibus compressis.

† *Aptera*. Elytris alisque in utroque sexu nullis.

filiforme. 1. P. pedibus anticis inermibus longitudine corporis, antennis nigris.

TAB. I. fig. 1.

Mantis filiformis. *Fabric. entom. system. t. 2. p. 12. n. 1.*

Mant. inf. 1. p. 227. n. 1. Gmel. syst. nat. p. 2048.

n. 1.

Small Brasil Quill Locust. *Petrover Gazoph. t. 60. f. 2.*

Browne Hist. of Jamaica, p. 433. t. 42. f. 5.

Habitat in America australi et infulis oppositis. Museum Ohrtmannianum.

Sequenti adfines sed multoties minus. Corpus et pedes fusci testaceo annulati. Tarforum articuli primores

Phasmatis corpus filiforme subcylindricum (rarius abdomine depresso) glabrum, immarginatum, tardum: capite prominulo magno ovali, latiore quam thorax; oculis parvis reticulatis frontalibus; stemmatibus tribus lucidis, in triangulum intra oculos dispositis; antennis distantibus lateralibus juxta oculos infertis; thorace elongato lineari cylindrico, scutello nullo; elytris ovalibus parvis (in maribus minimis, basi sæpe aristatis) membranaceis; alis, costa lata membranacea, hyalinis plicatilibus, rarius nullis; pedibus sex, anticis capiti proximis juxta basin intus emarginatis, omnibus cursoriis, tarsis quinquearticulatis; abdomine segmentis decem, ano laminis tribus partes sexuales abscondentibus.

reliquis æquales. Synonyma quæ prætermisi utique excludenda; præsertim *Herbst. arch. inf.* 8. t. 51. f. 2. quæ exhibet larvam alius speciei hujus generis.

Ferula. 2. Ph. pedibus aliquanto corpore brevioribus, tarforum articulo primo triangulari erecto.

Mantis *Ferula.* *Fabric. entom. system.* t. 2. p. 12. n. 2.

Arumatia. *Marcgraf Brasil.* 251.

Rosfel inf. 2. *Gryll.* t. 19. f. 10. *Stoll Mant.* t. 13. f. 51.

Habitat cum præcedente. Museum Holthuyf.

Descriptio Fabricii accuratissime quadrat, nisi quod in nostro exemplari etiam anticorum pedum femora et tibiæ apice subspinofæ; item color non viridis sed fuscus testaceo annulatus. Forte quoniam in spiritu vini olim servatum.

cornutum. 3. Ph. pedibus anticis mediocribus tibiis omnibus muticis, capite oblongiusculo cornuto oculis prominulis.

Stoll Mant. t. 15. f. 57. et 57. t.

Habitat in America australi. Mus. Holthuyf.

Corpus læve glabrum cylindricum, dilute fuscum; pedes elongati femoribus angulatis.

Calamus. 4. Ph. corpore virescente, femoribus striatis.

Mantis *Calamus.* *Fabric. entom. syst.* t. 2. p. 13. n. 3.

Habitat in insula St. Croix. Mihi haud visum.

Skeleton. 5. Ph. pedibus anticis elongatis, thorace cylindrico scabro postice attenuato, capite inermi oculis prominulis.

Stoll Mant. t. 14. f. 55.

Habitat in Sina. Mus. Holthuyf.

Corpus magnum, elongatum, obscure testaceum. Antennæ fetacæ mediocres. Pedum tarfi articulo primo

primo triangulari erecto. Adfines præter alarum defectum *Ph. nectydaloides* cujus tamen vix larva.

latipes.

6. *Ph.* pedibus mediocribus foliato compressis.

Stoll Mant. 1. 14. f. 54.

Habitat in Amboina. *Muf. Holthuyf.*

Corpus magnum, elongatum, lineare, teres, fuscum.

Caput subrotundum; antennæ breves, oculi prominuli; ensis partumeius (sive cauda ensiformis) reflexus dentatus.

Plocaria.

7. *Ph.* corpore viridi, femoribus dentatis.

Mantis Rossia. Fabric. entom. syst. 1. 2. p. 13. n. 4.

Roffi Faun. Etr. 1. n. 636. t. 8. f. 1. mas.

Plocaria domestica. Scop. delic. Insubr. 1. p. 60. t. 24. f. A. 1—3.

Habitat in Italia. Mihi haud visum.

†† *Subcaptera*, elytris, at alis nullis.

- angulatum.* 8. *Ph.* capite thoraceque spinosis, elytris rotundatis brevissimis, femoribus subtus angulatis.

Mantis angulata. Fabric. entom. syst. 1. 2. p. 13. n. 5.

Mantis Gigas. Drury inf. 2. p. 89. t. 50.

Mantis gigantea. Gmelin syst. nat. edit. xiii. p. 2055. n. 49.

Habitat secundum Fabricium in Guadeloupe, secundum Gmelin in Italia superiori. Mihi haud nota.

††† *Alata.* Elytris alisque in utroque sexu.

Gigas.

9. *Ph.* thorace teretiufculo scabro, elytris planis ovalibus nervosis, pedibus spinosis.

Mantis Gigas. Linn. syst. nat. 2. p. 689. n. 1. Muf.

Lud. Ulr. n. 109.

Mantis Gigas. Fabric. entom. syst. n. 6. Stoll Mant. 1. 2. f. 5.

Habitat in Amboina. Muf. Holthuyf.

Corpus magnum elongatum, supra cylindricum subtus complanatum. Caput erectiusculum inerme ovale, paulo latius quam thorax. Antennæ setaceæ mediocres. Oculi parvi, frontales vix prominuli. Thorax antice, ubi pedes primores inferti, subdepressus et glabellus; medio teres, granulis elevatis scaber; postice ad basin elytrorum et alarum terminatus appendicula triangulari scutelliformi. Abdomen teres lineare ut in hac tribu semper. Elytra brevia, plana, spathulato ovalia repanda, nervosa (item ut alæ maximæ,) obscure testacea fusco undata. Pedes elongati robusti spinosi dilutius testacei, fusco annulati.

Omnia exemplaria mihi certe adhuc visa sunt sexus feminini. Utrum *Phasma hecticum* infra describendum hujus *Ph. Gigantis* mas sit nec ne, dies docebit; item utrum color naturalis vel in hac specie sit viridis.

Empusa. 10. Ph. thorace tereti granulato, elytris brevibus ovatis medio gibbis dente elevato obtuso, dilute testaceis basi et apice fuscis, pedibus spinulosis.

Aubent. Miscell. t. 65. f. 1. mala.

Stoll Mant. t. 1. f. 1. bona.

Habitat in India orientali. Muf. Holthuyf.

Proxime adfines antecedenti at diversum forma elytrorum et coloribus. Exemplar Holthuyfianum Stollii archetypon est corpore fusco, artubus dilute testaceis fusco undulatis. D'Aubenton exhibet colorem totius insecti viridescentem, præter bases apicesque elytrorum, ut in nostro, fuscis. Forsan ideo, quod ejus exemplar numquam in spiritu vini adservatum fuerat.

Quod

Quod vero idem pedes primores brevissimos pingit ; inde sequitur, ut vel defuerint in exemplari Lutetiano, vel spurii fuerint adglutinati, vel denique ut chalcographus tabulæ angustîâ se viderit circumscriptum. Quidquid id est, deformat isthæc præternaturalis pedum brevitatis omnem phasmatis nostri habitum.

navium. 11. Ph. thorace cylindrico scabro, elytris ovatis angulatis, alis oblongis fuscis hyalino fenestratis.

α Femina. Mantis necydaloides. *Linn. syst. nat.* 2. p. 691. n. 14. *Amæn. acad.* 6. p. 397. n. 3.

Mantis necydaloides. *Fabric. entom. syst. t.* 2. p. 14. n. 7. *Rösel inf.* 2. *Gryll. t.* 19. f. 9. *Stoll Mant. t.* 3. f. 8.

β Mas. Mantis cylindrica. *Gmelin syst. nat. edit.* xiii. p. 2048. n. 54. *Mus. Lesk. p.* 46. n. 12. *Stoll Mant. t.* 4. f. 11.

Habitat in Amboina. *Mus. Holthuyf.*

Differt ab antecedentibus, crassitie corporis basi elytrorum multo angustiore et alis fuscis hyalino fenestratis. Mas in hac et sequenti specie (forfan pluribus quoque in hac tribu) multoties minor quam femina, sed antennæ robustiores.

edule. 12. Ph. thorace tereti (maris scabro, feminae glabro), elytris alarumque costa læte viridibus, pedibus submuticis.

α Femina. *Stoll Mant. t.* 6. f. 20.

Houttuyn natuurl. histor. t. 79. f. 1.

β Mas. Mantis phthifica. *Linn. syst. nat.* 2. p. 689. n. 2.

Mantis Jamaicensis. *Fabric. entom. syst. t.* 2. p. 15. n. 11.

Gmelin syst. nat. edit. xiii. p. 2054. n. 41. *Drury inf.* 2. t. 49. f. 1. *Stoll Mant. t.* 6. f. 21.

Habitat in India orientali. *Mus. Dom. Holthuyfen.*

Corpus

Corpus magnum, præsertim feminae, quæ adeo crassior quam *Ph. Gigas*, et teste Valentino Malaii pro cibo infervit. Cf. *Houttuyn. nat. hist. p. 1. vol. 10. p. 138.*

beeticum. 13. Ph. thorace tereti scabriusculo, pedibus angulatis anticis latissimis tibiis dentatis, elytris brevissimis juxta basin spinosis, alis hyalinis fusco maculatis.

TAB. I. *fig. 2.*

Habitat in Sina. Mus. Dom. Holthuysen.

A Stollio non depictum. Ulteriore descriptionem vide infra.

atrophicum. 14. Ph. thorace quadrispinoso, elytris brevissimis, basi aristato mucronatis.

Mantis atrophica. *Pallas spicil. zool. fascic. 9. p. 12. t. 1. f. 7. Fabric. entom. syst. t. 2. p. 14. n. 8. Gmelin syst. nat. p. 2054. n. 38.*

Habitat in Java.

Exemplar quod Pallas vidit et descripsit fuit mas. Femina adhuc ignota probabiliter est aliquoties major, elytris mediocribus ovali-repandis.

Umbretta. 15. Ph. thorace tereti scabro, elytris brevissimis basi aristato spinosis, alis longitudine abdominis.

Stoll Mant. t. 8. f. 27.

Habitat in Surinamo. Mus. Dom. Holthuysen.

Exemplar masculinum. Color totius corporis obscure fuliginosus; alæ extus maculis oblongis fuscis. Antennæ concolores fetaceæ longitudine corporis. Femina adhuc ignota.

roseum. 16. Ph. thorace tereti glabro, elytris lanceolatis, alis roseis costa viridi.

Mantis

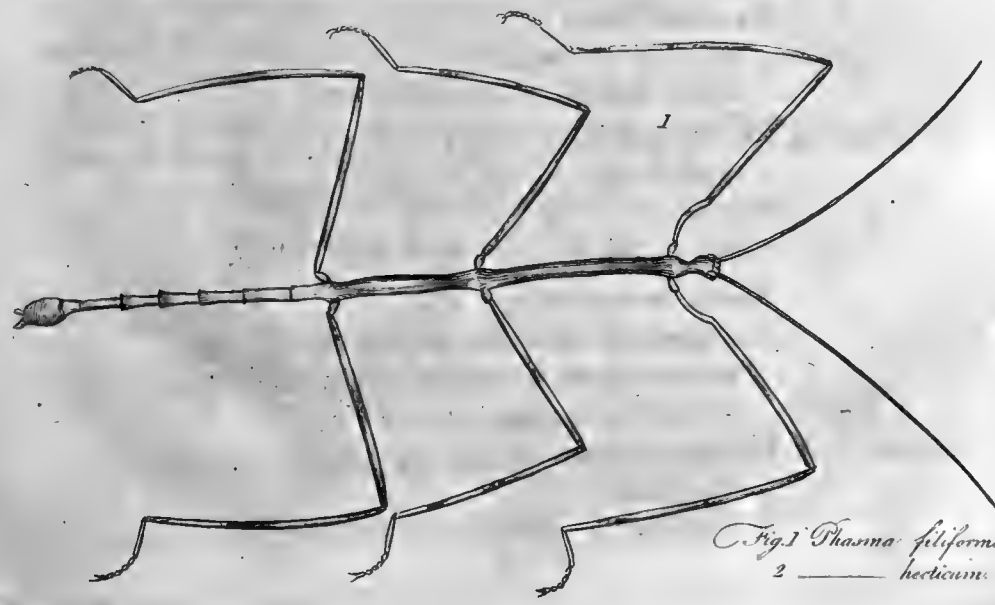
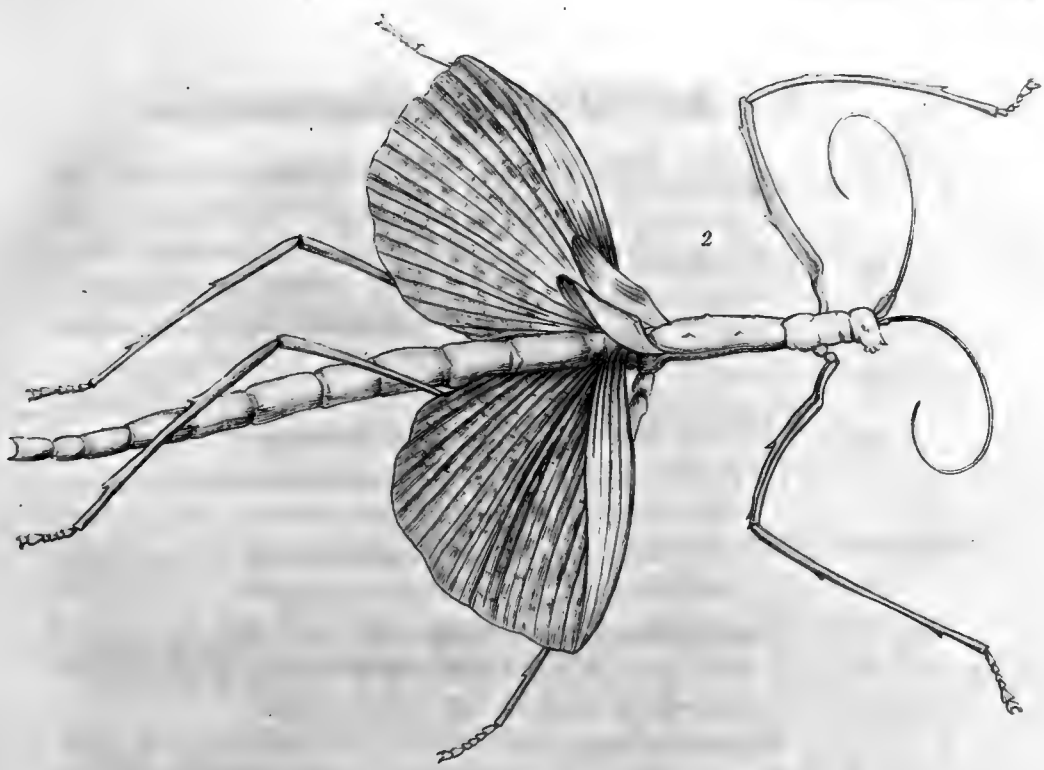
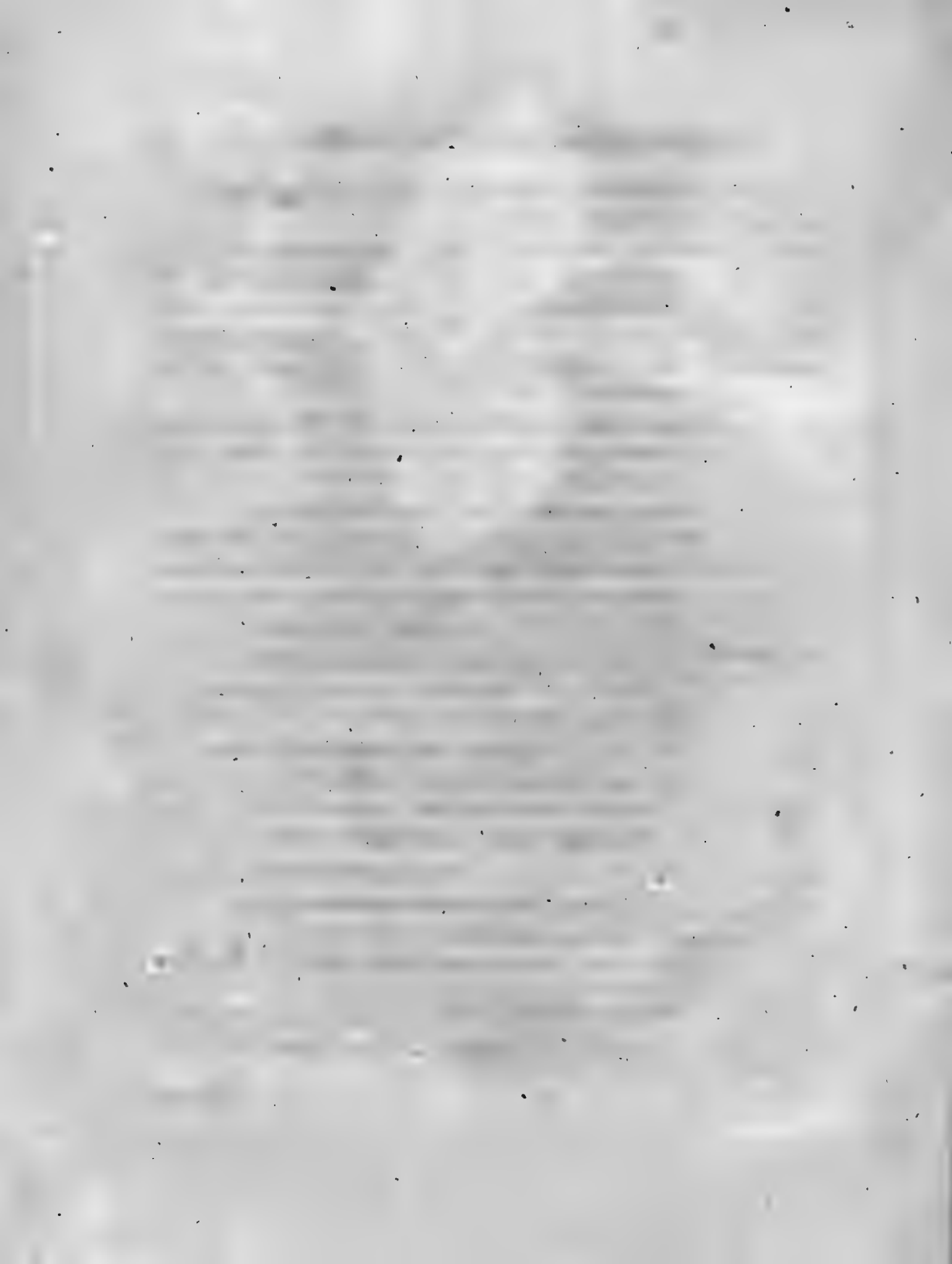


Fig. 1 Phasma filiforme.
2 ——— hecticum.



Mantis rosea. *Fabric. entom. syst. t. 2. p. 16. n. 15.*

Stoll Mant. t. 5. f. 17.

Habitat in Amboina. Mus. Dom. Holthuyfen.

Fabricius æque ac Stoll vidit exemplar masculinum, sed meliùs siccatum ideoque viride. Femina adhuc latet.

laterale. 17. Ph. thorace teretiufculo glabro, pedibus inermibus, corpore nigro, elytris brevibus alarumque basi sulphureis.

Mantis lateralis. *Fabric. entom. syst. t. 2. p. 15. n. 12.*

Gmelin syst. nat. p. 2054. n. 42. Stoll Mant. t. 10. f. 36 et 37.

Habitat in Indiis. Mus. Dom. Holthuyfen.

Stoll quidem putat se exhibere ambos sexus, sed utraque figura videtur masculina; alioqui magnitudo et elytrorum figura in hac specie pro sexu parum variaret; quod certe contra analogiam hujus generis.

variegatum. 18. Ph. thorace tereti glabro, elytris brevissimis ovatis, alarum costa fusca, fasciis quatuor sulphureis.

Stoll Mant. t. 8. f. 26.

Habitat in Surinamo. Mus. Dom. Holthuyfen.

Parvum. Antennæ setaceæ brevissimæ; alæ juxta basin hyalinæ, costa latissima. Abdomen subdepressum dilute fuliginosum. Alter sexus adhuc latet.

bimaculatum. 19. Ph. thorace tereti glabro, elytris brevissimis lanceolatis dilute fuscis, medio macula sulphurea.

Stoll Mant. t. 8. f. 29.

Habitat in Coromandel. Mus. Dom. de Breukeler Wærth.

Antennæ setaceæ longissimæ; corpus et pedes dilute fuliginosi. Alæ hyalinæ, basi rufescentes, costa dilute fusca. Femina adhuc latet.

cinereum. 20. Ph. thorace tereti glabro, elytris brevissimis lanceolatis cinereis fusco reticulatis, alis dilute cinereis fusco venosis costa rufescente.

Stoll Mant. t. 14. f. 56.

Habitat in Surinamo. Mus. Dom. Holthuysen.

Parvum. Antennæ fetacæ breves. Corpus cinereum. Femina adhuc latet.

valgum. 21. Ph. thorace tereti glabro, elytris brevissimis ovatis, alis hyalinis, femoribus anticis extrorsum divaricatis.

Stoll Mant. t. 13. f. 52.

Habitat in Sina. Mus. Dom. Holthuysen.

Antennæ fetacæ longissimæ nigrae. Corpus parvum. Femina adhuc latet.

** *Depressa.* Abdomine lato depresso; pedibus anticis brevibus, latis, depresso; thorace brevi. (Hæc aliquanto similia mantibus quam antecedentia teretia.)

Dracunculus. 22. Ph. thorace brevi depresso, mutico; elytris viridibus, apice rubris.

Stoll Mant. t. 18. f. 65. femina declarata.

t. 5. f. 18. femina pupa e Mus. Dom.

Holthuysen, rectius ad sequentem referenda.

Habitat in Indiis.

Antennæ mediocres fetacæ, basi crassiores, manifesto articulatae, articulis oblongis depresso. Alæ cineræ fusco undatae; costa testacea fusco maculata, apice rubra. Pedum anticorum femora late marginata membranacea.

Forfan Fabricii *Mantis aurita*, n. 13. est hujus mas,

dummodo pedes antichi membranacei; id quod ex descriptione parum elucet.

- Ohrtmanni.* 23. Ph. thorace brevi, teretiufculo, sub-biarticulato; elytris mediocribus ovato-oblongis; alis rotundatis, abdomine brevioribus; pedibus anticis latissimis, omnibus membranaceis, marginato-ciliatis.

TAB. II. *fig. I.*

Habitat in Indiis. Mus. Dom. Ohrtmann.

Antecedenti adfine sed diverfum. Caput antice granulatum, postice spinosum, spina sesquialtera longiore auriformi. Antennæ fetacæ longitudine corporis articulis oblongis depresso. Thorax granulatus. Abdomen elongatum cylindricum. Elytra juxta basin integra, neque ut antecedentis emarginata. Alarum costâ concolor griseo fusca.

- manicatum.* 24. Ph. elytris brevissimis, basi denticulo elevato, femoribus anticis membranaceis.

Mantis linearis. *Fabric. entom. syst. 2. p. 16. n. 14.*

Habitat in India.

Antecedenti proxime adfine atque ejus forte mas.

Mihî ex sola descriptione Fabricii notum.

- citri-folium.* 25. Ph. thorace brevi, antice depresso, postice obcordato denticulato, femoribus ovatis membranaceis, marginibus denticulatis.

Mantis ficcifolia. *Linn. syst. nat. 2. p. 689. n. 3.*

Mus. Lud. Ulr. n. III. Fabric. entom. syst. 2. p. 18. n. 24.

Roesel inf. 2. Gryll. t. 17. f. 4, 5. femina.

Edw. aves, t. 258.

Houttuyn nat. hist. p. 1. vol. 10. t. 79. f. 2. femina.

Stoll Mant. t. 7. f. 24. mas. f. 26. femina, f. 25. A.
 larva junior. *f. 25. B. larva adulta. f. 25. C. pupa.*
 Omnia ex Museo Holthufiano.

Habitat in Indiis.

Antennæ fetacæ mediocres, manifesto articulatae, articulis oblongis depresso.

Mas minor, angustior, alatus: elytris lanceolatis brevibus, viridibus, alis hyalinis, costa marginali lata virescente.

Femina major, lata, aptera: elytris oblongis venofo-reticulatis viridibus fere longitudine abdominis. Alarum rudimentis nullis.

Caput, antennæ, oculi, pedes in utroque sexu, item elytra et alæ in masculis hanc speciem procul dubio generi *phasma* vindicant; licet uterque sexus corpore depresso, femoribus membranaceis, et ano simplici; femininus vero præsertim elytris oblongis abdomen tegentibus naturalem transitum faciat ad Mantes.

120. M A N T I S.

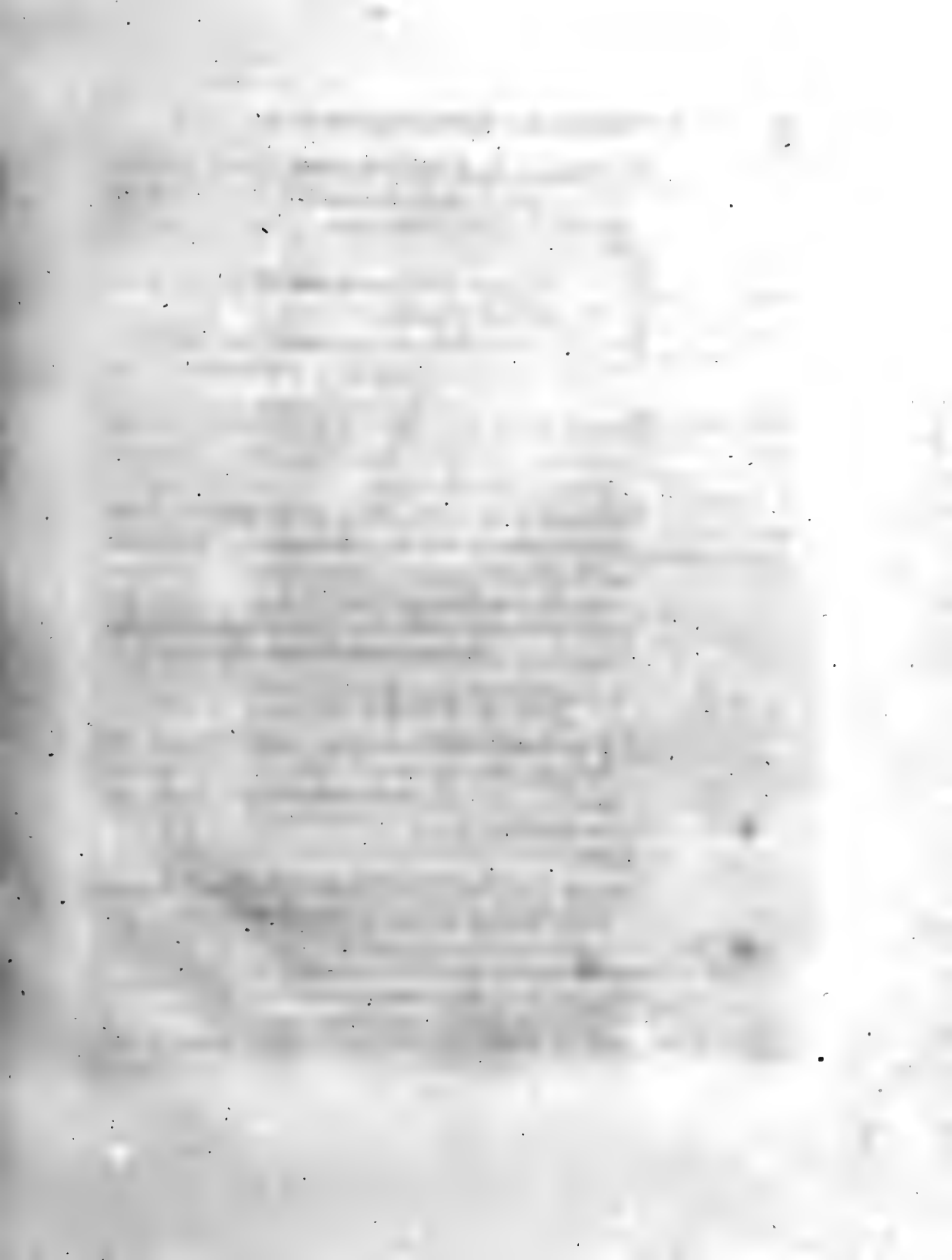
Palpi quatuor subæquales, patuli, laterales teretes, filiformes; *antici* quadriarticulati, articulo extremo breviori acuto; *postici* triarticulati, articulo extremo mediocri acuminato.

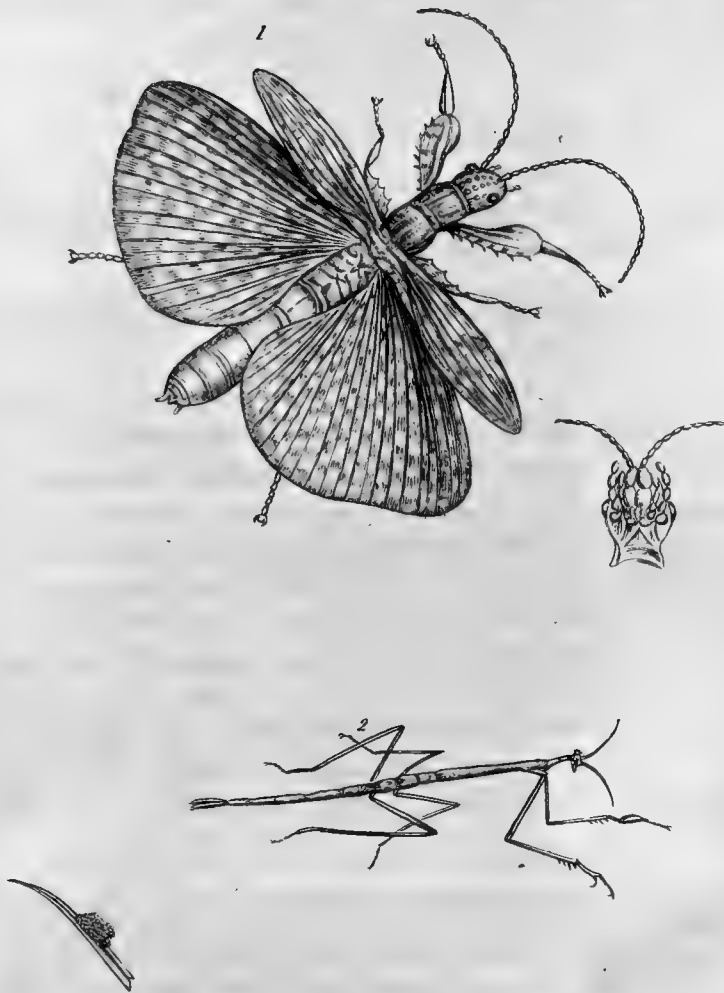
Labium

Antennæ frontales, approximatae, plerisque filiformes in utroque sexu; rarius pectinatae vel barbatae.

* *Teretes.*

Mantis corpus elongatum, plerumque depresso, glabrum, immarginatum, tardum: capite exserto, latiore quam thorax, cordato, declivi; oculis magnis, prominulis, lateralibus; stigmatibus plerumque duobus lucidis, intra basin antennarum; antennis intra oculos





*Fig. 1 Phasma Chrtmanni.
2 Mantis filum.*

* *Teretes.* Thorace subæquali angusto, abdomine teretiusculo; pedibus anticis longissimis subteretibus, spinoso-ciliatis.

† *Aptera.* Elytris alisque in utroque sexu nullis.

Filum. 1. Mantis corpore filiformi aptero, thorace tereti subgranulato, abdomine depressiusculo, brachiis subcylindricis, pedibus cursoriis setaceis simplicibus.

TAB. II. *fig.* 2.

Habitat in Surinamo. Mus. Dom. Holthuysen, et Dom. Ohrtmann.

Corpus elongatum lineare, ut phasma filiforme, sed duplo minus: caput subtriangulare, declive, latius quam thorax: antennæ filiformes brevissimæ; oculi rotundi laterales prominuli: thoracis pars antica versus caput attenuata et subincurva, quasi collum mentitur, postica longissima, haud manifesto ab abdomine secreta: pedes antici per collum a capite remoti forma et usu brachiorum ut in congeneribus: ulnarum apice spinulis tribus. Pedes intermedii brevissimi, posticique mediocres capillares teretes mutici. Cauda triphylla foliolis acuminatis. Color totius corporis obscure testaceus; oculi foli fusci.

oculos insertis: thorace obovato angusto (rarius strumoso), dorso carinato, margine depresso, scutello nullo; elytris oblongis submembranaceis, basi complicatis (dum sinistrum margine interno semper incumbit basi elytri dextri, ut in locustis Fabricii) longitudine alarum, rarissime nullis: alis plicatilibus fere totum abdomen tegentibus: pedibus sex; anticis brachiiformibus, qui constant humeris, ulnis, manibus denique falcatis, pollice laterali filiformi quinquearticulato; reliquis pedibus intermediis nempe et posticis plerumque teretibus muticis, rarius lobatis; tarsis quinque articulatis: abdomine plerumque ovato, depresso, submarginato, rarius teretiusculo, segmentis 8—10, ano simplici. Vitæ præda animalis, quam manibus comprehensam, ut sciuri ori admovent, devorant.

- †† *Alata*: Elytris alisque in utroque sexu.
 ‡ *Dioptrica*; oculis conico-acuminatis.
- aculata*. 2. M. corpore filiformi, thorace lineari subcarinato, cly-
 tris dimidio brevioribus quam abdomen.
 M. bicornis. *Linn. syst. nat.* 2. p. 691. n. 11.
Mus. Lud. Utr. n. 116.
 M. oculata. *Fabric. entom. syst.* 2. p. 19. n. 26.
Stoll Mant. t. 10. f. 38.
 Habitat ad Cap. bon. spei. *Mus. Dom. Holthuyfen.*
 Mantis fausta. *Fabric. entom. syst.* n. 47.
Thunberg nov. inf. sp. 3. p. 63.
Stoll Mant. t. 13. f. 53. vix ac ne vix quidem ab hac
 specie fecernenda videtur.
 Hottentottos hanc pro numine tutelari adorare per-
 negat Sparrmannus.
- †† *Bœopides*. Oculis simplicibus, rotundis, prominulis.
- leptelytra*. 3. M. thorace lineari elongato, subdepresso, marginato;
 elytris angustis longitudine abdominis, hyalinis.
 costa viridi; alis hyalinis, costa fusco maculata;
 apice dilute fusca.
Stoll Mant. t. 5. f. 16.
 Habitat in Surinamo.
 Antennæ mediocres filiformes, pedes graciles et, præter
 ulnas ciliatas, mutici.
- purpurascens*. 4. M. thorace lineari; elytris alarumque costa dilute
 fuscis; alis purpurascensibus, maculis quatuor cœ-
 ruleis.
Stoll Mant. t. 8. f. 28.
 Habitat in Surinamo.

Habitus.

Habitus phasmatis sed certissime mantis. Sequenti
adfinis attamen diversa.

pieta.

5. M. thorace lineari, elytris alarumque costa et apice
fuscis; alis hyalinis, juxta costam quinque maculis
alternis, tribus purpureis, duabus dilute flavis.

Stoll Mant. t. 3. f. 9.

Habitat in Surinamo.

** *Depressæ.* Thoracis basi vel medio latiore. Abdomine ovato depresso; manibus,
femoribus tibiisque compressis; tibiis tarsisque anticis spinoso-dentatis.

† *Arthritica.* Pedibus lobatis.

† *Boopides.* Oculis simplicibus rotundis prominulis, thorace elongato filiformi.

- gongylodes.* 6. M. thorace antice dilatato dentato; elytris repandis
costa viridi, longioribus quam alæ hyalinæ; femo-
ribus anticis spina, reliquis lobo terminatis.

M. gongylodes. *Linn. syst. nat. 2. p. 690. n. 4.*

Mus. Lud. Ulr. n. 112. Amæn. acad. 1. p. 504.

Fabric. entom. syst. 2. p. 17. n. 17.

Aldrov. inf. t. 13. f. 21.

Marcgraf. Brasil. 246. Gaayra.

AË. angl. 301. t. 20. f. 3.

Seb. mus. 4. t. 68.

Roef. inf. 2. gryll. t. 7.

Sulzer char. inf. t. 8. f. 50.

D' Aubent. misc. t. 65. f. 2.

Drury inf. 1. t. 50. f. 2.

Stoll Mant. t. 16. f. 58, 59.

Habitat:

Habitat in Indiis. Mus. Dom. Holthuysen.

Antennæ breves filiformes; capitis vertex subulatus bifidus; ulnæ dilatatæ ciliatæ; femora introrsum lobo simplici semicordato, extrorsum duplici aculeato, stipitata; tibiæ teretes; elytra et alæ breviores quam abdomen.

flabellicornis. 7. M. thorace antice dilatato, subdenticato; elytris repandis longitudine alarum; antennis pectinatis.

M. flabellicornis. *Fabric. entom. syst.* 2. p. 16. n. 16.

Stoll Mant. 1. 17. f. 61.

Habitat in Indiis. Mus. Dom. Holthuysen.

Proxime antecedenti adfinis. Differt modo antennis pectinatis; alis longioribus quam abdomen; et oculis minus prominulis. Lobi femorum exacte ut in *M. gongylode*. Quare olim forsan recte a Fabricio (*spec. inf.* 1. p. 346. n. 8.) pro eadem specie habita est.

pectinicornis. 8. M. thorace antice unidentato, elytris integerrimis hyalinis costa viridi, alis hyalinis costa fusca, antennis barbatis.

M. pectinicornis. *Linn. syst. nat.* 2. p. 691. n. 10.

Amen. acad. 6. p. 396. n. 27. *Fabric. entom. syst.* 2. p. 18. n. 25.

M. pennicornis. *Pallas ii.* 2. *app.* n. 81. *Gmelin syst. nat.* p. 2055. n. 53.

M. pectinicornis. *Herbst. arch. inf.* 8. t. 50. f. 2.

Stoll Mant. 1. 9. f. 34. mas. f. 35. femina.

Habitat prope mare Caspium. Mus. Dom. Holthuysen. Mas multo minor, thorace mutico; femina thorace ciliato; antennis ulnisque latioribus. Femora in utroque

utroque sexu solummodo gaudent introrsum lobo simplici femicordato subterminali. Tibiæ teretes. In synonymia fortasse passim confusio cum antecedente latet, ob neglectas elytrorum et femorum differentias.

lobipes.

9. M. thorace antice subdilatato mutico; elytris alisque hyalinis, costa striisque obliquis viridibus.

(M. undata. *Fabric. entom. syst. 2. p. 19. n. 28.* videtur hujus femina.)

Stoll Mant. t. 8. f. 30. mas.

Habitat in Tranquebar. Mus. Dom. Holthuysen.

Caput triangulare; frons producta in conum erectum; antennæ filiformes brevissimæ; oculi exserti. Brachia robusta manusque ut in tribulibus hujus generis femora et tibiæ utrinque lobis femicordatis stipitatæ; tibiæ item spina subterminali. Elytra et alæ aliquoties longiores quam abdomen. Fabricius in descriptione M. *undata* videtur usus fuisse femina hujus nostræ *lobipedis*, quæ colorum detrimentum cepit e spiritu vini.

mendica.

10. M. thorace antice marginato, ciliato; elytris albo viridique variis, costa guttis albis adspersa.

M. mendica. *Fabric. entom. system. 2. p. 17. n. 19.*

Stoll Mant. t. 12. f. 47.

Habitat in Africa boreali.

Caput triangulare, frons parumper producta, antennæ pectinatæ. Thorax pro hac tribu brevis. Femora sola introrsum lobo femiovato subterminali.

- foliata.* 11. *M. thorace mutico, elytris viridissimis; posticorum pedum femoribus intus, tibiis utrinque lobatis.*
Stoll Mant. t. 18. f. 67.
 Habitat in Bengala.
 Caput triangulare, frons parumper producta. Antennæ breves filiformes. Oculi exserti. Elytrorum basis interior, alæque hyalinæ. Pedes intermedi teretes.
- pauperata.* 12. *M. thorace spinuloso; humeris extus spina, femoribus intus lobo semicordato terminatis.*
Fabric. entom. system. 2. p. 17. n. 18. Thunberg nov. inf. spec. 3. p. 61.
Herbst. arch. inf. 8. t. 51. f. 1. femina.
Stoll Mant. t. 10. f. 40. mas.
 Habitat in Coromandel.
 Adfinis *M. pectinicorni*, at neutiquam ejus femina, namque est multoties minor. Differt præterea antennis in utroque sexu filiformibus brevibusque, thorace parum dilatato, elytris integerrimis viridibus flavo marginatis, et lobis intus modo ad femora adnatis.
- bidens.* 13. *M. thorace scabro, elytris viridibus fasciis nigris, alis fuscis disco atro.*
M. bidens. Fabric. entom. syst. 2. p. 22. n. 39.
 Habitat in America.
 Mihi solummodo ex Fabricii descriptione nota.
- †† *Dieptricæ.* Oculis conico acuminatis, thorace brevi lobato.
- coronata.* 14. *M. thorace cordato, marginato; oculis oblongis porrectis; femoribus intus late lobatis.*

Stoll Mant. t. II. f. 44. Ibid. f. 44. item ejus larva.

Habitat in Amboina.

Antennæ filiformes mediocres. Quintuplo major quam sequentes.

lobata. 15. *M. thorace cordato marginato, elytris maculis binis quadratis albis.*

M. lobata. Fabric. entom. 2. p. 23. n. 45.

Thunberg nov. inf. spec. 3. p. 62. f. 73.

Stoll Mant. t. 12. f. 50.

Habitat ad Cap. bon. spei.

Sequenti simillima, at paulo major. Ulnæ angustæ submuticæ.

nasuta. 16. *M. thorace cordato ciliato, fronte porrecta spinoso-emarginata.*

M. nasuta. Fabric. entom. syst. 2. p. 23. n. 44.

Stoll Mant. t. 9. f. 33. et t. 12. f. 48.

Herbst arch. inf. 8. t. 51. f. 4. Mantis tricolor. Pupa.

Habitat ad Cap. bon. spei. Mus. Dom. Holthuyfen.

Antecedente paulo minor; abdominis margo lobato dentatus, lobis recurvis; brachiorum ulnæ latiores dentato ciliatæ.

†† *Eucnemides.* Femoribus tibiisque simplicibus.

† *Boopides.* Oculis prominulis rotundis.

cancellata. 17. *M. thorace dilatato, margine membranaceo plano; elytris ovalibus cancellatis.*

M. cancellata. Fabric. entom. syst. 2. p. 18. n. 23.

Stoll Mant. t. 11. f. 42.

Habitat in Surinamo.

M. Strumarie adfinis, sed differt: antennis brevissimis, thoracis margine plano, elytris ovalibus ferrugineis fusco cancellatis, medio macula subocellari testaceâ.

Strumaria. 18. *M.* thorace obcordato dilatato, margine subcucullato, elytris lanceolatis pellucidulis.

M. strumaria. *Linn. syst. nat.* 2. p. 691. n. 13.

Fabric. entom. system. 2. p. 18. n. 21.

Merian. Surin. 1. 27.

Seb. Mus. 4. t. 69.

Roef. inf. 2. *Gryll.* t. 3.

Stoll Mant. 1. 12. f. 45.

Habitat in Indiis. *Mus. Dom. Holthuysen.*

Antennæ filiformes elongatæ.

precaria. 16. *M.* thorace elongato subciliato, elytris ovatis acuminatis virescentibus, ocello ferrugineo.

M. precaria. *Linn. syst. nat.* 2. p. 691. n. 8. *Fabric.*

entom. syst. 2. p. 20. n. 32.

Merian. Surin. 1. 66.

Seb. Mus. 4. t. 67.

Houttuyn nat. hist. p. 1. vol. 10. t. 79. f. 3.

De Geer inf. 3. p. 407. n. 3. t. 36. f. 4.

Herbst arch. inf. 8. t. 50. f. 1.

Stoll Mant. 1. 17. f. 62.

Habitat in America. *Mus. Dom. Holthuysen.*

Antennæ filiformes mediocres; elytra ovata, acuminata; nunc ocello ferrugineo simplici, nunc dimidiato albo, nunc macula subocellari alba.

hodegetica. 20. *M.* thorace elongato subciliato; elytris ovatis acutis, viridibus immaculatis; alis hyalinis fusco undatis.

M. carolina. Linn. *syft. nat.* 2. p. 691. n. 9.

Amæn. acad. 6. p. 396. n. 28.

Habitat in Surinamo. Muf. Dom. Holthuyfen.

Antennæ filiformes breves. Ulnæ intus macula magna atra.

irrorata. 21. *M. thorace lævi subcarinato, elytris viridibus, punctis ferrugineis sparsis.*

M. irrorata. Linn. *syft. nat.* 2. p. 690. n. 7. *Amæn. acad.* 6. p. 397. n. 29. *Fabric. entom. syft.* 2. p. 19. n. 29.

Habitat in America australi.

Antecedenti proxime adfinis, neque ab illa forsan tamquam peculiaris species diverfa. Puncta sparsa elytrorum fortassis a fanie, dum infectum acu occideretur, emicante orta, ut in nostra *M. conspurcata.*

cingulata. 22. *M. thorace elongato subciliato, elytris lanceolatis viridibus, nigro maculatis; alis nigricantibus nigro lineatis, costa ex fusco flavescente.*

M. cingulata. Gmelin *syft. nat. ed.* 13. p. 2055. n. 48.

Drury inf. 2. p. 89. t. 49. f. 2.

Stoll Mant. t. 9. f. 32.

Habitat in America australi. Muf. Dom. Holthuyfen.

Antennæ filiformes mediocres. Abdomen nigro cingulatum.

urbana. 23. *M. thorace elongato subciliato, elytris ovalibus viridibus, fascia punctisque ferrugineis.* *Fabric. entom.*

system. 2. p. 23. n. 42. mas.

Stoll Mant. t. 9. f. 31. femina.

Habitat in Indiis. Mus. Dom. Holthuysen.

Mas multo minor quam femina differt thorace integro.

Simulacrum. 24. M. thorace subelongato, ciliato; elytris oblongis viridibus macula media alba.

M. Simulacrum. *Fabric. entom. system. 2. p. 21. n. 34.*
Stoll Mant. t. 12. f. 49.

Habitat in Indiis. Mus. Dom. de Breukelerwærth.

Antennæ filiformes longæ; thorax paulo brevior et antice latior, quam in tribulibus.

obsecraria. 25. M. thorace elongato lævi; elytris spathulatis hyalinis, costa viridi; ocello rubro, dimidiato albo; alis hyalinis.

Stoll Mant. t. 18. f. 66.

Habitat ad Cap. bon. spei. Mus. D. de Breukelerwærth.

Antennæ filiformes mediocres. Ulnæ intus macula nigra. *M. oratoria* adfinis, attamen diversa.

oratoria. 26. M. thorace elongato lævi, elytris viridibus immaculatis.

M. oratoria. *Fabric. entom. syst. 2. p. 20. n. 31.*

α mas. Mantis religiosa. *Linn. syst. nat. 2. p. 690. n. 5.*

Roef. inf. 2. Gryll. t. 1. f. 1, 2.

Schæf. elem. t. 81.

Seb. Mus. 4. t. 67. f. 7, 8.

Stoll Mant. t. 5. f. 19.

β femina. M. oratoria. *Linn. syst. nat. 2. p. 690. n. 6.*

Roef. inf. 2. Gryll. t. 2. f. 5. item inf. 4. t. 12.

Sulz. hist. inf. t. 8. f. 4.

De Geer inf. 3. p. 410. n. 5. t. 37. f. 2. hic delenda;
nam est *M. sancta*, quod vel magnitudo docet.

Seb. Mus. 4. t. 67. f. 9, 10.

Stoll Mant. t. 17. f. 64.

γ *striata*. *M. striata. Fabric. entom. system. 2. p. 20. n. 30.*

Roef. inf. 2. Gryll. t. 2. f. 6.

Habitat ubique in Zona torrida et temperata.

Mas antennis longioribus; thorace brevior. Femina
alis apice viridibus.

conspurcata. 27. *M. thorace carinato ciliato, elytris spathulatis hyalinis, costa subrepanda viridi, (punctis ferrugineis sparsis.)*

Stoll Mant. t. 16. f. 60. ib. t. 4. f. 12. pupa.

Habitat in Coromandel. *Mus. Dom. Holthuyfen.*

Adfinis *M. oratoriae*, at paulo major; antennæ filiformes mediocres. Thorax manifesto ciliatus. Puncta sparsa videntur a fanie, dum occideretur, orta.

grisea. 28. *M. thorace latiusculo; oculis prominentibus; elytris alisque griseo hyalinis, fusco maculatis.*

M. grisea. Fabric. entom. syst. 2. p. 22. n. 40.

Stoll Mant. t. 6. f. 23.

Habitat in Coromandel.

Statura mediocris. Caput quale Agrii virginis, at majus. Antennæ filiformes mediocres. Corpus artufque grisei, fusco punctati. Elytra oblonga, costa subrepanda.

ochroptera. 29. *M. thorace lævi, elytris oblongis testaceis, macula laterali fusca.*

De Geer inf. 3. t. 36. f. 8?

Stoll Mant. t. 6. f. 22. pupa? t. 4. f. 13. larva?

Habitat in Coromandel. Adhuc dubia species.

adpersa. 30. *M. thorace ciliato; elytris alisque longis griseis fusco maculatis.*

Stoll Mant. t. 11. f. 41.

Habitat in Africa æquinoctiali.

Similis *M. precaria*, sed minor. Elytra alæque oblonga integerrima.

hyalina. 31. *M. thorace ciliato, elytris hyalinis margine viridi, fronte bidentata.*

M. hyalina. Fabric. entom. syst. 2. p. 21. n. 37.

De Geer inf. 3. p. 410. n. 4. t. 37. f. 1.

Habitat in America.

Nimis adfinis videtur *M. oratoria*.

monacha. 32. *M. thorace lævi, elytris alisque viridi hyalinis. M. monacha. Fabric. entom. syst. 2. p. 21. n. 35.*

Stoll Mant. t. 1. f. 2. mas.

Habitat ad Cap. bon. spei.

Similis *M. precaria*, sed duplo minor.

sancta. 33. *M. thorace ferrulato, elytris viridibus immaculatis, alis hyalinis.*

M. sancta. Fabric. entom. system. 2. p. 21. n. 33.

De Geer inf. 3. t. 37. f. 2. Mantis oratoria.

Habitat in Europa australi.

Similis *M. precaria*, at triplo minor. Elytra oblonga integerrima. Alæ apice virescentes.

fasciata. 34. *M. thorace subcarinato lævi; elytris oblongis integerrimis*

rimis dilute fuscis; alis cinereis fusco undatis, fascia lata purpurea juxta basin hyalinam.

Stoll Mant. t. 18. f. 68.

Habitat in Surinamo.

Similis *M. purpurascenti*; sed hujus tribus. Antennæ filiformes mediocres. Thorax elongatus vix marginatus, sed subcarinatus nec linearis. Elytra alæque longitudine abdominis.

truncata. 35. *M. thorace lævi; elytris integerrimis; alarum apice exalbido; abdomine depresso, margine lobato.*

M. truncata. Fabric. entom. syst. 2. p. 17. n. 20.

Stoll Mant. t. 3. f. 10.

Habitat in America australi.

Parva sed robusta. Abdomen fasciis fuscis cingulatum. Elytra puncto-disci fusco.

neuroptera. 36. *M. thorace lævi, antice tereti; elytris alisque hyalinis, fusco venosis.*

Stoll Mant. t. 12. f. 46.

Habitat in Ceylon.

Elytra et alæ fere, ut neuropteris v. c. Hemerobiis, longiores quam abdomen. Attamen certissime hujus generis et tribus.

Confer *M. perspicua Fabric. entom. syst. n. 48. cui simillima præter maculas: item*

M. parva Gmelin p. 2055. n. 47. Drury inf. 2. p. 75. t. 39. f. 5.

caffrana. 37. *M. thorace lævi, antice tereti, postice marginato; elytris viridibus, sulphureo marginatis.*

Stoll Mant. t. 11. f. 43.

Habitat:

Habitat ad Cap. bon. spei.

Proxime adfinis *M. sanctæ*.

- prasinana.* 38. *M.* thorace depresso, subcarinato, lævi; elytris brevibus acutis; alis abdomine longioribus nigris apice flavescens.

Stoll Mant. t. 1. f. 4.

Habitat in Surinamo.

Corpus parvum viride. Elytra brevia, medio linea elevata fusca, fere ut Phasmatis; sed caput, thorax et brachia Mantin arguunt. Pedes postici teretes tenuissimi.

- minuta.* 39. *M.* thorace elongato teretiusculo, elytris hyalinis costa virescente.

Fabric. entom. system. 2. p. 24. n. 50.

Stoll Mant. t. 2. f. 7.

Habitat in America australi. Mus. Dom. Holthuyfen.

Parva. Caput cordatum oculis lateralibus. Antennæ filiformes breves. Pedes antici a reliquis distantes capiti approximati. Elytra et alæ viridi hyalinæ.

- pegana.* 40. *M.* thorace teretiusculo, elytris alisque reticulatis albis, priorum costa macula laterali ferruginea.

Fabric. entom. system. 2. p. 24. n. 49.

Raphidia Mantispa. *Linn. syst. nat. 2. p. 916. n. 2.*

Raphidia stiriaca. *Pod. Mus. Græc. 101. t. 1. f. 15.*

Mantis Perla. *Pallas spicil. zool. fasc. 9. p. 14. t. 1. f. 8.*

Stoll Mant. t. 2. f. 6.

Habitat in Gallia, Germania.

Parva. Caput cordatum oculis lateralibus. Brachia capiti approximata. Thorax brevior quam antecedentis; vix carinatus, integerrimus.

pufilla.

pufilla. 41. *M. thorace teretiufculo lævi, elytris aliſque oblongis integerrimis hyalinis, priorum coſta flaveſcente.*

Fabric. entom. ſystem. 2. p. 25. n. 51.

Pallas ſpicil. zool. faſc. 9. p. 15. t. 1. f. 9.

Stoll Mant. t. 1. f. 3.

Habitat ad Cap. bon. ſpei.

Parva, vix major quam *Raphidia Ophiopſis*.

nana. 42. *M. thorace teretiufculo elongato, elytris aliſque hyalinis fuſco venoſis, abdomine longioribus.*

Stoll Mant. t. 4. f. 15.

Habitat in Coromandel.

Antecedenti adfinis, attamen diverſa. Abdomen vix depreſſum; brachia capiti approximata. Corpus ruſum; elytrorum coſta anguſta ruſeſcens.

†† *Dioptrica*; oculis conico-acuminatis.

angulata. 43. *M. thorace mediocri, elytris ſinuato-repandis, abdomine lobato.*

Stoll Mant. t. 4. f. 14.

Habitat in Surinamo. Muſ. Dom. Holthuylſen.

Corpus mediocre at robuſtum ferrugineum. Caput cornutum vertice bifido. Antennæ filiformes mediocres. Thorax cinereus ſubcarinatus elongatus lævis. Abdomen rufo-faſciatum, marginatum lobis ciliato-dentatis. Brachia ut in congeneribus. Pedes curforii ſimpliciſſimi, lobis nullis; quum reliquæ Mantes depreſſæ dioptricæ omnes quoque ſimul arthriticæ reperiuntur, vel hoc nomine, ut alioque ſpecies maxime ſingularis.

This may be sufficient for the nomenclature of the two genera which I have taken the liberty to name in German *Blattschrecke*, or *Laubschrecke*, and *Fangschrecke*. It is unnecessary to repeat here all that I have said in Latin; I will only make a few general remarks, especially on the species omitted by Fabricius. In the *Entomologia Systematica* we find in all 51 *Mantes*; I here describe 25 *Phasmata* and 43 *Mantes*, together 68 species; hence it might be concluded, that I had 17 new species; but this mode of reckoning is not perfectly sure: it may be, and is, indeed, the fact, that I have added more than 17 species. The descriptions of Fabricius are very good and correct, but they are frequently insufficient to determine to which family a *Mantis* belongs, and, therefore, I cannot always be certain whether this or that species delineated by Stoll, where I do not cite Fabricius, may not yet be found in the *Entomologia Systematica*. But this will be very rarely the case, and nearly all the species of Fabricius, which I pass over in the monograph, are certainly wanting in Stoll.

Every one acquainted with the subject will observe, that the first 15 *Mantes* of Fabricius are one and all *Phasmata*. A certain proof that the difference of the habit struck also the attention of this sharp-sighted entomologist. The *Phasma citrifolium* alone has gone astray among the *Mantes*, under the name of *M. ficcifolia*, n. 24. This has been occasioned partly by its belonging to a peculiar family, which has rather more resemblance to the *Mantes* than the other *Phasmata*, and partly from this circumstance, that Fabricius was acquainted only with the female, and not with the male, which bears much stronger marks of a *Phasma* than the female. Three species of *Phasma* occur in Fabricius which Stoll has not, and which I have hesitated to number in the order of species. Not that I doubt their existence, but because they are males, and I cannot be certain that the female is not already reckoned among the species. They are

are the following, *M. spinosa*, n. 9. *M. bispinosa*, n. 10. and *M. aurita*, n. 13. This last is, in all probability, the male of the *Phasma Dracunculus*, provided it has broad forelegs, and in general skinny margins on all its legs, which may easily be determined by inspection of the Lundian collection in Copenhagen. The next in order, *Ph. lineare*, is certainly at least of the second family, and, probably, the male of my *Ph. Ohrtmanni*. The *Ph. spinosum* and *bispinosum* belong certainly to the first family, and are very nearly related to the *Ph. atropicum* and *bellicum*. The last mentioned are also males, of which the females are, perhaps, already known. In the genus *Phasma*, the males in general are very clearly distinguishable from the females. The sexual distinctions may be taken with the greatest advantage from those species of which the males and females are known with perfect certainty as belonging to each other. These are particularly my *Ph. nævium* and *Ph. edule*. There are, indeed, some genera in which it seems that the difference of the sexes in respect to magnitude is only observable in some species, and not in the genus at large. I need not go so far as to mention that in the genus *Cervus*, the stag, *Cervus Elaphus*, is greater than the hind; and, on the contrary, the roebuck, *Cervus Capreolus*, is considerably smaller than the doe; such considerations would carry me too far from my purpose. I will confine myself to insects. Here we have the *Bombyx dispar*, in which an inequality exists between the two sexes that may be called unexampled in this genus. It were useless to assert that there is a natural genus among the *Glossata* of which the sexes are unequal in size, and which ought to be separated from the genus *Bombyx*, in the same manner as the *Lucani*, where the sexes are of unequal magnitudes, are separated from the more proportionate *Paffali*. Yet, setting aside all these minutæ, we may assume it as a probable hypothesis, until the contrary be clearly proved, that the differences of most, if not of all, the other species of

Phasma, with respect to sex, are analogous to those of the *nævium* and *edule*. This being granted, we may observe that, 1. The males are always much less than the females. 2. Their antennæ are proportionably longer and thicker. 3. Their hemelytra are smaller, round-oval, sharper at the tip, thorned at the base; those of the females larger, oval, rounded off at the tip, without thorns, but more strongly ribbed. 4. The females of some species are, perhaps, without wings, although they have hemelytra, and the males have really wings. The *Phasma citrifolium* of the second family, and the *Pb. angulatum* of the first, afford examples of this. It is not impossible that some females may be found to want both wings and hemelytra, whose males may have both. At the same time, there are certainly some males without wings in the perfect state. The *Pb. filiforme* in the Ohrtmannian collection is, without doubt, a male, full grown, and yet without any wings. Time will show whether or not this *Pb. filiforme* be the male of the *Pb. Ramulus*. 5. The head and thorax of the male *Phasma* are more thorny than those of the female. 6. The female *Phasmata* have, between the three leaves at the end of the abdomen, a proper spine for laying eggs; the male organs, concealed in a similar position, are in dried specimens not to be clearly distinguished. 7. The forefeet of the males are in proportion longer, thinner, and dentated with fewer but stronger thorns.

These observations may be of use in bringing together the sexes of the same species, and may serve to guide and assist a reader, who has an opportunity of observing these insects alive, to throw more light on their economy and procreation. But, on the other hand, they render difficult the determination of the species. The specific characters ought properly never to be taken from the particulars just mentioned, as they hardly ever agree perfectly in both sexes. I have sought as much as possible to avoid this error in the description of the

the

the species, of which I knew both the male and the female. Where I could ascertain but one sex, whether in a natural specimen, or in a drawing or description of good authority, I have been obliged, against my own principles, to form the specific characters from those variable distinctions which are subject to change with the difference of sex. In this respect, therefore, whoever shall hereafter think proper to write a more complete and accurate monograph on the *Phasmata*, will find still much room left for corrections and improvements. I consider myself as excused in the eyes of enlightened judges, as having been able to make use only of dried specimens and books; and, besides, as fairly confessing and pointing out the defects of my specific characters, and recommending them to the improvements of those who have opportunity of examining the living subjects.

In the genus of the proper *Mantes*, the difference between the two sexes is far from being so striking as in the *Phasmata*. I believe that I have observed in some species the following sexual characters, which I do not lay down dogmatically, but propose, as a critical reasoner, to be brought to the test by those who have opportunity and skill to make use of them. 1. The male *Mantes* are only a little smaller than the females. 2. Their antennæ are considerably longer, and somewhat thicker, sometimes, although rarely, even pectinated. Thus, perhaps, the *M. flabellicornis* may be the male of *M. gongylades*; on the other hand, both sexes of the *M. pectinicornis* seem to have pectinated antennæ. 3. The males have proportionably larger eyes than the females; in respect to form and situation, the eyes of each sex agree of course very exactly. 4. The thorax of the males is narrower, and, especially at the margin, smoother. 5. Their abdomen is narrower and thinner. 6. Their hemelytra are narrower, and often longer. 7. Their wings are longer, and every way larger. 8. Their arms are somewhat longer; the upper and lower arm narrower, and less flattened; the scissar-like, or falciform hand, narrower

and longer; the thumb rounder and longer. The females are proportionately the reverse in all these respects, that is, the whole form is heavier, broader, flatter, and firmer. The proper organs of generation of the *Mantes* do not, in dried specimens, admit of examination.

From this digression on the sexual differences in both genera, I return to the account which I proposed to give.

In Gmelin's thirteenth edition of the *Systema Naturæ* the *Phasmata* stand as in Linné, intermixed with the *Mantes*. But we find some enumerated amongst them that Fabricius has not. The *M. cylindrica*, n. 54. is doubtless the male of *M. necydaloides*. I have united both under *Ph. nævium*. *M. phthorica* is probably the male of my *Ph. edule*. *M. labiata* is also a *Phasma*, but I can say nothing further of it. *M. gigantea* is our *Ph. angulatum*, as I rather choose to call it after Fabricius; it is this species described from a female.

I now come to the proper *Mantes*. I must here enumerate the following from Fabricius, which I have been obliged to omit, not being able to ascertain to which family they belong. 1. *M. superstiosa* of that author, n. 27. appears to belong to the *Mantes* with a flattened body, rounded feet, and round eyes, and in my series to come in between *M. strumaria* and *precaria*. 2. *M. fenestrata*, n. 38. appears to claim a place in the same family and party. 3. *M. bidens*, n. 39. belongs to my arthritic division with round eyes, between *lobipes* and *mendica*. 4. *M. rustica*, n. 43. must, according to analogy, be also arthritical; and in that case it follows *M. peclincornis*. 5. *M. fausta*, Fabr. n. 47. is scarcely a species essentially different from the *M. oculata*. 6. *M. perspicua* must be placed directly after my *neuroptera*.

The following *Mantes* of Gmelin I am quite at a loss to arrange, as I have no sufficient accounts to enable me to ascertain their family and relationship with any certainty. 1. *M. maculata*, n. 45.

2. *M. capensis*, n. 46. 3. *M. angusta*, n. 50. 4. *M. sibirica*, n. 51. and
5. *M. brachyptera*, n. 52.

The new species, which I here describe for the first time, with the addition of coloured plates, are the following :

1. *Phasma heeticum*, TAB. I. fig. 2.
2. *Phasma Obertmanni*, TAB. II. fig. 1.
3. *Mantis Filum*, TAB. II. fig. 2.

The *Phasma heeticum*, which is an inhabitant of China, I describe from a specimen in the collection of Mr. Holthuyfen ; it is of the male sex, and resembles the *Phasma Gigas* ; but does not seem to be the male of that species, although its female must be of the size of the *Ph. Gigas*.

The head is oblongo-ovate, highly vaulted, and covered with a shagreen-like skin. The forehead is elongated into a sharp projected horn, which is excavated in the middle with a deep furrow ; the margins are bent round and serrato-dentated. It consists of two leaflets, compressed from the sides, which the insect, when alive, can probably separate at pleasure from each other, and move either of them apart. The organs of feeding are of the same nature with the others of this genus and family. The eyes are situated under the forehead, and are small, round, and black. The antennæ are setaceous, originate between the eyes, and have, at the base, two thick divisions ; the rest are longish, and become, by degrees, narrower and narrower.

II. *The Botanical History of the Genus Ehrharta.* By Olof Swartz,
M. D. F. M. L. S.

Read January 7, 1800.

AMONG the numerous botanical acquisitions made upwards of twenty years ago by Professor Thunberg during his extensive peregrinations in the southern part of Africa, was a kind of grass, whose difference from all before known, occasioned him to consider it as a peculiarly distinct genus. It was afterwards described and delineated by him in the Memoirs of the Swedish Royal Academy for 1779, p. 216. t. 8. under the name of *Ehrharta*, in honour of F. Ehrhart, native of Berne in Switzerland, once a pupil of the elder Linnæus, and His Britannic Majesty's botanist at Hanover; a man of great merit in the science of botany, and who is well known by his labours, particularly in the history of grasses and the cryptogamous tribe.

The same year this genus was adopted amongst the *Nova Graminum Genera*, arranged in a dissertation under the presidency of the younger Linnæus at Upsala.

In the mean time, the Abbé Rozier published in his *Journal de Physique*, 1779, p. 225. a botanical description made by L. Richard, of a kind of grass called by him *Trochera striata*, of which, notwithstanding the indifferent figure he has given, it is not difficult to perceive the near affinity with the former.

Several years afterwards the President of the Linnæan Society described in the first fasciculus of his *Plantarum Icones hætenus ineditæ*,

179. a new species, under the name of *Ebrharta panicea*, detected in the year 1776 by Sonnerat, at the Cape of Good Hope.

In the second fasciculus of the same valuable work, the author enriches the genus *Ebrharta* with two other species, the *E. longiflora* and *E. calycina*, the latter of which had, some time before, appeared in the Linnéan *Suppl. Plantarum*, p. 108. where it is called *Aira capensis*.

But the great external similarity of this genus with that of *Melica*, has made me anxious to examine, with the leave of my highly esteemed friend Prof. Thunberg, into several of those species preserved in his museum, which we find not only insisted in the *Suppl. Plant.* under the generic names of *Melica* and *Aira*, but even those inserted in the first part of his own *Prodr. Floræ Capensis*; and to my very great satisfaction, I have had the good fortune to detect some possessing all the characteristic marks of the genus in question. I am happy to acknowledge my high obligations to Prof. Thunberg, by whose generous communications I have thus been able to attain a tolerably complete knowledge of several beautiful kinds, which will still more help to settle the limits of this most distinct genus, and become so many cyphresses round the urn of a man untimely lost for science, whose name will be preserved by them in the annals of botany.

Having now had the opportunity of studying and comparing so many species, I venture to offer more accurate characters to form the natural and genuine difference of the *Ebrharta* from other genera of the same natural order, the character hitherto given in the *Suppl. Plant.* and in the above-mentioned dissertation, being rather a specific description of the only species on which this new genus was first founded.

Habitus generis naturalis.

Radix fibrosa l. rarius bulbosa.

Culmi conferti, simplices l. subdivisi, subinde ramosi, articulati, subge-

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G

niculati,

niculati, erecti, l. versus radicem decumbentes, stoloniferi; in quibusdam suffrutescentes.

Folia ut in gramineis basi vaginantia, disco plana, apice interdum convoluta; margine cartilaginea scabra l. crenulato-undulata.

Vaginæ arctæ, fauce contractæ, liguliferæ.

Panicula terminalis, simpliciuscula, contracta l. patens.

Flores mutici l. aristati.

Glumæ calycinæ sæpius coloratæ.

*Chara*cter genericus.

CAL. *Gluma* uniflora, bivalvis.

Valvulæ corolla sæpius breviores, ovatæ, acutæ; concavo-canaliculatæ, muticæ, patentiusculæ, inæquales.

exterior plerumque minor, ovato-lanceolata, interiorem basi amplectens.

interior parum major, lato-ovata, acuta.

COR. *Gluma* duplex, calyce longior, subclausa.

Exterior bivalvis.

Valvulæ complicatæ, compressæ, amplexantes inæquales, sæpe basi uno alterove fasciculo villorum præditæ.

interior angustior, basi utroque latere excisa.

exterior latior, ante florescentiam maximam partem interioris obvolvens, infima basi interiorem subtus (articulatione quasi) excipiens.

Interior anceps, bivalvis.

Valvulæ complicatæ, membranaceæ, carinatæ inæquales.

exterior latior, basi ad latera excisa glumæ oppositæ corollæ exterioris illam amplectens.

interior subulato-falcata.

Ad basin *interioris*, versus valvulam interiorem glumæ corollinæ
exterioris

exterioris, infidet *tuberculum* sessile, subrotundum, inæquale; forsan rudimentum *flosculi*.

Nectarium. Petala s. membranulæ 2. minima, basi crassiuscula, apice tenuissima; genitalia obvolventia.

STAM. *Filamenta* 6. brevissima, circa germen inserta. *Antherae* lineares, erectæ, basi emarginatæ, apice bifidæ, biloculares: *loculis* apice oblique hiantibus.

PIST. *Germen* ovatum, minutum, glabrum. *Styli* duo, brevissimi, erecti, contigui. *Stigmata* longa, conniventia, demum divergentia, compresso-bijubata.

PER. nullum; fed valvulæ coroll. persistentes includunt

SEMEN unicum glabrum.

Character essentialis.

CAL. *Gluma* bivalvis uniflora.

COR. *Gluma* duplex, utraque bivalvis; *exterior* basi excisa.

From the above generic character it appears—that the *glumæ corollinæ* being joined at the base by a kind of hinge or articulation, the interior of the exterior *corolline glumes* is emarginated at the sides of the base, or has on each side a semilunar cavity;—that a *rudimentum flosculi* is commonly found at the base between the two interior corolline valves; but in those species where this rudiment is wanting, a *squama petaloidea* is seen in its place on both sides, where the interior valve is emarginated;—that the filaments are not inserted in a parallel manner on two sides of the germen, but surround it; the *antheræ*, however, concealed within the compressed glumes of the corolla, are placed three on each opposite side of the *pisillum*;—that the *antheræ* open only at the top at the time of fecundation;—and finally, that the *Styles* are invariably two, and the *Stigmata* *bijubata*.

This genus ought accordingly, in the sexual system, to take its place in *Hexandria digynia*, immediately after *Oryza*, it having been erroneously placed in the order *monogynia*; of this I shall have occasion to say more hereafter. With respect to its natural order, it belongs to the *Gramineæ*, like the *Oryza*, *Zizania* and *Pharus*, with which it agrees in number of stamina,—a number unusual among the grasses.

As to the habit of the species in general, they approach particularly that of the *Melicæ*, although quite different in the number and the disposition of the glumes.

The natural place of growth of this genus, as far as we yet know, is only near the southernmost part of Africa, commonly called the Cape of Good Hope.

As there are species with *Aristæ* as well as without them, I have thought it most convenient in the following scientific descriptions, to divide the *Ehrhartæ* into *Muticæ* and *Aristatæ*.

* *Muticæ*.

I. EHRHARTIA *mnemateia*.

E. glumis corollinis exterioribus rugosis obtusis (muticis); panicula simplici laxa, culmo indiviso; foliorum margine cartilagineo crispo.

E. mnemateia, foliis vaginatis crispis, corolla rugosa obtusa. *Thunb. prodr. fl. Cap. p. 66.*

E. capensis, *Act. Holm. 1779, p. 216. t. 8. Nova plant. gen. Ups. 1779. Linn. suppl. 209. Syst. nat. ed. Gmel. I. p. 549.*

E. cartilaginea, culmo indiviso, panicula simplici, corolla exteriore retusa submutica, foliorum margine cartilagineo-crispo. *Smith icon. plant. ined. II. t. 32.*

E. nutans. Lamarck encycl. sp. I.

DESCR.

DESCR. *Radices* filiformes, longæ, simplices, rigidæ, erumpentes sub bulbo supra radicali glabro lutescente, vaginis foliorum radicalium subimbricatis striatis emarcidis tecto.

Culmus erectus, simplex, subbipedalis, remote articulatus (articulis circiter quinque) foliosus, crassitie culmi *Triciti repentis*.

Folia inferiora s. radicalia longiora, palmaria, superiora breviora, subensiformia, erecta, marginata, margine cartilaginea, crispa, l. crenulata, disco læviuscula, subtus nervosofstriata, basi in vaginis contractis desinentia, fauce reflexo nigro. *Ligula* minuta albida membranacea ciliata intra faucem inserta culmumque cingens.

Panicula erecta, simplex, subflexuosa; *pedunculi* bini ternique, laxiusculi, capillares, inferiores 2—3 flori, sub floribus incrassati, sæpeque colorati.

Flores magni, cernui, flavo-purpurascens.

Calyx bivalvis.—*Valvulæ* subæquales, subovatæ, acutæ, concavæ, leviter carinatæ, patentes, membranacæ, vix nervosæ, totæ glabræ, dorso et basi fusco purpurascens.

Interior paulo major latiorve, *exteriore* basi amplexa.

Gluma corollina duplex, mutica, calyce longior.

Exterior acinaciformis, bivalvis.

Valvulæ complicatæ, compressiusculæ, oblongo-lanceolatæ obtusæ, basi paullulum excisæ.

exterior elongato-obovata, latior, carinata, dorso levissime recurvata, lateribus inferne costatis et rugosis, marginibus superne subconvolutis; apice carinaque (oculo armato) scabriuscula subhispida; fasciculis duobus villorum albissimorum extus basin, unus supra alterum insertis, sæpe pallide violacea.

interior

interior angustior, linearis, acumine brevissimo vix incurva, obtuse carinata, tota rugis transversis elevatis notata, margine subciliata, pallescens; ad utrumque latus baseos carinæ hispidulæ fasciculo villorum prædita.

Interior bivalvis.

Valvulæ inæquales, complicatæ, glaberrimæ, membranaceæ, pallide virescentes.

exterior ovato-lanceolata obtusa, emarginata, dorso imprimis carinata; nervosa.

interior multo angustior, lanceolato-falcata, dorso bicarinata, margine tenuissima, albida.

Inter basin hujus et interiorem corollæ exterioris, *tuberculum* scissile, minutum, inæquale.

Nectarium. Petala bina, minuta, obovata, erecta, basi flavescencia, superne tenuissima albida, margine lacero-ciliata, genitalia amplectentia.

Filamenta sex brevissima s. longitudine nectarium, circa basin germinis inserta, alba. *Antheræ* erectæ, lineares, longitudine glumæ interioris corollæ, basi emarginatæ, apice bifido extrorsum pollen emittentes; luteæ.

Germen ovato-compressiusculum, glabrum. *Styli* duo, filamentis breviores latiusculi compressi, conniventes. *Stigmata* longitudine antherarum erecta, vix divergentia, compresso-bijubata s. pilis distichis longiusculis albidis splendidis ornata.

Semen ovatum, glabrum, glumis corollinis inclusum.

This beautiful grass is distinguished by its *acinaciform* or scymitar-shaped flowers, and its leaves being more cartilaginous and undulated at their edges than in any other known species. Though the culm is not so long as in many other species, the flowers surpass most of them in size. That the root, though provided with fibres, is at the same

time bulbous, is a circumstance, I believe, hitherto not attended to. Truth obliges me also to declare that the *Ehrharta mnematea*, or *Cappensis*, is not monogynous, but really digynous. The mistake, however, was easily made, because the styles are very short, and the long stigmas in the compressed valves stick close to one another, and appear as one, like a plume with four margins, and is called by Linnæus *quadrijubatum*, fourmaned; but on a nearer scrutiny, by the help of a pin, it may be divided down to the top of the germen.

Thunberg found this plant in the grassy regions about *Swellendam*, and in other places at the Cape.

2. EHRHARTA panicea.

E. glumis corollinis exterioribus glabris subrugosis obtusis; panicula subramosa secunda; culmo subdiviso.

E. panicea, culmo diviso, panicula subramosa, floribus erectis digynis.
Smith pl. ined. 1. t. 9.

E. erecta. Lamarck encycl. sp. 2.

DESCR. *Radices* longissimæ, simpliciusculæ, filiformes, fibrillis lateralibus brevibus, ex albido-fuscæ.

Culmi cæspitosi, 1—2—3 pedales, geniculati, inferne decumbentes, subadscendentes, ad genicula (præsertim inferiora) subdivisi, quasi ramosi, tereti-compressiusculi, glaberrimi, striatuli, foliosi.

Stolones tereti-subulati albidi vaginati e radicibus ad basin culmorum emissi.

Genicula majuscula, glabra.

Folia 2—6 pollicaria et ultra, lineari-lanceolata, acuta, erecta, longitudinaliter striata glabra; margine integra leviter undulata scabriuscula, oculo armato cartilagineo-ferrulantes; juniora pubescentia, læte virentia.

Vaginae

Vaginæ foliorum compressæ culmum arcte cingentes, *ore* membranacæ ciliatæ; *ligula* albo-membranacea, semitubulosa, laciniato-ciliata, intra faucem inserta.

Paniculæ terminales, erectiusculæ, laxæ, subramosæ. *Pedunculi* capillares, superiores simplices, erecti, alterni; inferiores terni secundi, quorum duo elongati, horizontaliter patulo-deflexi, *pedicellis* 1—2 linearibus, sub flosculis incrassatis, pubescentibus, unifloris.

Flores erecti, virides; polygami.

Calyx bivalvis. *Valvulæ* ovatæ, concavæ, subcarinata, obtusæ, glabræ, virides, apice membranacæ purpurascens, exteriore majore.

Gluma corollina exterior mutica, calyce parum longior. *Valvulæ* complicatæ, oblongæ, concavæ, obtusæ, compressiusculæ, margine membranacæ, dorso (oculo armato) cartilagineo-ferratæ basi nudæ; subæquales. *Exterior* lævis, basi triquetra; *interior* leviter costata, basi pubescens nec villosa, valde excisa; lateribus inter costas transversaliter rugosis.

— *interioris* valvulæ complicatæ, carinatæ; *exterior* parum latior, glaberrima, 5-nervia, viridis, *interiorem* minorem, teneriorem, bicarinatam, albidam, amplectens.

Tuberculum minutum ovatum ad basin inter valvas corollinas interiores.

Neſtarii petala duo minutissima, obovata retusa erecta, plana integerrima, genitalia includentia.

Stam. 6. longitudine valvularum. *Filamenta* brevissima.

Antheræ lineares, basi apiceque emarginatæ, biloculares, luteæ, apice extrorsum hiantes, polliniferæ.

Germen ovatum, glabrum, basi attenuatum. *Styli* duo, staminibus

minibus breviores, divaricati. *Stigmata* albida, bijubata :
pilis longis.

Semen oblongum, compressiusculum, basi oblique attenuatum,
glabrum, semidiaphanum; valvulis cor. inclusum.

Alii flosculi monoici, hermaphroditis in eadem panicula
mixti.

Masc. Pistillum abortiens.

Fem. *Filamenta* longissima, capillaria absque antheris, circa
pistillum fertile.

Dr. Smith described this species after a dried specimen in the collection of his friend Thouin at Paris. Having myself cultivated the same for some years, it has been in my power to add a little to the specific description. From the manner of growing of this kind, as well as of others examined in the herbarium of Thunberg, it seems that, producing many shoots or runners from the roots, they form grassy turfs. What has appeared to me most singular in the *E. panicæ* is, that the lowermost peduncles of the panicle lean horizontally towards one side, or downwards. The flowers are, perhaps, the smallest of the genus. The lateral wrinkles (*rugæ*) of the exterior corolline valves also indicate an affinity to the foregoing, whose flowers they resemble in form. Their likeness, however, to some of the *panicum* genus certainly justifies the specific name given by Dr. Smith.

3. *EHRHARTA* ramosa.

E. glumis coroll. exterioribus scabris retusis; panicula coarctata;
culmo ramosissimo suffrutefcente.

Melica ramosa, corollis glabris muticis, panicula coarctata, culmo
ramoso. *Thunb. prodr. p. 21. Sp. pl. ed. Wild. p. 383.*

Ehrharta digyna, foliis planis, corollis lævibus obtusis costatis. *Ibid.*
p. 66.

DESCR. *Culmus* 3—4-pedalis, erectus, glaber; inferne crassitie pennæ anserinæ, subsolidus, rigidus, ramosissimus, seu ad articulos nodosus, ubique dichotome subdivisus, ramis teretibus subgeniculatis striatis glabris vaginatis.

Folia inferiora vaginantia concava lanceolata, s. potius vaginæ inferiores bipollicares, culmum ramosque basi cingentes, usque ad articulum apertæ, striatæ, glabræ, virides.

Superiora, s. ramorum terminalium, linearia, apice erecto convoluta, basi longissime et arcte vaginantia.

Paniculæ terminales, erectæ, coarctatæ, simplices, rarius ramosæ, bi- tri-pollicares.

Pedunculi 2—4 lin. longi, 2—3, conferti, inæquales, uniflori.

Flores oblongo-lanceolati, obtusi, erecti, albescentes, glabriusculi.

Calycis valvulæ subæquales, ovato-lanceolatæ, acutæ, concavo-carinatæ, muticæ, glaberrimæ, nitidæ.

Gluma coroll. vix longior calycis, intra calycem pedicellata.

Exterioris valvulæ subæquales, carinatæ, lanceolatæ subretusæ, lineis elevatis notatæ (costatæ Thunb.) oculo armato scabris, carinaque ciliatæ; albidæ, apice extimo plerumque fuscæ; *exterior* fasciculo pilorum ad basin dorso inserto; *Interior* basi utroque latere valde excisa, fasciculis pilorum duobus, squamulisque semilunaribus minutissimis albidis lateralibus adpressis. (Forte rudimenta flosculorum.)

interioris valvulæ inæquales, glaberrimæ, carinatæ; *exterior* glumæ exteriori simillima, sed tota carinaque glabra; *interior*

terior minor, tenerrima, acutiuscula, diaphana, apice subciliata.

Tuberculum inter valv. inter. in hac specie deest.

Nectarium: Petala cuneiformia, retusa, integra, genitalia amplectentia, albida.

Filamenta 6, brevissima. *Antheræ* lineares, minutæ, flavæ, apice pollen emittentes.

*Germe*n ovatum. *Styli* duo, divergentes, glumis breviores. *Stigmata* congenerum, albida.

This kind is not less distinct in its flowers than in the rigidity of its branching culm, which, about the articulations, is almost ligneous. The panicles at the top of all the branches, being generally undivided, have more the appearance of *racemi*. The flowers somewhat resemble those of the *Festuca decumbens*, and are quite bare, with a calyx as long as the corolline valves, and frequently (not always) distinguished by dark tips. Thunberg, probably induced by the outward resemblance of the flowers, made this species a *Melica*; but being in possession of another, though less perfect, specimen, (which he did not suppose to be the same with his *Melica ramosa*,) and having in that found the flowers corresponding with the character of *Ehrharta*, he again inserted it in the *Prodr. fl. Cap.* under the appellation of *Ehrharta digyna*.

Thunberg met with this grass in a valley distant from the Cape, called by the Dutch *Zoetemelks-valley*.

4. EHRHARTA melicoides.

E. glumis corollinis exterioribus glaberrimis obtusis, panicula patentissima.

Melica Capensis, corollis glabris muticis, panicula patentissima, foliis subfiliformibus. *Thunb. prodr. Cap. p. 21. Spec. plant. ed. Wild.*

p. 383.

DESCR. *Culmus* erectus, inferne geniculatus, teres, striatus, glaber.

Articuli pubescentes, albidi.

Folia linearia, acuta, longiuscula, erecta, striata, glabra, margine cartilagineo scabra. *Vaginæ* arctæ. *Ligula* subnulla.

Panicula erecta, pedalis, ramosa.

Pedunculi patentissimi, subdivisi, 3—4nis, capillares, purpurascens; *pedicellis* tenuissimis longiusculis laxis flexuosis, sub floribus incrassatis, coloratis.

Flores ovati, *E. paniceæ* vix majores.

Calycis valvulæ æquales, dorso obtuse carinatæ, oblongæ, leviter acutæ, subnervosæ, glaberrimæ, basin versus rubro s. violaceo-coloratæ.

Gluma corollina mutica, tota glabra, nitens, pallide virens.

Exterioris valvula oblongæ, obtusæ, vix compressæ, dorso convexæ, inæquales: *exterior* 3plo minor; *interior* magnitudine calycis, basi excisa, cum squamulis lateralibus albidis.

Interioris valvula exterior magnitudine glumæ exterioris majoris, oblonga, obtusa, glaberrima; *interior* minuta, lanceolata, tenerrima, albida.

Nectarii petala subrotunda, retusa, albida ad latera germinis.

Filamenta 6, brevissima. *Antheræ* lineares, longitud. coroll. interioris, flavæ, apice bifido polliniferæ.

Germen ovatum. *Styli* duo, breves. *Stigmata* priorum, albida.

This species has still more resemblance to a *Melica*, but the description above shows its true genus. None of the former has such bare and rounded corolline glumes. It distinguishes itself at first sight by the very diffuse panicles, more evidently subdivided than in the other kinds. There can scarcely be a doubt that this has been confounded with the following:

5. *EHRHARTA calycina*.

E. glumis corollinis exterioribus subpilosis obtusis cum acumine brevi; panicula coarctata simpliciuscula; culmo ramofo.

E. calycina, culmo ramofo, panicula subsimplici, calyce colorato corollam æquante. *Smith ined. fasc. II. t. 33.*

Aira capensis, culmo ramofo, floribus racemosis, corollis pilosis. *Linn. suppl. p. 108.*

DESCR. *Radices* capillares, filiformes, simplices, longissimæ.

Culmi cæspitosi, 2—3-pedales, subdivisi vel subramosi, inferne geniculati, teretes, glabri.

Folia linearia acuta, bi-fex-pollicaria, erecta, striata, margine scabra (oculo armato subciliata).

Vaginæ striatæ, fauce coarctatæ, subinde ciliatæ; *Ligula* minuta, erecta, membranacea, albida, multifido-ciliata.

Panicula erecta, simpliciuscula, coarctata, semipedalis; *pedunculis* binis, ternis s. quaternis, capillaribus, rectis, subsecundis, inferioribus 2—3—4-floris; pedicellis apice incrassatis.

Flores erectiusculi, plerumque purpurascens, *E. paniceæ* duplo majores, plerique hermaphroditi, pauci feminei staminibus carent.

Valvulæ calycinæ subæquales, longitudine fere corollæ, exteriore parum angustiore, lanceolatæ, obtuse carinatæ, oblique retusæ, striatæ, scabriusculæ vel glabræ, sæpe violaceo s. pallide purpureo-coloratæ vel albidæ.

Valvulæ coroll. exterioris inæquales, carinatæ, extus pilosæ, obtusæ subretusæ cum brevi acumine. *Exterior* angustior, linearis, vix brevior; *interior* duplo latior, apice compressa, basi parum excisa, absque villis, sed squamulis minutissimis lateralibus.

Valvulae interioris subæquales, carinatæ; *exterior* rarius pilosa; *interior* tenerrima.

Nectarium petala integra, rotundata, albida.

Filamenta 6. *Antheræ* erectæ, flavæ, utrinque bifidæ, apice polliniferæ.

Germen ovale, glabrum. *Styli* duo, breves. *Stigmata* pallida, bijubata, patula.

Semen oblongum, valv. coroll. inclusum.

Feminei in eadem panicula, quorum

Germen fetis 4—6 longis rigidis albidis intra nectarium cingitur (forfan stam. sterilia).

Varietas hujus speciei occurrit:

Culmis filiformibus, foliis angustioribus.

Floribus albidis, minoribus.

Calycibus non coloratis, glabris.

Glum. cor. exter. valvula exteriori minuta, interiori obtusa, inter pilos subrugulosa.

The description is scarcely more than a copy of the very good one already given by Doctor Smith, and proves this plant undoubtedly different from the genus of *Aira*. By comparing several specimens of the same, I have added something to the illustration of the species. The exterior corolline glumes, though obtuse, are usually terminated towards the back in a very short point, often scarce visible to the naked eye. The colour of the calycine and corolline glumes is sometimes alike in both, particularly in the variety above mentioned. The calyces are besides more or less coloured in most of the species. The hairiness of the corolline valves is also various, but always to be seen, at least by the assistance of the microscope. The pointed exterior corolline glume, the whole compressed *flosculus*, as well as

the appearance of the panicle, make this kind very distinct from the *E. melicoides* just described.

Sterile male filaments are likewise found here as in the *E. panicea*, in separate flowers from the hermaphrodite. Dr. Smith has also observed the same. There may, perhaps, be something analogous in all the species of the genus, which for want of sufficient specimens could not at present be explored.

** *Aristata*.

6. *EHRHARTA geniculata*.

E. glumis coroll. exterioribus hirtis, altera mucronata; panicula coarctata; culmo decumbente geniculato.

Melica geniculata, corollis hirtis, panicula coarctata, culmo decumbente. Thunb. prodr. p. 21. Spec. pl. ed. Wild. p. 382.

DESCR. *Radices longissimæ, filiformes, simplicis.*

Culmi 3—4-pedales, teretiusculi, glabri, geniculati, inferne decumbentes, laxi.

Genicula tumida, fusca.

Folia linearia, acuminata, plana, 4—6-uncialia, margine obtuso cartilagineo leviter undulata, quasi tenuissime crenulata, longitudinaliter striata, glabra, supra glaucescentia.

Vaginæ longitudine articulorum, tereti-compressiusculæ, striatæ, glabræ, arctæ, fauce nigricante ciliatæ; ligula albidomembranacea, lacero-ciliata.

Panicula erectiuscula, coarctata, subramosa, femipedalis, pedunculis subsecundis, pedicellis sub floribus incrassatis.

Flores oblongi, acuminati, erecti, exalbido purpurascens.

Kalvula calycinæ ovato-lanceolatæ, subacutæ, concavæ, mucosæ, glaberrimæ, pallide purpurascens, fere æquales.

Kalvula.

Valvulae corollinae exteriores calyce parum longiores, inæquales, carinatae, albescentes, hirsutae erecta tectae. *Exterior* linearis, acuminata; *interior* dimidio major, basi excisa, carina (oculo armato) ferrato-ciliata, mucrone (arista brevi) fubulato fusco terminata.

Ad latera baseos valv. inter. insident duae *squamulae* subrotundae oppositae minutissimae albae.

Valvulae coroll. interiores muticae, glabrae, carinatae. *Exterior* lato-lanceolata, apice obtusa, carina ciliata, flavescens, margine tenui diaphana. *Interior* dimidio minor lanceolata acuta tenera alba.

Nectarium petala oblonga, erecta.

Filamenta 6, brevissima. *Antherae* lineares, flavae, pollen ex apice fundentes.

Germen ovatum, minutum. *Styli* 2. *Stigmata* alba, praecedentium.

This most resembles the *E. calycina*; but, except a more geniculated disposition of the culm, and the crisped edge of the leaves, as in the *E. mnematea*, the flowers appear to be longer. The calycine glumes equal in length with the corolla, which is more hairy than in the *E. calycina*. The exterior corolline glumes are also pointed, and one of them has a true, though short, *arista*.

7. EHRHARTA longiflora.

E. glumis coroll. exterioribus rugosis hispidis aristatis; panicula laxiuscula ramosa.

E. longiflora, culmo simplici, panicula ramosa multiflora, corolla exteriori mucronata tuberculato-hispida, floribus triandris. *Smith ined. t. 32.*

E. aristata,

E. aristata, foliis planis, corolla rugosa aristata. *Thunb. prodr.* p. 66.

E. Banksii, floribus digynis, corollæ gluma exteriori exterius hispida.

Syst. nat. ed. Gmel. II. p. 549.

DESCR. *Radices* simplices, filiformes.

Culmus simplex, bi-tripedalis, erectus, basi subgeniculatus, teres, glaber.

Articuli fusci.

Folia lanceolata, latiuscula, erecta, pedalia, glabra, striata, margine plana, cartilagineo-scabra.

Vaginæ carinatae, laxiusculæ, striatæ, fauce contractæ, imberbes, fuscæ. *Ligula* intra faucem, margine laciniato-ciliata, fusca.

Panicula palmaris, subramosa, multiflora.

Pedunculi inæquales, capillares, conferti, subverticillati, *pedicellis* sub floribus incrassatis, hispidulis.

Flores majores, lanceolati, aristati, pallide l. viridi-purpurascens, nitidi.

Valvulæ calycinæ inæquales, 5-nerves, muticæ, pallide purpurascens. *Exterior* minor, ovata, acuminata, subcarinata, margine anteriore ferrulata; *interior* duplo major, ovata, concava, apice ferrulata, acumine brevi terminali.

Valvulæ corollinæ exteriores calyce longiores, aristatæ, pallide virides, fere pollicares, subæquales, lanceolatæ, compresso-prismaticæ, complicatæ, carinatæ, apice convolutæ in *aristam* subulatam, rectam, longitudine valvulæ, hispidoscabram; inter angulos versus basin transverse rugosæ, subinde læves, dorso l. præsertim versus apicem hispidæ, oculo armato tuberculatæ. *Exterior* fasciculo pilorum ad basin unico; *interior* basi excisa, cum duabus squamulis lateralibus albidis.

Valvulæ corollinæ interiores minores, ovato-lanceolatæ, acutæ, carinatæ, muticæ, nervosæ, glaberrimæ; interiore parum minore angustiore teneriore; dorso subbicarinata.

Nectarii petala minutissima, ovata, superne latiora, lacero-ciliata, albida.

Filamenta sex, brevia. *Anthæræ* oblongo-lineares, utrinque fissæ, apice extrorsum pollen fundentes.

Germen oblongum. *Styli* duo. *Stigmata* congenerum, parva,

This is one of the larger kinds, with a geniculated culm, broad leaves, and a much branched panicle. The flowers are remarkable for their pointed exterior corolline glumes, and their long *aristæ*. The glumes are often transversally wrinkled, but not so much as in the *E. mnematea*. One of the calycine glumes is uncommonly small. The number of the stamina I have, in all the flowers I examined, found to be really six, although Dr. Smith has seen only three. Accordingly, I have been doubtful whether or not the plants of Smith and Thunberg should be considered as different; but having good reason to believe that the unnamed specimen of *E. longiflora* in the Linnæan herbarium was communicated originally by Thunberg, and also finding his *E. aristata* coinciding with the description of Dr. Smith's *E. longiflora*, it is most likely they are not different species. The particular distinction appears to consist in the length of the *aristæ* and of the glumes, in the said description styled only *mucronatæ* *.

8. EHRHARTIA gigantea.

E. glumis corollinis exterioribus hirsutis aristatis; panicula coarctata subverticillata; culmo arundinaceo, foliis involutis.

* They appear to be one and the same species. Nothing is more variable than the length of *aristæ* in grasses. *J. E. Smith.*

Melica gigantea, corollis hirsutis aristatis, panicula verticillata; culmo erecto. *Thunb. prodr. p. 21. Sp. pl. ed. Wild. p. 382.*

Aira villosa, foliis subulatis, panicula elongata angustata; flosculis sesquialteris hirtis aristatis; arista recta brevi. *Linn. suppl. p. 109.*

DESCR. *Radices* longæ, simplices, rigidæ, nudæ.

Culmus 6-pedalis, erectus, basi sublignosus nodosus, ad radices stolonifer, remote articulatus, teres.

Stolones cylindricæ radicanter crassæ, vaginis imbricatis striatis fericeis tectæ.

Folia semipedalia, remota, linearia, apice subulato-involuta, integra, erecta, striata, glabra, rigida, arundinea.

Vaginæ arctæ, hirtæ s. pubescentes, fauce s. ad basin foliorum margine reflexo nigræ.

Panicula bipedalis, erecta, coarctata, subramosa, rachi apice subflexuosa.

Pedunculi capillares, conferti, subverticillati l. secundi, nigricantes, glabri; plerique simplices breves, 3—4 lin. longi, erectiusculi uniflori, uno alterove elongato 1—2-pollicari subdiviso 3—4-floro laxo; *pedicellis* sub flore incrassatis.

Flores subnutantes, rubro-flavescentes.

Valvula calycinæ lanceolatæ, acutæ, concavæ, dorso subcarinata, marginibus membranaceis oculo armato minute ciliatis, glaberrimæ, basi purpurascentes; *exteriore* vix majore sed latiore, apice minus acuto.

Corolla calyce duplo major, aristata.

Valvulae exteriores lanceolatæ, concavæ, carinatæ, flavescentes, pilis longis albidis undique vestitæ, baseosque fasciculatis; apice *arista* subulata, erecta, nigra, oculo armato ferrata, valvulis dimidio breviori auctæ, margine membranaceo involutæ;

involutæ; subæquales l. *interiore* paullo majore, infima basi excisa.

Valvulae interiores glabræ, muticæ. *Exterior* lato-lanceolata, retusa, carinata, carina subciliata, brevissime acuminata; *interior* minor, acuta, apice emarginata, tenera, alba, nitens. *Tuberculum* minutissimum ad basin inter valvulas interiores corollæ, sessile.

Nectarii petala oblonga, basi carnosâ lutea, superne latiora, retusa, margine crenulata, albida, radiato-venosa.

Filamenta 6, filiformia, brevia. *Antheræ* lineares, flavæ, utrinque bifidæ, basi obtusæ, apice extrorsum polliniferæ.

Germen ovatum. *Styli* duo, lati, erecti, contigui. *Stigmata* longa, albida, cæt. conformia.

If the preceding deserved the appellation of *longiflora*, this also merits the name of *gigantea*, being the largest known of its genus, and having the appearance of a reed. The flowers are in like manner proportionally large, and have, on minute inquiry, a strict agreement with the generic character. They can by no means be united with the *Melicæ*, though the plant, as to the ramification and shape of the panicle, has some resemblance to the *M. ciliata*. It cannot at all be compared with the *Airæ*, because it has neither a *calyx biflorus* nor the habit of them. The interior corolline valves have probably been mistaken for the superfluous floret. The different colour and figure of the *arista* suggests the idea of such a floret more than in the other species, notwithstanding its shortness. The calycine glumes are stained with purple or brown, and are two-thirds the length of the corolla, which abounds with shining hairs.

9. EHRHARTA bulbosa.

E. glumis coroll. exterioribus obovatis emarginatis rugosis aristatis; panicula simplici laxa.

E. bulbosa,

E. bulbosa, culmo indiviso, panicula ramosa multiflora, corolla exteriori retusa aristata. *Smith ined. fasc. II.*

Trochera striata, culmo enodi, foliis glabris, pedicellis paniculæ plerumque unifloris, valvulis exterioris corollæ transversim striatis, basi papposis aristatis. *L. Richard in Rozier Journ. de Phys. v. 13. p. 225. t. 3.*

DESCR. *Radix* bulbosa.

Culmus erectus, pedalis & ultra.

Folia lanceolata, linearia, glabra.

Panicula erecta, laxiuscula, simplex, 2—3-pollicaris. *Pedunculi* 3—5-ni, capillares, patentes, inferiores 2-flori longiores, superiores sensim breviores, uniflori.

Flores pallide lutescentes.

Valvulae calycinae ovatae, acuminatae, patentes, 2—6-lin. longitudine, membranaceae; *interiore* parum majore.

Valvulae corollinae exteriores subæquales, s. *interiore* vix minore, calycis multo majores, complicatae, carinatae, obovatae, basi angustiores excisae, fasciculis albis villorum praeditae, apice latiores, obtusae, emarginatae, *aristam* sesquilinearem erectam in emarginatura inferentes, *rugis* transversis elevatis notatae, pubescentes.

Valvulae interiores inæquales, compressae, acuminatae; *interiore* minore.

Nectarium ut in cæteris.

Filamenta tria ?? *Antherae* oblongo-lineares, apice bifidae.

Germen oblongum. *Styli* 2, capillares. *Stigmata* villosa.

This bears the same trivial name that Dr. Smith, probably on account of the root, has given it; I have, however, already proved that the root is not bulbous in this species only. The *E. mnematea*
and

and *bulbosa* are nearest related; they have both their exterior corolline glumes much wrinkled, but the latter is very distinct because of its *aristæ*. The description is a copy of Monf. Richard's, made from a living specimen out of a garden in France. He attributes to it only three stamina, which I will not dispute, but should wish for a further inquiry when the plant comes under future consideration. The figure given by the author, though not good, gives an idea of the real specific difference.

HAVING thus endeavoured to illustrate all the known *Ehrbartæ*, it may not be improper to add concise descriptions of the remaining two Cape *Melicæ* mentioned by Professor Thunberg in his *Prodromus*, in order to show that they are true species of *Melica*, and not to be referred to the above genus, lest it should be supposed there were no real *Melicæ* in that part of the world.

MELICA *decumbens*.

M. corollis hirsutis, floribus racemosis nutantibus, culmo decumbente. *Thunb. prodr.* 21. *Sp. plant. ed. Wild.* p. 382-4.

DESCR. *Culmus* decumbens, teres, subfiliformis, glaber. *Genicula* glabra.

Folia conferta, basi subimbricantia, erecta, lanceolato-lineararia, apice involuto-fubulata, glabra. *Vaginæ* striatæ.

Flores racemosi, secundi, pedicellati, semipollicares, nutantes in *racemo* terminali, erecto, bipollicari, indiviso.

Calyx bivalvis.

Valvulæ ovatæ acuminatæ carinatæ, striatæ, nervosæ, glabræ, membranacæ, flavescentes, basi purpurascens; exterior triplo minor.

Glumæ corollinæ bivalves, subæquales, extus, basi imprimis, sericeo-albidoque villosæ.

Flosculus unus sessilis, alter breviter pedicellatus.

Filamenta tria.

Rudimentum tertii floris, s. flosculus minutus, neuter.

MELICA racemosa.

M. corollis hirtis, racemo subpaniculato floribus cernuis. *Thunb. prodr.* 21. *Sp. pl. ed. Wild. p.* 382—5.

DESCR. *Culmus* bipedalis erectus, teres, glaber, crassitie *Melicæ altissimæ*.

Articuli glabri.

Folia linearia, erecta, apice involuta, glabra, striata. *Vaginæ* striatæ.

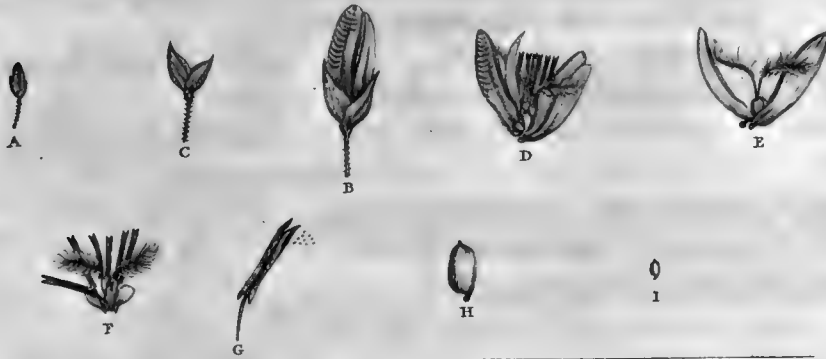
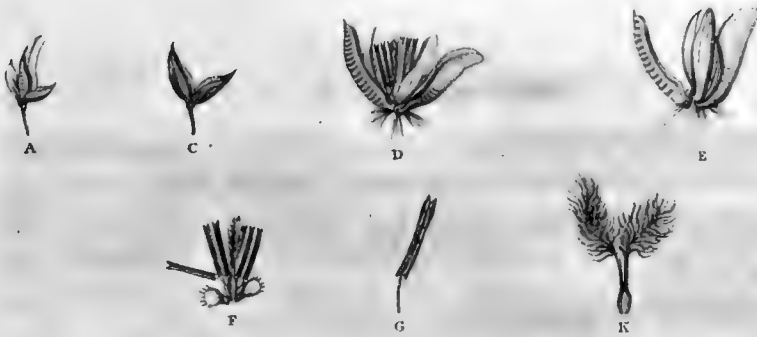
Racemus subpaniculatus, erectus, spithameus, ramis paucis brevibus.

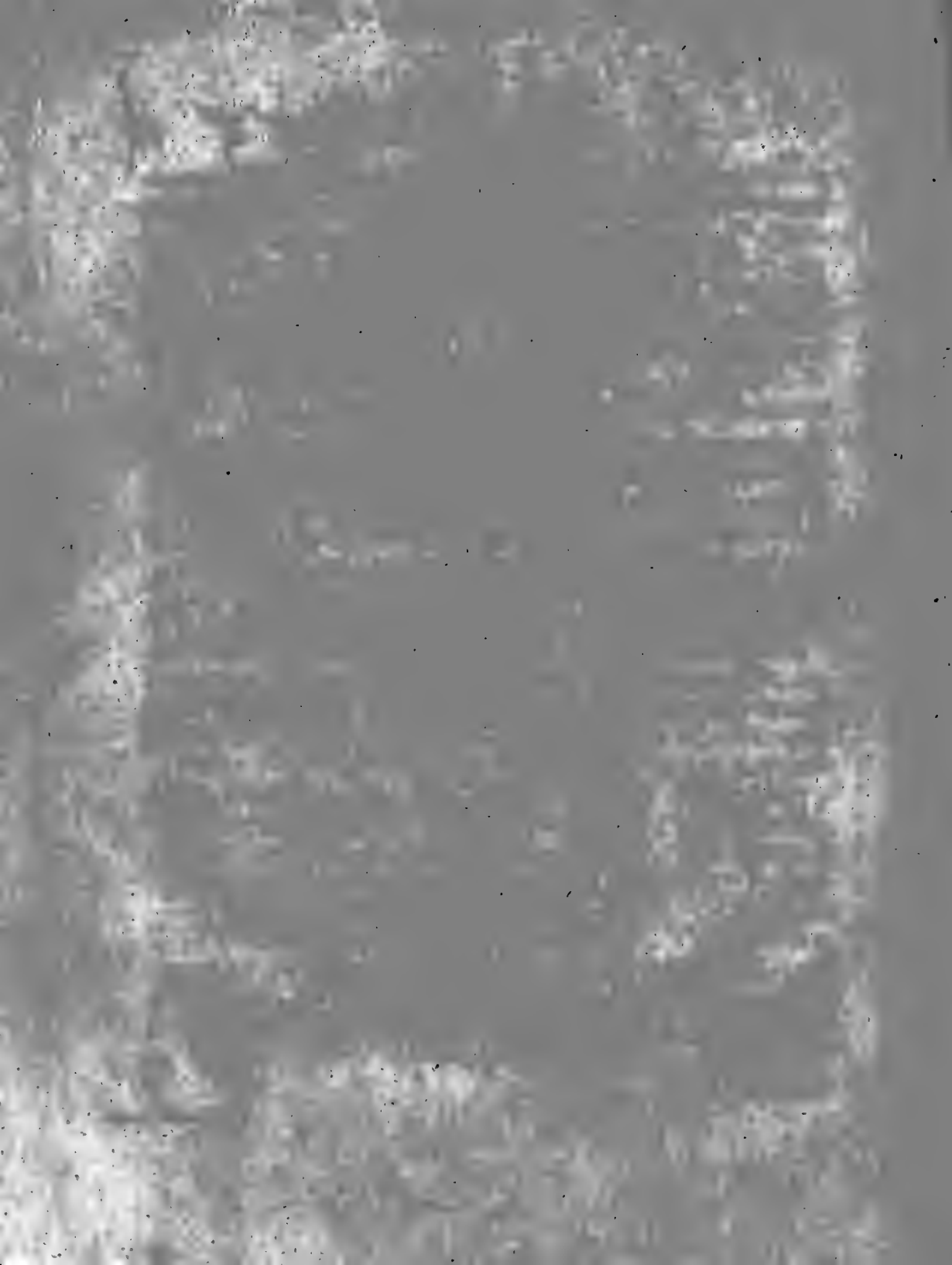
Flores pedicellati, subsecundi, cernui, magnitudine *M. ciliatæ*, cui simillimi glumis calycinis & corollinis & numero staminum.

EXPLANATION OF THE FIGURES.

TAB. III. and IV. represent the flowers of all the foregoing species of *Ebrharta*.

- a* A flower of the natural size.
- b* A flower magnified.
- c* The calycine valves magnified.
- d* Both the corolline glumes, without the calycine valves, magnified, with the genitals within.
- e* The interior corolline valves, except in *E. mnematea*, where the exteriors also are represented.
- f k* The male and female parts, or the female alone, together with the membranous nectary, all magnified.
- g* A filament with the *anthera* opening at the top, magnified.
- h* The seed in *E. panicea* magnified.
- i* The same of its natural size.





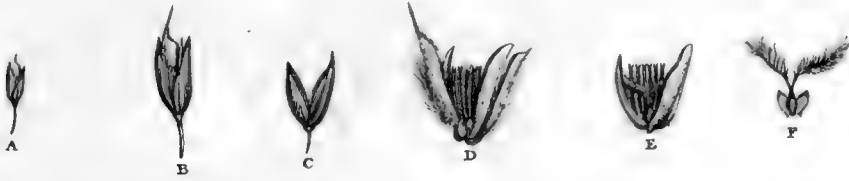
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E. calycina



6

E. geniculata



7

E. longiflora



8

E. gigantea

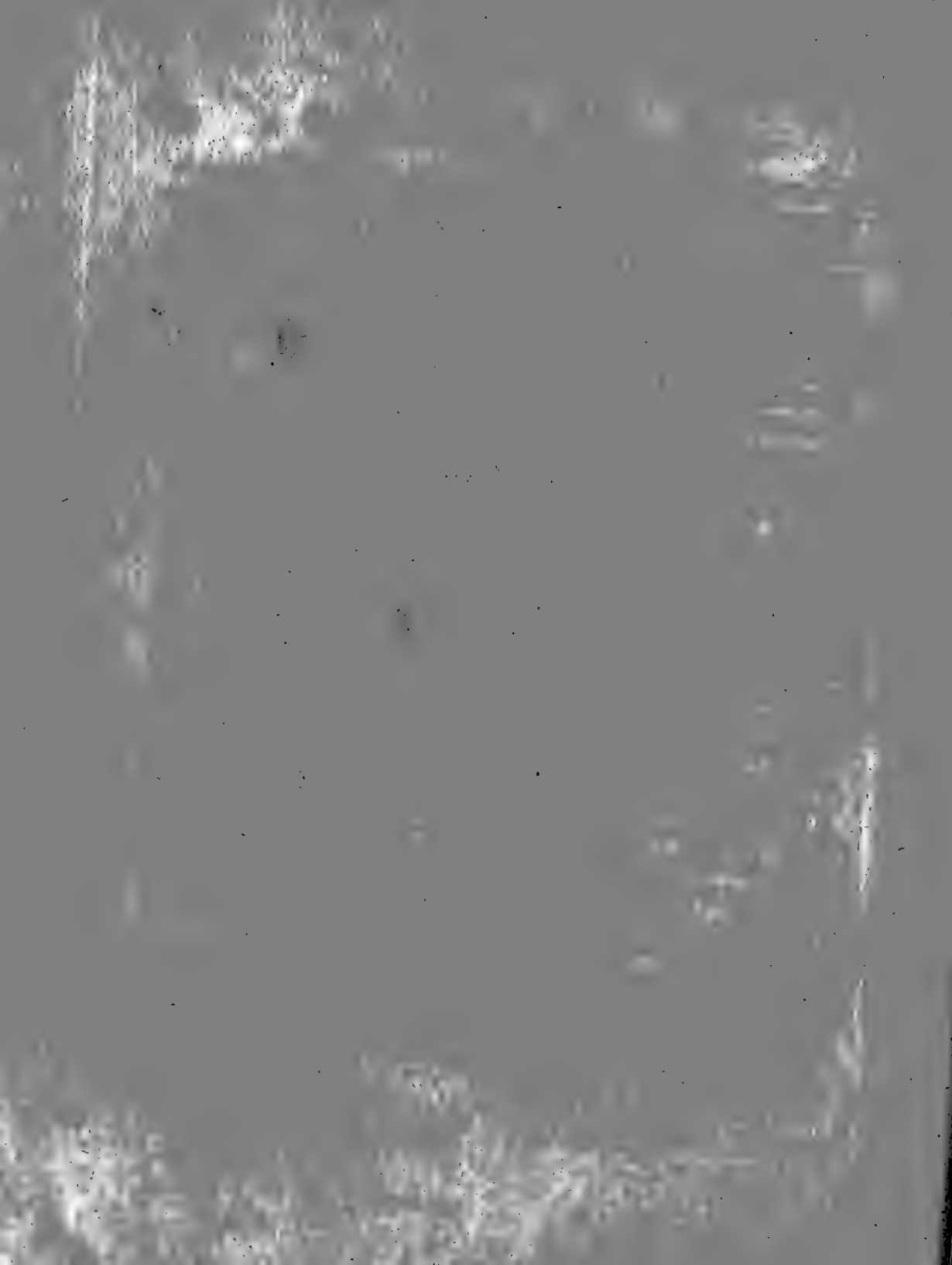


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E. bulbosa



G. Quiróz sculp.



III. *Account of a Microscopical Investigation of several Species of Pollen, with Remarks and Questions on the Structure and Use of that Part of Vegetables.* By Luke Howard, Esq. of Plaistow in Essex.

Read March 4, 1800.

IN the Spring of 1795, having much leisure, I devoted a portion of it to the examination of various minute productions of Nature in a good compound microscope. These researches would probably have terminated in present information and amusement only, but that they were accidentally turned to the pollen of flowers, respecting which, as a botanist, I found an inclination to inform myself, by comparing the several species together.

I began my observations with the Hazel-tree, *Corylus Avellana*. On a calm dry day I shook off some of the pollen from the expanded catkins upon a clean piece of writing-paper. I also gathered some of the catkins and female buds. These I viewed separately on a clear plate of glass, usually transmitting the light through them from a speculum below, and with different magnifying powers, preferring those which, without enormously enlarging the objects, gave a clear view of the structure and position of several at once. As I pursued this method with the rest I examined, I mention this to save repetition, and shall give the appearances from notes made at the time.

1. *Corylus Avellana*. Anthers furnished with transparent horn-like appendages. Pollen crumbles from the surface, and is sometimes so abundant as to fall in a visible cloud on the slightest motion

of a branch. To the naked eye it is a fine yellow powder. A few grains laid on the glass plate and viewed with the lens No. 4, some appear of an irregular angular shape, opaque, except in one or two parts, where light passing presents the appearance of a perforation; others nearly spherical, the surface divided by depressed lines into a number of convex facets. The transparency of these is such, that they reflect the image of a small object held under them, as well as a drop of liquid. On repeating the examination, the former are found to come from the most mature anthers, and to differ from the latter only as a raisin does from a grape.

A clear drop of distilled water being put on the glass, both kinds imbibe it with the avidity of a sponge; at the same time distending and spreading abroad in the water, but without any motion further than that which this expansion causes. When saturated with water they remain at the bottom, clear as the liquid itself, and all alike distended to a bulk many times greater than their original one in the dry state. They are now seen to be multilocular capsules, having septa in various directions within them, the union of which with the external membrane appears at the angles in the dry state, and at the depressed lines in the wet.

These capsules may be kept in the water for several days without any further perceptible change. When that is dried up they return to the opaque state, and the same operation may be several times repeated on them.

In exhibiting this spectacle to some friends, pure water not being just at hand, a drop of brandy was substituted for it. This gave rise to a phenomenon equally curious and unexpected. The grains expand, as in water; but in the mean time they are put into rapid motion, each grain darting from side to side with the vivacity of a swarm of gnats in the air. As they approach to complete expansion the motion dies away, and one after another sinks to the bottom.

By

By a small addition of fresh brandy some few are excited a second time, but with fainter movements. Presently the liquid begins to be obscured, and in a few minutes the grains are mostly dispersed and decomposed, and the spirit, exhaling, leaves a sort of extract on the glass mixed with very minute undissolved particles; among which sometimes appear a few unbroken grains, much changed, and now resembling an empty bladder lying flat.

2. *Erica carnea*. Anthers capsular, bearing the pollen on their inner surface, and discharging it by a brisk explosion from an aperture on the side next the pistil. If the *stigma* be touched with a pin at a certain period of the inflorescence, it happens commonly that all the anthers project their pollen at once; and it may thus be collected on paper. The proper time for this is when the *stigma* is elevated a little from between the anthers. In size and structure this pollen nearly resembles the preceding, and is, in like manner, capable of imbibing water and dispersing with a rapid motion in spirit.

3. *Reseda odorata*. Mignonette.

Unripe pollen, smooth, egg-oblong, transparent, without septa? In water it expands to a sphere, and is acted upon by spirit as the preceding.

4. *Cactus flagelliformis*. Creeping Cereus.

Anthers oblong, crumbling. Pollen of a large size, compared with any others I have seen; in shape resembling a plump grain of wheat, white and diaphanous. It expands in water to a shape nearly spherical. The contact of spirit brings on a pearly opacity. The grains imbibe it slowly, and during expansion revolve on their axes with a pretty regular motion, exhibiting a spectacle no less novel than delightful. In the mean time, some minute particles are seen to be ejected, and, the motion ceasing, the transparency returns, proceeding from the surface to the centre.

If a pistil be separated from the expanded flower with grains of pollen adhering to it, the latter will be found already expanded to a spheroid. Cover the whole with a drop of spirit on the glass, the pistil is not affected in any way, but some of the grains quit it and revolve on their axes. When these are exhausted, the addition of more spirit excites others: after a few minutes, some of those first excited begin to put out a small thread, which gradually elongating, the grain diminishes in proportion, until it is entirely drawn out into a vermicular fibre, which again is presently dissipated into particles too minute to be seen in the now opaque medium. The liquor from the tube of the pistil, and a solution of sugar in water, were also found to produce this evolution in very mature grains from the anther. It also sometimes takes place in the twinkling of an eye, so as to be scarcely traced in some few grains out of a number put into spirit at once. Those which have been some time in contact with the pistil are always most sluggish in their evolution.

5. *Carex acuta.*

Anthers oblong, crumbling. Pollen angular, opaque, with apparent perforations. It dilates in spirit and remains stationary, but ejects numerous minute particles in rapid succession from its surface. When it has become transparent it appears as if filled with seeds.

The preceding may serve for examples of these phenomena; but there was not one among the various species I examined, which did not exhibit them in a greater or less degree. Yet various other parts of the flower, immersed in spirit under the microscope, did not betray the smallest vestige of them.

The proper spirit for this purpose seems to be a mixture of one part pure spirit of wine with two of water. A stronger spirit, or even spirit of wine alone, may sometimes be required when we operate upon a pollen which has, by any means, become previously

saturated with moisture, (or has lost, by keeping, a part of its irritability?) but it does not enter the dry grains so readily as water alone.

I have since subjected pollen to examination in several of the most stimulant oily and saline liquids, but have not been able to perceive that any of them had a similar effect on it.

It is proper here to remark that the utmost care is requisite to prevent accidental mixtures of the subjects or menstrua in these experiments, which might greatly embarrass and mislead the observer. Separate pieces of clear glass for the several kinds, and separate pointed glass tubes to convey the liquids, will therefore be requisite. It will be proper attentively to examine the pollen dry, as well as the liquids, before they are used, in order to be satisfied of the absence of animalcules and other extraneous matters which might be suspected to influence the appearances.

I do not pretend to say that the above-related experiments were absolutely free from optical deception; but I may venture to affirm, from frequent repetition of them, that, when tried with due precaution, they will scarcely ever be found to fail of producing the appearances related.

Engagements of superior importance at present prevent, and may long continue to prevent, my pushing these inquiries much further. It is for this reason, and because I should take a pleasure in seeing it done by some person more capable of executing them with due exactness, and drawing proper inferences from them, that I am willing to make them known in their present imperfect state. For the assistance of those who may incline to prosecute the subject, I shall now state the amount of the present discovery, and the hints for further investigation which have occurred to me.

Should it be found, on repeating and extending these observations,

tions, that the pollen of vegetables is in all cases similarly acted upon by water and by spirit of wine, it will follow,—

1. That each grain of pollen in the anther is an organic body, variously constructed in various species, and containing

a Vessels or pores capable of imbibing water, of distending thereby and contracting again when it quits them; in which particulars they resemble sponge, &c.

b A parenchyma, consisting of some substance (of greater specific gravity than water, and insoluble therein), which is emitted with a greater or less degree of force when the stimulus of alcohol is applied to the absorbent vessels. This substance is either in part soluble in alcohol, or the grains contain

c An essential oil or resin, to which they owe their colour and odour.

2. That there exists in the grains of pollen, in a very eminent degree, that property of vegetables called irritability, which they are capable of retaining for a certain time after separation from the anther.

3. That alcohol is the proper stimulus by which this irritability may be excited, and the texture of the pollen in some manner developed in consequence thereof. I prefer this method of accounting for the appearances that take place when the pollen is immersed in spirit to another that might be supposed on chemical principles, being assured, that any one who has once inspected the process will be satisfied that something more than mere solution or chemical decomposition takes place therein, and that the vital principle of the pollen is the chief agent.

The liquor from the tube of the pistil and the solution of sugar were, indeed, found to bring on the evolution of the pollen of *Cactus flagel.* in a slower manner than spirit; but when we consider how
speedily

speedily such matters pass into the vinous state, it seems possible that both of these might contain alcohol. Yet, it is also possible that something common to this latter substance, with the saccharine matter it is producible from, may be the real exciting cause.

The existence of absorbent vessels in the pollen is proved by the change of form, increased transparency, and great distention produced by the water. It is remarkable, that complete saturation usually brings the grains near to a spherical shape, however remote from it their original one.

It seems necessary to suppose the parenchyma for the following reasons. Something is evidently given out to the spirit before the dispersion of the grain commences. In some cases this is visible in minute particles moving about in the drop; in others it is discoverable by the tinge on the dried space, and by the striæ which appear when more spirit is added. Now, if the grains consisted merely of the vegetable fibre formed into vesicles or cells, their texture would no more be destroyed by spirit than by water, and the penetration of the water would produce the same motions as that of the spirit. But if we suppose that, in proportion as the spirit penetrates the several parts of these curious capsules, some transparent substance is forcibly expelled from them; the various motions into which they are thrown will be easily explained by the recoil of the grain in the opposite direction. It will hence appear why the pollen of 1. which seems to consist of many separate cells, is driven alternately in all directions by their successive discharge, and why that of 4. which is a long tube rolled up, and probably with but one orifice, is thrown into a rotatory motion. The opacity of this species during the discharge may be attributed to the evacuation of this canal, and the returning transparency to the entrance of the spirit into it from the absorbent vessels, or at the orifice. I do not remember to
have

have seen a single bubble of air escape from the grains of pollen in the whole course of my observations. As their texture was in many cases quite destroyed, if it had been porous, as that of dry wood, &c. air must have appeared. I therefore conclude them perfectly solid in the dry state.

I think it possible that the prosecution of these inquiries by means of the microscope, may throw some light on the obscure subject of vegetable reproduction; may teach us why the anther is almost always exposed to the air for some time previous to the discharge of the pollen, and this even in aquatic plants; as also what is the office of that saccharine liquor with which the stigma is furnished, and of which such a store is sometimes provided in the nectary. The very manner in which the impregnation takes place may possibly be learned by attentive observation.

The similarity of the unfolded pollen of No. 4. to the form of the plant it comes from, might furnish matter for speculation; but I decline this, believing that experiment and careful observation must always precede sound theory.

Reflecting on some of the properties of pollen in which it bears a resemblance to starch, I was led to examine that also in a similar manner, and was not disappointed to find its structure the same. Starch consists of homogeneous grains or capsules shaped like No. 3. capable of imbibing water with increase of bulk and transparency, and of returning to their original state on parting with it. They are also dispersed, with more or less of motion, in spirit; but in this particular different specimens were found to vary, which may be attributed to difference in age or soundness. If a little wheat flour be mixed with water and spread on the glass, these grains appear in great abundance, mixed with fibrous matter. Other kinds of grain afforded the same result, with a difference in the form of
the

the capsules. As the vegetable *fæculum*, which consists entirely of this kind of matter separated from the soluble and fibrous part, has been long considered as the same substance, though obtainable from different parts of vegetables, I extended the inquiry to tuberous roots, and obtained a further confirmation of the identity of pollen and *fæculum*. A potatoe seems to be almost nothing else but an assemblage of grains of *fæculum*, with their interstices occupied by the juice. If this root be boiled or baked until it becomes mealy, the juice will no longer be found; and we might be at a loss to know what was become of it, if the microscope did not show that it has entered into the grains of *fæculum*, which are thereby greatly distended, as is, indeed, evident to the naked eye. The vital principle is thus destroyed; for these bloated grains will not move in spirits, but give out a tincture to it like other dead matter. By this means, and the loss of solidity, they are prepared for more easy decomposition in the stomach.

Starch is absolutely insoluble in water. If water containing it be made to boil, it becomes a jelly. I do not apprehend that a true solution takes place even in this case. It appears that the same effect is produced on the grains by the heat as by spirit of wine. They are dispersed into very minute particles; and the surface being thus multiplied, a greater degree of attraction takes place between the starch and the water, and the former remains suspended.

It appears to me to be worthy of future inquiry,

1. In what parts of vegetables in general the pollen or *fæculum* is to be found.

2. In what respects that which is secreted on the anther differs from that which is contained in the root, seed, or sap. In the leaf, petal, bulb, fibre of the root, or other parts already brought to perfection, I am inclined, from some observation, to think it will not be met with.

3. Whether the germ or embryo of the seed, previous to the impregnation, contains it.

4. In what manner the pollen of plants in general will be acted upon by the liquor from the nectary, when exposed to it in circumstances similar to those of Exp. 4.

5. And lastly, to investigate the varieties in form and structure of the different species of pollen; and to examine how far they agree or differ in the several species of each genus, and genera of each natural order.

IV. *Observations on Aphides, chiefly intended to show that they are the principal Cause of Blights in Plants, and the sole Cause of the Honey-Dew.* By the late Mr. William Curtis, F. L. S.

Read May 6, 1800.

THE *Aphis*, or Blighter, as we now for the first time venture to call it, from its being the most general cause of what are termed blights in plants, forms a highly interesting tribe of insects. In point of number, the individuals of the several species composing it surpass those of any other genus in this country*.

These insects live entirely on vegetables. The loftiest tree is no less liable to their attacks than the most humble plant. They prefer the young shoots on account of their tenderness, and on this principle often insinuate themselves into the very heart of the plant, and do irreparable mischief before they are discovered. But for the most part they beset the foliage, and are always found on the under side of the leaf, which they prefer, not only on account of its being the most tender, but as it affords them protection from the weather, and various injuries to which they would otherwise be exposed. Sometimes the root is the object of their choice, which, from the nature of these insects, one would not *à priori* expect; yet have I seen the roots of lettuces thickly beset by them, and the whole crop rendered sickly and of little value: but such instances are rare. They rarely

* Reaumur, considering each *Aphis* as bringing forth ninety young, calculates that in five generations the produce from a single one would be five thousand nine hundred and four million nine hundred thousand.

also attach themselves to the bark of trees, like the *Aphis salicis*, which being one of our very largest species, and hence possessing superior strength, is enabled to penetrate a substance harder than the leaves themselves.

As among caterpillars we find some that are constantly and unalterably attached to one or more particular species of plants, and others that feed indiscriminately on most sorts of herbage; so it is precisely with the *Aphides*: some of them are particular, others more general feeders.

As they resemble other insects in the above respect, so do they also in being infinitely more abundant some years than others; and though, with regard to certain insects, this variation (sometimes wonderful in the extreme, as in the brown-tail moth which ravaged the quickset hedges in 1782) is not easily accounted for, it is solved without much difficulty as to the *Aphis*, as will be shown in the sequel. In the year 1793 they were the chief, and in 1798 the sole, cause of the failure of the crop of hops. In 1794, a season almost unparalleled for drought, the hop was perfectly free from them, while peas and beans, especially the former, suffered very much from their depredations. Beans were in 1798 almost wholly cut off by them; indeed they suffer more or less every year by a black species of *Aphis*, particularly the latter crops. To potatoes, and even to corn, we have known them some years prove highly detrimental, and no less so to melons. To plants in stoves, green-houses and frames, where, from the warmth and shelter afforded them, a preternatural multiplication takes place, they prove extremely injurious, and many a rare and valuable plant also in the open ground of our botanic gardens falls a victim to these general depredators. Seeing, therefore, that our necessaries as well as luxuries of life are so materially affected by the insects of this genus, an attempt to ascertain some of the curious and important facts

relative to their history, and to make them more generally known, will not, we trust, be unacceptable to the public. Such inquiries may possibly lead to the means of obviating the injuries they occasion; and if they fail in this, they may tend at least to correct the erroneous notions entertained of blights, not by the vulgar and illiterate merely, but even by persons of education, who may frequently be heard to maintain that these insects are brought by the east winds; that they attack none but sickly plants; with other notions, all as false in fact as unphilosophical in principle.

Locusts and caterpillars, famed for their devastations, are furnished with strong jaws, by means of which they crop and wholly devour the foliage of plants. The *Aphis* destroys them in a different way. Instead of jaws and teeth it is provided with a hollow-pointed proboscis or trunk, which, when the animal is not feeding, folds under its breast. With this instrument it pierces the plant, and imbibes its juices to support itself; but these juices being essential to the life of the plant, it follows that, when they are drawn off, the plant, exhausted, flags and perishes, being in fact literally bled to death by these leech-like animalcules. Yet, so tenacious of life are plants in a healthy state, that they in general only fall victims to the continued attacks of these insects when in immense numbers. But it most commonly happens that if they do not wholly destroy a plant they deface it, and a small number of *Aphides* are sufficient to produce this effect. The leaves of such trees and plants as have a firm texture and strong fibres, though infested with these insects, preserve their form; but the more tender foliage of others, and flowers in general, cannot bear their punctures without curling up and becoming distorted; in consequence of which they lose their beauty entirely and irretrievably. The cultivators of plants, especially in stoves and green-houses, cannot be too much on their guard against the whole tribe of *Aphides*; for with what pleasure can a
large

large or choice collection be viewed, when there is scarcely a plant but what exhibits symptoms of disease occasioned by vermin?

As the species of this genus are very numerous, and afford but few marks of distinction, Linnæus has contented himself with giving most of them trivial names, according to the particular plant on which they are found: a close attention to them will, however, disclose more distinctive characters than naturalists are aware of.

Aphides are described by the best informed authors as being generally oviparous and viviparous at different periods of the same year. Monf. Bonnet, who had the honour of making this discovery in 1740*, says that in the summer the females are viviparous, but toward the middle of autumn they lay real eggs. De Geer observes, that the females of all the *Aphides* he had seen, constantly laid eggs, intended to preserve the species during winter, and that he is therefore inclined to believe that the same takes place in all *Aphides* whatever. From the 24th of September to the 6th of December following, during which time Fahrenheit's thermometer had been as low as 29, I found the *Aphis salicis* to be constantly viviparous, though from the inclemency of the weather very few of these insects at the period last mentioned remained on the trees, and those few were soon after entirely cut off by the unusual cold that took place, the thermometer falling to 4 degrees below 0.—Other *Aphides* are oviparous or viviparous according to the temperature of the air to which they are exposed. In very cold weather they are oviparous, for this obvious reason: the eggs are capable of resisting cold more powerfully than the young. On the 22d of November same year as above, I found a considerable number of eggs which had been deposited in some auricula plants by a small green *Aphis*,

* Or rather Monf. Trembley. See his Letter to M. Bonnet from the Hague: *Oeuvres de Bonnet.*

which

which infests plants very generally *, while the same species, on a geranium that I kept within doors, produced young. In mild winters I have observed, in the month of January, the same species of *Aphis* in great numbers on various species of primula without doors, and all the females viviparous. These are facts which prove that all *Aphides* are not oviparous and viviparous at the same season, but that some may be wholly viviparous; that all such as are both oviparous and viviparous do not lay eggs toward the middle of autumn, nor at all during the winter, unless a certain degree of cold takes place.

Most people will think it a matter of very little moment to mankind whether an *Aphis* comes into the world with its head or its heels foremost:—it may be so; yet, as nature's historian, it is perhaps incumbent on us to notice this circumstance. The young *Aphis* then is ushered into the world with its feet foremost, see TAB. V. fig. 1., and this act of parturition, unimportant as it may appear, serves to display the wisdom of the all-provident Author of Nature. The female *Aphis* is usually delivered of its offspring as it sits close to the bark of the tree, but not suddenly and all at once. Two-thirds of the body of the young one is quickly protruded. When it gets so far, the power of expulsion ceases, and the delivery proceeds slowly. Time is thus given to the young one to learn the use of its legs, which it soon kicks about briskly, and the first service it employs them in is to clean away a white substance, the remains, perhaps, of the membrane in which it was enveloped in the womb.

* These eggs were laid in small, irregular groups, on the upper as well as on the under side of the leaves; they were of a perfectly black colour, and very visible to the naked eye. I found afterwards that the eggs when recently excluded were green, from which colour they gradually changed to that which rendered them so conspicuous. They were slightly attached to the leaf.

But what is of greater consequence is, that it is enabled by their use to cling fast to the bark of the tree as soon as it is brought forth, and thus to obtain its necessary nutriment.

Of some of the circumstances attendant on the propagation of these minute animals accounts are related, deviating so wonderfully from the common course of nature, that they could not be credited, were not the authors of them known to be men of the nicest and most accurate observation and of the strictest veracity. On this part of the subject I have little to say from my own observation; but, as some account of so extraordinary a part of their history may be expected in a paper of this sort, I shall state the facts, briefly observing that neither in the *Aphis salicis*, which at times I have watched with great attention, nor in any other species of *Aphis*, did I ever observe any sexual intercourse to take place. Whether this has arisen from the extreme infrequency of such a procedure, or from my not having observed these insects at a proper time of the year, I know not; but, most undoubtedly, such intercourse does not take place between the different sexes of *Aphis* as in other insects. Yet Monf. Bonnet, who may be said to have almost taken up his abode with these insects, informs us that he has frequently noticed such connexion, which he describes as taking place at one certain time of the year only; and that, from a female thus impregnated, many successive generations will be produced without any further impregnation. He took the *Aphides* as soon as brought forth, and kept each individual separate. The females of such brought forth abundance of young. He took the young of these and treated them precisely in the same manner. The produce was the same; and thus he proceeded to the ninth generation with the same success: and so far from considering that as the utmost extent of the effect, he thinks it might be carried on to the thirtieth generation.

In

In most species of *Aphides* both males and females acquire wings at certain seasons; but in this respect they are subject to great variation, there being some males and some females that never have wings; again, there are some females that become winged, while others of the same species do not.

In the quality of the excrement voided by these insects there is something wonderfully extraordinary. Were a person accidentally to take up a book in which it was gravely asserted that in some countries there were certain animals which voided liquid sugar, he would soon lay it down, regarding it as a fabulous tale, calculated to impose on the credulity of the ignorant; and yet such is literally the truth.

The superior size of the *Aphis salicis* will enable the most common observer to satisfy himself on this head. On looking steadfastly for a few minutes at a group of these insects while feeding on the bark of the willow, one perceives a few of them elevate their bodies, and a transparent substance evidently drop from them, which is immediately followed by a similar motion and discharge like a small shower from a great number of others. At first I was not aware that the substance thus dropping from these animals at such stated intervals was their excrement, but was convinced of its being so afterwards; for, on a more accurate examination, I found it to proceed from the extremity of the abdomen, as is usual in other insects. On placing a piece of writing-paper under a mass of these insects, it soon became thickly spotted; holding it a longer time, the spots united from the addition of others, and the whole surface assumed a glossy appearance. I tasted this substance, and found it to be as sweet as sugar. I had the less hesitation in doing this, having observed that wasps, ants, flies, and insects without number, devoured it as quickly as it was produced: but, were it not for these, it might no doubt be collected in considerable quantities, and, if subjected to the

processes used with other saccharine juices, might be converted into the choicest sugar or sugar-candy. It is a fact also, which appears worthy of noticing here, that, though the wasps are so partial to this food, the bees appear totally to disregard it.

In the height of summer, when the weather is hot and dry, and *Aphides* are most abundant, the foliage of trees and plants (more especially in some years than others) is found covered with, and rendered glossy by, a sweet clammy substance, known to persons resident in the country by the name of *honey-dew*: they regard it as a sweet substance falling from the atmosphere, as its name implies.

The sweetness of this excrementitious substance, the glossy appearance it gave to the leaves it fell upon, and the swarms of insects this matter attracted, first led me to imagine that the honey-dew of plants was no other than this secretion, which further observation has since fully confirmed. Others have considered it as an exudation proceeding from the plant itself. Of the former opinion we find the Rev. Gilbert White, one of the latest writers on natural history that has noticed this subject*.

But that it neither falls from the atmosphere, nor issues from the plant itself, is easily demonstrated. If it fell from the atmosphere, it would cover every thing on which it fell indiscriminately, whereas we never find it but on certain living plants and trees. We find it also on plants in stoves and green-houses covered with glass. If it exuded from the plant, it would appear on all the leaves generally

* "June 4th, 1783. Vast honey-dews this week. The reason of these seems to be, that in hot days the effluvia of flowers are drawn up by a brisk evaporation, and then in the night fall down with the dews, with which they are entangled.

"This clammy substance is very grateful to bees, who gather it with great assiduity; but it is injurious to the trees on which it happens to fall, by stopping the pores of the leaves. The greatest quantity falls in still, close weather; because winds disperse it, and copious dews dilute it, and prevent its ill effects. It falls mostly in hazy, warm weather." See *White's Naturalist's Calendar*, p. 144.

and uniformly; whereas its appearance is extremely irregular, not alike on any two leaves of the same tree or plant, some having none of it, and others being covered with it but partially.

But the phænomena of the honey-dew, with all their variations, are easily accounted for by considering the *Aphides* as the authors of it. That they are capable of producing an appearance exactly similar to that of the honey-dew, has already been shown. As far as my observation has extended, there never exists any honey-dew but where there are *Aphides*; such, however, often pass unnoticed, being hid on the under side of the leaf. Wherever honey-dew is observable about a leaf, *Aphides* will be found on the under side of the leaf or leaves immediately above it, and under no other circumstances whatever. If by accident any thing should intervene between the *Aphides* and the leaf next beneath them, there will be no honey-dew on that leaf. Thus then we flatter ourselves to have incontrovertibly proved that *Aphides* are the true and only source of the honey-dew.

We have found that where the saccharine substance has dropped from *Aphides* for a length of time, as from the *Aphis salicis* in particular, it gives to the surface of the bark, foliage, or whatever it has dropped on, that sooty kind of appearance which arises from the explosion of gun-powder, which greatly disfigures the foliage, &c. of plants. It looks like, and is sometimes mistaken for, a kind of black mildew. We have some grounds for believing that a saccharine substance, similar to that of the *Aphis*, drops from the *Coccus* also, and is finally converted into the same kind of powder.

In most seasons the natural enemies of the *Aphides* are sufficient to keep them in check, and to prevent them from doing any essential injury to plants in the open air. But seasons sometimes occur, very irregularly indeed, on an average, perhaps, once in four or six years, in which they are multiplied to such an excess, that the

usual means of diminution fail in preventing them from doing irreparable injury to certain crops.

In severe winters we have no doubt but *Aphides* are very considerably diminished; in very mild winters we know they are very considerably increased; for they not only exist during such seasons, but continue to multiply. Their enemies, on the contrary, exist, but do not multiply, at least in the open air, during such periods; and thus the *Aphis* gets the start of them, and acquires an ascendancy, which once acquired is not easily overcome by artificial means, upon a large scale at least, in the open air. Vain would be the attempt to clear a hop-garden of these pernicious vermin, or to rescue any extensive crop from their baneful effects. Violent rains attended with lightning have been supposed to be very effectual in clearing plants of them; but in such case more is to be attributed to the plants being refreshed and made to grow by the rain, of which they stood in need, than to any destruction of the *Aphides* themselves, which, on an accurate examination, will be found to be as plentiful after such rains as they were before; nor is wet so injurious to these insects as many imagine, as is evident from the following experiment: On the 12th of May 1799, I immersed in a glass of water the footstalk of a leaf of considerable length, taken from a stove plant, beset with *Aphides* of a dark lead colour, which were feeding on it in great numbers. On immersion they did not quit the stalk, but immediately their bodies assumed a kind of luminous appearance from the minute bubbles of air which issued from them. They were put under water at a quarter past six in the evening, and taken out at a quarter past ten the next morning, having continued immersed sixteen hours. On placing them in the sun-shine, some of them almost immediately showed signs of life, and three out of four at least survived the immersion. One of the survivors, a male, very soon became winged, and another, a female,

was

was delivered of a young one. Many years before this experiment, with a view to destroy the *Aphides* which infested a plant in my green-house, I immersed one evening the whole plant, together with the pot in which it grew, in a tub of water. In the morning I took out the plant, expecting with certainty to find every *Aphis* dead; but to my great surprize they soon appeared alive and well: and thus, in addition to the other extraordinary phænomena attendant on these insects, we find that they are capable of resisting the effects of immersion in water for a great length of time. When taken from the plant on which they feed, and kept under water, they do not survive so long; their struggling in that case perhaps exhausts them sooner. This part of the subject might be pushed much further: it is sufficient for our purpose to have shown that wet is not so hurtful to them as is generally imagined.

Though no mode of destroying *Aphides* will perhaps ever be devised on a large scale in the open air by artificial means, we can accomplish it most effectually when they infest plants in stoves, green-houses, and frames, or in any situation in which we can envelop them for a certain time in clouds of smoke. Powders or liquids, however fatal to *Aphides*, must ever be ineffectual, from the trouble and difficulty of applying them so that they shall come in contact with those insects, situated as they usually are; but in this respect smoke has every advantage, it penetrates and pervades their inmost recesses. The smoke of common vegetables, however powerful, is found to be inadequate to their destruction, and hitherto no other than that of tobacco is found to be effectual. That, judiciously applied, completely answers the purpose, without injuring the plant. It mostly happens in well managed houses that a few plants only are infested with *Aphides*: in such a case, the smoking of the whole house is a business of unnecessary expense and trouble; and we would recommend to persons who have large collections to make use

of a box of a commodious form that shall hold about a dozen plants of various sizes, to be used as a sort of hospital, in which infested plants may be smoked separately, and the insects more effectually destroyed, because it may be rendered more perfectly smoke-tight.

To prevent the calamities which would infallibly result from the accumulated multiplication of the more prolific animals, it has been ordained by the Author of Nature, that such should be diminished by serving as food for others. On this principle, we find that most animals in this predicament have one or more natural enemies. The helpless *Aphis*, the scourge of the vegetable kingdom, has to contend with many. The principal are the *Coccinella*, the *Ichneumon Aphidum*, and the *Musca aphidivora*. Such as are unacquainted with the history of insects will learn with some surprize that the *Coccinella**, a common insect well known even to children by the name of the Lady-bird, is one of the greatest destroyers of the *Aphides*, which indeed are its only food, its sole support, as well in its perfect as in its *larva* or grub state. During the severity of winter this insect secures itself under the bark of trees, or elsewhere †. When the warmth of spring has expanded the foliage of plants, the female deposits its eggs on them in great numbers, from whence in a short time proceeds the *larva*, a small grub of a dark lead colour spotted with orange: these may be observed in the summer season running pretty briskly over all kinds of plants; and if narrowly watched, they will be found to devour the *Aphides* wherever they find them. The same may be observed of the Lady-bird in its perfect state. As these insects in both their states are

* All the different species of *Coccinella* feed on *Aphides*; the *bipunctata*, by far the most common, does the most execution.

† Many are found in houses; for, early in May 1799, I counted on the window of my common sitting-room, exposed to the sun, nineteen of the *Coccinella bipunctata*.

very numerous, they contribute wonderfully to diminish the number of *Aphides*. There is a saying which humanity has put into the mouths of children in favour of this insect *, now rendered more sacred by its great utility, which has happily rendered it a sort of favourite with them, and contributes usually to its escape from their dangerous clutches. Another most formidable enemy to the *Aphis* is a very minute, black and slender Ichneumon fly, the *Ichneumon Aphidum* of Linnæus. The manner in which this insect proves so destructive to the *Aphis* is different from that of the Lady-bird. The female Ichneumon, of which numbers may be found where *Aphides* are in plenty, settles on a stalk, or leaf, more or less covered with them, marches slowly over their bodies, feeling with its *antennæ* as it proceeds for one of a suitable size and age; which having discovered, it pushes forward its body, or abdomen, in an incurved state, and with a fine instrument at its extremity, invisible to the naked eye, punctures, and deposits an egg in the body of the *Aphis*; which having done, it proceeds, and lays an egg in a similar way in the bodies of many others. The egg thus deposited quickly hatches, and becomes a small *larva*, or maggot, which feeds on the substance of the *Aphis*, and, having eaten the whole of it, the skin excepted, it changes to a *pupa*, or chrysalis; in which state when it has remained a sufficient time, it becomes an Ichneumon fly, which eats its way out of the *Aphis*, leaving the dry inflated skin of the insect adhering to the leaf, like a small pearl. Such may always be found where *Aphides* are in plenty. We have observed different species of *Aphides* to be infested with different Ichneumons.

In general the torpid *Aphis* submits quietly to this fatal operation; but we have observed some of them, especially one that feeds on the

* "Lady-bird, lady-bird, fly away home! Your house is on fire, your children at home."

fycamore,

sycamore, which is much more agile than many of this race, endeavour to avoid the Ichneumon with great address.

There is, perhaps, no genus of insects which in their *larva* or maggot state feed on such a variety of food as the *Musca*, or Fly. There is scarcely a part of nature, either animate or inanimate, in which they are not to be met with. One division of them, called by Linnæus *Musca aphidivora*, feeds entirely on *Aphides*. Of the different species of aphidivorous flies, which are numerous, having mostly bodies variegated with transverse stripes, their females may be seen hovering over plants infested with *Aphides*, among which they deposit their eggs, on the surface of the leaf. The *larva*, or maggot, produced from such eggs feeds, as soon as hatched, on the younger kinds of *Aphis*; and, as it increases in size, attacks and devours those which are larger. These *larvæ* are usually of a pale colour, adhere closely to the leaf, along which they slowly glide, and are formed very tapering towards the head. When fully grown, they change to a *pupa*, or *chrysalis*, attached to the leaf, from whence issues the fly. The *larvæ* of these flies contribute their full share to diminish the despoilers of Flora. To these three kinds of insects, which are the chief agents in the hands of Nature for keeping the *Aphides* within their proper limits, we may add a few others which act a subordinate part in this necessary business of destruction.

The *larva* of the *Hemerobius* feeds on them in the same manner as that of the *Musca aphidivora*, and deposits its eggs also on the leaves of such plants as are beset with *Aphides*. The eggs of this *Hemerobius* stand on long filaments, which are attached by a base to the leaf, and have more the appearance of the filaments of flowers with their *antheræ* than the eggs of an animal. The number of these

these insects being comparatively very small, they may be considered rather as the casual invaders of their existence than the main host of their destroyers.

The Earwig, which is in itself no contemptible enemy to plants, makes some atonement for its depredations by destroying the *Aphides*; especially such as reside in the curled-up leaves of fruit-trees, and the galls formed by certain *Aphides* on the poplars and other trees.

Lastly, we may add as the enemies of these creatures, some of the smaller soft-billed birds, which feed generally on insects, and which may frequently be seen busily employed in picking them from the plants. Their utility did not escape the observation of the pleasing author of the *Seasons*. We shall quote the whole of what he writes on this subject, presuming that none of our readers will think it too long; remarking, however, that he has fallen into the error of most others in regard to the manner in which these insects are said to be brought by the easterly winds, and that he confounded the mischiefs of Caterpillars with those of the *Aphis*.

“For oft engender'd by the hazy north,
 Myriads on myriads, insect armies warp
 Keen in the poison'd breeze, and wasteful eat
 Thro' buds and bark into the blacken'd core
 Their eager way. A feeble race! yet oft
 The sacred sons of vengeance, on whose course
 Corrosive famine waits, and kills the year.
 To check this plague, the skilful farmer chaffs
 And blazing straw, before his orchard burns,
 Till, all involv'd in smoke, the latent foe
 From every cranny suffocated falls;
 Or scatters o'er the blooms the pungent dust
 Of pepper, fatal to the frosty tribe;
 Or, when the envenom'd leaf begins to curl,
 With sprinkled water drowns them in their nest;
 Nor, while they pick them up with busy bill,
 The little trooping birds unwisely scares.

When plants assume a sickly appearance, or are disfigured by disease, from whatever cause the disease may arise, they are said to be blighted. Blights originate from a variety of causes, the chief of which are unfavourable weather and insects.

Two opinions prevail very generally in regard to blights: the one, that the insects which are the cause of them are brought from a distance by easterly winds; the other, that they attach themselves to none but plants already sickly. Neither of these opinions, as far as I have observed, is founded in fact. I am induced, from the numerous observations I have made on insects for a series of years, (in pursuing the cultivation of plants) to consider the *Aphis* as by far the most general cause of the diseases distinguished by the name of blights. Other insects, it is true, more especially the *larvæ* of some of the *Lepidoptera*, as those of the *Phalœna tortrices*, disfigure and do infinite mischief to plants, by rolling and curling up the leaves. But these for the most part confine themselves to certain trees and plants. Their ravages also are of shorter duration, being confined to the growth of one brood, and they are also less fatal. It would be no difficult matter for me to fill a volume with observations, to which I have been an eye witness, of the injuries which plants sustain from insects; but that would be foreign to my present purpose, which is to show that the *Aphis* is the grand cause of these diseases, and to place the *modus operandi*, or the manner in which they effect this business, in its true light.

We are fully aware that certain gregarious insects may at particular times rise up in the air, and, if small and light, be impelled by any wind that may chance to blow at the time; and on this principle we account for that shower of *Aphides* described by Mr. White to have fallen at Selborn. But certainly this is not the mode in which those insects are usually dispersed over a country. The phenomenon is too unusual, the distribution would be too partial; for

Aphides,

Aphides, while at their highest point of multiplication, do not swarm like bees or ants, and fly off or emigrate in large bodies; but each male or female *Aphis*, at such periods as they arrive at maturity, marches or flies off without waiting for any other. Yet it may happen that, from a tree or plant thickly beset with them, numbers may fly off or emigrate together, being arrived at maturity at the same moment of time.

Detaching itself from the plant, each pursues a different route, intent on the great business of multiplying its species; and settles on such plants in the vicinity as are calculated to afford nourishment to its young.

The common green *Aphis*, which is so generally destructive, lives during the winter season on such herbaceous plants as it remained on during the autumn, either in its egg or perfect state. If the weather be mild, it multiplies greatly on such herbage; as the spring advances, in May the males and females of these insects acquire wings: and thus the business of increase, hitherto confined, is widely and rapidly extended, as the winged *Aphides*, by hop-planters called the Fly, may be seen from this period very generally sitting on plants, and floating in the air in all directions.

*Minutes of Appearances observed in the Aphis salicis from the End of
September to December 6th.*

The *Aphis salicis* is among the largest English species, and is found on the bark both of the trunk and branches of the *Salix triandra*, *fragilis*, and *viminalis*, but most abundantly on the last. The bodies of these insects contain a red liquid, and hence persons employed in stripping osiers have their hands rendered apparently bloody by unavoidably bruising them.

Near the end of September multitudes of the full grown insects of this species, both winged and others, are observed to desert the

willows on which they feed, and to ramble solitarily over every neighbouring object, in such numbers that we can handle nothing in their vicinity without crushing some of them. Are they retreating to fresh trees, on which to deposit their young, or seeking some warmer situation for the winter season? Vast numbers of them, mostly in a younger state, still remain in large masses on the trees.

Though numberless insects, Wasps in particular, were devouring the sweets they deposited, the Lady-bird (*Coccinella*) was the only one which preyed on the *Aphides* themselves; and these towards the end of the month began to relax their depredations, and to retreat to their winter quarters.

As the season advances, the *Aphides* are found higher on the trees, proceeding gradually upwards in quest of new food. When the young *Aphis* is brought forth, and is completely disengaged, it insinuates itself under the body of its mother, and places itself close to its elder brother or sister, thus early manifesting an attachment to that congregated state of society in which it afterwards exists.

If by striking it you jar the branch of the tree on which *Aphides* are placed, or should a wasp or other large insect approach them suddenly, or rudely, the whole of them as it were in a mass elevate their bodies and hind legs and put them in motion; and herein appear to consist their whole powers of defence; in this state their very fine white legs, thus elevated, give them a curious filamentous appearance. We have frequently observed white incrustations adhering to different parts of their legs, wings, and bodies.

Oct. 12. Still observable in great masses on the large branches of the trees.

Many winged males now among them, yet no appearance of copulation. Many pregnant females emigrating from the mass.

Nov. 8. A fine warm day, after many of violent and long continued rain, the *Aphides* were observed to be very much diminished

in

in number. On some of the branches they had quite disappeared, but on others great numbers still remained in masses. Disease was now making havock among them; the bodies of many were swollen and discoloured. Most of them were suspended by the *proboscis*, still inserted into the bark of the tree; their juices were of a deep purple or blackish hue. Not a Wasp to be seen, but few Flies, and fewer *Coccinellæ*, the only natural enemy to which we have observed this species to be subject.

Nov. 10. On opening the abdomen of one of the largest females, I counted sixty-one young, large and small.

Put by in three separate pill-boxes, placed in a warm closet to the south-west, many large pregnant apterous *Aphides*, and many males with their wings perfectly expanded, and others with their wings not expanded.

The large apterous *Aphides* deposited young in the boxes, but all of them died in less than a fortnight. These several *Aphides* were placed in this situation to see if they would live through the winter, as they would be out of the reach of frost.

Nov. 21. Opened the body of a female *Aphis*, and found it to contain forty-six young; three parts of these at least were such, and the smallest of them had more the appearance of embryos than eggs.

At the close of the month of May 1799, after a very long and hard winter, plants were more free from *Aphides* than usual; yet, in sheltered gardens particularly, I found them on the top shoots of trees, (none on herbaceous plants) as the currant, gooseberry, apple, cherry, and common spindle tree. As yet, few of them had wings. It would appear from this circumstance, that the female must lay her eggs in hard winters on the extremities of the branches.

Observed the excrement of a black *Aphis* clear and transparent, but the liquor from the tubular *Cornicula* was of a purple colour.

It appears that the excrementitious substance both of this black *Aphis* and the common green one crySTALLIZES soon after it is evacuated at this season of the year; for we observe a white substance on the leaves where the *Aphides* are, and scarcely any of the glossy honey-dew.

At twenty minutes past six in the evening of May 31st, I immersed some black *Aphides* in water, with the leaves of the *Evonymus europæus* on which they were feeding, in two separate glasses of water, and took them out at ten. All survived the experiment.

At twelve at noon I immersed some common green *Aphides* on gooseberry shoots, and a black sort on *Evonymus*, in water; when taken out at twelve at noon next day they were found every one dead.

TAB. V. fig. 1. represents part of a branch of the *Salix viminalis* with a number of specimens of the *Aphis salicis*.

—————fig. 2. is a female of the same species magnified, in the act of excluding its young.



The History of the County of York

The County of York is one of the most fertile and populous in the Kingdom. It is bounded on the north by the County of Northumberland, on the east by the County of Lincoln, on the south by the County of Nottingham, and on the west by the County of West Yorkshire. The River Ouse flows through the County from north to south, and is the principal river of the County. The County is divided into several Hundreds, and is governed by a Sheriff. The County is one of the most ancient in the Kingdom, and has been the seat of many Kings and Queens. The County is also one of the most fertile in the Kingdom, and produces a great quantity of Corn, and other Goods. The County is also one of the most populous in the Kingdom, and is the seat of many great Towns and Cities. The County is also one of the most ancient in the Kingdom, and has been the seat of many Kings and Queens. The County is also one of the most fertile in the Kingdom, and produces a great quantity of Corn, and other Goods. The County is also one of the most populous in the Kingdom, and is the seat of many great Towns and Cities.

Printed by J. Smith, at the Press of the University of York, in the Year 1785.

V. Remarks on the Genera of *Pæderota*, *Wulfenia*, and *Hemimeris*. By
James Edward Smith, M. D. F. R. S. P. L. S.

Read October 7, 1800.

THE genus of *Pæderota* was first constituted by Linnæus in his Academical Dissertation entitled *Plantæ rariores Africanæ*, published at Upsal in 1760, and reprinted in the 6th volume of the *Amœnitates Academicæ* in 1763. In the former edition the genus was called *Hemimeris*, in the latter *Pæderota*, and the only species there mentioned bears the trivial name of *bonæ spei*. This plant has never been well known to botanists in general. The original specimen probably remained in Professor Burmann's hands, along with the other plants described in the above-mentioned dissertation; but Linnæus, I know not at what period, obtained another, which is preserved in his herbarium with the name of *b. spei* in his own hand, and which he afterwards described in the *Supplementum* as *Hemimeris diffusa*. Unfortunately he neglected to quote *Pæderota bonæ spei* as a synonym in that work, and his son, with all the materials before him, totally overlooked it; so that Professor Murray, and other compilers, give us the same plant under both names. Even M. De Jussieu seems not to have known this original species of *Pæderota*. His ideas of the genus are taken from the *Buonarotta* of Micheli, and the *Pæderota lutea* of Scopoli, the former of which is referred to *Pæderota* by Linnæus in the 2d edition of *Sp. Plant.* by the name of *P. Buonarota*, and the latter is called in his 2d *Mantissa*, *P. Ageria*. These plants appear again in the *Supplementum*, with new and improved specific characters, under the names of *P. cœrulea* and *P. lutea*, and their

old denominations not being there quoted, each of them occurs twice in Murray's and Gmelin's editions of the *Systema*; but such repetitions are too frequent in both those writers to excite our wonder at present. M. De Jussieu observes, very justly in my opinion, that the *Wulfenia* of Jacquin agrees in genus with these last-mentioned plants. This being the case, and as they by no means agree with the original *Paderota*, it would be best to range them under that of *Wulfenia*, a name which has every possible claim to be retained. *Paderota* may very well be spared. The plant which first bore that name was *previously* called *Hemimeris*, as I have already observed, and is now so denominated in the *Supplementum*, along with two others that accord with it in genus. If the name *Wulfenia* should be refused to the plants to which I would apply it, they must be called *Buonarotta*, merely on account of priority; for I know of no other claim to such an honour in the Florentine senator after whom Micheli named them.

The generic characters of *Wulfenia* and *Hemimeris* may be expressed as follows:

WULFENIA.

Diandria Monogynia, next to *Veronica*.

Corolla tubulosa, ringens. *Calyx* quinquepartitus. *Capsula* bilocularis, quadrivalvis.

The species are,

1. *W. Buonarotta*, caule folioso, corollæ labio superiore indiviso.
2. *W. Ageria*, caule folioso, corollæ labio superiore emarginato.
3. *W. carinthiaca*, caule nudo, foliis crenatis.

HEMIMERIS.

Didynamia Angiospermia, next to *Antirrhinum*.

Calyx quinquepartitus. *Corolla* rotata, refupinata, basi gibbosa, hinc fissa. *Filamenta* glabra. *Capsula* bilocularis.

The

The only species I have hitherto ascertained are the following;

1. *H. sabulosa* diandra, foliis oppositis pinnatifidis, caule prostrato.
2. *H. diffusa*, didynama, foliis alternis oppositifque pinnatifidis, caule patulo.
3. *H. montana*, diandra, foliis ovatis ferratis obtusiusculis, caule erecto.
4. *H. urticifolia*, didynama, foliis ovatis ferratis acutis, caule suffruticoso, capsulis retusis.

Celsia urticifolia. *Curt. Mag.* t. 417.

5. *H. linearis*, didynama, foliis lineari-lanceolatis subserratis, caule suffruticoso, capsulis acutis.

Celsia linearis. *Jacq. Ic. rar.* v. 3. t. 497. *Curt. Mag.* t. 210.

The three first I know only from specimens in the Linnæan herbarium. The *diffusa* is suspected by the younger Linnæus to be a variety of the *sabulosa*, to which I can scarcely assent. It is not easy to say which of the two may be the original *Pæderota bonæ spei*. The specimen of Linnæus so marked is the *diffusa*; but he had not that before him when he wrote the dissertation upon rare African plants, and it has certainly four stamina. If the number of stamina be constant, the *sabulosa* (which has but two) must have been the real *Pæderota*. The *montana* is sufficiently distinct in habit and character from both.

The two remaining species are natives of Peru, and have for some time been commonly known in our gardens as species of *Celsia*, but certainly without foundation. The error originated with Professor Ortega, and he has been followed by Jacquin and Curtis against their own judgment, for neither of these plants has the habit or character of any *Celsia*. It is to be lamented that such erroneous names should be ignorantly given and heedlessly retained, as it is difficult to eradicate them when once applied to any very popular and ornamental plant. Thus a most beautiful *Chelone* has been

lately brought from Spain by the specific name of *ruelloides*, and it is so called amongst us: but a more preposterous blunder was hardly ever made in botany, as those who know the plant, and can read Linnæus's *Supplementum*, p. 279, will readily perceive. With respect to the two species of *Hemimeris* in question, they perfectly accord with the generic character given above, with which also the Linnæan *sabulosa* and *diffusa*, (which I have carefully macerated and dissected), and to all appearance the *montana* also, perfectly agree. In their general habit and structure they also manifestly form altogether one natural genus.

VI. *An Illustration of the Genus Solandra.* By Richard Anthony Salisbury,
Esq. F. R. S. and L. S.

Read November 4, 1800.

CUM in variis amabilis Botanices Scientiæ partibus, id mihi constanter propositum fuit, ut rariores stirpes in horto, si quando fructum maturaverint, eas demum accurate intelligerem, forsan non dedignetur Societas Linnæana observationibus quibusdam quæ *Solandram* illustrent: genus longe pulcherrimum æque ac distinctissimum. “Attamen Angli hanc recepere teste horto Kew,” in *Linn. Præl.* p. 392. observat Giseke. Lamarck, in *Journ. Hist. Nat.* v. I. p. 369. asserit, “que ce pretendu genre est une veritable espece de *Datura.*” Utinam sane more parco auctoris Horti Kewensis nova genera reciperent alii Botanici, quippe qui ingenii acumine venerando suo præceptori Linné parum cedens, ne unicum genus, secundum nostrum tantillum iudicium, in eo libro inferuit, quod non summo jure distingui debet. Fatendum est autem neque characterem hujusce generis in *Vetensk. Acad. Handl. ann.* 1787. p. 301. primo propositum, neque alterum ab eodem auctore in suâ *Fl. Occ. Ind.* v. I. p. 386. nuperrime publici juris factum, omnino attigisse felicitatem, quâ nostris temporibus plures novæ stirpes dignoscuntur. Fructu certe gaudet *Daturæ*. Folia vero constanter alterna, nec per paria in ramis florentibus approximata, inflorescentia, corolla irregularis cum æstivatione limbi, hæc omnia a veris *Solaneis* adeo late recedunt, ut multo potius in proprio Ordine, cum consimilibus stirpibus *Brunsfeldiâ*, et *Crescentiâ*, locarem. Affinitatem cum *Besleria* video nullam.

SOLANDRA.

Torus medioliformis. *Calyx* margine tori insertus, tubulosus, persistens. *Corolla* margine tori inserta: limbo ventricoso, irregulari, subæstivatione imbricato; decidua. *Filamenta* 5, ore tubi inserta, versus latus inferius secunda. *Pericarpium* superum, pene totum 4-loculare, succulentum, deciduum. *Semina* receptaculo longe stipitato, centrali, profunde 2-loba, undique sessilia.

Solandra grandiflora. Swartz *Fl. Ind. Occ. v. 1. p. 386. t. 9.* *Solandra grandiflora.* Mæn. *Exot. Bot. t. 6.* *Solandra grandiflora.* Swartz in *Vetensk. Acad. Handl. ann. 1787. p. 300. t. 11.* *Stramonium scandens, flore luteo.* Plum. *Ic ined.* Peach-coloured trumpet flower, *Jamaicensibus.*

Sponte nascentem in Inf. *Jamaica*, in truncos arborum sæpe parasiticam fissurisquæ rupium, legit O. Swartz,

Floret *Januario, Februario*, fructum maturans *Augusto.*

Frutex 9—20 pedes altus. *Radix* fusca, longe excurrens, ramosissima, spongiose lignosa. *Caulis* cinereus, scandens, teres: Rami multi, varie flexi, alii longissimi: plus minus radicans, rimosus; superne pallide viridis, viscido-pubescentis; spongiose lignosus. *Folia* densa, alterna, frondosa: Petioli viridi-purpurascens, recurvuli, semiteretes, viscido-pubescentes, supra concavi lineâ medio eminente: Laminæ supra virides, subtus pallidiores, petiolis multo longiores, recurvo-patentissimæ, obovato-lanceolatæ, integerrimæ, acuminatæ, utrinque viscido-pubescentes, paululum lucidæ, planiusculæ, carnosæ: Nervi plures, mediis crassior petioloque confluentibus: quottannis prodeuntia et decidua. *Flores* fragrantis, nutantes, solitarii, rarius 2 vel 3 fasciculati. *Pedunculi* pallide virides, ramulis terminales, crassi, 4-5 lineas longi, obconici, insertione articulati, minutissime viscido-pubescentes. *Torus* pallide viridis, pedunculo confluentibus quo brevior et crassior, medioliformis, obsolete angulatus,

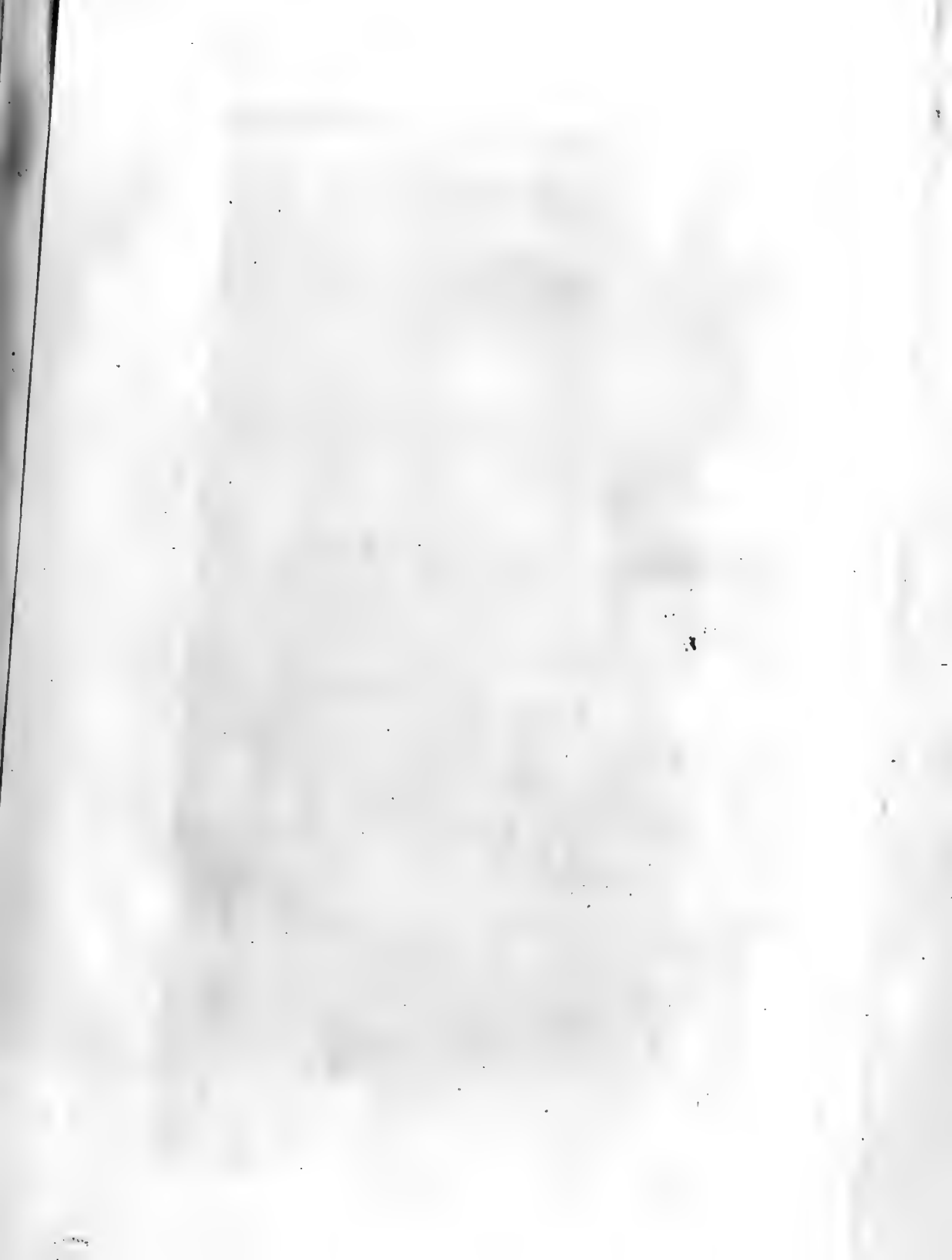
minutissime viscido-pubescent. *Calyx* pallide viridi-purpurascens, margine tori insertus, 3 pollices longus vel plus, erectus, tubulosus, 5-angulus lateribus concaviusculis, sub florescentiâ per angulos duos vel tres breviter & inæqualiter fissus, postea fructu intumescente sæpe profundius usque ad basin: laciniæ erectæ, femilanceolatæ, integerrimæ, acuminulatæ: minute viscidulo-pubescent potissimum intus, extus nonnihil lucidus, persistens. *Corolla* margine tori inserta, 7-8-pollices longa: Tubus pallide viridi-flavus, calyce parum brevior, versus latus ejus inferius declinatus, inferne vix 3 lineas diametro, superne sensim dilatatus, 5-gonus, ad insertionem filamentorum extus depressiusculus: Limbus maximâ parte albidus, tubo multo longior; inferne infundibuliformis; mox admodum ventricosus fauce circiter 2 pollices diametro; dein recurvus ore summo $4\frac{1}{2}$ pollices diametro, breviter 5-fidus; per indivisam partem obsolete 10-angulus, angulis 5 ab inferioribus tubi continuatis intusque Vittâ obscure purpureâ coloratis, 5 ab insertione filamentorum enatis multo tenuioribus intusque Vittâ obsolete vel nullâ: Laciniæ extus læte purpurascuntulæ interstitiis basi minute suborbicularibus, exquisitissime ciliatæ; 1 extima, semiorbicularis, repandula, plana; 3 interiores majores latere altero quod æstivatione includitur dilatato incisocrenato crispoque; 1 intima, maxima, semiorbicularis, tota elegantissime crispo-crenulata: inferne extus glabra, cæterum lævis, coriacea, decidua. *Filamenta* 5, pallidissime viridi-flava basibus obscure purpureis, ore tubi inserta, decurrentia, limbo circiter dimidio breviora, deorsum secunda, incurva, approximata, subulata, glabra. *Antheræ* pallidissime viridi-flavæ lateribus purpureis, basi insertæ ibidemque breviter 2-fidæ, filamentis longe breviores, erectæ, nonnihil lunulatæ, 4-angulæ, mucronulatæ, 2-loculares: Valvæ 4, 2 anteriores paulo angustiores et rectiores: lateraliter dehiscentes; post anthesin obscure purpureæ, paulo minores, inæquilateraliter

quilateraliter ovata, valde compressa. *Pollen* pallidissime flavum. *Pericarpium*: castum pallidissime viridi-flavum, disco tori superum, pyramidale, laeve: gravidum $1\frac{1}{2}$ -2 pollices longum, ovatum, fere usque ad apicem 4-loculare, dein septis 2 parietalibus sensim deficientibus 2-loculare; receptacula 2, centralia, longe stipitata, profunde 2-loba, varie repando-sinuosa: parturiens succulentum, deciduum, putrescens. *Stylus* apice purpurascens, directione filamentorum quibus tenuior et altior, teres, glaber. *Stigma* pallide viride, compressum, minutissime pubescens, tenuiter canaliculatum. *Semina* plurima, ferruginea, receptaculo undique sessilia, reniformia, 2-cotyledonea.

Consistentiam fructus in uno eodemque genere, admodum variare tot docent exempla, ut vix unquam istâ solâ notâ plantam abundentem ab affinibus separarem: structuram ejus contra, in diversissimis generibus simillimam esse, multæ aliæ stirpes Classis 8-væ *Juss.* *Gen.* præter hanc de quâ supra agitur, probant.

EXPLICATIO TAB. VI.

- Fig. 1. Corollæ tubus cum insertione genitalium.
 2. Pericarpium submaturum.
 3. Idem juxta medium transverse sectum, ubi 4-loculare.
 4. Idem juxta apicem ubi 2-loculare.
 5. Semen maturum.





VII. *Observations on some remarkable Strata of Flint in a Chalk-pit in the Isle of Wight, in a Letter from Sir Henry Charles Englefield, Bart. F. R. S. to John Latham, M. D. F. R. S. and L. S.*

Read April 1, 1800.

DEAR SIR,

AS you considered the specimens of flint which I showed you worthy of the notice of the Linnean Society, I transmit them to you, together with such an account of the situation in which I found them, as may perhaps lead to a guess of the causes of their present very extraordinary condition, and will at least serve as a guide to those who may wish at a future time to inspect the curious pit where I found them.

Before I enter on the particular description of that spot I cannot help saying a few words on the lithology of the island in general, which has not, that I know of, been described, as it highly deserves, by any naturalist. Had I been equal to such a task opportunities of observation were wanting, and the phænomenon which I am about to describe was discovered by me so short a time before I quitted the island that I had not time to inspect more than one pit besides that in which I first observed it.

The Isle of Wight, which is nearly of a rhomboidal form, lies with respect to its four angles, almost absolutely in the four points of the compass. It is divided into two very nearly equal parts by a range of chalk hills, whose general direction is due east and west. These hills do not, however, lie in a straight line, nor are they at all

of equal breadth or height throughout their extent. At Bembridge, where they form the eastern point of the island, they rise abruptly from the sea to a height of about 400 feet; and, bending a little to the northward, they continue of nearly the same elevation and a very narrow breadth, till they terminate at the valley through which the Medina runs. To the west of the Medina the range grows considerably wider, and is subdivided into several subordinate vallies. This additional breadth gives the southern limit a great curvature to the south, while the northern line remains nearly straight. Their elevation increases much, and at Mottiston is 700 feet. The acute and perpendicular promontory in which they terminate to the west, well known by the name of the needles, is nearly as high as Mottiston. Besides the valley of the Medina this range is singularly interrupted by two vallies exactly similar to each other at the two ends of the island. Brading Haven renders Yaverland at the east almost an isle, and the Yarmouth inlet cuts off the western end so nearly that at high tides it is sometimes quite insulated at Freshwater Gate.

To the north of this range of chalk hills the soil is chiefly clay, with a superstratum, in many parts, of gravel. The clay is interspersed with many beds of stone of different qualities, and which appear to lie in great confusion. Of these some are grit with a slight admixture of calcareous matter; others have nearly equal parts of sand and lime, and others are purely calcareous. In the first, which are of great hardness, very few extraneous bodies appear. In the second are many fine impressions of shells, while the last are almost entirely composed of moulds of turbinated shells so as to appear quite honeycombed by them. This stone is, however, of great durability, for the walls of Cowes Castle, which was built by Henry VIII. and is exposed to the sea air from the west and north, are as perfect as on the day in which they were built. Below all these
strata

strata of stone, at East Cowes, and just above a bed of black and solid clay, is a stratum of shells about two feet thick, of which a specimen accompanies this, and which is totally composed of these shells without any admixture or earth whatever. As the sea makes great inroads here, vast heaps of these shells lie on the beach, and seem just washed up by the waves, instead of being torn from their bed in the cliff. They appear nearly in the same state as those on the Hampshire coast, which have long been famous among naturalists. In the bed at East Cowes there appears however no variety; for I could see no species but what are here exhibited.

Whatever confusion in the strata appears to the north of the chalk range, or in that range itself, disappears to the south of it, where the strata are nearly in a horizontal position, and singularly regular and undisturbed. The sea coast from Bembridge south to the Needles, except in the small extent of Sandown Marsh, is every where higher than the immediately contiguous land of the island, and to the south-east rises into a vast range of hills running from Dunnose west to St. Catherine's. The substratum of these hills seems every where to be clay lying in strata of different colour and purity. The lowest is black and very hard; approaching to shale. Above this some strata have a great mixture of sand, and take the appearance of a soft stone breaking into very regular cubical forms. These strata extend over the whole southern part of the island, and terminate against the chalk range very suddenly. Above the clay strata is a bed of stone in thin layers, and of very mingled materials, but in general very hard. Great quantities of chert or flint nodules appear in this stone. The general thickness of the stratum is from 150 to 200 feet. Above this the highest hills of the range have a stratum of chalk, not pure or white as that of the chalk range properly so called, nor producing flint so black.

The height of Dunnose is 800 feet above low water mark. St. Catherine's hill is at least 850. Of the former I had no opportunity of examining accurately the thickness of the strata; but at St. Catherine's the strata are as follow:

Chalk	-	250 feet
Stone	-	200 feet or perhaps not quite so much.
Clay and sand		400 feet

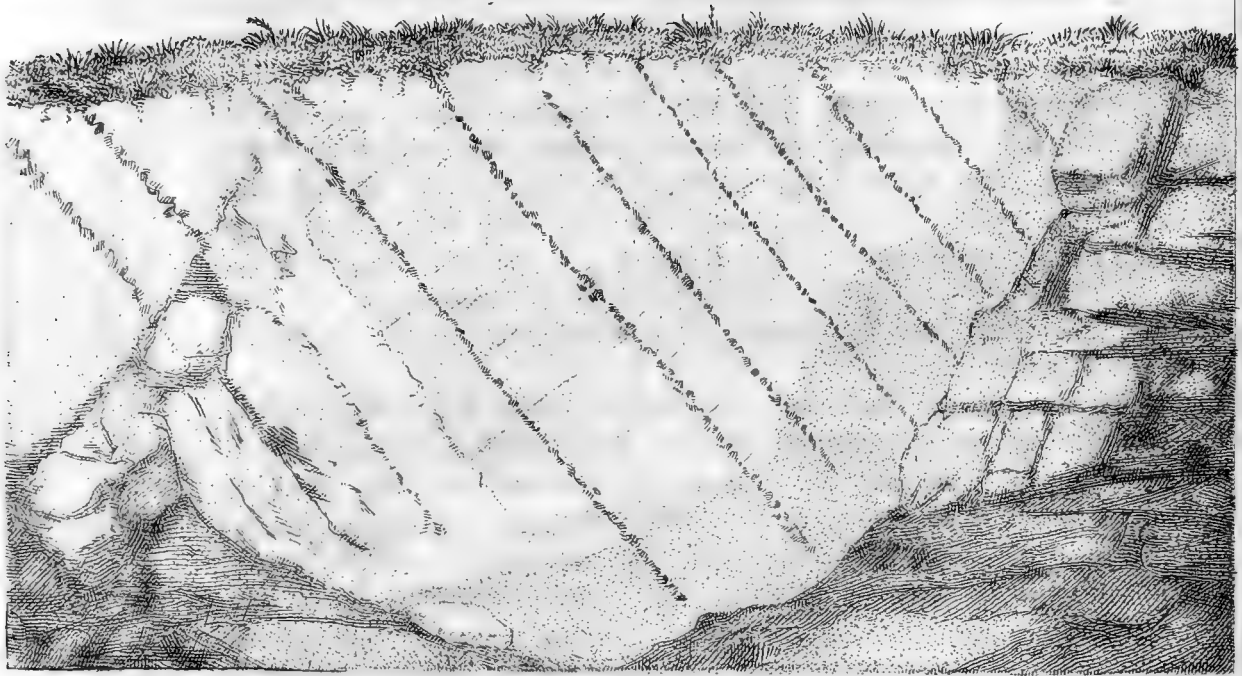
850

This arrangement accounts entirely for the formation of that singular coast called the Undercliff, which extends from Dunnose to St. Catherine's, and is composed of the confused fragments of the upper stratum of rock which have given way and rolled down as the substratum of clay has been washed away by the sea. In most parts the process seems nearly at a stand; the coast being now protected by the fallen rocks; but at St. Catherine's great devastation is still taking place. The earth-fall mentioned last year was a very small operation of this kind when compared with the relicks of former convulsions.

From this short sketch of the general position of the strata in the island, I return to the particular subject of the present paper.

The chalk pit, which I am about to describe, is situated on the northern edge of the chalk range just out of the village of Carifbrook, and about an hundred yards beyond the division of the roads to Yarmouth and Shorwell. The pit is open to the east. The strata of chalk are very regular, from two to five feet in thickness, and divided by seams of flint from six inches to nine inches in depth. The flints are, as usual, in nodules of different sizes, from the size of the fist to twice the size of a man's head. The whole dip northward with an inclination of at least 67 degrees. Perpendicular fissures run through the whole from north to south, the sides of which





which are nearly as flat and smooth as a wall. As these fissures are followed with convenience in working the pit, an extensive face was laid open when I saw it, and the appearance was as in the annexed sketch. See TAB. VII. On examining the beds of flint nearly, I was astonished to find that every flint, though lying in its place, and retaining perfectly its original shape, was more or less burst and shattered; some few were only split into large pieces, but the greater part were broken into small fragments, and some absolutely reduced to impalpable powder. From one which had suffered the most the annexed specimen was taken. The powder was so very fine that I had conceived it must have been mixed with chalk; but, on washing it with diluted marine acid, I found that it was purely siliceous. Indeed the chalk which surrounds these flints is uncommonly solid, and does not exhibit cracks or marks of any violence except the great fissures beforementioned. A specimen of the flint powder after washing in the acid is sent with the other.

I must observe that I had but imperfect opportunity of inspecting the flints which lay at a distance from the fissure; such however as I could see in the bed then working appeared to have been less shattered in proportion as they were more remote from the fissure; but all had suffered more or less.

About 200 yards below this pit, and nearer to Carisbrook village, the road is in part cut through the chalk, and the beds of flint exposed by that means exhibit the same appearances as those in the pit above.

The chalk pit above Shide Bridge, which is the only one I had an opportunity of examining after my discovery of the phænomenon above described, presents in some degree the same appearances, but does not afford so good an opportunity of viewing the strata as that at Carisbrook. The strata did not appear to me to lie so regularly

rior the flints to be disposed so much in beds as at Carisbrook. They were however extremely broken and shattered, and apparently the most so where they lay most in strata. The strata had also a great inclination or dip to the north.

Although it would be rash to attempt to account for this very singular state of destruction of the flints in the Carisbrook pit, yet it is impossible not to offer some conjectures on the subject. There can be very little doubt that the strata, though now so inclined, were originally formed in a horizontal position. When the tremendous convulsion took place which sunk them to the situation in which they now appear (at which time the channel which separates the Isle of Wight from the main land was perhaps formed), the strata of chalk, in the act of subsidence, had a tendency to slide on each other, and this would be exerted most sensibly where from the admixture of the flints the cohesion of the parts of the chalk was the weakest. This motion, or rather strain, of so enormous a weight, might in an instant shiver the flints, though their resistance stopped the incipient motion; for the flints, though crushed to powder, are not displaced, which must have been the case had the beds slid sensibly. This conjecture is perhaps strengthened by what I observed in a few detached nodules of flint in the chalk strata which did not appear to have suffered as those in the beds of flint have done. I may here add that it seemed as if in some places the fine powder of the flints had run down, and invested the nearer parts of the fissure with a thin coating of the agglutinated dust; but this may possibly have taken place since the face of the fissure has been exposed to the weather.

Perhaps it may not be totally foreign from the present subject, to mention that in a very great chalk pit at the village of Preston, a mile north of Brightelmstone, in which the flints lie in very regular and nearly horizontal strata, but which has also vast perpendicular

fissures in the chalk, the fissures are in many places filled to a considerable extent with a very thin vein of pure flint exactly as if the flint, not being quite hard when the fissures took place, had been squeezed out of the beds and run into the fissures as soft pitch would do. I do not mean at all to say that this was the case, but merely to describe the appearances. In the chalk pit just below the church at Brighthelmstome another singular appearance may be seen. The upper part of the chalk is in separate masses, not properly rubble, but with all their tender angles sharp exactly as if just broken to pieces to put into the lime kiln, and quite clean, nearly of a size, and almost without any chalk powder mixed with them.

I remain, &c.

Southampton, Jan. 22, 1800.

VIII. *Remarks on some British Species of Salix.* By James Edward Smith, M.D. F.R.S. P.L.S.

Read May 5, 1801.

IT has for a long time been my intention to offer to the consideration of the Linnean Society some elucidation of the British Willows; but there are many reasons why any thing like a complete history of the genus of *Salix* cannot at present be made out, even so far as regards our native species, and I have therefore withheld the partial information I had acquired, in hopes of learning more, and being able to communicate something better worth the Society's acceptance.

At length however it becomes necessary that this obscure genus should assume as regular a form as possible in the *Flora Britannica*; where, as in every other instance, my object is to publish nothing that I have not ascertained myself, at least as far as the imperfection of all human knowledge and judgment will permit. The enumeration therefore of the species of *Salix* in that book, though more comprehensive than any yet published in Britain, will be but an essay, to be perfected hereafter; and what I have to offer in this paper are various matters collected in the course of my inquiries, which require a more diffuse explanation than the systematic form of the work just mentioned will admit. I shall at present confine my observations to the arborescent species of the first section of the genus *Salix*, which comprehends such as have leaves more or less serrated, and nearly smooth, at least when fully formed. This is the

most difficult section, and I flatter myself I shall be able to furnish some new information respecting it.

Some difficulties which attend the investigation of this genus are almost peculiar to it. Willows to be well understood require to be studied at three different periods of their growth; first when in flower, at which time the leaves in general scarcely appear at all; next when the capsules are fully formed and nearly ripe, and the leaves just expanded, with their stipulæ; lastly when the leaves have attained their full size, and all remains of the fructification have disappeared. In this last state the true form, and pubescence or smoothness, of the leaves is to be known; in the second the nature of the *stipulæ*, which frequently are very deciduous, and the figure and surface of the capsules; whereas in the first state the very discriminative and curious parts of the flower, the stamina, nectaria, and, above all, the proportion and structure of the germen, style and stigmata, are only to be learnt. I have found the last-mentioned parts so constant and important, so strongly indicative of natural subdivisions of the genus, that if we could at all times command them, they would certainly afford better characters for that purpose than the margin or pubescence of the leaves. But the dioecious nature of these plants is another inconvenience, and peculiarly militates against a general arrangement of them according to parts, which it is an even chance whether we meet with or not, and which are moreover so very transient.

If I should prove more successful in treating the subject under consideration than my predecessors Mr. Hudson and Mr. Lightfoot, it will be greatly owing to three causes. First the publication of Professor Hoffman's *Historia Salicum*, so full, so accurate, I might almost say so perfect, as far as it goes. This work the authors of the *Flora Aëlica* and *Flora Scotica* never knew. In the next place the opportunity I have had of studying the Linnæan original specimens, in

in this genus peculiarly ample and instructive, and of comparing them, through Her Majesty's gracious permission, with Mr. Lightfoot's Herbarium, by which most of the doubtful specimens mentioned in his *Flora*, p. 611, have been referred to some species or other, and all his difficulties with regard to others removed. Lastly the assistance I have received from my accurate and indefatigable friend Mr. Crowe, who for many years has with unwearied diligence collected Willows, both indigenous and exotic, from all quarters; carefully noting their peculiar uses and properties; distinguishing the truly wild from the naturalized, or merely cultivated kinds; and watching them with a most discriminating eye through all their stages of growth in his garden, which is fortunately situated so as to be peculiarly favourable for the purpose.

Linnæus begins his arrangement of the *Salices* with those species which have some peculiarity in their stamina, and our British writers follow him in this distribution. It is not my design to disturb it. All such as, instead of the 2 distinct stamina of Willows in general, have their filaments united into one, or have more than 2 stamina, have smooth ferrated leaves, and therefore stand commodiously enough at the head of this first section.

The *Salix hermaphroditica* I believe has no right to a place among British plants. Hudson introduces it only with a mark of doubt. The *Salix latifolia folio splendente* of Ray seems, by Dillenius's remark, to be a variety of the Sallow. The real *hermaphroditica* of the Linnæan herbarium is closely allied to *S. pentandra*, except in the fructification, and has never been detected in Britain. All that I have found in the gardens under that name is merely a broad-leaved variety of *S. pentandra*, the flowers of which are pentandrous and dioecious. The true *hermaphroditica* has but 2 stamina, and those in the same flower with the pistillum. I have never seen it alive, nor do I believe it to be known out of Sweden.

The

The first species on our list of British Willows is the

I. *SALIX purpurea.*

Bitter Purple Willow.

S. monandra, foliis obovato-lanceolatis ferratis glabris, stigmatibus brevissimis ovatis subfessilibus.

Salix purpurea, *Linn. Sp. Pl.* 1444. *Huds.* 427.

S. monandra. *Willd.* 45. *Curt. Lond. fasc.* 6. t. 71. *Hoffm. Sal.*
v. 1. 18. t. 1. f. 1, 2. t. 5. f. 1. t. 23. f. 1.

S. humilior, foliis angustis subcæruleis, ex adverso binis. *Raii Syn.*
448. *Cant.* 144. n. 5.

In palustribus, et ad fluvios. Fl. Martio:

This is a bushy shrub, three or four feet high, with long, slender, tough, purple, shining branches. The leaves are either opposite or alternate, nearly linear, but broadest upwards, serrated chiefly towards the summit, very smooth, glaucous beneath, destitute of stipulæ. The male catkins are very slender, scarcely an inch long, nearly sessile, consisting of many thick-set flowers, the uppermost of which expand first. Scales black at the tip, hairy. Nectary a solitary gland opposite to each scale. Stamen one solitary simple filament, never dividing, bearing an orange-coloured double, or four-lobed, anthera. Female catkins exactly like the male in size and form. Germen sessile, small, of an ovate or rather elliptic form, silky. Style very short, or scarcely any. Stigmas small, sessile, somewhat ovate, undivided, marked with a longitudinal furrow on the upper side. Capsule ovate, small, silky.

The leaves and twigs of this species are extremely bitter, and therefore authorize the English name given by Mr. Curtis, who has

well figured and described the species, though he erred in confounding it with the following.

2. *SALIX Helix.*

Rose Willow.

S. monandra? foliis lanceolatis acuminatis ferrulatis glabris, stylo elongato filiformi, stigmatibus linearibus.

Salix Helix. *Linn. Sp. Pl.* 1444. *Huds.* 427. *Dalech. Hist.* 277. f. 2.

S. n. 1640. *Hall. Hist.* v. 2. 306.

Salicis racemi feu nucamenta, rosæ et capitula squamata. *Bauh. Hist.* v. 1. p. 2. 213.

In salicetis et palustribus. Fl. Martio, Aprili.

Haller and Ehrhart seem to have led Prof. Hoffmann into the error of confounding this with the preceding, from which it is most unquestionably very distinct. Mr. Curtis, and some of our more recent writers, have followed Hoffmann, perhaps without having ever seen the true *S. Helix*. I am obliged to Mr. Crowe for first pointing out to me the different heights of the two plants, and different sizes of their catkins, and on a critical examination of the female flowers, I was so fortunate as to find further marks of distinction.

S. Helix rises to the height of 9 or 10 feet, and is a small slender tree. Even in the form of its leaves it differs from the *purpurea*, those of the *Helix* being more truly lanceolate and taper-pointed, by no means obovate. From the size which Haller ascribes to his *Salix n.* 1640, I venture to presume he intended this plant, and not the *purpurea*, and therefore borrow from him the character *monandra*, for I have never seen the male of this species. It is extremely probable moreover, from the close affinity of the two in other

respects, that they should agree in this. The female catkins are somewhat longer, and twice as thick, as in the last, and stand on longer stalks. The germen is sessile, ovate and silky, but the style is considerably lengthened out, quite smooth and naked. The stigmas also, instead of being short and ovate, are linear and considerably elongated. To these satisfactory marks may be added that the leaves are less glaucous beneath, and not so bitter as those of the *S. purpurea*.

3. *SALIX fissa.*

Basket Osier.

S. monadelpha, foliis lanceolatis acutis subdenticulatis glabris: subtus glaucis.

Salix fissa. Hoffm. *Sal.* v. 1. 61. t. 13, 14.

In falicetis. Fl. Aprili, Maio.

In several osier-grounds near Lynn, Norfolk. *Mr. Crowe.* At Prickwillow near Ely. *Rev. Mr. Hemsted.* At Fincham, Norfolk. *Rev. Joseph Forby.*

This is a shrub 4 or 5 feet high, with upright, flexible and very tough branches, of a yellowish ash-colour, often purplish. Leaves alternate, on footstalks, lanceolate, pointed, 2 or 3 inches long, minutely toothed, or somewhat serrated, principally towards the top; smooth on both sides except when very young; glaucous beneath; dark-green above. Stipulæ none. Catkins on short stalks, cylindrical, blunt, first red, then yellow, flowering first at the top. Stamina 2, united from the base about half way to the top. Antheræ of 2 lobes, yellow. Germen ovate, acute, hairy. Style short. Stigmas oblong, blunt, undivided.

This is cultivated in the fens, and preferred above all other Wil-
lows or Osiers for the finest kinds of basket work. Female plants
only have hitherto come under my inspection, but, by a peculiar
instance of good fortune, I last spring met with one or two male
flowers at the base of a few female catkins in Mr. Crowe's garden.
These enabled me to complete my description, and at the same time
removed every possible doubt of our plant being the *S. fissa* of Hoff-
mann, with every part of whose excellent description it accords,

4. SALIX *rubra*.*Green Osier.*

S. monadelpha? foliis lineari-lanceolatis elongatis acutis denticulatis
glabris: subtus concoloribus.

Salix rubra. Hudf. 428. *With.* 49.

S. virescens. *Villar's Dauph. v. 3. 785. t. 51. f. 30.*

S. minimè fragilis, foliis longissimis utrinque viridibus non ferratis.
Raii Syn. 449.

S. nerii folio utrinque virente. *Vaill. Par.* 175.

In falicetis rarius. Fl. Aprili, Maio.

Between Maidenhead and Windfor, and near Salisbury. *J. Sher-
rard.* In an osier-holt near Ely. *Rev. Dr. Goodenough.* At Prick-
willow near Ely. *Rev. Mr. Hemsted.* Near Bedford. *Rev. Mr.
Abbot.*

The branches of this shrub are very long, slender, tough, smooth,
gray or purplish. Leaves about 4 inches long when full-grown,
linear-lanceolate, narrow, acute, slightly toothed or ferrated, by no
means entire, of a bright green on both sides, not at all glaucous,
smooth in general, sometimes sprinkled with a few slender hairs
beneath. Stipulæ, if present, linear-lanceolate, a little toothed;
but

but generally wanting. The male catkins I have not seen. I presume them from analogy to have monadelphous stamina. The females differ but little from the preceding, except in having rather thicker, almost ovate, stigmas.

This species appears to be but little known, though among the most valuable as an Osier. The habit of the plant, figure and length of its leaves, agree with the Common Osier *S. viminalis*; but their bright green colour on both sides, and want of all pubescence, except when very young, render them easily distinguishable from that species, while their great length, linear form, and narrowness, and their colour being not at all glaucous, prevent their being confounded with *S. fissz.*

Specimens obligingly communicated by my friend Mr. Lambert, V. P. L. S. from Mr. Hudson's own herbarium, have removed all uncertainty as to its being his *S. rubra*. The name is less apposite than might have been wished: *virens* or *concolor* would better have expressed the peculiar character of the species. Of the synonym of Ray there can be no doubt. That of Vaillant I learned from the Sherardian herbarium.

5. *SALIX Croweana.*

Broad-leaved Monadelphous Willow.

S. monadelpha, foliis ellipticis subserratis glaberrimis: subtus glaucis.

In palustribus. Fl. Aprili, Maio.

At Cranberry Fen in the parish of East Winch, and in other parts of Norfolk. *Mr. Crowe.*

This scarcely rises to the height of a tree. The branches are short and spreading, rather brittle, clothed with a shining yellowish

or purplish bark. Leaves on footstalks, elliptical, or inclining to obovate, somewhat pointed, scarcely an inch and half long, slightly ferrated or rather crenate, smooth on both sides; bright-green and shining above; glaucous and veiny beneath. Catkins nearly sessile, of a short somewhat ovate form. Scales obovate, black, very hairy. Stamina pale lemon-coloured, longish, their filaments united from the base to a greater or lesser distance, sometimes almost to the top. Antheræ reddish. The female flowers are as yet unknown.

This species of *Salix* seems to have escaped the notice of every botanist hitherto, and I have given it the name of its discoverer. It is most certainly very distinct from all others, and easily known by its united stamina, and short broad leaves. It is destitute of the valuable properties of an Osier, having short and rather brittle, not long and flexible, twigs. It has therefore to all appearance never been cultivated, but is truly wild in Norfolk.

6. *SALIX triandra.*

Long-leaved Triandrous Willow.

S. triandra, foliis lineari-oblongis ferratis glabris, germinibus pedicellatis.

Salix triandra. *Linn. Sp. Pl.* 1442. *Huds.* 425. *Wib.* 45. *Curt. Lond. fasc.* 6. t. 72. *Hoffm. Sal. v.* 1. 45. t. 9. 10. t. 23. f. 2.

S. folio amygdalino utrinque aurito, corticem abjiciens. *Raii Syn.* 448.

In salicetis et ad ripas fluviorum frequens. Fl. Maio, etiam Augusto.

This is naturally a tree 30 feet or more in height, but being one of the best Osiers for the use of basket-makers, is generally cut and kept low. The bark of the stem and branches peels off spontaneously, almost like that of the plane-tree. The branches are upright,

right, long, slender, pliable and tough, though somewhat brittle at their insertion; their bark is brownish and smooth. Leaves about 3 or 4 inches long, of a linear oblong figure, tapering away towards the base, and their breadth on each side the nerve is as nearly equal as possible; they terminate in a point; their margin is thickly serrated, the serratures incurved and rounded, a little glandular; both sides smooth, the under rather glaucous. Stipulæ ovate, oblique, crenate, veiny, smooth, often wanting. Catkins at the ends of small leafy young branches, erect, slender, yellowish, with blunt downy scales. Stamina generally 3 to each scale, very rarely (in the same catkin) only 2. Germen stalked, ovate, pointed, warty. Stigmas short, spreading, notched. Capsule very smooth, green.

7. *SALIX amygdalina*.

Broad-leaved Triandrous Willow.

S. triandra, foliis ovatis obliquis serratis glabris, germinibus pedicellatis, stipulis maximis.

Salix amygdalina. *Linn. Sp. Pl.* 1443. *Huds.* 426. *Lightf.* 596.

S. folio auriculato splendente flexilis. *Raii Syn.* 448. *Cant.* 144.

In falicetis et palustribus. Fl. Aprili, Maio.

On Badley moor by Dereham, Norfolk. *Mr. Crowe*.

Most botanists confound this with the preceding, and I should scarcely have escaped the same error but for the observations of Mr. Crowe, who was led to investigate their botanical distinctions by the different qualities of the two plants for æconomical purposes. This is but rarely preserved in osier grounds, being a bad Osier, greatly inferior to the true *S. triandra*. It never rises into a tree. The bark indeed is deciduous, as in the preceding, which added to the triandrous flowers, perhaps led Mr. Curtis and others to suspect there existed

existed no specific difference between the two. The leaves however will sufficiently serve to discriminate them. Those of *S. amygdalina* are shorter, scarcely 2 inches long, of a broadish ovate figure rounded at the base, by no means linear; they are moreover oblique, the width of the two sides being unequal. The stipulæ are remarkably large, varying from a roundish to an half-heartshaped form, crenate, deciduous. Female flowers and capsules much like those of the last species.

8. *SALIX pentandra.*

Bay-leaved Willow.

S. pentandra, foliis elliptico-lanceolatis crenulatis glabris, germinibus glabris subseffilibus.

Salix pentandra. *Linn. Sp. Pl.* 1442. *Huds.* 426. *With.* 46. *Lichtf.* 595.

S. folio laureo, feu lato glabro odorato. *Raii Syn.* 449.

Ad rivos Angliæ septentrionalis et Scotiæ australis. Fl. Maio, Junio.

The sweet or bay-leaved Willow is sufficiently well known by its broad odoriferous leaves, whose ferratures exude a copious yellow resin, and its numerous stamina, which are commonly about 5 to each flower. We have only to remark that the variety β of *Fl. Suevica* seems to be a distinct species, not yet found in England.

9. *SALIX nigricans.*

Dark broad-leaved Willow.

S. foliis elliptico-lanceolatis crenatis glabris subtus glaucis, germinibus pedicellatis lanceolatis acuminatis sericeis.

Salix

Salix phylicifolia β. *Linn. Sp. Pl.* 1442. *Fl. Lapp. ed. 2.* 291. t. 8.
f. c. n. 350.

In falicetis Fl. Aprili.

At Wrongay fen, Norfolk, and in other grounds in other places
not uncommon. *Mr. Crowe.*

No writer except Linnæus appear to have known Willow, this
but he surely has erred in making it a variety of his *phylicifolia*, from
which it differs in the much greater size of all its parts, as well as in
the totally different form of its ferratures, a part so peculiarly cha-
racteristic in the *phylicifolia*.

This species I have named *nigricans* from the dark colour of its
branches, as well as its black hue when dried, which last indeed is
not absolutely peculiar to it. The trunk scarcely rises to the height
or form of a tree. The branches are upright, round, rather brittle,
smooth. Leaves 2 or 3 inches long, elliptic-lanceolate, acute, a
little rounded at the base, crenate in almost every part, but more
slightly in the female plant; dark-green and very smooth above;
glaucous, veiny, rarely a little hairy beneath. Foot-stalks very
broad at their base. Stipulæ (if present) rather large, obliquely
heart-shaped, ferrated, smooth. Catkins from an inch to an inch
and half long, thickish, with obovate, brown, hairy scales. Stamina
2, distinct, more or less hairy about their base. Style short, smooth.
Stigmas thick, ovate, united at their base, permanent, undivided.
Capsules on footstalks, long and tapering, clothed with white silky
down, as are the general and partial stalks.

The leaves in the female plant are shorter, and less crenate, as
well as more tapering towards the base. Such differences between
the two sexes of Willows are rare, but I can hardly conceive these
to be different species, as they agree in every part besides.

10. SALIX *laurina*.*Shining dark-green Willow.*

S. foliis ellipticis acutis denticulato-ferratis glabriusculis subtus glaucis, germinibus pedicellatis lanceolatis sericeis.

In falicetis et palustribus. D. Dickson. Fl. Aprili, Maio.

Very nearly related to the last, but certainly a distinct species. It essentially differs in the male catkins, which are but half the size of those last described, and their stamens are shorter, perfectly smooth, not hairy at their base. The leaves also are of a brighter green, their margin inclined to be revolute, and rather toothed than crenate. The germen also is shorter, blunter, and less tapering.

Neither of these Willows is known to be of any particular use. Their branches are not endued with much flexibility or toughness.

11. SALIX *petiolaris*.*Dark long-leaved Willow.*

S. foliis lanceolatis ferratis glabris subtus glaucis, germinibus pedicellatis ovatis sericeis, stigmatibus sessilibus bilobis.

In falicetis et palustribus. D. Dickson. Fl. Aprili.

This species has not been found wild in Norfolk, but was sent to Mr. Crowe by Mr. Dickson, along with the last, as of British growth. It has most affinity with the two preceding species, but has longer and more slender twigs. The leaves are 4 or 5 inches long, about an inch broad, lanceolate, pointed, serrated, somewhat revolute, generally a little unequal at the base; bright-green, smooth and shining above; glaucous beneath, and sometimes a little hairy.

hairy. In drying they turn of a purplish black. The footstalks are peculiarly long, linear, and slender, silky on the upper side. Stipulæ small, crescent-shaped, toothed, smooth. The female catkins, the only sex I have seen, are scarcely an inch long, with black, hairy, obovate, often notched, scales. Germens on long footstalks, small, ovate, silky. Stigmas perfectly sessile, ovate, obtuse, divided into two lobes.

12. *SALIX phylicifolia.*

Tea-leaved Willow.

S. foliis lanceolatis undulato-crenatis glabris subtus glaucis, stipulis sublunatis.

Salix phylicifolia α. *Linn. Sp. Pl.* 1442. *Fl. Lapp. ed. 2.* 291. t. 8.

f. d. n. 351.

In alpebus Scotticis. *Fl. Maio.*

At Finlarig, Bredalbane. *Rev. Mr. Stuart.*

I am enabled to add this to the list of British plants, by means of a specimen sent to Mr. Lightfoot by Mr. Stuart, of Lufs, and now preserved in his herbarium, among others which the author of the *Flora Scotica* had not sufficient materials to decide upon. Having confronted with this the original Lapland specimen of Linnæus, I can speak with certainty to their being exactly the same. Unfortunately the fructification is wanting in both, but their leaves are sufficient to mark the species.

S. phylicifolia appears to be a shrub with smooth, slender, spreading branches. Leaves alternate, stalked, exactly lanceolate, rather acute, furnished, about the middle principally, with broad and unequal crenatures, between which the leaf is as it were almost sinuated; the margin is a little more thickened than ordinary; the base

and extremity of each leaf are entire, destitute of glands: all the leaves are either perfectly smooth in every part, or a little sprinkled with minute inconspicuous hairs; dark-green above; glaucous and reticulated with veins beneath. Footstalks slender, smooth. Stipulæ crescent-shaped, mostly ferrated, various in size.

To the tribe which this paper is intended to illustrate belong (besides a few smaller species, which have little affinity with those already mentioned) two well-known trees, the *S. vitellina* and the *S. fragilis*. These will have a place in the *Flora Britannica*, though it may be doubted whether the former be really indigenous. As, however, I have nothing new to say concerning them, but, on the contrary, am waiting for more information than I have yet been able to obtain concerning the fructification of both, I will not add to the length of this treatise by any imperfect descriptions. Some remarks of Professor Hoffmann lead me to suspect we may have more than one species in England under the name of *fragilis*, but that I must leave for future inquiry.

My worthy friend the Rev. Mr. Abbot of Bedford, so well-known to this Society, has favoured me with one, if not two, entirely new English Willows, which belong to this first section of the genus, and which promise to be important in an œconomical view. I lament that the want of their fructification, and a longer time to observe their growth and different appearances, oblige me to postpone any further mention of them at present.

IX. *Descriptions of four new Species of Fucus.* : By Dawson Turner,
M. A. F. L. S.

Read May 5, 1801.

ALTHOUGH the numerous individuals comprehended under that extensive family known by the name of *Fucus*, and especially such of them as are considered natives of Britain, have of late years been the subject of much inquiry, and have induced many most able botanists to exert their skill in the investigation of them, it nevertheless requires but a very slight acquaintance with the subject, to be fully persuaded that, without entering into laborious researches upon their internal organization, or the mode of their fructification, things hitherto almost entirely neglected, a wide field remains for future naturalists to display their ingenuity, in the determination of many even of those species which are most abundant upon every part of our Island. I should feel extremely sorry were this, or any similar observation, to be considered as detracting from the merits of those gentlemen, to whose exertions I have always had a pleasure in acknowledging that the science is most deeply indebted:—far from such an idea, my intention is only to say that our knowledge of the marine *algæ* is still in its infancy; and a stronger proof of the justice of this remark can hardly be adduced, than the common *Fucus vesiculosus*, from the varying appearances of which, Linnæus and some subsequent botanists have formed such an infinity of distinct species. Did this circumstance require further confirmation, it might possibly in some degree receive it from a consideration of the
four

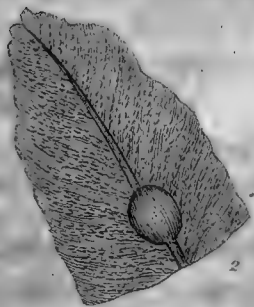
four plants to which it is my object, in the present paper, to call the attention of the Linnæan Society, and of which two only can properly be said to be either altogether new, or even very uncommon; there being little doubt but the others will be found to be sufficiently abundant, at least upon the eastern shore of England, where their having remained so long unnoticed has arisen only from their having been regarded as varieties of some of their congeners, to which they are in reality very nearly allied. From these authors I should not now venture so openly to differ, or rather should express my sentiments with far greater diffidence, were not the plants which I have undertaken to describe, and upon which I trust that future investigators will confirm my decision, especially natives of the Yarmouth beach; and had not my attention been particularly directed to them, from almost the earliest period that I have made the marine algæ my study, by my instructor and coadjutor Mr. Wigg, upon whose knowledge of them the Society have heard too much from more able as well as more eminent botanists, to make it necessary for me in any wise to enlarge.

I had proposed to myself to extend this paper to a greater length than my contracted leisure will now admit, and, among other plants, to have included in it a figure of *Fucus fruticulosus* of Jacquin, which, in company with Mr. Sowerby, I found not unfrequently upon the shores of the more western counties; the excellent account however of this plant, given by the Baron de Wulfen, made such an intention useless; and I am now induced to mention the circumstance, only from a fear that my having abandoned the idea may have been the cause of leading my friend, Mr. Stackhouse, into error, as, I understand that, in the third fasciculus of his *Nereis*, the appearance of which may soon be expected, he has declined figuring this species from an idea that it would previously be done by me.

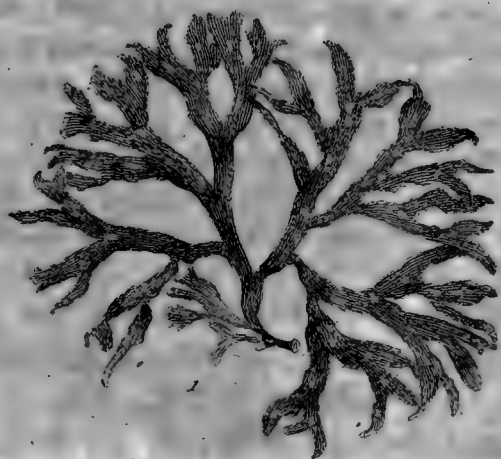
Fucus

SECRET

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Fucus vaseifolius



Fucus crenulatus

Fucus ruscifolius.

F. caule ramofo alato; foliis oblongis obtufis planis integerrimis proliferis: venulis diaphanis catenatis.

TAB. VIII.

Fig. 1. Planta naturali magnitudine.

2. Folii capfuliferi extremitas lente auéta.

Inter rejectamenta maris apud Yarmouth in Norfolciâ. Perennis: Floret Januario Februario.

Radix fibrofo-callofa, furculifera. Frons bipollicaris, membranacea, tenerrima, e bafi ramofo, caule nonnunquam brevi tereti filiformi prædita. Rami membranâ tenuiffimâ utrinque alati. Folia in omnibus quæ adhuc mihi videre contigit exemplaribus, principio ovata, dein oblonga, femper obtufa; e costa iterum atque iterum prolifera. A Fucò Hypogloffo, cui proximè accedit, primo intuitu dignofci potest, non modo foliorum figurâ, verùm etiam structurâ totâ internâ, præfertimque lineis pellucidis, catenatis, plerumque simplicibus, quandoque ramofis et anastomofantibus, quæ a costâ utrinque copiofe oriuntur, et ad foliorum margines decurrunt, angulum cum costâ plùs minùs acutum fervantes. Fructificatio, tubercula parva, globofa, in ipfâ costâ, præcipuè foliorum extremitatem verfùs fita, quorum plurima sæpe in eodem folio: his diffilientibus, feminum minimorum, faturatè rubentium copia fatis ampla ejicitur, et costæ utrique lateri, feriatim quafi difpofita, adhæret. Color plantæ fanguineus.

The refemblance of this plant to *Fucus Hypogloffum* is fo extremely great, that, though I have been in the habit of observing it for many fucceffive years, and can point out feveral circumftances in

which they essentially differ, I should still have felt very unwilling to describe them as specifically distinct, were it not for the curious lines of concatenated veins which I find both peculiar to this species, and constant in all the specimens that have fallen under my observation. In a fresh state these veins are so easily visible, as to give the plant a striated appearance; but when dried, especially if fastened upon paper, a good glass and strong light are necessary to discover them. I have never been able to form a satisfactory opinion upon the office which they are intended to perform in the internal organization of the species; nor indeed is this a subject upon which, in our present knowledge of the marine algæ, it would be right to hazard a conjecture. I shall therefore content myself with observing, that they run from the midrib to the sides of the leaf generally in parallel lines, but sometimes branching and anastomosing; that they are quite pellucid; and that they are intersected at regular distances with joints, like the filaments of *Conservæ*. The colour of *Fucus ruscifolius* is always much darker than that of *Fucus Hypoglossum*; the leaves of a different form, and, particularly when young, very blunt; the texture of the membrane, under a powerful microscope, dissimilar; the stem far stronger; and the midrib more prominent as well as more visible: to which is to be added, that the months of January and February are those in which this plant bears its fruit, and in which it is most frequently seen upon the Yarmouth beach; whereas *Fucus Hypoglossum* fructifies only in the summer, and never appears at any other part of the year. Hence I conclude, that the one is annual, the other perennial. I have a specimen of *Fucus ruscifolius* with the root completely fibrous; no tendency to which I ever saw in *Fucus Hypoglossum*; but, this not appearing to be always the case, I have not considered a single instance sufficiently important to ground any part of the specific distinction upon it. In the mode of fructifying, the two plants completely agree; and, as

much has been already written upon that subject, the Society will perhaps excuse me if I trespass somewhat upon their time by a slight digression respecting it. The fruit of *Fucus Hypoglossum*, as is well known, is sometimes found in small globular capsules situated upon the midrib of the leaves, while in other specimens no traces of these capsules are apparent, but minute dark seeds are discovered in two small rows on each side of the midrib, and parallel to it: a circumstance which with some botanists has given rise to the conjecture that this *Fucus* may possibly be dioicous, while others have carried the matter so far as to wish to constitute two distinct species. The latter idea however is done away by plants being occasionally found in which both kinds of fructification, as they are called, may be discovered upon the same plant; and the former supposition has always appeared to me equally ill-founded, from my once having examined a plant in which the capsule was actually bursting, and the seeds partly discharged. I have no hesitation in owning, that I never could account for these seeds, supposing them to be casually scattered, adhering in such regular lines as is always the case; nor can I see any reason for that part of the membrane upon which they are disposed being of a darker colour, and apparently thicker substance, than the rest of the leaf: these are difficulties which I hope other botanists will remove, but which do not appear to me of sufficient importance to induce me to accede to the idea of *Fucus* being monoicous or dioicous. I am indeed on the contrary persuaded that they prove nothing, as many other *Fucus*, among which are to be enumerated the following, have their seeds equally contained in capsules, and afterwards dispersed upon the frond, though without the same appearance of regularity: these are *Fucus alatus*, *ovalis*, *dasyphyllus*, *articulatus*, *kaliformis*, *clavellus*, *tenuissimus*, and *pinnatifidus*. From a consideration of these and other circumstances, I have been led to conjecture, that in the above-mentioned

Fuci the capsules, when mature, burst, and immediately die away; while the seeds, from that viscosity which they are known so eminently to possess, adhere to the surface of the frond, till, upon the whole plant at the end of autumn passing into decay, they attach themselves to the stems of the larger species, or rocks, as the force of the sea carries them, and there remain fixed till the latter months of the following spring again awake their vegetative powers.

Excepting *Fucus Hypoglossum* there is none in the British list with which *Fucus ruscifolius* can possibly be confounded, and I shall therefore trouble the Society with no more upon the subject.

Fucus crenulatus.

F. fronde planâ coriaceâ lineari dichotomâ; ramorum apicibus bifurcis oblongo-lanceolatis.

TAB. VIII.

Fig. 3. Planta naturali magnitudine.

4. Frondis apex lente auctus.

Habitat prope Durium flumen in Lusitaniæ littoribus; β apud Dubrem. D. L. W. Dillwyn.

Perennis? Floret Augusto, Septembri.

Radix callus expansus, fibrarum aliquot crassiuscularum rudimentis plerumque instructus. Frondes plurimæ, vix palmares, planæ, enerves, stipiti brevi, tereti infidentes, latè expansæ, undique dichotomæ, lineares, singulari modo, præsertim extremitates versùs, obtusè, sed et minutissimè crenatæ. Apices bifidi, angulis acutis, in lobos oblongo-lanceolatos definentes. Rami plurimi, nunquam proliferi. Fructificatio tubercula hemisphærica, magnitudine feminis

minis rapæ, verrucosa, pallidè rubentia, feminibus repleta, utrique frondis paginæ insidentia. Substantia coriacea. Color e fusco saturatè sanguineus, fugacissimus, et in sordido-flavescentem transiens.

Var. β . substantiâ tenuiore, margine integro, apicibus plerumque obtusissimis.

In selecting for description this Portuguese Fucus, in preference to many more beautiful as well as more rare species, which my friends have been so obliging as to procure for me from foreign shores, I am actuated principally by the hope that it may thereby be in my power to throw some light upon the botany of my own country; what I consider a variety of this having been found abundantly at Dover by my friend Mr. L. W. Dillwyn, and by him obligingly communicated to me in the course of the last autumn. When this plant becomes more generally known and understood, it may probably admit of well-founded discussion how far what I have now made a variety may not in reality be a distinct species; and I have little doubt but almost every botanist, who has only an opportunity of examining them in a dry state, will immediately decide in favour of the latter opinion. For my own part, I can only say that I have had many specimens of each under my observation, and that, after having frequently examined and compared them as attentively as was in my power, I could find no permanent difference between them; though the English plant is strikingly dissimilar at first sight, in having the edges of the frond far more entire, the ends generally blunt and frequently emarginate, but neither of these are constant, and the angles of the forks much less acute. The final determination of this point must be reserved for future investigation: it is sufficient for my purpose here to show how this species differs from its congeners. *Fucus crenulatus* was brought me in such quantity

from Oporto by a gentleman who gathered it there in the month of September 1798, that I can have very little doubt of its being one of the most common weeds of that shore. It is altogether a connecting link between two species, by no means nearly allied to each other, *Fucus crispus* and *Fucus rubens*, with each of which it has many points in common, though sufficiently removed from the one as well as the other. It agrees in texture and substance with the former, and in general habit with the latter, but may at first sight be with ease distinguished from both by the branches always preserving their linear form, and being divided at the extremities in a manner somewhat similar to those of *Fucus bifidus*. The colour too, as far as I have observed, differs from that of every other British *Fucus*; of a dark red, inclining to brown, most rapidly changing, if exposed to the air or kept in fresh water, to a dull dirty yellow: my Dover specimens, when placed in a strong light, are of a fine pink at the end of the frond. But the most striking peculiarities of this species are the minutely crenulated edges, which cannot fail of being remarked by the most inattentive observer, and the fructification, which consists of pale flesh-coloured tubercles of the size of a pin's head, plentifully scattered upon each side of the frond, especially towards the extremities, in their earliest stage immersed, but soon bursting through the epidermis, and not continuing covered with it, as in all other species with which I am acquainted except *Fucus radiatus*, sessile, of a substance inclining to spongy, and very different from the rest of this plant: when dry they turn to a dark brown, and entirely lose their natural appearance. The habit of this *Fucus* in a fresh state appears to me to be much twisted, and in some branches almost spiral. From analogy I have no hesitation in concluding that it is perennial, and Mr. Dillwyn's specimens as well as those brought me from Oporto leave no doubt as to its fructifying in the autumnal months.

Fucus:



Fucus clavellus

Fucus clavellofus.

F. fronde filiformi subgelatinosâ ramosissimâ; ramis confertis; ramulis subulatis subpinnatis, tuberculis axillaribus.

TAB. X.

- Fig. 1. Planta naturali magnitudine.
2. Ramulus cum capsulâ lentè auctus.
3. Ramulus alter feminibus dispersis.

Habitat apud Brancafter in Norfolciâ; inter rejectamenta maris apud Yarmouth frequens.

Annuus. Floret Julio, Augusto.

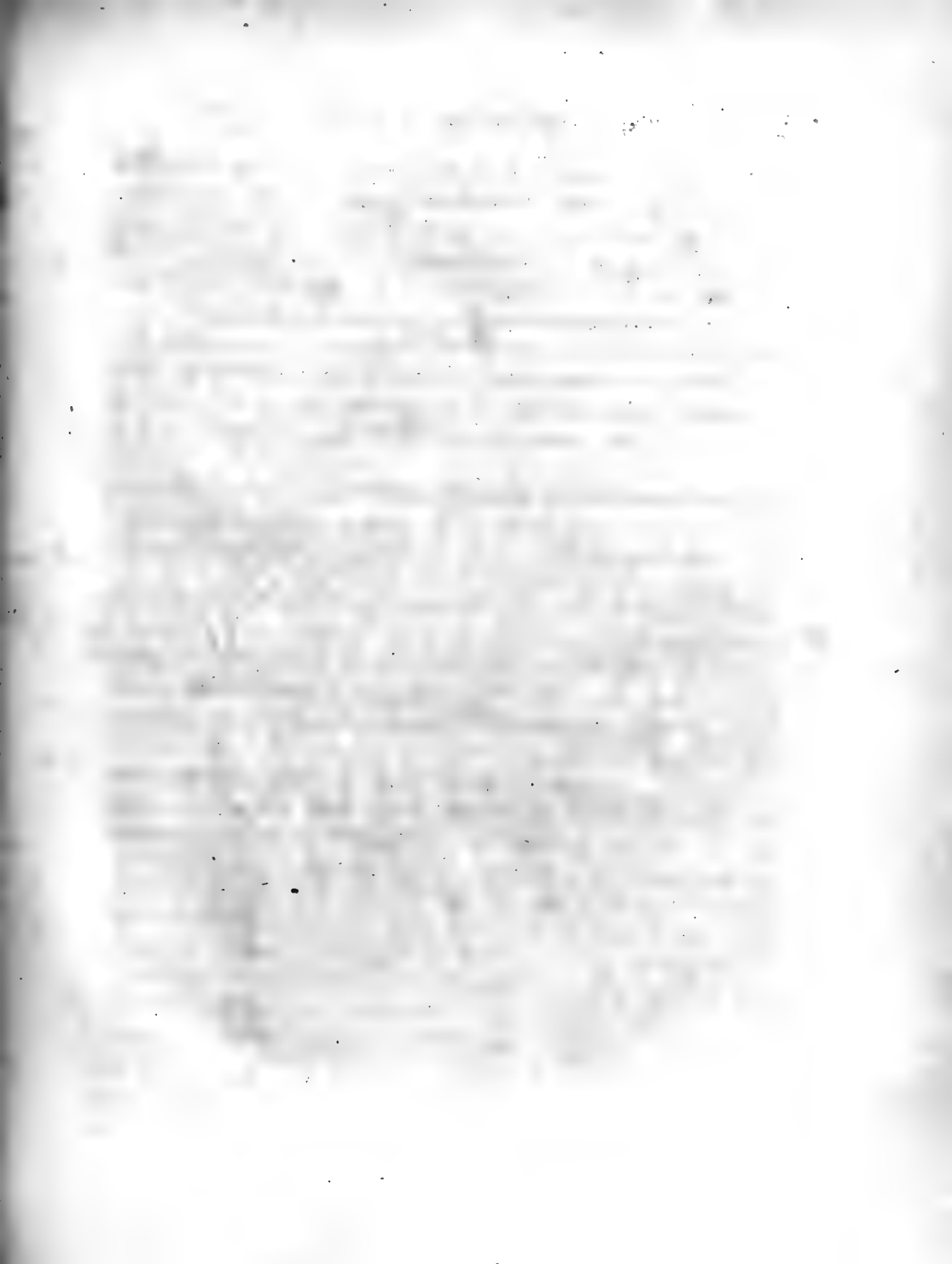
Radix callus minutus. Frondes plurimæ, ferè spithamææ, filiformes, teretes, lubricæ, undique ramosissimæ, ramis ramulisque approximatis, longitudine variis, fummis ferè pinnatis, subulato-clavatis, plerumque oppositis, nunquam vel verticillatis vel ita contractis ut articulati videantur. Frondis crassities pennam passerinam rarò æquat. Fructificatio, tubercula minuta, nigricantia, e cordato-triangularia, inter ramulos minimos sita, feminibus referta, quæ, capsulis marcescentibus, ramulis inordinatim adhærent, ulvæque speciem pro se ferunt. Color pallidè ruber.

For the information that the late Rev. John Lightfoot had intended to describe the present plant as a distinct species, and had bestowed upon it the trivial name of *clavellofus*, I am indebted to the kindness of Sir Thomas Frankland; and, as this gentleman has abundantly found it upon the rocks at Scarbro', and long been in the habit of observing it, I must be allowed for the sake of science to express the wish I have always felt that he would himself have un-

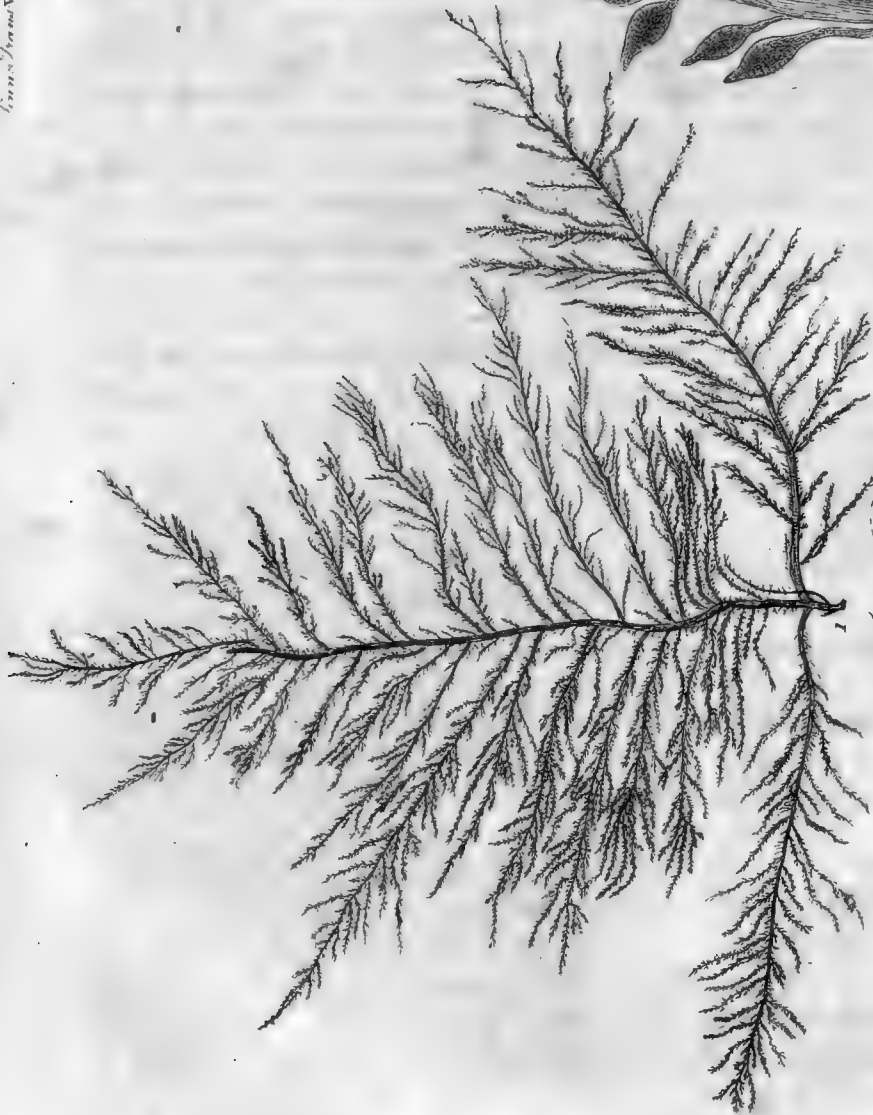
dertaken the description and determination of it. The fate of this elegant *Fucus* has been peculiarly unfortunate, and the endeavouring to point out its specific character is attended with singular difficulties; all authors upon the subject, with the exception of Mr. Lightfoot, to whom I presume it was not known when he wrote his *Flora*, having considered it only as a varying appearance of *F. kaliformis*, and purposely drawn up their description of that plant so as to include this species: a circumstance far from surprising, as they are gathered upon different shores, so that few botanists well acquainted with the one are likely to have seen the other in its place of growth: the *Fucus kaliformis* being principally, if not entirely, confined to the western shores of Great Britain, where I have no reason to believe that *F. clavellofus*, a native of the coast from Norfolk to Northumberland, ever makes its appearance. As, during the months of summer, this latter is far from uncommon upon the Yarmouth beach, I have had an opportunity of watching it for several years, in the course of which I never, at any period of its growth, remarked a tendency to assume the appearance of the former; but being acquainted with that species only from having seen a few dried specimens, I reserved my opinion till my tour into Cornwall in the summer of 1799 gave me an opportunity of examining it plentifully in a recent state, and satisfying myself that the plants are even more distinct when fresh than when expanded upon paper, and preserved in herbaria. The points of difference are of a nature to be far more easily understood by a comparison of specimens, than by any language it will be in my power to employ; the most striking of them depending upon the general habit, upon the greater size of *F. kaliformis*, and upon its branches, particularly the extreme ones, being verticillated, and at intervals so contracted as to give the whole plant a jointed appearance, very nearly resembling *F. articulatus*, from which in some battered specimens I

6

have



Ann. Bot. Soc. Lond. VI. tab. 10. p. 133.



Ficus Weyherii

have had a difficulty in distinguishing it. These marks, which are very obvious, will be altogether sufficient to enable any botanist to determine between the plants; but I extremely regret that, when I had an opportunity of examining *F. kaliformis* fresh, I omitted subjecting the capsules to a strong microscope, and seeing if the seeds, which to the naked eye and in a dry state appear round, be not in reality, as in *F. clavellus*, rather cordate. If they be not, and I wish those naturalists who have it in their power would attend to this circumstance, a sufficient and perhaps more satisfactory difference is at once established.

Fucus Wiggii.

F. fronde filiformi subgelatinosâ ramosissimâ; ramis ramulisque setaceis; fetis in filiculas lanceolatas mucronatas extensis.

TAB. X.

Fig. 1. Frons naturali magnitudine.

2. Ramuli particula lentè aucta.

Inter rejectamenta maris apud Yarmouth rarissimè lecta.

Radix, ut in plerisque huic proximis, callus minutus. Frons filiformis, teres crassitie fili emporetici minoris, vix spithamæa, ramosissima; rami sæpiùs alterni, ramulis ita cincti ut pinnati quodammodo appareant: omnes, tam maximi quàm minimi, fetis, ut ita dicam, cincti; quæ plerumque simplices, interdum autem sunt bifurcæ, interdumque, sed rarissimè, ita divisæ ut in ramulos novos transire videantur. Setæ hæ pedunculorum vice funguntur, filiculasque parvas, ovato-lanceolatas, feminibus repletas, in mucronem desinentes, ad extremitates ferunt. Semina saturatè rubra, minima, oculo nisi valdè armato, non discernenda. Pedunculi
 filiculis

filiculis duplò vel triplò longiores. Substantia e cartilaginco gelatinosa, lubrica. Color totius plantæ fusco-ruber.

A single specimen of this Fucus was found many years ago upon the Yarmouth beach by Mr. Wigg, to whose merit I feel a peculiar pleasure in paying what I consider the most public testimony in my power, by making it known to the botanical world under his name; and, as I think there cannot be the smallest doubt of its being totally distinct, not only from every English, but also from every other Fucus hitherto known, I trust that, however uncouth the appellation I have bestowed upon it, the Linnean Society will share my feelings, and nevertheless suffer it under that title to descend to posterity. Mr. Mason and myself have since gathered it, though neither of us more than one plant, nor do I know that it was ever seen in any other part of the kingdom. The place which naturally belongs to it in the British list is immediately between *F. pedunculatus* and *F. asparagoides*; but, as there is no fear of its being confounded with those or any other species, and as I have in my specific character included all the particulars respecting it with which I am acquainted, I shall add no more upon the subject, except that the pods containing the seeds seem to be, as in *F. sinuosus*, *laciniatus*, and many others, merely extensions of the frond, which, when their office is fulfilled, start forth into new branches.

X. Description of *Callicocca Ipecacuanha*.

By Felix Avellar Brotero, Professor of Botany in the University of
Coimbra, F.M. L.S.

Read February 3, 1801.

CALLICOCCA IPECACUANHA.

CALLICOCCA caule ascendente, suffruticoso, farmentoso; foliis ovato-lanceolatis, infernè subpubescentibus; capitulo terminali, pedunculato; involucro tetraphyllo, foliolis subcordatis; corollis quinquefidis.

Tapogomezæ specierum congener. *D. De la Marck. Illustr. Gen. Diæt. Bot.*

Ipecacuanha fusca. Pis. Bras. p. 101. It. Margr. Bras. p. 17.

Brasiliensibus aliis *Ipecacuanha*; aliis *Poaia do Matto*, in australioribus Brasiliæ locis; *Cipó* aliis, uti etiam Portugallensibus.

Pharm. *Ipecacuanhæ fuscæ f. brunæ Radix*, aut *Radix Brasiliensis f. antidyfenterica*.

Radix perennis, simplex aut subramosa, subteres, sæpius perpendicularis, rarò leviter obliqua; duas, tres, quatuorve uncias et ultra longa; supernè gracilior, crassitudine et similitudine caulis, sæpius hic illicve brevibus radiculis instructa (quarum una alterave interdum crassescit); infernè duas tresve lineas crassa, vagè flexa, extùs fusca, subannulata, annulis prominentibus, inæqualibus, subrugosis; sapore acri, amaro, odore vix ullo, nisi herbaceo. Dum

ficca, cortex crassa, dura, fragilis, extùs bruna, intùs albicans, gomoso-resinosa, filo percurfa lignoso, æquali, albo, ferè insipido, mucilagineo, a quo facilè in plures annulos fissa contiguos et inæquales, fissuris lævibus, separatur; sapore primùm farinaceo, postea subamaro, subacri, et semper minùs acri quàm in statu viridi, seu vivo; odore vix ullo, sed cum mortario contunditur, tenuis ejus pulvis subnaseoso nares odore afficit et usque ad sternutamentum stimulat.

Caulis suffruticosus, ex procumbenti erectus, ad basin, qua procumbit, interdum repens, teres, crassitudine pennæ gallinacæ, quinque ad novem uncias altus, infernè glaber, efoliatus, fuscus, nodosus (ubi a foliorum casu cicatrices), internodiis fursùm versùs apicem indies decrecentibus, ibique villosus, viridis, foliatus, in primis plantæ annis simplicissimus aut simplex, postea farmentosus, farmentis perpauca efoliatis, subtortuosis, procumbentibus, plùs minùsve dodrantalibus, nodosis, ad nodos vagè radicanibus, ibique unum alterumve novum caulem, a primo aut alio semipedem et ultra distitum, producentibus.

Folia inferiora caduca, ita ut in plantæ florescentia 4, 6, aut 8 solùm, rarissimè plura, ad apicem caulis persistant; opposita, patentia, ovato-lanceolata, nonnulla interdum ferè obovata, tres ad quatuor uncias longa, unam ad duas ferè lata, integerrima; supernè saturatè viridia, punctis scabriusculis aspersa, glabra, rarò vagè subpubescentia; subtùs ex viridi-albida, subpubescentia, costâ parùm elevatâ, venis lateralibus alternis, subparallelis, ad apicem curvatis: petiolus folii laminâ brevior, 2, 3-ve lineas longus, canaliculatus, subvillosus.

Stipulæ geminæ, laterifoliæ, appressæ, sessiles, sublineares, partito-fimbriatæ, lacinulis subulatis, petiolis leviter adnatæ, illorum longitudine aut vix longiores, cum ipsis caulem subvaginantes, marcescentes.

Flores aggregati in capitulum solitarium, subnutans, caulem terminans, pedunculatum; pedunculo tereti, pubescenti, petiolis longiore, plus minusve semiunciam alto: flosculi sessiles, 15 ad 24, bracteolis distincti; bracteolæ involucri et flosculorum longitudine, pubescentes, integerrimæ, sessiles, virides, formâ sæpe variantes, nunc subovatæ oblongiusculæ, nunc lanceolatæ obtusiusculæ, nunc (quod rarius) formâ et magnitudine involucri foliolis similes, et tunc flosculi ipsis numerosiores.

Involucrum tetraphyllum; folioli subcordati, acuti, integerrimi, subsessiles, leviter undati, hirsuti; duo externi majores, omnes flosculis paulò longiores.

Cal. Perianthium membranaceum, albidum, brevissimum, quinque-dentatum, dentibus obtusis, superum, persistens.

Cor. monopetala: tubus cylindraceus, longus, suprâ parùm ampliatus, fauce et extùs lanuginosus; limbus tubo brevior, quinquefidus, laciniis ovatis, acutis, recurvis.

Stam. Filamenta quinque, capillaria, brevia, supernè tubo inserta. Antheræ oblongæ, lineares, erectæ, exsertæ.

Pist. ovatum, inferum, non angulatum. Stylus filiformis, longitudine tubi corollæ; margine nectarifero brevi ad basin cinctus. Stigmata duo, oblonga, crassiuscula, obtusa, antherarum longitudine.

Peric. Baccâ unilocularis, disperma, ex ovali-subrotunda, nec fulcata, nec angulosa, sed lævis, calyce coronata, ex rubro-purpurascens, mollis, demùm corrugata, nigricans: Quæ immaturæ decidunt, siccanturque, sunt ovales, utrinque (quâ semina internè planâ facie continguntur) unifulcatæ.

Semina duo, elliptica, lævia, leviter torta, arillo nullo; hinc plana, lineâ parùm elevatâ mediâ longitudinali notata, inde convexa, ad

apicem unifulcata. Testa lignea, fordidè albida; integumentum internum membranaceum, tenuissimum, testæ arctè adnatum: albumen testæ cavitati respondens, convexo-planum, cartilagineum, durum, ex fusco-fulvum, hinc ad faciem planam sulco longitudinali exaratum, inde læve; embryo dicotyledoneus, albumine brevior, erectus, dorsalis.

Habitat in solo umbroso humosoque sylvarum, in Pernambuquiã, Bahiã, Riojanæriã, Paulensîã, Marianniã, aliisque Brasiliæ provinciis.

Floret Nov. Dec. Jan.; nec non Februario aut Martio; baccæ Maio maturefcunt.

Radicis vires medicæ fat cognitæ.

Hæc omnia non plùs ex meis observationibus in plantis ficcis mihi missis, quàm ex aliis in plantis vivis in Brasiliã iterùm atque iterùm factis a D. Bernard. Bnt. Gomes, Botanicæ Medicæ diligentissimo, et mecum benignè communicatis, teneo.

EXPLICATIO TAB. XI.

Fig. A, B. Caules duo ex farmento orti.

C. Sarmentum unum.

D, E. Duæ radices.

1. Una stipula cum duobus petiolis; in uno folii basis adest.

2, 3. Duo foliola involucris, unum ex majoribus, aliud ex minoribus.

4, 5. Bracteolæ interflorales.

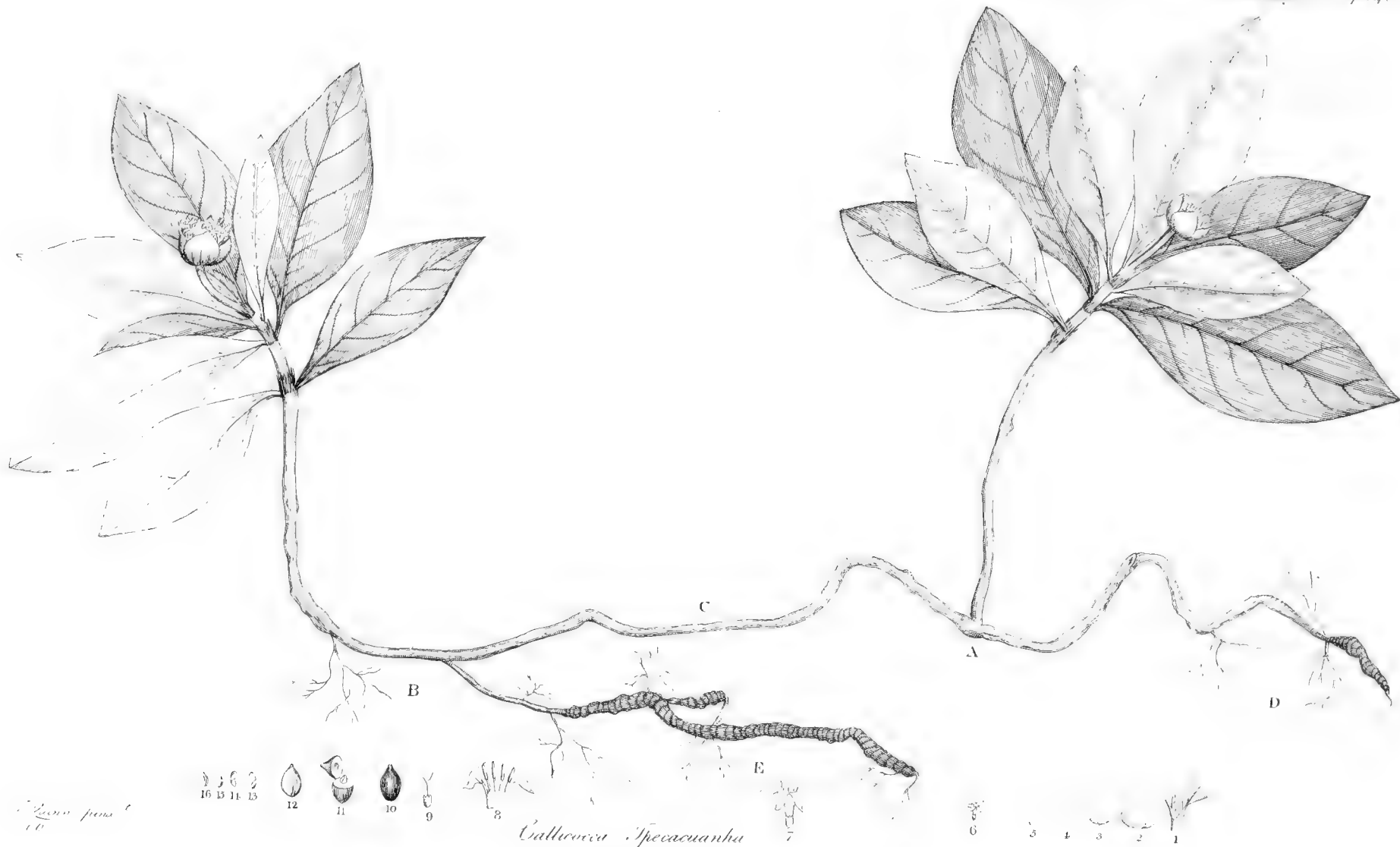
6. Corolla magnitudine naturali, germini imposita.

7. Eadem lente aucta, uti et calyx et germen inferum.

8. Eadem scissa et aperta ut videantur antheræ.

9. Germen, calyx, stylus et stigmata, lente aucta.





Calliandra speciosa
10

Calliandra speciosa

16 15 11 13

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Fig. 10. Bacca magnitudine naturali.

11. Eadem transversè secta, ut locus et femina duo videantur.

12. Bacca immatura utrinque unifulcata.

13, 14. Semina leviter torta, magnitudine naturali, sed hinc plus torta quam in naturali statu, pictoris negligentia.

15, 16. Nucleus feminis, avulsâ testâ.

XI. *Observations on the Curculio Trifolii, or Clover Weevil, a small Insect which infests the Heads of the cultivated Clover, and destroys the Seed. In a Letter to Thomas Marsham, Esq. Tr. L. S. by William Markwick, Esq. F. L. S. With additional Remarks by Mr. Marsham.*

Read February 3, 1801.

DEAR SIR,

THE very polite and obliging attention so frequently shown by you to my trifles in Natural History, encourages me to trouble you with this letter, to be laid, if you think proper, before the Linnean Society; and should they discover in it any thing that at all tends to improve the science, or that may be in any other respect useful, I shall feel myself highly gratified.

Having ordered a field of clover, consisting of about eight acres, to be sowed for seed, my servant, on the 9th of August last, asked me whether I chose to save the whole field for that purpose, saying that he had examined several of the heads, and found the maggot in them. On this information I was induced to order only a part of the field to be sowed for seed, and the rest to be mowed for hay. Soon after, I went myself to examine the state of the clover, and found in many of the heads several small white maggots or larvæ, invariably placed on the outside of the base beneath the individual calyx of each floret, eating through the bottom, and thereby destroying the germen or rudiment of the future seed. Each of these larvæ appeared to be exactly similar in shape and colour (only much smaller) to the nut maggot, having a white body, black head,
and,

and, as I at first imagined, no legs; but I have since discovered, on a closer inspection assisted by glasses, near the head, three small white scales or prominences on each side, which I suppose may supply the place of legs, in this minute insect. See TAB.V. fig. a. A. I traced it through its chrysalis to its imago or perfect state, in the following manner. Having placed a number of the blighted heads of the clover in a box, which was carefully covered with gauze to prevent any insect from getting either in or out, I found, on opening the box on the 19th of the same month, a great number of small blackish weevils running about in it, and on inspection discovered many of their chrysalids, sticking to the stem at the base of the individual floret, exactly in the same situation as I had before found the larvæ; nay, I even saw one or two of these weevils crawl out from their chrysalids.

Under these circumstances there can be no doubt that the before-mentioned larva changes to a small white chrysalis, which differs but little from it, except in being egg-shaped and motionless; and this produces a small blackish weevil with a long beak, whitish belly, and yellow legs.

With regard to the quantity of damage done by this little destructive insect, I know of no better way of ascertaining it, than by taking a comparative view of two of my crops, which grew in two fields adjoining to each other, and which appeared to be equally good with respect to the growth of the plants, but very different in the produce of seed: this will leave but little doubt that the deficiency of this year's crop has been occasioned by the devastations of these insects, which abounded in an astonishing degree. This I shall do with as much accuracy as I can.

In the year 1798 I grew on nine acres of ground (just double the quantity that was sowed for seed this year) either thirty-three or thirty-four bushels and a half of clover seed, of which twenty-eight

bushels and a half were sold for fifty shillings per bushel, and the rest, amounting to either five or six bushels (I am not quite certain which), was kept for my own use; so that, taking it at the lowest, the statement will stand thus:

	Bushels.		£.	s.	d.	
In 1798 four acres and a half, } being half of the crop,	} produced 16 $\frac{3}{4}$	}	}	}	}	
This year (1800) the same quantity of ground produced only						- - 7 $\frac{1}{2}$
				18	15	0
	Deficient	9 $\frac{1}{4}$	worth	23	2	6

Thus it appears that the loss on this year's crop is very great, occasioned, most probably, by the depredations of this insect; and besides, what seed I have is of an inferior quality.

The species of clover sown in both these fields was the common purple or honey-suckle clover, which I take to be no other than the *Trifolium pratense* of Linné improved by culture.

I am, &c.

REFERENCES TO THE FIGURES.

- TAB. V. Fig. a. The larva of the natural size.
 A. The same magnified.
 b. The chrysalis of the natural size.
 B. The same magnified.
 c. The weevil of the natural size.
 C. The same magnified.
 d. The individual calyx with the larva eating through its bottom, magnified.

The foregoing observations of Mr. Markwick furnish another instance of the destructive property of insects to the agriculture of this country, prove the necessity, particularly at this time, of a minute investigation into the causes of the failure of crops, and fully evinces that the practical entomologist is a valuable member of society; as, by discovering the œconomy and perfect history of these minute destroyers, and ascertaining, as much as possible, the injury they do, we may either be enabled to discover a remedy to the evil, or to dissipate our fears when we perceive, as in the case of the wheat insect so fully described by this gentleman and Mr. Kirby, that Providence has set bounds to their mischief, and provided a suitable check to prevent its increase. The insect here mentioned has been described by several authors, some of whom have given a figure of it; but they all appear to have been unacquainted with its history except the great Linné, for it is without doubt the *Curculio Trifolii* of that celebrated naturalist, and described by him in the *Appendix Animalium, Syst. Nat.* vol. iii. p. 224. where he says, "*Habitat in Trifolii montani spicis, intra quas declaratur.*" It is also, I presume, the *Curculio flavipes* of Fabricius, *Systema Entomologiæ*, p. 133, n. 33, and of Paykul's Monograph, n. 135; but they only observe, "*Habitat frequens primo vere locis apricis calidioribus.*" Geoffroy calls it *le Becmare noire à pattes fauves*, in his *Histoire Abrégée des Insectes*, tom. i. p. 272, n. 8. and adds to the description "*On le trouve sur les fleurs.*" Fabricius in his *Entomologia Systematica emendata* has removed it from the genus *Curculio*, and attached it to that of *Attelabus*, in which he has been followed by Panzer in his *Entomologia Germanica*, p. 298, n. 22, and *Fauna Germanica* 20, tab. 13, but I think without reason, and they add nothing to its history. The latter author says "*Habitat in salice, populo, primo vere;*" but taking the *Habitat* merely from the plants on which insects are found, without further examination, must frequently lead to error. I had examined this insect in its per-

fect state very minutely, and have described it in my manuscript as follows:

CURCULIO *Trifolii*. Cur. ater, rostro porrecto, pedibus ferrugineis:
plantis nigris.

Long. corp. $1\frac{1}{2}$ lin.

Habitat in Trifolio.

DESCRIP. Corpus atrum. Rostrum thorace paulo longius. Antennæ piceæ. Thorax punctulatus. Elytra striata. Pedes ferruginei, plantis semper nigris; est ubi tibiis nigris variat. Abdomen niveum.

T. M.

XII. *Further Observations on the Curculio Trifolii. In a Letter to William Markwick, Esq. F.L.S. by Martin Christian Gottlieb Lebmann, M.A. of Gottingen.*

Read February 3, 1801.

SIR,

WHEN you favoured me, last summer, with an account of the damage done to your clover by a number of little maggots, and permitted me to gather some of the injured flower-heads, I felt interested in the cause, and became anxious to observe the œconomy and changes of this little destructive animal, and by my observations, in addition to those which you had sent to the Linnean Society, to endeavour to complete the history of an enemy you had so unfortunately become acquainted with.

As far as my limited knowledge in the science of entomology extends, nothing appears to have been hitherto published of the nature and habits of this insect. The French naturalist Geoffroy, who first described the perfect animal, says it is found on flowers, and calls it *le Becmare noir à pattes fauves*, but takes no notice of its larva. Fabricius describes it as an *Attelabus*, and observes "*Habitat primo vere frequens locis apricis calidioribus*;" which perfectly agrees with my own observation, for it was the first insect I found last spring in a sunny meadow near a shrubbery.

The blighted clover heads which I gathered in your grounds in August were, like all the rest in the field, full of maggots of different

sizes, which of course passed into their perfect state at different periods from the middle of August until the end of September.

I preserved half a dozen of them in a flower-pot covered with gauze, in which I had previously sown some turnip seed. They fed a little upon the cotyledons of this plant, but seemed not inclined to perform that duty which nature has imposed on them in their perfect state. On the contrary, they soon retired to a secret corner of their prison *above* the earth, where they remained in a quiescent state; and, after the first cold nights in October, appeared as if dead, but soon revived upon being brought into my warm study.

Few as these observations may appear, yet, added to your interesting discovery, they may form an outline of the history of this little animal, which further and more accurate observations may complete.

Hatched between the calyces of the *Trifolium pratense*, the maggot penetrates with its head into the rudiments of the first seed, as yet in a liquid state, and then proceeds to another more advanced and suitable to its increased strength. Having consumed 3 or 4 of them, it remains in the place of the last, where it is sufficiently sheltered, and changes like other weevils into the pupa or chrysalis state, through the transparent skin of which an experienced eye may trace the different limbs of the future animal. After a few days the insect comes forth in its imago or perfect state, at first soft and white, but soon changing to a shining black colour, except the tibiae and first joint of the antennæ, which remain yellow.

Having taken a short meal, it slowly conceals itself in the small holes of fences, or in the bark of trees, where it reposes during the winter, if sufficiently protected from its numerous enemies. Few however, happily, survive; for it appears impossible that many should escape the vigilance and dexterity of the wren, the redbreast, the nun,

nun, and other birds of the titmouse kind (*Motacilla, Pari.*). Such as escape their bills are among the first partakers of the universal life which nature excites in the spring. Last year they appeared in Suffex in the month of March, and, in addition to their numerous persecutors, the *Staphylini* were then particularly formidable to them.

Surrounded by so many dangers, while feeding on the tender leaves of plants, they are employed in seeking their consorts, until the heads of clover and perhaps other papilionaceous flowers break out, when the female deposits on the cup of the swelling seed the egg that produces its destroyer.

The fecundity of this little insect is so prodigious, that the maggots destroyed a whole field which the year before, when not a single insect of this kind was discovered, produced 70 pounds of seed. There is reason to believe, however, that the parents of those millions were then in your grounds, as, the animal being not only destitute of wings but also very slow in its motion, it is not probable that it could have overrun your field to such a degree from a distance in the course of one season.

In the history of this, as in almost that of every other insect, if observed with attention, the œconomy of nature appears wonderful. This little insect seems designed to prevent the boundless increase of the trefoil, and is itself circumscribed in its numbers by numerous enemies constantly on the watch to devour it. The female of this insect could never lay a great number of eggs if she had to search for flowers sparingly spread over a large field, as she would in that case infallibly become a prey to some of her enemies; whereas in the clover field, where flower presses upon flower, she may lay ten thousand in secret.

The wolf is extirpated in these islands, formerly its abode. Insects not less formidable and destructive are yet unsubdued. Our cattle, our
fields

fields, our granaries, &c. often bear witness to this truth. The same spirit which made us masters of the creation is still necessary to preserve the government. Our knowledge must keep pace with our desires, and men in general will soon be compelled by necessity to the universal pursuit of a science to which a philosophic mind needs no such incentive.

November 28, 1800.





XIII. *Description of Brotera persica and Mustelia eupatoria, two new Plants cultivated in the Botanic Garden of Halle, by Curt Sprengel, M.D. Professor of Botany in the University of Halle.*

Read March 3, 1801.

BROTERA PERSICA.

TAB. XII.

CLASSI XIV. adnumeranda.

Charaëter essentialis genericus.

LABII inferioris lacinia media cucullata, involvens genitalia, eaque cum impetu protrudens.

DESCRIPTIO.—*Herba* quadripedalis, caule ramisque tetragonis, axillis (fig. a.) barbatis.

Folia opposita, subsecunda, petiolata, ovata, ferrata, scabriuscula.

Infloresc. Cymata axillaris pedunculata. (fig. b. b.)

Cal. quinquearistatus, pubescens. (fig. c. c.)

Corolla minuta, calyce vix longior, ringens (fig. d.): labium superius bipartitum: (1.) inferius tripartitum, lacinia media (3.) cucullata, antheras cum stylo occultans, donec externus stimulus accedat, qui ilico deprimit cucullum, ut antheræ erectæ prodeant

prodeant. Corolla pallida, lutescit ad faucem cuculli: ipse cucullus rufus est.

Stamina pilosa. *Antheræ* luteæ. (fig. e.)

Stylus violaceus. *Stigma* capitatum. (fig. f.)

Semina quatuor oblonga nuda in fundo calycis. (fig. g.)

In honorem summi botanici Felicis Avellar Brotero, Prof. Conimbricensis, id genus dixi. Accepi autem femina ab amico *Thouino* e museo naturali Parisino, quo apportata sunt ab *Oliverio* et *Bruguerio* e Persia.

MUSTELIA EUPATORIA.

TAB. XIII.

CLASSI XIX. adnumeranda.

Charaeter essentialis genericus.

Anthodium simplex polyphyllum. *Rec.* nudum. *Papp.* duplex, paleaceus & quinquearistatus. *Corollulæ* quinquefidæ.

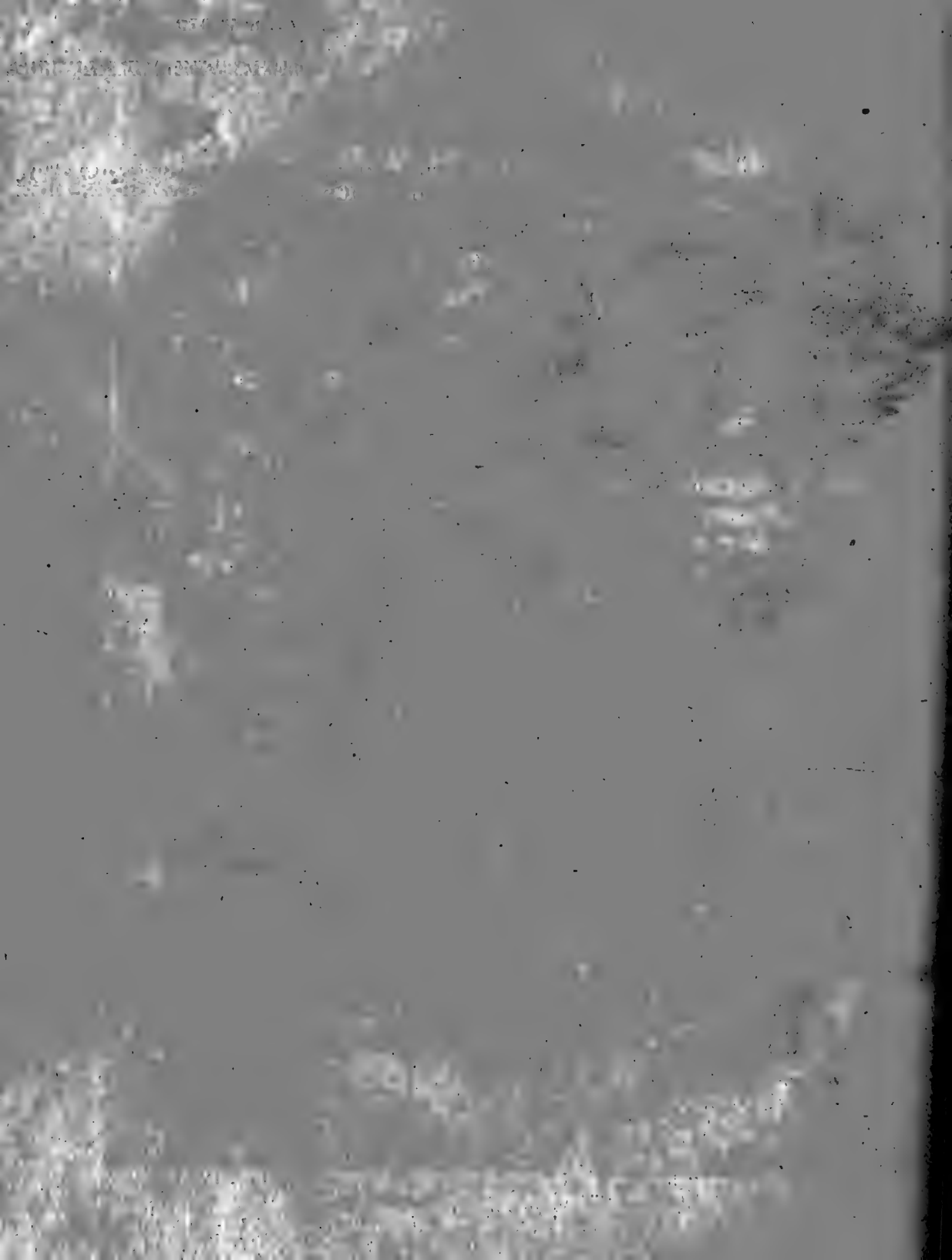
DESCRIPTIO.—*Herba* bipedalis: caule inclinato, recurvato.

Folia opposita, fasciculata, oblonga, apice denticulata, lucida, punctata, trinervia.

Inflor. in corymbis, quorum medius primo floret, lateralibus elongatis serius florescentibus.

Anthodium constanter quinqueflorum; polyphyllum, æquale. (fig. a.)





Corollulæ quinquefidæ, quinæ. (fig. b.)

Stigmata longissima. (fig. e. e.)

Pappus duplex, paleaceus alter externus, internus alter quinque-
aristatus. (fig. c.)

His potissimum notis abunde distinguitur ab *Agerato* et *Eupatorio*, cum quibus alioquin germanitatem quamdam naturalem habet.

Dixi in honorem eximii phytologi, *Mustelii*, cujus *Essai sur la Végétation* insignia addidit incrementa doctrinæ de fabrica plantarum & de usu partium.

XIV. *Observations on the Hinges of British Bivalve Shells.*

By Mr. William Wood, F.L.S.

Read January 6, 1801.

AMONG the many authors who have either noticed shells in their works on Natural History, or have written professedly on the subject, it is rather extraordinary that no particular attention should have been hitherto paid to their hinges; more especially as they afford the leading characters by which shells are arranged.

Da Costa, indeed, in his *Elements of Conchology*, has figured the hinges of the several genera of bivalves; but many of them are not calculated to give a clear idea of the parts which they are intended to represent: besides, he has confined himself to one species in a genus, which is by no means sufficient, inasmuch as many of the hinges of the same genus of shells differ materially from one another in their specific characters.

Figures on this subject have been given also in the last volume of the *Amenitates Academicæ*; but these are more calculated to mislead than to instruct. The consideration that something of this kind, executed in a more accurate and comprehensive manner than has hitherto been done, is still a desideratum among conchologists, has induced me to attempt the following observations, which I lay before the Society with all diffidence, conscious that they are far from being faultless, and that some shells are omitted which may,

for any thing I know to the contrary, exhibit peculiarities in the formation of their hinges, not to be found in this paper. Perhaps what is already finished may excite some more able member of this Society, whose cabinet is more extensive, to complete the subject.

I am indebted to the accurate pencil of my friend Mr. Henry Boys for the *Solen pellucidus*, *Tellina bimaculata*, *Venus Chione*, and *Venus undata*. My acknowledgments must likewise be made to his most respectable father, William Boys, Esq. for the ready access which I have at all times had to his collection.

In the course of the following remarks, it will be noticed, that several shells are totally neglected, which are too common to be wanting even in a very confined collection. To account for this, it will be necessary to mention all the shells belonging to the British series of bivalves which have not been inserted, and to give a sufficient reason for their omission.

Of the genus *Mya*, all have been figured, except the *M. dubia* of Mr. Pennant, which at present I have not in my collection.

Of the *Solenes*, I have neither the *Legumen* nor *Cultellus*. But their loss is of little consequence, as the teeth of the former (according to Mr. Pennant) exactly resemble those of the *S. pellucidus*; whilst the latter, having a single tooth on both sides of the hinge, will probably not differ materially from the *Vagina*. The hinge of the *S. Ensis* agrees exactly with that of the *Siliqua*.

Among the *Tellinæ*, the *T. fragilis* is unknown to me. The *T. trifasciata*, *cornubiensis*, and *donacina*, are wanting, and the hinge of the *Fabula* is like the *planata*.

There is too great a similarity in the hinges of the species belonging to the genus *Cardium*, to make more than one figure necessary.

Excepting the two lateral teeth of the *Mastra solida*, no essential

difference is to be perceived between the hinge of that shell and of the *M. lustraria*. I have therefore omitted it, in order that the number of figures might not be unnecessarily increased.

Of the two species of *Donax*, described by British conchologists, the *Trunculus* only is in my possession; but it is more than probable, from the resemblance these two shells bear to each other, that their hinges are not very dissimilar.

I have never seen the *Venus deflorata*, described and figured by Mr. Pennant in the *British Zoology*. The *V. sinuosa* and *ovata* are not among my shells; and the hinge of the *V. rotundata* is too like the *decussata* to need a description. The hinge of the *V. borealis* will be found, upon comparison, to resemble exactly that of the *Maetra alba*; therefore it would be placed with more propriety in that genus. The *Donax Irus* ought at the same time to be removed into the third division of the genus *Venus*, where the contour of the shell, as well as the formation of the hinge, will point out its proper situation.

In the genus *Arca*, it was thought unnecessary to give a figure of the *laetea*, after exhibiting the striking difference between the hinge of the *A. Nucleus* and *Glycymeris*.

Of the genus *Pecten*, *Ostrea*, *Anomia*, and *Mytilus*, it is sufficient to say, that a specimen has been given from each, as the species are, for the most part, destitute of teeth, and the shells merely united by cartilage.

MYA.

truncata. Linn. *Syst. Nat. ed. Gmel.* 1. p. 3217. Penn. Br. Zool. No. 14. t. 41. f. 14. Da Cost. Br. Conch. p. 233. t. 16. f. 1. 1.—Elem. Conch. t. 7. f. 16. List. Conch. 4. 428. f. 269.—Hist. An. Ang. t. 5. f. 36. Gault. Test. 1. 91. f. D. Chemn. Conch. 6. t. 1. f. 1, 2.

TAB.

TAB. XIV. Fig. 1, 2.

A thick, broad, upright, striated tooth in the upper valve*; in the lower valve, a deep, spoon-shaped hollow, with a small tooth on one side, and a sharp ridge on the other, running from the beak towards the truncated end.

Lister, in his *Historia Animalium Angliæ*, has figured the lower valve of this shell; but has totally mistaken the form of the tooth.

Da Costa, in his *British Conchology*, and likewise in his *Elements*, has succeeded better, although his figures are by no means perfect.

arenaria.

Linn. Syst. Nat. ed. Gmel. 1. p. 3218. Penn. Br. Zool. No. 16. t. 42. f. 16. List. Conch. t. 418. f. 262.—Bast. Opusc. subj. 2. p. 69. t. 7. f. 2, 3. Argenv. Zoom. t. 5. f. 10.

TAB. XIV. Fig. 3, 4.

Hinge with an upright, fan-shaped tooth; on the side, a ridge deeply sulcated; lower valve like the preceding, except the side tooth, which is scarcely to be distinguished.

Mr. Pennant has given a very good figure of the tooth in the upper valve of this shell, and of the *M. truncata*.

* For the sake of perspicuity, in the description of the Hinge, I have called that the upper valve which contains the great tooth.

margaritifera.

margaritifera. *Linn. Syst. Nat. ed. Gmel.* 1. p. 3219. *Penn. Br. Zool.* No. 18. t. 43. f. 18. *Da Cost. Conch.* t. 15. f. 15. *List. Conch.* t. 149. f. 4.—*An. Ang. App.* 15. t. 1. f. 1. *Chemn. Conch.* 6. t. 1. f. 5. *Gault. Test.* t. 102. f. C. *Klein. Ostr.* t. 10. f. 47. *Knorr. Vergn.* 4. t. 25. f. 2.

TAB. XIV. Fig. 5, 6.

The hinge of this shell is very thick and rugged; the tooth in the upper valve blunt, and uneven at the top. On one side there is a fulcus, which receives a small tooth from the opposite valve, at the same time that the large one fits into a corresponding depression.

This, with the following shell, completes Da Costa's genus of *Mya*. The two former he has placed among the *Chamæ*.

piclorum. *Linn. Syst. Nat. ed. Gmel.* 3218. *Penn. Br. Zool.* No. 17. t. 43. f. 17. *Da Cost. Br. Conch.* p. 228. t. 15. f. 4. 4.—*Elem. Conch.* t. 7. f. 12. *List. Conch.* t. 147. f. 2, 3.—*An. Ang.* t. 2. f. 30. *App.* t. 1. f. 4. *Chemn. Conch.* 6. t. 1. f. 6. *Argenv. Conch.* t. 27. f. 10.—*Zoom.* t. 8. f. 11.

TAB. XIV. Fig. 7, 8.

In the hinge of the *M. piclorum* we meet with an arrangement of teeth different from any other of the British species of this genus.

Near the beak are situated two upright teeth, one in each valve. The largest of the two is serrated.—There are likewise three remote teeth, two in one shell,

shell, and one in the other. Both Da Costa and Pennant have figured the inside of this shell, without paying any attention to the teeth. Dr. Lister, however, thought their arrangement too curious to be passed unnoticed. He has therefore engraved them in his *Hist. Conchyliorum*, and also in his *Hist. An. Ang.*

SOLENS.

Siliqua.

Linn. Syst. Nat. ed. Gmel. 1. p. 3223. Penn. Br. Zool. No. 20. t. 45. f. 20. Da Cost. Br. Conch. p. 285. t. 17. f. 5.—Elem. Conch. t. 7. f. 8. List. Conch. t. 409. f. 255.—An. Ang. t. 5. f. 37. Chemn. Conch. 6. t. 4. f. 29. Gault. Test. t. 95. f. C. D. E. Knorr. Vergn. 6. t. 1. f. 1.

TAB. XIV. Fig. 9.

The hinge of the *Solen Siliqua* is furnished with three teeth; two thick ones in one valve receiving a lamina between them from the other. An edged production from the teeth is continued down about the third of an inch on each side of the hinge, where it terminates inwards in a rounded shape.

Da Costa, in his *Br. Conch.* has described the *Solen Siliqua*, but figured the *S. incurvatus* of Dr. Solander. Gmelin also has fallen into much the same error, by quoting Lister, *Hist. Conch. t. 413*. A note of interrogation, indeed, is very properly added, but no reference is made to t. 409, f. 255, which is an exact copy of the true figure of the *S. Siliqua*, in the *Hist. An. Ang.*

The hinge in the two shells is the same.

Vagina.

Vagina.

*Linn. Syst. Nat. ed. Gmel. I. p. 3223. List. Conch. t. 410.
f. 256. Argenv. Conch. t. 24. f. K. L. M. Zoom. t. 6.
f. G. H. Knorr. Vergn. I. t. 28. f. 3.*

TAB. XIV. Fig. 10.

Hinge with a single tooth in each valve. A continuation of the inner edge of the shell forms the upper tooth. The lower one is fixed upon a base, which is situated obliquely.

The surface of both is flat.

pellucidus.

Penn. Br. Zool. No. 23. t. 46. f. 23.

TAB. XIV. Fig. 11.

The hinge of this very delicate shell is furnished with five small, pointed teeth, three of which are situated in one valve, and two in the other. It must be remarked, that the central one of the three is bifurcated.

This shell has hitherto, I believe, escaped the notice of every author, except Pennant; who informs us that it inhabits the Red Wharf, Anglesea. We find it, though very rarely, in the muddy part of the Sandwich shore, towards the mouth of the haven. A few specimens have lately been dredged up at Folkestone.

TELLINA.

planata.

*Linn. Syst. Nat. ed. Gmel. I. p. 3232. Penn. Br. Zool.
No. 29. t. 48. f. 29. List. Conch. t. 405. f. 251. Gault.
Test. t. 77. f. M.*

TAB.

TAB. XV. Fig. 1—4.

One valve of the *T. planata* contains three teeth; two near the beak, and one rather remote.

The other valve has only two, and the largest is divided longitudinally.

incarnata. Linn. Syst. Nat. ed. Gmel. 1. p. 3234. Penn. Br. Zool. No. 32. t. 49. f. 32. 32. List. Conch. t. 405. f. 250. —An. Ang. t. 4. f. 25. Da Cost. Br. Conch. p. 211. t. 12. f. 4. 4. 4. Gault. Test. t. 88. f. M.

TAB. XV. Fig. 5—8.

This shell has two teeth close to the beak in each valve, one of which is fulcated. There are no remote teeth.

Mr. Pennant has called this shell *carnaria*. I believe his *T. incarnata* to be the *T. radiata* of Linnæus.

cornea. Linn. Syst. Nat. ed. Gmel. 1. p. 3242. Penn. Br. Zool. No. 36. t. 49. f. 36. Da Cost. Br. Conch. p. 173. t. 13. fig. 2. 2. List. Conch. t. 159. f. 14. —An. Ang. t. 2. f. 31. App. 22. t. 1. f. 5. Gault. Test. t. 7. f. B. C. Chemn. Conch. 6. t. 13. f. 133. a. b.

TAB. XV. Fig. 9—12.

In the *T. cornea* we find four teeth in each valve. The two remotely situated are of a considerable size; but those placed more immediately under the beak are so minute, that they are hardly to be distinguished without a magnifying glass, even in the large Thames specimens.

If the principal generic character of a shell rest upon the formation of the hinge, it will, perhaps, be difficult to find a proper place for the *T. cornea*. The central teeth do not perfectly agree with the character of a *Tellina*; and the remote teeth differ so evidently, that Da Costa has removed this shell into the next genus, where we find it under the name of *Cardium Nux*.

rivalis. *Maton in the Linn. Transf. v. 3. p. 44. t. 13. f. 37, 38.*

TAB. XV. Fig. 13—16.

The hinge of this shell is formed of four teeth in each valve, two at the beak and two remote. The two near the beak in one valve unite to form a small arch. One of the teeth in the other valve is double.

T. rivalis is ably described, and well figured, in the Transactions of this Society, where the difference between it and the *T. cornea* is sufficiently pointed out.

bimaculata. *Linn. Syst. Nat. ed. Gmel. 1. p. 3240. Da Cost. Br. Conch. p. 213. Chemn. Conch. 6. t. 13. f. 127.*

TAB. XV. Fig. 17, 18, 19.

The figure of this shell was sent to me, unaccompanied by a description. There appears to be a thick tooth in the centre of the hinge of one valve; and a cavity, probably for its reception, between two teeth, in the opposite.

fervensis.

servensis. Linn. Syst. Nat. ed. Gmel. 1. p. 3235. List. Conch. t. 394. f. 241.

TAB. XV. Fig. 20, 21.

This hinge, in one valve, has a single upright tooth, situated by the side of a slight depression, which is divided in the middle by a small ridge. The lower valve has likewise an erect tooth, which is notched. The shape of this shell approaches so nearly to the *T. radiata*, that I imagine the hinge in both will be found the same. At present I have not an opportunity of comparing them.

CARDIUM.

aculeatum. Linn. Syst. Nat. ed. Gmel. 1. p. 3247. Penn. Br. Zool. No. 37. t. 50. f. 37. Da Cost. Elem. of Conch. t. 1. f. 8. List. Conch. t. 321. f. 128. Gault. Test. t. 72. f. A. Chemn. Conch. 6. t. 15. f. 155—157.

TAB. XVI. Fig. 1, 2.

The character of the hinge in this shell is so strongly marked, and so exactly resembles the other species, that one figure will suffice for the whole genus. No other description is necessary than what may be found in the explanation of the plates.

MACTRA.

lutraria. Linn. Syst. Nat. ed. Gmel. 1. p. 3259. Penn. Br. Zool. No. 44. t. 52. f. 44. List. Conch. t. 415. f. 259.—An. Ang. t. 4. f. 19. Rumph. Mus. t. 45. f. M. Chemn. Conch. 6. t. 24. f. 240, 241.

TAB. XVI. Fig. 3, 4.

The valves of this shell are firmly connected together, by a quantity of cartilage seated in two spoon-shaped cavities. On the side of one of the cavities, in the upper valve, there is a very strong tooth, the two plates of which form an obtuse angle, and the whole is received between two teeth in the opposite valve.

Da Costa, when he wrote his *British Conchology*, was not aware that this shell formed a distinct species from the following; he has therefore described and figured the *M. bians* α under the name of *Chama magna*, while his Synonyms direct the reader to the *M. lutraria*.

bians.

Da Cost. Br. Conch. p. 231. t. 17. f. 4.

TAB. XVI. Fig. 5, 6.

The great cavity in the hinge of this species is larger, more spread, but not so regularly shaped as in the preceding. The great tooth in the upper valve locks, like that in the *M. lutraria*, between two teeth in the lower valve, of which the outer one, in the specimen before me, is grooved longitudinally, and, when the shell is closed, fits into a small cavity on the outside of the tooth in the upper valve. It should likewise be noted, that there is in both valves a deep, narrow fulcus, which runs from the beak of the shell across the base of the great cavity, and close on the inside of the teeth.

Aultorum.

stultorum. Linn. Syst. Nat. ed. Gmel. 1. p. 3258. Penn. Br. Zool. No. 30. t. 49. f. 30. Da. Cost. Br. Conch. p. 196. t. 12. f. 3. 3. List. Conch. t. 251. f. 85. Gault. Test. t. 71. f. C. Chemn. Conch. 6. t. 23. f. 224—227.

TAB. XVI. Fig. 7, 8.

There is an erect tooth in the upper valve of this shell, near the beak, somewhat similar in shape to the great one in the *M. lutraria*. This fits within a rectangular tooth in the lower valve, which likewise contains four remote teeth, like laminæ, receiving between them two from the upper valve.

I have referred for this shell to Mr. Pennant's *Tellina radiata*, as both his description and figure agree exactly with the Linnean *M. stultorum*. His shell of that name (No. 42. t. 52. f. 42.) is, perhaps, only a young one of the *M. solida*.

alba.

TAB. XVI. Fig. 9—12.

I believe we are indebted for the discovery of this shell to that accurate conchologist, William Boys, Esq. who found it on the Sandwich shore, where I have since met with it in abundance.

The hinge has the true spoon-shaped cavity peculiar to the genus *Mastra*, with a small tooth situated close to it in the upper valve, which has no remote teeth. The lower valve is provided with two.

DONAX.

trunculus. Linn. Syst. Nat. ed. Gmel. 1. p. 3263. Penn. Br. Zool. No. 45. t. 55. f. 45. Da. Cost. Br. Conch. p. 207. t. 14.

t. 14. *fig.* 3. *List. Conch.* *t.* 376. *f.* 217.—*An. Ang.*
t. 5. *f.* 35. *Borlase Cornw.* *p.* 278. *t.* 28. *f.* 25.
Chemn. Conch. 6. *t.* 26. *f.* 253, 254.

TAB. XVI. Fig. 13—16.

Hinge with a thick furrowed tooth in one valve, received between two others in the opposite. A single marginal tooth in each valve, at a little distance from the beak.

VENUS.

islandica.

Linn. Syst. Nat. ed. Gmel. 1. *p.* 3271. *Penn. Br. Zool.*
No. 47. *t.* 53. *f.* 47. *Da Cost. Br. Conch.* *p.* 183.
t. 14. *f.* 5. *List. Conch.* *t.* 272. *f.* 108.—*An. Ang.*
t. 4. *f.* 22. *Gault. Test.* *t.* 85. *f.* B. *Chemn. Conch.* 6.
t. 32. *f.* 341.

TAB. XVII. Fig. 1, 2.

There is a thick upright tooth under the beak in one valve of this shell, which locks between two others in the opposite valve.

For the other teeth with which this shell is provided, see the Explanation of the Plates.

Chione.

Linn. Syst. Nat. ed. Gmel. 1. *p.* 3272. *Da Cost. Br.*
Conch. *p.* 184. *t.* 14. *f.* 7. *Gault. t.* 86. *f.* A.

TAB. XVII. Fig. 3, 4.

A strong thick tooth is seated in each valve, directly under the cordiform depression of the shell; another close to the beak, and a third diverging from it, which last is thin, and in one valve grooved.

verrucosa.

Linn. Syst. Nat. ed. Gmel. 1. p. 3269. *Penn. Br. Zool.*
n. 48. t. 54. f. 48. *Da Cost. Conch.* p. 185. t. 12.
f. 1. 1. *List. Conch.* t. 284. f. 122. *Gault. Test.* t. 75.
f. H. *Borlase Cornw.* p. 278. t. 28. f. 32.

TAB. XVII. Fig. 5, 6.

This hinge is set with two strong erect teeth, near the beak, in each valve, besides another which runs in the direction of the cartilage.

Gallina.

Linn. Syst. Nat. ed. Gmel. 1. p. 3270. *Da Cost. Br. Conch.*
p. 191. t. 12. f. 2. 2. *List. Conch.* t. 282. f. 120.
t. 295. f. 131. *Knorr. vergn.* 5. t. 14. f. 2—5. *Chemn.*
Conch. 6. t. 30, f. 308, 310.

TAB. XVII. Fig. 7, 8.

One valve is furnished with three teeth, the middle one thick and triangular, broad at the base, and the upper angle seated directly under the beak of the shell. Of the two other teeth, one is plate-like, and runs in the direction of the cordiform depression, whilst the other, much thicker, passes from the beak towards the cartilage. The other valve differs in having a middle tooth less triangular, and situated obliquely. In the room of the plate-like tooth there is one much more substantial.

exoleta.

Linn. Syst. Nat. ed. Gmel. 1. p. 3284. *Penn. Br. Zool.*
No. 49. t. 54. f. 49. *A.* t. 56. f. 49. *Da Cost. Br. Conch.*
p. 187. t. 12. f. 5. 5. *List. Conch.* t. 292. f. 128. *Gault.*
Test. t. 75. f. F. *Chemn. Conch.* t. 38. f. 402. 404.

TAB. XVII. Fig. 9, 10.

The *Venus exoleta* is provided with three large teeth in each valve, one of which is double. This shell has the rudiment of a small tooth seated at the base of one of the largest, on the side next the cordiform depression, and in the valve opposite to that which contains the lateral double tooth.

decussata.

Linn. Syst. Nat. ed. Gmel. 1. p. 3294. Da Cost. Br. Conch. p. 202. t. 14. f. 4. 4. List. Conch. t. 423. f. 271. Gault. Test. t. 85. f. L.

TAB. XVII. Fig. 11, 12.

This shell has two grooved teeth in one valve, besides a plain one. These teeth receive another between them, from the opposite valve, which is likewise grooved, and has for its companions a small plain tooth on one side, and the appearance of a tooth on the other. Young shells have three teeth in each valve. The intermediate one is constantly cleft, the others plain; at least, in all the specimens which I have met with.

crassa.

Linn. Syst. Nat. ed. Gmel. 1. p. 3288. Penn. Br. Zool. No. 28. t. 48. f. 28. Da Cost. Br. Conch. p. 194. t. 13. f. 4. right hand. List. Conch. t. 299. f. 136.

TAB. XVII. Fig. 15, 16.

Although we have high authority for placing this shell among the *Veneres*, yet we find it in the British Zoology ranked among the *Tellinæ*; and, indeed,

if we are to judge by comparison, it more properly belongs to that genus.

The hinge of the *V. crassa* is very plain and simple, consisting of a grooved central tooth and two others, which are remote. One valve, however, has hardly the appearance of remote teeth, though the central tooth in both is equally strong.

undata.

Penn. Br. Zool. No. 51. t. 55. f. 51.

TAB. XVII. Fig. 17, 18.

The hinge of the *V. undata* has a small central tooth situated under the beak of the shell, which fits into a triangular cavity in the opposite valve. A deep fulcus runs from the beak in the direction of the cartilage slope.

ARCA.

Glycymeris.

Linn. Syst. Nat. ed. Gmel. 1. p. 3313. Penn. Br. Zool. No. 58. t. 58. f. 58. Da Costa. Br. Conch. p. 168. t. II. f. 2. 2. List. Conch. t. 278. f. 82. Chemn. Conch. 7. t. 57. f. 564.

TAB. XVIII. Fig. 1, 2.

“The hinge of the *Arca Glycymeris* is semicircular, and on each side set with a curved row of strong transverse teeth, generally from five to ten on each side.”

This is Da Costa's description, and is so far just; but he tells us that the centre of the hinge is quite smooth,

smooth, and without teeth. This his figure contradicts, as well as two specimens in my cabinet, the teeth of which meet in the centre, though their size is very much reduced. The drawing which I have given is from one of them.

Nucleus.

Linn. Syst. Nat. ed. Gmel. 1. p. 3314. Da Cost. Br. Conch. p. 170. t. 15. f. 6. right hand. Gault. Test. t. 88. f. R. Chemn. Conch. 7. t. 58. f. 574. a. b.

TAB. XVIII. Fig. 3—6.

The beautiful arrangement of teeth in the hinge of this shell is not to be equalled by any other species on our shores. The regularity of their order and the elegance of their form make an accurate figure particularly desirable. This I have attempted to give, to the best of my abilities, in a magnified representation.

The hinge is to be seen in all its beauty only in live shells.

Of the remaining genera little need be said, as the hinges are, for the most part, without teeth. I have, therefore, only figured one species of each genus, which, I presume, will be thought sufficient.

PECTEN.

pictus.

*Linn. Syst. Nat. ed. Gmel. 1. p. 3325. (ostrea opercularis.)
Da Cost. Br. Conch. p. 144. t. 9. f. 1, 2, 4, 5.*

TAB.

TAB. XVIII. Fig. 7, 8.

“Hinge toothless, being only a trigonal cavity in the very centre of the commissure or summit of the shell, which runs in a straight horizontal line.” *Da Costa. Br. Conch. p. 140.*

OSTREA.

edulis.

Linn. Syst. Nat. ed. Gmel. I. p. 3334. List. Conch. t. 194. f. 31.

TAB. XVIII. Fig. 9, 10.

The shells of this genus are connected together by a strong central cartilage. There is a variety with a rugose appearance on each side of the hinge, which is very well represented in Dr. Lister's figure.

ANOMIA.

Ephippium.

Linn. Syst. Nat. ed. Gmel. I. p. 3240. Penn. Br. Zool. No. 70. t. 62. f. 70. Da Costa. Br. Conch. p. 165. t. II. f. 3. List. Conch. t. 204. f. 38.

TAB. XVIII. Fig. 11, 12.

A simple cartilaginous hinge with an oval cavity in the concave valve. *Da Costa* mentions a claw in the other valve, which is not in my specimen.

MYTILUS.

edulis.

Linn. Syst. Nat. ed. Gmel. I. p. 3353. Penn. Br. Zool. No. 73. t. 63. f. 73. Da Costa. Br. Conch. p. 216. t. 15. f. 5. left hand.

TAB. XVIII. Fig. 13, 14.

I believe it has not hitherto been publicly noticed, that the common muscle possesses teeth; such, however, is the case, and their situation, close to the beak of the shell, was first pointed out to me by Mr. Boys.

These teeth are by no means regular, either in their arrangement or shape; nor is every shell provided with them. The specimens in which I have found them are of a much larger size than the common, and generally make their appearance in the London markets in the depth of winter; but I am told they are not so much esteemed as the smaller ones.

The teeth are from three to seven in number, and, when examined collectively, resemble in figure and irregularity the knobs of a lobster's claw.

PINNA.

muricata. Linn. *Syst. Nat. ed. Gmel.* I. p. 3364.

The two valves of the *Pinna* are merely united by a thin membrane, which forms a hinge of the most simple construction, without even the vestige of a tooth.

EXPLANATION OF THE PLATES.

TAB. XIV.

Fig. 1, 2. The hinge of the *Mya truncata*. (a) The great tooth.
(b) The

- (b) The corresponding depression. (c) A small tooth on one side of it.
- Fig. 3, 4. The hinge of the *Mya arenaria*. (a) The great tooth. (b) A ridge grooved longitudinally. (c) A small curve in the margin. (d) The cavity for the reception of the tooth.
- 5, 6. The hinge of the *Mya margaritifera*. (a) The rugged tooth. (b) Its cavity. (c) A sharp ridge on one side of it, which passes into the cavity (d).
7. The hinge of the *Mya pictorum*. (a. a) The indented teeth. (b. b) The remote teeth.
8. A side view of one valve of the same.
9. The hinge of the *Solen Siliqua*.
10. The hinge of the *S. Vagina*.
11. *S. pellucidus*. (a) The bifurcated tooth. (b. b) The two other teeth in the same valve. (c) The two opposite teeth.

TAB. XV.

- 1, 2. The hinge of the *Tellina planata*.
- 3, 4. The same magnified*. (a. a) The large tooth in each valve. (b. b) Two small teeth. (c) The lateral tooth.
- 5, 6. The hinge of the *Tellina incarnata*.
- 7, 8. The same magnified. (a. a) The two large teeth. (b. b) The two smaller ones. When the shell is placed horizontally these teeth appear very prominent, and the fulcus in the large tooth is very apparent.
- 9, 10. The hinge of the *Tellina cornea*.

* The shells were, for the most part, magnified by Ellis's single Aquatic Microscope.

- Fig. 11, 12. The same magnified. (a.b) Two teeth which receive between them the triangular tooth (c). (d) A small tooth which passes on the outside of (a). (e. e. e. e) Lateral teeth.
- 13, 14. The hinge of the *Tellina rivalis*.
- 15, 16. The same magnified. (a.b) Two teeth which unite, and are continued to form an arch for the reception of the triangular tooth (c), on one side of which is a small tooth (d). (e. e. e. e) Lateral teeth.
- 17, 18, 19. Hinge of the *Tellina bimaculata*.
- 20, 21. *Tellina fervens*. (a.b) Two erect teeth. In my specimen, one is plain, the other notched. (c) A small ridge dividing a depression by the side of (a).

TAB. XVI.

- 1, 2. *Cardium aculeatum*. (a. a. b. b) Four erect teeth which lock together when the shell is closed. (c) A remote tooth which fits between (d. e), while (f) receives its opposite, (g).
- 3, 4. *Mastra lutraria*. (a) The great tooth. (b) The spoon-shaped cavity. (c) The place which receives the great tooth.
- 5, 6. *Mastra hians*. (a) The erect tooth. (b.b) The great cavity. (c. d) Two teeth which receive (a) between them. (e) A small cavity for the grooved tooth (d). (f.f) A narrow fulcus.
- 7, 8. *Mastra sultorum*. (a) The triangular tooth. (b) The rectangular one in the opposite valve. (c. c) The cavity for the cartilage. (d. d. d. d) Remote teeth.
- 9, 10. *Mastra alba* of the natural size.
- 11, 12. The hinge of the same magnified. (a. a) The spoon-shaped cavity. (b) A small tooth. (c.c) Remote teeth.

Fig.

Fig. 13, 14. The hinge of the *Donax Trunculus*.

15, 16. The same magnified. (a) A thick fulcated tooth received, when the shell closes, between (b. b). (c. c) Marginal teeth.

TAB. XVII.

- 1, 2. *Venus islandica*. (a) The great tooth which locks between (b. b), while the rugged tooth (c) fits into a hollow within the small tooth (d). (e. e. e) Remote teeth.
- 3, 4. *Venus Chione*. Besides the two strong teeth in this shell, (a) and (b), there is a third, (c), which passes into the cavity (d). (e) A tooth grooved longitudinally.
- 5, 6. *Venus verrucosa*. (a. b) Two thick teeth receiving (c) between them. (d) A large tooth which passes on the inside of (e). (f) A thin tooth in the direction of the cartilage.
- 7, 8. *Venus Gallina*. (a. b) The two principal teeth. (c. d) Two smaller ones, of which (d) is plate-like. (e) A marginal tooth.
- 9, 10. *Venus exoleta*. (a) An erect tooth which locks between (b. b). (c) A thick channelled tooth received between (d. d).
- 11, 12. *Venus decussata*. (a) The two cleft teeth in one valve. (b) The same in the opposite. (c) The plain tooth.
- 13, 14. This shell is provided with a beautiful pectinated hinge, consisting of three teeth in each valve. These teeth are placed in the most regular order, and the middle one, I believe, is constantly grooved. Frequently there is a channel in one of the other teeth, and sometimes, though rarely, we meet with it in both.

When this species is found with only two teeth in one

valve and three in the other (as is sometimes the case), it must be considered as incomplete.

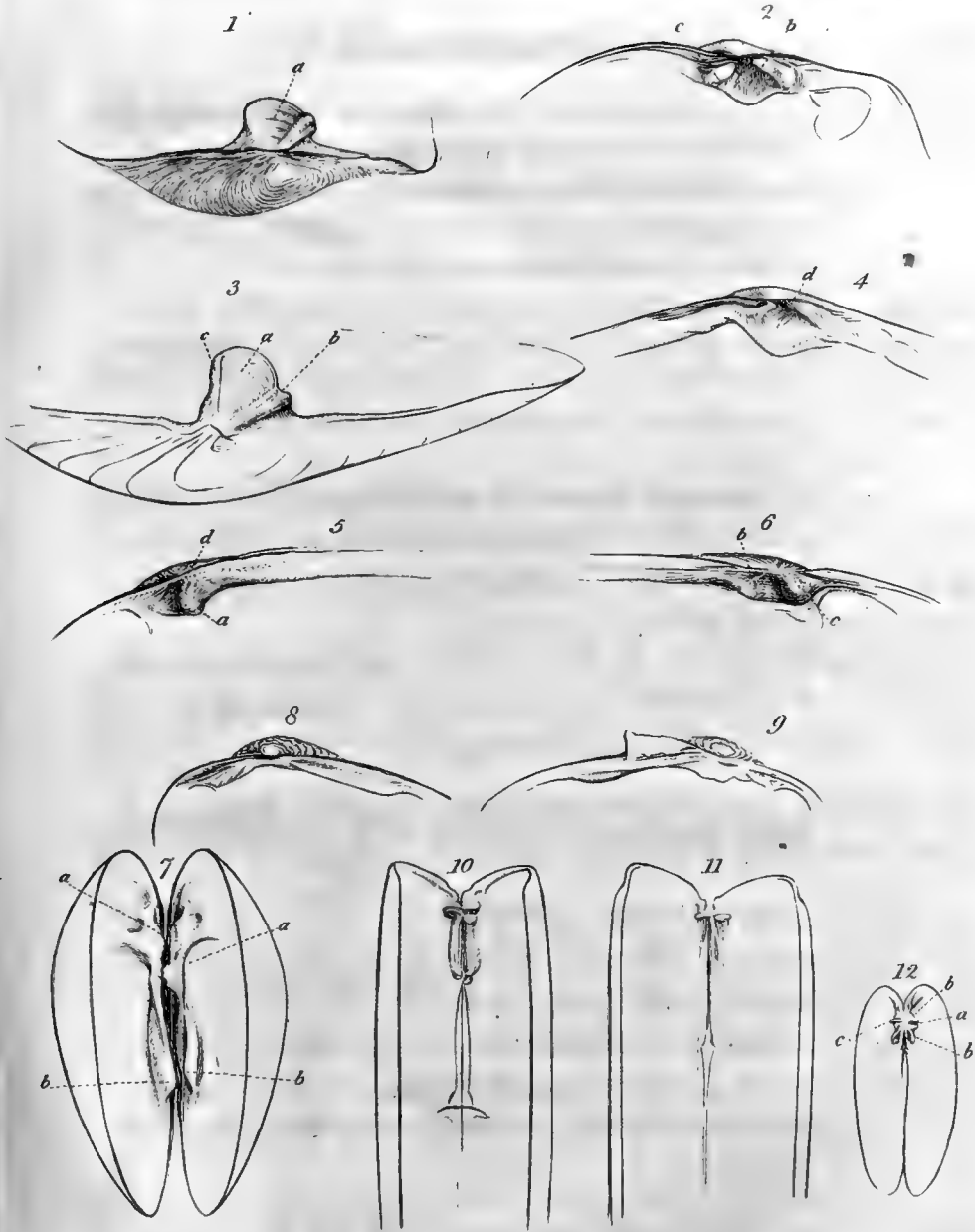
It was not till I began attentively to examine the hinges of British bivalves, that this shell appeared to me essentially different from the *V. decussata*. We find it, not uncommonly, on the Sandwich shore, from half an inch to one and a half or two inches in breadth, and sometimes marked on the outside (in a zigzag manner) with all the strength and elegance of a foreign specimen.

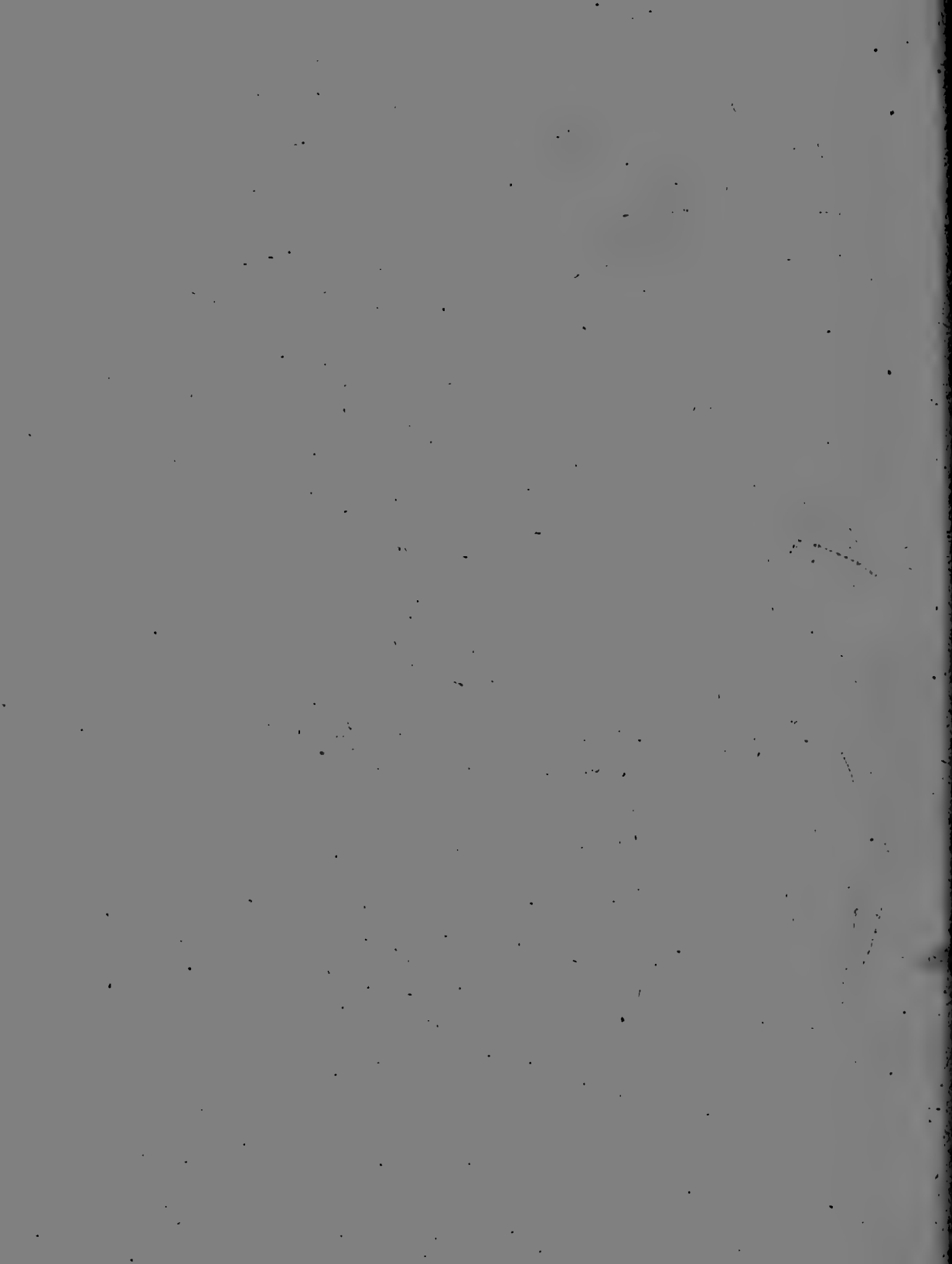
This species is broader, in proportion, than the *V. decussata*, and the striæ are more delicate.

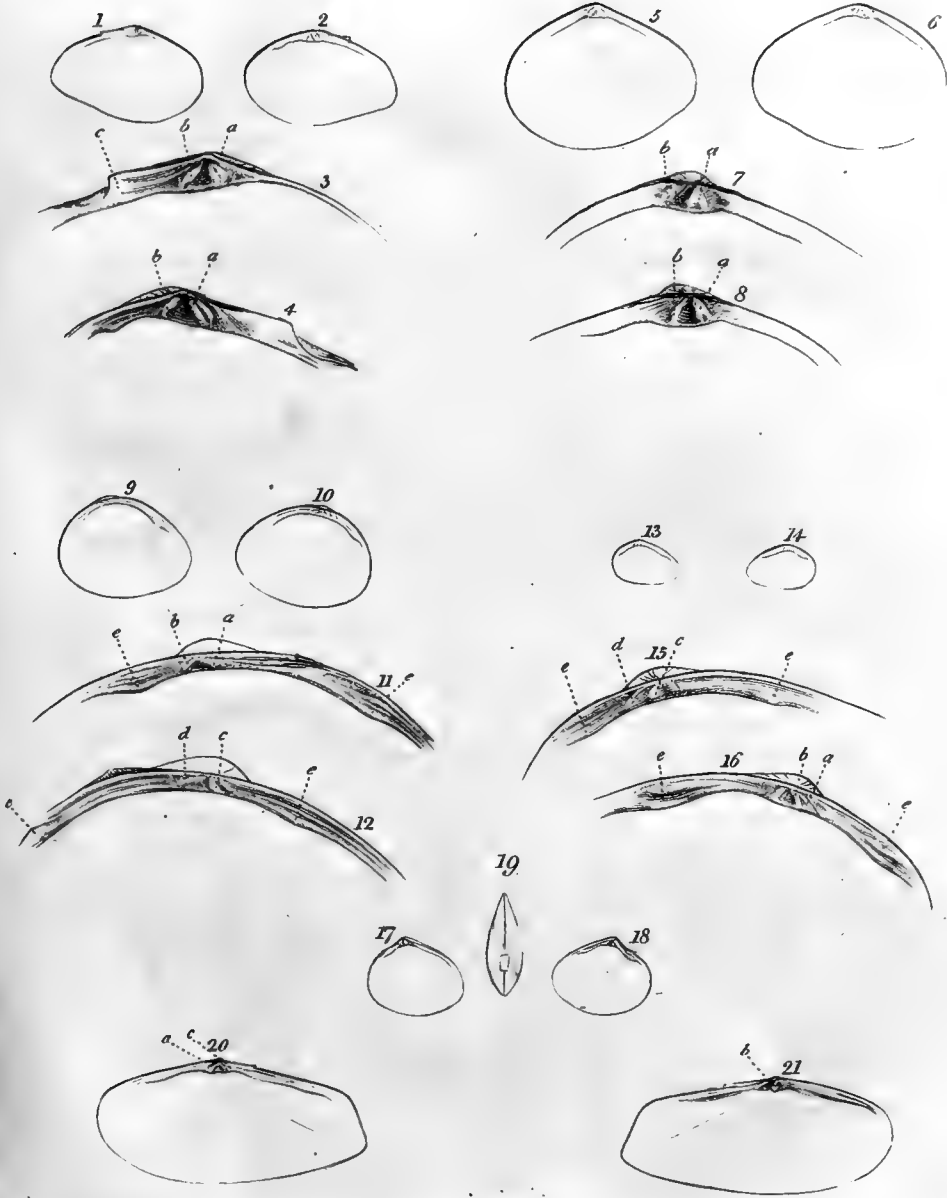
- Fig. 15, 16. *Venus crassa*. (a) The two principal teeth. (b.b.b.b) Remote teeth.
 17, 18. The hinge of the *Venus undata*. (a) The central tooth. (b) Its cavity.

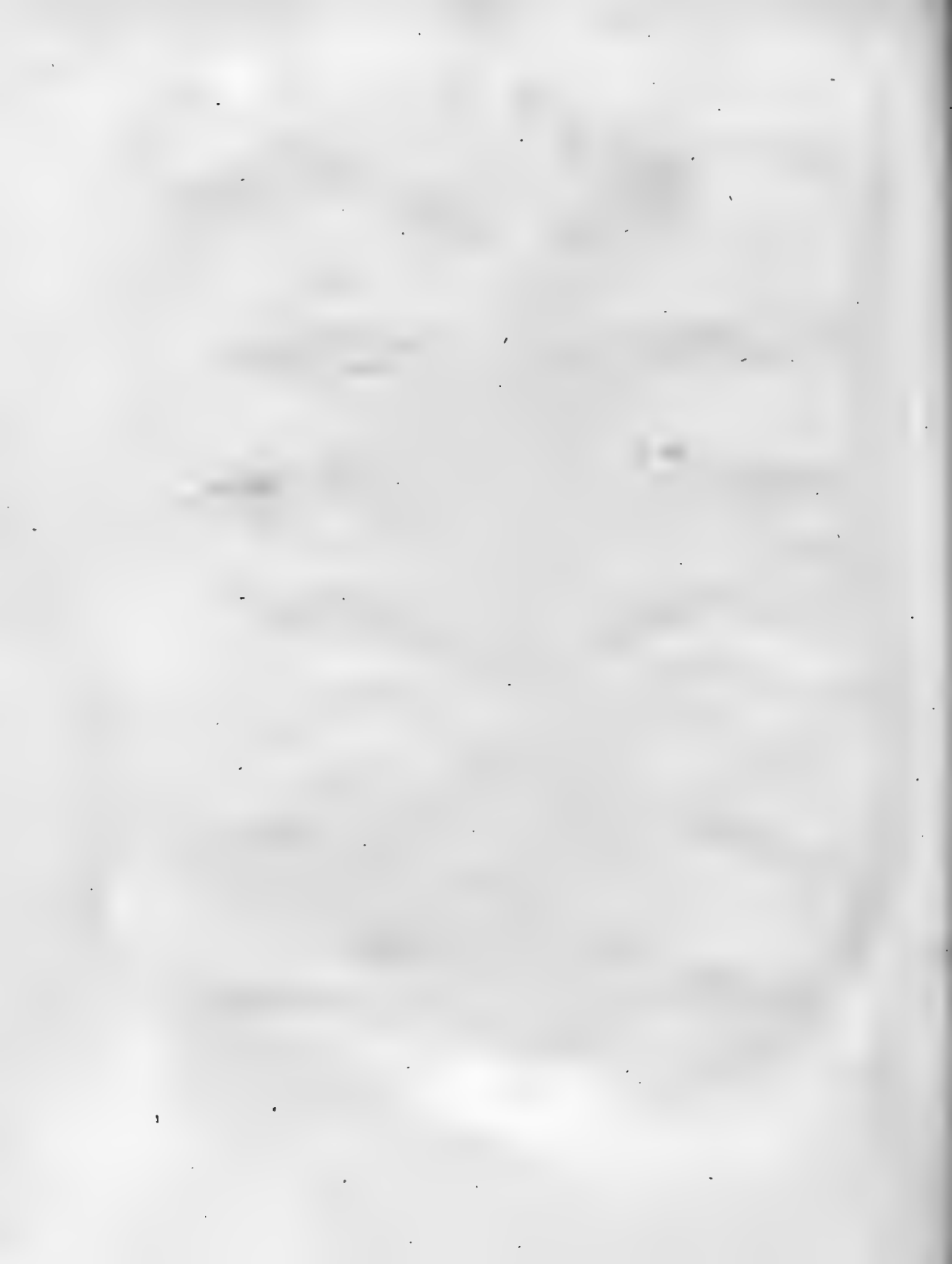
TABLE XVIII.

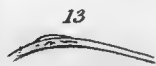
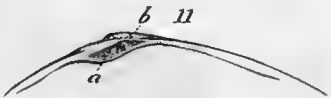
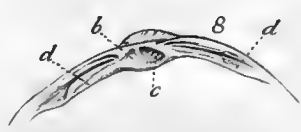
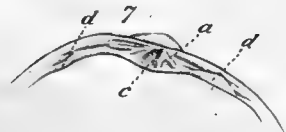
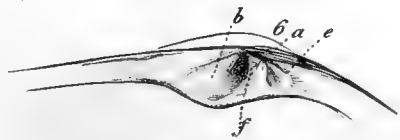
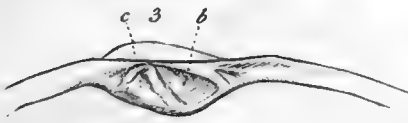
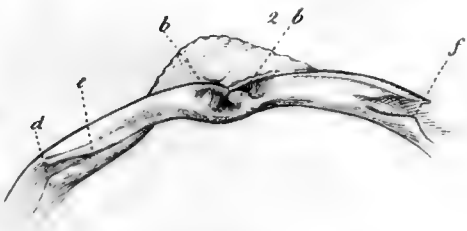
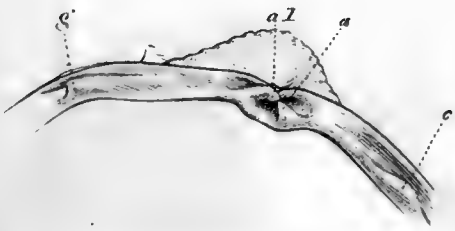
- 1, 2. The hinge of the *Arca Glycymeris*, which in this particular specimen is furnished with an extraordinary number of teeth.
 3, 4. *Arca Nucleus* of the natural size.
 5, 6. The hinge of the same magnified.
 7, 8. The hinge of the *Pecten pictus*.
 9, 10. The hinge of the *Ostrea edulis*.
 11, 12. The hinge of the *Anomia Ephippium*.
 13, 14. The hinge of the *Mytilus edulis*. (a. a) The situation of the teeth.

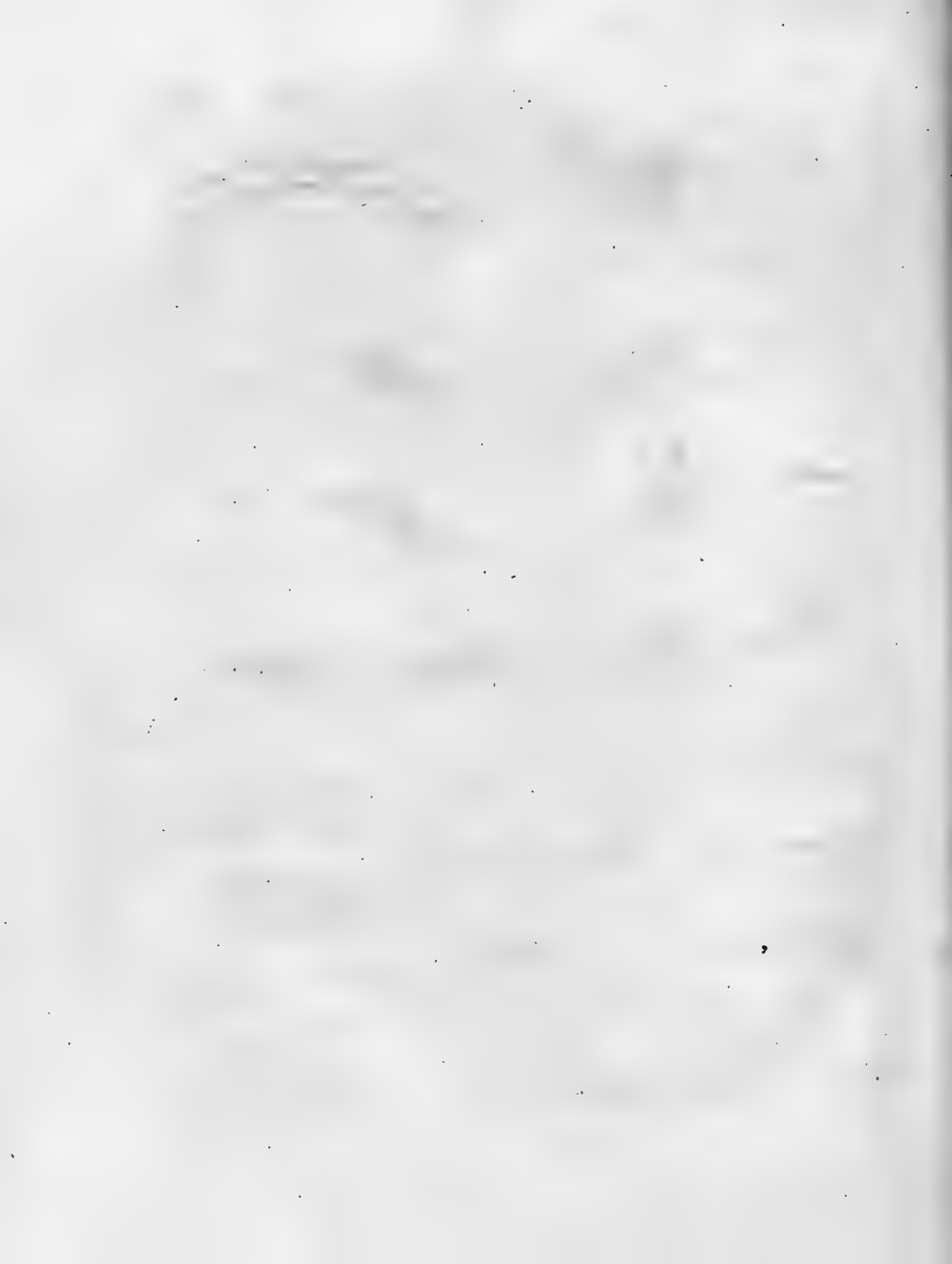


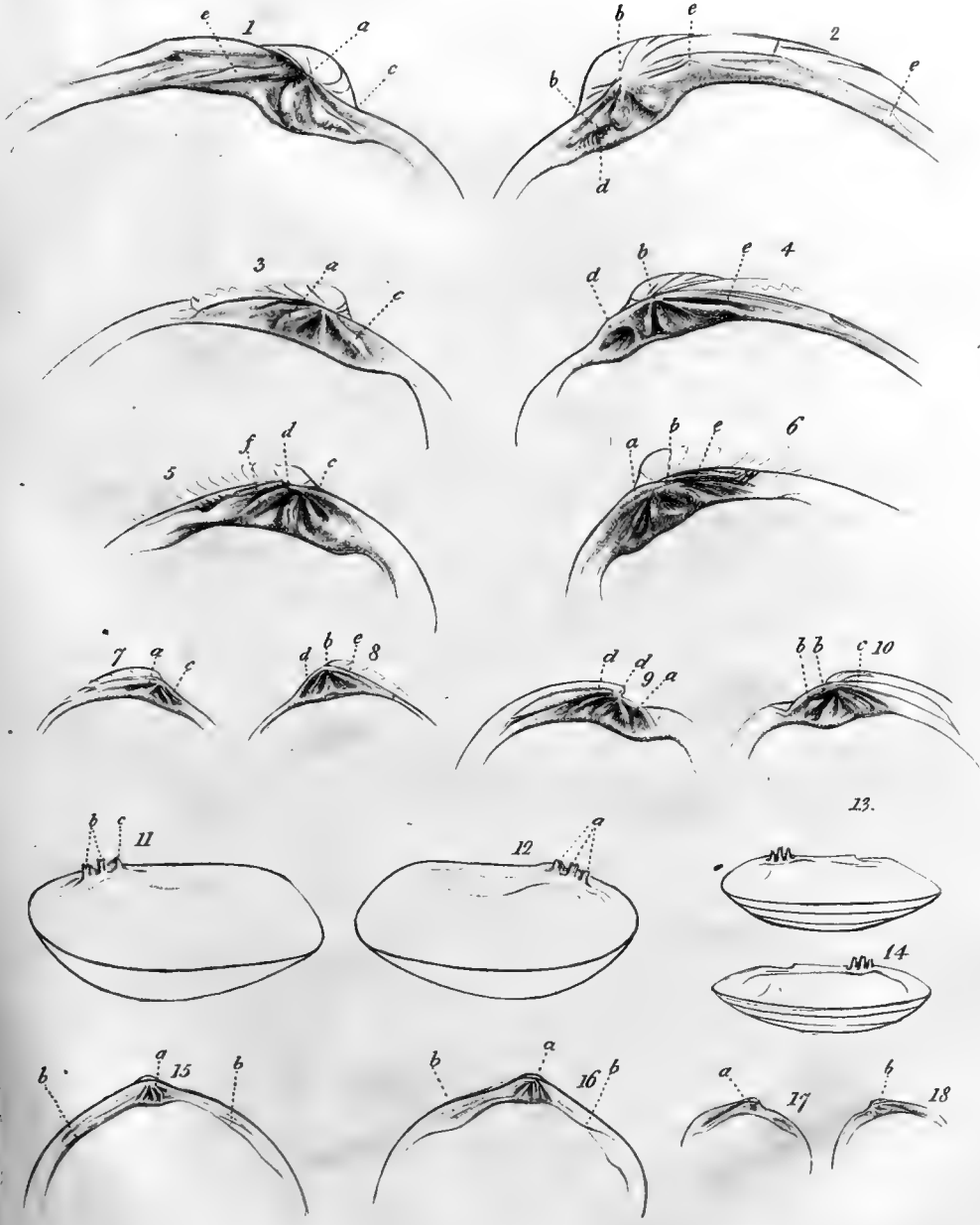




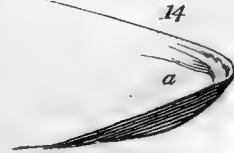
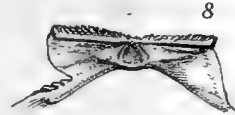


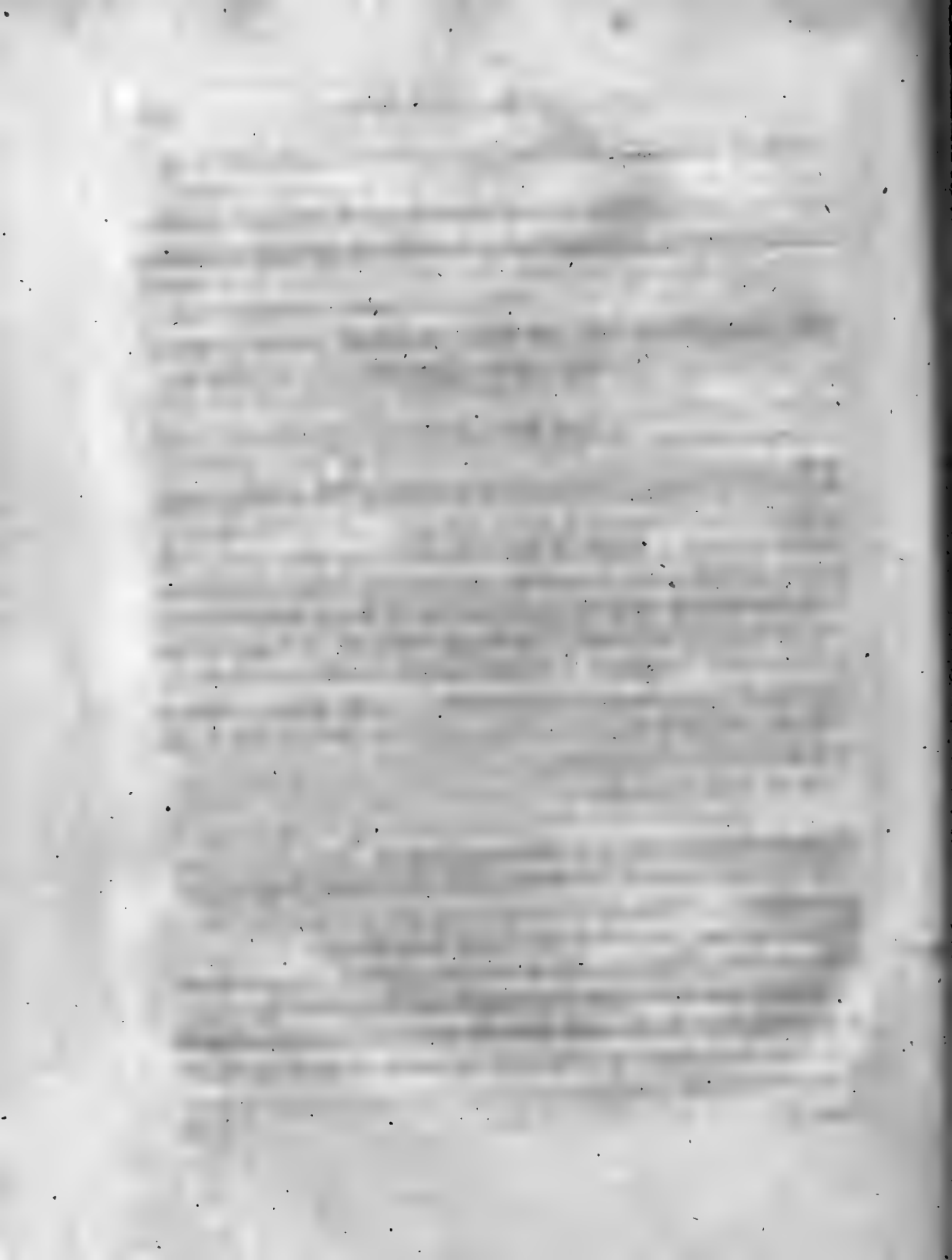












XV. *Catalogue of the more rare Plants found in the Environs of Dover, with occasional Remarks.* By Mr. Lewis Weston Dillwyn, F.L.S.

Read March 3, 1801.

HAVING spent a considerable proportion of the last three years at Dover, and preserved a list of the plants which I found in its neighbourhood, I submit to the Linnean Society the following selection of those which, from their scarcity or any other circumstance, more particularly attracted my attention. I flatter myself it will not be unacceptable to such botanists as may visit that part of the kingdom, and that it may also serve in some measure to correct the habitats, given in some respectable works, of a few plants which, if not now extinct in the places assigned to them, have at least eluded a diligent search on my part.

Higham Lodge, Feb. 16, 1801.

Salicornia herbacea, with *Aster Tripolium*, *Eryngium maritimum*, and most of the more common sea-shore plants, in or about Sandwich salt marshes.

Veronica montana. In most of the woods about Dover.

Valeriana rubra. On old walls of the Elms, where it has propagated itself for time immemorial, but is probably of garden origin.

Iris fetidissima. On the road from Dover to Folkestone, about half a mile from Archcliff Fort, and in many other places in the neighbourhood.

Schænus Mariscus. In Ham Ponds near Eaftry.

—— *compressus.* In boggy ground at Cockthill, and about Ham Ponds.

Scirpus pauciflorus. About Ham Ponds.

Phalaris arenaria. On the sandy shores of Deal, Sandwich, and Dimchurch.

Aira cristata. On Sandwich Flats.

Poa distans. On Sandwich Flats and about Lidden-spout, near Dover.

—— *bulbosa.* Among the sand-hills between Deal and Sandwich.

Arundo colorata, foliis variegatis striatis. In a ditch in Romney marsh near Dimchurch.

Rotbolla incurvata. On the shore a little north of Sandown Castle, and near Lidden-spout.

Triticum loliaceum. About Sandwich Salt-pans.

Asperula cynanchica. Common on the hills about Dover.

Rubia peregrina. On the cliffs east of the Caves, and in Langdon-bay.

Borago officinalis, floribus albis. At the entrance into Sandwich from Deal, and about Lyme Castle.

Convolvulus Soldanella. About Deal and Sandwich, plentifully.

Verbascum nigrum. On the sides of the London road on Lidden-hill, about four miles from Dover.

Vinca minor. In great abundance in the lane about half a mile west of the Elms.

—— *major.* In the lane adjoining East Langdon church; near Eyethorne, and in the lanes at the back of Hythe.

Gentiana Amarella. Plentiful on the Dover hills.

Bupleurum tenuissimum. W. Boys, Esq. F.L.S. informs me that Hudson found this on the bank of the river, about half a mile N.E. of Sandwich; but I looked for it there in vain.

Critimum maritimum. On the cliffs about Dover.

- Oenanthe pimpinelloides*. Ditches in Sandwich and Romney marshes.
- Smyrniolum Olusatrum*. Common in the neighbourhood of Dover.
- Narcissus poeticus*. Found near Hougham, by the Rev. J. Lyon, F. L. S. to whom I am much obliged for the assistance he gave me in my botanical researches.
- Juncus maritimus*. Near Dimchurch on the road to Romney.
- Frankenia lævis*. On the cliffs about Archcliff Fort.
- Alisma Damasonium*. In a pool under the cliff between Folkstone and Sandgate, sparingly.
- *ranunculoides*. Ditches between Ham Ponds and Eastry, and in the boggy grounds about Wingham.
- Epilobium angustifolium*. In the woods about half a mile west of River Poorhouse.
- Chlora perfoliata*. Common in the neighbourhood of Dover.
- Paris quadrifolia*. In the orchard at the Elms, and in most of the woods about Dover; often with 5, 6, or 7 leaves.
- Dianthus Caryophyllus*. Not 'on Sandown,' and very sparingly 'on Deal Castle.'
- Silene nutans*. On the cliffs about Dover, abundantly, and on Sandgate Castle. *S. paradoxa* is not, I believe, to be found in the neighbourhood.
- *maritima*. On the beach between Sandgate and Hythe, where I have found some plants with ripe seed in the middle of June, and some in full flower in the beginning of November.
- *conica*. Common on the range of sand-hills beginning at Deal and running eastward of Sandwich; and on the sand-hills directly 'opposite the Warren-house at New Romney' sparingly.
- Arenaria marina*. Common at the Caves, &c. The seeds are roughish. Seldom more than one in ten of those in each capsule are furnished with a margin, which is broad, membranaceous, white,

- white, and striated; and I never observed the rudiment of one in more than half the other seeds.
- Sedum anglicum*. About Sandown Castle, and on the beach about two thirds of the way from Dover to Folkstone.
- Lychnis dioica, floribus albis plenissimis*. On the sides of the north end of the Old Haven at Sandwich.
- Euphorbia paralias*. Under the South Foreland, and in great abundance a little westward of Shakespear's Cliff.
- Papaver hybridum*. Edge of the cliff near Archcliff Fort.
- *Argemone* β . Near Sandown Castle.
- Aquilegia vulgaris*. About the ruins of Raddigund's Abbey.
- Ranunculus Lingua*. In the Old Haven at Sandwich, and in and about Ham Ponds.
- Antirrhinum spurium*. Corn-fields near Ramsgate, on the road to Margate.
- *majus*. On old walls, but not 'on the cliffs of Dover.'
- Digitalis purpurea*. On the beach near Hythe, and in large quantities on the beach near Dungeness Light-house.
- Orobanche ramosa*. Found by the Rev. J. Lyon near Hougham.
- Crambe maritima*. In St. Margaret's and Langdon bays; and very plentifully on the beach, about half way from Dover to Folkstone.
- Brassica Oleracea*. About the Caves and Shakespear's Cliff.
- Erodium maritimum*. Found by my friend, Joseph Woods, jun. and myself on the walls of Sandgate Castle.
- Geranium lucidum*. On the beach about half way between Dover and Folkstone; and about the ruins of Lymne and Saltwood Castles, near Hythe.
- *columbinum*. On the hills about Dover, sparingly.
- Malva moschata, floribus albis*. In fields near Eyethorne.

Pisum maritimum. On the beach between Walmer Castle and King-down.

Lathyrus Nissolia. About the 65th mile stone on the sides of the London road.

—— *sylvestris.* In the dark lane south of the main entrance into Waldershare Park.

Hippocrepis comosa. Common on the hills about Dover.

Trifolium ornithopodioides.

—— *subterraneum.*

—— *scabrum.*

} Between Dimchurch and New Romney.

Trifolium maritimum. In Sandwich salt marshes.

—— *glomeratum.*

Medicago polymorpha β.

} Near Sandown Castle.

Hypericum androsaemum. In most of the woods about Dover. In the wood on Lynne-hill, plentifully.

Crepis biennis. On the heights near the Horse Barracks.

Carduus eriophorus. About a farm called Polton, near Raddigund's Abbey; and about the ruins of Lynne Castle.

—— *acaulis.* Abounds on the hills about Dover.

Orchis ustulata. In the Foreland Meadow, and on the hills about Dover, sparingly.

—— *militaris.* Found by the Rev. S.L. Jacobs, F.L.S. near Chilton, on the side of the path leading from Bushy Rough to Alkham.

—— *conopsea.* Very luxuriant on the hills about Dover. I counted 229 flowers in one spike.

Ophrys Nidus avis. Wood between Alkham and Ewel Minnis.

—— *spiralis.* In the Foreland Meadow, and a little east of the Caves.

—— *Loeselii.* Boggy ground about Ham Ponds.

—— *anthropophora.* Bank westward of Crabble.

—— *muscifera.* Sunny bank at the side of Coombe Wood, and, as

I am

- I am informed by the Rev. J. Lyon, in several other similar situations about Dover.
- Ophrys apifera*. Common in sunny exposures about Dover: on a barren bank in the lane running east of Barton, plentifully.
- *aranifera*. On the hills about Dover; some years much more plentifully than others.
- Serapias latifolia*. In the wood between Alkham and Ewel Minnis; and in a wood between Alkham and Raddigund's Abbey.
- *longifolia*. Boggy ground about Ham Ponds, marshes about Hacklinge between Deal and Sandwich, and in Wingham marshes.
- Carex pulicaris*. Boggy ground about Ham Ponds.
- *arenaria*. Sand-hills about Deal, Sandwich, and Romney.
- *divisa*. Near Ham Ponds and in Sandwich marshes.
- *pendula*. Wood on Lymne-hill, abundantly.
- *distans*. Sandwich marshes and about Ham Ponds.
- *pseudo-cyperus*. Ditches between Deal and Sandwich, and in Sandwich Old Haven.
- Urtica pilulifera*. Is extinct at 'Old Romney;' but a little south of Lyd Church-yard grows plentifully.
- Myriophyllum verticillatum*. Ditches between Deal and Sandwich.
- Salix argentea*. A little north of Sandown Castle, plentifully. I am obliged to Dr. Smith for its name.
- Hippophaë rhamnoides*. With the last in abundance between Folkestone and Sandgate, Undercliff, and a little west of St. Margaret's Bay.
- Atriplex littoralis*. About Ramsgate pier, and on the shore a little north of Sandwich salt-pans.
- Equisetum fluviatile*. In Folkestone Cherry orchard.
- Asplenium Ceterach*. On the wall at the entrance into Ewell Church-yard.

- Fontinalis secunda.* On trees west of Buckland Church.
- Mnium undulatum.* } In Waldershare Shrubbery, in fruit abundantly,
 ——— *hornum.* } May 14, 1799.
- Bryum unguiculatum.* On the outside of the eastern inner wall of Dover Castle, sparingly.
- *triquetrum* β . *Hudson.* Bank of the rivulet near Cockshill.
- Hypnum lutescens.* Not uncommon on the hills in the neighbourhood of Dover.
- *Smithii.* On the trees a little north of the Half-way House between Dover and Canterbury; and plentifully on the trees in Waldershare Park. Early in April, 1800, the veils appeared with upright hairs, agreeing with those of the genus *Orthotrichum*; and I found one with a capsule, but I do not think any came to perfection.
- *proliferum.* In fruit, near Barham, May 3, 1799.
- *alopecurum.* Hedge-bank in the dark lane east of Charlton, in fruit, November 26, 1799.
- *squarrosum.* } About the wood near Raddigund's Abbey, in
 ——— *purum.* } fruit, November 1, 1799.
- *filiforme.* On trees near Bier.
- *tenellum.* (*Dickson, fasc. 4.*) On old walls at the Priory, and other walls about Dover.
- Fucus sanguineus.* Frequently washed on the Dover shore. It is in fructification from December to the latter end of March.
- *sinuosus.* }
 —— *Hypoglossum.* } Sometimes, but not frequently, found in the
 —— *dasyphyllus.* } neighbourhood.
- *membranifolius* β . Rocks near the Caves, sparingly.
- *fibrifus.* }
 —— *bulbosus.* } Sometimes washed on shore after storms.
- *crenulatus.* Not unfrequent 'inter rejectamenta;' and at a neap tide

tide I found it on the rocks opposite Shakespear's Cliff near low water mark.

Fucus loreus. Abounds on the shore after storms.

— *edulis*. Rocks near the Caves, plentifully.

— *plumosus*. Rocks about Dover, common.

— *nodosus*. Rocks at Folkstone, abundantly.

— *Filum*. On the Dover beach only after storms.

— *radiatus*.

— *confervoides*.

— *subfuscus*.

— *articulatus*.

— *Opuntia*.

} With many of the more common species, on the rocks about Dover. Between *F. confervoides* and *F. albidus* I can find no specific difference, and I believe *F. Opuntia* is only *F. articulatus* in a young state.

Ulva dichotoma.

— *rubra*.

} Are sometimes found on the beach at Dover.

Conserva equisetifolia.

— *verticillata*.

— *fucicola*.

— *elongata*.

— *ciliata*.

— *nodulosa*.

— *diaphana*.

— *byssoides*.

} With many of the more common species, are frequently met with on the Dover rocks and beach, as well as several which, in the present state of our knowledge of this genus, cannot be arranged.

— *gelatinosa*. In the rivulet which runs across the Victualing-Office yard, and other places about Dover.

— *glomerata*. About the wooden bridge a little beyond Bushy Rough.

Agaricus psittacinus. Wood near Raddigund's Abbey.

— *varius*. Var. 6, of Withering, as also one agreeing with Var. 7. except in having the pileus white, and

Peziza inflexa, in the same wood near Raddigund's Abbey.

XVI. *Descriptions of some singular Coleopterous Insects.*

By Charles Schreibers, M. D. Deputy Professor of Natural History in the University of Vienna.

Read April 7, 1801.

LUCANUS ÆNEUS.

TAB. XX. Fig. 1.

LUCANUS oblongus æneus; mandibulis exsertis, brevibus, validis, recurvis, interne ferrugineo hirtis; capite parvo, transverso, subbicornuto; thorace magno, convexo, transverso, margine utrinque angulo deflexo; elytris subcylindricis, convexis, subrugofulis; tibiis anticis latioribus, dentatis, interne lamina cornea falciformi munitis.

Caput transverse oblongo quadratum, breve, thoraci multo angustius, planiusculum, punctis excavatis scabrum, nitidum viridi æneum, interdum ex cupreo incurvatum; triangulo medio magno subexcavato marginibus elevatis glabris, lateralibus postice conniventibus, antice ad latera marginis anterioris ante oculos subprominentibus; hinc caput subbicornutum. Margo anticus subemarginatus.

Oculi laterales, ovati, brunnei.

Antennæ breves, fusco-nigrescentes, glabræ, nitidæ, ante oculos insertæ, thoraci breviores, uni-articulatæ, lateraliter expansæ vel subfissiles, extrorsum crassiores, apice pertusæ, 10-articulatæ: articulo primo maximo, clongato, clavato; 5 insequentibus parvis subæqualibus,

submoniliformibus; ultimo magno, clavato, subperfoliato, foliis 4, quorum primum minimum haud conspicuum. TAB. XIX. fig. 5.
Mandibulae porrectae, capite longiores, validae, recurvae, apice latiores, hic truncatae & emarginatae, hinc bidentatae, dente apicis & medio ubi recurvae, spatium inter hos subdenticulato. Glabrae sub lente haud distincte punctatae, interne pilis densis ferrugineis hirtae, obsolete viridi aeneae subnitidae marginibus nigrescentibus.
 TAB. XIX. fig. 1—3.

Palpi quatuor filiformes, glabri, brunnei, crassiores; posterioribus 3-articulatis, articulis fere aequalibus, primo minimo, 2do subclavato, 3tio obtuso-acuminato; subincurvis brevioribus: anterioribus longioribus 4-articulatis, articulo primo minimo, 2do elongato subclavato, 3tio parvo submoniliformi, ultimo longiori, obtuso-acuminato. TAB. XIX. fig. 6.

Maxillae breves, membranaceae, fetosae. TAB. XIX. fig. 4.

Labium superius nullum; inferius corneum, rotundum, integrum.

Thorax magnus, brevis, elytris latior, convexus, margine utrinque angulo deflexo; margine postico parum sinuato, marginibus lateralibus subreflexis; nitidus, viridi-aeneus, in medio subtilissime & sparsim excavato-punctatus, caeterum glaber puncto excavato majori laterali supra angulum deflexum.

Scutellum magnum, semicirculare, planum, glabrum, concolor.

Elytra brevia, parum convexa, oblongo-ovata, subcylindrica postice parum angustiora, non connata, marginata, subpunctata, subrugosula, nitida, viridi-aenea, totum corpus ambientia, margine subreflexo, tuberculo laevi versus apicem.

Corpus alatum, alis fuscis; subtus aeneum, plus minus ex viridi, nitidum, punctatum, subvillosum pilis brevibus fericeis hinc inde praesertim ad latera segmenti primi abdominis, densioribus, ex cinereo flavescens.

Abdomen

Abdomen segmentis 6, primo (pectore) maximo, crasso, convexo, acumine brevi porrecto in margine superiori inter femora media; reliqua segmenta brevia angusta, marginibus piceis.

Femora antica crassa, valida, cylindrica; media cylindrica, graciliora paulo; postica compressa latiora; omnia nitida, viridi-ænea subpunctata, subhirta.

Tibiæ anticæ (TAB. XIX. fig. 7.) apice dilatatæ, paulolum compressæ, extrorsum dentatæ, dentibus nigrescentibus 6—7; apice truncatæ, oblique emarginatæ, pilis ferrugineis in fasciculum acutum dentiforme collectis, longioribus, & prope hoc lamina fat magna, cornea, radiata, falciformis, nitida picea ad angulum internum; tibiæ reliquæ graciles, subcylindricæ, ad articulationem tarforum interius bispinosæ; omnes punctatæ, subhirtæ, nitidæ viridi-æneæ.

Tarsi 5-articulati, articulis 4 primis moniliformibus, subtus ferrugineo-hirtis, ultimo longo, clavato, incurvo; omnibus glabris nitidis, nigro-piceis, unguibus 2 fat validis, incurvis, acutis, & inter hos in vagina condita ad libitum porrigenda spina gracilis apice divisa in duas multifidas.

VARIETAS.

Paulo minor & color viridi-æneus cum nitore aureo pulcherrimo.

Mandibulæ longiores, prolongatæ, minusque recurvæ, graciliores, flexuosæ, punctatæ, splendentes, nitidissimæ, aureæ, apice marginibusque cyaneis, interne pilis densissimis ferrugineis hirtæ.

Structura cæterum mandibularum conspicue differt & difficillime est describenda. Apex subrecurvus, latior, bis emarginatus hinc tridentatus, margineque inferiori interne in medio unidentato, dente fat valido, acuto, antrorsum spectante. TAB. XIX. fig. 9—11.

Inter palpos rudimenta penicillorum, *Lucanis* ad instar, ast non

porrecta, & reliquis plane deficientia, ubi spatium pilis tantum impletum.

Cætera omnino correspondent. Elytra levia minime punctata.

FEMINA.

Ejusdem habitus & magnitudinis, paulo tamen angustior & magis adhuc cylindrica. Color nigro-æneus cum nitore violaceo. Triangulum capitis minus distinctum.

Mandibulæ multo breviores, fere erectæ, parum incurvæ, apice paulo crassiores, & hic oblique antrorsum emarginatæ & excavatæ; punctatæ, nitidæ nigrescentes, interne pilis ferrugineis, sed minus quam in prioribus, hirtæ.

Thorax magis punctatus & scaber.

Tibiæ anticæ (TAB. XIX. fig. 8.) multo graciliores, quamvis apice parum dilatatæ, subfulcatæ, punctatæ, extrorsum dentatæ, dentibus 8, 9 sensim magnitudine decrescentibus paulo validioribus; apice minus emarginatæ, pilis aliquot ferrugineis solitariis denteque sat longo, acuto, loco laminæ corneæ, ad angulum internum.

Tibiæ mediæ & posticæ extrorsum spinosæ.

Cætera conveniunt.

Patria, Nova Hollandia; Infula Norfolk Maris Pacifici.

Ex Museo D. Francillon.

Hospitatur in Museis D. Banks, D. Marsham, D. Parkinson.

Descripsit jam hoc insectum clar. Fabricius in Systemate suo Entomologiæ emendato, t. i. p. i. p. 2. sub nomine *Letbri ænei*, ex Museo D. Banks, ubi dicit: "Forte proprii generis," cum ob defectum palporum genus rite determinare non potuisset; cæterum nimis obiter specimen examinasse videtur dicendo, elytra "haud connata," quæ primo intuitu perfecte separata apparent. Minime ad genus *Letbri* referendum est, cum non solum toto habitu, sed corpore alato,

alato, elytris separatis, tota antennarum, partiumque oris omnium conditione omnino differt. His potius cum *Lucanis* convenit, saltem cum aliquis, nam magnam inter varias hujus generis species observavimus characterum discrepantiam; differt autem a communi earum conditione habitu, capite parvo, thorace convexo, lateribus deflexis; elytris convexis; antennis articulo primo minus gracili non arcuato, ultimo minus perfoliato; labio inferiori integro corneo; palpis crassioribus, posterioribus articulis non subæqualibus; penicillorum, saltem perfectorum, absentia, &c.

Proprium hinc certe genus constituere videtur, hancque ob rationem follicitam partium characterificarum descriptionem dedimus; pro tempore autem, cum singula sit species, ad *Lucanos* retulimus.

SCARABÆUS PROBOSCIDEUS.

TAB. XX. Fig. 2.

Ratione habitus, *Copris*, recentiorum.

Ratione capitis thoracisque conditionis pertinet ad familiam secundam *Scarabæorum* Fabricii.

SCAR. scutellatus ferrugineus; thorace mutico subretuso; clypeo postice bilobato, antice in medio prolongato, cornu brevi, erecto, obtuso, emarginato; apice subemarginato in rostrum gracile, subattenuatum, subdecurvum, terminante.

Color totus ferrugineus, interdum obscurior & nigricans.

Clypeus thoraci multo angustior, planiusculus, postice ad utrumque latus in lobum ocularem dilatatus, antice in medio prolongatus in laminam cujus margines laterales per lineam elevatam supra caput ad basin usque sese extendunt, & sic lobos posticos laterales a clypeo ipso distinguunt. In laminæ hujus medio; a thorace con-

siderato,

siderato, cornu breve seu tuberculum erectum, apice obtuso-emarginatum. Lamina ipsa versus apicem dilatatur, & hic submarginata prolongatur in rostrum longitudine totius clypei, gracile, subattenuatum, quadrangulare, subdecurvum, apice crassiori marginato proboscideo, furcato, furcis lateralibus deorsum spectantibus apice paulo magis divaricantibus. Rostriformis hæc clypei prolongatio valde singularis est solida atque imperforata. Subtus lamina clypei in medio elevata, paulolum supra os fulcro verticali, longitudine 3 linearum, apice furcato, munita est. TAB. XIX. fig. 12.

Clypeus præsertim antice & rostrum sub lente scabriuscula; cæterum subnitida, ferruginea, marginibus omnibus, apice tuberculi medii, apice furcisque rostri, nigris. Latera clypei totius præsertim postice pilis ferrugineis in fasciculos longos, acutos collectis.

Antennæ ferruginæ, clava magna ovato-rotundata, sublamellata.

Thorax brevis, elytris latior, valde convexus, subretusus, inermis, forma & conditione feminæ *Scar. 4-dentis*, *Cyclopis*, &c. similis, at non ad margines laterales anticos dilatatus ut in *Cyclope*. Ad latera punctis impressis subscabriusculus, antice & in medio glaber, macula rotundata impressa supra marginem lateralem; marginibus omnibus elevatis, lateralibus fasciculis pilosis, ferrugineis acuminatis, ciliatis; margine postico rotundato-truncato. Cæterum subnitidus, ferrugineus.

Scutellum magnum, triangulare, planum, concolor.

Elytra valde convexa, totum corpus ambientia, excavato punctato-striata, subnitida, ferruginea.

Corpus subtus subscabriusculum, obsolete ferrugineum, pilis sat longis ferrugineis undique hirtum.

Pedes concolores, hirti; femoribus anticis & posticis incrassatis; tibiis anticis extrorsum dentatis, dentibus 5 validis sensim decrementibus nigris;

nigris; tibiis mediis & posticis triquetris, valde spinosis; tarsis hirtis versus insertionem nigro marginatis.

Femina incognita.

Magnitudine *Scarabæo Cyclopi* accedit, *Sc. quadridentem* multum superat.

Habitu & forma immo & colore *Scarabæis Cyclopi*, *Coriphæo* & *quadridenti* accedit.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

SCARABÆUS DYTISCOIDES.

TAB. XX. Fig. 3.

Ratione capitis thoracisque conditionis pertinet ad familiam sextam *Scarabæorum* Fabricii.

SCAR. exscutellatus, muticus, niger, opacus; clypeo bidentato; thorace subplaniusculo, conico; elytris latis, planis, apice rotundatis, dentatis, striatis; tibiis anticis sexdentatis, posticis ciliatis; tarsis mediis longissimis.

Clypeus subovatus, postice convexiusculus, antice subexcavatus, sub lente punctis minimis subscabriusculus, niger, opacus; margine laterali hirto, parumper reflexo, antico subemarginato & in medio bidentato, dentibus longioribus, acutis, subreflexis, approximatis, antrorsum divergentibus.

Antennæ nigræ, clava cinerascens.

Thorax subplaniusculus, conicus, postice elytrorum fere latitudine, antice multo angustior, utrinque truncatus, paulo latior quam longus, lateribus antice subinflexis; niger opacus, sub lente subscabriusculus.

Scutellum

Scutellum nullum distinctum, ast elytra hoc loco spatium triangulare fat magnum haud impletum formant.

Elytra ovata, plana, totum corpus tegentia, apice rotundata, tenuia, opaca, nigra, sub lente punctis minimis elevatis crenulata, longitudinaliter striata, striis leviter impressis 7 in utroque, fulcoque elevato versus marginem lateralem. Dentes 7 in utroque versus apicem, quorum unusquisque inter duas strias impressas parum oblique positus fat validus, basi latior, triangularis, compressus.

Anus magnus truncatus, triangularis ut in *Scar. sacro & gibboso*, margine utrinque elevato, glaber, opacus, niger, sub lente crenulatus.

Corpus subtus nigrum, nitidum, *Sc. sacro* simile.

Femora antica valida, compressa, clavata; media paulo graciliora compressa, subcurvata; postica graciliora compressa; omnia glabra nitida, marginibus pilis longis, atris, hirtis.

Tibiae anticae hirtae, extrorsum dentatae, dentibus 6, validis longis acutis, 3 primis longissimis fere aequalibus.

Tibiae mediae graciles, subtriquetrae, hirtae, spinosae, apice spinis duabus longioribus.

Tibiae posticae validiores, triquetrae, pilis densis, longis, atris ad margines ut in *Sc. sacro*, ciliatae, apice spina unica munitae.

Tarsi hirti, spinosi, antichi brevissimi; postici paulo longiores; medii longissimi, triplo posticis & quidem ipsis tibiis longiores.

Magnitudine *Scar. sacrum* aequat.

Habitu & forma *Sc. sacro* & similibus accedit, ast thoracis figura singulari conica, angusta, elytris complanatis pedibusque multo longioribus multum differt, & primo intuitu *Dytisci* similitudinem refert.

Patria, Brasilia.

Ex Museo D. Francillon.

CETONIA PHILIPSII. (SCARABÆUS Linn.)

TAB. XX. Fig. 4.

CET. clypeo elongato, emarginato, atro; thorace planiusculo piceo marginibus atris; elytris planiusculis, atris, fulcatis, sulcis excavatis latis ex fulvo hirtis.

Clypeus magnus, planus, elongatus, cylindricus, apice emarginatus, densim excavato punctatus, margine laterali elevato, ater, opacus.

Oculi laterales fuscoflavescentes.

Antennæ atræ, structura communi, at articulus primus valde magnus.

Thorax planiusculus, antice angustior, ad latera parum sinuatus, postice latior, at elytris paulo angustior, margine postico sinuato, laterali subreflexo; leviter excavato punctatus, magis conspicue ad latera, haud nitidus piceus, marginibus omnibus atris.

Scutellum magnum, planum, triangulare, atrum.

Elytra plana, corpore haud breviora, apice paulo angustiora quam basi, haud nitida, glabra, atra, sulcis in utroque quatuor longitudinalibus leviter excavatis, nec basin nec apicem attingentibus, pilis brevibus fulvis repletis; duobus exterioribus haud distinctis, interiori brevissimo, medio latissimo, cujus margines elevatæ versus apicem connivent & tuberculum leve formant.

Corpus subtus atrum, opacum, crassum pilis fuscis hinc inde hirtum, sterno porrecto, compresso, subtriangulari.

Pedes atri, femoribus anticis hirtis brevioribus, posticis 4 incrassatis, compressis; tibiis anticis brevioribus, subpalmatis extrorsum tridentatis; mediis et posticis cylindricis, extrorsum in medio unispinosis, apice 4-spinosis; tarsis 5-articulatis.

Magnitudine *Cetoniæ* (Scarabæum Linn.) fascicularem multum superat.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

SILPHA LACRYMOSA.

TAB. XX. Fig. 5.

SILPH. atra; thorace plano in medio atro tuberculato, lateribus late marginatis testaceis; elytris subconvexiusculis medio atris, apice & ad latera testaceis, maculis oblongis deorsum incrassatis, elevatis.

Caput deflexum, oblongo-quadratum, glabrum, opacum, atrum, linea transversa, elevata, subsinuata cervicis inter oculos, aliaque haud distincta frontali, media, longitudinali.

Oculi laterales, ovati, testacei.

Antennæ subhirtæ, atræ, articulis 3 ultimis rufis.

Thorax planiusculus, latus, margine antico emarginato, postico subsinuato-truncato, laterali rotundato, subreflexo; antice parum angustior, & tota forma *Silphæ thoracicæ* & similibus accedens; glaber, opacus, minime nitidus, in medio ater & hic tuberculis aliquot irregularibus, parum nitidis notatus, ad latera testaceus, colore thoraci *Silph. thoracicæ* omnino simili, at minime nitido, per atrum in medio emarginato.

Scutellum magnum, planum, subexcavatum, triangulare, atrum.

Elytra parum convexa, basi thoracis latitudine, apice latiora dilatato-rotundata, margine laterali subexcavato, subreflexo; in medio atra, opaca, lateribus & apice late testaceis, maculis elevatis paulolum nitidis, glabris, lacrymosis, in utroque 10. Tres ad futuram superiori lineari, media infra hanc, oblonga deorsum crassiori, tertia minori, ovata; quatuor in medio, prima lineari, secunda oblonga deorsum incrassata, tertia oblonga valde incrassata, similima guttulæ seu lacrymæ deploranti, ultima oblonga, obliqua, interdum divisa versus apicem. Tres exteriores subrotundæ minimæ.

Omnes, ultima apicis excepta, discum atrum obsident. Plurimæ earum ob figuram oblongo-ovatum deorsum incrassatam similes sunt guttulis decadentibus seu lacrymis, & tres series longitudinales haud regulares constituunt.

Color ater disci elytrorum tantum a corpore transparente, sic ut thoracis, maculæ autem atræ per se.

Corpus subtus cum pedibus atrum, subnitidum.

Pedis postici longiores, antici brevissimi.

Magnitudo *Silph. littoralis* ut habitus, quamvis elytra apice latiora & thoracis forma diversa.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

Hospitatur etiam in Museo D. Marsham.

CLERUS FASCICULATUS. (ATTELLABUS *Lin.*)

TAB. XX. Fig. 6.

Cl. niger; thorace subglobofo, scabro, pubescente, atro; elytris elongatis, cylindricis, porcatis, nigris, basi fasciculis duobus pilosis, erectis, fasciaque lata transversa, albomarginata, subpubescente, nitida versus apicem, atris; antennis flavescens.

Caput thoraci insertum illoque paulo angustius, margine antico subemarginato, laterali antice ante oculos elevato; punctis excavatis, densis, scabrum, subpubescens præsertim ad latera pilis longioribus atris, hinc inde cinerascens; subnitidum, atrum.

Oculi laterales, ovati, nigro-picei.

Antennæ crassæ, moniliformes, extrorsum crassiores, articulis 3 ultimis majoribus, *Clero apiario* similes, flavescens.

Palpi quatuor, securiformes omnes, quamvis articulus ultimus anteriorum minor. His differt a communi hujus generis conditione

partium oris, & convenit cum *Cl. apiario* pari modo discrepante.

Thorax convexus, subglobosus, immarginatus, anticè truncatus, postice rotundatus, punctis impressis scaber, pilis atris & hinc inde cinerascens, pubescens, hirtus, ater.

Scutelli loco punctum villosum, cinereo-album.

Elytra convexa, subelongata, cylindrica, apice rotundata, humeris paulo prominulis, opaca, nigra, punctis majoribus, profunde excavatis, densis, catenulatis, porcata; fasciculo in utroque, magno, erecto conico, atro, versus basin a pilis densis conflato, alioque multo minori, haud distincto infra hoc & supra medium elytri, cinereo; fasciaque lata, communi, transversa, sinuata, subpubescente, subnitida, atra pilis cinerascens marginata, postica, apicem excludente. Macula parva, glabra, lutea ad marginem anteriorem in directione parallela cum fasciculo cinereo, aliaque paulo majori tali infra illam ad marginem & angulum externum, superiorem fasciæ.

Corpus atrum, hirtum subpubescens, abdomine polline flavo adperso.

Pedes atri, rugosuli, hirti, femoribus anticis paulo crassioribus; tarsis 4-articulatis, piceis, subtus flavo-fuscis, hirtis, pubescentibus; *Cler. apiario* similes forma, breviores, latiores, articulis magis emarginatis quam in *Cler. mutillario* Fabr.

Duplo major est *Clero mutillario*, & inter hanc & *Clerum apiarium* medium tenet; convenit cum priori habitu & colore, differt autem conspicue respectu conditionis antennarum, palporum, tarsorumque.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

PRIONUS LEPIDOPTERUS. (CERAMBIX Linn.)

TAB. XXI. Fig. 1.

PR. thorace subcylindrico, convexiusculo, subunidentato, subvillosa, rufo-piceo nigro-maculato; elytris subcoriaceis, abdomine brevioribus, apice dehiscentibus, truncatis, subemarginatis, humeris subgibbosis, margine laterali deflexo; lineatis subnitidis, rufo-piceis, maculis ovatis, villosis, ex flavo cinerascens; abdomine elongato, sphingiformi variegato.

Caput thoraci angustius, insertum, transversum, planiusculum, atrum, fronte & margine laterali pilis densis, brevibus ex flavo cinerascens, pubescentibus; mandibulis porrectis, simplicibus, apice mucronatis, incurvis, basi hirtis, atro-piceis, longitudine capitis.

Oculi transversii, subreniformes, marginales, fusci.

Antennæ setaceæ, atræ, elytris haud breviores.

Thorax brevis, transversus, subconvexus, subcylindricus, margine laterali in medio subunidentato; subvillosus, magis ad latera pilis brevissimis ex flavo cinerascens; cæterum glaber, subnitidus ex rufo-piceus, margine laterali maculisque duabus magnis, irregularibus, dorsalibus, vitta longitudinali pubescente a margine laterali distinctis, vel lateribus late, dorsoque atris.

Scutellum magnum, planum, triangulare, atrum.

Elytra subcoriacea, elongata, subcylindrica, abdomine breviora, apice angustiora & ab invicem dehiscentia, truncato-subemarginata, margine laterali deflexo, versus basin impresso, hinc humera gibbosa; margine, futura lineisque elevatis in utroque quatuor longitudinalibus; quarum exterior subdistincta in margine deflexo, abbreviata a basi & apice remota; insequens ibi ubi margo deflectit ab humere ad apicem usque; tertia infra basin usque paulo ante apicem; quarta interna a latere scutelli, brevissima.—

Elytra

Elytra cæterum glabra, subnitida, rufo-picea, maculis ovatis & oblongis, majoribus, ex pilis brevibus, densis, ex flavo cinerascens, pubescentibus; irregulariter variegata.

Thorax & pectus subtus atra densim ex cinereo pubescentia.

Abdomen elongatissimum, crassum, teres, sensim versus apicem attenuatum, paulum ad unum alterumve latus flexum, apice obtuso acuminato; glabrum, nitidum, rufum, margine superiori omnium segmentorum late atro, maculaque magna, transversa, oblonga pubescente, cinereo-flavescente ad latus utriusque segmenti, ultimo excepto rufo nigroque indistincte variegato.

Singularis abdominis forma & pictio magnam cum Sphingibus affinitatem & similitudinem refert.

Pedes breves, anteriores breviores, ultimi longiores ex rufo testacei, femoribus subpubescentibus, tibiis interne subbispinosis, plantis subtus fericeis.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

CERAMBIX GIRAFFA.

TAB. XXI. Fig. 2.

CER. obscurus, immaculatus; thorace inermi elongato, in medio angustato, transversim rugosulo; elytris subconvexis, basi scabriusculis, apice glabrioribus, scutello cinerascens, villoso.

Caput angustum, cylindricum, vertice elongato, linea dorsali, media subdistincta, nitidiori, subimpressa; haud nitidum, atrum, glabrum, vage & sparsim excavato punctatum, fronte inter antennas profunde canaliculata, mandibulis validis, incurvis, acutis, compressis.

Oculi atrii, reniformes, ad antennarum radicem, easque ambientes.

Antennæ

Antennæ corpore duplo longiores, atræ, subscabriusculæ, articulis 5, 6, 7, 8, paulum arcuatis.

Thorax angustus, medio angustissimus, valde elongatus, una cum capite elytrorum longitudine, inermis, immarginatus, teres, antice latitudine capitis, postice paulo latior, at elytris angustior, nitidus, niger, densim transversim rugosulus.

Scutellum sat magnum, femirotundum, planum, tomentoso-cinerascens.

Elytra convexiuscula, subcylindrica, apice parum rotundato-atenuata, angulis humeralibus paulo prominulis; nitida, obscura, ex fusco-viridana, subænea, colore *Lamiæ* (*Cerambici Linn.*) *Sartori* affinia, basi usque ad medium scabra, a medio ad apicem glabra.

Corpus subtus nigrum; thorax transversim rugosulus.

Pedes unicolores, antici longissimi, longitudine totius corporis; medii multo breviores; postici brevissimi.

Femora gracilia, subcylindrica, in medio parum incrassata, mutica.

Tibiæ graciles, anticæ versus apicem dente acuto interius; mediæ & posticæ eodem loco sed exterius dente obtuso armatæ.

Tarsi quadriarticulati, articulis conicis, tertio emarginato, 4to unguato, antici multo majores, barbati.

Aliud specimen, forte sexus alter, minus, antennis brevioribus articulis non arcuatis, thorace multo breviori, nec tam angusto, pedibus omnibus æqualibus, tarsis anticis non majoribus nec barbatis.

Differt a *Cerambice longicollis* Fabricii (*Entom. Syst. emend. t. i. p. 2. p. 265. n. 52. Olivier Ent. t. ij. f. 73.*) cui habitu similis; thorace rugoso, in medio angustissimo; elytris immaculatis; tibiis omnibus & diverso modo dentatis, pedibus anticis longissimis tarsis anticis barbatis, &c.

Diversa omnino hinc species esse videtur, quamvis femina minus discrepat nullo modo *C. longicollis* confundenda antennarum longitudine satis distincto.

Patria, Nova Hollandia.

Ex Museo D. Francillon, D. Marsham.

CERAMBIX FICHTELII.

TAB. XXI. Fig. 3.

CER. æneus; capite latissimo, transverso, tuberculò laterali villoso ferrugineo-flavescente, oculum dividente; thorace angusto cylindrico; elytris abdomine multo longioribus, valde attenuatis, apice prolongatis, divergentibus, subbarbatis.

Caput breve, latissimum, transversum, planum, nigrum, pilis densis, tenuibus, fericeis, nitidis, æneis, villosum linea media dorsali impressa. TAB. XIX. fig. 13.

Oculi laterales, gibbi, per tuberculum fericeo-villòsum, ferrugineo-flavum, post antennas situatum, tali modo divisi ut duo ad utrumque latus appareant. In omnibus quidem *Cerambycibus* Linn. *Prionis*, scilicet, *Lamiis*, *Saperdis*, &c. Fabr. oculi sunt magni lunati, arcuati vel reniformes, antennarumque insertionis tuberculum plus minus circumambientes. Singulare autem in hac specie est, eos tuberculo proprio, magno, tali modo divisos vel interruptos esse ut immo sub lente vix ulla eorum appareat connectio. TAB. XIX. fig. 14. Oculus externus gibbosus, pars ejus posterior ad verticem post antennas haud convexa, ovata.

Antennæ corpore longiores, setacæ, nigrescentes.

Frons latus, transversus; labium superius angustum, hirtum, piceum.

Mandibulæ exsertæ, apice acuminatæ, incurvæ, basi latæ, compressæ; nitidæ, piceæ, fulco laterali, lævi, hirtò, exarata.

Thorax planiusculus, cylindricus, muticus, immarginatus, transversim rugosulus, postice in medio impressus, nigro-æneus, lineis duabus vel quatuor, plus minus distinctis, dorsalibus, longitudinalibus, fericeo-villoso-æneis, punctisque duobus majoribus, plus minus conspicuis flavescentibus ad utrumque latus.

Scutellum

Scutellum parvum, subquadratum, planum, medio subimpressum, glabrum, nitidum, obscure æneo-nigrum.

Elytra subconvexa, basi thoraci paulo latiora, abdomine multo longiora, elongata, apice valde acuminato-attenuata, prolongata, angustissima, imo apice ab invicem divergentia & pilis nigris ciliato-barbata; glabra, subnitida, villosula, obscure ænea, futura, a medio ad apicem, fulcoque longitudinali, a basi ad apicem elevatis.

Thorax subtus & pectus, nigra, fericeo-villosa, macula laterali distincta, ovata, villosa, lutea ad marginem pectoris posticum, aliaque subdistincta tali ad marginem anticum priori parallela.

Abdomen subtus nigro-piceum, glabrum, nitidum, macula utrinque laterali, parva, villosa, lutea, ad utriusque segmenti marginem inferiorem.

Pedes obscure ænei, villosi, femoribus omnibus paulum inflatis.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

SCARITES SCHROETTERI. (CARABUS *Linna.*)

TAB. XXI. Fig. 4.

SCAR. ater; capite magno, porrecto, postice bituberoso, mandibulis magnis exsertis, basi unidentatis; thorace planiusculo, marginato, subcordato; elytris planiusculis cylindricis, marginatis, striatis; tibiis anticis palmato-subdentatis, posticis incurvatis.

Omnium longe maximus, ater, nitidus.

Caput magnum, porrectum, subquadratum, thoracis latitudine, postice angustatum in collum teres, crassum, (TAB. XIX. fig. 16. a. a.) fronte subimpressa, subrugosa (e); postice ad latera tuberosum, tuberculo utrinque fat magno, rotundo post oculos (b), fulcoque

elevato, longitudinali laterali, abbreviato, ab antennarum insertionis loco ad tuberculum usque decurrente (d).

Antennæ moniliformes, haud thoracis longitudine, articulo primo maximo, crasso, cylindrico, 3 insequentibus moniliformibus, multo minoribus, primo ex his minimo, 7 ultimis his paulo majoribus, æqualibus, compressis, marginibus villosis, hirtis ferrugineo-fuscis; cæterum atræ, lateraliter inter oculos & mandibulas insertæ.

TAB. XIX. fig. 16. g. h. i.

Oculi subglobosi, laterales, fusci. TAB. XIX. fig. 16. c.

Mandibulæ magnæ, validæ, crassæ, exsertæ, porrectæ, longitudine capitis, excepto collo, arcuatæ, incurvæ, acutæ, striatæ, basi multo crassiores, interne dente valido, obtuso, exterius dilatatæ subunidentatæ. TAB. XIX. fig. 15. b—f. fig. 16. k.

Palpi sex, filiformes, inæquales; anteriores breviores, biarticulati (fig. 17. a); medii longiores, 4-articulati, articulo primo minimo (b); posteriores longissimi, 4-articulati, articulo primo crasso, minori, cylindrico rufo (fig. 18). Cæterum obtuso-acuminati, subhirti, nigri.

Maxillæ acutæ, subarcuatæ, corneæ, interne pilis ferrugineis ciliatæ.

TAB. XIX. fig. 15. g.

Labium superius corneum, emarginatum.

Labium inferius majus, corneum, subtridentatum, dentibus externis multo majoribus, rotundatis, medio minimo, diviso. TAB. XIX. fig. 15. h. h. i.

Thorax a communi hujus generis structura diversus, nam subcordatus ut in familia prima Caraborum, antice elytrorum latitudine, postice angustior; planiusculus, margine laterali reflexo, antico & postico truncatis, angulis subprominulis, obtusis. Glaber, ad latera substriatus, striis transversis levibus, linea dorsali media subimpressa, aliaque laterali abbreviata, curva ad angulos posticos.

Scutellum

Scutellum mediocre, planum, subcordatum.

Elytra oblonga, cylindrica, non connata, convexiuscula, profunde longitudinaliter striata, striis in utroque 7 ante apicem conniventibus; apice rotundata, subsinuata, lateribus deflexis ante marginem sulco lato, leviter excavato, rugosula, margine ipso subreflexo.

Thorax *subtus* convexus, sulco abbreviato impresso in medio.

Pectus convexum, sulco longitudinali impresso in medio, sulcoque elevato, subarcuato ad utrumque latus.

Abdomen breve, convexum, segmentis angustis.

Femora antica brevissima, incrassata, posticæ thoracis parti inserta.

Femora media paulo graciliora, pectoris basi inserta.

Femora postica dimidio fere prioribus longiora, crassa, subcylindrica, valde postica, haud 8 lin. ante anum abdomini inserta.

Tibiæ anticæ compressæ, dilatato-palmatæ, inferius scabræ, apice dentibus seu spinis 3 acutis, sat longis; margine exteriori parum sinuato, in medio paulum extenuato; margine interno excavato & hoc loco dente seu spina sat longa, acuta, deformi, incurva, armato. TAB. XIX. fig. 19.

Tibiæ mediæ graciles, subcylindricæ, subcompressæ, scabræ, subspinosæ, apice dente superius, & spinis duabus, acutis, inferius, armatæ.

Tibiæ posticæ subcylindricæ, subcompressæ, subarcuato-incurvæ, subspinosæ, apicis dente interno, spinisque duabus inferius.

Tarsi omnes 5-articulati, articulo 1mo & 5to longioribus, 3 mediis æqualibus, conicis.

Patria, Nova Hollandia.

Ex Museo D. Francillon.

ANNOTATIO.

Genus, *Scarites*, a Fabricio Entomologisque recentioribus constructum, comprehendit species a Linnæo promiscue sub *Caraborum* *Tenebrionum*que nomine descriptas, multasque alias recenter detectas, characteribus omnino distinctis fatis differentes. Differunt a *Carabis*, quibus habitu simillimi forte, capite thoraceque magnis, latis; mandibulis validis, porrectis dentatis; antennis moniliformibus (non filiformibus) brevioribus crassioribus; palpis filiformibus, minime truncatis; labio dentato, non truncato; tibiis anticis dentatis, &c.

Hæc supra descripta species a communi *Scaritum* structura characteribusque huic generi adscriptis, aliquantum differt, hancque ob rationem accuratiorem dedimus descriptionem.

EXPLICATIO TABULARUM.

TAB. XIX.

Lucanus æneus.

Mas.

- Fig. 1. Capitis cum mandibulis pagina inferior.
 2. Mandibula a latere conspecta.
 3. Mandibulæ pagina inferior.
 4. Maxilla.
 5. Antenna.
 6. Palpi.
 7. Maris tibia et tarsus anterior.
 8. Fœminæ tibia et tarsus anterior.

Ejusdem varietas.

9. Capitis cum mandibulis pagina inferior.

8.

10. Mandibula

- Fig. 10. Mandibula a latere conspecta.
11. Mandibulæ pagina inferior.
12. Clypeus *Scarabæi proboscidei*.
Ceramix Fichtelii.
13. Caput a fronte adspectum.
14. Oculi divisio per tuberculum.
Scarites Schroetteri.
15. Labium inferius cum mandibula maxillaque.
a. Margo capitis inferior.
b. Mandibula arcuata incurva.
c. Extenuatio dentiformis exterior.
d. Dens internus baseos validus obtusus.
e. Apex acutus incurvus.
f. Sulci abbreviati.
g. Maxilla arcuata acuta interne ciliato-pilosa.
h. h. Labium inferius corneum magnum valde emarginatum,
i. subdentatum in medio, dente bifido.
16. Labium superius cum antenna, &c.
a. a. Collum.
b. Tuberculum post oculum.
c. Oculus.
d. Sulcus elevatus lateralis.
e. Impressio frontalis.
f. Labium superius emarginatum.
g. Antennæ articulus primus cylindricus maximus.
h. Articuli tres insequentes subæquales moniliformes.
i. Articuli 7 ultimi compressi.
k. Mandibula.
17. a. Palpus anterior.
b. Palpus medius.

18. Palpus

Fig. 18. Palpus posticus.

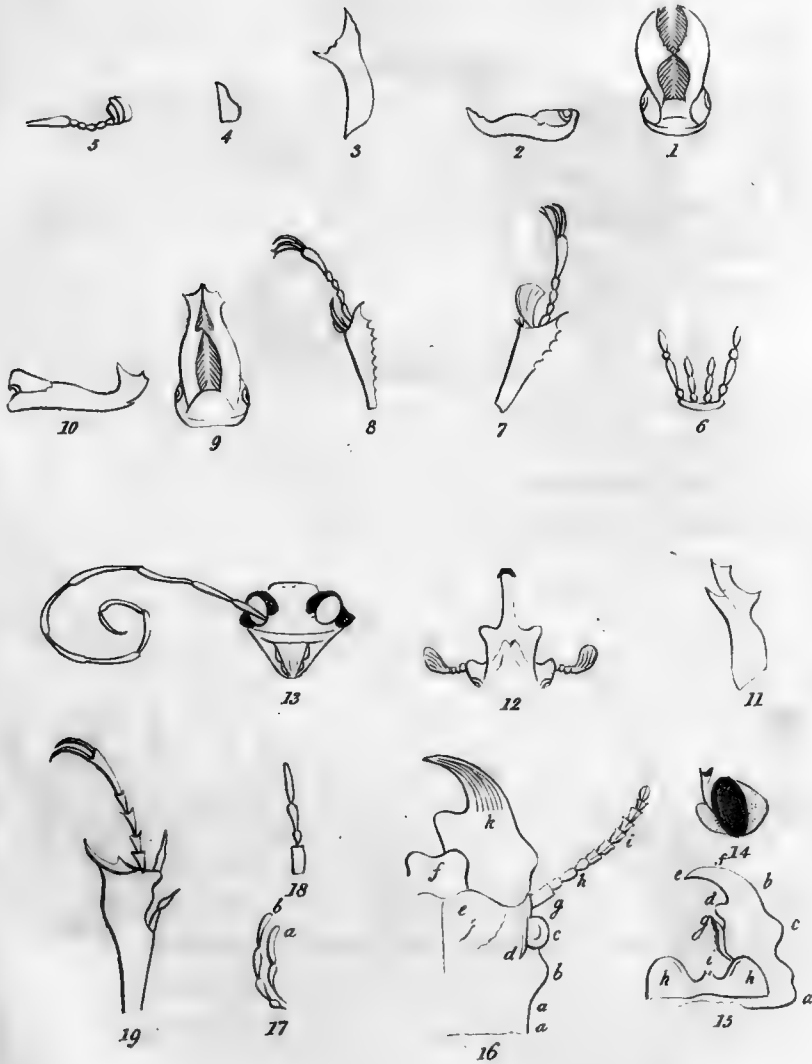
19. Tibia et tarsus anterior.

TAB. XX.

1. *Lucanus æneus.*
2. *Scarabæus proboscideus.*
3. *Scarabæus dytiscoides.*
4. *Cetonia Philipsii.*
5. *Silpha lacrymosa.*
6. *Clerus fasciculatus.*

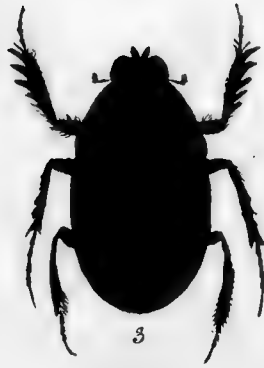
TAB. XXI.

1. *Prionus lepidopterus.*
2. *Cerambix Giraffa.*
3. *Cerambix Fichtelii.*
4. *Scarites Schroetteri.*



Staphylinidae



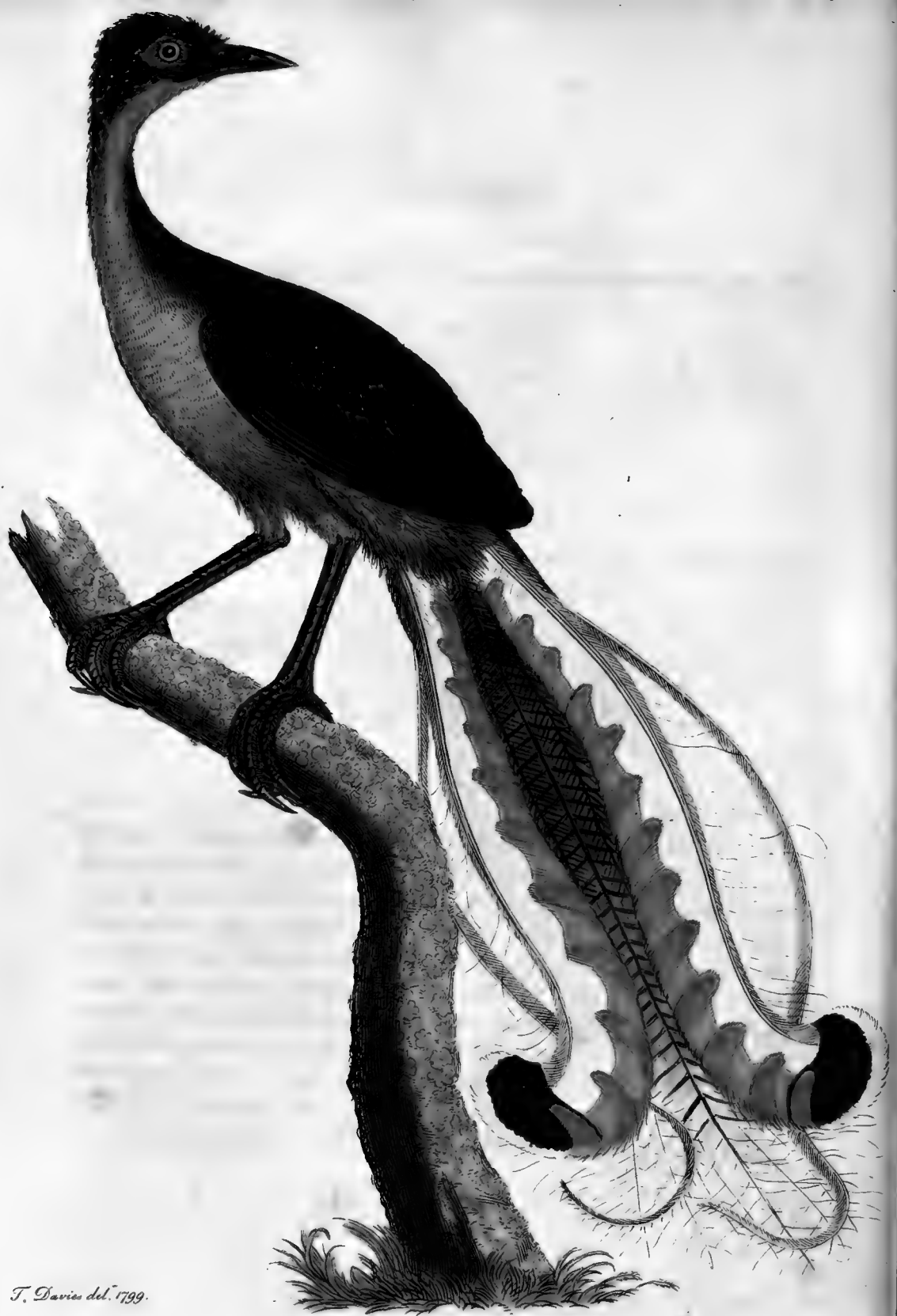












J. Davis del. 1799.

XVII. *Description of Menura superba, a Bird of New South Wales.*
By Major-General Thomas Davies, F.R.S. and L.S.

Read November 4, 1800.

MENURA.

CHAR. GEN. *Rostrum validiusculum, convexo-conicum.*

Nares ovatae in medio rostri.

*Reetrices elongatae, pinnulis decompositis; intermediae
2 longiores angustae, exteriores ad apicem patulae,
revolutae.*

Pedes validi ambulatorii.

MENURA SUPERBA.

TAB. XXII.

THE total length of this singular bird from the point of the bill to the end of the broad tail feathers is 43 inches; 25 of which are in the tail alone. The bill rather exceeds an inch in length, is strong, formed much like that of a peacock, and black, with the nostrils, which are long open slits, rather large, placed near the middle of its length. The head, which is somewhat crested at the hind part, neck, shoulders, back, upper tail coverts, and upper surface of the tail feathers, of a dark brownish black. Throat rufous, reaching some way down the middle of the neck. Breast, belly, and vent gray. The feathers of the latter are long, very soft, and of a silky texture. Thighs nearly of the same colour, rather long, and feathered

down to the knee. Scapulars of a brownish tinge. Upper tail coverts, and prime quill feathers, which are somewhat curved at the ends, brown black. Edges of the quills gray. The legs long and very strong, covered with large scales, especially in front. The feet, which are likewise large, and the nails, are black; the last somewhat crooked, convex above and flat beneath; the hind nail near three quarters of an inch long.

The tail consists, in the whole, of sixteen feathers; all of which, except the two upper or middle ones, and the two exterior on each side, have long slender shafts furnished on each side with delicate long filaments, four inches or more in length, placed pretty close towards the rump, but more distant from each other as they approach the extremity, and resemble much those of the Greater Paradise Bird. The two middle or upper ones are longer than the rest, slender, narrow at the base, growing wider as they approach the ends, which are pointed; webbed on the inner edge all the way, and furnished with some distant hair-like threads near the end on the outer side, of a pale gray colour beneath, and brown black above, as is the rest of the tail. The two exterior feathers on each side are of an extraordinary construction, rather more than an inch wide at the base, and growing wider as they proceed to the ends, where they are full two inches broad and curve outwardly; the curved part is black with a narrow white border; the quills of these feathers are double for two thirds down from the rump. The general colour of the under sides of these two feathers is of a pearly hue, elegantly marked on the inner web with bright rufous coloured crescent-shaped spots, which, from the extraordinary construction of the parts, appear wonderfully transparent, although at first sight seemingly the darkest; they are also elongated into slender filaments of an inch or more, especially towards the extremities.

The figure of the male, which accompanies this description, was
taken

taken from a specimen sent from New South Wales as a present to Lady Mary Howe. I have also seen two other specimens in the possession of the Right Hon. Sir Joseph Banks, which I believe have since been deposited in the British Museum.

SINCE I had the honour of communicating to the Linnean Society the foregoing description of the *Menura*, I have been favoured with both male and female of that extraordinary bird from my friend Governor King, by the Buffalo store-ship; and I am thereby enabled to lay before the Society a description of the different sexes. I find, indeed, that with a little deviation the same characters and colours will serve for both of them. The female, however, is somewhat smaller, being in length, from the crown of the head to the end of the tail, only 31 inches. The general plumage of the whole bird is of a dull blackish colour, a little rufous under the chin and throat, and of a brownish cast on the scapulars, as in the male. The plumage of the whole body, from the breast to the vent, and from the shoulders to the rump, is composed of long, slender, thread-like, silky feathers, resembling fringe, of a dull grayish black; lighter on the breast, belly, and vent. The bill and legs, which are strong and furnished with large scales, as in the cock, are black. From the head to the rump 14 inches. The tail 18 inches, also of a dull brown black colour above and gray beneath. The two upper tail feathers are sharp pointed at the ends; the rest are rounded and darker in colour, and shorten by degrees, as they approach the rump, so as to appear cuneated. The two outer feathers are shorter than the rest, bent in form like those of the male, brown black above, of a pearly gray beneath; and the crescents, which are

of a deeper rufous colour, are not so visible nor so large, but more transparent if possible, than those of the cock. They are about an inch and a half broad, and not black or longer at the ends as in the other sex.

From these birds being found in the hilly parts of the country, they are called by the inhabitants the Mountain Pheasant. With respect to their food or manners I have not as yet obtained any particular account. In my specimens, there is a nakedness round the eyes, but whether this is from the feathers having fallen off I know not. I rather think otherwise, and that it may be brightly coloured as in many other birds.

Blackheath,
19th June, 1801.

XVIII. *On the Doryanthes, a new Genus of Plants from New Holland, next akin to the Agave.*

By Joseph Correa de Serra, LL.D. F.R.S. and L.S.

Read December 2, 1800.

AMONGST the various new and interesting plants with which New Holland has of late enriched Botany, none perhaps has an equal claim to public notice with the plant which forms the subject of the present paper. Its beauty, its shape and elegance, and the tenacity of its vital powers, entitle it to particular attention both from the cultivator and the naturalist.

It was found in the mountainous part of the colony of New South Wales, by Mr. George Bass, A.L.S. who brought the first specimens of it last year to Europe, in the ship *Perseverance*. Other specimens, in a high state of preservation, have since been brought in spirits by Governor Hunter. From both these sources, and a single flower which came to perfection at Kew, from a portion of stem without roots, which had been cut many months before, in New Holland, the following description of the genus has been made, and the character established:

DORYANTHES*.

FLOS.

Calyx nullus, nisi spathæ partiales.

* From the Greek *Δορυ*, *hasta*; *Δορυανθης*, *Hasta florida*.

Corolla monopetala, infundibuliformis, sexpartita; laciniae sex, oblongo-lanceolatae, concavae, dorso carinatae, tres interiores basi latiores.

Stamina. Filamenta sex, longitudine fere petalorum, subulata, antherarum bases profunde penetrantia; antherae erectae, subcylindricae, biloculares, post fecundationem extinctoriiformes.

Pistillum. Stylus unicus (ex tribus connatis), trifurcatus, longitudine staminum; stigma trilobum.

FRUCTUS.

Induviae nullae.

Pericarpium. Capsula turbinato-ovata, subtrigona, trifurcata, vestigiis petalorum stylique coronata, trilocularis, trivalvis; substantia duplex: interior lignosa, exterior corticosa, striata, fibrosa.

Placentatio. Chordulae pistillares sex, per paria dispositae, axi dissepimentorum affixae. Semina chordulis pistillaribus alternatim affixa, ut singula tantum series in unoquoque loculo appareat.

Dehiscentia duplex: per axim dissepimentorum, et per valvarum futuras.

SEMEN LIBERUM.

Forma. Semen planum, reniforme, rugosum. Nucleus lateralis, subtriqueter, dimidiam hujus partem obtinet.

Integumentum. Duplex; exterius spongiosum; nuclei cartilagineum.

Perispermum. Amygdalinum, nuclea conforme.

Embryo monocotyledoneus, minutus. Cotyledon foliaceo-compressa, plana, cuneiformis.

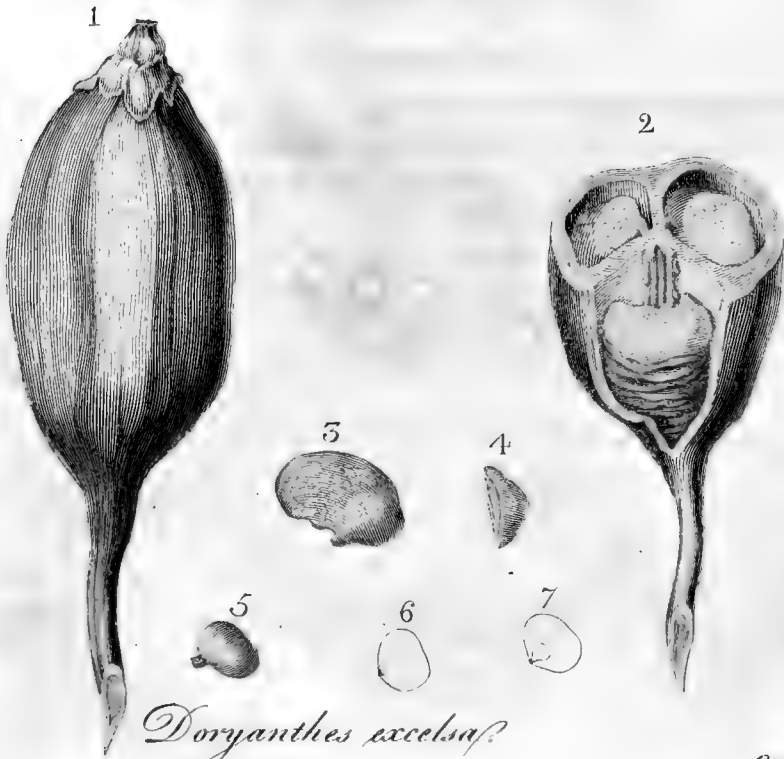
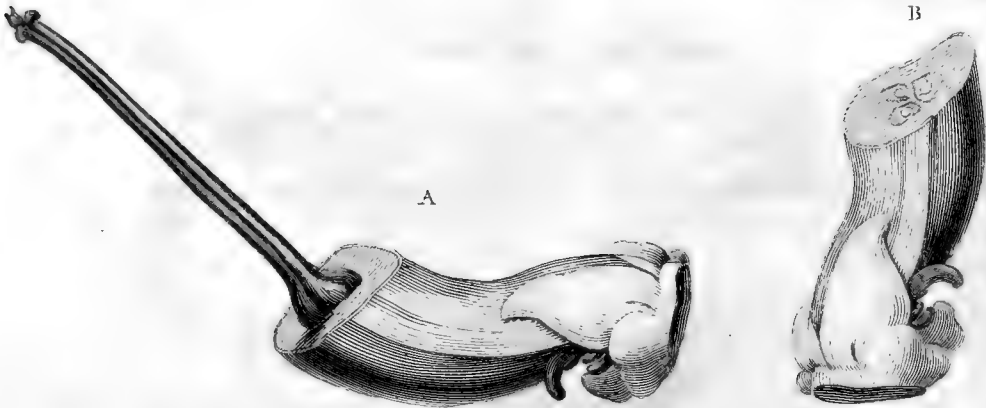
Observation 1. The *Agave*, *Fourcraea*, and *Doryanthes*, have a very strict affinity. The antherae, filaments, and the disposition of seeds offer the greatest differences. The antherae in the *Agave* are *incumbentes*, in the *Fourcraea* the filaments are alated; the corolla
hexapetala.



Doryanthes arcelsa?

G. Queiroz Sculp.





Doryanthes excelsa?

Queiroz Sculp.

hexapetala. The seeds in the *Agave* are ranged in two series; in the *Doryanthes* they are disposed as above, and the antheræ as described.

Observ. 2. The vestiges of the corolla in the fruit persuade me that the corolla is to be considered as *superæ*, but the *traces* of the divisions of petals, which may be remarked in the flower as far as the pedunculus, might perhaps induce a suspicion that the fruit makes one body with the inferior part of the corolla, which by that means *in fructum abit*.

The loftiness of the stem of the only species hitherto known of this genus, which arises to the height of above 20 feet, may warrant the trivial name of *Doryanthes excelsa*.

REFERENCES TO THE PLATES.

TAB. XXIII.

- Fig. 1. The whole flower.
 2. Lacinia of the corolla with a filament.
 3. Anthera extensoriiformis, as it appears after the fecundation.

TAB. XXIV.

- Fig. A. Germen and pistillum.
 B. Horizontal section of the germen.
 1. Capsula.
 2. Horizontal section of the same.
 3. Seed.
 4. Section of the same.
 5. Nucleus.
 6. Naked seed.
 7. Section of the same to show the perispermum and embryo.

XIX. *Observations on several Species of the Genus Apis, known by the Name of Humble-bees, and called Bombinatrices by Linnæus.*

By Mr. P. Huber, of Lausanne in Swisserland.

Read May 5, 1801.

INTRODUCTION.

ON s'est intéressé de tous tems aux Abeilles ; leur industrie a fait désirer de connoître leurs mœurs, et de profiter de leurs travaux ; mais les Bourdons, moins utiles, ont aussi moins attiré les regards : ils ne font connus que par les observations de Mr. de Réaumur ; avant lui, des naturalistes peu exacts avoient fait une espèce de roman de leur histoire, mais il l'a purgée de tout le merveilleux, et il a sçu nous intéresser par le simple récit de faits dont il a été le témoin ; on trouve un précis de ses observations dans la préface du fixième volume in octavo de son *Histoire des Insectes*.

Mr. de Réaumur ne donne pas une description assez détaillée de ces insectes, et les descriptions de Linné et de Géoffroi ne me paroissent pas même suffisantes pour distinguer les divers individus dont chaque famille de Bourdons est composée ; j'ai essayé de les décrire, avec tous les détails propres à les faire reconnoître ; j'ai même joint à mes descriptions des figures précieuses dont quelques uns de mes amis ont bien voulu enrichir ce mémoire.

Mr.

Mr. de Réaumur n'avoit pas vû sur ce sujet tout ce qu'il pouvoit offrir de curieux ; il avoit laissé un vaste champ aux recherches des naturalistes ; il restoit à observer si le logement et le nid des Bourdons étoient toujours tels qu'il les avoit décrits, si ces insectes n'habitoient jamais que des nids de mousse placés au-dessus du terrain, et si le nombre des individus de chaque peuplade étoit limité, ou s'il ne l'étoit pas.

On pouvoit désirer plus de détails que cet observateur n'en a donné sur la cire qu'il a trouvé dans les nids des Bourdons, il étoit curieux de connoître la nature de cette matière, sa formation, et ses rapports avec la cire des Abeilles ?

Les notions que ce célèbre naturaliste nous a laissé sur l'éducation des petits, n'étoient pas assez distinctes et assez détaillées pour satisfaire nôtre curiosité.

Il étoit à désirer de savoir si les Bourdons n'avoient d'autres magazins que ce peu de reservoirs dont parle Mr. de Réaumur, et s'ils tenoient leur miel dans des vases fermés ou dans des vases ouverts ?

Plusieurs traits curieux de l'industrie des Bourdons avoient encore échappé à Mr. de Réaumur ; soit qu'il eût d'autres occupations quand il observoit ces insectes, soit qu'il donnât alors trop peu d'importance à ces recherches. Mais depuis *les nouvelles observations sur les Abeilles*, des problèmes intéressans devoient piquer la curiosité des naturalistes, il étoit important de savoir si l'on trouveroit chez les Bourdons, comme chez les Abeilles, cet attachement et ces soins des petits pour leur mère, s'ils feroient un cercle autour d'elle, et si lorsqu'ils la perdroient ils abandonneroient leur ruche ; si l'on trouveroit quelquefois plusieurs femelles qui pondissent dans le même nid, et si l'on verroit parmi les ouvrières de ces mouches à demi fécondes dont tous les œufs donnent naissance à des mâles ; supposé que cela fût, il falloit encore savoir s'il y auroit quelque rivalité entre toutes ces mouches fécondes ; enfin si les mâles des Bourdons périssent, comme

ceux

ceux des Abeilles dans l'acte de la fécondation, & quelle pouvoit être la durée de la vie de ces insectes.

Le désir ardent de résoudre des problèmes aussi intéressants m'auroit seul déterminé à choisir cette branche de l'histoire naturelle, si cette étude n'avoit pas eu un autre attrait pour moi; car en me familiarisant avec des insectes du genre des Abeilles, je pouvois féconder mon père dans sa recherche favorite, et remplacer auprès de lui l'homme précieux que des circonstances affligeantes lui avoient fait perdre.

C'est dans ces vues que je commençai au mois de Juin, 1796, à étudier les mœurs des Bourdons; on jugera par ce qui suit, de la manière dont j'ai rempli mon but, mais j'espère qu'on aura quelque indulgence pour le travail d'un naturaliste de dix-neuf ans.

CHAPITRE. I.

Descriptions de quelques Espèces de Bourdons.

LES Bourdons ont été rangés par les naturalistes dans la seconde famille du genre des Abeilles, autant peut-être par la considération de leurs mœurs et de leur industrie, que par celle de leur conformation.

Les Caractères de ce Genre sont,

Deux *antennes* brisées, dont le premier anneau est très long.

Les *ailes* inférieures plus courtes que les ailes supérieures.

La *bouche* armée d'une machoire avec une trompe membraneuse repliée en dessous, l'aiguillon simple et en pointe.

Le *ventre* attaché au corcelet par un pédicule court.

Trois petits *yeux* lisses.

Le *corps* velu.

Ce qui fait placer les Bourdons dans la seconde famille des Abeilles c'est le nombre et la longueur de leurs poils; mais ce caractère est si

peu solide qu'il étoit important d'en trouver un qui tint à la forme du corps, et fut à l'abri de tous les inconvéniens des couleurs.

Ce caractère, je crois l'avoir trouvé dans la forme de la tête.

Les Bourdons ont la tête proportionnellement plus allongée que les Abeilles ; dans celles-ci elle est plus large que longue, ou du moins jamais plus longue que large ; et dans les Bourdons, sa longueur surpasse toujours sa largeur.

Je vais passer à la description de quelques caractères qui peuvent faire distinguer les Bourdons de différens sexes dans la même espèce.

Description des Caractères individuels.

Les entomologistes ont décrit près de 34* espèces de Bourdons, ou plutôt 34 de ces insectes ; mais leurs descriptions ne sont pas aussi complètes qu'on pourroit le désirer.

Les Bourdons femelles, mâles, et ouvrières ne se ressemblent pas toujours ; et comme ces naturalistes ne se sont pas expliqués sur le sexe des individus qu'ils décrivoient, on peut craindre qu'ils n'aient fait des classes différentes toutes les fois qu'ils auront trouvé des individus qui ne se ressembloient pas.

Il y avoit cependant un moyen sûr, de laisser chaque individu dans sa famille, dans sa place naturelle ; il falloit les prendre dans leurs propres nids au mois d'Août ou de Septembre. C'est là qu'on devoit indubitablement trouver le mâle, la femelle, et l'ouvrière de la même espèce : on eut bientôt appris à reconnoître le mâle de l'ouvrière, et l'ouvrière d'avec la femelle ; voici les caractères généraux auxquels on pouvoit les distinguer.

* Caroli Linnæi Entomologia Faunæ Suevicæ Descriptionibus aucta ; D. D. Scopoli, Geoffroy, De Geer, Fabricii, Schrank, &c. speciebus vel. in Systemate non enumeratis vel nuperrimè detectis, vel speciebus Galliæ Australis locupletata, generum specierumque rariorum iconibus ornata ; curante et augente Carolo de Villers. Lugduni 1789.

Les Mâles et les Femelles diffèrent

1. Par leur grandeur.
2. Par l'aiguillon.
3. Par la longueur des antennes.
4. Par le nombre de leurs anneaux.
5. Par la forme de la cinquième articulation de leurs jambes postérieures.
6. Par celle de leurs mandibules.
7. Par la longueur de leur trompe.

Premier caractère, *la Grandeur.*

Les mâles des Bourdons sont tous plus petits que leurs femelles : la différence est plus ou moins grande selon les espèces : dans quelques-unes les femelles sont au moins le double de leurs mâles, dans quelques autres elles ne les surpassent que de quelques lignes.

La grandeur des mâles et des femelles ne varie presque pas dans chaque espèce, mais les ouvrières n'ont point une grandeur aussi constante : les unes sont si petites qu'on ne les prendroit pas pour des Bourdons : d'autres sont si grandes qu'on seroit tenté de les prendre plutôt pour des femelles que pour des ouvrières : cependant leur taille n'égale jamais celle des mères, et un coup d'œil suffit pour les comparer, et les mettre chacune dans la place qu'elles doivent occuper.

Second caractère, *l'Aiguillon.*

L'aiguillon est placé à l'extrémité du ventre des Bourdons et des Abeilles : il est long de deux ou trois lignes, et se meut avec beaucoup de vivacité par le moyen de huit muscles, placés auprès de son origine : le dard qui paroît si délié à l'œil nud, est un petit tuyau creux, de matière de corne ou d'écaille ; il contient l'aiguillon composé

posé lui-même de deux dards accolés, qui jouent ensemble ou séparément ; leur extrémité est taillée en scie dont les dents sont tournées en fer de lance.

La vessie à venin est à la racine de l'aiguillon. Lorsque ces mouches sont irritées elles font sortir la liqueur dont elle est remplie, pour la darder avec l'aiguillon dans la partie qu'elles veulent blesser.

Les mâles n'ont pas d'aiguillon, ce qui les rend inhabiles à défendre leur peuplade ; mais ce soin appartient aux femelles et aux ouvrières : elles font un usage fréquent des armes qu'elles ont reçu, et ne perdent pas leur vie et leur aiguillon, comme cela arrive aux Abeilles lorsqu'elles s'en servent contre nous.

Leur piqueure est douloureuse ; elle fait élever une petite ampoule ; mais le mal s'apaise et l'enflure disparoit en fort peu de tems.

Si l'on enlève le toit de mousse dont les Bourdons recouvrent leur nid, on entend d'abord les ouvrières et la mère battre des ailes vivement, et ce bruit aigu est le signe de leur colère, ou de l'alarme qu'on leur cause ; on les voit alors venir sur leurs gateaux avec agitation, lever une patte, puis une autre du même côté, puis la troisième, et se renverser tout-à-fait sur le dos ; elles recourbent en haut leur anus, et présentent à l'observateur indiscret leur aiguillon, qui sort accompagné d'une goutte de venin : quelquefois dans leur colère elles lancent cette liqueur, qui ne fait néanmoins aucun mal si elle n'est précédée d'une piqueure : le venin est cependant acide, puisqu'il rougit les teintures bleues végétales.

Les Bourdons se tiennent sur la défensive jusqu'à ce qu'on les ait mis dans la nécessité d'attaquer, par le dérangement de leur nid, ou par l'enlèvement de leurs petits ; alors l'observateur doit rester sans mouvement auprès du nid, les Bourdons s'apaisent, et il peut avec de l'adresse visiter leurs gateaux, et même les enlever avec tous leurs habitans.

Troisième caractère, *les Antennes.*

Les antennes des Bourdons sont composées de plusieurs articles, dont le premier est fort long, le second très court, tous les autres coniques excepté le dernier, qui est de la forme de la dernière articulation du doigt annulaire; il a peut-être cette forme à cause de son usage; il paroît bien prouvé par les observations de mon père, que les antennes sont les organes du tact chez les Abeilles, et j'ai vu les Guêpes, les Fourmis et les Bourdons s'en servir d'une manière analogue.

Les antennes des mâles ont treize articles, elles sont beaucoup plus longues que la tête de ces insectes; celles des femelles et des neutres sont plus courtes en proportion; leur longueur n'excède pas celle de la tête, et elles ne sont composées que de onze articles.

Quatrième caractère, *l'Abdomen.*

L'abdomen des femelles est composé de six anneaux, celui des mâles de sept.

Les anneaux de l'abdomen des mâles peuvent se mouvoir avec une grande liberté; c'est surtout dans l'accouplement qu'on le remarque, parce qu'alors le mâle se cramponne sur le corselet de la femelle; et comme celle-ci est beaucoup plus grande que lui, l'accouplement ne pourroit pas se faire dans cette posture, mais le mâle allonge son corps de près de trois lignes, il recourbe son dernier anneau contre l'anus de la femelle, y fait entrer les parties qui lui sont propres, et l'accouplement s'opère.

Dans cet acte le mâle ne perd pas les organes de la génération, et la vie même, comme cela arrive au mâle de la Reine Abeille. Quand l'accouplement a duré une demi-heure, les insectes se séparent: le mâle est quelquefois si ardent qu'il remonte sur sa femelle pour s'unir encore,

Le cinquième caractère est tiré de la *forme d'une des articulations des jambes postérieures des Bourdons.*

La cinquième articulation des jambes postérieures de femelles est d'une forme triangulaire, large ordinairement d'une ligne et demi à son extrémité inférieure, et beaucoup plus étroite à l'autre extrémité ; elle est garnie tout autour de poils longs, forts, très nombreux, et tournés en dehors ; elle est destinée à servir de corbeille aux Bourdons lorsqu'ils vont sur les fleurs, faire leur récolte de poussières d'étamines, ils en ont une à chacune de leurs jambes de la troisième paire ; ils les garnissent de ces poussières à l'aide des pattes antérieures, et quand il les ont chargées l'une et l'autre également ils retournent à leur nid, où ces provisions sont déposées dans le magasin commun. La partie analogue dans les mâles est moins longue proportionnellement, beaucoup moins élargie à son extrémité convexe, & entourée de poils courts foibles et peu nombreux ; elle est entièrement incapable de servir aux mêmes usages, mais aussi les mâles ne sont-ils point chargés de la récolte du pollen.

Sixième caractère, *les Mandibules.*

Les Bourdons ont plutôt des mandibules que des dents ; car ils ne se servent que rarement de ces instrumens pour se nourrir, mais ils les employent à d'autres usages, et leur forme nous fournira un caractère nouveau pour distinguer les mâles des femelles.

Les mandibules ou les dents des Bourdons sont ajustées aux deux côtés du chaperon à la partie latérale de la tête ; elles se meuvent de droite à gauche, et de gauche à droite, mais jamais de haut en bas comme nos machoires : elles se croisent au devant de la tête, à laquelle elles donnent une forme triangulaire ; elles sont quelquefois un peu repliées au dessous de la lèvre supérieure.

Celles des femelles ont une ligne de longueur ; elles sont presque

en

en forme de cuillère, dentées à un bord, striées, arquées, et creusées intérieurement d'une manière très délicate.

Les mandibules des mâles sont plates & minces, arrondies, & légèrement enfourchées à l'extrémité, foibles et bordées sur le dos de barbes longues nombreuses, réunies en plusieurs faisceaux, et toutes tournées du côté de l'extrémité des dents.

Les mandibules des ouvrières sont semblables à celles des femelles ; les unes et les autres sont telles qu'elles doivent être pour couper et ciseler la cire, pour arracher la mousse et les brins d'herbes dont ces insectes composent le toit de leurs nids. Celles des mâles sont trop foibles, trop embarrassées de poils, et pas assez tranchantes pour couper la cire, et pour servir aux mêmes usages que celles des ouvrières.

Septième caractère, *la Trompe.*

La trompe des femelles est plus longue que celle des mâles ; la partie membraneuse ou charnue de cet instrument m'a paru moins velue dans les mâles que dans les femelles.

Les étuis écailleux de la trompe servent quelquefois à écarter les obstacles qui se présentent à la récolte du miel, comme les étamines et les pistils de certaines fleurs ; d'autrefois cet usage se fait remarquer d'une manière plus frappante. Je me souviens d'avoir vû de fort gros Bourdons essayer en vain de prendre le miel contenu dans des fleurs de fèves ; la grosseur de leur tête et celle de leur corselet les empêchoit d'entrer assez avant dans les longs tubes de ces fleurs ; mais ces insectes alloient droit au calice ; ils le perçoient, ainsi que le tube, avec la partie écailleuse de leur trompe ; la partie membraneuse de cet instrument, ou la trompe proprement dite, pénéroit alors jusqu'au sein de la fleur, y trouvoit les nectaires, et en enlevait le miel dont ils étoient remplis. Ces insectes alloient ainsi de fleurs en fleurs perçant leurs tubes par dehors, et suçant le nectaire, tan-

dis que d'autres Bourdons plus petits, ou dont les trompes étoient plus longues, entroient dans la corolle, pénétroient dans le tube, et atteignoient le miel sans la déchirer.

Les semences contenues dans leur filique ne souffroient point de la blessure faite au calice et à la corolle de ces fleurs, et les fèves qui en provenoient ne paroissoient pas différentes des autres fèves.

J'ai vu des Bourdons de la même espèce ouvrir avec leurs dents les tubes de l'ancolie à leur base, & chercher de la même manière le miel dans ses nectaires.

Je joins ici une description particulière de tous les Bourdons que j'ai trouvé dans les environs de Lausanne, et que j'ai pris dans leur nid ; ils ont tous été peints d'après nature ; je n'ai suivi aucun ordre dans la place que je leur ai donnée dans mes descriptions ; elle étoit indifférente.

CARACTERES SPECIFIQUES.

ESPECE I.*

TAB. XXV. Fig. 1—3.

La FEMELLE. Sa tête, son corselet, & les trois premiers anneaux de son abdomen sont noirs ; les trois derniers sont écarlate ; la brosse de ses jambes postérieures est dorée ; ses ailes sont sans couleurs ; le dessous de son corps et de son corselet est noir. Fig. 1.

Le MALE diffère de la femelle par deux mouchets de poils verts, l'un au dessus, l'autre au devant de la tête ; par une bande de poils verts qui borde le corselet du côté de la tête, et qui passe le long de son cou jusqu'au dessous du corselet, où elle s'étend entre les jambes, & par une autre bande verte qui borde antérieurement l'abdomen. Le dessous du corps, qui est entièrement vert ; les poils de

* *Apis lapidaria* Linn.

la même couleur qui bordent les premières articulations des jambes antérieures; les jambes postérieures bordées de poils écarlates, sont encore autant de signes auxquels on peut recourir pour reconnaître les mâles entre les femelles et les ouvrières; ils sont d'un tiers plus petits que les femelles. Fig. 2.

L'OUVRIERE, ou l'individu neutre, ressemble en petit à la femelle, mais ses pattes postérieures ne sont point dorées; la grandeur moyenne des ouvrières est un peu inférieure à celle des mâles. Fig. 3.

OBSERVATIONS. Ces Bourdons habitent sous terre à une plus grande profondeur que tous les autres; ils y sont très nombreux: ils se logent cependant quelquefois à la surface du sol; alors leur famille est au plus composée d'une vingtaine d'individus; les femelles y naissent plutôt que dans les nids profonds, & les mâles ont des couleurs moins vives: seroit-ce une variété? Dans les uns et les autres ils naissent plutôt que les femelles. Ces Bourdons sont communs dans les plains sèches et sur les collines.

ES P E C E II.

TAB. XXV. Fig. 4—6.

La FEMELLE. Sa tête est noire; son corselet de la même couleur, mais verdâtre antérieurement; l'abdomen noir; les quatre derniers anneaux brun-rouges; son corps, son corselet sont noirs en dessous; ses couleurs sont moins vives que dans l'espèce précédente, ses ailes plus brunes, et sa taille inférieure. Fig. 4.

Le MÂLE. Il porte une couronne de poils verts sombres ou quelquefois gris sur un torax noir; le premier anneau est gris blanc, le second fauve, les cinq derniers bruns rouge; il diffère aussi de la femelle par le dessous de son corps, qui est couvert d'un duvet brun;

brun ; par ses jambes postérieures dorées, et par ses ailes, qui sont moins brunes. Fig. 5.

NEUTRE. L'ouvrière diffère de la femelle par une petite couronne de poils d'un verd sombre et très foncé sur le thorax : les trois premiers anneaux de l'abdomen sont couleur de maron, les trois derniers à peu près comme dans la femelle ; le reste de même. Fig. 6.

OBSERVATIONS. Ces Bourdons vivent sous terre. Les peuplades de cette espèce que j'ai possédées n'étoient pas considérables ; les mâles y nâquirent au commencement d'Août, et les grandes femelles au commencement de Septembre.

E S P E C E III.*

TAB. XXV. Fig. 7—9.

La FEMELLE. La tête et le corselet sont noirs : le corselet porte une bande jaune antérieurement. Le premier anneau de l'abdomen est noir, le second citron, le troisième noir, et les trois derniers blancs ; les ailes sont fort brunes, la brosse est dorée. Fig. 7.

Le MALE ressemble parfaitement à la femelle, à l'exception de ses pattes postérieures, qui ne sont point dorées ; il est aussi beaucoup plus petit. Fig. 8.

L'OUVRIERE. Ne diffère de la femelle que par l'infériorité de sa taille, par le 4me anneau de son corps, qui est noir, et par ses pattes, qui ne sont pas dorées. Fig. 9.

OBSERVATIONS. Ces Bourdons sont fort communs sur les fleurs ; ils font leurs nids en terre à la profondeur d'un pied ou d'un pied et demi ; la population de quelques-unes de leurs ruches peut aller à

* *Apis terrestris* Linn.

2 ou 300 individus. Les mâles et les femelles paroissent dans leurs nids au mois de Juillet. Cette espèce de Bourdons est remarquable par la grandeur, la force, l'activité et la vigilance des femelles et des ouvrières. L'ouvrière représentée dans la figure a été choisie parmi les plus petites, pour faire voir combien elles peuvent être petites quelquefois ; leur taille ordinaire est à peu près celle du mâle dépeint. Ces insectes volent avec rapidité et avec grand bruit, à cause de la largeur de leurs ailes.

E S P È C E IV.*

TAB. XXV. Fig. 10—12.

LA FEMELLE. La tête noire ; le thorax noir, chargé d'une couronne de poils jaunes interrompue à l'origine des ailes ; l'abdomen, dont le premier anneau, est jaune, le second et le troisième noirs, les autres blancs, est d'une forme étroite alongée ; la brosse des jambes postérieures est dorée, les ailes très-brunes. Cette femelle est un peu moins grande que la précédente. Fig. 10.

LE MÂLE ressemble à tous égards à la femelle, excepté par son dernier anneau, qui est noir, et par ses jambes non dorées ; il est aussi plus petit que la femelle. Fig. 11.†

L'OUVRIÈRE ne diffère de la femelle que par ses pattes nullement dorées ; elle est à-peu-près de la taille du mâle. Fig. 12.

OBSERVATIONS. Ces Bourdons ainsi que les précédens ornent in-

*. *Apis hortorum* Linn. *A. ruderata* Fab.

† Les trois demi-anneaux inférieurs, qui répondent aux trois demi-anneaux blancs du dessus de l'abdomen, sont quelquefois jaunes, et les autres noirs ; il n'en est pas ainsi de la femelle et de l'ouvrière.

finiment les prairies par l'éclat de leurs couleurs; ils volent avec bruit, et sont fort attachés à leur peuplade. Celles-ci sont logées en terre; elles sont moins nombreuses et moins fortes que celles du *terrestris*. Les mâles et les femelles naissent à la fin du mois d'Août et au commencement de Septembre; ils sont cependant fort rares alors dans les prairies; les individus sont presque toujours de la grandeur de ceux que j'ai fait peindre.

E S P E C E V.

TAB. XXV. Fig. 13—15.

La FEMELLE. La tête est ornée de touffes de poils d'un verd jaunâtre très pâle, sur le front et sur le crane; le corselet noir porte une couronne d'un verd jaunâtre, qui s'étend au dessous des ailes et des jambes; les deux premiers anneaux de l'abdomen sont d'un blond cendré: le troisième est noir; les trois derniers sont d'un roux clair, & bordés de poils jaunes. Cette femelle est ordinairement plus petite que celles des espèces précédentes. Fig. 13.

Le MÂLE, plus petit que la femelle, n'en diffère que par les deux premiers anneaux de son corps, qui sont fauves. Fig. 14.

L'OUVRIERE diffère de la femelle en ce que les deux premiers anneaux de son abdomen sont d'un verd clair; le troisième est noir, et bordé de poils d'un verd foncé. Elle est à peu près de la grandeur du mâle. Fig. 15.

OBSERVATIONS. Le mâle est ordinairement plus gros qu'il n'est représenté dans la figure. On trouve les mâles et les femelles aux mois d'Août et de Septembre. Leurs peuplades sont enterrées à une petite profondeur, et ne sont pas très considérables.

ESPECE VI.*

TAB. XXV. Fig. 16—18.

La FEMELLE. Dans cette espèce la femelle est plus petite que dans toutes les autres : elle a des poils jaunes sur le sommet de la tête, et blancs sur le front, une touffe de poils d'un jaune doré sur le thorax, et entre les jambes d'un jaune verdâtre ; le premier anneau de l'abdomen est d'un blanc jaunâtre, les autres d'un verd pâle et tirant sur le jaune ; les pattes sont couvertes de poils blanchâtres, la brosse dorée, et les ailes fort brunes. Fig. 16.

Le MALE a la tête comme la femelle ; le corselet à peu près semblable, excepté qu'il est moins doré au dessus, et que les poils des bords et du dessous sont blancs ; mais l'abdomen en diffère beaucoup plus ; le premier anneau est blanchâtre, le second et le troisième ont une nuance de verd ; les quatrième et cinquième brunissent un peu ; les derniers sont d'un roux légèrement doré. Fig. 17.

L'OUVRIERE a la tête et le corselet à peu près comme la femelle ; les trois premiers anneaux sont couverts de poils bruns ; les trois derniers de poils d'un jaune verdâtre ; la brosse dorée. Fig. 18.

OBSERVATIONS. Ces Bourdons ont été appelés par les naturalistes *Bourdons de la mousse* ; en effet, on les trouve presque toujours dans les prés, cachés sous un petit toit de mousse, qui s'élève au dessus du sol, de 5 à 6 pouces ; leur nid est cependant dans un petit creux. Leurs peuplades sont peu nombreuses ; ils sont d'une humeur fort pacifique.

* *Apis Muscorum Linn.*

E S P E C E VII.

La FEMELLE. Le corselet est noir, et bordé antérieurement d'une large bande jaune pâle; les deux premiers anneaux sont noirs, les 3^{me} et 4^{me} blancs, et les autres noirs.

Le MALE. Son corselet est noir et bordé de verd; le premier anneau de son corps est recouvert de poils noirs et verds; le second et le troisième sont noirs; les quatrième et cinquième sont verds; les sixième et septième sont noirs bordés à l'extrémité de poils rouffâtres.

NOTE. Lors que je fis la description de ces deux insectes, je ne songeai point à la nécessité de décrire aussi l'ouvrière; je ne l'ai pas retrouvée depuis lors; je ne fis pas non plus dessiner les individus décrits, mais je n'ai pas cru devoir pour cela négliger de placer ensemble deux individus que j'ai vu accouplés, et qui sont si différens qu'on ne les croiroit pas de la même famille.

E S P E C E VIII.

TAB. XXV. Fig. 19—21.

LA FEMELLE. Le corselet de cette femelle est noir, bordé antérieurement d'une bande verte foncée et très distincte; son corps est noir; les trois derniers anneaux sont noirs, et bordés antérieurement de poils écarlates; ses ailes sont noires, les jambes noires. Fig. 19.

Le MALE a la tête noire; le corselet noir, portant une petite couronne verte qui est très sensible du côté de la tête; les trois premiers anneaux de son corps sont noirs, bordés antérieurement de poils

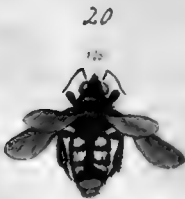
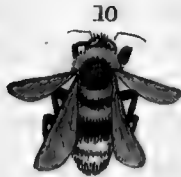
poils verts ; les quatre derniers sont couleur d'or ; toutes les pattes sont dorées à l'extrémité, les ailes sont beaucoup moins brunes que celles de la femelle. Fig. 20.

L'OUVRIERE ressemble parfaitement à celle de la première espèce ; ses ailes sont seulement un peu plus brunes ; les pattes ne sont point dorées : elle diffère de la femelle en ce qu'elle n'a point de bande verte sur le devant du thorax. Fig. 21.

OBSERVATIONS. La femelle de cette espèce est d'une grande taille ; ses écailles sont d'un noir très foncé ; le mâle est le seul de tous les Bourdons ci-dessus dont toutes les jambes soient dorées ; il diffère essentiellement de ceux de la première et seconde espèce à cause des poils verts répandus sur ses trois premiers anneaux ; ces insectes vivent sous terre, à la profondeur d'un pied. Les mâles et les femelles naissent vers le milieu de Juillet.

Je pourrois aisément donner la description d'un plus grand nombre d'espèces ; mais mon but n'étoit que d'indiquer la manière dont il seroit à désirer qu'on décrivit les insectes qui comptent parmi eux des individus neutres et différens, comme quelques Abeilles, les Guêpes, les Frémons, les Fourmis et d'autres Bourdons.

J'ai cherché longtems des caractères qui pussent distinguer les Bourdons entr'eux, et qui fussent à l'abri des inconvéniens attachés aux couleurs et aux poils ; mais j'ai été forcé de recourir à ces mêmes poils, comme la seule partie de leur corps qui offroit quelque différence facile à saisir. Des observations de trois années m'ont appris que les caractères tirés des poils étoient très peu solides ; et je crois devoir avertir les naturalistes que les Bourdons perdent leur éclat, leur lustre et leur couleur : et qu'ils grisonnent en vieillissant
comme





comme les grands animaux. Les poils des Bourdons noirs et écarlates passent du noir au gris, de l'écarlate au jaune ou même au blanc; & les mâles, dont les couleurs sont si brillantes, les perdent en partie. Les Bourdons jaunes, blancs, et noirs deviennent quelquefois noirs et blancs par l'affoiblissement graduel de la couleur des bandes jaunes dont ils sont ornés.

Un plus grand écueil encore pour les naturalistes, c'est la perte des poils mêmes, qui pourroit les induire à prendre pour de nouvelles espèces des individus seulement mutilés; car l'épaisseur plus ou moins grande de ces poils, au travers desquels on aperçoit d'autant mieux les écailles de l'animal qu'ils sont plus rares, donne lieu à des nuances nouvelles, et qui m'ont quelquefois trompé, malgré les soins particuliers que j'ai mis à savoir les distinguer.

Ainsi, dans les Bourdons de la mousse, leur corps d'un jaune verdâtre devient brun au bout de quelque tems; d'autres Bourdons perdent les poils de leur corselet, et laissent le disque supérieur parfaitement à nud; quelquefois tous les poils de leur abdomen tombent, et l'on ne voit plus qu'un corps noir et écailleux, là où des belles bandes jaunes se faisoient précédemment remarquer par leur éclat. Je conserve dans ma collection une femelle qui n'a plus que deux mouchets de poils rouges sur les derniers anneaux de son abdomen; elle est d'ailleurs parfaitement rase; j'en ai vu d'autres entièrement dépourvus de poils: la calvitie des Bourbons seroit encore bien plus importante à reconnoître, si la forme de leur tête ne pouvoit offrir un caractère qui les distingue des autres Abeilles.

Ces insectes sont sujets à divers accidens; quelques-uns d'entr'eux sont remarquables par des mouchets de poils blancs placés irrégulièrement sur leur abdomen, au milieu de leurs poils noirs; d'autres ont sur leur corps un mouchet de poils écarlates vraiment accidentels, car leurs petits ne participent point à ces irrégularités. On

trouve encore dans les nids des Bourdons des individus mutilés ; celui-ci vient de naître, et ses ailes, au lieu de se développer, se tordent et se dessèchent ; celui-la périt parceque sa trompe est mal construite, et qu'il ne peut en faire usage ; un troisième est sorti de ses enveloppes avant l'âge prescrit par la nature ; ses membres n'ont pas acquis toute leur consistance ; quelques parties des jambes sont restées blanches ainsi que les yeux ; la trompe mal développée ne peut fournir à l'insecte la nourriture dont il a besoin ; il meurt.

J'ai remarqué un fait analogue chez les fourmis de plusieurs espèces ; leurs femelles naissent ailées ainsi que leurs mâles ; quelque tems après leurs amours les mâles périssent ; mais les femelles subsistent, et toutes perdent leurs ailes très peu de jours après ; qu'on fouille alors leur nid jusqu'au fond, on ne trouvera pas un insecte ailé ; je ne fais pas exactement le nombre de jours au bout desquels elles sont ainsi mutilées, mais je crois que ce n'est pas plus d'un mois après l'accouplement*.

CHAPITRE II.

Des Cavités souterraines dans lesquelles on trouve les Nids de Bourdons.

LES Bourdons sont des insectes ovipares ; ils pondent leurs œufs dans une cellule d'une cire particulière, qu'ils construisent dans une cavité souterraine ; il sort de ces œufs autant de petits vers ; ils y sont nourris et soignés par une mère qui veille d'abord seule à leur sûreté et à leur conservation ; ils grossissent de jours en jours ; ils se filent un coque de soie, ainsi que les vers des Abeilles ; quelques jours leur suffisent pour se transformer en nymphe ; ils demeurent immo-

* Ce fait a été vu par Mr. Latreille.

biles jusqu'au moment où ils doivent déchirer toutes leurs enveloppes, et se montrer sur le nid comme les autres Bourdons ; alors leurs ailes se déploient, tout leur corps est semé de poils, qui prennent bientôt les couleurs les plus variées ; ils commencent à aider leur mère dans ses travaux avec une adresse qui ne le cède pas à la sienne.

Je ne fais point si Mr. de Réaumur a observé les Bourdons qui habitent les creux souterrains ; mais il n'a pas écrit l'histoire de ces insectes, et l'on ne trouve rien dans ses mémoires sur la profondeur à laquelle ils fixent leur habitation, sur la forme et les dimensions de la cavité qui doit receler leur nid, ni sur les chemins qui y conduisent ; il dit seulement qu'il a vû fort souvent des femelles de Bourdons qui travailloient avec une grande activité à creuser en terre des trous très profonds ; leurs dents détachent des brins de terre ; les premières jambes s'en faisoient, et les pousoient au devant des secondes ; celles de la troisième paire les recevoient à leur tour, et les pousoient en arrière aussi loin qu'il leur étoit possible.

Il paroît que ces femelles fondoient le terrain ; elles auroient probablement approfondi ces trous, et prolongé leurs galeries souterraines si quelque obstacle ne s'y fut opposé ; mais celles qui les avoient ébauché avec beaucoup de travail, et qui y avoient employé plusieurs heures, les abandonnoient sans les percer au delà d'un pouce ou deux, et alloient en construire d'autres tout auprès. Mais Mr. de Réaumur ne les vit jamais prolonger ces galeries, ni commencer aucun nid dans l'espace que plusieurs d'entr'elles avoient creusé séparément sous ses yeux. On croiroit même qu'il n'a pas soupçonné que certains Bourdons habitoient des cavités souterraines ; son observation, toute incomplète qu'elle est, prouve que ces insectes ont été instruits à creuser des souterrains, et peut nous donner l'idée de la manière dont ils les excavent.

Géoffroy parle des Abeilles Bourdons dans son *Histoire abrégée des Insectes*; voici ce qu'on lit à la page 404 du second volume de ses œuvres :

“ C'est sous la terre que travaillent les Bourdons, et surtout sous les gazons dont les racines liant la terre forment une voûte plus solide au souterrain que pratiquent ces insectes. On en voit un nombre considérable voltiger sur les gazons; on n'a qu'à les suivre, on appercevra un endroit où ils disparaissent, et en regardant de près on découvrira l'ouverture de leur habitation. S'ils ne font que la commencer, tous ces insectes seront occupés à fouir la terre et à transporter dehors les molécules qu'ils en détachent. Les trous qu'ils pratiquent sont vastes et spacieux, aussi beaucoup d'insectes se mettent-ils à l'ouvrage, car ces Abeilles vivent en société comme les Abeilles domestiques.”

Les Bourdons que j'ai observé habitoient aussi sous terre; on trouvoit leur nid à la profondeur d'un ou deux pieds; le chemin qui y conduisoit étoit quelquefois long et tortueux; le nid étoit dans une cavité assez considérable, d'une forme voutée, plus large que haute; elle étoit tapissée de feuilles dans le fond, et le gâteau étoit posé délicatement sur un lit de cette matière.

Quelquefois les femelles de ces Bourdons qui habitent sous terre établissent leur nid à la surface du terrain; elles le font dans un petit creux tout ouvert par dessus; elles savent le couvrir avec de la mousse, et sont instruites à le tapisser en dedans avec de la même matière; ce n'est cependant pas là leur logement naturel, car leurs familles y sont peu nombreuses, tandis qu'elles le font beaucoup plus, lorsqu'elles les fixent dans des cavités dont l'abord est plus difficile pour les insectes qu'elles ont à craindre; leurs petits y sont aussi moins à l'abri des injures du tems, et de toute espèce d'accidens.

Idées sur la Formation de la Cavité souterraine que les Bourdons habitent ordinairement.

L'excavation de cette cavité souterraine et du chemin qui y conduit, n'est point, comme le pensoit Geoffroy, le résultat du travail de toute une famille de Bourdons; le nid lui-même n'est pas l'ouvrage d'un peuple nombreux.

Une femelle solitaire a choisi et préparé ce logement au commencement du printemps; elle a posé les fondemens des gâteaux, et elle n'a pu être aidée dans son travail, que lorsque ses petits sont parvenus à l'état de perfection.

Je n'ai point vu de quelle manière elle creusoit le chemin qui aboutit à son nid; je ne fais pas mieux comment elle forme la voûte sous laquelle elle a établi les fondemens de ses gâteaux. On ignore même si elle creuse toujours cette voûte, ou si elle ne profite point dans certaines occasions de quelques trous faits par des taupes, ou par d'autres animaux; le hazard seul peut mettre sous les yeux de l'observateur une femelle creusant la galerie qui doit conduire à son nid.

Il ne seroit peut-être pas impossible d'obliger une femelle de Bourdon à travailler en terre.

On lui donneroit pour habitation un cabinet bien exposé au soleil, et fermé de toutes parts.

On mettroit à sa portée des vases de fleurs, où elle pourroit recueillir, comme dans un parterre, tous les ingrédiens nécessaires à l'exécution de ses travaux; elle trouveroit dans les vases une terre facile à miner; on la verroit peut-être commencer à escaver la galerie dont j'ai parlé: après avoir suivi ce travail, on ne trouveroit pas de difficulté à concevoir comment elle prépare, comment elle évide la cavité souterraine.

Si elle se refusoit à miner la terre, on pourroit essayer de lui pré-

parer quelques trous semblables à ceux des taupes : ce ne feroit pas à la vérité le moyen de voir comment elle creuse son logement ; mais si elle profitoit de ces trous, on pourroit soupçonner que dans l'état naturel elle se sert aussi quelquefois des cavités qu'elle trouve toutes faites, et qu'elle est dispensée de la peine de les creuser.

Quelques observations viendroient alors appuyer le jugement du naturaliste.

Il fauroit qu'on voit dès le commencement d'Avril les femelles de Bourdons errer çà et là dans les prairies, entrer dans tous les trous qu'elles apperçoivent, les uns après les autres, comme pour choisir celui qui leur conviendra le mieux.

Elles font ce manège pendant tout le courant de ce mois ; elles semblent alors plus inquietes de trouver des cavités souterraines qu'occupées à chercher du miel sur les fleurs.

J'aurois désiré pouvoir raconter de quelle manière les jeunes femelles posent les fondemens de leurs gâteaux, comment elles élèvent leurs petits dans la solitude, et quel est leur genre de vie pendant le tems où elles sont isolées ; mais ce n'est que du hazard, comme je l'ai dit, que l'on doit attendre l'occasion de voir ce qui se passe alors dans un nid de Bourdons ; à quel signe pourroit-on en effet reconnoître l'existence d'une cavité souterraine à laquelle on n'aboutit qu'au moyen d'un canal étroit, tortueux, et plus ou moins long, lorsqu'aucun de ses habitans ne voltige à l'entour de son entrée.

Je ne perds point l'espérance de le voir un jour ; mais en attendant je me permettrai quelques conjectures qui sont fondées sur mes observations ; et afin qu'on puisse juger de leur vraisemblance, j'exposerai ici ce que j'ai vû dans les nids de Bourdons, pris au mois de Juin au fond de leur cavité souterraine, et placés ensuite sous des cloches de verre.

CHAPITRE III.

Description des Nids des Bourdons qui vivent sous Terre.

LES Bourdons dont Monsieur de Réaumur a écrit l'histoire, ne font pas exactement de la même espèce que ceux dont je me suis occupé. Les premiers habitent presque à la surface de la terre, et construisent leur nid avec de la mousse, comme cet observateur le décrit dans son mémoire. Ceux qui m'ont occupé pendant l'été dernier habitoient quelquefois à un ou deux pieds au dessous de la surface du sol; un long canal oblique ou perpendiculaire au terrain, servoit de galerie aux Bourdons qui revenoient au nid. Ce conduit pouvoit avoir un demi-pouce de diamètre; il étoit cylindrique, quelquefois jonché de feuilles sèches et de menu foin; c'est au milieu de ces matériaux qu'on trouvoit le nid des Bourdons, recouvert d'une calotte de cire, qui s'élevoit d'abord comme un mur autour du nid, et qui s'arrondissoit par dessus en suivant les gâteaux à la distance de 4 à 5 lignes.

TAB. XXVI. Fig. I.

Après avoir enlevé cette enveloppe de cire, on étoit frappé de l'apparente grossièreté de l'ouvrage qu'elle renfermoit; c'étoient des masses de corps ovoïdes d'un jaune plus ou moins pâle et d'une grosseur différente; les uns avoient 6 lignes de longueur et 4 de largeur, les autres en avoient 4 dans leur plus grande dimension, et $2\frac{1}{2}$ dans la plus petite; leur plus grand diamètre étoit ordinairement vertical. Si l'on observoit avec plus d'attention on découvroit qu'un petit nombre de ces corps ovoïdes formoient, en se réunissant, un groupe dont toutes les parties étoient solidement liées ensemble; que les corps oblongs qui occupoient le milieu de ces groupes étoient plus élevés que ceux qui les entouroient, et que ceux-ci dominoient encore ceux qui formoient un troisième rang.

On ne voyoit la plupart du tems que le sommet de ces corps ovoïdes,

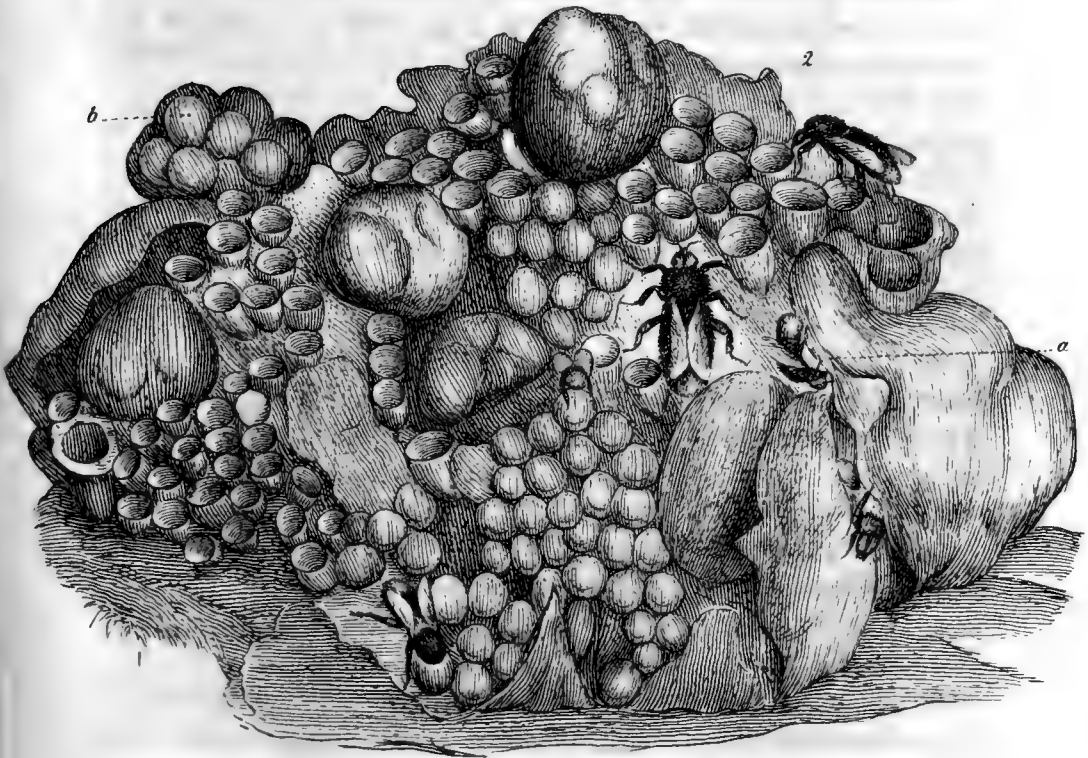
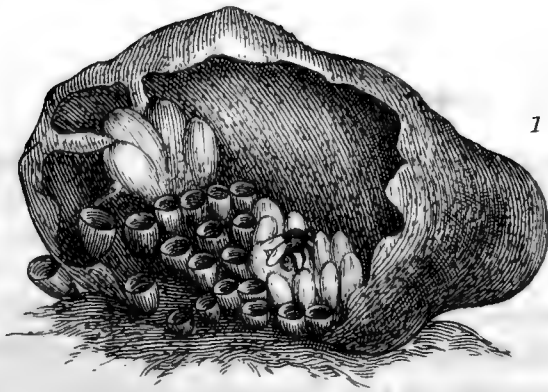
ovoïdes, parceque leurs bases étoient cachées dans le centre du groupe. TAB. XXVI. Fig. 2. Les dimensions ordinaires d'un groupe étoient d'un pouce et demi dans sa hauteur et de deux dans sa largeur.

Un certain nombre de ces groupes à peu près semblables, placés les uns à côté des autres, dans un plan horizontal, et unis légèrement ensemble par de petits liens de cire, formoient un espèce de gâteau, dont le dessus étoit convexe, et le dessous légèrement concave.

Plusieurs gâteaux de ce genre étoient posés les uns au dessus des autres ; l'irrégularité de leurs surfaces, et les vides que laissoient entr'eux les corps ovoïdes dont il a été parlé, permettoient aux Bourdons de les parcourir en tout tems. Chacun de ces gâteaux étoit supporté par les sommités les plus élevées des corps oblongs de l'étage inférieur ; ils étoient outre cela liés ensemble par des piliers de cire longs de 2 ou 3 lignes, qui alloient d'un étage à l'autre, et qui étoient moins épais dans leur milieu qu'ils ne l'étoient à leur base et à leur sommet.

Les corps ovoïdes qui formoient la masse des gâteaux n'étoient autre chose que des coques d'une soie forte et bien collée ; elles contenoient des Bourdons dans l'état de nymphe, ou des larves prêtes à se transformer (TAB. XXVII. Fig. 1. a & b.) ; toutes les coques des gâteaux inférieurs étoient ouvertes et tronquées à leur extrémité supérieure, parceque les nymphes qui les avoient habitées s'étoient transformées en Bourdons, et s'étoient fait une ouverture au sommet de la coque pour jouir de leur liberté, tandis que les coques du gâteau supérieur étoient encore fermées, et conservoient la forme ovoïde qui leur appartenoit.

On remarquoit au dessus du gâteau supérieur des massifs de cire d'une forme arrondie et très irrégulière. Ces masses de cire différoient beaucoup par leurs dimensions ; les plus apparentes avoient un pouce et un quart de diamètre, sur cinq ou six lignes de hauteur ; on



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en voyoit de moins grosses, les plus petites n'avoient que 3 ou 4 lignes de largeur ; leur forme étoit ordinairement celle d'un sphéroïde applati ; quelquefois on trouvoit dans ces massifs une grande quantité de poussière d'étamines humectée avec du miel. On découvroit au milieu de cette pâtée un grand nombre de petits vers qui paroissoient s'en nourrir ; car la cire qui formoit ces massifs n'étoit point destinée à leur nourriture, comme le pensoient Swammerdam et Réaumur, mais à les préserver du froid, de l'humidité, et des accidens.

Il ne faut pas confondre ces logemens habités par plusieurs individus, avec d'autres logemens également couverts de cire à l'extérieur, et d'une forme à peu près semblable, mais dont l'intérieur étoit tapissé d'une soie très délicate. Ces coques ovoïdes dont nous avons déjà parlé ne sont habitées que par le ver qui les a filés (TAB. XXVII. fig. 1. a.) : on trouvoit après cela un assez grand nombre de petits vases remplis de miel dans tous les coins, et surtout au milieu du gâteau.

J'ai trouvé, comme Mr. de Réaumur, trois sortes de mouches dans ces nids ; des femelles, des mâles, et des ouvrières neutres.

Les jeunes femelles ne paroissoient qu'à la fin de Juillet et dans le courant des mois d'Août et de Septembre ; elles étoient beaucoup plus grandes que les autres mouches ; leur couleur étoit quelquefois la même que celle des ouvrières, d'autres fois elles en différoient beaucoup.

On ne trouvoit qu'une femelle au printems ; c'étoit la mère, comme je m'en suis assuré en la voyant pondre plus d'une fois.

Toutes les ouvrières n'étoient pas aussi neutres que Mr. de Réaumur le croyoit, et les mâles ne travailloient point, quoique cet observateur l'ait prétendu ; je montrerai cependant qu'ils ont plus d'une utilité pour la chose commune.

J'ai observé plusieurs espèces de Bourdons ; leurs mœurs ne différoient

féroient pas essentiellement ; j'ai même suivi ceux qui faisoient des toits de mousse au-dessus de leur nid ; ils ne se conduisoient pas différemment dans l'intérieur de leur habitation que les Bourdons qui vivoient à une plus grande profondeur.

Après avoir donné une idée générale des nids de Bourdons, j'esfayerai de décrire les particularités les plus importantes de leur histoire ; et comme c'est dans des cellules d'une cire particulière que naissent les Bourdons, je parlerai d'abord de la matière dont elles sont composées.

CHAPITRE IV.

De la Cire des Bourdons.

MONSIEUR DE REAUMUR parle de la cire des Bourdons qui habitent à la surface de la terre, lors qu'il décrit les toits de mousse dont leurs nids sont recouverts ; il dit que les Bourdons mettent un enduit de cette matière sur toute la surface de l'intérieur de ces toits ; qu'ils y font d'abord un espèce de plafond, de cire brute, et qu'ils en recouvrent ensuite toutes les parois ; il ajoute que la couche de cette matière n'a environ qu'une épaisseur double de celle d'une feuille de papier, qu'elle est impénétrable à l'eau, et qu'elle contribue à la solidité de l'édifice, en liant ensemble les brins de mousse dont le toit est composé.

Monsieur de Réaumur, occupé de l'histoire générale des insectes, n'a donné aux Bourdons qu'une attention partagée ; aussi ce grand naturaliste nous a-t-il laissé bien des questions à résoudre, et des points à éclaircir ; je me trouverai heureux si l'on veut bien regarder mes observations comme un supplément à son travail.

La cire des Bourdons est la première pierre de l'édifice; elle est le berceau de toute la peuplade, le ciment de tous les gâteaux, la seule matière que ces insectes puissent pétrir, la seule enfin qu'ils sachent manier.

Cette matière dont ils savent faire un toit pour garantir leur nid des eaux qui pourroient filtrer au travers de la terre, et dont ils font des vases propres à retenir leur miel, n'est cependant point si délicate, si blanche, si ferme et si fusible, que celle des Abeilles; elle n'est point propre à des travaux aussi délicats.

Il ne s'agit point de construire un double rang de cellules hexagones, à fonds pyramidaux; il ne s'agit point de donner certaines mesures aux logemens des individus de sexes différens, comme chez les Mouches à miel; tous les travaux devoient être plus simples chez les Bourdons.

Il falloit élever une famille plus ou moins nombreuse d'insectes, assez semblables aux Abeilles; leurs goûts, leurs besoins, étoient les mêmes; la nature a cependant voulu qu'ils parvinssent aux mêmes fins par des moyens différens.

Si chez les Bourdons le nombre des ouvrières est plus petit qu'il ne l'est chez les Abeilles communes, si les matériaux qu'ils employent sont plus grossiers, et leurs ouvrages moins délicats; l'on pourra cependant remarquer, que tout est en proportion chez les insectes qui nous semblent moins parfaits, et que le bien être de la peuplade résulte constamment de l'ordre et de l'accord de toutes les parties.

Monsieur de Réaumur ne nous donne aucune idée exacte sur la nature et sur l'origine de la cire; il paroît même, en plusieurs endroits, la confondre avec la poussière des étamines; sa couleur, sa consistance, ses propriétés, en diffèrent cependant d'une manière sensible.

La cire des Bourdons que j'ai observé étoit brune, molle; et le pollen que ces insectes conservent dans leurs magasins est ordinairement jaune, friable, et se réduit en poudre sous les doigts. On verra par l'analyse que je joins ici, que ces matières diffèrent encore à bien d'autres égards. Mr. de Réaumur croyoit sans fondement, que le pollen étoit une espèce de cire *brute*, que les Abeilles favoient convertir en véritable cire; il avoit donné à la matière molle dont les Bourdons se servent dans leurs nids, le nom de cire; et jugeant par analogie, il lui avoit attribué la même origine. Il me sembla qu'on ne pouvoit adopter un tel sentiment, sans un examen plus approfondi; c'est ce qui m'engagea à faire quelques recherches sur l'origine de la cire des Bourdons.

Le pollen se convertissoit-il en cire dans l'estomac des Bourdons? C'est une question qui étoit facile à résoudre. Je savois que les Bourdons pouvoient se nourrir pendant quelque tems avec le pollen qu'on trouve dans leurs magasins. J'imaginai de les servir de miel; de leur donner autant de pollen que je pourrois m'en procurer; de les enfermer, et de leur donner un gâteau composé de quelques coques, qui ne contiennent pas de cire. Ce plan fut exécuté; les Bourdons n'en firent point de cire pendant tout le tems qu'ils ne furent nourris que de pollen. Je crus pouvoir conclure de là, que le pollen ne leur avoit servi que de nourriture dans cette circonstance, et qu'il n'avoit pas été converti en cire dans leur estomac.

L'expérience suivante, l'inverse de la première, me prouva bien plus clairement encore, que la cire n'étoit pas du pollen préparé; elle prouve même que le pollen n'entroit pour rien dans la composition de cette matière; et que, par conséquent, Mr. de Réaumur avoit supposé à la cire des Bourdons une origine qui ne lui convenoit point.

J'enfermai d'autres Bourdons sous une cloche de verre; je leur donnai

donnai aussi un petit gâteau de coques dégarnies de cire; je les sevrâi de pollen, et je les nourris de miel.

J'observai dès le second jour, que les coques avoient changé de couleur depuis la clôture des Bourdons.

Ces loges de soie, ordinairement d'un jaune clair, étoient devenues brunes au sommet, luisantes et gluantes; le lendemain je fus étonné de voir que la matière colorante avoit été enlevée de dessus les coques de cire; et qu'elles étoient jaunes comme auparavant; mais le surlendemain je scûs ce qu'elle étoit devenue,—je vis que les Bourdons en avoient fait un pot à miel sur le bord du gâteau.

Je trouvai le jour suivant, que la femelle avoit construit une cellule de cire neuve sur l'une des coques, et qu'elle y avoit déposé des œufs.

La matière dont elle avoit été construite étoit parfaitement semblable à la cire ordinaire des Bourdons, excepté qu'elle étoit plus luisante, propriété qui tenoit peut-être à ce qu'elle avoit été produite depuis peu; cette expérience m'apprit non seulement que le pollen n'entroit pas dans la composition de la cire, mais elle me découvrit que le miel étoit la matière première de cette substance, et qu'il se convertissoit en cire par l'effet d'une élaboration particulière.

Mais étoit-ce la partie sucrée du miel, ou quelque autre principe, qui avoit produit dans le corps des Bourdons cette cire que je trouvais sur leurs gâteaux?

Il falloit une expérience directe pour le décider; je commençai par répéter la précédente, et j'obtins le même résultat.

J'imaginai de nourrir ces mêmes Bourdons avec du sucre humecté; je leur donnai un autre gâteau qui ne contenoit aucune parcelle de cire.

Je les tins enfermés sous une cloche de verre. Au bout de vingt-quatre heures je vis distinctement le dessus du gâteau teint en brun; je ramassai avec la lame d'un canif la matière colorante; j'y reconnus

bientôt la cire comme la première fois ; cette substance exposée au feu sur une lame de verre se fondoit, et couloit un peu ; elle bouillit bientôt après, et laissa échapper une odeur désagréable.

Je conclus de cette dernière expérience, que la partie sucrée du miel suffisoit pour mettre les Bourdons en état de produire de la cire.

Je n'avois pas encore vu de quelle manière les Bourdons produisoient cette cire ; je pensai d'abord qu'elle sortoit par leur bouche, et que les Bourdons enduisoient de cire, ou peignoient les gâteaux, en se servant de leur langue comme d'un pinceau ; mais avant de me laisser persuader par une simple conjecture, je cherchai à m'instruire de la vérité par de nouvelles observations.

Je pensai que ces Bourdons feroient vraisemblablement de la cire, lors même que je ne leur donnerois point de gâteau.

Je plaçai une table devant ma fenêtre, à fin de voir au grand jour les moindres détails ; je mis une feuille de papier parfaitement blanc sur cette table ; je la couvris avec un récipient de verre, et j'en fermai sous la cloche un certain nombre de Bourdons d'une autre espèce ; je les nourris avec du miel, que je leur donnai sur une carte, et je les observai.

Les Bourdons se rangèrent en cercle autour de leur mangeoire ; ils déployèrent leur trompe, et prirent avec cet instrument tout le miel que je leur avois donné.

Ils mangèrent pendant près de 10 ou 15 minutes ; j'en vis alors quelques-uns se mettre un peu sur le côté, broffer leur ventre avec les pattes de la seconde paire, se frotter de même à l'endroit où les demi-anneaux se rencontrent sur les côtés de leurs corps, et se redresser ensuite : ils faisoient alors passer tour-à-tour les deux jambes qui venoient de broffer leur ventre entre les deux jambes de derrière, qui se rapprochoient l'une de l'autre ; et tandis que celles-ci seroient l'une de celles de la seconde paire, le Bourdon faisoit effort

pour la retirer de l'espèce de pince dans laquelle il l'avoit engagée: par cette manœuvre bien simple les jambes de la troisième paire enlevoient à celles de la seconde toute la matière qu'elles avoient prise sur les anneaux. TAB. XXVII. Fig. 2.

Mais quand les jambes de la troisième paire étoient assez chargées de cette matière, il falloit aussi qu'elles s'en dépouillassent, et c'étoit par un autre moyen.

Les Bourdons y parvenoient en les frottant du haut en bas assez rapidement: quand la matière étoit arrivée à leur extrémité, ils la pouffoient sur le parquet. Ces Bourdons répétoient deux fois cette manœuvre pour chacune des jambes broffantes.

Dans cette opération on a vû les Bourdons frotter leur ventre avec les jambes de la seconde paire, puis les faire passer successivement deux fois entre celles de la troisième, qui finissoient par déposer sur le parquet la matière dont elles avoient été chargées.

D'autres fois ils frotoient leur ventre avec les jambes de la troisième paire, et les faisoient passer entre celles de la seconde; cette opération l'inverse de la précédente avoit le même résultat, et les jambes de la seconde paire se dépouilloient ensuite, de la même manière, de tout ce qu'elles avoient pris à celles de la troisième. TAB. XXVII. Fig. 3.

Tous ces Bourdons firent plusieurs fois la même manœuvre; et quand j'en eus découvert le but, j'examinai avec beaucoup d'attention la matière que leurs jambes laissoient après elles sur le papier.

C'étoit ordinairement des points noirs ou bruns, presque liquides, mais qu'on ne pouvoit examiner que lorsqu'il y en avoit un certain nombre; alors, en les réunissant sur la lame d'un couteau, on y reconnoissoit la même matière que celle dont les Bourdons se servent pour faire des pots à miel; elle se fondoit ainsi que leur cire ordinaire, et répandoit la même odeur quand elle étoit exposée au feu. Ils en faisoient tous les jours une quantité assez considérable; mais elle

elle étoit bien petite, si on la comparoit à la dose de miel qu'ils consommèrent; ils pouvoient en couvrir la moitié d'une carte en un jour; la couche étoit d'abord très mince, mais elle devenoit graduellement plus épaisse: ils me prouvèrent enfin, que c'étoit leur véritable cire en construisant des pots à miel sous mes yeux.

L'apparition presque instantanée de la cire sur les anneaux des Bourdons qui venoient de manger du miel, étoit un fait très remarquable; il m'importoit de le constater; je crus d'abord nécessaire d'écarter une objection qui se présenta à mon esprit; on auroit pu croire que la matière cireuse n'avoit pas été produite instantanément dans le corps des Bourdons que j'avois enfermés; et qu'elle avoit été élaborée par ces insectes, avant l'instant de leur clôture, par l'effet de la nourriture qu'ils avoient pu choisir. Il y avoit un moyen bien simple de vérifier ou de détruire cette conjecture; il ne s'agissoit que d'enfermer un grand nombre de Bourdons, et de leur donner du pollen, qui ne pouvoit que les nourrir sans les mettre en état de produire de la cire.

S'ils avoient fait de la cire dans leur prison, il auroit été prouvé que l'élaboration de cette matière avoit été faite avant la clôture; si, au contraire, ils n'avoient point fait de cire, la supposition d'une élaboration antérieure à la clôture auroit été détruite; j'aurois alors donné du miel à ces mêmes Bourdons toujours prisonniers, et j'aurois observé ce qui se seroit passé avec l'attention la plus scrupuleuse.

Ce fut le 20 Juillet que je fis cette expérience; les Bourdons que j'avois sequestrés et réduits au pollen pour toute nourriture, ne firent point de cire; un seul de ces insectes brossa une fois les côtés de son ventre, mais ses jambes ne déposèrent rien sur le parquet de sa prison. Quand je me fus bien assuré qu'ils ne pouvoient faire de la cire, je leur donnai une abondante ration de miel; je vis alors la mère et les ouvrières brosser leur ventre, et déposer sur le parquet la matière qui avoit suinté au travers de leurs anneaux: le résultat

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de cette expérience écartoit le doute que j'avois élevé, et il me parut démontré que la matière cireuse n'étoit pas dans le corps des Bourdons avant qu'ils eussent mangé du miel, et que sa production instantanée étoit l'effet de cette nourriture.

Cette vérité fut pleinement confirmée dans la suite par plusieurs observations.

L'une des plus remarquables fut, que des Bourdons, nourris quinze jours avec du miel seulement, firent assez de cire dans leur prison pour pouvoir en construire deux pots à miel, sous mes yeux.

Une autre observation qui vient à l'appui de tout ce que j'ai avancé jusqu'à présent sur la cire, mérite aussi quelque place dans ce chapitre.

J'avois enfermé une douzaine de Bourdons sous une cloche de verre; je leur avois donné une portion de gâteau dépouillée de cire autant qu'il avoit été possible, et j'avois résolu de les nourrir de miel pendant quelques jours, pour confirmer une des expériences précédentes.

Leur gâteau étoit composé d'une dizaine de coques de foie; ces loges qui contenoient des nymphes étoient tellement inégales, que le gâteau n'avoit aucune assiette; sa mobilité inquiétoit extrêmement les Bourdons: s'ils avoient eu de la cire, ils n'auroient pas manqué de l'assujettir; ils ne pouvoient monter sur le gâteau sans le faire pencher, et sans le mettre en mouvement: cependant leur habitude, ou plutôt leur affection pour les nymphes que contenoient ces coques, exigeoit qu'ils se tinssent sur le gâteau pour rechauffer les petits: ils inventèrent un expédient si ingénieux, pour solidifier ce gâteau, que je ne puis résister à l'envie de le raconter.

Ils suppléèrent au défaut de la cire, en soutenant le gâteau à force de bras, comme on le voit dans la TAB. XXVII. Fig. 5.

Quand

Quand ils appercevoient par le balancement du gâteau qu'il alloit pencher de leur côté, ils descendoient un peu sur ses bords, et se tenoient suspendus par les jambes de derrière au haut des coques, tandis qu'ils étendoient en embas les jambes de la seconde paire, qui sont très longues, comme on le voit (TAB. XXVII. Fig. 4.). Ils attendoient dans cette attitude, que le mouvement du gâteau leur fit atteindre la table. Alors ils s'y cramponnoient avec les crochets de leurs pieds, comme dans la figure 5, et restoient dans cette posture jusqu'à ce qu'ils fussent fatigués. D'autres Bourdons venoient alors les relever; plusieurs à la fois retenoient ainsi le gâteau en situation; la mère elle-même les aidait dans ce travail extraordinaire: ce manège dura deux ou trois jours; je le fis remarquer à plusieurs personnes, qui le virent ainsi que moi, et qui n'en furent pas moins frappés.

Pendant le miel que je leur avois donné les avoit mis en état de produire de la cire; au bout de deux jours les coques étoient entièrement couvertes de matière brune et cireuse. Le troisième jour les Bourdons ne soutenoient presque plus leur gâteau; ils avoient construits des pilliers de cire, qui partoient de la table, pour aller soutenir celles des coques, dont la base étoit plus éloignée du plan; ce qui les dispensoit du travail extraordinaire que j'avois admiré les jours précédens.

Ces pilliers ne durèrent pas longtems; ils finirent par se rompre: leur cire s'étoit séchée, et n'adhéroit plus avec la même force au plan. Les Bourdons eurent recours au même expédient, pour arrêter le mouvement de leur gâteau; ils recommencèrent à le soutenir avec leurs jambes; j'eus alors pitié d'eux, et je colai leur gâteau sur la table où il étoit posé.

J'observai dans toutes ces expériences que la mère produisoit beaucoup plus de cire que les simples ouvrières.

Je vis dans d'autres occasions des mâles que j'avois enfermé séparément, et nourris de miel, se brosser les côtés comme les ouvrières; mais je ne pus examiner la matière qu'ils laissoient sur le parquet; ce fera le sujet de nouvelles observations.

En réunissant mes observations sur la cire je trouve,

1. Que la cire et le pollen font deux matières essentiellement différentes.

2. Que le pollen n'est point la matière première de la cire.

3. Que des Bourdons nourris de miel seulement font de la cire.

4. Que c'est la partie sucrée du miel qui produit la cire dans le corps de ces insectes.

5. Que cette cire sort de leur corps en très petite quantité à la fois, et par les vides que laissent entr'eux les anneaux écailleux dont le corps de ces insectes est garni dessus et dessous.

6. Que leur cire sort de leur corps un instant après qu'ils ont mangé du miel.

7. Que les femelles font une plus grande quantité de cire que les autres individus.

8. Que les mâles paroissent en faire ainsi que les ouvrières, et que les femelles; mais on verra dans le chapitre suivant que les ouvrières et les femelles seulement ont été instruites à l'employer à différens usages.

CHAPITRE V.

De la Manière dont les Bourdons employent la Cire dans leurs Constructions.

VENONS tout de suite au principal usage de la cire; voyons comment on prépare au ver du Bourdon le logement et la nourri-

ture. Je supposerai d'abord un nid semblable à celui que j'ai décrit dans le chapitre troisième; tel qu'on le trouvera au mois de Juin, peuplé d'un nombre de mouches assez considérable, et pourvu d'une mère bien féconde; je fortirai le nid de la terre; je le mettrai au grand jour sur ma fenêtre; je le couvrirai d'un récipient, ou d'une cloche de verre; je laisserai aux Bourdons la liberté de sortir, au moyen d'une porte pratiquée dans la planche sur laquelle j'aurai posé leur nid; à la faveur de tous ces préparatifs je pourrai observer et décrire ce que j'aurai vu.

Mais le nid proprement dit est encore caché à mes yeux par une calotte de cire, qui s'élève tout autour des gâteaux, et qui vient se former en voûte au dessus d'eux.

Rien n'est plus facile que d'enlever cette calotte, mais les Bourdons la reconstruisent en peu de tems; ce n'est cependant point un inconvénient, parceque la douceur de ces insectes permet toujours de la détruire.

Au dessous de cette voûte on voit déjà deux rangs de gâteaux composés de coques oblongues, de massifs de cire de différentes formes, et de plusieurs pots à miel.

Le nid ne contient point encore de mâles ni de jeunes femelles; on ne trouve sur les gâteaux que des ouvrières, et la femelle qui leur a donné le jour. On voit souvent cette mère, fort agitée, courir çà et là sur le nid, s'arrêter sur un massif de cire, ou sur un de ces pots à miel dont j'ai parlé, enlever avec ses dents quelques parties de cire sur son bord, puis se remettre à courir; s'arrêter au point de réunion de trois coques, y déposer le brin de cire qu'elle apportoit, et réitérer ce manège jusqu'à ce qu'elle ait élevé un petit tas, auquel elle puisse donner une certaine forme.

Elle rongé alors cette masse de cire dans le milieu; elle fait passer dans sa machoire les parcelles de matière qu'elle en retire; et les posant sur le bord du creux, elle les pétrit avec ses dents, ainsi que

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celles qu'elle y avoit laissées; elle amincit les bords de la petite cavité, et en l'approfondissant d'avantage elle donne plus de hauteur à ses parois; elle recule un peu, et travaille la matière qu'elle trouve sous sa machoire; elle recule encore; mais en tournant autour de sa cellule, car sa tête n'en quitte presque jamais le bord, elle tourne ainsi à reculon jusqu'à ce qu'elle ait fait le tour du petit creux, qui prend déjà la forme du calice d'un gland. Cela fait, elle retourne chercher de la cire, qu'elle vient poser sur le bord de la cellule; elle en apporte assez en deux ou trois fois pour élever ses bords de trois ou quatre lignes.

On voit souvent les ouvrières l'aider dans ce travail, d'autres fois le faire en entier; tantôt elles font plusieurs de ces cellules les unes à côté des autres; tantôt elles défont la parois qui les sépare pour n'en faire qu'une seule, plus large que les autres.

Mais dès que la cellule est achevée la mère vient lui donner la dernière perfection; elle en polit l'intérieur, en arrondit les contours, en épaisit les parois et en relève les bords.

C'est là qu'elle doit déposer ses œufs; c'est là que ses petits passeront une partie de leur vie, qu'ils seront nourris jusqu'à ce qu'ils soient en état de voler. Mais après leur avoir construit une demeure assez spacieuse pour les premiers jours de leur vie, elle semble songer aussi à leurs premiers besoins; elle pourvoit d'avance à leur nourriture; elle va chercher du pollen dans ces pots, où les Bourdons conservent quelquefois des poussières d'étamines, et qui sont ordinairement destinés à contenir leur miel. Elle revient et dépose dans le fond de la cellule une épaisse couche de pollen, mais elle l'étend de manière à laisser pour ses œufs le plus grand espace possible.

Tandis que la femelle prépare un logement et des vivres pour ses petits, les ouvrières sont occupées à divers travaux qui méritent d'être connus. Un certain nombre d'entr'elles construisent la voûte de cire qui recouvre les gâteaux; c'est ordinairement à la base

des coques antérieures qu'elles fixent l'origine de cette enveloppe; elles la commencent d'abord d'un seul côté; elles attachent pour cela quelques parcelles de cire à plusieurs coques contigues; elles en apportent d'autres qu'elles placent entre les premières, ce qui forme une ligne plus ou moins courbe; cette ligne, fort étroite, est la base de leur premier travail: elles vont ensuite chercher de la cire dans leur nid; et lorsqu'elles reviennent, on voit à leur bouche un petit morceau de cette matière, qu'elles posent et qu'elles arrangent avec leurs dents sur les premiers brins. Leur nombre augmente, et l'on voit bientôt s'élever un mur de cire plus haut dans son milieu qu'à ses extrémités, et dont l'épaisseur n'excède pas un huitième de ligne: cependant le nombre des travailleuses est assez grand pour que l'ouvrage avance à vue d'œil, le mur s'élève déjà au dessus des coques, d'autres ouvrières en construisent de semblables de tous les côtés à la fois. Ils ont leurs bases fixées sur le fond du nid sur les feuilles, ou même sur le terrain; ces murs sont attachés aux coques des gâteaux, qui leur donnent toute la solidité dont cet ouvrage est susceptible.

Tous ces murs sont bientôt joints ensemble par d'autres murs semblables, et construits de l'un à l'autre; on voit déjà un cintre irrégulier d'un pouce de hauteur ou d'un pouce et demi autour des gâteaux.

Jusqu'ici le travail des Bourdons avoit été vertical; leurs jambes antérieures et leur tête posée sur le bord de l'enveloppe étoient occupées à augmenter sa hauteur, tandis que les pattes postérieures étoient fixées sur les coques les plus voisines; on voyoit leurs antennes placées aux deux côtés du bord de la petite muraille, comme pour diriger le travail des dents; celles-ci placées de la même manière en arrière des antennes paîtrissoient la nouvelle cire qu'elles venoient d'apporter, et qu'elles mêloient avec la vieille: leur tête faisoit un petit mouvement en avant; les dents déposoient alors une
petite

petite bande de cire sur le bord de cette enveloppe, et donnoit au tout une épaisseur parfaitement égale.

Les pattes antérieures servoient, pour ainsi dire, de bras à ces insectes; c'est avec ces membres qu'ils tenoient en situation le bord de cire qu'ils travailloient; leurs jambes de la seconde paire servoient à les supporter; ils les cramponnoient dans la cire, et cette attitude sembloit faciliter leurs diverses manœuvres.

A cette époque le travail devient horizontal; les Bourdons, au lieu d'ajouter de nouvelles bandes au dessus du bord de leur muraille, les entent un peu de côté, comme font les massons lorsqu'ils commencent à construire le cintre d'une voûte; bientôt ils quittent entièrement le travail vertical, et font au dessus du nid un toit plus ou moins horizontal; on les voit souvent alors à califourchon sur le bord de la voûte à laquelle ils se cramponnent et se suspendent au moyen des crochets dont leurs pieds sont munis.

Ils sont représentés dans cette attitude TAB. XXVI. Fig. 2.

Les Bourdons travaillent alors de côté, mais c'est avec la même dextérité que lorsqu'ils élèvent le mur qui est la base de leur voûte; elle s'étend en tout sens avec une grande rapidité, et bientôt elle est entièrement formée, tous les bords ont été joints ensemble, et les Bourdons n'ont laissé que quelques ouvertures fort irrégulières, destinées à leur servir de passage. Ces insectes sont véritablement alors sous une tente d'une toile de cire; elle est soutenue en plusieurs endroits par de petits pilliers de forme irrégulière, qui partent de dessus les coques, et qui arrivent à la surface inférieure de la voûte.

Un pouce carré de cette toile de cire pèse à peu près quatre grains; les plus grandes enveloppes que j'ai vû avoient ordinairement quatre pouces carrés, et pesoient par conséquent environ 64 grains.

J'enlevai un jour l'enveloppe d'un nid de Bourdons rouges et noirs, très peuplé, et au bout de deux jours ils en eurent construit une nouvelle qui pesoit 55 grains, elle pouvoit avoir 3 pouces $\frac{7}{10}$ carrés

de

de surface : j'enlevai encore plusieurs fois leur enveloppe sans les décourager ; ils en firent quatre en neuf jours ; je les pesais, et leur poids réuni montoit à 272 grains, ce qui équivaloit à celui d'une toile de cette matière qui auroit huit pouces quarrés de surface ; ils en firent une nouvelle en 4 à 5 jours, qui pesa 93 grains.

Les Bourdons dans l'état de nature couvrent leurs nids de mousse, et, comme Mr. de Réaumur l'avoit observé, ils la solidifient au moyen d'une couche de cire fort mince qu'ils construisent au dessous : mais lorsqu'on leur refuse les matériaux nécessaires, ou lorsque la nature les a placé trop loin de la mousse et des brins d'herbe, ils savent s'en passer, et construisent leur toit en cire seulement comme je viens de le raconter.

Le hazard m'a fait découvrir un trait de leur industrie que la nature ne m'eut certainement jamais offert. J'avois recouvert un nid de Bourdons avec une cloche de verre, comme je le fais ordinairement ; les bords de la cloche ne posoient pas exactement sur la table où elle étoit placée ; il y avoit même certains endroits où le plateau étoit si fort voilé, qu'un Bourdon auroit pû passer sous les bords de la cloche avec la plus grande facilité. Je remplis les vuides avec de la toile grossière ; je la fis même entrer fort avant dans la cloche, afin de la fermer plus sûrement. La ruche étoit établie dans mon cabinet ; un long canal vitré, adapté à la porte du nid, conduisoit les Bourdons hors de la fenêtre par une ouverture que j'avois pratiquée dans le bois même de la croisée, et au moyen de ces préparatifs je pouvois observer sans risquer d'être piqué. Je vis bientôt les Bourdons attaquer les morceaux de toile qui fermoient leur ruche ; ils en arrachoit les fils les uns après les autres ; ils les cardoient avec leurs dents, et les coupoient aussi menus que des brins de coton ; ils réunissoient ensuite ces brins avec leurs jambes ; ils en formoient des flocons qu'ils pouvoient derrière eux, à mesure qu'ils les avoient cardés. Plusieurs Bourdons étoient continuellement occupés

occupés à ce travail, tandis que d'autres individus de la peuplade s'occupoient à pousser avec leurs jambes ces petits monceaux de coton contre le nid même; ils travaillèrent à éfiler cette toile pendant près d'un mois; ils en entourèrent leur nid d'un tas épais au moins d'un pouce et demi en certains endroits, et qui s'élevoit jusqu'à la moitié de la hauteur du nid. Quand ils eurent éfilé une plus grande quantité de toile, ils en couvrirent entièrement l'enveloppe, comme ils auroient fait avec de la mousse, et même ils en firent entrer sous l'enveloppe une assez grande quantité pour fermer tous les vuides qu'elle pouvoit laisser entre son bord et celui du gâteau.

D'autres Bourdons déchirèrent la couverture d'un livre dont je m'étois servi pour recouvrir la boîte où je les avois logé; ils coupèrent ces lambeaux de papier en fort petits morceaux, qu'ils réunirent au dessus de l'enveloppe de leur nid.

Il paroît donc que ces insectes savent profiter en de certaines occasions des matériaux que la nature ne pourroit leur présenter: on verra dans le chapitre dixième ce qui peut avoir donné lieu aux Bourdons de déployer un talent et un instinct aussi extraordinaire.

Si l'on met des morceaux de toile ou de papier dans une ruche d'Abeille, elles les déchirent avec leurs dents, et en emportent les débris hors de leur habitation. A quelle cause pourroit-on attribuer cette différence de mœurs, entres des insectes dont l'instinct paroît si rapproché? Ne seroit-ce point que les Abeilles instruites à déchirer, à enlever les tissus de soie filés par les teignes dans l'intérieur de leurs gâteaux, prennent la toile et le papier pour l'ouvrage de leurs ennemis? tandis que les Bourdons, sujets aux mêmes fléaux, ne savent point s'en défendre, et qu'ils n'enlèvent jamais les galeries que les teignes ourdissent dans leurs gâteaux?

Les insectes qui vivent en société ont cela de commun avec les hommes, que leur industrie augmente en raison de leur nombre. Il semble qu'une grande population facilite les travaux de toute espèce;

espèce; et c'est dans les nids les plus peuplés qu'il faut observer les ouvrages des insectes, pour connoître le plus haut point de leur industrie.

J'ai observé plusieurs fois que les Bourdons de même espèce n'exécutoient pas aussi bien les mêmes travaux lorsqu'ils étoient en petit nombre, que lorsque leurs nids avoient plus d'habitans. J'ai remarqué que ceux dont les familles étoient moins nombreuses ne doubloient point de cire leur toit de mousse, comme le font ceux qui habitent des nids bien peuplés; les premiers n'allongeoient pas leurs pots à miel, tandis que le besoin forçoit les autres à user de cet artifice.

Il est cependant vrai, que pour commencer des observations il vaut mieux se contenter des familles les moins considérables; elles sont plus faciles à examiner, le tableau en est moins confus, et l'on y peut suivre plus exactement les principaux traits de leur histoire; mais si l'on désire de connoître un plus grand nombre de faits, il ne faut plus s'en tenir aux ébauches de la nature, il faut chercher des détails nouveaux dans des nids bien peuplés. C'est là qu'on pourra rectifier ses erreurs, et qu'après avoir généralisé ses idées, il fera aisé de les réduire à de justes bornes.

CHAPITRE VI.

De la Ponte.

LORSQUE la femelle a achevé la cellule qui doit recevoir ses œufs, elle se met à pondre; mais elle essaie auparavant si le bout de son corps peut y entrer: quand elle la trouve trop étroite, elle en fort et revient l'aggrandir; elle essaie une seconde fois, et si les

les dimensions de la capsule ne sont pas exactement celles qui conviennent au bout de son ventre, elle évalue plus ou moins les bords de l'alvéole; elle réussit enfin, à leur donner une mesure exacte, et on la voit alors s'établir sur la cellule.

Cependant elle fait de vains efforts pour pondre, les lèvres de son anus ne s'ouvrent pas assez pour laisser sortir ses œufs; mais elle a été instruite à faire usage d'un instrument qui favorise ses efforts, et dont j'ai longtems ignoré l'utilité.

Cet instrument est l'aiguillon dont le bout de son corps est armé, et dont elle ne se sert presque jamais comme d'une arme offensive.

L'aiguillon chez ces insectes n'a d'autre issue que l'anüs, et cet anus est composé de deux lèvres horizontales, qui s'ouvrent et se ferment l'une sur l'autre.

Lorsque la femelle est établie sur l'alvéole, et qu'elle est rête à pondre, elle entr'ouvre avec effort les lèvres de son anus, en fait sortir son aiguillon, et le poussant fortement en arrière, elle l'enfonce dans le bord de la cellule, qu'elle perce de part en part; la lèvre supérieure de l'anüs se trouve donc prise entre l'aiguillon et le bord de l'alvéole; ses pattes postérieures embrassent en même tems la cellule, et pressent contre l'aiguillon la cire molle dont elle est formée: au moyen de cette dernière opération elle y tient assez fortement. Voyez TAB. XXVII. Fig. 6.

Si j'osois donner une explication de ce fait, voici ce que je dirois:

Les lèvres de l'anüs ont une tendance naturelle à se rapprocher; il faut une force extraordinaire pour rompre cette force musculaire; l'effort se fait du dedans au dehors; et si quelques muscles agissent dans ce sens en cette occasion, il leur faut un point d'appui, pour que l'anüs puisse s'ouvrir; il faut que ses lèvres ne se suivent pas l'une l'autre; mais elles se suivront, tant que l'une des deux ne sera pas retenue par quelques moyens extraordinaires; car rien n'est plus mobile que les derniers anneaux du ventre de la femelle. Mais où seroit

cette pince? où feroit ce point d'appui? La nature a instruite les femelles des Bourdons à le chercher sur les bords de la cellule qui doit recevoir leurs œufs, à engager la lèvre supérieure de l'anüs entre la cire de l'alvéole et leur propre aiguillon; et à former ainsi une espèce de pince, qui en leur donnant une assiette convenable force leur anus de rester entr'ouvert, et facilite leur accouchement.

Lorsque les femelles se sont fixées sur leur cellule, comme je viens de le dire, elles pondent six ou sept œufs de suite, sans changer d'attitude.

Il n'y a point d'exemple d'une ponte de ce genre chez les Abeilles et chez les Guêpes.

Les insectes qui diffèrent encore plus des Bourdons, leur ressembleroient-ils à cet égard? Cela n'est pas vraisemblable; il existe une variété infinie dans toutes les opérations de la Nature, et plus les classes sont différentes, moins les détails se rapprochent.

Les œufs des Bourdons sont d'une ligne de longueur, un peu recourbés, et plus gros à un bout qu'à l'autre.

Ils paroissent au microscope en quelque sorte semblables à du chagrin; ils sont d'une couleur laiteuse et remplis de liqueur.

Swammerdam dit que ces œufs sont plantés dans la cire de leur cellule par leur bout le plus pointu; ce fait n'a pas été confirmé par mes observations; j'ai toujours trouvé les œufs de Bourdons couchés les uns à côté des autres; ou les uns sur les autres, sans aucun ordre; la description qu'il en a donnée est d'ailleurs exactement conforme à ce que j'ai vû.

A peine la femelle a-t-elle achevé de pondre, qu'elle fonge à renfermer ses œufs; elle rabat sur eux les bords de leur petite loge; elle va ramasser sur les coques de soie et sur les pots à miel une suffisante quantité de cire, pour enfermer ses petits; elle remplit avec le plus grand soin les moindres interstices; elle achève ainsi la cloison supérieure de leur logement, et se couche sur la cellule, en remuant

très vivement le bout de son corps au dessus de leur berceau, comme si elle vouloit les couvrir; elle reste quelquefois vingt minutes sur la cellule; elle la quitte pour quelques instans, et y revient bientôt après.

Faire une cellule, la garnir de pollen, pondre des œufs, les renfermer—voilà bien des opérations—elles sont faites en une demi-heure: si l'on s'étonne de cette rapidité, l'on ne fera pas moins surpris de la cause qui oblige cette mère à se hâter si fort.

Au moment où ses œufs sont pondus, et lorsqu'elle commence à les renfermer, on voit les ouvrières se précipiter sur leur cellule, et essayer d'en dérober quelques-uns; elles attaquent même ces œufs, lorsque la mère est occupée à les pondre; mais celle-ci a donné de si exactes dimensions aux bords de l'alvéole, que les ouvrières ne réussissent point à les enlever pendant qu'elle reste sur la cellule; ces ouvrières harcellent cependant de telle manière l'extrémité de son ventre, qu'elle se retourne en fureur, et les poursuit jusqu'au bas du nid, battant des ailes.

D'autres Bourdons profitent du moment où la mère s'est écartée; ils viennent sur la cellule avec les mêmes signes d'avidité, et en tirent à la dérobée un œuf, dont ils boivent le suc laiteux, et dont ils rejettent la coquille, qui n'est qu'une membrane transparente.

Quand la femelle revient pondre de nouveaux œufs, et qu'elle voit les Bourdons dévorer ceux qu'elle a déjà pondus, elle leur tombe dessus à coups de dents, les poursuit au fond du nid, et chasse tous ceux qui veulent approcher de sa cellule; jamais le voleur n'éprouve d'autres effets de sa colère; elle ne se fert point contre lui de son aiguillon; car, individus pour individus, ils sont tous égaux pour la nature, et celui qui est déjà parvenu à l'état de perfection vaut à ses yeux celui qui ne fait que de naître.

Lors même que ces œufs sont fermés ils ne sont point à l'abri de la gourmandise des ouvrières; elles savent entr'ouvrir la cellule, et

attaquer ses habitans ; la surveillance de la mère peut seule les en garantir.

Celle-ci fait alors la garde autour de ses petits, avec une vigilance étonnante, pendant six ou huit heures.

Il paroît que les vieux œufs sont moins recherchés des ouvrières que ceux qui sont nouvellement pondus ; en effet, j'ai rarement vu les ouvrières les attaquer le second jour.

J'essayai une fois de leur offrir de vieux œufs, au moment où elles attaquoient les nouveaux ; elles renfermèrent soigneusement les premiers, sans tenter de s'en nourrir.

Que penser de la Nature, quand elle semble donner aux insectes la faculté de détruire leur propre espèce, lorsqu'elle permet aux Abeilles de tuer leurs mâles, et qu'elle laisse aux Bourdons le droit et l'envie de dévorer les œufs nouvellement pondus ?

Ne sembleroit-il pas naturel d'en conclure, qu'elle veut opérer une destruction totale ? Cependant les espèces se conservent, les familles se multiplient, les loix ne sont point changées ; et il paroît au contraire, que c'est par le sacrifice de quelques individus que la conservation de l'espèce est assuré. Des observations particulières nous apprennent, que les Abeilles ne tuent leurs mâles que lorsqu'ils sont devenus inutiles à leur peuplade ; ils consommeroient une grande partie des provisions, dont les Abeilles ont besoin pour se nourrir pendant l'hiver ; et la Nature a préféré la conservation des individus industrieux, à celle des mâles qui ne sont plus d'aucun service après le tems de la fécondation.

Quand au pillage des œufs de Bourdons, il faut en chercher la cause plus loin.

Il ne paroît d'aucune utilité à la peuplade même ; car les œufs qui sont exposés à la glotonnerie des ouvrières sont aussi bien des œufs d'ouvrières que des œufs de mâles et de femelles.

Mais

Mais peut-être l'Auteur de la nature a-t-il voulu diminuer par là le nombre des mellivores.

Les Bourdons sont les plus grands des insectes qui se nourrissent de miel ; et si leur nombre étoit triple et quadruple, d'autres insectes ne trouveroient plus de nourriture, et peut-être leur espèce seroit-elle détruite.

Cet argument prendra plus de force si l'on remarque avec quel soin la Nature a mis des entraves à la trop grande population des Bourdons. Ces insectes ont plusieurs sortes d'ennemis ; entr'autres une espèce de fausse teigne, et un gros ver blanc, qui se nourrissent de leur cire, de leurs nymphes, et d'eux-mêmes quelquefois ; ils sont même chargés d'une nombreuse famille de poux, qui s'attachent à leur corselet, et qu'ils emportent avec eux dans les airs.

CHAPITRE VII.

Des Vers de Bourdons, et de la Manière dont ils se nourrissent.

SWAMMERDAM n'ignoroit pas que les Guêpes donnent la bécquée à leurs petits ; que ceux de l'Abeille maçonne se trouvent entourés, au sortir de l'œuf, des alimens que leur mère a préparé ; il savoit enfin, que les Mouches à miel préparent une bouillie particulière ; qu'elles la mettent dans les cellules qui servent de berceau à leurs petits ; qu'elles les nourrissent jour à jour ; et, ce qui est plus remarquable, qu'elles proportionnent la quantité et la qualité de cet aliment à l'âge et au sexe de chaque individu.

Il paroît qu'il n'avoit pas observé les mœurs et l'industrie des Bourdons ; rejetant les lumières que l'analogie pouvoit lui offrir, il veut que les petits de ces insectes se nourrissent de la matière même dont leurs berceaux sont composés.

Je fais tout ce qu'on doit de confiance aux lumières de ce grand anatomiste; mais il ne parle point ici d'après ses propres observations, et je me trouve heureux de n'avoir à combattre qu'une conjecture, à laquelle il n'attachoit pas un grand prix.

Le simple récit des faits prouvera, je l'espère, que les vers de Bourdons ne se nourrissent point comme ceux qui habitent nos fruits; qu'ils ne mangent pas la cellule qui leur sert de berceau; que leurs nourrices connoissent l'instant où leurs petits sont éclos, et où ils ont besoin de leurs secours; qu'elles ouvrent alors leurs cellules pour leur donner à manger; qu'elles le font avec trop de délicatesse pour pouvoir leur nuire; et qu'elles ferment après cela l'ouverture de l'alvéole; on verra enfin que les Bourdons nourrissent en certain tems leur petits comme les Abeilles maçonnes, et en d'autres comme les Guêpes et les Mouches à miel.

Les vers de Bourdons sont apodes et de couleur blanche; Mr. de Réaumur dit qu'ils ont sur les côtés des taches noires de figure irrégulière, plus longues que larges, et disposées transversalement: je n'en ai vu aucunes sur le corps des vers que j'ai observé.

On distingue aisément la tête de ces vers, dont la lèvre inférieure est fort avancée.

Leur corps est composé de treize ou quatorze anneaux.

Le cœur de ces insectes paroît au travers de la peau: quand on les regarde du côté du dos il est rempli d'une liqueur transparente, et s'étend en ligne droite de la tête jusqu'à l'anus; j'ai toujours vu ces vers courbés ou en cercle; leur grandeur varie suivant l'âge, le sexe, et l'espèce; ceux des femelles sont toujours les plus grands.

Les vers de Bourdons sortent de leurs œufs au bout de 4 à 5 jours; ils se nourrissent d'abord du pollen préparé dans leur cellule; mais la provision qu'on leur en a fait n'étant pas considérable, ils n'ont pas des vivres pour fort longtems, ils dépendent alors des soins des ouvrières.

Celles-ci

Celles-ci viennent sur la cellule ; elles font avec leurs dents un petit trou dans la cire du couvercle ; elles parcourent après cela les gâteaux, pour chercher du miel ou du pollen ; on les voit ensuite revenir sur le berceau de leur petits, mettre leur tête dans l'ouverture qu'elles ont pratiquées, pénétrer jusques aux vers, rester quelques instans dans cette attitude, retirer ensuite leur tête, et fermer la cellule.

Pendant que les Bourdons font les fonctions de nourrice, il est impossible de voir quelle matière sort de leur bouche ; mais j'ai observé qu'ils font alors avec les anneaux de l'abdomen les mêmes mouvemens que pour dégorger le miel dans les réservoirs qui lui sont destinés ; les anneaux de leur abdomen rentrent les uns dans les autres, et le ventre se raccourcit considérablement ; leur bouche s'ouvre au même instant, et on voit découler dans les réservoirs une partie du miel qui étoit dans leur estomac ; hors puisqu'ils font le même mouvement lorsqu'ils mettent leur tête dans la cellule, ce n'est point apparemment par une simple curiosité qu'ils l'avoient ouverte, il est bien plus probable que c'étoit pour nourrir les jeunes vers ; et les observations suivantes confirment cette conjecture.

Quand ils nourrissent leurs vers on ne peut appercevoir si c'est avec du miel ou avec du pollen ; il est à croire que c'est avec du pollen, puisque c'est une nourriture qui leur convient dès l'enfance, et que les Bourdons eux-mêmes en mangent avec passion ; j'ai chassé de dessus une cellule une ouvrière qui venoit de nourrir un ver, avant qu'elle eut eu le tems de boucher l'ouverture qu'elle y avoit faite ; j'ai écarté les parois de la cellule ; le ver y étoit couché en cercle à peu près horizontalement ; le centre du ver étoit rempli d'une liqueur jaune retenue par les peaux de son ventre ; je goutai cette liqueur, et j'y reconnus le goût du pollen mêlé avec le miel des Bourdons.

J'ai réussi à nourrir pendant plusieurs jours un ver de femelle avec du pollen et du miel de ces insectes ; ce qui me confirme encore dans mon opinion c'est que j'ai toujours trouvé l'estomac de ces vers rempli

rempli d'une matière jaune friable, très compacte, et semblable au pollen.

Les Bourdons ne préparent jamais de pollen dans les cellules qui doivent servir de berceau aux mâles et aux femelles ; les uns et les autres ne naissent ordinairement qu'au mois d'Août et de Septembre ; les ouvrières paroissent dès les mois de Mai et de Juin.

Quelle peut être la raison de la différence des soins que les ouvrières donnent aux mouches des trois fortes ?

Ce n'est pas qu'il y ait moins de pollen sur les fleurs au mois d'Août qu'il n'y en a au mois de Juin ; car les ouvrières en apportent tous les jours, dans les mois d'Août et de Septembre, et d'ailleurs elles en ont fait provisions considérables à cette époque : mais voici l'explication que je pourrais donner de cette négligence apparente.

Le nombre des ouvrières est beaucoup plus grand au mois d'Août qu'il ne l'est au mois de Mai ; à peine trouve-t-on au printems quelques ouvrières dans les nids de Bourdons ; la mère commence seulement alors à n'être plus solitaire ; dans les mois d'Août et de Septembre, au contraire, leur nombre est très considérable.

Les vers qui sont nés dans les mois de Mai et de Juin courroient le risque de manquer de nourriture s'ils n'avoient pas des provisions dans leurs cellules ; car le petit nombre des ouvrières ne permettrait peut-être pas qu'elles apperçussent le moment où ils éclosent, et celui où ils ont besoin d'alimens, tandis qu'à la fin de l'été leur nombre peut suffire à surveiller et à nourrir tous les vers. La nature devoit donc pourvoir au défaut du soin des ouvrières dans les tems où elles sont en plus petit nombre ; mais cela étoit moins nécessaire à la fin de la saison, quand les soins et les secours étoient plus faciles à obtenir.

Lorsqu'en automne les teignes et les autres ennemis des Bourdons viennent attaquer leur nid, et qu'ils mangent les provisions journalières de la peuplade, un grand nombre d'ouvrières périt, et

les

les vers ne font que très mal soignés ; ils n'ont pas de vivres dans leurs cellules, et ne reçoivent aucun secours du dehors, ils meurent de faim dans leurs loges de cire, qui ne peuvent donc point leur servir de nourriture comme le croyoit Swammerdam.

Je ne puis terminer ce qui regarde la nourriture des vers, sans m'arrêter sur une observation qui sembleroit contredire en partie ce que j'ai écrit sur cette matière.

J'ai trouvé au printems, dans tous les nids de Bourdons, des boules de cire plus grosses qu'aucunes de celles dont j'ai parlé ; lorsque j'enlevai la superficie de ces boules, je reconnus qu'elle étoit, en effet, une pellicule de cette matière à laquelle j'ai conservé le nom de cire ; je croyois devoir trouver au dessous de cette pellicule un assez grand nombre de gros vers, mais je n'y vis qu'une couche épaisse, ou plutôt une masse d'une matière jaune et compacte, que je reconnus pour du pollen empilé et ferré ; j'ouvris ce massif de pollen, et je trouvai dans son intérieur quantité de petits vers de Bourdons rassemblés ; les vers s'y nourrissoient du pollen qui les entourait, ainsi que les vers du fruit, et du fromage, se nourrissent des parois de leur habitation ; bientôt toute leur provision étoit consommée, et ils se trouvoient sous la cire exposés à mourir de faim ; mais les ouvrières appercevoient en passant sur leur logement, peut-être, qu'ils n'étoient plus environnés de pollen, et qu'ils étoient à nud sous la cire ; elles les nourrissoient donc à leur manière ordinaire, et dès lors le sort de ces insectes ne différoit plus de celui des vers dont j'ai parlé.

Ces détails suffisent pour donner une idée assez exacte de la manière dont les Bourdons nourrissent leurs petits ; je vais passer à ce qui regarde leur accroissement.

CHAPITRE VIII.

De l'Accroissement des Vers du Bourdon.

LES vers de Bourdons enfermés ensemble dans de petites loges de cire, avoient à prendre plus d'accroissement en tout sens avant de se transformer en nymphes ; ces loges étoient bien proportionnées à leur petitesse actuelle, mais je ne concevois pas comment ces vers, pressés les uns contre les autres, pourroient se mouvoir, ou se développer dans un espace aussi étroit : l'observation m'apprit ce que je n'avois pu diviner ; je vis, en suivant ces loges avec beaucoup d'attention, et en les mesurant de jour en jour, que leurs dimensions n'étoient plus ce qu'elles avoient été dans l'origine. Ces loges, que j'avois vu grosses au plus comme un pois lorsque la mère leur avoit confié ses œufs, étoient devenues par degrés aussi grosses que des petites noix.

Mais comment ces loges s'agrandissoient-elles ? c'étoit un nouveau problème ; il n'auroit pas été difficile à résoudre, si l'opinion de Swammerdam sur la nourriture des vers avoit été plus fondée qu'elle ne l'étoit réellement ; car s'il eut été vrai que les vers de Bourdons se nourrissent en mangeant la cire de leur alvéole, il auroit été permis de supposer que leurs nourrices se feroient aperçues de leur nudité comme de leurs besoins, qu'elles se feroient hâtées de les entourer d'une nouvelle couche de cire, et qu'en reconstruisant leur berceau, elles l'auroient proportionnée à leur âge et à leur grosseur.

Mais on a vu dans le chapitre précédent, que les vers de Bourdons ne mangent point leur propre-cellule ; je fus donc obligé de chercher une explication plus satisfaisante, et qui s'accordât mieux avec les faits que j'avois observé.

L'agran-

L'agrandissement des loges de cire n'avoit été remarqué par aucun naturaliste. Un trait aussi neuf, et aussi intéressant, piqua ma curiosité, et je résolus de ne rien négliger pour la satisfaire.

Cette recherche fut longtems infructueuse; malgré tous mes efforts, je ne parvenois point à saisir le moment où les loges s'agrandissoient; celles que j'avois mesurées l'instant d'auparavant n'avoient plus les mêmes dimensions quand je revenois les observer.

Les traits les plus intéressans de l'histoire naturelle ne font pas d'abord sur nous tout l'effet qu'ils devoient produire, et ce n'est qu'après bien des observations qu'on peut espérer de voir ce qu'ils ont de plus saillant: on regarde souvent le premier aperçu comme un fait douteux; s'il se présente encore il devient plus digne d'attention; mais il n'a tout son intérêt, et il n'excite vraiment notre curiosité, que lorsqu'on en soupçonne le principe et le but.

Ce n'est que d'après un aperçu auquel je ne m'étois pas arrêté que je suis parvenu à découvrir la manière dont s'agrandissent les loges des vers.

J'avois vu dès le mois de Juin de grandes cellules de cire ouvertes par dessus, et qui laissoient appercevoir dans leur intérieur plusieurs vers de Bourdons restés à découverts; j'avois remarqué que les ouvrières en enlevoient quelques-uns et les emportoient hors de leur ruche; je m'intéressois à ces insectes, et je les suivis pour connoître leur sort; je négligeois de regarder ce qui se passoit sur le nid; et lorsque je revenois à l'observer, je remarquois seulement que ces loges étoient refermées.

Ce ne fut que lorsque je m'occupai particulièrement de rechercher la manière dont ces loges s'étoient agrandies, que je me rappellai ces observations, et que je soupçonnai leur importance; je me condamnai donc à visiter ces cellules de quart d'heure en quart d'heure, et à ne les quitter que lorsque j'aurois pris la nature sur le fait.

Le 13 Août j'observai plusieurs loges de cire de différente grandeur ; une de ces cafes se fendit sous mes yeux ; la fente étoit longue de plusieurs lignes, parceque la loge entr'ouverte étoit déjà d'une grosseur considérable.

Comme il n'y avoit point de Bourdon sur cette loge, je ne pûs douter que l'ouverture observée à sa surface ne fut la fuite naturelle d'un mouvement, ou d'un effort, qu'avoient fait les vers dont elle étoit remplie ; la pression latérale de des vers, dont la taille croissoit chaque jour, devoit enfin obliger la légère cloison de cire qui les gênoit, à se fendre et à s'entr'ouvrir ; et ce qui me prouva que c'étoit leur seule pression qui avoit occasionné la déchirure dont je viens de parler, c'est que le ver qu'elle laissoit appercevoir dans toute sa longueur ne montroit que son dos à l'observateur ; s'il eut rongé la cellule pour l'entr'ouvrir, ç'auroit été son ventre et ses dents que l'on auroit aperçu.

Il restoit à voir de quelle manière cette loge seroit renfermée. Je n'attendis pas longtems : une ouvrière s'approcha de la loge entr'ouverte, et dès qu'elle eut aperçu la fente, ou le ver qu'elle laissoit à nud, je la vis chercher de la cire sur différentes parties du gâteau, la prendre avec ses dents, la porter sur la loge, et la placer entre les bords de son ouverture : quand elle eut employé toute la cire qu'elle avoit apporté, elle alla en prendre de la nouvelle sur les cellules voisines ; elle revint bientôt avec sa charge, de nouveaux brins de cire furent ajoutés à ceux qu'elle avoit placé précédemment ; et quand elle eut répété trois ou quatre fois cette manœuvre la fente se trouva fermée, et la cellule agrandie de toute la largeur de la pièce qu'elle avoit fabriquée ; elle fit à peu près comme cette teigne, qui, après avoir coupé longitudinalement son fourreau, l'élargit en y mettant une pièce, ou comme la couturière qui élargit la manche d'une robe.

Chez les Bourdons, les ouvrières ne coupent point une pièce de
cire

cire pour l'ajuster sur l'ouverture de la cellule ; elles construisent entre les deux bords de la fente une plaque qui ne se forme qu'à mesure qu'elles apportent de nouveaux brins, et qu'elles les maçonnet avec les autres ; mais quoiqu'elles ayent à faire bien plus d'ouvrage que les teignes, la clôture et l'élargissement d'une cellule ne leur prend pas beaucoup de tems ; celle que je suivis dans cette observation n'employa qu'une minute à ce travail.

Voilà comment ces alvéoles, qui ne contiennent ordinairement que six ou sept vers, peuvent devenir de la grosseur d'une noix.

La forme de ces grandes loges est quelquefois irrégulière ; leur augmentation graduelle ne l'est pas moins.

Le 21 de Juin je vis une femelle pondre des œufs dans une cellule ; le 24 ou le 25 je trouvai des vers de Bourdons à la place des œufs ; le 27 ils avoient 3 ou 4 lignes de longueur, et leur cellule s'étoit agrandie de six à sept lignes ; le 1 Juillet les Bourdons la réunirent à deux petites cellules voisines occupées par des œufs, ou par des vers qui venoient d'éclore ; ce logement étoit d'une forme extraordinaire. Sa longueur étoit à peu près de dix-sept lignes ; sa largeur varioit suivant la partie où on la mesuroit ; elle avoit en quelques endroits cinq lignes, en d'autres deux ou trois seulement ; sa hauteur dépendoit aussi du nombre et de la grosseur des vers qui habitoient les différentes parties de la loge, car ils étoient souvent placés les uns au dessus des autres sans se déranger mutuellement.

Le 2 Juillet la loge avoit reçu quelque accroissement à l'une de ses extrémités, elle avoit sept lignes en cet endroit.

Le 3 la même extrémité eut onze lignes de largeur, ce fut le terme de l'accroissement de cette partie ; la cellule ne grossissoit pas par tout également, ni même en proportion, parceque les vers étant plus ou moins nombreux, ou plus ou moins agés, dans les divers points de sa longueur, la faisoient élargir de manière différente dans une progression plus ou moins rapide.

Sa plus grande longueur fut de deux pouces ; et tandis que les vers d'une extrémité filoient leur coque, ceux de l'autre commençoient à peine à prendre quelque accroissement ; la cellule prit enfin la forme d'une poire, bien différente des autres, qui étoient ordinairement circulaires, et un peu bombées.

Je remarquai à peu près dans le même tems une autre singularité relative à un cellule de ce genre.

Les Bourdons d'une de mes cloches avoient construit horizontalement un pillier de cire, qui partoit du bord du gâteau, et qui alloit soutenir l'enveloppe du nid ; ils formèrent une petite cellule sur le pillier même ; elle fut bientôt peuplée de petits vers, qui grossirent, et qui firent augmenter les dimensions de leur habitation ; comme elle s'accrût à la manière ordinaire, elle poussa l'enveloppe à une plus grande distance des gâteaux, et devint si massive, que les Bourdons furent obligés de la solidifier, au moyen de plusieurs pilliers fort larges et fixés d'une part au gâteau, et de l'autre à son enveloppe circuleuse. Voyez TAB. XXVI. Fig. 1.

Lorsque les vers ont pris tout leur accroissement, ils ont un demi-pouce de longueur ; c'est à cette époque qu'ils ont un véritable rapport avec les chenilles ; ils savent, comme elles, se filer une coque de soie ; on en verra les détails dans le chapitre suivant.

CHAPITRE IX.

Des Coques de Soie que filent les Vers de Bourdons avant leur Métamorphose.

LES vers qui avoient jusqu'alors habité la même cellule vont passer une partie de leur vie dans la solitude ; chacun d'eux se construit un logement à part sous le toit de cire où ils vivoient en commun.

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La nourriture ne leur est plus nécessaire ; leur logement sera impénétrable pour les ouvrières ; la soie dont ils le construisent est si solidement tissée, que les dents de ces insectes n'ont aucune prise sur elle ; cette soie est blanche, et d'une finesse singulière.

La forme des coques n'est pas la même en tout tems ; elle est d'abord celle d'une boule aplatie. TAB. XXVI. Fig. 2. a. Le ver y est couché en cercle, elle deviendra oblongue. TAB. XXVII. Fig. 1. a. et le ver s'y tiendra de bout.

Le ver n'a plus besoin d'aliment lorsqu'il a filé sa coque ; et quand les ouvrières ou la mère viennent lui donner la nourriture, elles trouvent sous la cire un tissu difficile à rompre, et renoncent à le soigner.

Les vers enfermés d'abord dans la même cellule filent à peu près dans le même tems ; les ouvrières dégarnissent peu à peu leurs coques de soie de la cire qui les recouvre, et l'employent à différens usages. Ce n'est qu'alors qu'on peut appercevoir la forme de ces nouveaux logemens ; les Bourdons en enlèvent la cire, l'étendent sur toute leur surface ; la voûte qui cache la forme des loges construites dans l'intérieur cède sous leurs pas ; elle fait voir en bosses et en creux ces coques, et leurs intervalles.

Au bout de deux ou trois jours ces coques ont entièrement changé de couleur, presque toute la cire a disparu, et ce qui en reste n'a qu'une légère teinte de jaune.

Les vers n'ont plus qu'une opération à faire avant de passer à l'état de nymphe ; la position circulaire qu'ils ont gardée n'est point celle qui leur convient pour se transformer. Avant de perdre leur peau, chacun d'eux se redresse dans sa cellule, qui n'étant plus garnie de cire se prête à tous ses mouvemens ; il lui fait prendre alors la forme d'un ovoïde alongé, dont le grand axe est vertical ; et si l'on fend la loge de soie de haut en bas, on trouve le ver dans la situation où il est représenté dans la TAB. XXVII. Fig. 1.

Monsieur

Monsieur de Réaumur n'a point vû ce changement de forme des coques; il dit même que les vers ont la tête tournée en embas dans leurs loges de soie, et qu'ils sortent ensuite par dessous.

Ces deux assertions ne sont pas confirmées par l'observation; mais avant de la prouver, je vais raconter les expériences qui établissent la réalité de ce changement de forme.

J'ai longtems cherché à voir cette transformation; elle se passe dans un moment si court, que je n'ai jamais pu en être le témoin; je me contentai donc de m'affurer du fait par deux expériences.

Première Expérience.

Je mis un nid de Bourdons dans une boîte vitrée; au haut du nid étoit une coque de femelle nouvellement filée; elle étoit encore aplatie, et cylindrique; son diamètre étoit de six lignes, et sa hauteur de quatre; la forme et les dimensions de cette coque indiquoient le sexe de l'individu qui l'habitoit; je mesurai la distance qui étoit entre la coque et le crystal; il étoit bien aisé de savoir si elle s'allongeroit en mesurant ensuite cette distance.

Au bout de deux jours cette coque fut entièrement dégarnie de cire; le troisième, j'aperçus un changement considérable dans ses dimensions; sa forme étoit à peu près celle d'un œuf; elle avoit cinq lignes de diamètre dans sa partie inférieure, et trois seulement à son autre extrémité; sa longueur me parut d'environ huit lignes; elle touchoit alors à la glace dont la boîte étoit recouverte, et les Bourdons essayèrent de l'attacher au verre avec de la cire; mais ce fut inutilement; leurs dents ne pouvant passer entre la coque et la glace, ils y renoncèrent.

Seconde Expérience.

Je voulois m'affurer que les vers ne se fileroient pas deux coques, l'une platte et l'autre allongée; je marquai donc avec de l'encre le milieu d'une coque aplatie; au bout d'un jour elle avoit changé de forme, et la marque que j'y avois fait pouvoit encore se distinguer.

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Ces deux expériences ne me laissèrent aucun doute sur ce changement de forme.

C'est de la réunion d'un nombre, plus ou moins grand, de coques semblables que se forment les gâteaux des Bourdons ; chaque cellule de cire donne lieu à la formation de sept à huit coques de soie, qui adhèrent ensemble, parceque les vers, en les filant, les ont attachées les unes aux autres : lorsque tous ces petits gâteaux sont réunis, ils n'en forment plus qu'un seul, qui paroît à cause de cela très irrégulier, quoiqu'il soit composé de parties assez régulières.

On voit quelquefois deux ou trois grands gâteaux de coques rangés les uns au dessus des autres, et qui ne sont liés ensemble que par un peu de cire.

C'est dans ces coques oblongues que les vers passent à l'état de nymphes (TAB. XXVII. Fig. I. b.) ; qu'ils perdent la peau, ou la robe, dont la nymphe étoit recouverte, et qu'ils se montrent sous la forme de Bourdon ; il ne leur manque que la couleur, la force, et le mouvement : au bout de quinze jours ils ont acquis tous ces avantages, ils sont des insectes parfaits.

Leurs membres se sont durcis, et sont devenus écailleux : ces insectes sont armés de dents également écailleuses ; leur corps est couvert d'un duvet gris, qui se colorera lorsqu'il aura été exposé à la lumière.

Ces Bourdons commencent alors à se servir de leurs dents ; chacun d'eux rongé sa prison aux deux tiers de sa hauteur ; dès qu'il a commencé, d'autres Bourdons viennent l'aider ; ils la déchirent horizontalement un peu au dessus du renflement ; au bout d'un quart d'heure le nouveau Bourdon commence à fortir de sa coque, et le premier usage qu'il fait de sa liberté est d'aller aux provisions.

CHAPITRE X.

Sur l'Usage des Coques de Soie lorsque les Bourdons en sont sortis.

PLUS je compare les Bourdons avec les Abeilles, plus je trouve les loix par lesquelles ils se gouvernent adaptées à la situation, à l'état de ces peuplades.

Là, c'est un peuple si nombreux, que la peine et les travaux n'y font point épargnés; la matière seule y est précieuse, parcequ'elle doit servir de berceau à un infinité d'individus; cette matière doit être d'usage pendant plusieurs années; aussi, avec quelle adresse les Abeilles ne la travaillent-elles pas! et quels soins n'apportent-elles pas pour donner à leur ouvrage toute la solidité dont il est susceptible!

Chez les Bourdons, la cire grossière dont ils se servent est souvent plus abondante qu'il ne faut, mais le nombre des individus est fort petit, par conséquent la main d'œuvre très précieuse: on reconnoitra par tout, combien la nature a eu soin de ne leur donner que des ouvrages faciles à exécuter.

Toutes les coques de soie que les jeunes Bourdons ont habité ont été coupées dans un plan horizontal, un peu au dessus de leur renflement; le ver ne songeoit pas vraisemblablement, en filant sa coque, à l'utilité dont elle pouvoit être à la peuplade, quand elle ne seroit plus nécessaire à son propre perfectionnement; mais celui qui dirige tout dans la nature dirigeoit aussi ses opérations.

La soie dont ces coques sont faites, le tissu ferré que les vers leur ont donné, la couche de cire dont elles sont enduites, et dont tous les fils sont imprégnés; la forme d'œufs tronqués qu'elles ont prise quand

les

réservoirs, auxquels ils peuvent confier leurs provisions; quand ils reviennent de la campagne, ils cherchent à l'instant à décharger leur estomac du miel qu'ils ont recueilli sur les fleurs; ils visitent les pots comme pour s'assurer qu'ils sont bien construits; puis ils y font entrer leur tête, et une partie de leur corselet, (fig. 73.) ils ouvrent leur bouche, et raccourcissent leur corps, comme je l'ai dit ailleurs, le miel tombe dans le réservoir, et les Bourdons retournent à la campagne.

On voit souvent près de soixante de ces pots dans un seul nid; j'en ai compté, au moment de la floraison des tilleuls, plus de quarante, qui furent remplis de miel dans un seul jour; quand ils sont pleins, les Bourdons en rétrécissent l'ouverture, mais ils ne la ferment presque jamais.

Ces insectes ne savent pas se nourrir les uns les autres, comme le font les Guêpes et les Abeilles; c'est dans ces pots toujours ouverts que chacun d'eux puise à son tour le miel dont il a besoin.

Les Bourdons savent aussi construire des pots de cire, sans le secours des coques; ils leur donnent ordinairement un fond de cire, d'autres fois ils ne font qu'élever des tubes de cette matière sur le parquet ou sur les bords de leurs gâteaux.

Le miel dont ils remplissent leurs magasins est aussi doux que celui des Abeilles; il est plus coulant et plus clair, il a aussi un goût particulier, mais il ne laisse pas de saveur âpre à la gorge.

Ces provisions ne servent guère que pour la nourriture journalière; d'ailleurs il est rare que tous les pots soient pleins, et les vivres sont bientôt consommés.

Aux mois de Mai et de Juin on ne trouve des pots qu'au milieu du gâteau; parceque c'est là que sont nés les premiers Bourdons.

Quand la mère pond ensuite les œufs de mâles et de femelles, c'est
fur

sur les premières coques qu'elle établit les petites cellules où elles les enferme; ils y croissent et font agrandir chaque jour leur logement; ils y filent des coques, dont la réunion compose un second gâteau. Ces coques servent enfin de magasin aux Bourdons, comme celles des simples ouvrières.

Je dois faire observer ici, que les mâles et les femelles sont élevés dans les mêmes cellules de cire, et qu'ils y sont nourris de la même manière. Les coques soieuses des femelles se montrent au milieu des coques de mâles, et elles servent ensuite de réservoir comme les autres; ils ont l'avantage d'être plus grands.

Ces coques servent aussi de magasin pour les poussières d'étamines que les Bourdons apportent dans leur nid; je n'ai point vu de quelle manière ces insectes recueillent cette matière sur les fleurs, mais Mr. de Réaumur a vu les Abeilles se charger de leur poussière, et en former des pelottes, qu'elles appliquoient à leurs jambes postérieures.

Les jambes des Abeilles, ainsi que celles des Bourdons, sont composées de plusieurs parties, dont l'une, que Mr. de Réaumur appelle palette, est plate, et parfaitement lisse, mais entourée de poils; ces poils, courts et forts chez les Bourdons, et longs chez les Abeilles, ont fait donner à cette partie de la jambe le nom de corbeille. Dès que les Mouches-à-miel sont arrivées sur les fleurs où elles veulent faire des provisions de cette espèce, elles ouvrent avec leurs dents les anthères des étamines, ces petites bourses qui contiennent les poussières fécondantes; elles frottent leur ventre sur la fleur, ramassent avec leurs jambes les poussières qui se sont attachées aux poils de leur corps, les portent à leur bouche, forment de petites masses de cette matière, et les font passer de jambe en jambe, jusqu'à celle qui doit s'en charger; elles les pressent alors dans leur corbeille à l'aide de leurs pattes, et un grand nombre de ces petites masses forment enfin une pelotte de pollen, de la grosseur et de la forme d'un grain de poivre aplati.

Les

Les Bourdons viennent de la campagne chargés de pelottes semblables, tantôt vertes tantôt jaunes, quelquefois noires d'autres fois blanches, et souvent de la grosseur d'un pois ordinaire.

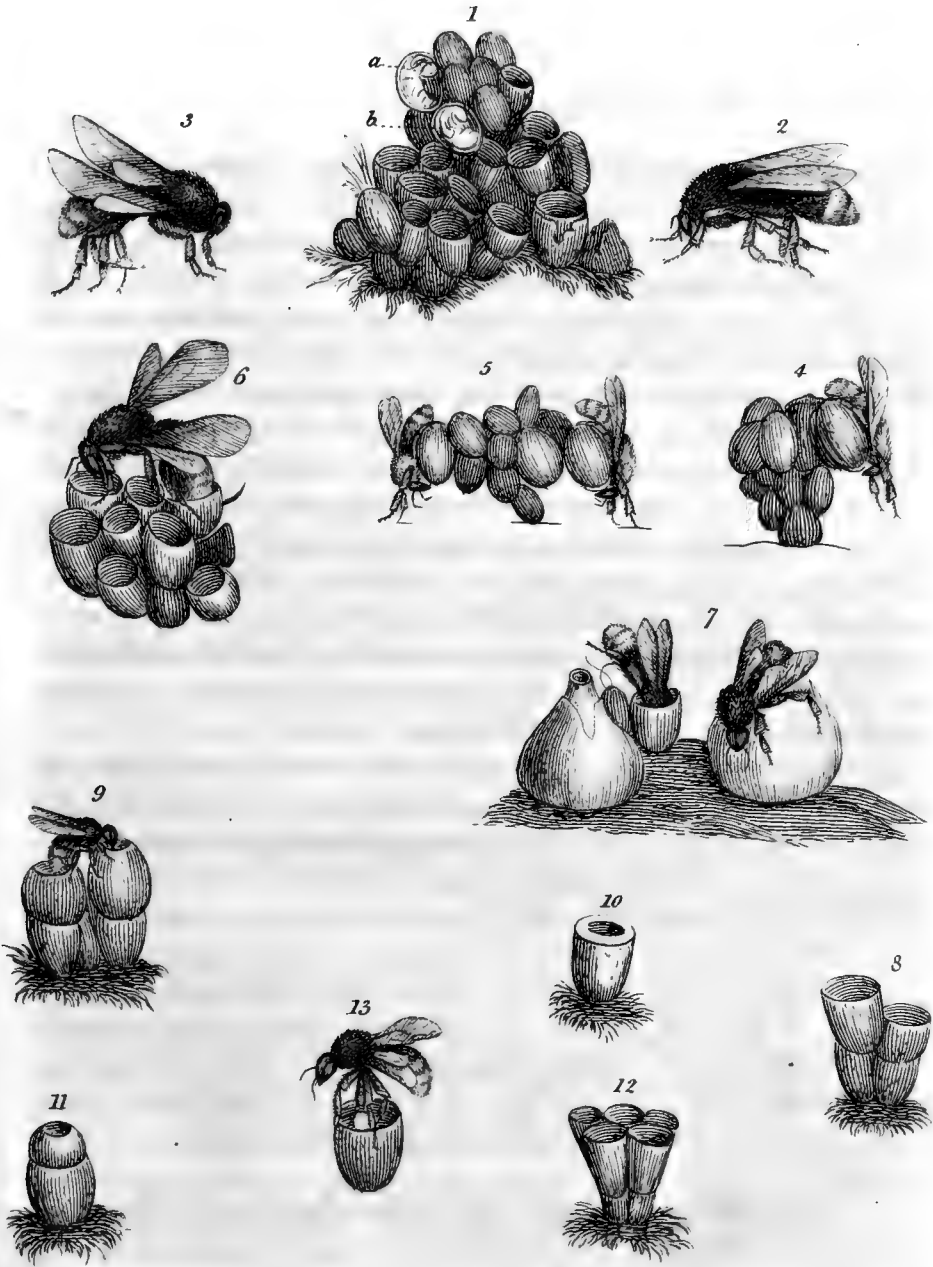
On voit souvent des Bourdons chargés de leurs pelottes. TAB. XXVII. Fig. 13. représente le Bourdon qui s'en décharge dans un des petits réservoirs dont j'ai parlé ; il monte sur ce pot, il cramponne ses jambes de la première paire sur le bord convexe de la coque ; il y fait entrer celles qui sont chargées de poussière, ainsi que celles de la seconde paire ; il serre et presse les jambes chargées entre les deux autres ; celles-ci poussent en même temps les deux pelottes en avant ; ces pelottes glissent le long des jambes, et tombent dans le réservoir.

Le Bourdon retire alors ses pattes hors du pot ; il se retourne, et descend la tête la première dans le réservoir, il étend avec ses dents le pollen sur le fond du vaisseau, et y mêle quelquefois un peu de miel, qu'il a rapporté dans son estomac.

Les Bourdons destinent les nouvelles coques à leur servir de magasins : dès qu'elles sont vides ils abandonnent les anciennes, qui se trouvent au fond des gâteaux, parcequ'elles sont trop éloignées du lieu où ils se tiennent, c'est-à-dire, des gâteaux nouvellement construits, où ils soignent et rechauffent leurs petits ; peut-être aussi les négligent-ils, parcequ'elles sont plus exposées à la voracité de leurs ennemis : ils savent, cependant, encore en tirer parti ; ils les effilent avec leurs dents, et en font un boue, ou une espèce de vouatte, dont ils recouvrent leur nid en guise de mousse. C'est peut-être par une suite du même instinct que ces insectes charpissent et cardent la toile que l'on met à leur portée, et qu'ils la font servir aux mêmes usages.

On voit donc, en général, que les Bourdons savent profiter de tous les avantages que la nature leur présente, et qu'ils savent faire servir les mêmes choses à des usages différens.

Monseigneur



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Monfieur de Réaumur croyoit que les jeunes Bourdons fortoient de leurs coques de foie par en bas, ou par deffous. Je ne comprends pas comment ils l'auroient fait, puisqu'ils auroient toujours rencontré la terre, ou les gâteaux inférieurs; d'ailleurs, lorsqu'on retourne un gâteau fens deffus deffous, les nymphes qui s'y trouvent enfermées deviennent noirâtres, et périffent en peu de tems; mais de quel ufage auroient été toutes ces coques, lorsque les Bourdons en feroient fortis par le bas? Ils n'auroient pas pû s'en fervir pour y tenir leurs provisions, ils auroient été obligés de construire en cire un grand nombre de petits vafes, ce qu'ils ne font que très rarement. Je ne fais où cet obfervateur à pû fonder cette conjecture; toutes les coques que j'ai vû dans mes nids de Bourdons étoient ouvertes par le haut, et elles ne l'étoient en deffous que lorsque les teignes, ou d'autres ennemis de ces infectes, venoient dévorer les nymphes dans leur afyle. Cependant, Monfieur de Réaumur a vû, fans doute, les ouvertures de ces coques tournées en bas, car il l'a dit, et l'on ne peut douter de fon exactitude. Il faut donc que ceux qui lui ont apporté des nids de Bourdons ayent renverfé leurs gâteaux; les ouvertures des coques auront été ainfi tournées en bas, et cet obfervateur aura pû prendre pour une difpofition néceffaire, ce qui n'étoit qu'un effet du hazard.

CHAPITRE XI.

Des Mâles et des Femelles, et de leur Sort après la Fécondation.

LA Providence, qui laiffe à certains animaux la liberté de fe reproduire en toutes faifons, ne détermine point celle de la génération de quelques efpèces, mais fixe le laps de tems qui doit s'écouler entre

entre une portée et celle qui lui succède, tandis qu'il en est pour qui les époques sont déterminées, et que parmi quelques insectes elle dirige encore l'ordre de la ponte. C'est ainsi que l'Abeille ne peut donner le jour aux mâles que dans une seule saison, quoiqu'elle pondre constamment des œufs d'ouvrières; qu'on ne voit point la Guêpe élever les mâles et les femelles avant l'automne; et que le Bourdon ne produit pas ses femelles avant le tems où elles peuvent recevoir les soins multipliés qu'elles attendent des neutres.

Les femelles de Bourdons ne naissent pas dans toutes les espèces au même moment; les unes paroissent au mois de Juin, d'autres au mois de Juillet, et celles des Bourdons rouges et noirs ne se montrent ordinairement qu'au mois d'Août.

Les mâles naissent aussi à différentes époques; on verra dans la suite la cause, ou du moins l'utilité, de cette disposition.

Les femelles portent leurs œufs jusques au printemps, et ne les pondent point dans le nid qu'elles habitent pendant le premier été. Il reste à décider, dans quel lieu elles passent l'hiver, comment elles se préservent des grands froids, comment elles se nourrissent alors. Si elles ne prennent pas de nourriture, seroit-ce l'engourdissement qui les rendroit capables de s'en passer?

Ce sont là autant de problèmes que Mr. de Réaumur avoit laissé à résoudre; il imaginoit "que les femelles de Bourdons se retiroient dans des trous de muraille, ou dans quelques cavités souterraines, et qu'elles s'y engourdissoient pendant l'hiver, jusques à ce que le soleil du mois de Mai eût rechauffé le terrain, et les eût rappelés à la vie et à leurs occupations."

Une observation faite par un homme dont l'exactitude ne peut être mise en doute, sembloit confirmer cette conjecture. Le secrétaire de mon père avoit découvert un nid de Bourdons dans une prairie; il le visita en automne, et il ne trouva plus d'ouvrières ni de mâles sur les gâteaux; mais, en examinant la cavité, il apperçut une cellule creusée

creusée en terre, et habitée par une seule femelle de Bourdon. Cette mouche n'étoit point encore engourdie ; elle prit le vol dès qu'elle aperçut le jour, et s'éloigna à perte de vue.

J'ai fait à ce sujet une observation, qui appuye encore l'opinion de Mr. de Réaumur, et qui nous apprend que les grandes femelles de Bourdons survivent seules à tous les individus dont leur famille est composée ; qu'elles se font un logement particulier auprès de leur nid, et qu'elles s'y enferment aux approches de l'arrière saison.

Le 21 Août je pris un nid de Bourdons de la sixième espèce ; quand j'eus ôté la mousse dont ils étoient entourés, j'enlevai les gâteaux ; ils paroissoient abandonnés les ouvrières et les mâles avoient disparu ; il y restoit seulement quelques femelles que j'enfermai avec leur nid dans une boîte faite exprès : en examinant plus attentivement la cavité souterraine, je découvris une autre loge, qui communiquoit avec la première par une gorge assez étroite ; j'enlevai délicatement le gazon qui la recouvroit ; je vis alors une grotte, ou plutôt une galerie, longue d'un pied au moins, et large de deux pouces et demi.

Je remarquai encore, que cette grotte étoit jonchée de mousse et de brins d'herbe, mais je n'y vis rien qui put servir d'aliment aux individus qui l'habitoient. Au moment où je soulevai le gazon qui lui servoit de toit, j'aperçus trente ou quarante femelles : je ne sais si elles furent alarmées du dégat que je fis dans leur retraite, ou de la lumière qui y pénétra, mais dès qu'elle fut découverte, toutes ces femelles prirent l'effort, quelques-unes s'éloignèrent beaucoup trop pour que je pusse les suivre : néanmoins, le plus grand nombre se précipita dans la cavité d'où les gâteaux avoient été tirés ; il me fut aisé de les saisir, et de m'assurer que c'étoient de jeunes femelles : si je ne les avois pas dérangées, elles se feroient engourdies dans la loge où elles étoient enfermées, elles y auroient passé l'hiver, et n'en seroient

forties que lorsque le soleil du printemps leur auroit rendu la chaleur et le mouvement.

Les mâles et les mulets de Bourdons vivent moins de tems que les femelles, car ceux qui naissent au printemps ou dans le courant de l'été périssent tous dans l'automne de la même année ; mais les femelles qui naissent au mois d'Août, pour le plus tard, passent l'hiver à l'abri des injures de l'air, mènent une vie laborieuse dès les premiers jours du printemps, et meurent ordinairement à l'âge d'un an.

Les mâles et les ouvrières des Guêpes et des Frelons ne vivent qu'un été, comme ceux des Bourdons ; ils périssent comme eux avant l'hiver ; les femelles seules survivent : elles se tapissent à la fin de l'automne dans quelques trous, ou bien elles se mettent à l'abri sous des tas de feuilles séchées, et dans les paillafons de jardins ; les premiers froids les font tomber dans un engourdissement, qui dure tout l'hiver, et qui ne cesse qu'au retour du printemps.

Dès le mois de Mars on voit les femelles de Bourdons reparoître, et voltiger sur les fleurs ; c'est alors qu'elles commencent leur nid dans la solitude, mais on ne connoit leur histoire qu'au mois de Juin : elles visitent seulement au printemps un grand nombre de trous, comme je l'ai dit ailleurs ; on peut croire qu'elles y cherchent un logement tel qu'il le faut pour établir leur famille.

CHAPITRE XI.

Sur les petites Femelles des Bourdons.

LA fécondité n'a point été accordée à tous les individus d'une ruche d'Abeille ; cette apparente castration, dont la nature semble être coupable, est peut-être un des chefs-d'œuvre du Créateur ; l'habilité

bilité des individus stériles semble si bien compenser le défaut des organes de la génération, qu'on ne fauroit dire lesquels sont les plus utiles ; de ceux qui donnent le jour à toute la peuplade, ou de ceux qui logent, nourrissent, soignent, et élèvent les petits.

Qu'arriveroit-il si toutes les Abeilles étoient reines, si toutes les Abeilles pouvoient pondre quinze à vingt mille œufs ? Telle est cependant la fécondité de cette mouche, qui entretient seule la population d'une ruche d'Abeille ; et la nature lui a refusé non seulement l'art de construire une cellule, mais celui d'élever et de nourrir un seul des petits qu'elle pond chaque jour.

Ces insectes sont cependant du même sexe ; le même œuf contient le germe d'une ouvrière et celui d'une reine ; et l'éducation du ver, c'est-à-dire, le genre de sa nourriture, et la forme de son logement peuvent en faire un individu stérile, ou un insecte dont les organes de la génération soient parfaits à tous égards ; elle peut même en faire un individu totalement dépourvu d'industrie, ou une mouche douée de l'art le plus étonnant que la nature ait confié aux insectes.

Il eut été bien singulier, qu'entre les deux extrémités de cette chaîne, dont l'un des bouts est occupé par la fécondité, et l'autre par l'industrie, la nature n'eut mis aucun intermédiaire ; aussi connoissons-nous chez les Abeilles deux sortes de mouches, qui semblent tenir le milieu entre les reines et les ouvrières ; ce sont les petites reines, et les ouvrières fécondes ; les premières avoient été aperçues par Needham ; leur existence a été prouvée par plusieurs observations de mon père. Ces insectes, que l'on trouve rarement en vie dans les ruches, naissent dans des cellules royales aussi grandes que celles des autres reines ; cependant, ils leur sont beaucoup inférieurs par leur taille ; leur couleur, la forme de leurs mâchoires, et des articulations de leurs jambes, sont autant des rapports qu'elles ont avec les Reines Abeilles ; autant de caractères qui les distinguent des simples ouvrières : on ne

les a jamais vû pondre, elles ont cependant des ovaires; voilà où se bornent nos connoissances relativement aux mouches de cette sorte.

Mais les individus qui ont plus de rapport avec les ouvrières qu'avec les reines, et qui cependant semblent tenir le milieu entr'elles, ces mouches qu'on appelle fécondes, sont semblables aux ouvrières par leurs caractères extérieurs; même couleur, même taille, mêmes dents propres à ciseler la cire, mêmes jambes capables de porter des poussières d'étamines; mais si elles ne sont pas stériles, elles ne sont que demi-fécondes; elles ne pondent jamais que des œufs de mâles.

On ne trouve de ces individus que dans les ruches qui ont perdu leur reine; la ponte de ces ouvrières entretient pour quelque tems l'intérêt et l'occupation dans la peuplade, qui ne tarderoit pas à périr sans cela: tandis que les Abeilles sont occupées à soigner et à nourrir les vers de mâles, elles ne songent point à désertter leur ruche; mon père pense aussi que les mâles provenus de la ponte de ces ouvrières sont peut-être destinés à féconder les reines, qui ne se sont transformées qu'après le massacre des faux Bourdons, parceque les mâles issus des ouvrières naissent ordinairement après cette époque. Chez les Bourdons, l'industrie n'a pas été accordée exclusivement aux mouches infécondes; au contraire, la femelle qui naît au mois d'Août, qui passe l'hiver en terre, et qui reparoit au printems, est la plus habile ouvrière dont sa famille fera composée; elle creuse une cavité dans la terre, y construit des cellules, nourrit et élève ses petits dans la solitude; une ouvrière seule ne feroit point ses travaux, sa taille sembleroit déjà s'y opposer; et d'ailleurs, on voit rarement une ouvrière isolée s'occuper d'aucune espèce de travail.

La conformation des machoires de la femelle est entièrement semblable à celle des ouvrières; ses jambes sont également capables de se charger des poussières d'étamines, les couleurs des unes et des autres sont pour l'ordinaire distribuées de la même manière sur toutes les parties de leurs corps: il semble qu'à tant de rapports si l'on ajoute celui

celui de la fécondité, on fera des ouvrières autant de petites femelles ; car la différence de la taille est le seul caractère extérieur qui puisse les faire distinguer.

Or c'est ce que la nature a fait, mais les petites femelles chez les Bourdons diffèrent encore à d'autres égards des femelles en titre.

C'est au commencement du printems que les grandes femelles pondent les œufs qui doivent donner des ouvrières et des mâles, mais elles pondent plus tard ceux qui doivent donner des mères aux peuplades futures. Toutes les ouvrières qui naissent au printems ne sont pas neutres, comme on l'a cru jusqu'à présent; il en est de fécondes ; on en voit plusieurs dans chaque nid. Ces mouches font toutes les fonctions des mères ; elles sont quelquefois très petites, et à cause de cela le nom de petites femelles peut servir à les distinguer ; elles sont entourées dès leur naissance d'un petit nombre de mâles provenus des œufs de la mère commune ; ces mâles les fécondent dès le mois de Juin ; elles pondent bientôt après ; et ce qui est bien remarquable, c'est qu'elles n'engendrent que des mâles, comme ces ouvrières que l'on observe quelquefois dans les ruches d'Abeilles, et qui ne pondent que des œufs de faux Bourdons. Mais si l'utilité de ces dernières est problématique, il ne paroît évident que les petites femelles des Bourdons sont destinées à fournir un plus grand nombre de mâles aux jeunes et grandes femelles, puisqu'après les avoir pondu et soigné, elles périssent comme les ouvrières au commencement de l'automne.

Les mâles, auxquels elles donnent naissance, servent, comme je m'en suis assuré, à féconder les grandes femelles qui paroissent à la même époque, et qui sans ce supplément auroient courru le risque de ne plus trouver de mâles dans leur habitation, et de rester infécondes.

Si l'on juge par analogie, l'on pourra conjecturer que c'est à l'espèce d'aliment qu'on prépare aux vers de Bourdons que sont dues ces différences qu'on peut remarquer dans leur instinct.

Chez les Abeilles il a été prouvé par des expériences bien faites que
des

des vers d'Abeilles communes étoient, à l'âge de trois jours, susceptibles de devenir reines, s'ils étoient dès lors nourris avec de la bouillie royale, et s'ils étoient logés dans des cellules semblables à celles des reines.

L'on aura donc peu de peine à comprendre comment le même moyen peut être employé avec succès chez les Bourdons, car les mœurs de leurs ouvrières ont bien du rapport avec celles de leurs femelles. De même l'on comprendra que ce moyen, employé avec quelques nuances, pourra faire de ces vers des vers de petites femelles.

C'est ici un des plus beaux traits de la puissance de la Nature, le fait est frappant chez les Abeilles; elle convertit à son gré des mouches stériles en des mouches fécondes, des insectes inhabiles et mal-adroits en d'autres insectes pleins d'adresse et d'industrie; mais quelle peine n'auroit-on pas attribuer à des causes en apparence éloignées, et si peu dignes d'attention, des effets aussi singuliers, des effets aussi frappans!

Cependant, il n'est pas impossible qu'un certain genre de nourriture puisse être plus favorable qu'un autre à l'accroissement et au perfectionnement des organes sexuels, et des membres d'un individu; mais comment concevoir qu'il puisse changer les passions, l'instinct et les mœurs d'insectes originairement semblables? concevoir qu'une femelle destinée à jouir de l'amour, à sentir la jalousie, à exercer sa vengeance, à vivre dans l'oïveté,—que le germe de cette femelle, ou plutôt le fœtus d'un tel insecte, puisse devenir celui d'une ouvrière zélée pour la défense commune, privée d'un plaisir que la Nature n'a refusé à aucun de ses enfans, mais délivrée des peines de l'accouchement, laborieuse, pleine d'adresse, habile à soigner les petits, à chercher du miel sur les fleurs, capable de faire de la cire, de construire des rayons dont les cellules hexagones ayent des fonds pyramidaux, de soigner les reines, dont elles auroient été les rivales si les organes de la génération eussent été développés chez elles, et chargée de tuer dans un certain tems les mâles, qui n'auroient point alors excité sa jalousie?

Voilà une véritable métamorphose. La chimie l'expliquera-t-elle? Nous apprendra-t-elle jamais, par quel secret la différence des nourritures peut produire un changement si complet dans l'instinct, les goûts, et les habitudes de ces insectes? Il est permis d'en douter; qu'ici donc la raison et la philosophie nous servent de flambeau.

Où seroient ces chefs-d'œuvres de l'architecture, ces colonnes, dont le fust est élevé sur les proportions de l'homme; ces statues qui représentent à l'esprit les actions des héros; ces monumens de la gloire, ces tableaux, dont les couleurs font illusion, et qui nous représentent les plus belles formes de la nature? Que deviendrait cette préférence de l'homme pour tout ce qui est parfait dans ses proportions, dans ses contours, dans ses couleurs, si cet être intelligent eût été privé de l'organe de la vue? si dès son origine l'homme n'eût connu que par son toucher, par son ouïe, par l'effet des odeurs, et par la différence des saveurs? L'eût on vû découvrir de nouveaux mondes, mesurer les cieux, calculer la distance, le poids respectif et l'étendue des planettes, et découvrir enfin la loi du mouvement, celle de la gravitation, le secret de l'univers? Voilà quels peuvent être les effets d'un sens, d'un organe, sur l'industrie, et sur les habitudes de l'homme; ils n'ont pas moins d'influence en proportion sur l'instinct des insectes; et quoique nous ne puissions pas prouver que la Reine Abeille possède plus ou moins de sens que l'Abeille commune, cela est cependant vraisemblable; la nourriture et le logement sont bien la cause première de toutes les différences que l'on remarque dans leur instinct; mais ils n'ont fait proprement que développer des organes de sens différens, et des membres plus ou moins, parfaits, dans des insectes originairement semblables; des sens nouveaux ont fait naître chez les uns des plaisirs et des besoins que les autres ne connoîtront point, les organes s'y sont prêtés, les membres les ont satisfaits.

Chez

Chez les autres peut-être de nouveaux sens ont-ils produit cet instinct qui répond si bien à nôtre raison ? Il a exigé des travaux ; ces travaux ont été exécutés par les membres doués d'une adresse infinie, et c'est ainsi que tout semble être dirigé chez ces petits animaux.

La nature n'a pas eu un aussi grand effort à faire avec les Bourdons ; il y a bien moins de différence entre les mœurs des mères Bourdons, comparées à celles de leurs ouvrières, qu'entre l'instinct des Abeilles et celui de leurs reines.

Car, comme je l'ai dit, la mère d'une famille de Bourdons peut faire tous les ouvrages qui se font chez elles, et il n'en est pas de même dans les ruches d'Abeilles.

Ainsi la nature n'a eu que peu de peine à convertir des vers de femelles en vers d'ouvrières, et encore moins à en faire des petites femelles.

La ponte et les passions de ces petites femelles doivent attirer particulièrement nos regards ; voici de quelle manière je découvris leur fécondité, et les détails de leur ponte.

Je ne les distinguai point d'abord des ouvrières, tant elles leur ressembloient par leurs caractères extérieurs, de sorte que je fus très surpris lorsque je les vis pondre pour la première fois. Je transcrirai ici mon journal des derniers jours de Juillet, et des premiers du mois d'Aout.

Copie du Journal de Juillet, 1796.

Le 26. Le vent a renversé la cloche qui étoit sur ma fenêtre, et le nid de Bourdons qu'elle renfermoit est tombé, avec tous les insectes qui l'habitoient.

Les ouvrières sont revenues à la place où étoit leur nid ; je leur ai donné une autre cloche, pour les garantir de la pluie ; je ne leur ai point

point rendu leur gâteau, qui étoit déjà rongé par les teignes depuis fort long tems.

La mère n'est point revenue, et je l'ai cherché vainement autour du gâteau.

Le 27. J'ai donné du miel aux Bourdons réfugiés; ils commencent déjà à faire de la cire.

Le 28. Ils continuent à faire de la cire.

Le 29. Ils ont construits un pot-à-miel sur le bord de la carte où je mettois leur miel.

Le 30. Un des plus petits individus de la peuplade, à mon grand étonnement, vient de construire une cellule de cire, où il a pondu deux œufs, en faisant sortir son aiguillon au travers de la cellule.

J'ai de la peine à le distinguer des autres, soit par la taille, soit par la couleur, soit par la forme de son corps; seulement son agitation semble plus grande, et il empêche les ouvrières de s'approcher de sa cellule.

Cependant, il n'est pas toujours le plus fort, et d'autres montent sur l'alvéole; ceux-ci ne cherchent point à enlever les œufs qui y sont renfermés, ce qui est fort singulier; au contraire, ils les soignent avec plus de zèle que celui qui les a pondus, et les défendent aussi contre les autres Bourdons.

Le 31. Seconde ponte du même Bourdon; mêmes circonstances qu'hier.

1 Août. La petite femelle continue à pondre; elle bâtit toutes ses cellules les unes à côté des autres.

Le 2. Continuation sans aucune différence; je remarque seulement que les Bourdons n'ont point apporté ni préparé de pollen dans les cellules où vient de pondre la petite femelle.

Le 4. Les Bourdons ont apporté du pollen sous la cloche; ils l'ont mis au fond d'un nouveau pot-à-miel; on les voit aller et

venir sur le tas des cellules, et faire des creux en divers endroits, comme lorsqu'ils nourrissent les vers. C'est qu'en effet quelques vers sont éclos.

Le 5. Les Bourdons nourrissent encore un peu les vers ; ils n'ont point apporté de pollen aujourd'hui.

Mon journal du onze m'apprend que ces vers périrent à défaut de nourriture, peut-être parce que les Bourdons s'étoient accoutumés à la ration de miel que je leur donnois chaque jour ; ils ne vouloient plus aller chercher leurs vivres à la campagne, en sorte qu'ils négligeoient entièrement d'apporter la nourriture des vers ; j'y vois aussi, que lorsque les Bourdons n'apportoient point de pollen, ils ne nourrissoient point leurs petits, et que lorsque je leur en avois donné, ils leur en faisoient part sans balancer.

Je vis enfin le tas de cire diminuer chaque jour, et de nouveaux pots construits à côté des premiers.

J'ignore ce que les Bourdons firent des petits vers ; il n'en restoit qu'un lorsque je leur enlevai la carte sur laquelle ils avoient été pondus.

Mon journal du mois d'Août m'apprend qu'une autre petite femelle d'une espèce de Bourdon différente pondit aussi dans son nid.

Mais je raconterai en détail ce qui s'y passa le septième jour du même mois ; c'étoient des Bourdons rouges et noirs.

Le nid étoit fort peuplé ; il possédoit un bon nombre d'ouvrières, plusieurs jeunes femelles de la grande taille nouvellement transformées, l'ancienne mère, et beaucoup de mâles.

Parmi les ouvrières il y avoit assurément des petites femelles, que j'aurois reconnues si j'avois sçu leur trouver un caractère distinctif ; mais les scènes suivantes prouvèrent ce fait d'une manière indubitable.

Le

Le 7 du mois d'Août à minuit j'appercus une grande agitation le nid; il s'agissoit d'une ponte extraordinaire.

Plusieurs Bourdons étoient occupés à faire une cellule de cire; cette cellule étoit bien moins grande que les alvéoles ordinaires, et ses bords étoient bien moins élevés; ils y travailloient encore quand la femelle, mère de la peuplade, vint sur la cellule, les chassa, et donna quelques coups de dents au bord de la petite coupe; elle fut contrainte de se retirer à cause de la fureur de quelques-uns d'entr'eux, qui s'approchèrent d'elle en battant des ailes, et qui la poursuivirent jusques au bas du nid: ils achevèrent alors la cellule; et quand ils lui eurent donné les dimensions convenables, je vis l'un d'entr'eux s'établir sur l'alvéole, comme s'il eut eu l'intention de pondre: un autre y inferra de même l'extrémité de son corps; et tandis qu'ils étoient ainsi occupés à pondre conjointement, je vis revenir la vieille mère: le bruit et le battement de ses ailes annonçoient d'avance sa colère; elle se jetta sur l'une des petites pondeuses, lui monta sur le dos, et réussit à la chasser à coups de dents: elle chassa l'autre de la même manière.

Dès que la cellule fut vacante elle y enfonça sa tête, prit les œufs qui venoient d'être pondus, et parût les manger avec avidité.

Bientôt l'une des petites femelles revint sur la cellule, lui rendit sa première forme, et se mit à pondre: la vieille mère revint encore avec sa jalousie ordinaire, chassa la pondeuse, et enfonça sa tête dans la cellule: j'ignore si la petite pondeuse crût avoir pondu, ou si elle n'apperçut pas le larcin de la vieille femelle, mais le fait est, qu'il ne resta point d'œufs dans la cellule, et qu'elle la referma dès que la femelle se fut retiré: elle s'écarta pour chercher de la cire, et fermer plus soigneusement sa cellule; mais d'autres individus, qui étoient vraisemblablement aussi de petites femelles, vinrent aussitôt, et lui rendirent sa propre forme.

Je crus reconnoître alors cette petite pondeuse que j'avois pris sur le fait le 2 d'Août ; elle étoit la plus grande des petites femelles de ce nid là ; elle monta sur la cellule, élargit son orifice, éleva ses bords, se mit à pondre, et fit deux œufs devant moi. Peut-être en eut-elle fait d'avantage sur la vieille mère, qui revint en battant des ailes, la poussa hors de la cellule, la chassa bien loin, et finit par manger ses œufs. Celle-ci fut aidée dans ce travail par une des petites femelles dont j'ai parlé plus haut, et que j'avois marquée avec de la couleur lorsqu'elle étoit occupée à pondre dans la même cellule.

La petite femelle qui venoit de pondre reparut à son tour avec tous les signes de la colère ; elle chassa toutes les ouvrières de dessus le gâteau, referma sa cellule quoique vide, et fit la garde autour d'elle avec une activité étonnante : elle se coucha sur son ouvrage ; et quand je la vis bien résolue à ne plus pondre, je l'enlevai avec la vieille mère, et je les enfermai dans un poudrier pour savoir si tous les Bourdons qui se mettroient sur ces cellules étoient de véritables pondeuses : mais je ne pûs pas m'en assurer, parceque les ouvrières détruisirent cet cellule ; et comme il étoit trois heures du matin, je me retirai, et je renvoyai au lendemain la suite de mes observations.

A six heures du matin il ne restoit plus de vestige de la cellule, et je rendis à leur nid les deux individus que j'avois fait prisonniers : ce jour là, à six heures du soir, l'agitation recommença ; une large et épaisse cellule se faisoit remarquer sur les gâteaux ; la vieille mère, qui ne pondoit plus depuis fort long tems, et qui étoit devenue stérile à force de pondre, étoit montée sur la cellule ; elle en déchiroit les bords avec acharnement, sans avoir pour but d'enlever les œufs qu'elle pouvoit contenir, car elle étoit ouverte, et d'ailleurs elle n'en contenoit pas un.

C'étoit donc par jalousie, et non pas par besoin.

Il m'importoit de savoir si les œufs de ces petites femelles viendroient à bien; et pour satisfaire ma curiosité, j'enlevai pour la seconde fois la vieille femelle, et j'observai encore les manœuvres des individus qui restoient dans le nid.

L'agitation monta à son comble.

Les petites femelles se poursuivoient les unes les autres; trois ou quatre d'entr'elles vouloient pondre à la fois; elles se disputoient la cellule avec une rage étonnante: celle qui parvenoit à la posséder un instant pondoit quelques œufs, et devenoit l'objet de la jalousie des autres; celles-ci se jettoient sur elle, harceloient le bout de son ventre, et la faisoient enfin déguerpir à coups de dents.

La plus grosse d'entr'elles parvenoit toujours à s'emparer de la cellule; mais elle n'en pouvoit jouir que foiblement, car les autres s'acharnent à l'en chasser; et comme elle se sentoit la plus forte, elle se retournoit, et les précipitoit au bas du gâteau avec la rage des vieilles mères: quand elle avoit pondu, elle étoit obligée de garder sa cellule—plutôt peut-être par jalousie que par amour pour ses petits.

Cette suite d'observations fut dérangée cette année là par les teignes; elles mangèrent les cellules où les petites femelles avoient pondu, et je ne pus savoir de quel sexe auroient été les individus qui en feroient fortis, mais depuis lors j'ai mis tous mes soins à le découvrir.

Dès le 21 de Juin de l'année 1797 les petites femelles m'offrirent les mêmes scènes: elles furent quelquefois encore plus animées; le 22 j'enlevai la mère; le 23 je la replaçai dans son nid; elle paroissoit robuste et bien portante, mais un quart d'heure après je la trouvai expirante sous le gâteau. Ses rivales continuèrent à pondre pendant plus d'un mois. Le 26 de Juin de petits vers naquirent dans une cellule où elles avoient pondus le 21. Le 4 Juillet ces vers filèrent

filèrent leurs coques ; le 6 ces coques changèrent de forme ; le 18 leurs habitans les ouvrirent pour en sortir ; je les observai avec soin, et je les reconnus tous pour des mâles.

Les grandes et jeunes femelles ne se mêloient pas aux scènes singulières dont on a parlé, et n'étoient point en butte à la jalousie des petites femelles. Tandis que la mère commune en étoit quelquefois la victime, la nature, en privant les jeunes femelles de la faculté de pondre dans le nid où elles étoient nées, les soustrayoit à la fureur toujours dangereuse de leurs rivales ; et c'étoit peut-être à cette seule précaution qu'étoit attachée la conservation de l'espèce.

Les mâles de la dernière ponte fécondoient les grandes femelles pendant ce premier période de leur vie : celles-ci destinées à fonder de nouvelles colonies n'étoient cependant pas inutiles à celles qu'elles habitoient encore ; elles travailloient comme de simples ouvrières dans le nid où elles avoient pris naissance ; elles s'occupoient comme elles à recolter le miel et le pollen ; je les ai vues chargées de pelottes à leurs jambes, vuides dans les pots-à-miel celui qu'elles avoient recueilli sur les fleurs ; elles faisoient de la cire, elles savoient la sculpter, elles devoient même savoir construire des cellules quand elles auroient à commencer de nouveaux nids ; mais avant ce terme elles ne faisoient jamais d'alvéoles.

Elles paroissent donc ignorer l'art de bâtir, et cette faculté reste suspendue jusques au retour du printemps : à cette époque le sentiment de leur maternité leur rend tout leur instinct, et reveille en même tems chez ces jeunes mères l'idée des œufs qu'elles ont à pondre, et celle des cellules dans lesquelles ils doivent être déposés.

Si les ouvrières construisent quelquefois des cellules, ce n'est que lorsqu'elles ont été commencées par la mère commune, ou par de petites femelles ; elles ne les construiraient peut-être jamais d'elles-mêmes.

CHAPITRE XIII.

Conjectures.

ME permettra-t-on de hasarder quelques conjectures sur l'origine des gâteaux, sur la formation des premières cellules, et sur les premiers travaux de la femelle lorsqu'elle est encore seule à l'ouvrage?

Si l'on doit croire que la Nature ait donné aux insectes des loix uniformes pour diriger leur conduite, je pourrois suivre l'analogie sans trop m'écarter de la vraisemblance.

La Nature semble déjà avoir tracé une ligne qu'il ne faut que continuer pour arriver à la vérité; un plan qu'il n'y a qu'à suivre, et ce plan on vient de le lire dans les observations précédentes.

La mère Bourdon, après avoir creusé d'une manière quelconque la cavité dans laquelle elle a posé les fondemens de son nid, aura amassé dans le fond du creux une assez grande quantité de cire pour former une cellule; car elle a, comme je l'ai dit, la faculté de produire cette matière en plus grande abondance que les ouvrières; elle aura façonné cette petite masse en forme de coupe; elle aura été sur les fleurs chercher des poussières d'étamines; elle les aura placées dans le fond de l'alvéole, et ce fera le premier aliment de ses petits.

Ce n'est qu'après ces préliminaires qu'elle y aura déposé ses œufs; selon son usage, elle en aura pondu sept ou huit à l'aide de son aiguillon; et pendant son travail elle n'aura point été inquiète pour leur sûreté, puisqu'ils n'auront pas été exposés à la voracité des autres Bourdons.

Des vers seront éclos; ils se feront nourris des provisions qu'on avoit préparé dans leurs cellules; ils les auront bientôt consommées; leur corps aura pû prendre de plus grandes dimensions avant de remplir le vide causé par la diminution du pollen; et leurs forces s'étant accrues avec leur grandeur, ils auront fait éclater la pellicule de cire qui les enfermoit.

La

La femelle aura pris quelques brins de cette matière sur la surface de l'alvéole, et aura joint, au moyen d'une bande de cette substance, les deux hémisphères creux dans lesquels la cellule aura été transformée.

Le logement des vers aura donc été augmenté au moyen de l'effort qu'ils auront fait pour le rompre, et par les soins de leur mère.

Elle doit alors avoir été obligée de les nourrir chaque jour, car ils ne devoient plus avoir de pollen dans leur magasin. Ces petits ayant pris tout leur accroissement, chacun d'eux se fera construit sous la cire un logement à part, dont les lambris auront été de tentures de soie.

La mère aura peut-être alors réuni la cire qui couvroit les nouvelles loges de ses petits, et l'aura sculptée en cellule pour y pondre de nouveaux œufs.

Mais remarquons déjà que voilà un gâteau tout formé; les loges de soie, qui d'abord étoient applaties, se feront redressées, et auront pris la forme d'un œuf, et les petits qu'elles renferment à cette époque auront subi toutes leur métamorphoses.

C'est dans cet état que j'ai trouvé au mois de Juin un petit gâteau de Bourdon dans une cavité souterraine; ce nid n'étoit habité que par trois individus parfaits, une mère et deux ouvrières.

Ce gâteau n'étoit composé que de huit coques réunies; les deux coques qui occupoient le milieu étoient ouvertes, les six autres étoient encore fermées; on voyoit sur ses bords deux masses de cire qui contenoient des œufs.

Ce gâteau entre parfaitement dans le plan que je viens de crayonner; il est d'accord en tout avec les idées que j'ai données pour des conjectures; il semble prouver que je ne me suis point écarté de la vraisemblance.

On conçoit facilement que de nouvelles cellules construites sur les premières coques donneront lieu à de nouveaux gâteaux, et que les premières

premières coques ouvertes serviront aussi les premiers de pots-à-miel à la famille.

Voilà donc la femelle en société, et le lecteur exactement au point d'où il étoit parti. La route que je lui ai fait parcourir conjecturalement me paroît assez naturelle pour l'adopter, en attendant que de nouvelles observations nous apprennent si c'est là réellement la marche de la Nature.

La scène change quand les premières mouches sont transformées; la mère, qui avoit vécu jusqu'alors dans une solitude profonde, se voit entourée de mouches industrieuses auxquelles elle a donné la vie. Elle n'est plus obligée d'aller aux champs pour récolter le miel et le pollen; elle est dispensée de ces courses toujours dangereuses; ses enfans adultes se chargent aussi de la nourriture des vers, de la cloture et de la défense du nid; et s'ils lui laissent le soin de perpétuer l'espèce, ils l'aident encore à construire et à perfectionner les berceaux de ses petits.

L'été offre des tableaux plus piquans à l'observateur. Le privilège de pondre n'appartient plus exclusivement à la mère commune; un peuple de petites femelles paroît alors; elles lui disputent ce droit qu'elles partagent avec elle. Elles se chassent les unes les autres, se combattent souvent, se tuent quelquefois, et donnent le jour à un grand nombre de mâles.

Ceux-ci fécondent les grandes femelles qui naissent à la même époque, et les dehors du nid sont le théâtre de leurs amours. Lorsqu'ils ont assuré la conservation de l'espèce, ils périssent, et l'automne voit aussi disparaître la vieille mère, les ouvrières, et les petites femelles.

Les jeunes femelles de la grande taille survivent seules à toute la peuplade, mais elles s'enferment dans un tombeau qu'elles ont creusé dans l'arrière saison; les premiers froids les engourdissent;

elles bravent dans cet état les rigueurs de l'hiver; elles ne sortent de leur léthargie qu'au retour du printems, et lorsqu'elles peuvent trouver sur les fleurs le miel et le pollen qui servent à les nourrir. Elles ne sentent donc les besoins que lorsqu'elles peuvent les satisfaire, et ce dernier trait n'est pas le moins intéressant de leur histoire.

XX. *Botanical Characters of four New-Holland Plants, of the Natural Order of Myrti.*

By James Edward Smith, M.D. F.R.S. P.L.S.

Read July 7, 1801.

SINCE the publication of a paper in the third volume of the Linnean Society's Transactions, the aim of which was to fix the botanical characters of several genera and species of the natural order of MYRTI, hitherto not well determined; I have become acquainted with a few more of the same tribe, four of which it is my design to describe at present. The number might appear too inconsiderable to be the subject of a paper, nor should I, scarcely, have offered them in this form to the Society, were it not as a kind of necessary supplement to the former treatise; and had I not a few particular observations to propose respecting one of the plants.

3. * *LEPTOSPERMUM grandifolium*, foliis lanceolatis mucronatis subquinqüenerviis subtus pubescentibus, calycibus villosis: dentibus membranaceis coloratis.

A single specimen of this new species of *Leptospermum*, gathered by Dr. White in New South Wales, has been communicated to me by A. B. Lambert, Esq. It is much larger than any other I have seen of the genus, especially the leaves, which are above an inch long, and near a quarter of an inch broad. Their form is lanceolate, tapering more towards the base than towards the extremity, and they are tipped with a small prominent, sharp point; their margin is en-

ture, a little revolute; upper surface smooth and shining; lower paler, opaque, downy, punctate, marked with two obsolete longitudinal ribs on each side of the principal one. Flowers terminating the short lateral branches, solitary, sessile, surrounded with a few leaves; white, large and handsome. Calyx clothed all over with white silky down; its teeth membranous, whitish, less silky on the inside, most so externally about the tip. The germen is found to consist of only five cells; otherwise the appearance of the plant, and large size of all its parts, would have led me to suppose it a *Fabricia*, nearly allied to Gærtner's *myrtifolia*. As a *Leptospermum* it should be inserted between the third and fourth species, being next akin to the *lanigerum*.

- 5.* *L. imbricatum*, foliis obovatis imbricatis enervibus, ramulis calycibusque glabris; dentibus membranaceis coloratis carinatis.

Gathered near Port Jackson, New South Wales, by the late Mr. David Burton, and communicated to me by the Rt. Hon. Sir Joseph Banks. It is closely allied to the fifth species, *L. parvifolium*, but differs at first sight in the imbricated appearance of its numerous leaves on the long lateral branches; and the flowers will be found on examination totally distinct, being not half the size of those of *L. parvifolium*, standing two or three together about the extremity of each branch, not solitarily: their calyx moreover is in every part perfectly smooth, and its teeth sharply carinated, which in the other are only a little convex, and entirely destitute of any keel.

- 4.* *MELALEUCA squarrosa*, foliis sparsis oppositisve ovatis muticis quinquenervibus, floribus lateralibus, dentibus calycinis lævibus.

M. squarrosa. *Donn. Hort. Cant. ed. 2. 101.*

I am

I am indebted to the Rev. Mr. Davies, F. L. S. Vice-Master of Trinity College, Cambridge, for specimens of this shrub, which was raised in the Botanic Garden of the University by Mr. Donn, from seeds brought from Port Jackson, and flowered in 1799. It should stand next to the *M. stypheloides*, to which its leaves bear some resemblance; but they are neither twisted nor pungent, neither have they more than five, or at most seven ribs; they are also more inclined to be opposite than in that species. The flowers are white, encircling the branches in longish clusters. Calyx-teeth blunt and without nerves, as in most of the other species, and totally unlike the ribbed acuminate teeth of *M. stypheloides*. Stamina collected together into bundles, but imperfectly, and never to any considerable distance from their base, so that it would scarcely be taken for a *Melaleuca* till the filaments in decay are found to fall off (for the most part) in clusters. The stigma is simple, as in *Metrofideros*.

The very imperfect connection of the stamina in this plant leads us to remark how little the distinction between *Melaleuca* and *Metrofideros*, and consequently even the character of the Linnean class *Polyadelphia*, are founded in nature. Most plants indeed, of that class, like most species of *Melaleuca*, have the filaments so strictly united, for a considerable part of their length, into several (mostly three or five) *phalanges* or bundles, and those bundles fall off so entire, that the character derived from such a circumstance seems no less natural than convenient for the systematic botanist. In the *Melaleuca nodosa*, on the contrary, the union of the stamina is continued but a little way from the base, and it is even more slight in the plant now before us, many of the filaments being quite simple, and unconnected with their neighbours. The case is the same in the genus *Citrus*, of which Linnæus could not but be aware when he established this class, and indeed he alludes to the variableness of the character in his *Genera Plantarum* in describing *Citrus*. Neither is
this

this character, slight as it is, connected with any peculiarity of habit by which a *Melaleuca* can be known from a *Metrofideros*; nor, I believe, would any botanist venture to guess at a *Melaleuca* without seeing the stamina, in which the only peculiarity of the genus resides. What then is to be done, when even this peculiarity seems eluding our grasp? We can only retain the genus as an artificial one, along with many other such, till the science be arrived at a greater degree of perfection; keeping, in the mean time, *natural orders* in view as the grand object of our systematic inquiries, and cherishing every truly *natural genus* as a fixed point, on which we may found the principles of future discoveries.

1. * *EUCALYPTUS marginata*, operculo conico magnitudine calycis, umbellis lateralibus, foliis ovatis margine incrassatis.
E. marginata. *Donn. Hort. Cant. ed. 2. 101.?*

Mr. Aiton favoured me with specimens of this plant three years ago from Kew Garden. The seeds were brought from Port Jackson. Its leaves agree very much in form with those of *E. robusta*, (next to which it ought to be placed,) but the footstalks are shorter, veins more prominent, and the margin more thickened, somewhat cartilaginous, and reddish. The umbels are solitary, axillary, and simple. Flowers scarcely one-third of the size of the *robusta*, and their covers are neither broader than the calyx, nor longer; neither are they contracted in their middle. The flowers much resemble those of my *E. pilularis*, but the leaves are totally different.

XXI. *Additional Observations, on some remarkable Strata of Flint in the Isle of Wight, in a Letter from Sir Henry Charles Englefield, Bart. F.R.S. to John Latham, M.D. F.R.S. and L.S. of Romsey.*

Read July 7, 1801.

DEAR SIR,

I FEEL much flattered by the notice taken of my Paper* on the Chalk Pits of the Isle of Wight by the Linnean Society; and as I wish to render my account of the very curious appearances observed by me in them as perfect as I can, the following additional observations on the subject, made during a second visit last year, are, by your favour, submitted to the Society.

The pits I last year inspected are as follow, beginning from the east.

Brading pit, which is at the eastern point of the great ridge, where the valley of Brading Haven intersects it, and separates it from the Yaverland hill, which terminates in the sea at Culver and Bembridge.

- A road cut into the chalk above Knighton.

Afhey-down pit, about three miles east of Newport.

A pit very near to, and south of, Carisbrook castle.

The cliffs and caves of Freshwater bay, both east and west of the valley, which intersects them entirely, and runs from Freshwater to Yarmouth.

The Yaverland chalk is, therefore, the only part which I have

* P. 103.

not examined, and little doubt can be entertained of its similarity to the rest of the range, to which it evidently belongs.

In Brading pit some flints appear in detached nodules, and these are found and unbroken.

The inclined strata of flint are visible, but not to advantage, owing to the manner of working the pit. In these strata the flints are universally shattered, some into absolute powder, others into grosser powder and fragments mixed. But besides these strata, the chalk in this pit is divided by vast perpendicular fissures, as smooth as plaster walls, and in some of these fissures flint has formed, which appears broken like that in the strata.

The road above Knighton only just cuts into the chalk stratum, but all the flints visible in the banks are extremely shattered.

The pit at the west end of Ashey-down, near two large barrows, is the most extensive and satisfactory of any I have seen. The perpendicular face of the chalk, where worked, is not less than fifty or sixty feet, and its direction is at right angles to that of the strata, and parallel to their line of dip:—of course, they are seen to very great advantage. The strata seem to dip northward more rapidly than in any other place where I could observe them. The angle of inclination is from 75 to 80 degrees. There are not layers of flint between every layer of the chalk. Some of the chalk is peculiarly solid, and rises in very large masses, affecting a cubic form. Their solid vein is from twenty-five to thirty feet thick, and is in strata from three to four feet. In all this solid part there are very few flints.

Both above and below this harder bed (speaking of the original position of the strata) the chalk is softer, and has more flints in it. The stratified flints in this pit are full as much shattered as any I

had seen. The nodules are not at all broken. Many of the stratified flints are much defaced in this pit by an admixture of pyrites, so as to be quite opaque, like a coarse jasper; and these flints are much softer than the others, as is always the case in the impure flint.

In the chalkpit near Carisbrook the strata are not so visible as in the pit north of the castle, (described in the first paper,) but the flints are to the full as finely, though perhaps not so generally, broken. In one flint I observed, that though it lay in its bed undisturbed, chalk, as if in a fluid state, had run into one of the fissures. Every appearance in this pit indicates that the chalk, since its stratification, has received a most violent shock.

The chalk at Freshwater bay appears in high perpendicular cliffs, particularly on the western side of the bay. Both on the east and west the strata dip northward near 80 degrees, and the dip seems to run east and west very regularly. The western cliff has a very regular and perpendicular face to the eastward; and here the parallel direction of the strata, each separated by a thin line of black flint, presents a most curious appearance. The flint here is often found in thin plates of considerable extent, sometimes not above an inch thick, and seems formed from each side of the space which it fills; as the exterior parts (or those nearest the chalk) are the purest and blackest, and it is gradually whiter towards the middle, where there is often a line of soft chalk included between the two plates of flint. All the stratified flints are more or less shattered, and some are reduced to very fine powder. The cave at Freshwater, which is really a beautiful as well as a curious one, is formed by the action of the sea on these nearly vertical strata. They are of different hardness, and all intersected with fissures at right angles to the strata. When the sea acts on and wears away a soft stratum, a gallery is formed, and

the upper parts of the stratum between fissure and fissure drop out, much in the same way as bricks are apt to do out of the flat arch over a window; the harder contiguous strata serve as walls to the gallery, but are by degrees perforated in different parts, and become irregular pillars, supporting the vast weight of the hill above, until the action of the sea weakens them so far, that they fall, and a part of the face of the hill goes with them: so that the cave is constantly, although slowly, changing its form.

Large masses of the harder strata, defended by their flint coating, also stand up in the bay as insulated rocks of different shapes, and much resembling the Needle rocks, which are exactly of the same materials, and formed by the same process. In this part of the chalk stratum I saw several fossil remains, which I had sought in vain in the pits I had visited. One was singular. It had the appearance of part of a very large shell, regularly striated, and almost flat. I have often seen small fragments apparently of a similar shell, in chalk, but never a large piece. It was so firmly fixed as not to be removed without a chisel; which I had not.

To these observations on the chalk of the island I must add, that this whole range, although really chalk, is much harder than the chalk of the South downs; insomuch that the carpenters cannot use it for drawing lines, but import chalk for that purpose from Portsdown hill, above Portsmouth. They also call the island chalk by the name of marle, which is, however, only the Breton name for chalk, and appears in many compound names, such as *Marl-borough* on the Wiltshire chalk hills, and the very significant one of *Albe-marle*, or white chalk.

As I made some further observations on the southern range of hills which form the back of the island, I will trespass on your patience a little longer, particularly as they in some degree contradict,

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or rather correct, what I had advanced on that subject in my former letter.

When the northern front of those hills is viewed from Ashley down, the stratum of stone mentioned in my former letter, as lying directly under the chalk of St. Catharine's and Dunnoke hills, appears every where to maintain an horizontal position; and so in its general disposition, particularly in its northern front, it certainly does; but just behind the village of Ventnor, the stratum entirely disappears, as if it had been ingulphed in a great chasm; and a deep and narrow valley runs winding into the chalk hill of St. Boniface, though it does not penetrate through it, which seems the remains of the fissure into which the stone had sunk.

The appearances of the great stone stratum, from Niton eastward to Ventnor, are noted as follows in the journal made on the spot :

On an attentive inspection of the strata of the under cliff, it appears that the great stratum of rugged and laminated stone, which first appears at the west side of St. Catharine's, and, thence ranging eastward, forms the front of the cliffs overhanging the Underway, dips in its southern face gently to the eastward. The cliffs at Mirables are much higher above the sea than those of St. Laurence; and from thence they decline till at the opening in the hill above Ventnor they totally disappear. A small crag just peeps out of the eastern face of this dell, and the whole hill of St. Boniface is, as far as can be seen, composed of chalk. As, however, this, like all other chalk hills, is in the state of a steep slope covered with turf, perhaps by digging into its face the stony stratum might be discovered. It is also to be observed, that the chalk, which is not visible above the rock at Mirables, begins to appear soon after, and grows gradually thicker as it proceeds eastward. At St. Laurence, it forms a thick cap to the rocks; and at Steephill shute its thick-

ness is very much increased, and soon after nothing but chalk appears in St. Boniface's hill. In what form the rock re-appears at Dunnose to the east of St. Boniface, I have had no opportunity of examining.

I should not, dear Sir, trouble you with these defective observations, but that every notice, however imperfect, may be of use when connected by future observations, and that they may serve as a stimulus to other travellers who often go over this beautiful line of country, to turn their attention to its singular natural phenomena.

I send you two specimens of the broken flints; one from above Brading, the other from near Carisbrook; but the tickets are mislaid, and I am not sure which is which.

I remain, &c.

Tilney Street,
May 26, 1801.

XXII. *Description of a new Species of Viola.* By Thomas Furlly Forster, Esq.
F. L. S.

Read July 7, 1801.

VIOLA CONCOLOR.

VIOLA caulis erectis, foliis lato-lanceolatis stipulisque lanceolato-linearibus integerrimis;

Habitat in uliginosis Americæ Septentrionalis. 2

DESCRIPTIO.

Radix fibrosa, ramosa, alba, perennis.

Caulis herbaceus, erectus, flexuosus, fulcato-angulosus, simplex, hispidus, pedalis et ultra.

Folia alterna, lato-lanceolata, acuminata, integerrima, rugosa, ciliata, dilute virentia; variant sæpe argute dentata aut lacera.

Petiolus brevissimus, femiteres.

Stipulæ quatuor; duæ majores, duæ minores; lineari-lanceolatæ, arcuatæ, integræ, ciliatæ.

Pedunculi duo, minimi, ex axillis foliorum; unus ferens florem abortivum.

Braectæ duæ, minimæ, lineares, obtusæ.

Flores

Flores parvi, dilute virides, plantæ concolores.

Calyx: *Perianthium* pentaphyllum, concavum, hamosum.

Corolla: Petala quinque viridia:

duo *superiora* minima, linearia, recurva, integra;

duo *lateralia* linearia, dentata, recurva;

infimum bipartitum.

Calcar brevissimum, obtusum.

Stamina quinque, subulata, brevissima.

Antheræ viridi-purpureæ, basi bifidæ.

Pistillum breve.

Stigma non urceolatum, sed hamosum, perforatum,

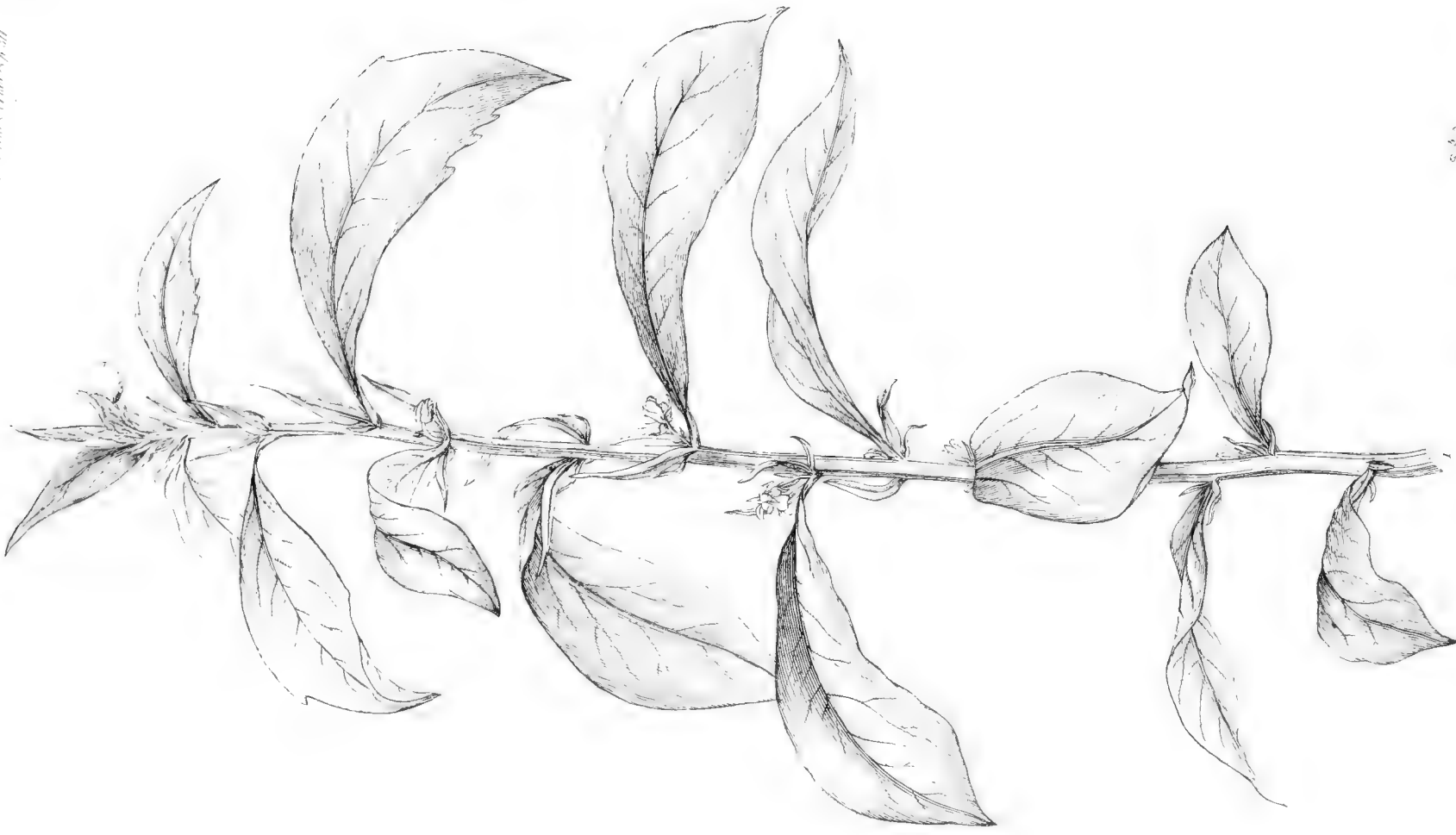
duplo longius antherâ.

OBSERVATIONES.

Culta rarissime floret. In horto meo jam annos plus quatuordecim existit; at cum sæpius ex America repetita esset, bis solummodo, primum duntaxat anno, hoc tanto temporis spatio floruit. Nusquam alias virecentem nisi in Horto Regio Kewensi vidi. Specimen siccum inde decerptum in Herbario egregio Dom. Jos. Banks, Bart. exstat, sed nondum in aliquo (quod sciam) de hac re scriptore hæc species notata est; nec pro certo habeo quod vere sit *Viola*, forsan cum multis aliis sub novo genere melius distinguenda.

Cum omne hoc genus (*Violam*) semper magno studio excoluerim, species haud minus sexaginta notavi; et cum per otium licebit, libenter genus, nunc plurimis mendis laborans, expedire conabor. Duas tantum observationes speciminis loco huc afferam.

Viola lanceolata Gmelin ex Siberia descripta non est eadem quam sub eodem nomine Kalm ex Canada proposuit. Hæc foliis perangustis lanceolatis nitidis, radice fibrosa, stolonifera; illa foliis ovato-lanceolatis pubescentibus, radice fusiformi, acaulis.



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Piper racemosa

Viola grandiflora hortorum non est eadem quæ *Viola grandiflora* Linnæi, sed omnino species nova, cui *Viola Pallasii* nomen dare velim, ut a Pallas primo in Siberia inventæ.

EXPLICATIO TAB. XXVIII.

- Fig. 1. Planta magnitudine naturali.
2. Calyx.
3. Petala suprema.
4. Petala lateralia.
5. Petalum infimum.
6. Stamen.
7. Pistillum.
8. Antheræ.
9. Anthera.
10. Capsula.
11. Semen.

XXIII. *Description of the Fruit of Cycas revoluta.* By James Edward Smith, M.D. F.R.S. P.L.S.

Read November 3, 1801.

THE *Cycas revoluta*, Thunb. *Fl. Japon.* 229, *Ait. Hort. Kew.* v. 3. 475, having, for the first time in England, produced fruit in the collection of the Honourable and Right Reverend the Bishop of Winchester, at Farnham Castle, Surrey; his Lordship was pleased to request that an account of it might be laid before the Linnean Society. For this purpose I was induced to go to Farnham in November 1799, accompanied by Mr. Sowerby, in order to make the requisite observations. We found the fruit then ripe, and exhibiting a most magnificent spectacle. The plant was much larger than any I had seen of the same species, and seems to be one of the oldest in England. We learn from the *Hortus Kewensis* that this *Cycas* has been about 40 years in our collections. It is not known that the Farnham plant was larger at its first introduction than such as are usually brought from abroad, perhaps 2 or 3 feet in the diameter of the circle formed by the expanded leaves; that diameter is now 10 or 12 feet. Supposing it therefore to have been one of the very first introduced, it has grown much more rapidly than usual; for there are few to be seen in England, even the oldest, that are half so large. I shall proceed to describe its appearance and structure.

The stem is about 2 feet in height, and 9 or 10 inches in diameter. Thunberg describes the same as rising in Japan to the height of 6 feet or more, with nearly the abovementioned diameter. Its surface is brown, and very scaly with the remains of old leaf-stalks.

stalks. A simple circle of about 40 evergreen pinnate leaves crowns the summit, forming a magnificent basin, whose margin measures 10 or 12 feet across, and 5 or 6 feet in height above the level of the bark bed of the stove. On mounting a ladder we beheld in the bottom of this verdant and shining amphitheatre a circular cluster, perhaps 18 inches wide, of above an hundred orange-coloured downy oval fruits, intermingled with innumerable palmate, pale brown, thick and woolly leaves or fronds, each of whose finger-like segments was tipped with a sharp spine. With respect to its earlier state, the Bishop has informed me, that on his arrival at Farnham early in September, the gardener informed his lordship the *Cycas* "had borne a singular appearance during summer." On inspection, the crown of the plant was found occupied by the abovementioned woolly leaves, then beautifully lacinated though not spinous, and having the appearance of a *strobilus* or cone, hollow like a bird's nest, and filled with a quantity of green *drupæ*, about the size of half-grown apricots, and intermixed with the same kind of downy greyish leaves that surrounded them. The changes which had taken place from that time to the period of my arrival were, that the whole cluster of fronds and fruit had become rather convex than concave, the fronds were browner, spines had grown at the tip of each of their lengthened segments, and the *drupæ* were become nearly as large as a moderate sized apricot, and further resembled that fruit in their rich orange hue and downy surface.

On separating some of these woolly leaves, they were found to be true fronds. Each was from 6 to 8 inches long, fleshy, entirely clothed with pale brown woolly down; their lower part a flattish stalk; their middle bearing on each margin a row of 3 or four sessile *drupæ*; their extremity dilated into a pinnatifid, or rather palmate, many-fingered leaf, whose lobes were generally curved inwards, and tipped with a spine as before mentioned. When wounded, these fronds

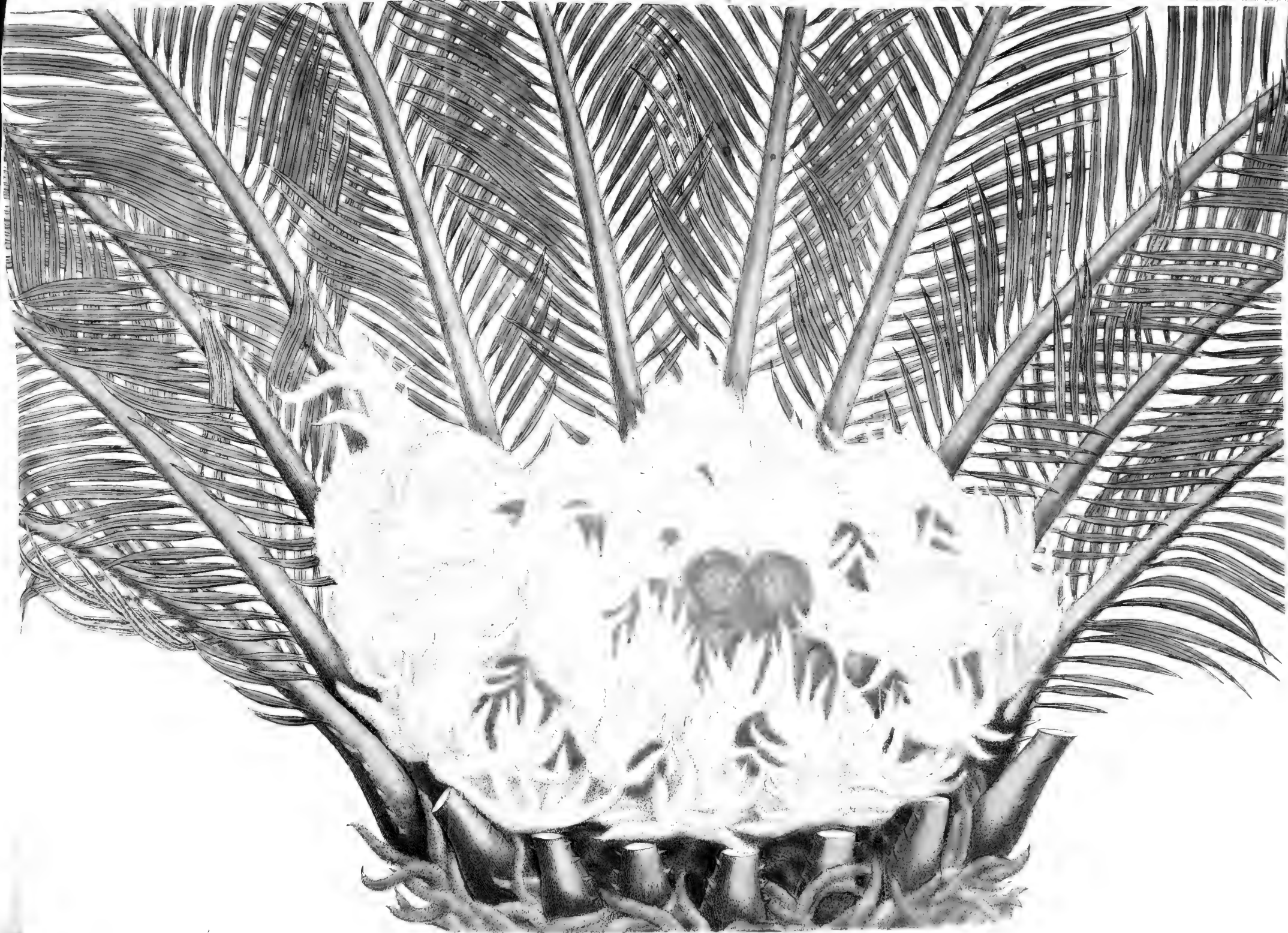
distilled a great quantity of thick clear insipid mucilage, which soon hardened into a substance resembling gum tragacanth, in which probably resides the nutritive quality for which this Palm is so celebrated in the *Flora Japonica*. We are there told that a very small morsel of the pith of its stem is sufficient to sustain life a long time, and on that account the plant is jealously preserved for the use of the Japanese army. The *drupæ* are also said to be used as food. We roasted some, and found in their kernels the flavour of chestnuts, with less sweetness and a more watery consistence. Each *drupa* is elliptical or somewhat obovate, a little compressed, tipped with a minute rigid point formed of the permanent stigma, which is umbilicated at its summit. The outer coat is coriaceous, bright orange red, clothed with woolly down which easily rubs off. This coat is not eatable. Nut solitary, elliptical, even, hard, whitish, tipped with a point connected with the stigma, and internally lined with a loose brown membranous integument closely enfolding the kernel, which is also elliptical, white, firm, uniform, completely occupying the shell, and consisting entirely of *albumen**. In its upper part, immediately under the stigma, we discovered a small round cavity where the embryo should have been, but no traces of it were to be found, for want of impregnation by the male pollen, which is produced on a separate tree. Probably the flavour of the nuts might have been improved had they been impregnated.

Enough has been said to show the near affinity of this genus to *Zamia*, (see Gærtner, *tab. 3.*) from which it is chiefly, and indeed sufficiently, distinguished by its *drupæ* growing on a true frond, contrasted with the amentaceous fruit of *Zamia*. The two genera perhaps, constitute an intermediate order between *Palmæ* and *Filices*, but are surely most akin to the former.

* Gærtner rather chooses to call it *vitellus* in *Zamia*.



Cucurbita pepo







Cycas revoluta

The annexed figure (TAB. XXIX.) is taken from a fine drawing by Miss North, presented to the Society by the Bishop of Winchester. It represents as much of the plant as was possible, somewhat under the natural dimensions, nor could the full number of surrounding leaves be conveniently admitted.

TAB. XXX. exhibits one of the fronds of its full size. Fig. 1. is an abortive *drupa*; 2. a ripe one; 3. a *drupa* cut longitudinally; 4. all the integuments of the fruit; 5. *albumen*; 6. cavity destined to contain the embryo.

XXIV. *Species of Erica.* By Richard Anthony Salisbury, Esq.

F.R.S. & L.S.

Read October 6, 1801.

ERICAS, in absolutâ monographiâ nunc illustrare, minime mihi propositum est. Attamen, quandoquidem in hoc genere nonnihil desudaverim, et multæ ejus pulcherrimæ species, sub ineptis ne dicam falsis hortulanorum titulis, iterum a *Willdenow* eyulgantur, meos Characteres, et Nomina, demum profero.

Species ordinavi secundum earum affinitates, adeo ut inter se proxime collocentur simillimæ: cuius diversæ methodo parum amicus. Etenim, si e numero foliorum separas, hunc non solum in unâ eâdemque stirpe mire ludentem offendes, sed tales divisiones magnitudine suâ laborantes fere nihil juvant: idem fortius objiciatur sectionibus ex antheris muticis calcaratisve petitis, quippe quæ valde propinquas species, imo ipsas varietates distrahunt: nec magis naturalem distributionem, vel e bracteis, vel ex inflorescentiâ, vel e filamentis, vel e fructu, adhuc extorquere potui. Jamdudum nos docuit *Linnè*, in Regno Vegetabili novæ prolis Herbam sequi patrem, Florem vero matrem: inde Clavis vastissimorum generum, ut mihi videtur, haud ita difficilis. Quamobrem cohortes e structurâ corollæ antherarumque potissimum desumpsi, gradumque affinitatis per comma, semicolon, rariusve colon, pone singula nomina appositum, indicavi: ubi nullum vidi præter communem generis nexum, ista species periodo notatur: multas enim similitudines oculis conspiciamus, quas tamen verbis exprimere admodum difficile sit. Nihilominus in Differentiis Specificis, puras certissimasque notas eligere conatus sum, haud
magis

magis quod opus esset dicere, quam quod non opus esset, non dicere, sollicitus.

Mirum fortasse nonnullis videatur, *Ericam vulgarem* desiderari in sequentibus paginis: sciant autem velim, hancce stirpem, si quæ alia in toto Ordine, proprium constituere genus: jure antiquiore profecto suum nomen retinisset, sed cum tot aliæ stirpes, apud omnes Botanicos jam eodem cognomine gaudeant, fatius duxi hanc unam novo insignire titulo: itaque *Callunam* appellavi, ob usum ejus frequentissimum in scopis conficiendis: essentia generis, quâ differt ab *Ericâ*, est in pericarpium valvis ad latera loculorum dehiscentibus, septis axi relictis: habitus, absque ullo rudimento petioli pedunculivæ, omnino sessilis. Alterum genus, cum illo pariter confusum, ob stigma grande *Salaxis* mihi audit, cujus calyx irregularis, et pericarpium drupaceum, triloculare, trispermum: quatuor species innotuere, faciem *Ericæ scopariæ* præ se ferentes.

Paucas observatiunculâs, in editione Dissertationis *Ericæ a Thunberg*, quam nuper typis mandabam, inserui. Hallucinationes graviores in tam vasto genere pene inevitabiles, Synonyma infra tacite indicabunt: cæterum hæc non nisi ex speciminibus ipsis auctorum unquam citavi. Maximâ profecto beneficentiâ sua Herbaria mihi patefecerunt omnes, atque frustula vel rarissimorum exemplarium communicaverunt: adeo ut ducentas et quinquaginta legitimas species nunc possideam, quarum dimidiam circiter partem in vivis alo. Hæc omnes, numerosissimis varietatibus mistas dignoscere, et prout verum Botanicum decet exponere, haud labor erit paucorum annorum: nimis felix si qua hæctenus videar vestigiis instituisse admirandi *Linne*, qui non absque divino quodam afflatu, cum Vegetabilium differentias tradidit, longissimo intervallo omnes superavit.

*Synopsis Specierum, secundum earum Affinitates.*Scoparia. 3. *m. i. p. ax.*Tenuis. 3. *c. i. t.*Spiculifolia. 3. *m. i. ax.*Humilis: 3. *c. i. t.*Virgularis, 3. *m. i. t.*Peduncularis: 3. *c. i. t.*Asperifolia, 3. *mc. i. t.*Amœna. 3. *c. i. t.*Ferox. 3. *m. i. t.*Oxycoccifolia, 3. *c. i. ax?*Glomiflora, 3. *c. i. t.*Thymifolia. 3. *c. ie. ax.*Formosa. 3. *c. i. t.*Axillaris. 3:4. *c. i. ax.*Carduifolia. . *c. i. t.*Sicæfolia. 3. *c. i. t.*Tubercularis. 3. *m. i. t.*Urceolaris, 3. *c. i. t.*Campanularis. 3. *m. i. t.*Fauſta, 3. *c. i. t.*Medioliflora. 3. *m. i. t.*Pallida, 3. *c. i. t.*Tomentosa, 3. *c. i. t.*Blanda, 3. *m. i. t.*Auricularis, 3. *c. i. t.*Hottoniæflora, 5. *c. i. ax.*Lamellaris, 3. *c. i. t.*Seriphiifolia, 5. *m. i. ax.*Marifolia, 3. *c. i. t.*Lavandulæfolia, 3. *m. i. t.*Helianthemifolia. 2. *c. i. t.*Humifusa, 3. *m. i. t.*Calathiflora. 3. *c. i. t.*Cristæflora, 3. *m. i. t.*Procera, 3:5. *c. i. t.*Lyfimachiæflora, 3. *m. i. t.*Polytrichifolia. 3:5. *c. i. t.*Passerinæfolia: 3. *m. i. t.*

Byſſina,

Byffina, 3. *m. ic. t.*
 Velleriflora, 3. *m. e. t.*
 Carbasina: 3. *m. e. t.*

Scariofa, 3. *c. e. t.*
 Sexfaria, 3. *c. e. t.*
 Corydalis, 3. *c. i. t.*
 Azaleæfolia, 3. *m. e. t.*
 Petiolaris, 3. *m. i. t.*
 Vesicularis, 3. *c. i. t.*
 Verniciflua, 3. *c. i. t.*
 Lachneæfolia, 3. *c. i. t.*
 Voltæflora, 3. *c. m. i. t.*
 Lyrigera, 3. *c. i. t.*
 Salax, 3. *c. i. t.*
 Gnidiæfolia, 3. *c. i. t.*
 Cumuliflora, 3. *m. i. t.*
 Genistæfolia, 3. *m. i. t.*
 Periplocæflora, 3. *c. i. t.*
 Lucida, 3. *c. i. t.*
 Munda, 3. *c. i. t.*
 Gnaphaliiflora. 3. *c. i. t.*

Fabrilis, 3. *c. i. t.*
 Dianthifolia, 2. *c. i. t.*
 Brevifolia, 3. *c. i. t.*
 Chlamydiflora, 3. *c. i. t.*
 Selaginifolia. 3. *c. i. t.*

Pannosa, 3: 5. *c. i. t.*

Hirsuta, 4. *m. i. t.*
 Plumosa, 4. *c. i. t.*
 Ciliciiflora. 3. *m. i. t.*
 Xeranthemifolia, 3. *m. e. t.*
 Nodiflora, 3. *m. e. t.*
 Flosculosa, 4. *m. e. t.*
 Exilis, 4. *m. e. t.*
 Labialis, 3. *m. e. t.*
 Embolifera, 4. *c. e. t.*
 Dumosa, 4. *c. e. t.*
 Barbigeræ, 4. *m. e. t.*
 Paleacea, 4. *m. e. t.*
 Bruniafolia, 6. *c. e. t.*
 Turmalis, 6. *m. e. t.*
 Equisetifolia. 3. *m. e. t.*

Diotæflora, 3. *m. e. p: ax.*
 Sertiflora, 3. *m. e. p: ax.*

Flexilis. 4. *m. e. ax.*

Saxatilis, 3-5. *m. e. p: ax.*
 Lugubris, 4. *m. e. p: ax.*
 Multiflora, 5-6. *m. c. p: ax.*
 Manipuliflora, 3. *m. c. p: ax.*
 Vaga. 5-6. *m. c. p: ax.*

Lentiformis: 3. *m. e. t.*
 Pudibunda. 3-4. *m. e. t.*

Filiformis, 3. *c. e. t.*

Turgida,

Turgida. 3. c. e. t.

Fusiformis; 3: 4. m. e. t.

Fragilis; 3. m. e. t.

Vestiflua, 3. m. e. t.

Baculiflora, 3. m. e. t.

Cothurnalis, 3. m. e. t.

Socciflora, 3. m. e. t.

Furfurosa, 3. m. e. t.

Follicularis, 3. m. e. t.

Penicilliflora. 3. m. e. t.

Placentæflora, 3. m. e. t.

Pyramidalis, 3. m. e. t.

Squamæflora, 3. m. e. t.

Cæsia, 3. m. e. t.

Flexuosa, 3. m. e. t.

Lasciva, 3. m. e. t.

Stylofa, 3. m. e. t.

Spirææflora, 3. m. e. t.

Milleflora. 3. c. e. t.

Diosmæflora, 3. c. i. t.

Palliiflora, 3. c. i. t.

Fugax, 3. c. i. t.

Pyrolæflora, 3: 4. c. i. t.

Tegulæflora, 3. c. i. t.

Baccæformis. 4: 3. c. i. t.

Modesta: 3. c. i. t.

Holofericea. 3. c. i. t.

Glauca: 3. c. i. t.

Variifolia. 3. c. i. t.

Rupestris. 3. c. i. t.

Versicolor, 3. m. i. t.

Decora, 3. c. i. t.

Cupressiformis, 3. c. i. t.

Melliflua. 3. c. i. t.

Nana, 4. c. i. t.

Spiffifolia, 6. c. i. t.

Sacciflora, 4. c. i. t.

Cylindriflora. 6. c. i. t.

Paludosa, 6. m. i. t.

Lituiflora. 4. m. i. t.

Obpyramidalis, 4. m. i. t.

Cyrillæflora, 4. m. i. t.

Velitaris. 4. c. i. t.

Culcitæflora, 4. c. i. t.

Tubiflora, 4. c. i. t.

Curviflora, 4. c. i. t.

Cuspidigera, 4. c. i. t.

Bibax, 4. c. i. t.

Buccinæformis, 4. c. i. t.

Fastuosa,

Fastuosa. 4. c. i. t.

Stagnalis, 4. m. i. t.

Conspicua, 4-5. m. i. t.

Longiflora, 6. m. i. t.

Verticillaris, 5-6. m. i. t.

Floccosa. 5-6. m. i. t.

Radiiflora, 8. c. i. p: lat.

Lycopodiifolia. 6. m. i. p: lat.

Pharetræformis, 6. m. i. p: ax.

Grandiflora, 6. m. e. p: ax.

Cerviciflora, 5-6. c. e. p: ax?

Pinifolia, 6. c. i. p: ax.

Calamiformis, 6. m. i. p: ax.

Longifolia, 6. m: c. i. p: ax.

Costæflora, 6. m. i. p: ax.

Onosmæflora, 6. m. i. p: ax.

Pulviniformis, 6. m. i. p: ax.

Froncosa, 6. m. i. p: ax.

Phylicæfolia, 6. m. i. p: ax.

Argutifolia. 6. m. i. p: ax.

Favosa, 6. c. i. p: ax.

Sceptiformis, 8. c. i. p: ax.

Clavæflora, 6. c. i. p: ax.

Alveiflora, 6. c. i. p: ax.

Mammosa. 4. c. i. p: ax.

Brachialis. 4. m. i. t.

VOL. VI.

Hystriciflora, 4. m? i. t.

Strigilifolia, 4. c. i. t.

Pectinifolia, 4. c. i. t.

Crinifolia. 6. c. i. t.

Cernua. 4. c. i. t.

Doliiformis. 6. c. i. t.

Pistillaris 4. c. i. t.

Ciliaris: 3. m. i. ax.

Botuliformis, 4. c. i. t.

Multicaulis. 6. c. i. t.

Mutabilis. 3. c. i. lat.

Uncifolia. 4. c. i. p: ax.

Caduceifera. 3. c. i. p: ax.

Empetrifolia, 6. c. i. p: ax.

Malleolaris, 6. c. i. p: ax.

Pyxidiflora, 6. c. i. p: ax.

Nolæflora. 6. c. i. p: ax.

Festa, 4. c. i. p: ax.

Fallax, 6. c. i. p: ax.

Parilis, 6. c. i. p: ax.

Viscida. 6. c. i. p: ax.

T t

Catervæflora;

Catervæflorâ; 4. *c. i. t.*
 Pubigera, 4. *c. i. t.*
 Mitræformis, 4. *c. i. t.*
 Tardiflora, 4. *c. i. t.*
 Parviflora, 4. *c. i. t.*
 Exigua, 4. *c. i. t.*
 Pufilla. 4. *c. i. t.*

Tragulifera, 4. *c. i. t.*
 Guttæflora, 4. *c. i. t.*
 Curvirostris, 4. *c. i. t.*
 Obefa, 4. *c. i. t.*
 Gracilis, 4. *c. i. t.*
 Intervallaris, 4. *c. i. t.*
 Quadræflora, 4. *c. i. t.*
 Prolifera, 4. *c. i. t.*
 Cyathiformis, 4. *c. i. t.*
 Pelviformis. 4. *c. i. t.*

Turrigera, 4. *c. i. t.*
 Lacunæflora, 3-5. *c. i. t.*
 Florida. 4. *c. i. t.*

Turbiniflora, 4. *c. i. t.*
 Bullularis, 3-4. *c. i. t.*
 Mucosa, 4-6. *c. i. t.*
 Piluliformis, 4-5. *c. i. t.*
 Obliqua, 6. *c. i. lat.*
 Sequax, 4-6. *c. i. t.*
 Blenna. 4-5. *c. i. t.*

Verecunda. 4. *c. i. lat.*

Glabella. 4. *c. i. t.*

Embothriifolia, 3. *c. i. lat.*

Glutinosa, *alt. c. i. lat.*

Curvifolia: 3. *c. i. lat.*

Squarrofa, 6. *c. i. t.*

Gorteriæfolia, 4. *m. i. t.*

Ampullæformis, 4. *m. i. t.*

Capax, 4. *m. i. t.*

Lagenæformis, 3-4. *m. i. t.*

Jafminiflora: 3-4. *m. i. t.*

Pavettæflora, 4. *c. i. t.*

Fasciformis, 4. *m. i. t.*

Fiftulæflora, 4. *m. i. t.*

Fragrans, 4. *c. m. i. t.*

Galiiflora, 4. *c. i. t.*

Nidiflora, 4. *c. i. t.*

Denticularis, 4. *m. i. t.*

Pulchra, 4. *m. i. t.*

Daphniflora, 4. *m. i. t.*

Pellucida. 4. *m. i. t.*

Amabilis, 4. *c. i. ax.*

Venufta; 4. *c. i. ax.*

Imbellis, 2. *c. i. ax.*

Linifolia, 2. *c. i. ax.*

Borboniæfolia, 2. *c. i. ax.*

Corifolia,

Corifolia, 3. c. i. ax.

Pugionifolia, 3. c. i. p: ax.

Obvallaris, 3. c. i. ax.

Viminalis, 3. c. i. p: ax.

Hyssopifolia, 3. c. i. ax.

Taxifolia: 3. c. i. ax.

Figuræ Arabicæ numerum foliorum in singulis verticillis indicant:

Litera *c.* filamenta calcarata, *m.* mutica; *e.* antheras exfertas, *i.* inclusas; *ax.* inflorescentiam axillarem, *p: ax.* pseudo-axillarem, *t.* terminalem, *lat.* lateralem.

ERICA.

Charaeter Generis.

Corolla persistens. Antheræ 4—10, ante anthesin per foramina duo lateralia connexæ. Pericarpium membranaceum, 4—8-loculare: Valvæ 4—8, medio loculorum una cum septis ab axi dehiscentes. Semina 10—100 in singulis loculis, decidua.

Differt ab *Andromedâ*, corollâ non deciduâ, et structurâ antherarum: a *Menziesiâ*, præter easdem notas, necnon fructu; ad quam *Erica Daboecii* referenda.

Charaeteres Specierum.

E. caule pubescentulo: corolla $\frac{3}{4}$ -lineari, lævi; tubo cyathiformi: filamentis muticis: stigmatate peltato.

Scoparia.

E. fucata. *Thunb. Diff. n. 9.* E. scoparia. *Linn. Mant. p. 372.* E. scoparia. *Linn. Diff. n. 13. cum fig. floris.*

E. coris folio IIII. *Clus. Hist. Pl. lib. I. p. 42.*

Cum suâ *Arboreâ* in Horto Cliffortiano olim confudit Linnè, neque postea filamenta esse mutica unquam animadvertit.

T t 2 E. pedunculis

Spiculifolia.

E. pedunculis ebracteatis: calyce breviter 4-fido: corollâ 1-lineari, lævi; tubo cyathiformi, 4-angulo: filamentis muticis.

E. olympiaca. Sibth. MS.

Sponte nascentem in fummitate Montis *Olympus*, legit heu defunctus Sibthorpe.

Perfingularis est defectus bracteærum.

Virgularis,

E. foliorum laminis plus minus ovatis: corollâ $\frac{2}{3}$ —1-lineari, viscidâ; tubo sphærico: stigmatate peltato.

Variat α : *E. absinthoides. Linn. Mant. p. 66.*

β : *E. virgata β . Thunb. Diff. n. 18.*

γ : *E. virgata γ . Thunb. Diff. n. 18.*

δ : *E. hispidula. Linn. Suppl. p. 222.*

ϵ : *E. hispida. Thunb. Diff. n. 20.*

Ab hisce omnibus longe discrepat *E. virgata δ . Thunb.* quæ, ni fallor, *Salaxis* est.

Asperifolia,

E. foliorum laminis linearibus: corollâ 1½-lineari, viscidâ; tubo sphærico: filamentis sæpius calcareatis: pericarpio lanato.

E. setacea. Andr. Er. n. 62. cum Ic. bonâ.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Ferox.

E. calyce ferrato: corollâ 1½-lineari, lævi; tubo ventricoso, dein-iterum dilatato: pericarpio glabro.

E. totta. Thunb. Diff. n. 17.

Sponte nascentem in *Konde Bockveldt*, legit F. Masson. Bracteæ 3 juxta calycem.

Oxycoccifolia,

E. caule decumbente, filiformi: foliorum laminis ovatis:

ovatis: corollâ $1\frac{1}{2}$ -lineari, campanulatâ, hirsutâ: filamentis muticis.

Sponte nascentem in *Hottentots Holland*, solo humido, legit I. Mulder.

Pulchella species: utinam ad vivam accuratius describere mihi quandoque liceat: tum caulis, tum folia *Oxycoccum Palustrem* ad amuffim simulant.

E. caule diffuso: foliorum laminis ovatis: corollâ $1-1\frac{1}{2}$ -lineari: filamentis basi valde dilatatis: pericarpio hirsuto.

Thymifolia.

Variat α : Corolla 1-linearis, viscido-pubescens. Antheræ inclusæ.

E. planifolia. *Thunb. Diff. n. 60.* E. planifolia. *Berg. Pl. Cap. p. 10.* E. planifolia. *Linn. Sp. Pl. ed. 2. p. 508.*

β : Corolla $1\frac{1}{2}$ -linearis, minutissime viscido-pubescens. Antheræ exsertæ.

E. planifolia. *Willd. Sp. Pl. v. 2. p. 362.*

E. africana hirsuta, &c. *Plukn. Mant. p. 69. tab. 347. pl. 1.*

γ : Corolla $1\frac{1}{2}$ -linearis, lævis. Antheræ exsertæ.

E. thymifolia. *Wendl. Obs. p. 48.*

Margo foliorum in omnibus constanter recurvulus.

E. foliorum laminis fetulosis: bracteis 2, minutis: corollâ $1\frac{1}{2}$ -lineari, lævi: calcaribus subulatis, hirtis.

Axillaris.

E. strigosa. *Soland. in Ait. Hort. Kew. v. 2. p. 17.* E. arborea. *Thunb. Diff. n. 63.*

Sponte nascentem in *Taffelberg*, legit F. Masson.

Variat floribus albis purpureisque.

E. foliorum

Sicæfolia.

E. foliorum laminis mucronatis: corollâ $1\frac{2}{3}$ -lineari, extus hirsutâ; tubo cyathiformi: calcaribus lineari-attenuatis: pericarpio glabro.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder. Nulli mihi cognitæ affinis est.

Urceolaris,

E. foliorum laminis fetosis: corollâ 3-lineari, extus pubescente; tubo urceolari: calcaribus lineari-attenuatis.

E. dura. *Soland. MS.* *E. hirta.* *Thunb. Diff. n. 56.*

Flores pallide purpurei.

Fausta,

E. foliorum laminis fetosis: corollâ $2\frac{2}{3}$ -lineari, extus pubescente; tubo urceolari: calcaribus aurito-attenuatis, valde ferratis.

Sponte nascentem in *Hottentots Holland*, solo humido, legit I. Mulder.

Valde similis antecedenti: sed Foliorum laminæ basi latiores; Pubescentia alia; et Antheræ omnino diversæ, in hac lineares seu totæ æqualis latitudinis, in illâ versus apicem sensim angustatæ.

Pallida,

E. foliorum laminis linearibus: calyce lateribus reduplicato: corollâ 2-lineari, utrinque pubescente: calcaribus brevibus.

E. pubescens pilosa. *Thunb. Diff. n. 61.* *E. pubescens.* *Linn. Sp. Pl. ed. 2. p. 506.* auctoritate speciminis in ejus herbario a *Burman*.

Variat magnitudine et pubescentiâ foliorum; sed, ni fallor, constanter 3-na sunt.

E. foliorum

E. foliorum laminis anguste linearibus : calyce planiusculo : corollâ $1\frac{1}{2}$ -lineari, utrinque tomentosa : calcaribus longis, recurvis.

Tomentosa,

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Bractææ juxta basin pedunculi sitæ, cum quo et calyce corollæ concolores.

E. foliorum laminis lineari-lanceolatis : corollâ 2-lineari, extus pubescente ; tubo ovato : calcaribus minutis, auricularibus.

Auricularis,

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Herba sequentis : cæterum ab omnibus hujus cohortis, calcaribus minutis fere ut in *Galiiflorâ*, diversa.

E. foliorum laminis lineari-lanceolatis : corollâ 3-lineari, tubo pyramidali, extus pubescente : calcaribus glabris.

Lamellaris,

E. urceolaris. *Pl. Kew.* t. 16. *E. urceolaris*. *Berg. Pl. Cap.* p. 107. *E. pentaphylla*. *Linn. Sp. Pl. ed. 2.* p. 506. *E. caffra*. *Linn. Sp. Pl. ed. 1. et 2.* auctoritate speciminis *Cliffortiani*.

Nulla pars in hac specie *urceolaris* est : a foliis longis planiusculis, titulum saltem non falsum offero.

E. foliorum laminis late ovatis, planiusculis : corollâ $1\frac{2}{3}$ -lineari, utrinque pubescente ; tubo ovato : calcaribus pubescentibus.

Marifolia,

E. marifolia.

E. marifolia. *Andr. Er. n. 29. cum Ic.* *E. marifolia.*
Pl. Kew. t. 14. optima. *E. marifolia. Soland. in Ait.*
Hort. Kew. v. 2. p. 15.

Sponte nascentem juxta *Constantia* abunde, legit F. Maffon.

Helianthemifolia. *E. foliis 2-nis; laminis obovatis planiusculis: corollâ 2-lineari, utrinque pubescente: calcaribus longis.*

E. Promontorio Cap.

Communicavit primum cum viginti aliis speciebus *Georgius Hibbert*, ob raras difficillimasque stirpes quas introduxit, merito celebris.

Calathiflora. *E. calyce tomentoso: corollâ 1-lineari, lævi: calcaribus cuneatis, hirtis: pericarpio tomentoso: stigmatate longe exserto.*

E. bicolor. Thunb. Diff. n. 57.

Procera, *E. caule tomentoso: bracteis approximatis: calyce basi medioliformi: corollâ 1—2-lineari: stigmatate peltato.*

E. scoparia. Thunb. Diff. n. 80. E. arborea. Linn. Diff. n. 14. cum fig. floris. E. caffra. Linn. Diff. n. 22. cum fig. floris. auctoritate speciminum ad quæ ibi descripsit. *E. triflora. Berg. Pl. Cap. p. 118. E. arborea. Linn. Sp. Pl. ed. 2. p. 502. E. scoparia. Linn. Sp. Pl. ed. 1. p. 353, exclusis synonymis. E. coris folio 1. Clus. Hist. Pl. lib. 1. p. 41.*

Sponte nascentem juxta *Baia*, legit amicissimus *Smith*. Variat admodum in diversis regionibus, stigmatate etiam incluso.

E. caule

E. caule tomentoso: bracteis remotis: calyce basi *Polytrichifolia*.
 sensim angustato: corollâ $1\frac{1}{2}$ —2-lineari: calcaribus
 cuneatis.

Sponte nascentem prope *Lisboa*, legit Banks.

Prioris nonnullis varietatibus similis, sed hæc mihi
 videtur legitima species. Foliorum laminæ angus-
 tiores, magis attenuatæ. Flores in nostrâ stirpe
 cultâ plane inodori. Corolla oblonga: tubo pocu-
 liformi. Stigma fibulæ-forme, nec late peltatum.
 Pericarpium pyriforme.

E. caule divaricato: foliorum laminis linearibus: *Tenuis*.
 corollâ $\frac{3}{4}$ -lineari, campanulatâ, lævi: filamentis
 brevissimis: calcaribus lineari-attenuatis.

E. divaricata. *Hortulanis*.

E. caule glabro: foliorum laminis argute reduplicatis: *Humilis*.
 corollâ $2\frac{1}{3}$ -lineari: calcaribus longis, subulatis,
 hirtis.

E. depressa. *Thunb. Diff. n. 50. cum Ic.*

E. foliorum laminis linearibus: corollâ 3-lineari: *Peduncularis*.
 tubo globofo: antheris longissime foraminosis, la-
 natis.

E. rubens. *Thunb. Diff. n. 83.*

Sponte nascentem in *Koude Bockveldt*, montibus, legit
 F. Maffon.

Pedunculi pollicem longi sunt.

E. foliorum laminis lanceolatis: corollâ 4—5-lineari; *Amæna*.
 tubo urceolari; limbo brevissimo: antheris bre-
 viter foraminosis, glabris.

E. incarnata. *Thunb. Diff. n. 84.*

Toto cœlo diversa ab *E. incarnatâ* hortulanorum, et non nisi ex specimine *Thunbergiano* mihi cognita.

Glomiflora,

E. foliorum laminis anguste cuneatis: calyce bracteis imbricato: corollâ $2\frac{1}{2}$ -lineari, viscidâ; tubo sphærico: calcaribus villosissimis.

E. vesicaria. *Soland. MS.*

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

Formosa.

E. calyce incurvo-deflexo: corollâ $1\frac{1}{4}$ -lineari, viscidâ; tubo sphærico, 8-angulo: antheris basi valde arcuatis: stigmatè lato.

E. formosa. *Thunb. Diff. n. 82. cum Ic.*

Sponte nascentem in *Lange Kloof*, regionibus orientibus, legit F. Masson.

Cardusifolia.

E. foliorum laminis fetosis: pedunculis longis: corollâ $2\frac{1}{2}$ -lineari, lævi; tubo globoso: filamentis brevissimis.

Communicavit *Hibbert*.

Inflorescentia adhuc mihi dubia: forte in rudimentis ramulorum terminalis. Stigma angustum.

Tubercularis.

E. corollâ $1\frac{1}{2}$ -lineari, tuberculis asperâ; tubo globoso: filamentis muticis: pericarpio longe stipitato.

E. inclyta. *Soland. MS.*

Antheræ minutæ, totæ læves.

Campanularis.

E. caule glabro: foliorum laminis angustis: corollâ $2\frac{1}{2}$ -lineari,

$2\frac{1}{2}$ -lineari, campanulatâ, lævi: filamentis brevissimis, muticis:

E. tenuifolia. Hortulanis.

Sponte nascentem in *Hottentots Holland*, locis humidis, legit F. Maffon.

Flos *Convallariæ majalis Linn.* sed luteus.

E. calyce tetraphyllo: corollâ 4-lineari, lævi; tubo medioliformi; limbo basi integro: antheris papulosis.

Medioliflora.

E. Thunbergii. Linn. Suppl. p. 220.

Genus jam tanto nomini sacratum, nec cum specificis, hujusmodi titulos miscendos esse censeo.

E. floribus glomeratis; corollâ $1\frac{1}{2}$ -lineari; limbo tubo $\frac{1}{2}$ longiore, laciniis femiorbicularibus: stigmatibus lato.

Blanda,

E. cornuta. Roxb. MS.

In hac pulcherrimâ cohorte, Antheræ ipsæ ultra foramen in cristam plus minus producuntur.

E. calycis foliolis ferrulatis: corollâ $2\frac{1}{2}$ -lineari; limbo basi integro, emarginulato: filamentis calcaratis.

Hottoniæflora,

E. cubica. Andr. Er. n. 39. cum Ic. malâ. E. cubica. Linn. Mant. p. 233.

E. calycis foliolis minute ciliatis: corollâ $1\frac{1}{2}$ -lineari; limbo basi integro, obtuso: filamentis muticis.

Scripbiifolia,

E. cubica. Thunb. Diff. n. 46.

Sponte nascentem in *Hottentots Holland*, montibus, legit I. Mulder.

Nullam *cubicam* partem in his duabus speciebus unquam detegere potui: præter notas autem supra

memoratas, discrepant Proportione, situ Bractearum, et colore Antherarum. Flores in utraque axillares.

Lavandulæfolia, E. caule incano : bracteis juxta calycem : corollâ 2-lineari ; tubo 4-angulo ; limbo incurvo : filamentis inferne latissimis.

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

Humifusa, E. foliis 2-nis ; laminis ovalibus ; corollâ $1\frac{1}{3}$ -lineari, limbo amplo : stylo longe exserto.

E. humifusa. *Hibbert MS.*

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Herba tota glabra videtur.

Cristæflora, E. calyce tetraphyllo : corollâ 2-lineari ; limbo tubo triplo longiore, basi integro : pericarpio lævi.

E. melanthera. *Thunb. Diff. n. 12.*

Sponte nascentem prope *Constantia*, legit I. Mulder.

Lysimachiæflora, E. calyce quadrifido : corollâ 2-lineari ; limbo tubo duplo longiore, basi integro : pericarpio fericeo.

E. melanthera. *Linn. Mant. p. 232.*

Stigma in hac longe exsertum.

Passerinæfolia : E. bracteis minutis : calyce breviter quadrifido, dense tomentoso : corollâ $2\frac{1}{2}$ -lineari : pericarpio tomentoso.

E. passerinæ. *Linn. Suppl. p. 221.* E. Cap. Coridis fol.

fol. fl. rubello. *Pet. Gaz. t. 3. f. 7. Cat. Top.*
n. 469.

Folia in nostris exemplaribus terna.

E. calyce dense sericeo, bracteis imbricato, quadrifido: corollâ 2-lineari, calyce parum longiore: nectario cotyliformi, rare hirto. *Byssina,*

E. capitata. *Andr. Er. n. 38. cum Ic.* *E. capitata.*
Linn. Mant. p. 373. *E. capitata.* *Linn. Diff. n. 36.*
cum fig. floris. *E. capitata.* *Berg. Pl. Cap. p. 94.*

E. africana calyce lanuginoso &c. *Seb. Thef. v. I.*
p. 30. t. 20. f. 1.

Flores pallide lutei: antheris sæpius inclusis.

E. calyce dense sericeo, bracteis remoto, quadrifido: *Velleriflora.*
corollâ $1\frac{3}{4}$ -lineari, calyce parum longiore: nectario
cotyliformi, glabro.

E. bruniades. *Andr. Er. n. 61. cum Ic.* *E. capitata.*
Thunb. Diff. n. 15. auctoritate ejus speciminis. *Erioc-*
cephalos Bruniades æthiopica, Corios, &c. Plukn.
Mant. p. 69. t. 347. f. 9. auctoritate ejus speci-
minis.

Sponte nascentem in *Drakenstein*, locis humidis, legit
F. Masson.

Flores pallide purpurei.

E. calyce dense sericeo, bracteis remoto, tetraphyllo: *Carbasina.*
corollâ $1\frac{3}{4}$ -lineari, calyce multo longiore: nectario
astragaliformi, sericeo.

E. bruniades. *Linn. Mant. p. 378.* *E. bruniades.*
Linn. Diff. n. 52. cum fig. floris.

Flores albidî, pallide rosei, vel etiam lutei: dignoscas

autem

autem a *Byssinâ*, bracteis calyce remotis; a *Velleriflorâ*, foliis latioribus et magis tomentosis.

- Scariofa*, E. bracteis suborbiculatis: corollâ $1\frac{1}{2}$ -lineari; limbo longitudine tubi; laciniis femilanceolatis: stigmatibus angustis.
- E. scariofa. *Berg. Pl. Cap. p. 102.* E. spumosa. *Berg. Pl. Cap. p. 103.* auctoritate speciminum, quæ amicissimo *Swartz* debeo. E. spumosa. *Linn. Sp. Pl. ed. 2. p. 508.* Nullam differentiam extricare potui in speciminibus *Bergianis*: hoc modo ante plenam explicationem florum, illud diu post, decerptum fuisse videtur. Filamenta rite calcata sunt. Antheræ in herbariis cito caduæ.
- Sexfaria*, E. foliis glabris; corollâ $1\frac{1}{3}$ -lineari, calyce obtectâ: calcaribus longis, marginalibus: pericarpio lævi.
- E. sexfaria. *Pl. Kew. f. 11.* E. spumosa. *Thunb. Diff. n. 14.*
- Antheræ hujus quoque post exsiccationem mox cadunt, proculdubio exsertæ.
- Corydalis*, E. foliorum laminis lanceolato-cuneatis: corollâ 2-lineari, limbo basi integro: antheris dorso alatis.
- Communicavit *Hibbert*.
- Nomen ab antheris galeam aliquatenus referentibus.
- Azaleæfolia*, E. foliorum laminis lanceolatis: corollâ $1\frac{1}{2}$ -lineari, hirtâ: antheris exsertis, pene totis foraminosis.
- E. spumosa. *Roxb. MS.*
- Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
- Petiolaris*, E. petiolis longis, cuneatis, fimbriatis: corollâ $2\frac{1}{2}$ -lineari, apice pubescentulâ: pericarpio rare hirtis.
- E. petiolata.

E. petiolata. *Thunb. Diff. n. 7. cum Ic. bonâ.*

Facies Rosmarini Officinalis, *Linn.*

E. foliis vesiculis nigris asperfis: corollâ 1-lineari, Vescularis,
viscido-pubescente: calcaribus parallelis, cuneatis:
pericarpio sericeo.

E. conacea. Hortulanis.

Sponte nascentem prope *Stellenbosch* inter montes,
legit I. Mulder.

Frutex 3-pedalis; ramis erectis, valde fastigiatis.

E. foliis viscidis: corollâ 2- $\frac{2}{3}$ -lineari, limbo recurvo: Verniciflua,
calcaribus aurito-cuneatis, hirtis: pericarpio lævi.

E. glutinosa. Roxb. MS.

Foliorum laminæ obtuse acuminulatæ, reduplicaturâ
dense glandulosæ, unde nitent glutine effuso.

E. foliorum laminis ovalibus, pubescentibus: corollâ Lachneæfolia,
2-lineari, limbo recurvo: calcaribus longis, an-
guste cuneatis.

E. lachnæa. Hortulanis.

Spontenascentem in *Hottentots Holland*, legit F. Masson.

Differt ab antecedente foliorum laminis penitus ob-
tusis, nec viscidis: calcaribus lævibus.

E. foliis lucidis: calycis lateribus inferne recurvis: co- Volutæflora,
rollâ 1 $\frac{2}{3}$ -lineari; limbo revoluto: filamentis sæpe
muticis: pericarpio tomentoso.

E. nigrita. Thunb. Diff. n. 53. E. nigrita. Linn. Diff.
n. 11. cum fig. floris, pessimâ. E. nigrita. Linn.

Mant. p. 65. E. larinica. Berg. Pl. Cap. p. 94.

E. africana, &c. Seb. Thes. v. 2. p. 11. t. 9. f. 7.

Calcaria brevia, parallela, cuneata, interdum omnino deficient.

Lyrigera,

E. foliis lucidis: corollâ $1\frac{2}{3}$ -lineari; limbo recurvo: calcaribus ferratis: antheris lyræformibus, hirtis: pericarpio tomentoso.

E. nigrita. *Roxb. MS.*

Hujusce speciei diagnosi pulcherrima, antheris ante anthesin tot lyras referentibus.

Salax,

E. foliis lucidis; calyce adpresso: corollâ $1\frac{2}{3}$ lineari: filamentis brevissimis: pericarpio lævi: stigmatate lato.

E. ramosissima. *Roxb. MS.*

Sponte nascentem in *Hottentots Holland*, montibus, legit F. Masson.

Facies *Voluæfloræ*, sed præter differentias supra datas, corollæ lacinia in hac, ni fallor, basi distinctæ.

Gnidiaefolia,

E. foliorum laminis lineari-lanceolatis, pubescentulis: calyce late obtusato: corollâ 2-lineari: calcaribus auricularibus.

E. vespertina. *Linn. Suppl. p. 221.* *E. calycina*. *Thunb.*

Diff. n. 78. *E. calycina*. *Linn. Sp. Pl. ed. 2. p. 507.*

Cumuliflora,

E. fasciculis 7—12-floris: calyce incano: corollâ $2\frac{1}{2}$ -lineari; limbo inferne ciliato: pericarpio hirtio: stigmatate angusto.

E. aggregata. *Roxb. MS.*

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

E. fasciculis

E. fasciculis 3-floris : calyce viscido : corollâ 2-lineari ; *Genistæfolia*,
limbo inferne ciliato : pericarpio lævi : stigmatè lato.

E. tetraloba. *Roxb. MS.*

Species ab antecedente penitus distincta ; huic femina
lævia, minute alveolata ; illi lucida, æquata.

E. foliorum laminis lanceolato-cuneatis : pedunculis *Periplocæflora*,
longis : calyce brevi, orbiculari : corollâ $1\frac{1}{2}$ —2-li-
neari : stigmatè angusto.

Communicavit *Hibbert*.

Flores in siccis saturate purpurei. Filamenta sæpius
calcaribus brevibus cuneatis armata, interdum vero
prorsus mutica.

E. calyce minute ciliato, lucido : corollâ 1-lineari : *Lucida*,
calcaribus auricularibus, inciso-ferratis : stigmatè an-
gusto, incluso.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

E. bracteis calyceque integerrimis : corollâ 1-lineari : *Munda*,
calcaribus auricularibus, ciliatis : pericarpio hirsuto.

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

Specimen nostrum imperfectum est, ante explicationem
florum lectum.

E. calyce patente, margine exquisite glanduloso : co- *Gnaphaliiflora*,
rollâ 1-lineari, calyce vix longiore : pericarpio lævi :
stigmatè grandi 4-fido.

E. gnaphalodes. *Thunb. Diff. n. 75.* *E. gnaphalodes*.
Linn. Diff. n. 25. cum fig. floris, pessimâ. *E. gnapha-*
lodes. Berg. Pl. Cap. p. 119.

- Fabrilis*; E. foliis dense imbricatis: corollâ 1-lineari, calyce vix longiore: calcaribus integerrimis: antheris minutis, pene didymis.
Sponte nascentem in *Hottentots Holland*, legit F. Maffon.
Herba recta, quasi Fabri manu artificiose imposita.
- Diantibifolia*; E. foliis 2-nis, longis: calyce ovato-cuneato: corollâ 3-lineari: calcaribus ferratis: pericarpio glabro.
Communicavit *Hibbert*.
Flores pallidissime purpurei.
- Brevifolia*, E. foliorum laminis ovatis: corollâ $1\frac{2}{3}$ -lineari, calyce $\frac{1}{2}$ longiore: calcaribus lineari-attenuatis: feminibus striatis.
E. *brevifolia*. *Soland. MS.*
Sponte nascentem in *Hottentots Holland*, legit F. Maffon.
- Chlamydistiflora*, E. foliorum laminis linearibus, hirsutis; corollâ 2-lineari, calyce vix longiore: calcaribus auricularibus: feminibus æquatis.
E. *viscaria*. *Roxb. MS.*
Sponte nascentem in *Hottentots Holland*, legit F. Maffon.
Calycis foliola fere distincta, erecto-recurva. ^{2f}
- Selaginifolia*. E. caule tomentoso: corollâ $1\frac{2}{3}$ -lineari, lævi: tubo globofo: calcaribus latissimis, orbicularibus.
Sponte nascentem in *Lange Kloof*, legit G. Paterfon:
Omnium specierum, quas detexerunt *Roxburgh*, *Paterfon*, *Maffon*, largo suo more copiam mihi fecit, summum nostræ ætatis decus, *Banks*.

E. foliorum

- E. foliorum laminis parum reduplicatis: corollâ 2-lineari, lanatâ: filamentis latis, breviter calcaratis: stylo exserto.* *Pannosa.*
- Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Affinitatem nescio: confer cum *Byssinâ*, sed folia videntur 4-na et antheræ diversissimæ.
- E. bracteis calyceque pilosissimis: corollâ 2-lineari, hirtâ, 4—5-andrâ: filamentis apice latissimis, muticis.* *Hirsuta,*
- E. hirsuta. Thunb. Prodr. p. 72.*
- E. foliis 4-nis, minutis: calyce pilosissimo: corollâ 1½-lineari, hirtâ, 4—5-andrâ: filamentis calcaratis.* *Plumosa,*
- E. plumosa. Thunb. Prodr. p. 73. Blæria ciliaris. Linn. Suppl. p. 122.*
- Nomen pessimum est, verum ex frustulo nostro aliud aptum excogitare nequeo.
- E. foliis 3-nis, minutis: calyce pilosissimo, bracteis distincto: corollâ 1½-lineari, hirtâ, 4-andrâ: filamentis muticis.* *Ciliciflora,*
- Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Antheræ pene didymæ, valde barbatae.
- E. foliis 3-nis: laminis valde incurvis: calyce lanato, imbricato: corollâ 1¾-lineari, lanatâ, 4-andrâ.* *Xeranthemifolia,*
- Sponte nascentem in *Hottentots Holland*, solo arido, legit F. Maffon.
- Facies diversissimi generis.

- Nodiflora*, E. foliis 3-nis: calyce infundibuliformi, villóssimo: corollâ $1\frac{1}{2}$ -lineari, hirtâ, 4-andrâ: antheris breviter foraminosis.
Communicavit *Hibbert*.
Folia villosa, nec lanata.
- Flosculosa*, E. calyce fimbriato: corollâ $\frac{3}{4}$ -lineari; tubo angustissimo, superne repente dilatato; 4-andrâ: filamentis angustissimis.
Sponte nascentem in *Hottentots Holland*, legit F. Masson.
Corolla refert flosculum disci in Ordine Naturali Compositarum.
- Exilis*, E. foliis 4-nis: calyce infundibuliformi, glabro: corollâ $\frac{3}{4}$ -lineari, glabrâ, 4-andrâ: filamentis muticis.
E. scabra. *Thunb. Prodr. p. 72*.
Inflorescentiam non rite intelligo, specimen enim unicum dilacerare nolui: videtur axillaris bracteis duabus in pedunculo brevissimo.
- Labialis*, E. foliis 3-nis; laminis glabris: calyce 2-labiato, fimbriato: corollâ $1\frac{1}{3}$ -lineari, 2-labiâtâ, 4—5-andrâ.
Blæria labiata. *Soland. MS.*
Sponte nascentem in *Hottentots Holland*, legit F. Masson.
- Embelifera*, E. bracteis solitariis: calyce infundibuliformi, quadrangulo: corollâ 2-lineari, 4-andrâ: calcaribus recte deflexis.
E. glabella. *Thunb. [Prodr. p. 73. Blæria pusilla. Linn. Mant. p. 39. auctoritate ejus speciminis. Blæria purpurea. Berg. Pl. Cap. p. 34.*

Folia,

Folia, in numerosissimis quæ vidi, tam cultis, quam indigenis exemplaribus, sunt hirsuta. Inflorescentia, ut in aliis hujusce cohortis est spica fasciculum mentiens, pedunculis brevissimis verticillatis, bractea loco folii singulis subjecta.

E. foliorum laminis fimbriatis, subtus glabris: corollâ 1½-lineari, 4—5-andrâ: calcaribus recte exstantibus. *Dumosa,*

E. Blæria. Thunb. Prodr. p. 72. Blæria ericoides. Linn. Sp. Pl. ed. 2. p. 162.

E. calyce bracteis imbricato, profunde 4-fido, barbato: corollâ 2-lineari, glabrâ, 4—5-andrâ: filamentis muticis: stylo angustissimo. *Barbigera,*

Sponte nascentem in *Hottentots Holland*, legit F. Maffon.

E. bracteis solitariis: calyce infundibuliformi, toto hirsuto: corollâ 1½-lineari, 4—5-andrâ: filamentis muticis. *Palacea,*

E. articulata. Thunb. Prodr. p. 71. Blæria articulata. Linn. Mant. p. 198.

Sponte nascentem in *Hottentots Holland*, legit F. Maffon.

Herba valde ludit; foliorum verticillis nunc distinctis quasi caulis articulatus esset, nunc approximatis; laminis nunc brevibus, nunc longis et linearibus.

E. foliis longis: bracteis juxta calycem, exteriore longissima: corollâ 1½-lineari, 6-andrâ: filamentis calcaratis. *Bruniæfolia,*

E. hemisphærica. Soland. MS.

Sponte nascentem in *Hottentots Holland*, legit F. Maffon.

E. pedunculis

Turmalis,

E. pedunculis brevissimis: calyce minuto, adpresso: corollâ 2-lineari, 4—5-andrâ: filamentis muticis: antheris latis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder. Facies antecedentis, sed penitus distincta, calyce triplo minore.

Equisetifolia,

E. foliis 3-nis: fasciculis 3—5-floris: pedunculis longis, glabris: corollâ 1½-lineari, 4—5-andra: filamentis muticis.

E. articularis. Hortulanis.

Herba ut in *Imbelli*, sed etiam gracilior.

Sertiflora,

E. calyce anguste cuneato: corollâ 1⅓-lineari; tubo urceolari: antheris totis exsertis: pericarpio lævi.

E. nudiflora. Smith Pl. Ic. ined. n. 57! E. nudiflora. Linn. Mant. p. 229.

Sponte nascentem in *Taffelberg*, legit G. Paterfon.

Bractææ, minutæ quidem, pro certo adsunt in exemplare Linnæano!

Diotæflora.

E. calyce late cuneato: corollâ 1½-lineari; tubo amphoræformi: antheris parum exsertis: pericarpio pubescente.

E. pistillaris. Soland. MS.

Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Flores in rudimentis ramulorum axillaribus.

Flexilis.

E. pedunculis viscidis, axillaribus: corollâ 1½-lineari; tubo ovato: filamentis muticis: pericarpio lanato.

E. racémosa.

E. racemosa. *Thunb. Diff. n. 47. cum Ic.*

Inflorescentia in axillis simplex, nec racemosa.

E. foliorum laminis argute reduplicatis : corollâ 2½-lineari ; tubo pyramidali : antheris a medio foraminosis. *Saxatilis,*

E. carnea. Curt. Bot. Mag. n. 11. cum Ic. mediocri. E. carnea. Jacq. Fl. Austr. v. 1. p. 21. f. 31. E. carnea. Scop. Fl. Carn. ed. 2. v. 1. p. 275. E. purpurascens. Linn. Diff. n. 55. E. herbacea. Linn. Diff. n. 57. cum fig. floris. E. foliis, &c. Hall. Hist. Helv. n. 1013. E. herbacea. Linn. Sp. Pl. ed. 2. p. 501. E. carnea. Linn. Sp. Pl. ed. 2. p. 504. E. purpurascens. Linn. Sp. Pl. ed. 2. p. 503. exclusis omnibus synonymis præter sequens. E. procumbens foliis in summitate, &c. Seg. Ver. v. 2. p. 280. auctoritate speciminis a Fabroni, cui folia 5-na. E. procumbens, ternis foliis, carnea. C. Baub. Pin. p. 486. E. procumbens herbacea. C. Baub. Pin. p. 486. E. coris folio vii. viii. ix. Clus. Hist. Pl. lib. 1. p. 46.

Foliorum numerus certe ludit, adeo ut non amplius dubitaverim omnia supra citare synonyma.

E. foliorum laminis anguste cuneatis ; floribus secundis ; corollâ 1½—2-lineari ; tubo urceolari : antheris ab infra medium foraminosis. *Lugubris,*

E. mediterranea. Curt. Bot. Mag. n. 471. cum Ic. E. mediterranea. Linn. Mant. p. 229. E. mediterranea. Linn. Diff. n. 59. cum fig. floris. E. major florib. &c. C. Baub. Pin. p. 485. E. coris folio 111. Clus. Hist. Pl. lib. 1. p. 42.

A saturo colore foliorum jamdudum distinxit *Clusius*.

E. foliorum

- Multiflora*, E. foliorum laminis linearibus : corollâ $1\frac{1}{2}$ —2-lineari ; tubo urceolari : antheris juxta apicem foraminosis.
 E. multiflora. *Linn. Diff. n. 58. cum fig. floris.* E. multiflora. *Linn. Sp. Pl. ed. 1. p. 355.* E. juniperifolia, &c. *Garid. Pl. Aix. p. 16c. t. 32.* E. foliis corios multiflora. *I. Baub. Hist. Pl. lib. 10. p. 356.* E. coris folio altera. 2. quæ Narb. &c. *Clus. Hist. Pl. lib. 1. p. 42.* E. juniperifol. &c. *Lob. Obs. p. 620.*
 Flores quoquoersis, pedunculis longiusculis.
- Manipuliflora*, E. caule incano : floribus in axillis interruptis : corollâ $1\frac{1}{2}$ -lineari ; tubo cyathiformi : antheris in tertum erectis.
 E. verticillata. *Forsk. Fl. p. 210.*
 Juxta *Bujuchtar* a se lectam misit amicissimus Sibthorpe.
- Vaga*. E. caule glabro : floribus in axillis contiguis : corollâ $1\frac{1}{3}$ -lineari ; tubo cyathiformi : antheris in tertum erectis.
 E. vagans. *Smith in Engl. Bot. n. 3. cum Ic.* E. multiflora. *Bulliard Fl. Par. t. 203.* E. didyma. *Stokes in With. Arr. ed. 2. p. 400.* E. purpurascens. *Lamarck in Encycl. Bot. v. 1. p. 488.* E. vagans. *Linn. Mant. p. 230.* E. vagans. *Linn. Diff. n. 56. cum fig. floris.*
 E. foliis corios multiflora. *Ray Syn. ed. 3. p. 471.*
 E. procumbens dilute purpurea. *C. Baub. Pin. p. 486.*
 Antheræ non revera didymæ.
- Lentiformis*. E. bracteis calyci adpressis : corollâ $1\frac{1}{2}$ -lineari ; tubo lentiformi, basi 8-angulo : antheris juxta apicem foraminosis.
 E. umbellata.

E. umbellata. *Pl. Kew.* t. 5. *E. umbellata*. *Linn. Sp. Pl. ed. 2.* p. 501. *E. umbellata*. *Loest. Res.* p. 138.

E. coris folio v. *Clus. Hist. Pl. lib. 1.* p. 43.

Flores ramis ultra folia productis terminales, nec umbellati.

E. foliis 3—4-nis: corollâ 2-lineari, viscidâ; tubo ovato: antheris latis, exsertis, hirtis: pericarpio turbinato, hirtis. *Pudibunda*.

E. nutans. *Wendl. Er. fasc. 3.* p. 5. *cum Ic.*

Hanc unice omnium quas proposui *Ericarum*, non vidi: icones autem a *Wendland*, si rudes, fidelissimæ.

E. bracteis juxta calycem: corollâ 1-lineari, glabrâ; limbo recurvo: antheris longe foraminosis: stigmatibus angustis. *Filiformis*;

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Caulis tenuis, diffusus. Folia 3-na, verticillis remotis:

Laminæ angustæ, recurvæ, viscido-pubescentes. Flores terminales. Filamenta ad apicem lata. Pericarpium læve.

E. pedunculis brevissimis: corollâ $1\frac{1}{2}$ -lineari, hirtâ; tubo modiali: calcaribus cuneatis: antheris brevissimis. *Turgida*.

E. fusco-rubens. *Roxb. MS.*

E. calyce bracteis remoto, cuneato, longitudine mire vario: corollâ 4—7-lineari, lævi; tubo ovato-pyramidali. *Fusiformis*;

Variat α : Calyx $1\frac{1}{3}$ -linearis. Corolla punicea, 6—7-linearis.

E. Pluknetii. *Linn. Sp. Pl. ed. 1. p. 356.*

β : Calyx $2\frac{1}{2}$ —3-linearis. Corolla punicea, 6—7-linearis.

E. Pluknetiana. *Pl. Kew. t. 9. optima.*

E. Pluknetii. *Linn. Sp. Pl. ed. 2. p. 506.*
exclusis synonymis.

γ : Calyx 1-linearis. Corolla albida, 3— $3\frac{1}{2}$ -linearis.

E. Petiverii β . *Thunb. Diff. n. 21.*

δ : Calyx $2\frac{1}{2}$ -linearis. Corolla albida 3— $3\frac{1}{2}$ -linearis.

In nostro horto, cæteris elatior.

ϵ : Calyx 5-linearis. Corolla albida, 5-linearis.

Postrema varietas maxime insignis est.

Fragilis; E. foliorum laminis acute mucronatis: corollâ 7—9-linearis; limbo recurvo-horizontali: pericarpio barbato.

E. Bankia. *Andr. Er. n. 26. cum Ic.*

Sponte nascentem in *Hottentots Holland*, locis rupestribus, legit F. Maffon.

Vestiflua, E. foliorum laminis incurvo-patentibus, junioribus pilosis: floribus solitariis: corollâ 7—9-lineari; tubo cylindræo.

E. Petiveriana. *Roxb. MS.*

Corolla rufa.

Baculiflora, E. foliorum laminis recurvo-patentibus: floribus solitariis:

litariis: corollâ 6—8-lineari; tubo cylindraceo: pericarpio ovato.

Variat α : Corolla lutea.

E. Petiveri. *Linn. Mant. p. 235.* E. Petiveri.
Linn. Diff. n. 50. cum fig. floris.

β : Corolla fordide rufa.

E. Petiverii α . *Thunb. Diff. n. 21.*

Limbus Corollæ obtusus, et instar affinium crenulatus in ipso specimine Linnæano.

E. foliorum laminis recurvo-patentibus; corollâ 7—9-lineari; tubo cylindraceo basi ventricosâ: pericarpio ovali. *Cotburnalis,*

Variat α : Bractææ et Calyx glabriusculæ.

E. Sebana. *Pl. Kew. t. 10. optima.* E. coccinea. *Linn. Sp. Pl. ed. 2. p. 505.* E. africana, &c. *Seb. Thes. v. 1. p. 32. t. 21. f. 4.*

β : Bractææ et Calyx pubescentes.

E. Pluknetii. *Berg. Pl. Cap. p. 92.*

Corolla in utraque læte rufa, et demum 4-angula.

E. foliorum laminis recurvo-patentibus: corollâ 4—6-lineari; tubo ovato-pyramidali: pericarpio ovato. *Socciflora.*

Variat α : Corolla lutea.

E. Sebana viridis. *Andr. Er. n. 59. cum Ic. bonâ.*

β : Corolla fordide rufa.

E. Sebana fordida. *Hortulanis.*

γ : Corolla læte punicea.

E. Petiveri. Hortulanis.

Limites, quibus stirpes sub hoc et tribus præcedentibus titulis traditas distinguerem, vix inveni: omnes forsitan rectius conjungendæ.

Furfurosa,

E. foliorum laminis incurvo-patentibus: corollâ 4—6-lineari, viscidâ: filamentis latis: nectario cotyliformi.
E. monodelphia! Andr. Er. n. 22. cum Ic.
 Filamenta forte latissima hujus generis.

Follicularis,

E. foliorum laminis patentibus: floribus solitariis: corollâ 5—7-lineari, basi inflatâ; nectario plinthiformi.
 Variat α : Corollæ limbus mox ferrugineus.
E. Petiveriana. Andr. Er. n. 25. cum Ic. bonâ.
 β : Corollæ Limbus mox atrobadius.
E. melastoma. Andr. Er. n. 43. cum Ic.
 Folia penultima ultimaque basi nonnihil dilatata.

Penicilliflora. E. corollâ 2-lineari, calyce obductâ; tubo sphærico: antheris in penicillum acutum convergentibus.
E. Petiveri vera! Hortulanis.
 Sponte nascentem in *Hottentots Holland*, legit L. Mulder.
 Pulchra species, bracteis calyceque niveis.

Placentæflora,

E. foliis obtusissimis: corollâ calyce obductâ: tubo rapæformi: filamentis sensim dilatatis: stigmate angusto.
 Sponte nascentem in *Hottentots Holland*, legit F. Masson.
 Herba pallidissime incana.

E. calyce

E. calyce bracteis imbricato: corollâ 1-lineari, longitudine calycis: antheris angustis, longis: pericarpio late gigartoido. *Pyramidalis*,

E. imbricata. *Linn. Mant. p. 372.* *E.* imbricata. *Linn. Diff. n. 53. cum fig. floris.* *E.* quinquangularis. *Berg. Pl. Cap. p. 117.* *E.* imbricata. *Linn. Sp. Pl. ed. 2. p. 503.*

E. bracteis supra medium pedunculi sparsulis: corollâ $\frac{2}{3}$ -lineari, calyce brevior: antheris acuminulatis: pericarpio late ovato. *Squamæflora*,

E. imbricata. *Roxb. MS.*

Sponte nascentem prope *Baay Fals*, legit I. Mulder.

E. calyce bracteis imbricato: corollâ $\frac{2}{3}$ -lineari, calyce brevior: antheris obtusis, septo lato: pericarpio ovato. *Cæsia*,

Communicavit *Thunberg*.

Stigma latiusculum, quod in antecedente angustum.

E. bracteis supra medium pedunculi sparsulis: corollâ 1-lineari, calyce longior: antheris obtusis septo angusto: nectario grandi. *Flexuosa*,

E. flexuosa. *Andr. Er. n. 33. cum Ic.*

Sponte nascentem juxta *Duyvelsberg* abunde, legit I. Mulder.

Pericarpium in hac turbinatum.

E. calyce bracteis imbricato: corollâ $\frac{2}{3}$ -lineari, calyce *Lasciva*,

parum

parum brevior : antheris a basi foraminosis : stigmatibus peltatis.

E. imbricata. *Thunb. Diff. n. II.* auctoritate ejus specimenis.

Facile dignoscas, Antheris longe foraminosis.

Stylofa;

E. pedunculis longis : bracteis juxta calycem sparsulis : corollâ 1-lineari, calyce parum longiore : antheris acuminulatis : pericarpio ovali.

E. bracteata. *Roxb. MS.*

Stylus longissimus.

Spirææflora ; *E. pedunculis glabris* : corollâ 1—1½-lineari ; limbo longitudine tubi, integerrimo : antheris juxta apicem foraminosis.

E. leucanthera. *Linn. Suppl. p. 223.*

Variat caule vix pubescente, et magnitudine florum.

Milleflora.

E. caule tomentoso : corollâ $\frac{2}{3}$ -lineari ; laciniis basi imbricatis : calcaribus linearibus, lævibus : stigmatibus exserto.

E. milleflora. *Berg. Pl. Cap. p. 96.* *E. paniculata*. *Linn. Sp. Pl. ed. 2. p. 508.*

Si quæ alia, legitima species : flores non paniculati, sed fasciculis trifloris terminalibus : a *Cyathiformi* stylo longe exserto dignoscenda.

Diosmæfolia. *E. foliis lucidis* : corollâ 2-lineari ; laciniis imbricatis : filamentis angustissimis : calcaribus exquisite attenuatis, ferrulatis.

E. subserrata. *Roxb. MS.*

Sponte

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Folia latiora quam in plurimis.

E. caule angulato: foliorum laminis lanceolato-cuneatis: corollâ $1\frac{1}{2}$ -lineari, calyce parum longiore: calcaribus auricularibus, glabris. *Palliflora*;

E. candida. *Soland. MS.*

Sponte nascentem in *Hottentots Holland*, legit F. Maffon.

E. foliorum laminis cuneatis: calyce obcuneato; corollâ $1\frac{3}{4}$ -lineari; tubo parum 4-angulo, turbinato: calcaribus anguste cuneatis. *Fugax*,

E. triflora aristata. *Wendl. Obs. p. 47.* E. triflora. *Thunb. Diff. n. 79. cum Ic.* E. triflora. *Linn. Mant. p. 374.*

E. triflora. *Linn. Diff. n. 23. cum fig. floris.*

Hujus speciei florentia citissime peragitur: non est triflora. *Linn. Sp. Pl.* quare nomen mutavi.

E. foliorum laminis cuneatis: calyce ovato-cuneato: corollâ 2-lineari; tubo valde 4-angulo, sphærico: calcaribus late auricularibus. *Pyrolæflora*,

E. triflora. *Willd. Sp. Pl. v. 2. p. 356.* exclusis synonymis.

Sponte nascentem infra *Duyvelsberg*, legit I. Mulder.

Perfimilis antecedenti, sed accuratius inspecta valde differt; tubo corollæ apice intus sub sinibus limbi, in tot carinas canaliculatas, extremitate pilis aliquot minutis barbata, prominente.

E. foliorum laminis ovalibus, pubescentibus: corollâ $1\frac{1}{2}$ -lineari; *Tegulaefolia*,

$1\frac{1}{2}$ -lineari; tubo parum 4-angulo, turbinato: calcaribus grandibus, orbicularibus. Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Folia lata, et ordine recto imbricata.

Baccaformis. E. caule angulato: foliis sæpius 4-nis: corollâ $2\frac{1}{3}$ -lineari; tubo valde 4-angulo, turbinato: calcaribus auricularibus.

E. baccans. *Curt. Bot. Mag. n. 358*. E. baccans. *Linn. Mant. p. 233*. E. africana glabra fruticosa arbuti flore. *Seb. Thes. v. 1. p. 32. t. 21. f. 3*.

Folia interdum terna: quamobrem Corifoliam *Linn. Sp. Pl. ed. 1 et 2*. ad hanc quoque pertinere suspicor.

Modesta: E. foliis parvis, dense imbricatis: corollâ $3\frac{1}{2}$ -lineari, tomentosâ; tubo late ovato; limbo recurvo: calcaribus lineari-attenuatis.

Communicavit *Hibbert*.

Flores pallidissime carnei.

Holofericea: E. foliorum laminis argute reduplicatis: corollâ 3-lineari, holofericeâ: tubo ovato: antheris hirtis.

Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Species pulcherrima, ab omnibus huc usque cognitis corollâ suâ holofericea facile dignoscenda. Primo intuitu *Taxifoliæ* affinem esse putavi, longe autem differt, cum inflorescentiâ, tum numero bractearum.

Glauca: E. foliis glaucis, succulentulis: corollâ 3-lineari, extus rorida: calcaribus suborbicularibus.

E. glauca. *Andr. Er. n. 47. cum Ic.*

Sponte nascentem in *Hottentots Holland*, legit F. Maffon.
Caulis 3-pedalis, teres. Folia 3-na, pene Sedi Reflexi
Linn. laminis tamen subtus pubescentibus. Flores
terminales. Pedunculi longi, una cum bracteis, calyce et corollâ omnes livido-purpurei. Stigma inclusum.

E. foliorum laminis lineari-attenuatis ovatisque: calyce recurvo-patente: corollâ 7—9-lineari: pericarpio globofo, 4-angulo. *Variifolia.*

E. Monfonix. *Pl. Kew. t. 7.* *E. Monfoniana.* *Thunb. Diff. n. 52. cum Ic.* *E. Monsonia.* *Linn. Suppl. p. 223.*

E. calyce adpresso: corollâ 7—8-lineari; limbo pyramidali, convoluto apice recurvulo: pericarpio hemisphærico. *Rupestris.*

E. halicacaba. *Pl. Kew. t. 2.* *E. halicacaba.* *Thunb. Diff. n. 51. auctoritate ejus speciminis.* *E. halicacaba.* *Linn. Diff. n. 3. cum fig. floris.* *E. halicacaba.* *Linn. Sp. Pl. ed. 2. p. 507.* *E. halicacaba.* *Linn. Amæn. Acad. v. 5. p. 85.*

Sponte nascentem in *Taffelberg, Steenberg*, locis rupestribus, legit F. Maffon.

E. calyce incurvo erecto: corollâ 8—10-lineari; tubo plus minus costato: filamentis muticis, basi dilatatis. *Variat α: Folia viridia. Corolla coccinea: tubo parum costato. Antheræ basi recte emarginatæ.* *Verficolor,*

E. verficolor. *Andr. Er. n. 12. cum Ic.*

β: Folia viridia. Corolla faturate coccinea: tubo parum costato. Antheræ basi sursum obliquæ.

Communicavit G. Aiton, princeps hortulanorum.

γ: Folia cæsia. Corolla faturate coccinea: tubo parum costato. Antheræ basi sursum obliquæ.

E. discolor coccinea. *Hortulanis*.

δ: Folia cæsia. Corolla rosea: tubo valde costato. Antheræ basi deorsum obliquæ.

E. costata. *Andr. Er. n. 46. cum Ic.*

Multas alias varietates nunc describere superfedeo:

Decora,

E. calyce plano marginibus crassis: corollâ 8—10-lineari, viscido-pubescente; tubo clavato: calcaribus longis, pubescentibus.

E. Eweri. Hortulanis.

Flores pulcherrime roseo-virides.

Cupressiformis,

E. calyce adpresso: corollâ 9—11-lineari, glutine illitâ; tubo tenuissime striato: calcaribus brevibus, glabris.

E. discolor. Andr. Er. n. 3: cum Ic. malâ.

Dignoscas ab omnibus varietatibus *Verficoloris*, filamentis angustioribus, et calcaratis.

Melliflua.

E. bracteâ infimâ juxta basin pedunculi: corollâ 9—12-lineari, lucidâ; tubo clavato, plus minus compresso: pericarpio ovato.

Variat

Variat α : Calyx valde ferratus. Corolla cruenta.

E. cruenta. *Pl. Kew. t. 13. optima.*

β : Calyx parum ferratus. Corolla punicea.

E. cruenta. *Andr. Er. n. 17. cum Ic.* E. cruenta. *Soland. in Ait. Hort. Kew. v. 2.*

p. 16.

Posterior varietas est longe pulchrior, et robustior.

E. caule humifuso: foliis obtusis: corollâ 9—11-lineari, extus rorulentâ; tubo clavato, compresso: calcaribus longis. *Nana,*

E. depressa. *Hortulanis.*

Sponte nascentem in *Hottentots Holland*, locis rupestribus, legit F. Masson.

Floret *Octobri, Novembri.*

Perfingularis est hæc Erica, flores grandes luteos cauli humillimo jungens.

E. foliis densissimis: calyce longe cuspidato: corollâ 6—8-lineari, glabrâ; tubo cylindraceo: calcaribus longis. *Spissifolia,*

E. Patterfonia. *Wendl. Er. fasc. 1. p. 15. cum Ic.* E. Patterfonia. *Andr. Er. n. 7. cum. Ic. bonâ.* E. abietina. *Linn. Diff. n. 20. cum fig. floris.* E. abietina. *Linn. Sp. Pl. ed. 2. p. 506.*

Sponte nascentem juxta *Cap Fals*, legit G. Paterfon.

E. calyce late ovato, acuminulato: corollâ 6—8-lineari, glabrâ; tubo cylindraceo: calcaribus longis: antheris linearibus, valde papulosis. *Sacciflora,*

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

Cylindriflora. E. foliis ciliatis fetis decompositis: calyce recurvulo: corollâ 9-lineari, glabrâ: tubo cylindræo: calcari- bus brevibus.

E. ferratifolia. *Andr. Er. n. 36. cum Ic.*

Filamenta in nostris exemplaribus nunquam mutica.

Paludosa, E. corollâ 7—9-lineari, pubescente, tubo parum cla- vato: antheris basi rostratis: pericarpio apice cotyli- gero.

E. abietina. *Andr. Er. n. 64. cum Ic.* E. concinna. *Schneev. Ic. n. 31.* E. concinna. *Soland. in Ait. Hort.*

Kew. v. 2. p. 23. E. verticillata. *Berg. Pl. Cap.*

p. 99. E. africana erecta, paludosa, &c. *Herm. Cat.*

Pl. Afr.

Nomen antiquum, et hortulano utilissimum, restitui.

Lituiflora: E. calyce obovato: corollâ 6—8-lineari, pubescente; tubo valde clavato: filamentis dorso apicis barbatis.

E. perspicua. *Wendl. Er. fasc. 1. p. 7. cum Ic.* E. Lin- næi! *Hortulanis.*

Pericarpium in hac, et antecedente, 6—8-loculare.

Obpyramida- E. corollâ $3\frac{1}{2}$ —4-lineari, pubescente; tubo infundi-
lis, buliformi; limbi interstitiis extrorsum tumidis: peri-
carpio sphaerico.

E. pyramidalis. *Curt. Bot. Mag. n. 366. cum Ic.* E. py-
ramidalis. *Soland. in Ait. Hort. Kew. v. 3. p. 401.*

Sponte nascentem juxta *Zwart Rivier*, locis humidis, legit F. Masson.

Ad stirpem vix naturalem, suum nomen proposuit So-
lander,

lander, rami enim debiles, et penduli sunt : itaque a tubo corollæ *Obpyramidalem* dixi.

E. caule tenui : corollâ $2\frac{1}{2}$ —3-lineari, pubescente : tubo *Cyrillæflora* ; anguste campanulato ; limbo brevi : filamentis muticis.

Sponte nascentem in *Hottentots Holland*, locis humidis, legit I. Mulder.

Flores pallide coccinei.

E. corollâ $2\frac{1}{2}$ —3-lineari, pubescente ; tubo obovato ; *Velitaris*. limbo recurvo-patente : calcaribus longis, argute cuneatis, parum ferratis.

E. glabra. *Roxb. MS.*

Nomen nostrum a foliis perangustis, Velitum jacula referentibus, petitur.

E. calyce ovato-cuneato : corollâ 7—8-lineari, pubescente ; tubo cylindraceo-urceolari ; limbo revoluto ; pericarpio obpyramidali.

E. spuria. *And. Er. n. 46. cum Ic.*

Facies *Tubifloræ*, cui certo proxima, sed nequaquam varietas. Filamenta evidenter calcarata, quæ mutica ostendit figura citata.

E. pedunculis glabris : calyce anguste lyrato : corollâ *Tubiflora*, 9—10-lineari, pubescente : limbi interstitiis basi lanceolatis.

Variat α : Corolla pallide carnea.

E. tubiflora.

E. tubiflora. Linn. *Diff.* n. 40. cum fig. floris.

E. tubiflora. Linn. *Sp. Pl. ed. 2.* p. 505.

β: Corolla læte carneâ.

E. coccinea. Linn. *Diff.* n. 42. cum fig. floris.

E. foliis, &c. Linn. *Hort. Cliff.* p. 148. n. 10.

Antheræ in postremâ varietate longius foraminosæ.

Curviflora,

E. pedunculis pubescentibus: calyce ovato-cuneato: corollâ 9-lineari, pubescente; limbi interstitiis basi lanceolatis.

E. simpliciflora. Willd. *Sp. Pl. v. 2.* p. 402. *E. curviflora*. Linn. *Syst. Veg. ed. 13.* p. 305. auctoritate ipsius speciminis.

Haud facile est hanc in herbariis a *Tubiflorâ* semper dignoscere, etsi facies viva multum abludat: foliorum laminæ autem in hac constanter lineari-attenuatæ, in illâ lineari-lanceolatæ: flores insuper rufi.

Cuspidigera,

E. pedunculis glabris: calyce ovato-cuspidato: corollâ 11—12-lineari, pubescente; limbi interstitiis basi lanceolatis: antheris hirtis.

Sponte nascentem juxta *Berg Rivier*, legit I. Mulder.

Filamenta rare villosa.

Bibax,

E. calycis foliolis imbricatis, inæqualibus: corollâ 8-lineari, pubescente; tubo valde clavato; laciniis basi imbricatis.

E. curviflora. Thunb. *Diff.* n. 30. *E. Flammea*. *Hortulanis*.

Sponte nascentem juxta *Palmit Rivier*, legit F. Masson.

E. pedunculis

E. pedunculis pubescentibus: corollâ 9—10-lineari, pubescente; limbo recurvo-patente: filamentis pubescentibus. *Buccinaefor-*

E. tubiflora. Thunb. Diff. n. 31.

E. pedunculis glabris: corollâ 10—11-lineari, glabrâ; limbo recurvo-patentissimo: pericarpio late turbinate. *Fastuosa,*

E. curviflora. Wendl. Er. fasc. 3. p. 7. cum Ic. E. curviflora. Andr. Er. n. 40. cum Ic. E. curviflora. Linn. Diff. n. 41. cum fig. floris, pessimâ.

Species in solo natali forsan procera, nam culta in quatuor annis jam quindecimipedalis est.

E. foliorum laminis hirsutis: pedunculis glabris: corollâ 10—11-lineari, hirsutâ: antheris rectis, papulosis. *Stagnalis,*

E. tubiflora. Roxb. MS.

Herba tota hirsuta est: cæterum facies sequentis, floribus pariter flavis.

E. pedunculis pubescentibus: calyce incurvo-erecto basi extus concavâ: corollâ 15-lineari, pubescente; limbo retuso. *Conspicua,*

E. conspicua. Pl. Kew. t. 12. optima. E. conspicua. Andr. Er. n. 29. cum Ic. E. conspicua. Soland. in Ait. Hort. Kew. v. 2. p. 22.

Sponte nascentem prope *Stellenbosch*, legit F. Masson.

E. pedunculis glabris: calyce recurvo-patente basi extus convexâ:

Mr. R. A. SALISBURY'S *Species of Erica*.

convexâ: corollâ 18—20-lineari, pubescente; limbo obtuso.

E. elata. Hortulanis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder. Herba, si probe observas, exquisitè pulverulenta.

Verticillaris, E. ramis verticillatis, lanatis: calyce incurvo-patente basi extus concavâ: corollâ 9—11-lineari, rare lanatâ.

E. lanata. Wendl. Obs. p. 45?

Sponte nascentem in *Hottentots Holland*, legit I. Mulder. Flores saturate rufo-fulvi.

Floccosa.

E. ramis sparsis, lanatis: floribus sæpius 1-riis: calyce adpresso basi extus convexâ: corollâ 12-lineari, rare lanatâ.

E. fordida. Andr. Er. n. 56. cum Ic. quæ revera titulo respondet. E. laniflora. Wendl. Er. fasc. 2. p. 23. cum Ic.

Affinis præ cæteris antecedenti: sed differt omnino Habitu, Tempore florendi, Foliorum laminis recurvis reclinativæ, Floribus sæpius tantum solitariis, Corollis latioribus limbo magis revoluto, Antherarum valvis basi fursum oblique emarginatis.

Radiiflora,

E. petiolis angustissimis: corollâ 13-lineari, viscidâ; tubo cylindræo-urceolari apice ventricoso: calcariibus subulatis.

E. octophylla. Willd. Sp. Pl. v. 2. p. 372. E. fascicularis. Willd. Sp. Pl. v. 2. p. 372. E. fascicularis.

Pl. Kew.

Pl. Kew. t. 6. *E. coronata*. *Andr. Er. n.* 10. *cum Ic.*
bonâ. E. octophylla. Thunb. Diff. n. 72. *cum Ic.*
E. fascicularis. Linn. Suppl. p. 219.

Sponte nascentem juxta *Hottentots Holland Kloof*, legit
 F. Masson.

E. foliis hirsutis: corollâ 10—11-lineari, viscidâ; tubo *Lycopodii-*
cylindracco-urceolari apice ventricoso: pericarpio sti- *folia.*
pitato.

E. Massoni. Pl. Kew. t. 18. *cæteris longe antecellente.*
E. Massoni. Curt. Bot. Mag. n. 356. *cum Ic.* *E. Mas-*
sonia. Andr. Er. n. 9. *cum Ic.* *E. Massoni. Linn.*
Suppl. p. 219.

E. foliorum laminis recurvis, acutis: corollâ 13—15- *Pharetra-*
lineari, viscidâ; tubo infundibuliformi; laciniis ova- *formis,*
to-cuneatis.

Variat α : Corolla aurantiaca.

E. exfurgens. Andr. Er. n. 13. *cum Ic.*

β : Corolla rutila.

E. abietina. Roxb. MS.

Dignoscas ab omnibus mihi visis, corollæ laciniis versus
 apicem attenuatis bifidulisque.

E. foliorum laminis reclinatis, obtusiusculis: corollâ *Grandiflora;*
12—14-lineari, viscidâ; tubo clavato: filamentis
exsertis.

E. grandiflora. Pl. Kew. t. 8. *E. grandiflora. Curt.*
Bot. Mag. n. 189. *cum Ic.* *E. grandiflora. Thunb.*

Diff. n. 28! auctoritate ejus speciminis. *E. grandiflora*. *Linn. Suppl. p. 223.*

Sponte nascentem juxta *Breede Rivier*, solo arenoso, legit F. Maffon.

Cerviciflora; *E. corollâ 5—6-lineari, pubescentulâ; tubo anguste urceolari; limbo patente: filamentis minute calcaratis.*

E. inaperta. Hortulanis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder. Hæc species primâ vice adhuc parcius floruit, nec ejus inflorescentiam omnino intelligo, an revera hujus cohortis: bractææ autem certo tres in singulis pedunculis.

Pinifolia, *E. calycis foliolis imbricatis, longe cuspidatis: corollâ 6—7-lineari, glabrâ; tubo clavato: filamentis calcaratis: pericarpio lævi.*

E. pinea. Thunb. Diff. n. 26.

Sponte nascentem prope *Baay Fals*, legit G. Robertson.

Calamiformis, *E. calyce adpresso: corollâ 9—10-lineari, glabrâ; tubo cylindraceo-urceolari; limbo recurvo: pericarpio lævi.*

E. radiata. Andr. Er. n. 53. cum Ic.

Bractææ infra medium pedunculi.

Longifolia, *E. petiolis angustissimis: corollâ 9—11-lineari, pubescente; tubo plus minus clavato: filamentis sæpius muticis: pericarpio superne sericeo.*

Variat

Variat α : Corolla alba.

E. vestita alba. *Andr. Er. n. 20. cum Ic.* E. vestita. *Thunb. Diff. n. 25.*

β : Caulis coarctatus. Corolla alba.
E. pinifolia. *Hortulanis.*

γ : Caulis coarctatus. Corolla rubra.
E. pinifolia. *Roxb. MS.*

δ : Caulis valde crassus. Corolla pallidissime carnea.

E. longifolia. *Pl. Kew. t. 4. optima.*

ϵ : Corolla purpurea.

E. vestita purpurea. *Andr. Er. n. 8. cum Ic.*

ζ : Corolla coccinea.

E. vestita coccinea. *Andr. Er. n. 33. cum Ic.*

E. vestita coccinea. *Curt. Bot. Mag. n. 402. cum Ic.*

η : Caulis crassus. Corolla carnea.

E. pinea. *Andr. Er. n. 57. cum Ic.*

In foliis omnium est etiam quædam differentia.

E. calyce adpresso: corollâ 5—6-lineari, viscidâ; tubo clavato, costato: antheris juxta apicem foraminosis. *Costæflora,*

E. Leea. *Andr. Er. n. 20. cum Ic.* bonâ.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

E. calyce apice recurvulo: corollâ 9—10-lineari, viscidâ; tubo clavato, costato: antheris a medio foraminosis. *Onosma-flora,*

E. glutinosa. *Andr. Er. n. 31. cum Ic.* bonâ.

Flores sulphurei.

Pulvini-
formis,

E. foliorum laminis attenuatis, ferrulato-ciliatis: floribus in rudimentis ramorum longiusculis: corollâ 7—9-lineari, viscidâ; tubo cylindræco-urceolari. Sponte nascentem in Hottentots Holland, legit I. Mulder. Faciem Crinifoliæ mire simulat, sed distinctissima est et inflorescentiâ, et filamentis, quæ profus mutica, atque instar sequentis pubescentia.

Frondeosa,

E. caule angulato: foliorum laminis attenuatis: calyce patulo: corollâ 9—10-lineari, viscidâ; tubo vix clavato.

E. coccinea. Wendl. Er. fasc. 3. p. 9. cum Ic. E. coccinea. Andr. Er. n. 41. cum Ic. E. coccinea. Thumb. Diff. n. 27. E. coccinea. Berg. Pl. Cap. p. 93. E. abietina. Linn. Sp. Pl. ed. 1. p. 355. E. foliis subulatis, &c. Linn. Hort. Cliff. p. 148. n. 9. auctoritate ipsius speciminis.

Sponte nascentem juxta Baay Fals, legit G. Paterfon.

Phylicæfolia, E. caule tereti: foliorum laminis brevibus, parum attenuatis: calyce incurvo-erecto: corollâ 8—9-lineari, viscidâ; tubo vix clavato.

E. purpurea. Andr. Er. n. 4. cum Ic.

Sponte nascentem in Hottentots Holland, legit I. Mulder. Diu hærebam animi dubius, an tantum pro varietate antecedentis proponerem: ob herbæ multas differentias, et calycem, tandem separavi.

Argutifolia. E. foliorum laminis valde attenuatis, argute reduplicatis:

tis : corollâ 5—6-lineari, viscidâ ; tubo infundibuliformi.

E. pulchella. *Thunb. Diff. n. 24. cum Ic.*

Nescio quæ facies torva et scabra hanc ab affinibus primo intuitu distinguit.

E. pedunculis brevissimis : calyce calloso : foliolis rhombo-spatulatis, integerrimis : corollâ 5—9-lineari, rorulentâ. *Favosa,*

Variat α : Corolla 7—9-linearis ; laciniis basi contiguus.

E. spicata. *Wendl. Er. fasc. 2. p. 27.* *E. spicata*. *Thunb. Diff. n. 71. cum Ic.* *E. seffiliflora*. *Linn. Suppl. p. 222.*

β : Corolla 5—7-linearis ; laciniis basi imbricatis.

E. spicata. *Andr. Er. n. 6. cum Ic.*

Inflorescentia e collatione affinium specierum tantummodo intelligenda, rudimentis ramulorum pedunculos simulantibus, veris pedunculis sane omnium brevissimis, aut nullis.

E. caule stricto : pedunculis brevissimis : calyce calloso, foliolis late spatulatis, inciso-ferratis : corollâ 7—10-lineari, rorulentâ. *Sceptri-formis,*

E. enneaphylla. *Roxb. MS.*

Foliorum numerus ultra 4-narium, in toto genere valde inconstans est.

E. pedunculis brevissimis : calycis foliolis orbiculato-spatulatis, *Clavæflora,*

spatulatis, integerrimis: corollâ 10—12-lineari, rorulentâ.

Communicavit *Hibbert*.

Herba ad amussim sequentis.

- Alveiflora*, E. pedunculis glabris: corollâ 7—9-lineari, rorulentâ; tubo cylindraceo-urceolari, inferne 4-angulo.
E. gelida. *Hortulanis*.
Sponte nascentem in *Hottentots Holland*, solo humido, legit F. Masson.
- Mammosa*. E. pedunculis pubescentibus: corollâ 8—10-lineari, rorulentâ; tubo cylindraceo-urceolari, juxta basin 4-fosso.
Variat α : Corolla coccinea.
E. verticillata. *Willd. Sp. Pl. v. 2. p. 370*.
E. verticillata. *Andr. Er. n. 21. cum Ic.*
E. speciosa. *Schneev. Pl. n. 3. cum Ic.*
 β : Corolla læte purpurea.
E. mammosa. *Andr. Er. n. 58. cum Ic.*
E. abietina. *Schneev. Pl. n. 23. cum Ic.* E. abietina. *Thunb. Diff. n. 68. auctoritate ejus speciminis.* E. mammosa. *Linn. Mant. p. 234.* E. mammosa. *Linn. Diff. n. 21. cum fig. floris.* E. abietina. *Berg. Pl. Cap. p. 105. auctoritate ejus speciminis.* E. folio Juniperi, &c. *Buxb. Cent. 4. p. 25. t. 41. 42.* E. african. arborescens, &c. *Barth. Aët. v. 2. p. 57. cum Ic.*
 γ : Corolla fordide purpurea.
E. abietina. *Willd. Sp. Pl. v. 2. p. 369.*

Hæ tres, et aliæ varietates, omnes ludunt stigmatibus interdum exsertis,

E. corollâ 6—8-lineari, utrinque hirsutâ; tubo curvo, *Brachialis.*
pyramidali: antheris inclusis, longissimis.

Sponte nascentem in *Hottentots Holland*, legit F. Masson.
Herba Sexfariæ.

E. foliorum laminis lineari-attenuatis, fetis asperis: calyce cuneato: corollâ 4—6-lineari, extus totâ fetosâ. *Hystri-*
flora,

E. Spaarmanni. *Thunb. Diff. n. 33.* *E.* Spaarmanni.
Linn. Suppl. p. 219. *E.* Spaarmanni. *Linn. in Aët.*
Holm. 1778. p. 24. t. 2.

Sponte nascentem juxta *Kromme Rivier*, legit A. Spaarman.

E. foliorum laminis ovato-cuneatis, breviter pectinatis: calyce cuneato: corollâ 6—7-lineari, extus versus apicem fetosâ. *Strigilifolia,*

E. transparens. *Thunb. Prodr. p. 71.* *E.* cerinthoides γ .
Thunb. Diff. n. 33.

Filamenta in hac calcarata.

E. foliorum laminis anguste ovato-cuneatis, pectinatis: calyce rhombeo-spatulato: corollâ 5—7-lineari, intus lanatâ. *Pectinifolia,*

E. cerinthoides β . *Thunb. Diff. n. 33.*

Sponte nascentem in *Lange Kloof*, legit F. Masson.

E. foliorum laminis lineari-lanceolatis, pilosis: calyce cuneato: corollâ 8—10-lineari, extus viscido-pilosâ. *Crinifolia.*

E. cerinthoides. *Andr. Er. n. 25. cum Ic.* *E.* cerin-

thoides. *Curt. Bot. Mag. n. 220. cum Ic.* E. cerinthoides α . *Thunb. Diff. n. 33.* E. cerinthoides. *Berg. Pl. Cap. p. 104.* E. cerinthoides. *Linn. Diff. n. 43. cum fig. floris.* E. cerinthoides. *Linn. Sp. Pl. ed. 2. p. 505.* E. coris folio, &c. *Breyn. Cent. p. 25. t. 13.* E. africana umbellata, &c. *Barth. Aët. v. 2. p. 57.*

Ludit interdum una eademque stirps, corollis multo brevioribus, erectis, stigmatibus longe exserto. Filamenta constanter calcarata sunt, nec mutica.

Cernua. E. bracteis decurrentibus: calyce valde fimbriato: corollâ $2\frac{1}{2}$ -lineari; tubo globofo: calcaribus auricularibus.

E. cernua. *Linn. Suppl. p. 222.* E. cernua. *Montin in Nov. Aët. Ups. v. 2. p. 291. t. 9. f. 3.*

Sponte nascentem in *Koude Bockveldt*, legit F. Masson.

Doliiformis. E. foliis hirsutis: bracteis juxta calycem: corollâ 4—5-lineari, viscidâ; tubo urceolari: calcaribus brevibus, cuneatis.

E. mammosa. *Thunb. Diff. n. 69. cum fig. in ed. nostrâ.*

Nulla mihi cognitæ affinis, nisi forte *Pallidæ*.

Pistillaris. E. pedunculis foliolis gemmaceis obtusis: corollâ 3-lineari, lævi; tubo curvulo, infundibuliformi; limbo recurvo.

E. australis. *Linn. Mant. p. 231.* E. coris folio II. *Clus. Hist. Pl. lib. 1. p. 42.*

Semina ad hilum, appendiculam fungosam exferunt.

Ciliaris. E. foliorum laminis ovatis; corollâ 4-lineari, lævi; tubo ovato-pyramidali latere superiore ventricosiore.

E. ciliaris.

E. ciliaris. *Curt. Bot. Mag. n. 484. cum Ic. bonâ*. *E. ciliaris*. *Linn. Diff. n. 39. cum fig. floris*. *E. ciliaris*. *Linn. Sp. Pl. ed. 1. p. 354*. *E. ciliaris*. *Loefl. Ref. p. 138*. *E. xii. Clus. Hist. Pl. lib. 1. p. 46*.
Folia terna sunt, at juxta sequentem in ferie naturali, ni fallor, locanda est, ob corollæ similitudinem.

E. foliorum laminis ciliatis: calyce adpresso: corollâ 3-lineari, apice extus pubescente: calcaribus lanceolatis. *Botuliformis.*

E. Tetralix. Curt. Fl. Lond. fasc. 1. t. 21. bona. E. Tetralix. Linn. Sp. Pl. ed. 2. p. 507.

E. foliorum laminis subtus bifulcis: calyce patente: corollâ 2½-lineari, lævi: calcaribus auricularibus. *Multicaulis.*

E. stricta. Willd. Sp. Pl. v. 2. p. 366.

Sponte nascentem in Inf. *Corfica*, legit G. Jones.

Caules undique diffusi, nequaquam stricti.

E. floribus caule nudo verticillatis: corollâ 3-lineari; tubo urceolari: calcaribus auricularibus. *Mutabilis.*

E. cinerea. Curt. Fl. Lond. fasc. 1. t. 25. bona. E. cinerea. Linn. Sp. Pl. ed. 2. p. 501. E. cinerea. Loefl. Ref. p. 137.

Flores purpurei, mox cum primum marcescunt cærulei, ut descripsit Loeffling.

E. caule glabro: foliorum laminis recurvis, attenuatis: corollâ 1¼-lineari, obovatâ: calcaribus longissimis. *Uncifolia.*

E. regerminans. Linn. Mant. p. 322.

Flores in rudimentis ramulorum axillaribus, nec racemosi: ad exemplar Linnæanum characterem concinnavi, nec in ullo alio herbario adhuc vidi.

Caduceifera. E. foliorum laminis cuneatis ovatifve: corollâ $\frac{2}{3}$ -lineari: filamentis juxta medium calcaratis.

E. pulchella. *Andr. Er. n. 51. cum Ic. mediocri*. E. articularis. *Thunb. Diff. n. 58*. E. pulchella. *Houtt. Nat. Hist. v. 4. p. 504. t. 23. f. 1*.

Sponte nascentem in *Hottentots Holland*, legit F. Maffon. Hæc species, primum, veram insertionem calcarium *Ericarum* mihi docuit, cujus stamina Mercurii fabulofum caduceum lepide simulant: nempe in omnibus non ab antheris sed e filamentis ortum suum ducunt.

Empetrifolia, E. calyce tetraphyllo: corollâ-2-lineari, hirsutâ; tubo urceolari; limbo recurvo-patente: stigmate longe exserto.

E. empetrifolia. *Thunb. Diff. n. 70*. E. empetrifolia. *Linn. Mant. p. 374*. E. empetrifolia. *Linn. Diff. n. 15. cum fig. floris*, pessimâ.

Sponte nascentem juxta *Baay Fals*, legit F. Maffon.

Malleolaris, E. calyce quadrifido: corollâ $1\frac{2}{3}$ -lineari, lævi; tubo urceolari; limbo recurvo-patentissimo: pericarpio hirsuto.

E. empetrifolia. *Schneev. Pl. n. 17. cum Ic.* E. empetrifolia. *Houtt. Nat. Hist. v. 4. p. 517. t. 23. f. 2*. E. empetrifolia. *Berg. Pl. Cap. p. 120*. auctoritate ejus speciminis.

Herba antecedentis, sed flores diversissimi.

E. calyce

- E. calyce quadrifido: corollâ 2-lineari, lævi; tubo ob-
ovato; limbo incurvo-patente: pericarpio hemisphæ-
rico, glabro.* *Pyxidiflora,*
- E. empetroides. Hortulanis.*
Flores odorem ceræ Apum spirant.
- E. calyce tetraphyllo: corollâ 2-lineari, lævi; tubo
calathiformi; limbo recurvo-patente: stigmatibus in-
cluso.* *Nolæflora.*
- Sponte nascentem in *Hottentots Holland*, legit F. Masson.
Pedunculi multo longiores quam affinium, floribus in
meâ stirpe cultâ ultra folia extantibus.
- E. caule valde angulato: foliis 4-nis: corollâ 2½-lineari,
viscidâ; tubo anguste urceolari: filamentis muticis.* *Festa,*
- Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Flores fulvi: in cæteris hujusce cohortis mihi visis folia
semper 5—6-na.
- E. corollâ 2-lineari, viscidâ; tubo urceolari, parum cost-
tato: filamentis longitudine tubi, calcaratis: peri-
carpio viscido.* *Fallax,*
- Sponte nascentem in *Hottentots Holland*, legit F. Masson.
Antheræ 2-partitæ, vix tamen revera didymæ.
- E. corollâ 3-lineari, viscidâ; tubo urceolari, parum costa-
to: filamentis vix longitudine tubi, minute calcaratis.* *Parilis,*
- Sponte nascentem in *Hottentots Holland*, legit F. Masson.
Habitus prioris, sed præter calycis foliola basi angusti-
ora, Antheræ duplo majores sunt, et calcaria fila-
menti apicem pene tota decurrunt.

Viscida.

E. corollâ 3-lineari, viscidâ; tubo cyathiformi, costato : filamentis brevissimis : pericarpio fericeo.

Variat α : Folia incana, $1\frac{1}{2}$ —3 lineas longa.

E. viscaria. *Thunb. Diff. n. 40.* E. viscaria.

Linn. Mant. p. 231. E. viscaria. *Linn. Diff.*

n. 46. cum fig. floris, pessimâ.

β : Folia viridia, 3—5 lineas longa.

E. viscaria. *Andr. Er. n. 55. cum Ic.* E. vis-

caria. *Pl. Kew. t. 1. optima, partibus dif-*

fectis exceptis.

Facie admodum discrepant hæ varietates.

Catervæflora.

E. caule angulato : corollâ 2-lineari, pubescente ; tubo anguste obovato : antheris longe foraminosis.

E. pubescens 3. villosa. *Thunb. Diff. n. 61.*

Sponte nascentem in summitate *Taffelberg*, legit C. P. Thunberg.

Species legitima proculdubio, gravis enim est differentia caulis antherarumque.

Pubigera,

E. calyce patente, ovato-acuminato : corollâ $1\frac{1}{2}$ -lineari, pubescente ; limbo longiusculo, recurvo : pericarpio hirta.

Communicavit *Hibbert.*

Facile dignoscas limbo corollæ longiusculo, recurvo, et penitus obtuso.

Mitraformis,

E. foliorum laminis parum reduplicatis, fimbriatis : corollâ $1\frac{1}{2}$ -lineari, pubescente ; limbo erecto : pericarpio glabro.

E. pubescens.

E. pubescens. *Andr. Er. n. 60. cum Ic.* *E. hirtiflora*.
Curt. in Bot. Mag. n. 481. cum Ic. optimâ. *E. pube-*
scens 2: hispida. Thunb. Diff. n. 61.

Folia aliquando sparsula, cæterum, ut in ipso specimine
Thunbergiano, quaterna.

E. calyce adpresso, anguste ovato-cuneato: corollâ $1\frac{1}{3}$ -
lineari, pubescente; limbo brevissimo, recurvo: pe- *Tardiflora,*
ricarpio hirto.

E. pubescens. Curt. in Bot. Mag. n. 480. cum Ic. optimâ.
Sponte nascentem juxta *Taffelberg*, legit F. Masson.

Hanc ab antecedente probe distinxit *Curtis*: differt
enim caule graciliore; ramis floriferis multo brevi-
oribus; foliorum laminis magis incurvis, lateribus
valde reduplicatis, integerrimis; corollæ laciniis re-
curvis, latius imbricatis; calcaribus angustioribus;
antheris glabris, foraminibus brevioribus; denique
feminibus scrobiculatis.

E. calyce adpresso, rhombeo-cuneato: corollâ $1\frac{1}{3}$ -line- *Parviflora,*
ari, pubescente; calcaribus auricularibus: pericarpio
glabro.

E. pubescens. Linn. Diff. n. 19. cum fig. floris. *E. pube-*
scens. Berg. Pl. Cap. p. 121. *E. parviflora. Linn. Sp.*
Pl. ed. 2. p. 506.

Folia quaterna, laminis valde reduplicatis.

E. calyce adpresso, ovato-acuminato: corollâ 1-li- *Exigua.*
neari, pubescente; tubo ovali; limbo brevissimo:
calcaribus lineari-attenuatis: pericarpio glabro.

E. pubescens 4 : parviflora. *Thunb. Diff. n. 61.*
Folia interdum terna, sæpius quaterna.

Pufilla.

E. calyce adpresso, late ovato-cuneato : corollâ $\frac{1}{4}$ -lineari, pubescente ; tubo calathiformi ; limbo longitudine tubi : pericarpio glabro.

Sponte nascentem prope *Baay Fals*, legit I. Mulder.

Non solum parvitate, sed etiam proportione omnium partium floris, a cæteris hujus cohortis abludit.

Tragulifera ;

E. calyce imbricato : corollâ $2\frac{1}{3}$ -lineari ; tubo urceolari ; limbo recurvo : calcaribus hirsutis : antheris latissime foraminosis, hirsutis.

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

Guttæflora,

E. foliorum laminis lineari-attenuatis : corollâ 1— $2\frac{1}{2}$ -lineari ; laciniis apice guttâ illitis : calcaribus pubescentibus.

Variat α : Caulis fastigiatus. Corolla 1— $1\frac{1}{2}$ -linearis, tubo hemisphærico. Stigma longe-exsertum.

E. lateralis. Willd. Sp. Pl. v. 2. p. 380.

β : Caulis demissus. Corolla 2-linearis, tubo late ovato. Stigma breviter exsertum.

E. incarnata. Andr. Er. n. 27. cum Ic.

γ : Caulis demissus. Corolla $2\frac{1}{2}$ -linearis, tubo ovato. Stigma breviter exsertum.

E. rubens humilis. Wendl. Er. fasc. 3. p. 13. cum Ic.

Flores non vere axillares, sed rudimentis ramulorum.

- E. foliorum laminis linearibus: calyce adpresso: corollâ $1\frac{1}{2}$ -lineari; tubo sphærico: calcaribus pubescentibus: stylo sursum curvo.* *Curvirostris,*
- E. declinata. Hortulanis.*
Frutex humilis, vix pro varietate prioris habendus, Antheris nimium diversis. Flores gravem, et plane nauseosum odorem spargunt.
- E. pedunculis glabris: calyce incurvo-patente: corollâ $1\frac{1}{4}$ -lineari; tubo sphærico: calcaribus auricularibus, glabris.* *Obesa,*
- E. margaritacea. Andr. Er. n. 54. cum Ic. malâ. E. margaritacea. Soland. in Ait. Hort. Kew. v. 2. p. 20.*
Sponte nascentem juxta *Stellenbosch*, legit F. Maffon.
- E. calyce minuto: corollâ $1\frac{1}{3}$ -lineari; tubo ovali; limbo recurvo: calcaribus lineari-attenuatis, hirtis.* *Gracilis,*
- E. imbecilla. Hortulanis.*
Caulis quamvis gracilis recte attollitur, minime imbecillis.
- E. caule tenui: foliis verticillis remotis: corollâ $1\frac{1}{2}$ -2-lineari; tubo ovato-cylindraceo, ore lato: pericarpio hirto.* *Intervallaris,*
- E. elongata. Roxb. MS.*
Species pulcherrima, ramulo fere omni floribus parvis, rubris, oblongis, nutantibus onusto.
- E. caule glabro: corollâ $1\frac{1}{4}$ -lineari; tubo poculiformi; limbo erecto: calcaribus lanceolato-cuneatis, integerrimis.* *Quadriflora,*
- E. quadrangularis. Prodr. p. 297.* *Sponte*

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Flores inconspicui, sed in vasto genere distinctissimi.

Prolifera,

E. caule hirsuto: corollâ $1\frac{1}{2}$ -lineari; tubo cyathiformi; limbi interstitiis acutis: calcaribus rectis: pericarpio hirto.

E. caffra. *Andr. Er. n. 50. cum Ic.* *E. strigosa.* *Wendl. Er. fasc. 2. p. 25. cum Ic.* *E. strigosa.* *Willd. Sp. Pl. v. 2. p. 365.* synonymo et descriptione exclusis.
E. perfoluta 2. Thunb. Diff. n. 62. *E. perfoluta. Linn. Mant. p. 230.* *E. perfoluta. Linn. Diff. n. 16. cum fig. floris.* *E. subdivaricata. Berg. Pl. Cap. p. 114.*

Florescentiâ peractâ, rami plerumque e centro florum ultra producuntur.

Cyathiformis, *E.* pedunculis glabris: corollâ $1\frac{1}{2}$ -lineari; tubo cyathiformi; limbi interstitiis acutis: calcaribus falcatis.

E. lævis. Hortulanis.

Valde affinis sequenti, antheris pene ad amussim respondentibus: ob limbi interstitia tamen ægre varietatem esse concedam.

Pelviformis.

E. pedunculis rare pubescentibus: corollâ $1\frac{1}{2}$ -lineari; tubo pelviformi; limbi interstitiis basi ovalibus: calcaribus falcatis.

E. perfoluta. Cart. in Bot. Mag. n. 342. *E. perfoluta 1. Thunb. Diff. n. 62.* *E. viridi-purpurea. Linn. Diff. n. 9. cum fig. floris.* auctoritate ipsius speciminis.
E. mauritanica. Linn. Syst. Nat. ed. 10. p. 1002.

Variat floribus albis, purpureis.

E. foliis

- E. foliis angustis: calyce recurvo-horizontali: corollâ 2-lineari; tubo hemisphærico; laciniis basi imbricatis.* *Turrigera,*
- E. cupressina. Hortulanis.*
Foliorum laminæ pene enerves videntur.
- E. foliis latis: calyce reclinato-deflexo: corollâ 2½-lineari; tubo late ovato: limbi interstitiis basi ovatis.* *Lacunæflora,*
- E. Bergiana. Wendl. Er. fasc. 2. p. 29. cum Ic. E. quadriflora. Willd. Sp. Pl. v. 2. p. 379. E. Bergiana. Schneev. Pl. n. 46. cum Ic. E. Bergiana. Linn. Mant. p. 235. E. Bergiana. Linn. Diff. n. 6. cum fig. floris, pessimâ.*
Foliorum Laminæ evidenter 1-nerviæ.
- E. bracteis minutissimis: calyce incurvo-deflexo: corollâ 2-lineari; tubo globoso; laciniis basi imbricatis.* *Florida.*
- E. florida. Thunb. Diff. n. 64.*
In hac *Calcaria lanceolata.*
- E. caule glabro: corollâ 1½-lineari, lævi; tubo turbinato, 8-angulo; limbo incurvo: calcaribus auricularibus, glabris.* *Turbiniflora,*
Communicavit *Hibbert.*
Flores pallide purpurei.
- E. caule viscidulo: corollâ 1⅓-lineari; tubo sphærico, valde 8-angulo: limbo recurvo-erecto: pericarpio hirto.* *Bullularis,*
- Vol. VI. 3C *E. granulata.*

E. granulata. *Linn. Mant. p.* 234. *E. ramentacea*.
Linn. Mant. p. 65. *E. multumbellifera*. *Berg. Pl.*
Cap. p. 110. *E. pilulifera*. *Berg. Pl. Cap. p.* 111.

Mucosa, *E. caule* glabro: corollâ 2-lineari, viscidâ; tubo plus minus obovato; limbi interstitiis parum tumidis.
E. mucosa. *Pl. Kew. t.* 15. bona. *E. mucosa*. *Linn. Mant. p.* 232. *E. ferrea*. *Berg. Pl. Cap. p.* 112.
 Folia mire ludunt; laminis linearibus, lineari-lanceolatis, vel etiam ovalibus.

Piluliformis, *E. foliis* sparsis: corollâ $2\frac{1}{2}$ -lineari, lævi; tubo longitudine calycis: calcaribus lineari-attenuatis: pericarpio lævi.
E. nudicaulis. *Berg. Pl. Cap. p.* 113. *E. pilulifera*.
Linn. Sp. Pl. ed. 2. p. 507.
 Foliorum Laminæ reduplicaturâ minute ciliatæ.

Obliqua, *E. foliis* oblique verticillatis: spicis coarctatis: corollâ $3\frac{1}{2}$ -lineari, viscidâ; limbi interstitiis in uncum tumidis.
E. obliqua. *Pl. Kew. t.* 3. optima. *E. obliqua*. *Thunb. Diff. n.* 73. cum *l.c.* bonâ.
 Flores pallide purpurei.

Sequax, *E. foliis* teneris glutine arachnoideis: fasciculis 4—6-floris: corollâ 3—4-lineari, viscidâ; limbi interstitiis in uncum tumidis.
 Variat α : Corollâ 3-linearis; tubo late ovato.
E. phytodes. *Thunb. Diff. n.* 89. *E. phytodes*.

fodes. *Linn. Diff. n. 32. cum fig.* E. phyfodes. *Berg. Pl. Cap. p. 101.* E. phyfodes. *Linn. Sp. Pl. ed. 2. p. 506.*

β: Corolla 4-linearis; tubo ovato.

E. phyfodes. *Andr. Er. n. 44. cum Ic.* E. phyfodes. *Curt. Bot. Mag. n. 443. cum Ic.*

Semina immatura tuberculata, postea tuberculis depressis evidenter scrobiculata.

E. foliorum laminis ovato-cuneatis: corollâ 4—5-lineari, *Blenna.*
viscidâ; tubo urceolari; laciniis basi imbricatis: filamentis latissimis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Pulchra species, corollis luteis ore viridi.

E. foliis 4-nis: spicis coarctatis: corollâ 2½-lineari, lævi; tubo amphoræformi; limbo crenulato. *Verecunda.*

E. cernua. *Andr. Er. n. 48. cum Ic.*

Flores pallide carnei.

E. corollâ 2-lineari, glabra; tubo urceolari, parum 4-gono: calcaribus cuneatis, hirsutis: antheris hirsutis. *Pulchella.*

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Facies aliqua *Galiifloræ*, sed veram ejus affinitatem adhuc nescio.

E. foliorum laminis lineari-lanceolatis: spicis coarctatis: corollâ 4-lineari; tubo superne admodum ventricoso: antheris exsertis. *Embothriifolia,*

Communicavit *Hibbert*.

Nomen aptius e singulari figurâ corollæ forsan exco-
gitandum: specimen siccum tantum vidi.

Glutinosa, E. foliis sparsis: spicis coarctatis: corollâ 3—5-lineari,
viscidâ; tubo ovato-pyramidali: calcaribus auricula-
ribus.

Variat α : Corolla 3-linearis.

E. glutinosa. *Pl. Kew. t. 17. optima. Cha-*
mæcistus roris folis foliis. Pet. Mus. p. 22.
t. 161.

β : Corolla 5-linearis.

E. Droseroides. *Andr. Er. n. 30. cum Ic.*
E. glutinosa. *Thunb. Diff. n. 48. Andro-*
meda droseroides. Linn. Mant. p. 239.
E. glutinosa. *Berg. Pl. Cap. p. 98. auctori-*
tate ejus speciminis.

Hujusce generis est proculdubio, nec, quicquid fuadeat
Habitus, ad *Andromedam* referenda.

Curvifolia. E. foliis ternis: laminis recurvis: spicis coarctatis:
corollâ 4-lineari, viscidâ; tubo ovato-pyramidali:
calcaribus lineari-attenuatis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.
Pericarpium minutissime hirtum.

Squarrosa, E. corollâ 5—6-lineari, viscidâ: tubo ovato-pyramidali;
limbo obtuso: calcaribus marginalibus: antheris læ-
vibus.

Sponte

Sponte nascentem in *Lange Kloof*, legit F. Masson.

Folia densissima.

E. corollâ 8—11-linearî, viscidâ; tubo ovato-pyramidali; limbo acuto: filamentis muticis: antheris lanatis. *Gorteriæ-folia,*

Variat α : Corolla 8—9-linearis.

In hac Tubus pene totus albus.

β : Corolla 10—11-linearis.

E. retorta. *Curt. Bot. Mag. n. 362. cum Ic.*

E. retorta. *Andr. Er. n. 15. cum Ic.*

E. retorta. *Thunb. Diff. n. 91. E. retorta.*

Linn. Suppl. p. 220. E. retorta. Montin. in

Act. Holm. 1774. p. 297. t. 7.

Herba simpliciter recurva: diversissimam directionem exprimit nomen auctorum, quam in Ordine Naturali *Graminum* aliquando videas.

E. foliorum laminis lanceolato-cuneatis: corollâ 8—10-linearî, viscidâ; tubo ampullæformi; limbo obtuso. *Ampullæ-formis,*

E. ampullacea. *Andr. Er. n. 34. cum Ic. E. ampullacea. Curt. Bot. Mag. n. 303. cum Ic. bonâ.*

In hac cohorte, Antheræ apicibus incurvis et valde attenuatis confimiles, fere dabunt characterem.

E. foliorum laminis ovato-cuneatis: corollâ 9—11-linearî, viscidâ; tubo late ampullæformi; limbo retuso. *Capax,*

E. prægnans. *Soland. MS.*

Sponte nascentem in *Hottentots Holland*, legit F. Masson.

E. foliis

Lagenæ-
formis,

E. foliis 3-nis: corollâ 12—14-lineari, viscidâ; tubo ovato apice ventricoso; limbo tubo 4-plo brevior, ovato.

E. jasminiflora! *Andr. Er. n. 49. cum Ic. mediocri.*

Sponte nascentem in *Platte Kloof*, locis humidis, legit F. Masson.

Jasminiflora. *E. foliis* 3-nis: corollâ 16—19-lineari, viscidâ; tubo cylindræo apice ventricoso; limbo tubo 3-plo brevior, ovali.

E. Aitonia. *Curt. Bot. Mag. n. 429. cum Ic.* *E. Aitonia.*
Andr. Er. n. 21. cum Ic. malâ. *E. Jasminiflora.*
Prodr. p. 293.

Flos ad amussim *Jasmini Grandiflori*, *Linn.*

Pavettaflora, *E. pedunculis* brevissimis: corollâ 9—10-lineari; limbo intus farinoso: filamentis juxta apicem antheræ calcaratis.

E. infundibuliformis. *Roxb. MS.*

Communicavit *Hibbert*: splendidum donum, ejus nomine, si talia admittere potuissem, certe condecorandum. Calcaria etiam in hac potius e filamentis, quam ipsâ antherâ, exseruntur.

Fasciformis, *E. pedunculis* brevissimis: corollâ 5—6-lineari; limbo intus farinoso: filamentis muticis: antheris rectis.

E. fastigiata. *Thunb. Diff. n. 37.* *E. fastigiata.* *Linn. Diff. n. 44. cum fig. floris.* *E. fastigiata.* *Linn. Mant. p. 66.*

Sponte nascentem in *Platte Kloof*, legit F. Masson.

E. calyce minute ciliato: corollâ 5—6-lineari; tubo anguste cylindraceo-urceolari; limbo brevissimo; filamentis muticis. *Fistulæflora*,

E. cylindrica. *Thunb. Diff. n. 39.*
Pericarpium obovatum, glabrum.

E. caule glabro: corollâ 3-lineari; tubo anguste pyramidali basi planâ: calcaribus femilanceolatis: pericarpio obpyramidali. *Fragrans*,

E. Muscari. *Andr. Er. n. 1. cum Ic. mediocri.*
Sponte nascentem juxta torrentem in *Zout Rivier*, legit
F. Maffon.

E. caule pubescente: corollâ $2\frac{1}{2}$ -lineari; tubo ovato-pyramidali: calcaribus auricularibus: pericarpio sphærico. *Galiiflora*,

Variat α : Corolla albida.

E. transparens. *Berg. Pl. Cap. p. 108.*

β : Corolla rubra.

E. comosa. *Pl. Kew. t. 18. mala.* *E.* comosa.

Thunb. Diff. n. 38. *E.* comosa. *Linn. Diff.*

n. 48. cum fig. floris. *E.* comosa. *Linn.*

Mant. p. 234.

Vox comosus, prout usurpatur apud Botanicos, in hanc speciem minime quadrat.

E. caule pubescente: calyce obcuneato, ferrato: corollâ 3-lineari; limbo tubo $\frac{1}{2}$ -breviore: calcaribus minutissimis, auricularibus. *Nidiflora*,

E. denticulata. *Roxb. MS.*

In hortis quoque confunditur cum sequente, cui similis: vix tamen pro varietate habenda, ob filamenta calcarata, et foramina antherarum breviora.

Denticularis, E. caule pubescente: calyce obcuneato, ferrato: corollâ 3-lineari; limbo tubo $\frac{1}{2}$ -breviore: antheris longe foraminosis.

E. dentata. *Thunb. Diff. n. 39.* E. denticularis. *Linn. Mant. p. 22.* auctoritate speciminis ex Herbario Bergiano.

Flores purpurei.

Pulchra, E. caule glabro: calyce anguste lanceolato, ferrato: corollâ 4—5-lineari; limbo tubo duplo brevior: antheris breviter foraminosis.

E. Walkeria. *Andr. Er. n. 45. cum Ic. bonâ.*

Daphniflora, E. calyce ovato-cuspidato, vix ferrato: corollâ 3-lineari; limbo tubo duplo brevior, recurvo-deflexo: filamentis muticis.

Sponte nascentem in *Hottentots Holland*, legit I. Mulder.

Pellucida, E. caule gracili: calyce spatulato, ferrato: corollâ 5—6-lineari; limbo tubo triplo brevior; filamentis muticis.

E. pellucida. *Soland. MS.*

Sponte nascentem in *Hottentots Holland*, solo humido, legit F. Maffon.

Caulis fastigiatus, verticillis foliorum, in ramis vegetioribus, remotis. Foliorum Laminæ angustæ, lineari-

attenuate. Corolla albida cum rubore aliquo, ita pellucida, ut literas tubo explanato subjectas facile distinguas.

E. bracteis duabus: corollâ 5—6-lineari; tubo ovato-pyramidali; limbo brevissimo: calcaribus longissimis, fubulatis. *Amabilis*.

E. inflata. *Thunb. Diff. n. 67. cum Ic.*

Species apud nos adhuc rarissima.

E. bracteis duabus: corollâ 6—7-lineari; tubo ovato-pyramidali apice ventricofulo: calcaribus brevissimis, auricularibus. *Venusta*.

E. ventricosa. *Wendl. Er. fasc. 3. p. 11. cum Ic. malâ.*

E. ventricosa. *Curt. Bot. Mag. n. 350. cum Ic.*

E. ventricosa. *Andr. Er. n. 2. cum Ic. E. ventricosa.*

Thunb. Diff. n. 36. cum Ic.

Sponte nascentem juxta *Fransche Hoek*, legit F. Masson.

E. foliis 2-nis: calyce $1\frac{1}{2}$ -lineari, anguste ovato-cuneato: corollâ $2\frac{1}{2}$ -lineari; tubo ovato-pyramidali: pericarpio obovato. *Imbellis*,

Variat α : Corolla albida.

β : Corolla pallide lutea.

γ : Corolla lutea.

E. lutea. *Wendl. Er. fasc. I. p. 13. cum Ic.*

E. lutea. *Andr. Er. n. 11. cum Ic. E. lutea.*

Thunb. Diff. n. 49. E. lutea. Linn.

Diff. n. 2. cum fig. floris, E. lutea. Linn.

Mant. p. 234. E. lutea. Berg. Pl. Cap.

p. 115.

Corollæ Laciniae æquales sunt: inæquales, ut describit Willdenow, in toto genere haud ferme invenias.

Linifolia,

E. foliis 2-nis: calyce $1\frac{1}{2}$ -lineari, late ovali-acuminulato: corollâ 2-lineari; tubo ovato: pericarpio turbinato.

Variat α : Corolla pallidissime rubra.

E. foliis lanceolatis oppositis imbricatis, &c.

Linn. Hort. Cliff. p. 148.

β : Corolla læte rubra.

E. tenuifolia. *Linn. Diff. n. 33. cum fig. floris.*

E. tenuifolia. *Berg. Pl. Cap. p. 116.* E. tenuifolia.

Linn. Sp. Pl. ed. 2. p. 507. E. africana, altera, &c. *Seb. Thes. v. I. p. 157.*

t. 73. f. 6.

Filamenta, æque ac in *Imbelli*, calcarata.

Borboniæ-folia.

E. foliis 2-nis: calyce $3\frac{1}{2}$ -lineari, late ovali-acuminulato: corollâ $3\frac{1}{2}$ -lineari; tubo ovato: pericarpio obovato.

Communicavit *Hibbert*.

Hæc tres, foliis 2-nis, puras legitimasque esse species, minime pro certo affirmarem: calycis enim proportio, in quibusdam aliis admodum variabilis.

Corifolia,

E. calyce reclinato-patente: corollâ $1\frac{1}{2}$ -lineari, calyci plus minus æquali; tubo urceolari; laciniis acutis.

E. articularis. *Curt. Bot. Mag. n. 423. cum Ic.* E. calycina. *Andr. Er. n. 17. cum Ic.* E. corifolia. *Thunb.*

Diff. n. 77. E. corifolia. *Linn. Diff. n. 26. cum fig.*

floris tenelli, pessimâ. E. articularis. *Linn. Mant. p. 65.*

An sit *Corifolia* *Sp. Pl. ed. 2.* solum ab Herbario

Burmänniano discendum.

Obvallaris,

E. bracteis grandibus, obovatis, supra medium pedunculi: corollâ 2-lineari; laciniis totis crenulatis.

E. bractæata.

E. bracteata. *Thunb. Diff. n. 3.*

Sponte nascentem ad *Platte Kloof* montibus, legit C. P. Thunberg.

Filamenta certe calcarata.

E. foliorum laminis pube densâ ciliatis : corollâ 2-lineari, Hyssopifolia,
versus apicem hirtâ ; laciniis crispis, retusis.

E. pigra. Soland. MS.

Sponte nascentem juxta *Baay Fals*, legit G. Robertson.

Bractæ tantummodo duæ, ut in omnibus hujus cohortis : vicem tertiæ supplet folium pedunculo subiectum, dilatatum, et plerumque coloratum.

E. foliorum laminis reclinatis, acute mucronatis : corollâ 3-lineari ; laciniis ovato-cuneatis, 2-fidulis. Taxifolia.

E. taxifolia. Wendl. Er. fasc. 2. p. 19. cum Ic. E. taxifolia. Pl. Kew. t. 19.

Calcaria in hac recte delineavit *Wendland* : hinc ab alio auctore ejus differentiam specificam, quæ antheras muticas sistit, concinnatam fuisse suspicor.

E. floribus in rudimentis axillaribus : calyce cuspidato, Pugionifolia,
longe ciliato : corollâ 4-lineari, pyramidalis : antheris a medio foraminosis.

E. tetragona. Thunb. Diff. n. 5, cum Ic.

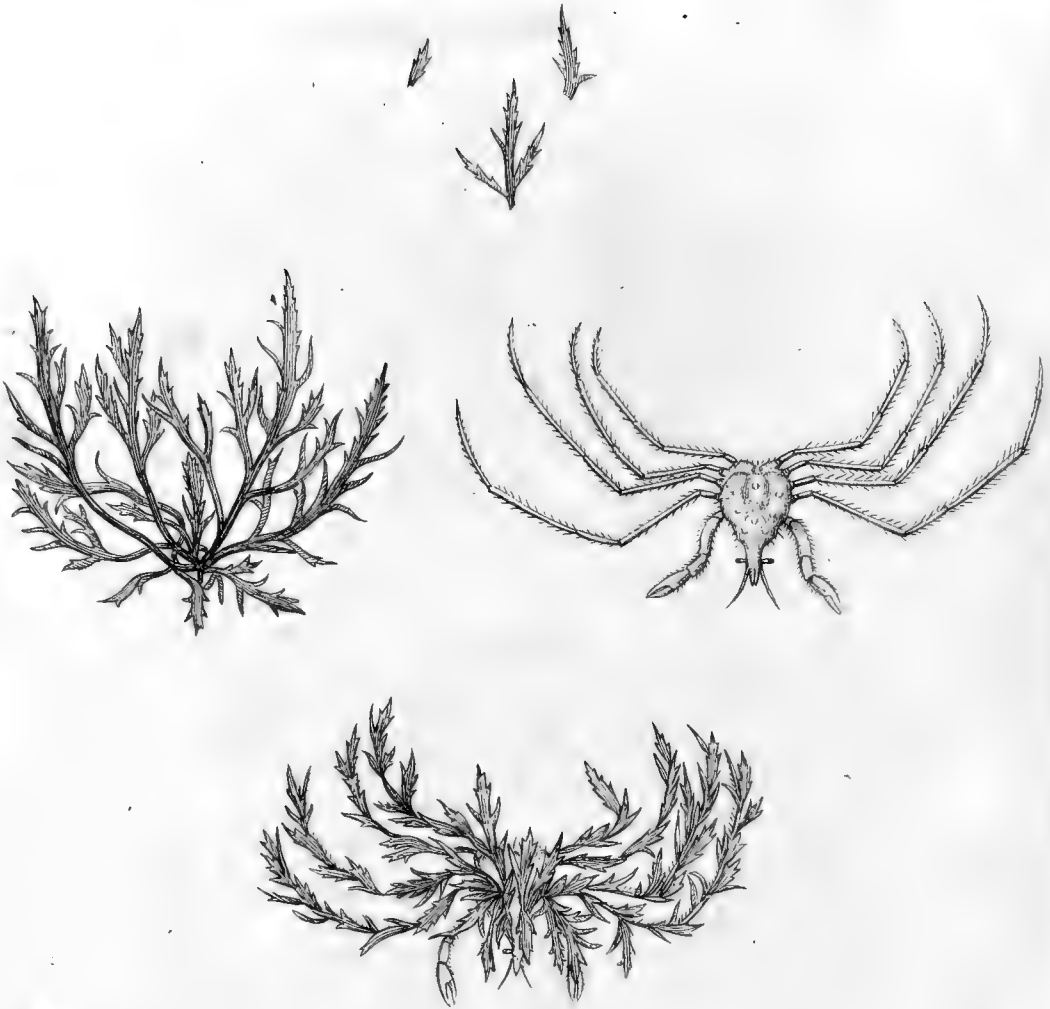
Flores lutei.

E. floribus in rudimentis axillaribus : calyce acuminato : Viminalis.
corollâ 3-lineari, ovatâ : antheris juxta apicem foraminosis.

E. albens. *Curt. Bot. Mag. n. 440. cum Ic.* *E. albens.*
Linn. Diff. n. 34. cum fig. floris. *E. albens.* *Linn.*
Mant. p. 231.

Flores ochroleuci.

Paucula nunc in vacuo chartæ spatioso, de nostris nominibus, inferere liceat. Satis scio, his temporibus periculum quid novandi: etiam doctissimos Botánicos, qui nullum, quantumvis licet absurdum vocabulum, quod ipsi non antea irrifui damnaverint, mutari patiuntur. Tantis viris, me nil contra rationem unquam mutasse, modo respondeam: quibus autem hortulanorum gentis prudentissimæ nomina adulatoria magis placeant, omnibus istis religiose a me citatis, prout cuique libido est, utantur.



J. Macculloch del. 1800.

 XXV. EXTRACTS *from the* MINUTE BOOK *of the* Linnean Society.

April 7, AN account was laid before the Society, from Dr. Mac-
 1801. culloch, F. L. S. of an artifice used by the *Cancer Phalangium*
 to ensnare its prey. This contrivance consists in the insect
 dressing itself up, as it were, in fragments of a *Fucus* (the
 narrow-leaved variety of Hudson's *ciliatus*), which it seems
 to cut off, and to attach to the long hairs of its body and
 legs by means of a glutinous substance. It thus imitates a
 perfect plant of that *Fucus* so accurately as to have deceived
 Dr. Macculloch. See TAB. XXXI.

Oct. 6. L. W. Dillwyn, Esq. F. L. S. sent information of his
 having discovered the *Syymbrium murale* of Linnæus (a plant
 not hitherto noticed as of British growth) growing wild
 abundantly on the pier at Ramsgate and other places there-
 abouts. He believes it to be rather common throughout the
 isle of Thanet.

Dec. 1. A letter from Dr. Walter Wade, of Dublin, A. L. S. to
 the President, mentions his having found the *Eriocaulon sep-
 tangulare*, *Engl. Bot. v. 11. t. 733*, in Ireland. It has never
 before been seen but in the Isle of Skye. Dr. Wade observed
 it last September, decorating the edges of all the lakes, great
 and small, in the romantic mountainous district of Cunnama-
 rara, in the county of Galway. He remarked the number
 of angles in the stem to vary from 6 to 10, though most
 frequently

frequently 7, and that the generic and specific characters accorded with those given in *Engl. Bot.*

Dec. 15. Information was given that the late Dr. Pulteney, F. R. S. and L. S. had ordered his very valuable Musæum of Natural History to be presented to the Society, on condition of its being preserved as a separate collection, in his name; and that he had also bequeathed to the Society the sum of two hundred pounds stock, in the three per cent. consolidated annuities.

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Continued from Page 293 of Vol. V. of the Society's Transactions.

N. B. To Books which are Continuations of Works contained in the former Part of the Catalogue the original Numbers are here affixed; and the other Books are numbered in regular Progression.

459. ACHARII (E.) *Prodromus Lichenographiæ Sueciæ*. Lincopiæ, 1798, 8vo.
17. Barton's (B. S.) Supplement to a Memoir concerning the fascinating Quality of the Rattle-Snake, and other American Serpents. 8vo.
35. Blumenbach (J. F.) *Abbildungen Naturhistorischer Gegenstände*. 5 tes heft. Göttingen, 1800, 8vo.
460. ————— *Ueber die Zauberkræft der Klapper-Schlange*. 8vo.
461. Clairville () *Entomologie Helvétique*, vol. 1. Zurich, 1798, 8vo.
462. Columnæ (F.) *Phytobafanus*. Mediolani, 1744, 4to.
463. Comparetti (A.) *Observationes Dioptrica et Anatomicæ Comparatæ de Vifu et Oculo*. Patavii, 1798, 4to.
464. Davy's (H.) *Syllabus of a Course of Lectures on Chemistry at the Royal Institution*. Lond. 1802, 8vo.
465. Donn's (J.) *Hortus Cantabrigiensis*, ed. 2. Cambridge, 1800, 8vo.
466. Donovan's

466. Donovan's (R.) Epitome of the Natural History of the Insects of India, No. 1 to 7
Lond. 1800—2, 4to.
467. Bryander (J.) Catalogus Bibliothecæ Historico-Naturalis Josephi Banks, tomus 5.
Londini, 1800, 8vo.
467. Fabri (J. M.) Strychnomania. Aug. Vindel. 1677, 4to.
468. Forster (G.) Herbarium Australe, Gottingæ, 1797, 8vo.
469. Freiesleben (J. C.) Ueber das schillernde Fossil, von der Basse bey Harzburg. Leipzig,
1794, 8vo.
470. Garnett's (T.) Annals of Philosophy for 1800. London, 1801, 8vo.
471. ——— Outlines of a Course of Lectures on Chemistry at the Royal Institu-
tion. London, 1801, 8vo.
472. Grasso (J. P.) Diff. inaug. de Lacerta agili. Helmstadii, 1788, 4to.
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476. Hofack's (D.) Syllabus of a Course of Lectures on Botany, delivered in Columbia-
College. New York, 1795, 8vo.
477. Hudson's (W.) Flora Anglicæ, ed. 2. Lond. 1778, 8vo.
478. Hutchinson's (J.) Natural History of the Frog Fish of Surinam. York, 1797, 4to.
479. Lamarck (J. B.) Systême des Animaux sans Vertèbres. Paris, 1801, 8vo.
480. ——— Encyclopédie Méthodique, Botanique, tome 1—3. Paris, 1789, 4to.
481. Langer (J. H. S.) Mineralogische Geschichte der Hochstifter Paderborn, und Hildes-
heim. Leipzig, 1789, 8vo.
482. Lapeyres (J. H.) Sessæ Europææ. Berol. 1801, 4to.
162. Latham's (J.) Supplement 2d to the General Synopsis of Birds. London, 1802, 4to.
483. Latreille (P. A.) Histoire des Salamandres de France. Paris, 1800, 8vo.
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486. Ludwig (C. F.) Erste Aufzählung der bis jetzt in Sachsen entdeckten Insekten. Leip-
zig, 1799, 8vo.
487. Markwick's (W.) Descriptions and Figures of Grasses. MS. folio.
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302. Martyn's (Tho.) Gardener's and Botanist's Dictionary, by the late Philip Miller,
corrected and newly arranged, with Additions. Part 14—16,
489. Martin's (J.) History of Nafeby. Cambridge, 1792, 8vo.
490. Mikán (J. C.) Monographia Bombyliorum Bohemiæ. Pragæ, 1796, 8vo.

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 495. Montagu's (G.) Ornithological Dictionary, or Alphabetical Synopsis of British Birds, 2 vols. London, 1802, 8vo.
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 498. Raji (J.) Synopsis Methodica Animalium Quadrupedum, et Serpentina Generis. Lond. 1693, 8vo.
 499. ———— Synopsis Methodica Stirpium Britannicarum, ed. 3. Lond. 1724, 8vo.
 500. ———— Historia Plantarum, tom. 1 et 2. Londini, 1686—88, fol.
 501. Van Rheede (H. A.) Hortus Indicus Malabaricus, tomi 12. Amstelod. 1678—1703, fol.
 502. Rosenmüller (J. C.) de Offibus Fossilibus Animalis cujusdam. Lipsiæ, 1794, 4to.
 346. Roxburgh's (W.) Plants of the Coast of Coromandel, vol. 2, parts 2 and 3.
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 512. Sinclair's (Sir John) Hints on Longevity. 4to.
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 514. Smith (J. E.) Flora Britannica, vol. 1. & 2. Londini, 1800, 8vo.
 515. ———— Compendium Floræ Britannicæ. Londini, 1800, 8vo.
 377. Smith and Sowerby's English Botany, vol. 10 to 14. London 1800—2, 8vo.
 516. Stacey's (H. P.) Observations on the Failure of Turnip Crops. London, 1800, 8vo.
 517. Strange, sopra l'Origine della Carta Naturale di Cortona. Pisa, 1764, 4to.
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 ——— *Dissertationes Academicæ.* Upsaliæ, 4to.
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 520. *De Drofera.* 1797.
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524. Weigel (C. E.) *Vom Nutzen der Botanik.* Greifswald, 1773, 4to.
 525. White's (Gilbert) *Works in Natural History, with a Calendar and Observations by W. Markwick, Esq.* 2 vols. London, 1802, 8vo.
 526. Young's (T.) *Syllabus of a Course of Lectures on Natural and Experimental Philosophy at the Royal Institution.* London, 1802, 8vo.
438. *Philosophical Transactions of the Royal Society of London, for 1800.* London, 4to.
 527. *Transactions of the Royal Society of Edinburgh, vol. 5. part 1.* Edin. 1799, 4to.
 439. *Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, vols. 17, 18, 19.* Lond. 8vo.
528. *Asiatic Researches, vol. 1—6.* Calcutta, 1788—1799, 4to.
 440. *Memoirs of the Literary and Philosophical Society of Manchester, vol. 5.*
 529. *Philosophical Transactions abridged, vol. 1—7.* London, 1721—1734, 4to.
 530. *Journals of the Royal Institution, No. 1—7.* 8vo.
 531. *Prodromus Lepidopterorum Britannicorum, by a Fellow of the Linnean Society Holt,* 1802, 4to.
 532. *Termini Botanici.* Edinburgi, 1770, 8vo.
 533. *Conspectus Horti Botanici Jenensis.* Jenæ, 1795, 4to.



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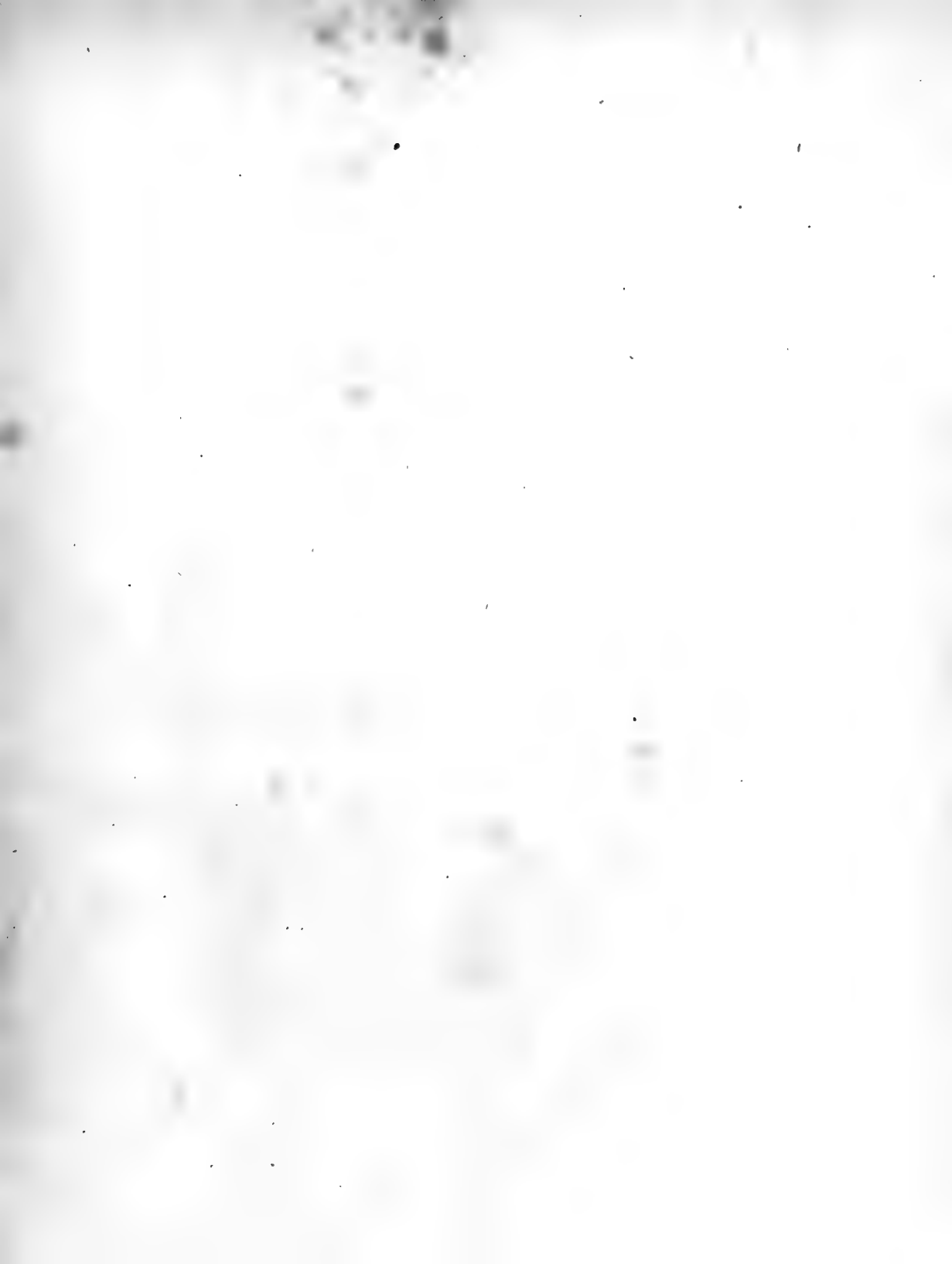
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