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LVIII. *Remarks on the Structure and Affinities of Cephalotus.*
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IN the Botanical Appendix of Captain Flinders's Voyage to Terra Australis, a figure and description of *Cephalotus foliolaris* are given, in some respects more complete than those of M. Labillardière, by whom this remarkable plant, a native of the south-west coast of New Holland, was first published. Both accounts, however, are equally imperfect with regard to the fruit; and my principal object in the present communication is to supply that deficiency.

My earliest knowledge of the ripe fruit of *Cephalotus* was

obtained from a single specimen, sent in 1815 by M. Lechenault, who had found the plant in February 1803 near the shores of King George's Sound, where I had gathered it in a less advanced state in the beginning of January 1802.

I have, however, more recently, received numerous specimens with ripe seeds from Mr. William Baxter, who collected them also at King George's Sound in 1829.

Cephalotus was introduced in 1823 from the same place by Capt. King, into His Majesty's Botanic Garden at Kew, where it flowered repeatedly, and ripened seeds from which several plants have been raised. A figure of one of these with expanded flowers, but still without fruit, has lately been published by Dr. Hooker in the Botanical Magazine; and a plant brought also from King George's Sound in 1829 by Mr. William Baxter is now in flower in Mr. Knight's nursery.

The following account of the ripe fruit will serve as a supplement to the description of the plant which I have given in the work referred to.

AKENIA membranacea, insecta parva alis conniventibus quodammodò referentia, perianthio parùm aucto staminibusque persistentibus cincta, iisque sesquolongiora, ferè distincta, ipsâ basi, ubi receptaculo communi inserta, post separationem intùs aperta ibique è membranâ simplici crassiusculâ imberbinitente formata; suprà clausa et è duplici membranâ conflata; harum exterior densè barbata, pilis longis, strictis, acutis, deflexis, stylo persistenti brevi arcuè reflexo rostrata: membrana seu lamella interior tenuis, intùs quandoque dehiscens.

SEMEN unicum (rarissimè duo), basi cavitatis membranæ interioris insertum, oblongo-ovale, teres, funiculo umbilicali brevi juxta basin affixum. *Integumentum* duplex: *Testa* membranacea laxiuscula, *raphe* tenui laterali et apice *chalazâ* parvâ insignita: *Membrana interior* tenuis separabilis. *Albumen* semini conforme, album, carnosum, subfriabile, è materiâ oleosâ cum granulis minutis mixtâ constans.

EMBRYO parvus, in basi axeos albuminis, teretiusculus, albus, rectus, albumine 4—5ies brevior. *Cotyledones* breves, plano-convexæ. *Radicula* teres, basin seminis attingens.

RECEPTACULUM commune fructûs: tuberculum centrale, parvum, brevissimum, subcylindraceum, cujus lateribus bases apertæ akeniorum adnatæ sunt, apice convexiusculo barbato.

From this description, especially of the embryo, it is evident that Cephalotus must be removed from Rosaceæ, to which it had been referred by M. Labillardière; and also, though not with much confidence, in the account which I published in 1814. M. de Jussieu, indeed, in 1818, proposed to exclude

it from Rosaceæ and append it to Crassulaceæ; and the structure of the seed, as well as of the folliculi or akenia, and even their insertion on the minute central receptacle or axis, may seem to confirm the correctness of this approximation.

Cephalotus, however, still appears to me sufficiently remote from every natural order at present established, to entitle it (like *Philydrum* * and *Brunonia* †), now that its structure is completely known, to rank as a distinct family which may be called *CEPHALOTÆÆ*, and which may be placed between *Crassulaceæ* and *Francoaceæ*; differing from both in being apetalous, in the valvate æstivation of the perianthium, and in many characters of inferior importance: from *Crassulaceæ* also in its minute embryo and more copious albumen; and from *Francoaceæ* in the absence of barren stamina and in the pistilla being monospermous and apparently distinct.

The most striking peculiarity of *Cephalotus* consists in the conversion of a portion of its radical leaves into *Ascidia* or pitchers. But as *ascidia* in all cases are manifestly formed from or belong to leaves, and as the various parts of the flower in *Phænogamous* plants are now generally regarded as modifications of the same organs, the question is naturally suggested, how far the form and arrangement of the parts of fructification agree in those plants whose leaves are capable of producing *ascidia* or pitchers. The four principal, and indeed the only genera in which pitchers occur, are *Nepenthes*, *Cephalotus*, *Sarracenia*, and *Dischidia*, and the few other somewhat analogous cases, consisting of the conversion of bracteæ or floral leaves into open cuculli, are found in *Marcgravia* and two other genera of the same natural family.

The only thing common to all these plants is, that they are *Dicotyledonous*.

It may also be remarked, that in those genera in which the *Ascidia* have an operculum, namely *Nepenthes*, *Cephalotus*, and *Sarracenia*, they exist in every known species of each genus, and the structure of these genera is so peculiar that they form three distinct natural families; while in *Dischidia*, whose pitchers are formed without opercula, these organs are neither found in every species of the genus, nor in any other genus of the extensive natural order to which it belongs.

The striking resemblance in most points of the *Ascidia* of *Cephalotus* to those of *Nepenthes*, leads to a comparison in the first place of these two genera. But although both are apetalous, and in the parts of the flower deviate from the quinary or prevailing number in *Dicotyledones*, yet they differ

* Flinders's Voyage, vol. ii. p. 578.

† Transact. Linn. Soc. vol. xii. p. 132.

in so many other important characters that they cannot be considered as nearly related.

The place of *Nepenthes* in the natural series I have long since*, in my account of *Rafflesia*, suggested to be near *Aristolochiæ* or *Asarinæ*, without, however, intending to include it in that family.

This approximation was adopted by M. Ad. Brongniart, who, however, went further, having absolutely referred *Nepenthes* to *Cytinæ*.

The union of plants so utterly unlike in appearance and œconomy, and so different, it may be added, in many of their most important characters, seems to have been generally regarded as somewhat paradoxical; and accordingly Professor Link, in 1829, has established *Nepenthes* as a section or tribe of *Aristolochiæ*, and Dr. Bartling and Mr. Lindley, in 1830, have considered it as forming a distinct natural family.

To the numerous and obvious distinctions between *Cytinæ* and *Nepenthes* may be added the no less important differences in their internal structure. For while *Cytinæ*, like most, perhaps all, other plants parasitical on roots, are destitute of spiral vessels, *Nepenthes* exhibits these vessels in the greatest degree of development and abundance, and also produces them in parts in which they are hardly to be met with in any other dicotyledonous plant.

Thus, in addition to the dense circle or stratum of spiral vessels existing in the stem between the outer parenchyma and the wood, they are found also singly or scattered in the pith, in the loose parenchyma situated between the wood and the bark, if it may be so called, even in the fibres of the root, and everywhere in the substance of the leaves, the pitchers, calyx and capsules. And between these solitary or scattered spiral vessels, which are often of considerable length, and those forming the stratum or circle externally bounding the wood and existing in the veins of the leaves, no essential difference in structure will I believe be found. In these points there is little resemblance between *Nepenthes* and *Cephalotus*, in the internal structure of which last there is nothing unusual.

Between the parts of fructification of *Nepenthes* or *Cephalotus* and *Sarracenia*, there is still less analogy, and it is obviously unnecessary to compare in this respect any of these genera with *Dischidia*.

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* Transact. Linn. Soc. vol. xiii. p. 219.

