

viz. one immediately below the base and extending nearly to the middle, the other just below the middle; the two outer spots are generally elongate, and sometimes form a submarginal vitta, interrupted in its middle.

V.—*Revision of the Natural Order Bignoniaceæ.*

By BERTHOLD SEEMANN, PH.D., F.L.S.

BEFORE proceeding to publish the results of my examination of Bignoniaceæ, I shall give a list of all the genera I hold to be true members of the order. They will have to be grouped very differently when the whole of them shall have been subjected to closer investigation, and a number of new ones added. The two tribes Eubignoniæ and Catalpeæ, founded upon important carpological characters, must stand, and a third one (Jacarandæ) be added to them.

I. *Eubignoniæ*, having a marginicidal fruit, and a septum placed parallel with the direction of the valves of the capsule.

II. *Catalpeæ*, having a loculicidal fruit, and a septum placed contrary to the direction of the valves of the capsule.

III. *Jacarandæ*, having a marginicidal fruit, and a septum placed contrary to the direction of the valves of the capsule.

From the subjoined it will be seen that all *cirrhose* Bignoniaceæ are confined to America, and that, with only one exception (*Dolichandra*), they are Eubignoniæ; again, that, with the exception of two Asiatic genera (*Millingtonia* and *Calos-anthes*) all the *erect* Bignoniaceæ belong to Catalpeæ and Jacarandæ.

Synopsis generum Bignoniacearum.

Tribus I. EUBIGNONIEÆ.

Capsula marginicida, septum valvis parallelum.—Frutices scandentes cirrhosi Americani, rarissime arbores Asiaticæ.

Divisio I. *Monostictides.*

Semina ad quodque septi latus uniserialia.

* Frutices scandentes cirrhosi Americani.

Bignonia, Tournef. Amer. trop.

Pachyptera, Mart. Amer. trop.

Fridericia, Mart. Amer. trop.

Cydistia, Miers (*Barteria*, Seem., non Hook. fil.). Amer. trop. et subtrop.

Cuspidaria, DeCand. Amer. trop.

Macfadyena, DeCand. (*Spathodea*, sp. auct.). Amer. trop.

Lundia, DeCand. Amer. trop.

Mansoa, DeCand. Amer. trop.

- Arrabidaea*, DeCand. Amer. trop.
Adenocalymna, Mart. Amer. trop.
Haplolophium, Endl. (*Aplolophium*, Cham.). Amer. trop.
Pyrostegia, Presl. Amer. trop.

** Arbores Asiaticæ.

- Millingtonia*, Linn. Ind. or.
Calosanthes, Linn. Ind. or.

Divisio II. *Pleostictides*.

Semina ad quodque septi latus serie duplici, triplici, vel quadruplici disposita.—Frutices scandentes Americani.

- Distictis*, DeCand. Amer. trop.
Amphilophium, Kth. Amer. trop.
Pithecoctenium, Mart. Amer. trop.
Anemopægma, Mart. Amer. trop.
Callichlamys, Miq. Amer. trop.

Tribus II. CATALPEÆ.

Capsula loculicida, septum valvis oppositum.—Frutices stantes vel arbores Gerontogææ vel Americæ, rarius frutices scandentes cirrhosi, radicales vel volubiles, rarissime herbæ.

Divisio I. *Monostictides*.

Semina ad quodque septi latus uniserialia.

* Frutices stantes.

- Craterotecomia*, Mart. Amer. trop.
Stenolobium, D. Don. Amer. trop.
Tecomella, Seem. Ind. orient. (*Tecoma undulata*, Don).
Tecomaria, Fenzl. Amer. trop.
Chilopsis, D. Don. Amer. trop.
Rhigozum, Burch (*Catophractes*, D. Don). Afric. trop.

** Arbores.

- Rademachera*, Zoll. Ind. orient.
Spathodea, Beauv. Afric. trop.
Stereospermum, Cham. (*Dipterosperma*, Hassk.). Afric. et Asia trop.
Tecoma, Juss. (*Tabebuia*, Gomez). Amer. trop.
Catalpa, Scop. Asia et Amer. trop. et subtrop.

Divisio II. *Pleostictides*.

Semina ad quodque septi latus serie duplici, triplici, vel quadruplici disposita.

* Frutices cirrhosi, radicales v. volubiles.

- Dolichandra*, Cham. Amer. trop.

Campsidium, Seem. et Reisseck. Chile.

Campsis, Lour. Asia trop. et subtrop., necnon Amer. subtrop.

Pandorea, Endl., Seem. Australasia et Asia trop.

** Arbores.

Delostoma, D. Don (*Codazzia*, Karsnt. et Trian.). Amer. trop.

Cybistax, Mart. (*Yangua*, Spruce). Amer. trop.

Zeyhera, Mart. Amer. trop.

Sparattosperma, Mart. Amer. trop.

Pajanelia, DeCand. Amer. trop.

*** Herbæ.

Argylia, D. Don (*Oxymitus*, Presl). Amer. subtrop.

Tribus III. JACARANDEÆ.

Capsula marginicida, septum valvis oppositum.—Arbores
Gerontogææ vel Americanæ.

Jacaranda, Juss. (*Pteropodium*, Meisn.). Amer. trop.

Dolichandrone, Fenzl, Seem. Ind. or. et Austral. (*Spathodeæ*
sp. auct.).

Astianthus, D. Don. Amer. trop. (Genera 43.)

Heterophragma, DeCand. Ind. or.

Genera incertæ sedis.

Monttea, Clos. Chile.

Reyesia, Clos. Chile.

Oxycladus, Miers. Chile.

I shall not follow any particular order in communicating my investigation, but publish the results as the complete materials come to hand.

1. ASTIANTHUS, D. Don.

Char. gen. emend.—*Calyx* tubulosus, ecostatus, limbo 5-dentato æquali. *Corolla* infundibuliformis, basi tubulosa, limbo bilabiato, labio inf. 3-, sup. 2-lobo. *Stamina* 4, didynama, cum rudimento quinti. *Antheræ* parallelæ, nudæ. *Stigma* bilobum. *Capsula* siliquosa, echinulata, 2-ocularis, marginicida, septo crasso spongioso valvis contrario. *Semina* in quavis septi fascie pluriseriata, minuta, compressa, alata, ala completa subovali, corpore cordato.—Arbor 30-ped. Mexicana et Guatemalensis, habitu Salicis; ramis glabris; foliis teris vel superioribus sparsis, elongato-linearibus, integerrimis, coriaceis (8–14 poll. long., 2–3 lin. lat.); racemis terminalibus sæpe dichotome paniculatis, floribus flavis.—D. Don in Edinb. Phil. Journ. vol. ix. p. 262 (1823); G. Don, Gen. Syst. iv. p. 228; De Cand. Prodr. ix. p. 177. Species unica:

Astianthus longifolius, D. Don in Edinb. Phil. Journ. vol. ix. p. 262

(1823); G. Don, Gen. Syst. p. 228; DeCand. Prodr. ix. p. 177; Bonplandia, t. 13.

Bignonia viminalis, Kunth in Humb. et Bonpl. Nov. Gen. Amer. vol. iii. p. 132; DeCand. Prodr. ix. p. 144.

Tecoma saligna, Lindl. Herb.

Nomen vernaculum Mexicanum, "Aguejote," teste Gregg.

Geogr. Distribution.—On the slopes of the mountains of Western Mexico, between Mescala and Estola (Humboldt and Bonpland! in Herb. Berol.); between Vera Cruz and Oaxaca (Galeotti! n. 1017), near Jalapa (Galeotti! n. 20); at Aguacatlan, near Tepic (Gregg! n. 946); in Guatemala (Skinner! in Herb. Lindl. et Hook.); always growing on the banks of rivers, and replacing our willows in those regions.

In Dr. Lindley's Herbarium there are specimens of *Astianthus* collected by Skinner in Guatemala, the value of which consists in their having both flowers and ripe fruit. The position of the genus, so long doubtful, is by means of these easily cleared up. Instead of belonging to the Eubignoniæ, *Astianthus* must be placed near *Dolichandrone*, amongst Jacarandææ. It has nothing to do with *Catalpa*, as was supposed, neither agreeing with it in fruit nor flower, and four of the stamens being fertile. The seeds are not, as D. Don had described them, "villis numerosis papposa." Don must probably have described the seeds of another Bignoniacea as belonging to *Astianthus*, perhaps those of *Chilopsis*, a Mexican genus very much resembling *Astianthus* in habit, and growing also on the banks of rivers, but having purple instead of yellow flowers. Don and DeCandolle describe the corolla of *Astianthus* as "rubro-purpurea;" but all those who have seen the plant wild, as yellow.

I have identified *Bignonia viminalis* of Kunth with *Astianthus longifolius*: the authentic specimens of Humboldt and Bonpland leave no doubt on that point. The genus consists only of one species, and differs from its allies in its spiny fruit, regular calyx, and parallel anthers. Its seeds are the smallest of any Bignoniacea known to me.

2. CAMPSIDIUM, Reiss. et Seem. (gen. nov.).

Char. gen.—*Calyx* campanulatus, ecostatus; limbo 5-dentato, æquali. *Corolla* tubulosa, leviter curvata; limbo 5-lobo, lobis subæqualibus. *Stamina* 4, didynama, cum rudimento quinti. *Antheræ* parallelæ, nudæ. *Stigma* bilobum. *Capsula* teretiuscula, lævis, loculicida. *Septum* valvis contrarium. *Semina* Frutex ecirrhosus scandens, Chilensis et Chiloënsis, glaberrimus; ramis angulatis; foliis oppositis 4-7-jugis cum impari, petiolo alato, foliolis ovato-oblongis vel ellipticis, utrinque obtusis vel acutis, sæpe mucronatis, margine dentatis vel subintegerrimis, supra læte viridi-

bus, subtus pallidioribus; racemis terminalibus simplicibus, 4-9-floris, pedicellis elongatis bibracteolatis, bracteolis linearibus acutis, petiolis pedunculis calycibusque purpurascensibus, corollis aurantiacis, intus versus basin filamentisque villosis, ovario glabro. Species unica :

Campsidium Chilense, Reiss. et Seem. MSS. in Herb. Vindob. ; Seem. in Bonplandia, vol. x. p. 147, t. 11.

Tecoma Guarume, Hook. in Bot. Mag. t. 4896, in adnot. (non DeCand.).

Nomen vernaculum Chiloëense "Pilpil Boqui," teste Bridges.

Geographical Distribution. — Chiloë (Bridges ! W. Lobb ! n. 474, King !); Island of Huafo, lat. 44° S. (Eights ! in Herb. Hook.) ; Arique, near Valdivia (Lechler ! Plant. Chil. n. 671).

This beautiful plant seems to be rather common between latitudes 40° and 44° S., and climbs over trees with a height of 40-50 feet. Nevertheless it is not mentioned in Gay's 'Flora of Chile,' and was thought identical with *Tecoma? Guarume* (*Bignonia alata*, Pav.) by Sir William Hooker. The authentic specimens of *Bignonia alata* in the Berlin Herbarium prove, however, to be identical with *Tecomaria fulva*, Seem. (*Tecoma fulva*, DeCand.); and the plant to which Sir W. J. Hooker alludes is the type of an entirely new genus, allied in habit to *Campsis*, Lour., but differing from that genus in the shape of the corolla and parallel, not divaricate, anthers. *Campsidium* has, however, no rooting branches, climber though it be, nor is it winding like *Pandorea*, nor furnished with tendrils like most climbing species peculiar to America.

VI.—On the Functions of the Nitrogenous Matter of Plants.

By M. L. GARREAU*.

THE numerous researches prosecuted of late years respecting the organic elements of plants, whilst on the one hand adding to our acquaintance with the structure, composition, and relations of their tissues, have, on the other, suggested to several botanists various theories regarding their evolution and their functions. But the physiology of plants being, like that of animals, inseparably dependent upon the knowledge of their organs, and this knowledge being far from thoroughly understood, the consequence is that every fresh discovery in their organization is followed by a new interpretation of some question or other in their physiological mechanism.

The cell, regarded by most botanists as the primitive element of vegetable organization, is represented as a nearly independent

* Translated by Dr. Arlidge, from the 'Annales des Sciences Naturelles,' tome xiii. 1860, p. 189.