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THE ANNALS
AND
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[SECOND SERIES.]

“..... per litora spargite muscum,
Naiades, et circum vitreos considite fontes :
Pollice virgineo teneros hic carpite flores :
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas ;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchyliæ succo.”
N. Parthenii Giannettasii Ecl. 1.

No. 61. JANUARY 1853.

I.—*Observations on the Solanaceæ.* By JOHN MIERS, Esq.,
F.R.S., F.L.S.

IT is now (October 1852) more than two years since I suspended my observations on the *Solanaceæ*, in expectation of the long promised monograph of M. Dunal, which has at length made its appearance in the 13th volume of the ‘*Prodromus*’ of M. DeCandolle. Several of the genera belonging to this family, as well as most of the species that I have enumerated at different intervals, are there recorded ; but as their respective affinities, their distribution founded on peculiar features, and the differential characters of the divisions thus proposed, are not noticed in the slightest degree, I feel myself called upon to make some remarks on the subject. Considering how little was known of the real limits of the genera of the *Solanaceæ* a few years ago, aware of the confusion in which these were associated upon the most irreconcilable data, as witnessed in the latest distribution of the family in Endlicher’s ‘*Genera Plantarum*’ and Don’s ‘*Dictionary*,’ knowing that the species were ill-defined and ill-classified, and that a large proportion of undetermined plants were amassed in every herbarium, for want of the means of their discrimination, it was natural that a general satisfaction should

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be felt on the announcement, that M. Dunal was occupied in elaborating a monograph of the family for the 'Prodromus.' This ought, in regular order, to have preceded the *Scrophulariaceæ*, and to have appeared seven years ago: the intervening delay has therefore served only to increase a general anticipation of greater perfection in a work, proceeding from the hand of one who had written on the genera of the family and their affinities thirty-five years since, and who had made this order an object of his study during a great portion of his life. It cannot be concealed that its appearance has not answered the universal expectation, and that a feeling of disappointment has been generally felt among botanists on its perusal. All will unite in their acknowledgement to M. Dunal for the production of this laborious work, and will willingly excuse a large share of its imperfections, when it is known, that in his anxious endeavours to bring it to a close, he has laboured beyond his physical powers, persevering in this task under the pressure of long and continued illness. Still it is to be regretted, that circumstances should have operated to keep its distinguished author in ignorance of the facts and reasonings that have been published within the last few years. If, therefore, I now proceed to point out several inconsistencies in the distribution exhibited in this volume, I can truly affirm, that it is not from any desire to criticize the labours of M. Dunal, but to justify what is due to the advancement of science, and to support the inferences drawn and the facts collected by me towards the history of this family.

The great object of all scientific arrangement is to group together individuals possessing some common conspicuous features, by which they may be readily distinguished: these may again be subdivided by other partial characters into sections and subsections, but all such characters should be clearly definable.

The ordinal character of the *Solanaceæ*, as given by M. Dunal, like that of his predecessors, falls very far short of this desideratum, and the Conspectus of the classification is deficient of those tangible features that should serve the purpose of discrimination. Its limits are by far too general, embracing within its scope individuals belonging to other orders. In the character of the corolla, for instance, the more important features are neglected or merely hinted at, while others more especially selected are frequent among *Scrophulariaceæ* and other orders: hence they are of little value for distinguishing the precise family to which species belong. In the characters given of the structure of the seed and embryo, many peculiarities are altogether omitted, while others are inaccurately described: these will be more particularly noticed presently. In his Conspectus, M. Dunal divides the family into two tribes, the *Nolaneæ* and the *Solaneæ*,

the latter being separated into nine subtribes, which are marked by very insufficient characters, as I shall hereafter explain. Of these subtribes the most numerous in genera is the *Solanaceæ*, signalized by three principal features; 1. a regular corolla, an indication of little utility, as it exists equally in other tribes; 2. a bilocular berry; 3. a semicircular or spiral embryo, a feature also retained by other subtribes, and even here too its applicability as a test is rendered nugatory by the knowledge that *Juanullosa* and *Marckea* have a nearly straight embryo.

It is to be regretted that M. Dunal should have associated the *Nolanaceæ* with the *Solanaceæ*, from which they differ essentially in the structure of the pistil and the fruit. The *Scrophulariaceæ*, *Atropaceæ* and *Solanaceæ*, placed as I have suggested under more strictly defined and simple limits, form, together with some other families, a very manifest alliance, exhibiting the prominent characteristics of monopetalous flowers, with a pistillum consisting of a superior ovary, a simple style, and a stigma generally entire or 2-lobed; the ovary by the confluence of its carpels being normally 2-locular, with the cells placed always anteriorly and posteriorly in regard to the axis; and whenever the few known exceptions occur of more than two cells, these will be found to arise generally from an unusual extension of the placenta, which always proceeding from the centre of the dissepiment, produce abnormally other spurious cells. Among the *Nolanaceæ*, the only genus that approaches this definition is *Grabowskyia*, all others differing essentially in structure, but even in that genus the resemblance is more apparent than real. In the *Nolanaceæ*, the carpels constituting the pistillum are more numerous, and, excepting the case just mentioned, are always free, springing from a fleshy receptacle surrounded by distinct glands, and all receiving their fertilizing influence through the medium of one common style, that has no direct communication with the ovaria, but always indirectly, through the intermedium of a supporting gynobase, in the same manner as the *Borraginaceæ* and the *Labiataæ*. In *Grabowskyia*, although the two component carpels are connate, the style apparently issuing from it does not spring from the summit, as in an ordinary pistillum, but may be traced down the axile line of their union to the base, and may be separated from the adherent carpels: the style therefore, though concealed below by the confluent carpels, is truly of gynobasic insertion. This essential difference in the structure of the pistil renders the union of the *Solanaceæ* and *Nolanaceæ* quite indefensible. Another peculiarity is constant in the *Nolanaceæ*, in which respect we find no parallel or analogy among the *Solanaceæ*: this consists in the fact, that whether the ripened nuts be unilocular or many-celled (the cells in all

cases being 1-seeded), there is always seen at their basal point of attachment, one or more scars, each closing the entrance into a corresponding cell, which scar, in every case, represents the end of a kind of plug, evidently analogous to the strophiole (or Calomphala of Schrader), so conspicuous in the nuts of the *Boraginaceæ*. Another distinction will also be found to exist which has not been noticed by M. Dunal: in the *Solanaceæ* the extremity of the radicle never points immediately to the hilum, but is directed to a spot removed from it, and even where the embryo is straight, as in *Metternichia*, *Cestrum*, *Fabiana*, &c. Although the end of the radicle points to the bottom of the seed, the hilum is always lateral or marginal, at some little distance from the base: in *Nolanaceæ*, on the contrary, the extremity of the radicle always points to the strophiolar cavity in the base of the nut, and of course to the hilum, or place of its attachment to the gynobase. This forms another essential and constant difference between the two families. There is still one more material distinction in the structure of the pistillum arising out of the circumstances just mentioned. In the *Solanaceæ*, we always meet with numerous ovules in each cell, all attached to the placenta springing from the dissepiment; in the *Nolanaceæ*, a single ovule only exists in each cell, and this is constantly erect and of basal origin.

Schlechtendal in 1832 (Linnæa, vii. 72) pointed out the analogy that exists in the genus *Nolana* to the families of the *Boraginaceæ* and *Solanaceæ*, admitting its greater affinity with the former, on account of the structure of its fruit and the æstivation of its corolla; but as a justification for those who might prefer placing it in *Solanaceæ*, it was argued by that able botanist, if the genus *Lycium*, which differs from other genera of this last-mentioned family in the æstivation of its corolla (the only exceptional case at that time known), be retained in this order, then there would be less difficulty in admitting *Nolana*, notwithstanding the very different structure of its fruit. Dr. Lindley, who first proposed this order in 1833, placed it near the *Convolvulaceæ*. G. Don (1837) was I believe the first who decidedly associated the *Nolanaceæ* as a tribe of the *Solanaceæ* (Dict. iv. 399), but he offered no reasons for this union. Endlicher in his 'Genera Plantarum' followed the views of Dr. Lindley, in attaching this group as a suborder of the *Convolvulaceæ*. Brongniart (1843) adopted the same views in regard to the affinity of the *Nolanaceæ*. A. de Jussieu (1844, Cours Élémentaire) equally confirmed the ideas of the before-mentioned botanists, in placing the *Nolanaceæ* in contiguity with the *Dichondreeæ*, between the *Boraginaceæ* and *Convolvulaceæ*. In 1845 I adduced many facts and several additional reasons, why the *Nolanaceæ* should be placed

in the system following the *Borraginaceæ* (Hook. Lond. Journ. Bot. iv. 366), which position was confirmed in the following year under the arrangement given by Prof. Lindley (Veg. Kingd. 654), where this order is placed in his Echial alliance with the *Borraginaceæ*, *Labiataæ* and others. The views of so experienced a botanist as M. Dunal must ever be received with respect, and will claim support from the mere prestige of his name, as well as from the high reputation of the great work to which he has contributed this important monograph; but we may be allowed to doubt the propriety of his determination, in placing the *Nolanaceæ*, as a tribe of the *Solanaceæ*, without refuting the reasons urged by so many botanists against the justness of this arrangement, or offering any arguments in favour of such an alliance. This classification may have originated in the too eager desire entertained by M. Dunal, in common with many botanists, to diminish as much as possible the number of natural orders, a very proper and meritorious caution, but when carried to excess, as in this instance, is productive of mischief; for by uniting several families into one, which are composed of very opposite and dissimilar characters, we destroy the very object we attempt to establish, viz. to mark the limits of distinction between different groups of plants. The selection of a few decided and constant characters, that can serve to distinguish each order, tribe or section, must infallibly tend to the greatest simplicity of arrangement; and if in accomplishing this purpose, we should thus be led to increase the number of families, in order to ensure the means of certain discrimination, it is indubitably better to do so, rather than, by pursuing the opposite extreme, to render all fixed landmarks useless. It was upon this conviction that I proposed (*huj. op.* iii. 163) to reduce the *Scrophulariaceæ* within more certain limits than Mr. Bentham had employed in his admirable monograph of the order in the 10th volume of the 'Prodrômus' of M. DeCandolle, and also to confine the *Solanaceæ* within strictly definable bounds. The difficulty of establishing an obvious line of demarcation between these two great families, was there discussed at some length, when I showed how unsuccessful had been the attempts of botanists to remedy so manifest a defect in the system. Mr. Bentham, it is true, adopted with this view, the plan of associating the few aberrant cases then known, in a distinct tribe, his *Salpiglossideæ*: the heterogeneous features of that tribe have been fully demonstrated, proving that the attempted remedy has been wholly inefficacious: among the many instances that could be cited, it is only necessary to point out, how impossible it is to retain *Salpiglossis*, *Anthocercis*, *Schwenkia* and others in *Scrophulariaceæ*, while *Petunia*, *Nierembergia*, and numerous others are placed in *Solanaceæ*. At the time of Mr. Bentham's monograph the exceptional genera were few, but

since that period they have become so multiplied as to equal in number those belonging to true *Solanaceæ*.

As a desirable test towards the attainment of this great desideratum, I suggested the constant character of the æstivation of the corolla, which, combined with other well-selected features, will be found to reduce these two extensive orders within definable bounds: for this purpose, it is only requisite to detach from each their several aberrant cases, and comprise these in an intermediate family, where they are easily separable into tribes, distinguishable by marked peculiarities. M. Dunal does not seem to have been aware of this suggestion, or at least, no such expedient appears to have entered into his contemplation; and his ordinal diagnosis of the *Solanaceæ*, aggravated still further by the inclusion of the *Nolanaceæ*, is necessarily a combination of contradictory characters, repeating and increasing all the defects of his predecessors.

I will here recapitulate the more essential points suggested on a former occasion, when upon the principle then recommended, the Solanal alliance, excluding entirely the *Nolanaceæ*, but including the *Scrophulariaceæ*, will consist of individuals, marked by the leading characters just enumerated (*ante*, p. 3). Among these, the *Solanaceæ* will embrace those genera with a monopetalous corolla, having a 5-, rarely 4-partite border, the lobes of which (even under the unusual circumstance of the tube being oblique) are nearly regular and equal, and their margins always valvate or induplicato-valvate in æstivation: epipetalous stamens, alternate with, and equal to the number of the lobes, sometimes unequal in length and size, and the fifth very rarely sterile; anthers introrse, bursting by longitudinal slits or apical pores; an ovarium most generally 2-celled, rarely 3- to 5-locular, with a simple style and a 2-lobed or clavate stigma, often hollow; a fruit either capsular or baccate, 2-locular, rarely more-celled from the increment of the placenta, albuminous seeds with an embryo, in the suborder *Curvembryeæ*, always slender, terete, and curved in a more or less annular or spiral form, in the suborder *Rectembryeæ*, short and straight, the radicle in all cases pointing, not to the base, but to the basal angle of the seed, and turned away to some short distance from the hilum, which is generally lateral and somewhat marginal, but never basal. They consist of plants, with alternate, often geminate, rarely pinnatifid leaves, with an inflorescence sometimes axillary, but more generally a little extra-axillary, or lateral, either single or fasciculated, or in different modifications of the cyme, panicle or corymb, under a mode of development called centrifugal.

The *Scrophulariaceæ* will consist of those genera, possessing a tubular corolla, more or less curved and irregular, with a 4- or 5-partite border, the lobes of which are generally unequal and

bilabiate, and decidedly imbricate, never valvate, in æstivation; stamens two or four, didynamous, rarely five, or with a rudimentary fifth; anthers always introrse; an ovary most generally bilocular, a simple style, with a stigma more or less bilabiate or 2-lobed; fruit almost always capsular, in a very few cases baccate, 2-locular, rarely more-celled, bursting in different ways, with placentæ proceeding from the dissepiment. Seeds albuminous, with an embryo quite straight, or but little curved, generally with the radicle pointed towards a basal hilum: in one solitary instance the embryo is perispherically curved, and in the *Rhinantheæ*, by an abnormal extension of the podosperm; the hilum appears somewhat lateral. In this very natural family, although the floral leaves are often alternate, the cauline leaves are most generally opposite, a circumstance that occurs only accidentally in *Solanaceæ*: the inflorescence is strictly axillary*.

The *Atropaceæ* will comprise all the anomalous exceptions to the foregoing rules in the *Solanaceæ* and *Scrophulariaceæ*, and will include plants with monopetalous flowers, with the tube often plicated longitudinally in bud, and a border often somewhat unequal, but seldom bilabiate, generally divided into five lobes, which are always either imbricately disposed in æstivation, or arranged under some modification between that form and the induplicate, but never valvate, the margins of each lobe being constantly free from the adjoining ones: they have generally five epipetalous fertile stamens, alternate with the lobes, one of them sometimes shorter, and very rarely three of them sterile: anthers generally introrse, sometimes extrorse, 2-lobed, usually with parallel cells bursting longitudinally, one of the lobes being occasionally sterile: ovary 2-locular, rarely, with other spurious cells, caused by the abnormal growth of the placentæ, with ovules generally ascending, attached to fleshy placentæ adnate to the dissepiment, as in the two preceding families, a simple style, a bilobed stigma, often of a peculiar form: fruit either baccate or capsular: seeds generally reniform and compressed, with a lateral hilum, the embryo placed in albumen, and either straight or more or less curved, sometimes spiral, with the radicle, as in the *Solanaceæ*, always turned away from the more lateral hilum. Herbaceous plants or shrubs, with a habit similar to that of the *Solanaceæ*, with alternate, simple, geminate, or fasciculate leaves:

* The efficacy of this test may be applied to *Verbascum*, a genus of the *Scrophulariaceæ*, which offers so many anomalous characters, as to have induced many botanists to place it in *Solanaceæ*. On a former occasion I discussed this subject at some length (*huj. op.* iii. 181), when reasons were shown why a preponderance tended towards its position among the *Scrophulariaceæ* as determined by Mr. Bentham: to these I may now add the fact of the structure of the seed, in which the radicle of its straight embryo is directed towards its basal hilum.

inflorescence generally somewhat extra-axillary, and lateral in regard to the insertion of the petiole.

The distribution of the *Solanaceæ* and of the *Atropaceæ*, as proposed in this work (*huj. op.* iii. 164-178), like every first attempt of the kind, is sure to present many faults that will admit of correction, but it appears deserving of the attention of botanists as a general plan: it certainly effects the great desideratum of removing the obstacles that have always stood in the way of a satisfactory arrangement of the Solanal alliance, and it separates the genera into very natural groups, which we do not meet with in the system adopted by M. Dunal. Some observations on the peculiar features of each of these groups will be found in the pages referred to.

I now proceed to review in succession the value of the characters selected as the discriminating marks of the subtribes, in the arrangement followed by M. Dunal. There does not appear to me sufficient reason for separating the genus *Triguera* as a subtribe distinct from the *Solaneæ*. It is certainly a well-marked genus, possessing prominent characters, and differs only from the other genera of the latter subtribe in the slightly oblique form of its bell-shaped corolla; but, like others of the *Solaneæ*, its border has five equal and regular lobes, and agrees with them in æstivation; it has also five equal stamens, supported on a ring, as in *Cyphomandra*, but this ring is more free from the tube of the corolla; its anthers open by apical pores, as well as by lateral slits, as in some sections of *Solanum*; in the structure of the ovary, its style and stigma, in its fruit, its placentation, its seed, and its embryo, there is nothing different from what we frequently meet with in *Solanum* itself. M. Dunal, on the authority of Cavanilles, states the fruit to be 4-locular, each cell producing only two seeds, which are superimposed. I found the fruit to be distinctly 2-locular, being divided by a single membranaceous dissepiment, with two or three seeds in each cell, fixed, as in *Solanum*, to fleshy placentæ adnate to the dissepiment. The seeds are reniform, compressed, large in proportion to the size of the fruit; but their paucity in each cell is a test of no value, for I found in *Withania* only a solitary seed perfected in each cell. There is not therefore a single character in *Triguera*, except the small obliquity of the tube of the corolla, that is not met with in other genera of the *Solaneæ*.*

Among the subtribes *Solaneæ* and *Atropineæ* of M. Dunal, we

* I have observed in several other cases an equal degree of obliquity in the corolla. Among these may be instanced *Hyoscyamus pictus*, where it is quite as oblique and gibbous as in *Triguera*: the same fact is depicted in the plate given of *Hyoscyamus niger*, in Nees's Gen. Pl. Fl. Germ. figs. 5, 6 and 7.

find genera placed heterogeneously together, without regard to uniformity of character, and totally irrespective of the most important feature of æstivation. Thus, among the *Solaneæ*, which possess a valvate æstivation, is placed the genus *Nicandra*, with a corolla resembling that of a *Convolvulus*, the lobes of its border possessing a decidedly imbricated æstivation. The want of attention to this last-mentioned important character has, in the same manner, led to the confused association of several genuine sections: thus, among the *Atropineæ*, we find the very natural group of the *Jaboroseæ*, distinguished by a tubular corolla, which in most cases grows black in drying, always possessing a valvate æstivation and other very distinct characters, classed with *Atropa* and *Mandragora*, genera quite different from them and each other, and possessing a remarkably imbricate æstivation. Thus also in the *Lycineæ*, there is an equal amount of complication, for we see *Dunalia*, *Iochroma*, *Pæcilochroma*, *Acnistus*, and others with valvate æstivation, associated with several distinct groups that possess an imbricated æstivation: among these we find *Juanulloa*, *Solandra*, &c., and also *Marckea*, *Thinogeton*, &c., and all these again congregated with *Lycium*—groups perfectly distinct from one another. We meet with *Juanulloa* and *Marckea*, having almost a straight embryo, placed among a number of genera having a nearly annular embryo.

The genus *Thinogeton*, arranged by M. Dunal among his *Lycineæ*, is said to be closely allied to *Jaborosa*, *Himeranthus*, *Dorystigma* and *Trechonaetes*, genera which he has singularly placed among his *Atropineæ*. This distinguished botanist can never have seen a specimen or drawing of *Thinogeton*, or he would never have ventured on such a conclusion: its affinity, as I have elsewhere shown, is toward *Scopolia*, *Physochlena* and *Cacabus*, genera that I have placed with *Hyoscyamus*, on account of their many uniform characters, particularly that of the operculiform dehiscence of their fruit.

In M. Dunal's tribe of the *Datureæ*, we meet with a similar degree of irregularity, in the association of perfectly incompatible genera. Thus *Dictyocalyx* is placed here, while *Thinogeton* is arranged among the *Lycineæ*, and yet these two genera are identically the same. This genus with a spiral embryo, and *Datura* with a nearly annular embryo, are associated with *Solandra*, where the embryo is nearly straight or but slightly curved; in this respect M. Dunal has followed the example of older botanists, who, for no other reason that we can imagine, drew this conclusion, because in former times *Solandra grandiflora* was the *Datura scandens* of Plumier. *Solandra* is as totally distinct in habit from *Datura* as it is in structure; it is a climbing plant, with large coriaceous leaves and orange-coloured

flowers of large size, with a thick fleshy corolla, having a ventricose funnel-shaped tube, and a border of five large fleshy lobes, which in æstivation are so deeply imbricated that they completely overlap one another. In *Datura*, on the contrary, the corolla is white or of a lurid blue, with a nearly entire or pentangular border; this in æstivation is plicated into five deep folds, which almost meet in the axis, and these folds are torsively and spirally twisted round the common centre, having their margins thus valvately coherent in juxtaposition: no two cases of more extreme difference could have been selected. On account of the very dissimilar æstivation of the corolla and other distinct features, the separation of *Solandra viridiflora* from this genus, as proposed by me under the name of *Dyssochroma*, has been acknowledged by M. A. DeCandolle in the Appendix (Prod. xiii. 689), although they are combined together in the body of the work. *Ectozoma* also, having a corolla with an imbricated æstivation, and which I have shown to be allied to *Juanulloa*, is also placed among the *Datureæ*, but for what reason is not explained: it has not the smallest relation with *Datura*. I shall in a separate memoir conclude the remarks I have to make on *Datura* and the genera allied to it, which I consider distinct, but which M. Dunal regards as mere sectional divisions of that genus.

Many objections may be made to M. Dunal's subtribe of *Hyoscyameæ*, formed only of the genera *Hyoscyamus* and *Scopolia*: this subtribe I have excluded from true *Solanaceæ* on account of the decided æstivation of the corolla. In the generic character of *Hyoscyamus*, this feature is represented as being plicated, not imbricated, and the description of the mode of placentation is quite at variance with my own observation; indeed the entire generic character given in the 'Prodromus' (p. 546), is a copy, verbatim, from the text of Dr. Putterlich in 'Nees's Gen. Pl. Flor. Germ.' On a former occasion (*huj. op.* v. 468) I showed that this description does not accord with the very clear and analytical details exhibited in the accompanying plate: the æstivation of the border, said to be plicate, is distinctly delineated as being quincuncially imbricate in figs. 3. and 21, and there is no indication of any plicature of the border in any of the other several figures of the corolla: the placentæ are stated in the text of that work, and of the 'Prodromus,' to be inserted on the dissepiment by a linear dorsal line, while the figures 19. and 28. exhibit broad lunated placentæ projecting into the cell, connected with a short membrane that emanates from the axis of the dissepiment: I find neither of these statements to accord with what I have seen in *Hyoscyamus pictus*, of which species I have examined scores of ovaria and capsules, in a living state, where I have invariably found the placentæ to be thick and

fleshy, and completely adnate to the dissepiment. I have also, in the work above referred to, directed attention to the striking, fleshy, epigynous gland, which has been quite unnoticed by preceding observers, and it is singular that so remarkable a feature should have been omitted in the 'Prodromus.' The genus *Scopolia*, as enlarged by M. Dunal, is divided into four sections, *Datora*, *Physochlena*, *Anisodus* and *Scopolia*, groups which appear to me all generically distinct. *Datora* evidently belongs to *Hyoscyamus* rather than to this genus. In *Scopolia*, judging from the plants I have seen growing in Kew Gardens, the inflorescence is always solitary, a single flower upon a long slender peduncle springing from between the two petioles of the geminate leaves of each distant axillary node of the main stem, and this feature is confirmed in the description of the same species by M. Dunal (Prodr. p. 556). Dr. Putterlich, however, in stating the flowers to be solitary and pseudo-axillary, adds that in reality it is terminal, from the centrifugal evolution of its 2-3-chotomous stem; I confess that I have been unable to distinguish this character: its calyx is urceolate, membranaceous, and regularly 5-toothed: the corolla has a somewhat broad, bell-shaped, almost cylindrical tube, with five very short erect lobes; and although the tube is plicated, the lobes are distinctly imbricated in æstivation: this last feature is acknowledged by Dr. Putterlich, but unnoticed by M. Dunal: the ovary, at its base, is imbedded in an adnate, fleshy, 5-lobed disk, a character existing also in *Hyoscyamus* and its several allied genera: the capsule, invested by its thin persistent calyx, bursts by a small membranaceous, circumscissile operculum. In *Datora*, the type of which is the *Hyoscyamus muticus*, Linn., the inflorescence is described as "floribus apice ramorum racemoso-spicatis" as in *Hyoscyamus*: the calyx in like manner is tubular, 10-ribbed, with five long acuminate teeth; this also increases with the growth of the fruit, becomes rigid in texture, but more ventricose, while the withering teeth collapse and cover the inclosed capsule, instead of remaining erect and spinose: the corolla and stamens differ in no respect from those of *Hyoscyamus*: the operculum of the fruit is, in like manner, hard and hemispherical, with a chartaceous septum; indeed I cannot perceive from the descriptions, any single character different from that genus, except that the calyx becomes more ventricose, and the teeth, instead of remaining erect and rigid, collapse and wither over the enclosed capsule: there is nothing here, however, to justify its being placed in *Scopolia*: I am not sufficiently acquainted with the plants of this section to offer a decided opinion; but if it really differ generically from *Hyoscyamus*, it must remain a distinct genus (perhaps *Secarana*, from its Arabic name, for *Datora* is too near *Datura* to be per-

mitted) ; but it appears to me far better to class the three species enumerated by M. Dunal as a mere section either of *Hyoscyamus* or of *Physochlæna*, as I suggested (*huj. op.* v. 473).

In regard to *Physochlæna*, many reasons have been offered (*huj. op.* v. 469) to show why it must be considered as a distinct genus : it cannot belong to *Scopolia*, its affinity being much stronger towards *Hyoscyamus*, especially the section last mentioned, on account of the character of its inflorescence, its tubular calyx, and its shorter and more campanulate corolla.

Anisodus, however, is so extremely different in all its characters, that it offers still less reason for being retained in *Scopolia*. The latter has a membranaceous urceolate calyx, one-third or one-fourth the length of the corolla, which is tubular or slightly funnel-shaped, thin in texture, with a border of five very short lobes, slightly imbricated in æstivation. In *Anisodus*, on the contrary, the calyx is extremely thick and fleshy in texture, broad, tubular, and somewhat ventricose, with ten thick, prominent nervures, and five obtuse teeth : this does not much enlarge, but it grows thick and rigid, assumes a very reticulated or cancellated appearance, and encloses the large oval berry, when its ten prominent thick nervures become ligneous ; the corolla does not much exceed the calyx in length, is thick and fleshy in substance, broadly campanulate, with a border of five large rounded lobes, which overlap one another at base, and are deeply imbricated in æstivation, one lobe being larger and more interior than the others. In *Scopolia* the testa is tuberculosely rugous, in *Anisodus* it is smooth and slightly punctulated : in the former genus the stigma is capitate and obsoletely 2-lobed, the external surface being covered with short articulated hairs or papillæ ; in the latter genus it is somewhat compressed and distinctly bilobed, with a simply rugous stigmatic surface : in *Scopolia*, the corolla is quite glabrous on both sides, as are also the filaments ; in *Anisodus*, the inner surface is quite woolly, and the filaments are pubescent when in bud ; in the former the fruit is quite capsular, thin in texture, 5-grooved with a torulose surface ; its operculum is simple, soon falls off, and its seeds are affixed on an inconspicuous adnate placenta, attached to the dissepiment ; in the latter genus the fruit is oval, smooth and thick, with a fleshy epicarp that hardens on the pericarp like an exsuccous berry, and the operculum only manifests itself after the decay of the dry fleshy covering ; the seeds are aggregated upon a very large, globose, carnose, favose placenta, adnate to the dissepiment, and are half imbedded in its fleshy substance. In fine, there are more manifest generic distinctions between *Scopolia* and *Anisodus*, than between *Scopolia* and *Hyoscyamus*. In my enumeration of the genera composing my tribe *Hyoscyameæ* (*huj. op.*

iii. p. 166), *Anisodus* was not included, because I had not then observed the operculiform dehiscence of its fruit, a character that had not been previously recorded by any observer; but I rectified this subsequently (*huj. op. vi. p. 37*).

M. Dunal's tribe of the *Nicotianeæ* consists of the genera *Nicotiana*, *Lehmannia*, *Petunia*, *Leptophragma* and *Vestia*: the latter genus certainly bears no affinity towards the others: it was placed by me upon more solid grounds near *Fabiana*, in the true *Solanaceæ*, because of the valvate æstivation of its corolla, and of the resemblance in the structure of its fruit and seed: the other genera, by reason of the imbricate æstivation of the corolla, were placed by me in *Atropaceæ*, but the *Nicotianeæ* were kept as a tribe, distinct from the *Petunieæ*, because of the peculiar mode of æstivation of the corolla, of which diagrams were given in explanation (*huj. op. iii. p. 173*). The genus *Leptophragma* (*Prodr. xiii. 578*), founded on the *Salpiglossis prostrata*, Hook. & Arn., will not be found to be valid. In March 1846, I first hinted at the possibility that *Callibrachoa* would not be found to be distinct from *Petunia*, on which Mr. Bentham immediately suggested that both *Callibrachoa procumbens* and *Salpiglossis prostrata* would in all likelihood prove to be identical with my *Petunia anomala* (see note April 1846, *Lond. Journ. Bot. v. 190*). It will be seen from another note published in Feb. 1848 (*Ill. South Am. Plants, i. 114*), that having met with an opportunity of examining specimens of the two first-mentioned plants, I had found them to differ in no respect from *Petunia parviflora*, of which I have given a drawing, with ample analytical details, in plate 23. of my work referred to: I showed also it is identical with the *Lindernia Montevidensis*, Spr. The genus *Leptophragma*, now first established by M. Dunal upon a letter from Mr. Bentham of an old date, cannot therefore be retained, and *Leptophragma prostrata*, Benth., can only be considered as another synonym of *Petunia parviflora*, Juss., a plant that appears to have a widely extended range over the American hemisphere.

I have already offered several observations on the genus *Retzia* (*huj. op. iii. p. 181*), with which M. DeCandolle, on the authority of M. Dunal, classes *Lonchostoma*, Wikstr. To this I cannot accede, for neither the habit of the plant, nor the structure of the flower, bears any analogy towards the *Solanaceæ*. On some future occasion I will furnish the results of my analysis of these two genera, when I will offer a few additional remarks on the subject.

M. Dunal, in his subtribe *Fabianeæ*, has in an equal degree overlooked the character of æstivation, which is one of the most important and constant features of the genera of the Solanaceæ.

alliance. This subtribe is made to consist of *Nierembergia*, *Bouchetia* and *Fabiana*. The latter genus only I consider to belong to *Solanaceæ*, on account of the valvate æstivation of its corolla. Of *Nierembergia* I have given several illustrations and copious analytical details, where the peculiar character of its æstivation has been fully shown. The genus *Bouchetia*, DC., now first published by M. Dunal, does not appear from the characters described (Prodr. 589) to differ in any respect from *Nierembergia*, and especially from *N. linifolia* and *anomala*, which are figured in plate 20. of my 'Illustrations,' and where the tube of the corolla is a little more swollen towards the summit, and the lobes of the border smaller than usual, as in the genus in question: in the latter species the insertion of the stamens is even lower than in *Bouchetia*.

Of the eleven species of *Fabiana* enumerated by M. Dunal, it is evident from the characters given that the five first mentioned only belong to the genus. *F. grandiflora* is probably one of the singular species of *Alona* (possibly *A. rostrata*) described by Prof. Lindley, or it may be a plant closely allied to, if not identical with, *Phrodus Bridgesii* (Ill. South Am. Plants, tab. 41). *F. squamuligera* is probably *Phrodus nodosus* (*loc. cit.* tab. 42 B). *F. thymifolia*, *F. Sellowiana* and *F. heterophylla*, none of which I have seen, appear, from the descriptions given of them, to belong to *Petunia*, as Dr. Sendtner has also concluded (Flor. Bras. part 6. pp. 175, 176).

Under *Cestrum*, M. Dunal considers *Habrothamnus* merely as a section of that genus, but in his 'Conspectus' he places them as distinct genera. For a long while I was doubtful on the subject; but on a more careful examination of living plants, an essential difference was found to exist in the floral structure, which was indicated by their habit: these differences were enumerated on a former occasion (*huj. op.* vi. 181).

[To be continued.]

II.—*Descriptions of some newly discovered species of Araneidea.*

By JOHN BLACKWALL, F.L.S.

Tribe OCTONOCULINA.

Family SALTICIDÆ.

Genus *Salticus*, Latr.

Salticus reticulatus.

LENGTH of the female $\frac{1}{10}$ th of an inch; length of the cephalothorax $\frac{1}{8}$; breadth $\frac{1}{4}$; breadth of the abdomen $\frac{1}{24}$; length of a posterior leg $\frac{1}{9}$; length of a leg of the second pair $\frac{1}{18}$.