

II.—*An Enumeration of the Plants Collected by Dr. Thomas Morong in Paraguay, 1888-1890.*

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WITH THE ASSISTANCE OF MISS ANNA MURRAY VAIL.

Read June 6, 1892.

The journey in which the plants enumerated and described in this paper were collected was made in the years 1888, 1889, and 1890. It was undertaken under the auspices of the Torrey Botanical Club, and by the aid of two members of that organization and a generous friend of science in Boston, Mass.

With the exception of a few plants hastily snatched by the writer at or near Buenos Aires, while waiting to proceed up the Rio de la Plata, the main part of the specimens was obtained in central Paraguay within a radius of 100 miles from Asuncion. In January, 1890, an exploration of the Pilcomayo River, a tributary of the Paraguay which forms the boundary line between western Paraguay and the Argentine Republic, was set on foot by the Paraguay Land Company, and the writer was invited to act as naturalist of the expedition. A small steamer was built in England for the purpose, and sent up the river under the command of Prof. O. J. Storm, of Buenos Aires. After a well nigh herculean effort, lasting six months, to overcome the obstructions of this little stream, consisting of shallows, sand-bars, and innumerable snags and old logs, and after proceeding nearly 400 miles, stemming on the way many swift and dangerous rapids and a waterfall around which the steamer was dragged by land, we encountered an immense swamp or lagoon overgrown with grasses and weeds through which it was impossible to force a way by any means at our command, and the expedition was necessarily abandoned. All of this region, lying in the Gran Chaco, is uninhabited except by tribes of roving savages, and much of it had never been previously traversed by civilized men. Here a considerable, and not the least interesting, portion of the plants was collected.

The notes appended to the species are taken in all cases from

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written descriptions made by the collector in the field, or from fresh specimens directly after reaching home. The observations and measurements are entirely his own, none of them being drawn from the works cited in the naming of the species, and they simply record what he saw himself whether they conform exactly to the published descriptions or not.

The determinations of the genera and species are due principally to Prof. N. L. Britton, of Columbia College, who visited the Herbaria at Kew, the British Museum, Paris, and Geneva in the summer of 1891, and compared such as could not be matched in the Herbarium of Columbia with the vast collections stored in those places.

He was aided in his researches by such eminent European botanists as J. G. Baker, Edmund Baker, A. Cogniaux, N. E. Brown, M. T. Masters, A. Franchet, Casimir DeCandolle, and R. A. Rolfe, who courteously named many of the plants belonging to genera in which they are experts.

Prof. Britton's descriptions of new species and occasional notes bear his signature.

In this joint work we have been greatly assisted by Miss Anua Murray Vail, who has not only consulted many publications in the attempt to identify the species, but also sorted out the plants, arranged them in systematic order, and devoted much time and labor to preparing the labels and distributing the specimens to subscribers.

So much care has been exercised in the identification of the species, that we feel sure that the names are substantially correct.

The nomenclature adopted is in accordance with the rules promulgated by the Botanical Club of the American Association for the Advancement of Science at its recent meeting in Rochester, New York.

THOMAS MORONG.

COLUMBIA COLLEGE, October 26, 1892.

RANUNCULACEÆ.

Clematis Brasiliana, D.C., Syst. i, 143.

Near Asuncion (759); Pilcomayo River (1067).

A climbing vine with white and very fragrant flowers, much like our *C. Virginiana*. The tails of the fruit are longer, plumose, and

exceedingly graceful. It climbs high and embowers tall shrubs in the Pilcomayo thickets. January-June.

Ranunculus apifolius, Pers., Syn., ii, 105.

Buenos Aires (8). October.

Ranunculus muricatus, L. Sp. Pl., 780.

Buenos Aires (7). October.

ANONACEÆ.

Rollinia emarginata, Schlecht., Linnaea, ix, 315.

Asuncion (99). November. = Balansa, No. 2296. Called in Guarani, Araticu; in Spanish Chirimoya.

This is not the large edible Chirimoya so common in Peru and the more northern South American countries, which, so far as I know, does not occur in Paraguay. It is a slender shrub with a handsome head of green, coriaceous leaves, 3-5 m. high, and sometimes a small tree of twice that height. The flowers are curiously constructed, consisting of 3 small, ovate, appressed sepals, and 6 petals, the 3 outer of which are yellow, flat bodies that stand edge upwards in a triangular position. These when drawn down at the base exhibit 3 other petals entirely unlike the outer ones, being small, rounded, and meeting in a whorl at the summit, with a purple interior. Under these is a ball or arch of cohering stamens, which are completely concealed by the overlapping inner petals. Under all is another ball or arch of styles and stigmas, and this is completely enclosed by the over-arching mass of stamens. I could see no possible manner in which the pollen could reach the stigmas, and am satisfied that it must be done as in the next species of the same order, which I examined more closely.

Anona cornifolia, St. Hil., Fl. Bras. Merid., i, 33. Ex. descr.

Asuncion and Pilcomayo River (149). November. = Gibert, No. 1095.

The outer petals here are not erect as in *Rollinia*, but flat and imbricated over the inner ones. A very similar arrangement of the stamens and pistils occurs however. The stamens are in an arched disk, the central ones apparently infertile, and all cohering by truncate callous connectives under which are the anthers. The stigmas

lie under the thick mass of infertile stamens, and so far as I could judge entirely out of the reach of the pollen by any action of the organs themselves. I found, however, that the pollen was very plentiful, and that a pin thrust through the anthers obliquely would carry its grains to the stigmas. There seemed in the older flowers to be evidence that this operation is performed by insects, and I came to the conclusion that, as in the case of *Eupomatia*, described by Maout and Decaisne, the plant must always depend for fructification upon insect agency. The fact that fruit is seldom found upon the shrub confirms the idea. I often obtained flowers both of this and *Rollinia*, but not one in ten of the flowers formed fruit. In both cases the fruit is a large, irregularly shaped berry containing many seeds imbedded in a pulpy aril, and said by the people to be edible. They are very inferior to the Chirimoya or custard apple, to which they are closely allied.

MENISPERMACEÆ.

Cissampelos Pareira, L., Sp. Pl., 1473.

Between Trinidad and Lympio (729); Pilcomayo River (815).
November–June.

The "*Pareira brava*" of the druggists, the roots of which are in high repute, medicinally, in urinary diseases. A diœcious vine twining around shrubs and trees. It has many broad cordate-ovate leaves, 5–10 cm. long, and nearly as wide at the base. Stems fuscous hairy. Roots exceedingly large and rather woody.

Cissampelos Pareira, L., var. **Caapeba** (L.), Eichl., Mart. Fl. Bras.,
xiii, pt. 1, 190.

Asuncion (829). November.

The variety with leaves only 1 cm. long and 2 cm. broad, bearing, when in fruit, many small red berries. This looks different enough to be almost regarded as a distinct species.

Castalia Gilbertii, Morong, n. sp.

Leaves oval in outline, entire, rounded at the apex, the lobes moderately spreading and obtuse, the under surface covered with short branching fuscous lines interspersed here and there with elevated raphioid striæ, the upper surface having these striæ mingled with minute tubercles, especially near the sinus. Flowers white, turning yellowish in drying, inodorous, 6–7 cm. in diameter. Sepals oblong-ovate, 3–3½ cm. long, somewhat acute, with numer-

ous fuscous lines or elevated striæ on the exterior surface. Petals in 3 series, a little shorter than the sepals, marked with faint purplish lines, which are even with the surface or slightly raised, the outermost thick and green along the middle of the back, like the sepals, and with broad white margins. Stamens in 4 series. Anther cells of the outermost 6 or 7 mm. in length. Carpels somewhat immature, but apparently 18. Ripe fruit and tubers not seen.

An unnamed specimen collected by Gibert (No. 53) at Asuncion in June, 1858, is at Kew.

Above the Falls on the Pilcomayo River, May 6 (1028).

Victoria Amazonica (Pæpp.), Planch. Rev. Hort., Feb. 15, 1853
(*V. regia*, Lindl.).

In lagoons near Asuncion (281). December-January.

This famous flower is abundant in the lagoons on the Paraguay River, and is found as far south as Corrientes. The popular name which it bears, "*Mais del agua*," is derived from the use made of its seeds. These are about as large as buck-shot, and are gathered by the natives and roasted or pounded into meal, from which very palatable and nutritious bread is made.

PAPAVERACEÆ.

Argemone Mexicana, L., Sp. Pl., 508.

Asuncion (155). Apparently naturalized.

FUMARIACEÆ.

Fumaria capreolata, L., Sp. Pl., 701.

Buenos Aires (18). October.

CRUCIFERÆ.

Lepidium Bonariense, L., Sp. Pl., 645.

Buenos Aires (12). October. Pilcomayo River (1056). June.

Coronopus didymus (L.), Smith, Fl. Brit. iii, 691.

Buenos Aires (5). October.

Raphanus sativus, L., Sp. Pl., 669.

Railroad between Paragua and Luque (855). December.

Seems to be thoroughly naturalized in the vicinity of towns, but it bears no root like the cultivated radish.

CAPPARIDACEÆ.

Cleome aculeata, L. Syst., Ed. 12, iii, App., p. 232.

Asuncion (117 and 117 a). November.

Gynandropsis pentaphylla (L.), D. C., Prod., i, 238.

Asuncion (348). December.

6-9 dm. high. Flowers large, purple, showy. Leaves on long petioles, 5-foliolate. Stem, petioles, and the dorsal nerves of the leaves beset with glandular hairs and small prickles. Peduncles, petals, and ovary with yellow glands. Pods $3\frac{1}{2}$ -4 cm. in length, on long peduncles, jointed about $\frac{1}{2}$ way up.

Capparis cynophallophora, L., Sp. Pl., 504.

Asuncion (763). July.

Found only in fruit. A small tree 5-6 m. high, with flexuous greenish-yellow branches, glabrous, with small black warts on the bark. Leaves simple, alternate, elliptical or oval, coriaceous, shining above, greenish-yellow, shortly petioled, the blades about 7 cm. long, and 3 cm. wide. Pods in clusters of 1-5, often as much as 30 cm. long, cylindrical, moniliform, the outside greenish-yellow or brown, the interior lining red.

Thickets near Asuncion.

Capparis declinata, Vell., Fl. Flum., v, t. iii.

Pilcomayo River (946 a). In fruit. January.

Similar to No. 763, but with smaller leaves and pods.

Capparis Tweediana, Eichl., Mart. Fl. Bras., xiii, pt. 1, 273.

Pilcomayo River (1046). May.

Nearer *C. Tweediana* than *C. crotonoides* as described in Mart. Fl. Bras., but not exactly agreeing with either. The projections of the disk are 5, alternate with the stamens, looking like staminodea. Leaves larger, petioles longer, pedicels longer than in *C. Tweediana*. Flower bud tetragonous (not triquetrous, as in *C. Tweediana*). Stamens 5 (in *C. crotonoides* 6-8).

A common shrub or small tree on the Pilcomayo, with roundish leaves, which are green and glabrous above and white tomentose beneath. It blossoms late in May and then sparsely. The flowers are peculiar, with 4 spreading yellowish-green sepals and as many

petals, 5 long stamens, alternate with as many staminodia or disk projections, and an ovary on a stellately downy stipe $2\frac{1}{2}$ cm. long. The flowers themselves are borne on a stellately downy peduncle $1\frac{1}{2}$ -2 cm. in length. The trunk of this shrub has near the base light brown scaly bark, smooth and yellowish above.

Crataeva Tapia, L., Sp. Pl., 444.

Asuncion (820); Pilcomayo River (897).

A fine tree growing around Asuncion and far up on the Pilcomayo River. It reaches a height of 16 m. or more. It has a smooth gray bark, and smooth, glossy, ternate leaves. The flowers are white in thick clusters at the ends of the branches, on pedicels $2\frac{1}{2}$ - $3\frac{1}{2}$ cm. long. The fruit at the time I saw it, January 24, was nearly as large as a lemon, on peduncles 7-12 cm. long, solitary, green on the outside, with a thick white meat on the inside, containing many seeds irregularly disposed. The tree is known among the Paraguayan natives as "Papaguayan" (name of a tribe of Paraguayan Indians) or "Indian orange," and it is said that the fruit is eaten as an orange by the Indians. Its numerous, large dark green leaves well adapt it for an ornamental shade tree, as which it is sometimes used in Paraguay.

Flowers in October, fruits in January.

VIOLARIE.

Calceolaria Brasiliensts, Britton.

Ipidium album, St. Hil., not *C. alba*, R. and P.

Caballero (410). January.

Calceolaria communis (St. Hil.), Kuntze, Rev. Gen. Pl., 41.

Near Pirayu (662). April.

This interesting plant growing in open woods is a suffruticose herb about 1 m. in height. The delicate white flowers are peculiar, entirely losing their character in dried specimens. There are 5 free, hairy, persistent sepals, and 5 distinct petals, 4 of them minute and the 5th larger and standing out prominently from the rest, with upturned edges which give it the appearance of a miniature sugar scoop. Stamens 5, the 2 lowest with short white spurs; filaments broad; anthers somewhat sagittate, the cells long and parallel, surmounted by a brownish sharp-pointed cap. The seeds, at first shallow pitted, when fully ripe are nearly smooth, black and shining.

BIXINEÆ.

Myroxylon Salzmanni (Clos.), Kuntze, Rev. Gen. Pl., 44. Ex descr.

Asuncion (235 and 718). December. Pilcomayo River (1585).
January-May.

An interesting diœcious shrub common about Asuncion, 1½-3 m. in height, armed with sharp spines. Leaves coriaceous, round or oval, often cuneate, serrate, with 2 glands on the petiole at the base of the blade. Flowers small, white, apetalous, in clusters, the staminate with 4 or 5 ciliate, ovate sepals, the peduncles and pedicels subtended by several ciliate bracts; stamens numerous, the filaments long, yellow, much exerted, and the anthers small, round, yellow, 2-celled, opening by slits above. Pistillate flower on an articulated pedicel, with 5 round, ciliate sepals which are persistent on the fruit. The fruit, about as large as a huckleberry, is blackish-purple when ripe. In fact, I thought it was a huckleberry when I found it. Berries very numerous, rather insipid in taste.

The spines are generally at the base of the leaves, and seem to take the place of stipules. The staminate and pistillate plants often far apart.

POLYGALEÆ.

Polygala Areguensis, A. W. Bennett, Jour. Bot., 17, p. 201.

Pilcomayo River (944). = *Balansa*, 2187, Herb. Kew. Named by A. W. Bennett.

An interesting purple-flowered species; growing on the open campo among grass. Some of the stalks are 50 cm. in height, and often twisted, several rising from the same root, frequently branched. Leaves in whorls of 5, sessile, minutely serrulate. The racemes are from 4 to 12 cm. long. The pod contains 2 light brown, hairy seeds, each with 2 flat, white caruncles one-half as long as the seeds. February.

Polygala galioides, Poir., var. *asperuloides* (H. B. K.), Britton.

Polygala asperuloides, H. B. K., Nov. Gen., v, 403.

P. galioides, var. *major*, A. W. Bennett, Mart. Fl. Bras., Fasc. lxxiii, 29.

Near Luque (325). December.

Polygala glochidata, H. B. K., Nov. Gen., v, 400.

A diminutive plant nearly hidden by the grasses on the Gran Campo, 8-10 cm. high. Flowers minute, white, on pedicels about

1 mm. long. Leaves linear, 5 or 6 mm. long, mucronulate, in verticils of 5s. Seeds very hairy, without a caruncle.

Near Luque (337). Determined by A. W. Bennett. December.

CARYOPHYLLÆ.

Cerastium Sellowii, C. and S.

Buenos Aires (4). October. Pilcomayo River (921). February.
= Balansa, No. 2274, Herb. Kew, in part.

I brought this plant from Kew under this name, but have since been unable to find the place of its publication.—N. L. B.

Tissa grandis (H. B. K.), Britton.

Arenaria grandis, H. B. K., Nov. Gen., vi, 30 (1823).

Spergularia grandis, Camb. in St. Hil. Fl. Bras., ii, 177.

Buenos Aires (3). February. Pilcomayo River (921).

I had ample opportunity to examine this plant on my Pilcomayo expedition, as it is not infrequent on the muddy banks of that river. It much resembles our common "Corn Cockle" in general appearance. In height it rises from one to two feet dichotomously much branched. The flowers are in irregular cymes at the ends of the branches, each on a short subulate pedicel. Calyx of 5 green sepals, membranous and white on their edges, persistent. Petals 5, white, much smaller than the sepals and hidden by them except when expanded. The 5 hypogynous stamens, opposite the petals, are on very delicate filaments, which are slightly dilated at the base. Ovary superior, 1-celled, many-ovuled, 2-4 mm. in length, increasing in fruit to an obtusely 3-angled, 1-celled pod a little longer than the sepals. The pod is filled with flat seeds, which lie horizontally upon each other, and have a broad, membranous wing notched on one side. The plant rises from a long, yellow tap-root.

Polycarpa australis, Britton, n. sp.

Diffuse, glabrous, much-branched, the branches ascending, terete, 20-50 cm. long. Leaves verticillate, oblanceolate or oblong, obtuse, thick, entire, narrowed at the base, 2-5 cm. long, 4-12 mm. wide; inflorescence dichotomously cymose, the flowers sessile, white, 1-2 mm. broad; bracts ovate-lanceolate, about 2 mm. long; sepals ovate, obtuse; petals entire, rounded, shorter than the sepals; stamens 3; ovary 3-angled, 1-celled; capsule membranous, shining, ovoid, about 4 mm. long.

Banks of the Pilcomayo River (933). February.

PORTULACEÆ.

6

Portulaca pilosa, L., Sp. Pl., 639.

Between Villa Rica and Escoba (452). January.

Portulaca marginata, H. B. K., Nov. Gen., vi, 58. Ex descr.

Between Villa Rica and Escoba (452 a). January. Pilcomayo River (1053). June.

Portulaca grandiflora, Hook., Bot. Mag., t. 2885.

Asuncion (278 and 59). December-June.

This *Portulaca* is very common around Asuncion, often growing in the streets of the city, and abundant in the sandy soil of the environs. It varies very much, however, in the size of the flowers, often showing a corolla not larger than a dime in diameter and again 3 times as large. It is usually of a bright purple or rose tint, but sometimes yellow. Its gay-colored corolla, fully expanded in the morning sun, scattered in masses over the green sward, often tempted me into early walks while the dew still lay upon the ground.

Talinum crassifolium (Jacq.), Willd., Sp. Pl., ii, 862.

Asuncion (104 and 677). = Balansa 2253. November-January.

A small branching plant 15-20 cm. high, with small terminal clusters of pretty rose-colored or sometimes yellowish-brown blossoms. Leaves succulent, obovate, 4 or 5 cm. long, rounded at apex, and sloping at base into a short petiole. Capsule white, as large as a pea, 1-celled, containing many small, black, striolate, cochleate seeds. In ordinary drying, this plant goes to fragments, and the only method by which I could preserve specimens whole, was to steep the fresh plant in boiling water.

Talinum patens (Jacq.), Willd., Sp. Pl., ii, 863.

Asuncion (252). December. Between Villa Rica and Escoba (531). January.

Similar to the preceding species in habit. Flowers white or yellow, in long, terminal panicles, on a leafless peduncle 10-15 cm. long. Leaves all near the base of the stem, obovate, rounded or abruptly pointed at the apex, 5-12 cm. long, sloping at the base into a short petiole. Stem reaches a height of 6 dm., and the panicle 2½ dm.

MALVACEÆ.

This order is very prolific of species and individuals in Paraguay. Indeed, some of the species run so closely together that it is not easy to separate them. In a radius of 3 or 4 miles, on the Pilcomayo River, I found no less than 12 or 15 species of the small, shrubby forms which insensibly graded into each other, and even the genera were hard to distinguish.

Malva parviflora, L., Sp. Pl., Ed. 2, 969.

La Plata, Argentine Republic (37). October.

Malveopsis lateritia (Hook.), Morong.

Malva lateritia, Hook., Bot. Mag., t. 3846.

Malvastrum lateritium, Nicholson, Dict. Gard., 2, 319.

Caballero (403 b). January.

Malveopsis Coromandeliana (L.), Morong.

Malva Coromandeliana, L., Sp. Pl., 687.

Malvastrum tricuspdatum, A. Gray, Pl. Wright, ii, 16.

Asuncion (57 a); Pilcomayo River (995). November–April.

A small shrub about 6 dm. high. The fruit is striking, being a broad, flat pod of 10–12 peculiar carpels with grooves between them. A row of short, stiff hairs stands on each carpellary edge, and at the commencement of the curve of the point there are 2 minute projections, the point ending in 2 similar projections, each of which is tipped with a weak spine. In the perfectly mature fruit, these rows of hairs make the carpels quite rough. Each carpel contains a single large, flat, smooth seed which perfectly fills it.

Malveopsis spicata (L.), Kuntze, Rev. Gen. Pl., 72.

Asuncion (215). December.

Sida angustifolia, Lam., Encyc., i, 4.

Between Villa Rica and Escoba (454); Pilcomayo River (989).
January–April.

Sida carpinifolia, L., f. Supp., 307.

Asuncion (172). November.

Sida ciliaris, L., Sp. Pl., Ed. 2, 961.

Asuncion (240). December.

Sida cordifolia, L., Sp. Pl., 684.

Asuncion (114). November–March.

Sida dictyocarpa, Gris., Mart. Fl. Bras., xli, pt. 3, 314.

Pilcomayo River (956). March. Named by Edmund Baker.

Sida dictyocarpa, var. **Cordobensis**, E. Baker, ined.

Pilcomayo River (953). February. Named by Edmund Baker.

Sida paniculata, L., Amœn. Acad., v, 401.

Asuncion (194). November.

Sida rhombifolia, L., Sp. Pl., 684.

Asuncion (57); Pilcomayo River (1055). November–June.

Sida spinosa, L., Sp. Pl., 683.

Pilcomayo River (953 a). February.

Sida urens, L., Amœn. Acad., v, 402.

Pilcomayo River (960). March.

The species of *Sida* here enumerated are small shrubs or suffruticose plants, one only, perhaps (*S. urens*), being herbaceous. As a rule, they have yellow or whitish-yellow flowers, but *S. ciliaris* has brownish-purple, and *S. paniculata* lurid-purple petals. They differ in the most extraordinary manner in regard to the number of styles, the number of carpels, and other fruit characters. *S. angustifolia* has 5 styles and 5 carpels, each containing a single seed which is downy and notched at the apex, the ventral summit projecting into one, sometimes two points. *S. ciliaris* has 8 styles and 7 carpels, the seeds somewhat irregular in shape, and the backs of the carpels covered with spine-like protuberances. *S. carpinifolia* has 7 smooth carpels which run up into a combined beak at the summit, each containing a single seed, and two flat faces meeting in a sharp ventral edge that terminates in a sort of curved horn at the apex. *S. cordifolia* has 13 one-seeded carpels, grooved on the curved back, which, with the faces, is rugose-reticulate-veiny, and beaked at the summit by two long, parallel, hispid awns that are very close together. *S. dictyocarpa* has 5.7 and 10 styles and 8 carpels, while its so-called var. *Cordobensis* has only 5 styles and 5 carpels. *S. paniculata* greatly differs in general appearance from its congeners, having numerous small lurid-purple flowers on long, naked, jointed pedicels in

branched panicles, 4 styles, 5, sometimes 4, carpels which are downy and destitute of awns, and seeds somewhat irregularly 3-sided and scarcely notched at the apex. *S. rhombifolia* has 10 downy carpels deeply grooved on the back, beaked at the apex by two short, smooth awns. *S. spinosa*, which bears no spines in my specimens to justify the name, has 5 carpels with very short hispidly hairy awns or horns, the faces marked by parallel veins, and smooth seeds which have a minute projecting point at the ventral apex. *S. urens*, the most peculiar of all these species in its general appearance, has only 3 styles, so far as I could discover in the fresh specimens. The whole plant is clothed with long, fuscous, glandular hairs, especially the calyx, which is greatly inflated, puffing out below in 5 folds and terminating in 5 acute lobes; carpels 5, small, smooth, beaked only by two minute points; seeds smooth, irregularly 3-sided; flowers yellow, massed in close clusters at the summit of the branches. The long hairs on the edges of the folds and lobes of the calyx impart a very nettle-like aspect to the plant, from which circumstance, I suppose, the specific name originates.

Wissadula patens (St. Hil.), Gareke, Zeitsch. Naturw., 1890, 123.

Pilcomayo River (1021). May.

Wissadula periplocifolia (L.), Presl. Reliq. Hænk., ii, 117.

Asuncion (251 and 376); Pilcomayo River (990). December-April. Named by Edmund Baker.

Wissadula hernandioides (L'Her.), Gürcke, in Mart. Fl. Bras. xii, pt. 3, 439.

Pilcomayo River (985). April.

Abutilon crispum (L.), Sweet., Hort. Brit. i, 53.

Pilcomayo River (979). March.

15-24 dm. in height. Leaves palmately 7-10 nerved, some of them measuring 8-10 cm. in length and 6-8 cm. in breadth. Petals white, with a slight bluish tinge, delicately striped with purple, the corolla nearly 2 cm. in diameter. Fruit a bladderly pod with 10-12 carpels, each containing several seeds.

Abutilon inæquilaterum, St. Hil. Fl. Bras. Merid., i, 155. Ex descr.

Pilcomayo River (992). March-April.

Abutilon pedunculare, H. B. K., Nov. Gen., v. 212.

Asuncion (204); Pilcomayo River (942). November–April.
Named by Edmund Baker.

Malachra alcaifolia, Jacq. Coll., ii, 350.

Pilcomayo River (1034). May.

A singular plant which was growing in the water of the great laguna on the Pilcomayo River. Stem 1–1½ m. high, beset with weak, yellowish prickles. Lower leaves ternate, 3-lobed or entire, dentate, sparsely pellucid-punctate, hairy on the nerves. Flowers lilac, in terminal clusters, 5–8 in a cluster and sessile on an involucre of large, ovate, crenate, foliaceous bracts. Calyx with 5 ovate, very hairy, 3-nerved lobes, shorter than the corolla and subtended by 7 or 8 subulate, long-haired bracteoles. Styles 10. Ovary 5-celled, with 1 ovule in each cell. Pod 5 mm. high, and nearly 1 cm. broad across the truncate top of 5 rugose, separate carpels, each containing 1 large seed.

Pavonia Morongii, Spencer Moore, ined. n. sp.

Stem shrubby, clothed with long, white, scattered hairs and also a close down, much branched, 4–9 dm. high. Leaves cordate-ovate, pointed at the apex, unequally dentate, 5–7 palmately nerved, hairy and downy like the stem, 3–5 cm. long and 2–2½ cm. wide, on petioles 1½–2½ cm. long. Flowers solitary on axillary peduncles 3–5 cm. long. Corolla light yellow, with a dark eye at the base inside, the eye radiating in short lines at the top. Petals obovate, rounded at the apex. Calyx much shorter, subtended by 7–8 subulate bracteoles 10–12 mm. long, hairy and downy like the stem. Styles and stigmas 10. Pod glabrous, depressed globose, splitting into 4 or 5 1-seeded carpels. The flowers of this plant when fully developed are very showy and beautiful. On the campus nearly the whole length of the Pilcomayo.

Pilcomayo River (872, 988, and 947). January–April.

Pavonia communis, St. Hil., Fl. Bras. Merid., i, 224.

Between Villa Rica and Escoba (473). January.

Stem downy with close, stellate pubescence, 4–6 dm. high. Leaves ovate-lanceolate, 3–5 palmately nerved, dentate, stellately haired and pubescent, pellucid-dotted, rounded at base, 5–10 cm. long, on petioles 3–5 mm. long. Flowers large, dark yellow. Carpels 5, armed with 3 long, downwardly barbed teeth. Persistent sepals and bracteoles (5 or 6) longer than the pod. Styles 10.

Pavonia sepium, St. Hil., Fl. Bras. Merid., i, 225.

P. flava, Spring, Flora, xx, Beibl. No. 2, 96.

Asuncion (473 b); between Villa Rica and Escoba (473 c).
= Mart. Herb. Flor. Bras., No. 95.

Similar to No. 473, but with taller stems, flowers smaller, on much longer peduncles, and the teeth of the carpels more slender. This frequently grows 2-3 m. high. Fruit abundant in a long, loose, terminal inflorescence, on peduncles 2-4 cm. long.

Pavonia hastata, Cav., Diss., iii, 138, t. 47, f. 2.

Caballero (428). January.

With hastate-lobed, oblong or ovate-lanceolate leaves. Flowers large and showy; petals 2 cm. long, light purple, with deeper purple stripes. Carpels very different from those of the preceding species, being flattened oval in shape, rugose-veiny, with 2 narrow wings on opposite sides and 2 gibbous points at the apex instead of the 3 long barbed teeth which are found in the other species. On the railroad track near Caballero.

Pavonia Mutisii, H. B. K., Nov. Gen., v, 283.

Asuncion (702). May. Named by Edmund Baker.

Stems 1-1½ m. high, very downy, the down mixed with long white hairs. Leaves and short lateral branches numerous. Leaves broadly cordate-ovate, velvety-downy, 2-6 cm. long and 1½-2½ cm. wide, on short petioles. Flowers numerous, solitary on short axillary peduncles, or when in bud looking as if in clusters, large, light yellow, with a dark purplish eye at the base inside. This is readily distinguished by its almost glomerate leaves, branches, and flowers, and especially by its curious carpels, which are hooded and 1-horned at the apex.

In old fields and along fence rows.

Hibiscus cisplatinus, St. Hil. Fl. Bras. Merid., i, 194.

Asuncion (849); Pilcomayo River (1016). December-April. Named by Edmund Baker.

This grows abundantly about the mouth of the Pilcomayo and at the Falls. It has a stem from 1½-3 m. in height, and clothed with small, hooked prickles which are slightly stinging. The corolla is very large, the petals being 5 cm. or more in length. They are

blood-red at the base, and lighter red above, making a very showy flower. The calyx lobes have 5 green nerves upon them, alternating with as many white stripes. Staminate column with 6 or 7 rows of stamens some distance apart; anthers red, stigmas some distance above the highest row of stamens, umbella-shaped from below, and with 5 broad, downy-edged lobes. The bark of this plant strips off like flax and splits into clean, fine fibres, and could doubtless be used in making textile fabrics, certainly as good for that purpose as that of our cotton plant, which, it is said, is now used in this way.

Hibiscus furcellatus, Desr., Lam. Encyc., iii, 358. Ex descr.
H. Diodon, D.C., Prod., i, 449?

Asuncion (682). April.

Strongly resembles *H. cisplatinus*, and with an equally showy flower. It is often cultivated in gardens at Asuncion. When it first opens the corolla is rose-red, but soon after fully expanding it turns a pure white.

Cienfugosia sulphurea (St. Hil.), Garcke, Bonpl., viii, 148.
Fugosia Drummondii, A. Gray, Pl. Wright, 23.

Pilcomayo River (929). February.

A shrubby, smooth-stemmed plant about 3 dm. high, with a tough, thick root, and many stems springing from it, which are somewhat decumbent at the base. Corolla sulphur-yellow, with a brown eye at the base inside, about $1\frac{1}{2}$ cm. broad when expanded. Calyx smaller, deeply divided, the lobes lanceolate, 3-5 nerved, and they, the bracteoles, and the pods marked by rows of black dots. Bracteoles 8. Leaves broadly ovate, palmately 7-nerved, irregularly crenate-dentate, occasionally with small lobes, on petioles 1-2 cm. long. Capsule glabrous, 5 celled, cells 2-seeded. Peduncles 2-8 cm. long.

This occurs in Texas and also in Southern Brazil.

Gossypium maritimum, Tod., Osserv. Cot., 83.

Pilcomayo River (978). March.

The native cotton of Paraguay. It is supposed to have been originally introduced into the country, but it certainly grows now spontaneously. I found it quite abundant about the Falls of the Pilcomayo, not only in old Indian encampments, but in thickets upon the campos. There it flourishes with great vigor, growing often to the height of 2 or 3 m., sometimes bearing 10 or 15 bolls upon one stem. Although the staple of the wild plant is not as long

as that of our upland Southern cotton, yet the fibre is very fine. The seeds are much smaller than those of our cultivated cotton. I have no doubt that it would be greatly improved by cultivation, and that among an enterprising people it might become an article of great commercial importance. March-April.

Chorisia speciosa, St. Hil., Pl. Usuel., t. 43.

Asuncion (725); Pilcomayo River (1075). March-May.

One of the most remarkable trees in Paraguay, known popularly as Palo borracho, or drunken tree, from the huge belly-like protuberance of its trunk. The flowers, at first a pale yellow, finally become nearly or quite white, and are as large as those of a lily. The limbs are long and stand out horizontally from the trunk. The trunk and largest limbs are armed with stout spines, which have a large button-shaped base, and a strong, sharp, spiny point. The inner bark, of a fine white color, strips off in long ribbons, and can be twisted into strong twine, which is used by the Indians in making fishing-lines and nets. The sap turns blood-red after being exposed to the air, and evidently contains a red coloring-matter, which might be used as a dye. The swollen trunk is often used for making canoes. One that we hewed out was capable of carrying two or three men. The wood is soft and can be cut with a penknife as easily as a raw potato, which it much resembles, very different from most of the woods of the region, which are nearly as hard as iron.

STERCULIACEÆ.

Sterculia striata, St. Hil. et Naud., Ann. Sci. Nat., II, ser. xviii, 213.

Asuncion (616). March.

A large tree from 16 to 25 m. in height, which I often saw cultivated in gardens at Asuncion. The trunk has smooth, dark bark, with large palmately 5-lobed leaves, which have the 2 lower lobes overlapping, so as to give a peltate appearance to the leaves at first sight. The flowers appear to be polygamous, mostly staminate, and hence the fruit is scarce. The inflorescence is very glandular and quite sticky in drying. Fruit in 2 twin, divaricate pods, each of which is 1-celled and several seeded. An American gentleman, resident of Asuncion, who had the tree growing in his garden, called it the "Peanut tree," though I cannot tell why, as there is nothing in the appearance or taste of the fruit like a peanut.

Melochia subcordata, Morong, n. sp.

Stem about 1 m. high, stout, softly and densely fuscous hairy, simple or divergently branching at the summit. Leaves broadly ovate, subcordate, or the upper ones elliptical, unequally dentate, the teeth tipped with black points, stellately fuscous hairy on both sides, palmately 5-7 nerved, the largest collected 11 cm. long and 8 cm. broad at the base. Petioles 3-6 cm. long. Stipules subulate, 3-5 mm. long, deciduous. Inflorescence branched, elongated, the flowers spicate, in interrupted glomerules. Calyx purple-tinted, hairy, with 5 acute lobes, a little more than $\frac{1}{2}$ as long as the corolla, subtended by 3 subulate bracteoles. Petals light purple, broad and outwardly curved at the apex, whitish and clawed at the base, 6-8 mm. long, staminate column connate with the petals below; anthers nearly sessile on the column, closely investing the style. Stigmas 5, projecting above the anthers, plumose; ovary silky hairy. Capsule obovoid, 3 mm. long, marked by small tubercles to the middle and white hairy above; seeds obtusely 3-angled, dark, puberulent.

Open places near Luque (292); railway track at Caballero (462).
December-January.

Melochia Morongii, Britton, n. sp.

Erect, densely pubescent, branched, 4-5 dm. high. Stem and branches terete; petioles terete, about 1 cm. long; leaves ovate-lanceolate; prominently pinnately-veined, the veins impressed on the upper surface, crenate-dentate, obtuse or obtusish at the apex, rounded at the base, 4-5 cm. long, 1-1 $\frac{1}{2}$ cm. wide, pubescent on both sides; inflorescence densely capitate, terminal, and opposite the leaves, peduncles 2-4 cm. long; heads about 2 cm. in diameter; corolla about 8 mm. long; calyx 5-lobed to beyond the middle, the lobes lanceolate, acuminate; capsule pyramidal, 5-angled, the 5 carpels loculicidally dehiscent, triangular, 4 mm. long, tipped with a beak of about one-half their length.

Asuncion (201 a). November. Apparently nearest to *M. parvifolia*, H. B. K.

Melochia pyramidata, L., Sp. Pl., 774.

Asuncion (697). May.

Melochia venosa, Sw., Prod. Flor. Ind. Oc. 97.

Caballero (403). January.

Melochia venosa, Sw., var. *polystachya* (H. B. K.), Schum., Mart. Fl. Bras., xii, pt. 3, 37.

Caballero (403 a); between Villa Rica and Escoba (588). January.
This species is densely fuscous woolly all over. Blades of the leaves 5-8 cm. long and 1-3 cm. broad, unequally serrate; petioles

5-15 mm. long; stipules lanceolate, acute, 12 mm. long, 4 or 5 mm. broad. Flowers small, yellow, in an elongated, naked panicle. Calyx 5-lobed, the lobes $\frac{3}{4}$ as long as the petals and very hairy. The variety is much more slender, much branched from the base. Leaves shorter and narrower; stipules 4 or 5 mm. long, setaceous or 1 mm. broad at the base. Inflorescence in a contracted terminal panicle, or a few flowers at the ends of the branches. Both occurring near Caballero and Villa Rica.

Waltheria Americana, L., Sp. Pl., 673.

Asuncion (201). November.

Waltheria communis, St. Hil., Flor. Bras. Merid., i, 123. Ex descr.

Asuncion (215 a). December.

Chaetæa Paraguayensis, Britton, n. sp.

Climbing, softly pubescent, branched, the twigs channeled. Leaves short-petioled, lanceolate, rather coriaceous, obscurely reticulate, blunt-pointed, remotely dentate near the apex or entire, glabrous above, slightly pubescent beneath, 4-6 cm. long, about 1 cm. wide; flowers in short, axillary cymes; lamina of the petal fliform; fruit globose-ovoid, about 1 cm. in diameter, the spines conio acute, 3-4 mm. long; seed obliquely oblong, brown, smooth, rounded on the back, the sides nearly flat.

In thickets, Asuncion (288). December. Same as Balansa's 2002. I do not use the generic name *Büttneria*, Læfl., because it is a homonym of *Butneria*, Duhamel = *Calycanthus*, L. N. L. B.

A singular liana which is not uncommon in the thickets around Asuncion. The stems are armed with small, recurved prickles, by means of which it climbs upon shrubs and low trees. It clings so closely to its supports that it is difficult to detach the branches. The largest leaves I found were 12 cm. in length by 5 cm. broad, and often had small prickles along the midrib beneath, with a petiole 2 mm. to 2 cm. long. Calyx monosepalous, with 5-pointed segments longer than the corolla. The whole flower is greenish-yellow in hue, and quite peculiar in appearance. The petals are flat at the base and 2-lobed, throwing up what appear to be 5 yellowish horns, which are the most conspicuous part of the flower. The capsule is normally 5-carpelled, but often several of the cells of the ovary are abortive, and not more than 2 or 3 of the ovules ripen into seeds. The fruit is down-covered, and has a curious prickly look about it.

TILIACEÆ.

Triumfetta semitriloba, L., Mant., i, 73.

Asuncion (116 and 132). November.

This Florida plant is very common in old fields around Asuncion, a rough-hairy shrub 4-6 dm. high, bearing small globular fruit beset with hooked prickles.

Corchorus hirtus, L., Sp. Pl., Ed. 2, 747.

Asuncion (1089). June.

A small, very hirsute plant, 12-15 cm. high, with long, fibrous roots. Stem simple or a little branching at base. Leaves ovate, palmately 5-nerved, hirsute, often doubly crenate-serrate, 3-5 cm. long, and 10-15 mm. wide, on hirsute petioles 7-12 mm. long. Flowers few, axillary, yellow.

Corchorus pilobolus, Link, Enum. Hort. Berol., ii, 72.

Asuncion (703). May.

Luhea divaricata, Mart. et Zucc., Nov. Gen., i, 101, t. 63.

Near Escoba (604). January.

A tree 6-16 m. high, with smooth and gray bark. Young branches and inflorescence pubescent. Bracteoles 6, narrower than the sepals, tomentose. Calyx lobes 5, tomentose on the outside, glabrous and yellow on the inside. Petals yellow, broad at the apex. Flowers large. Leaves serrate, ovate or oval, slightly and obliquely cordate, abruptly acute at the apex, dark green above, white tomentose beneath, nerves conspicuous beneath, 5-10 cm. long and 2-5 cm. broad.

Luhea uniflora, St. Hil., Flor. Bras. Merid., i, 226, t. 57.

Asuncion (676). April. = Balansa 2009.

A shrub or small tree 5-8 m. in height, growing in copses near Asuncion. It was only in fruit when collected, but attached to the fruit were the bracteoles, which are green and thick, longer than the fruit, linear-lanceolate, 8 or 10 in number. The fruit is a hard, pointed, 5-winged nut, green and downy, 5 cm. long and 2 cm. in diameter, the spaces between the wings concave, having 5 narrow cells projecting from the centre of the nut to the edges of the wings. Remains of the petals show them to be white, and the stamens very numerous.

Prockea Crucis, L., Sp. Pl., Ed. 2, 745.

Asuncion (827). November.

A shrub 2-3 m. high with brown, smooth bark. Leaves nearly glabrous and shining above, downy beneath, acuminate at the apex, narrowed and subcordate at base, serrate, the teeth with blunt callous points, palmately 5-nerved, 3-10 cm. long and $2\frac{1}{2}$ -7 cm. broad, on petioles 8-15 mm. long, stipules large, lunate, toothed, amplexicaul. Flowers in short axillary racemes. Flowers about 5 mm. high. Calyx lobes downy, ovate, abruptly acute at the apex, reflexed. Petals none. Stamens numerous, yellow. Ovary and young fruit downy. Each flower is on a downy pedicel 3-10 mm. long.

The genus *Prockea* is referred by Eichler to the Bixinæ.

ERYTHROXYLACEÆ.

Erythroxylon microphyllum, St. Hil., var. *cuneifolium*, Peyritsch., Mart. Flor. Bras., xii, pt. 1, 134.

Pilcomayo River (946). February.

A stragglingly-branched shrub, with light brown, very warty bark, 4 or 5 m. high, branches mostly short. Leaves cuneate, 1-1½ cm. long, 5-7 mm. broad, retuse. Found only in fruit, a flattish, angled, 1-seeded berry, when ripe pulpy and dark red, about 5 mm. long and 3 mm. wide. The persistent calyx has 5 ovate, acute lobes. This shrub occurs only rarely along the banks of the Pilcomayo. The ends of the branches are bare and sometimes inclined to be spinescent.

MALPIGHIACEÆ.

Dicella bracteosa, Gris., Linnæa, xiii, 250. Ex descr.

Between Villa Rica and Escoba (479). January.

A large tree. Leaves opposite, lanceolate, cuspidate, entire, glabrous and shining above, sparsely hairy beneath except on the nerves, the hairs often bicuspidate, 5-10 cm. long, 2-4 cm. wide, on slender petioles 6-8 mm. long, which are biglandular near the middle. Flowers in terminal panicles 10-15 cm. long. Sepals 5, oblong, 5 or 6 mm. long, silky with appressed hairs outside, whitish inside, bearing 8 large glands. Petals none. The nut is nearly 2 cm. long, obovate, covered, especially at the base, with silky, fuscous, appressed hairs, not crested and angled as described in Flor. Bras., but even,

surmounted by the sepals and glands. The flower buds are very silky with appressed fuliginous hairs, and the branches of the inflorescence marked in the same manner.

***Heteropterys angustifolia*, Gris., Linnaea, xiii, 223.**

Between Villa Rica and Escoba (487). January.

A liana climbing high among trees, shrubby, or looking like a small tree. Leaves opposite, or alternate, willow-like, linear, cuspidate, entire, glabrous, 4–8 cm. long, and 4–8 mm. wide, on petioles bracteolate and articulate midway, 2–5 mm. long. Flowers in terminal corymbs 4–8 cm. long. Found only in fruit, but persistent sepals 5, oblong, with 2 glands on the outside of each, and petals 3-toothed. Fruit a samara in 2s., 2 cm. long, broadly winged.

***Heteropteris Pirayuensis*, Morong, n. sp.**

Suffruticose. Stem terete, angled or striate below, more or less compressed and silky downy on the young branches, about 1 m. high. Leaves of a silvery hue, opposite, entire, coriaceous, ovate, subcordate, apiculate, glabrous and somewhat shining above, minutely downy beneath, often with 1 or 2 glands near the base of the blade; the largest collected 8 cm. long and 5 cm. wide. Petioles canaliculate above, eglandulose or biglandular near the apex, 5–10 mm. long. Flowers in small terminal panicles. Found only in fruit, but the persistent sepals oblong, each with 2 glands on the back. Flowers 4 in the umbel; pedicels jointed and bibracteolate above the base; bracteoles minute, obtuse. Samaras 2 together, obovate or sometimes cultriform, the wing beautifully purple-tinted, shining and sculptured with striæ, about 2 cm. long, on slender peduncles 10–15 mm. long.

Between Pirayu and Yaguaron (672). April 8.

***Heteropteris amplexicaulis*, Morong, n. sp.**

A liana, twining over trees for 6 or 8 m. Leaves numerous, opposite, lanceolate, elliptical or nearly orbicular, amplexicaul, apiculate, entire, callous on the margins, glabrous, somewhat shining above, lighter colored beneath, eglandulose, 2–6 cm. long, and 1½–3 cm. broad. Flowers in rather small terminal panicles. Calyx 4 or 5 parted, obtuse, downy, membranous and ciliate on the margin, with 8, sometimes 10 glands. Petals 4 or 5, bright yellow, longer than the calyx lobes (4 or 5 mm. long), rounded at apex, unguiculate. Pedicels jointed and bracteolate just above the base, midway or near the apex, occasionally glandular. Ovary quite hairy, the hairs sometimes reddish. Samaras reddish-purple, 3, about 2 cm. long, pubescent below, the wing sculptured with striæ, broad, crenate on the upper margin.

Asuncion (199). November–December. = Balansa 2400.

Hiræa pulcherrima, Morong, n. sp.

A liana, often climbing on trees for 10 or 15 m. Stem terete, glabrous or minutely appressed pubescent, especially on the young shoots and among the inflorescence. Leaves deep green, opposite, entire, ovate, rounded at base, acuminate at the apex, shining on the upper surface, pubescent when young, 5-10 cm. long, 3-6 cm. broad, usually biglandular at the base of the blade. Petioles 8-12 mm. long. Stipules minute, ovate, at the base of the petioles. Flowers in terminal panicles, often over 30 cm. long. Branches of the panicle opposite, spreading divaricately, 3-10 cm. long, the flowers disposed racemously or umbellately. Pedicels purplish, filiform, with minute bracts at the base, sometimes bibracteolate and jointed a little above the base, 8-15 mm. long. Sepals oblong, obtuse, hairy. Petals larger, purple, unguiculate. Ovary hairy. Samara 1, broadly 3-winged, clothed with long, appressed white hairs, crested on the back, becoming more or less glabrate; wings semiorbicular, separate or partly confluent at the base, striate, a shining purplish-brown when mature, the whole in dried specimens appearing orbicular and about 15 mm. in diameter. Seeds solitary in the centre of the axis of the wings. This liana is a great ornament to the woods when in flower, and its curious fruit are no less attractive.

Asuncion (626). March. = Balansa 2405.

Hiræa Salzmanniana, Juss., Monog., 312.

Chaco (431). March. = Balansa 24104.

In Bull. Soc. Bot. Suisse, i, 34, Prof. Chodat describes a var. *glandulifera* based on this number of Balansa, with the character that the leaves are biglandular at the base, with which our specimens agree, but Grisebach in Mart. Flor. Bras., xii, pt. 1, 99, previously described a different variety under the same name, the character being that the calyx is glandular.

A liana with small panicles or corymbs of yellow flowers; petals 6 or 7 mm. long, fringed, at the rounded apex. Sepals each biglandular and white tomentose. Leaves glabrous or pubescent when young, lanceolate or obovate, acute or apiculate, 10-20 cm. long, and 3-7 cm. broad. Petioles white tomentose, stipuliferous and biglandular at the apex. Wings of the samara separate, crenate or undulate on the border, golden-brown at maturity.

Hiræa macrocarpa, Chodat, Bull. Soc. Bot. Suisse, i, 35.

Asuncion (226); between the Recoleta and Luque (721). December-May. = Balansa 2408.

This species has round-oval, apiculate or abruptly acute leaves, glabrous above, covered with long, appressed white hairs beneath, 6-12 cm. long, and 4-8 cm. broad, eglandulose or biglandular at

base of the blade. Petioles very short. Flowers few, in small panicles, yellow or sometimes purple. Calyx with 8 glands. Fruit very large, 3- sometimes 5-winged, the wings 2 by $3\frac{1}{2}$ cm., hairy, purple-tinged, lobed, or irregularly dentate on the margins.

Janusia Guaranitica, Juss., Monog., 350.

Asuncion (704). November-May.

A very pretty little twining shrub, common in old fields and on roadsides about Asuncion and on the Pilcomayo, often found climbing upon herbaceous plants and small shrubs. The 5 green sepals have each 2 bean-shaped glands on the back. Petals yellow, with long claws, large ovate blades, widely separated, and the corolla spreads open rotately in anthesis from half to three-quarters of an inch in diameter. The ovaries are 3-carpelled, each carpel becoming in fruit a 3-winged samara with the seeds at the base.

Janusia Barbeyi, Chodat, Bull. Soc. Bot. Suisse, i, 34.

Pilcomayo River (1090). January. = *Balansa* 2401, Herb. Kew.

Chodat, in his brief description of this species, cites this number of *Balansa* in part. Our specimens appear slightly different from our no. 704, but do not altogether agree with the characters assigned by M. Chodat to *J. Barbeyi*.

GERANIACEÆ.

Tropæolum pentaphyllum, Lam., Encyc., i, 612.

Buenos Aires (14). October.

Oxalis articulata, Sav., Lam. Encyc., xv, 636.

Asuncion (656). April.

Flowers usually bluish-purple, sometimes white.

Oxalis corniculata, L., Sp. Pl., 435.

Asuncion (319). December.

An odd-looking little *Oxalis*, resembling a small clover in general appearance. It throws out runners 10 to 15 cm. long, which root at the joints, and from each joint rises a fascicle of stems and leaves. Leaves ternately or quaternately pinnate, the leaflets broader than long, emarginate and ciliate. Flowers light yellow. It has a curious habit in fruit. The peduncle is about 1 cm. long, and articulated half-way up, the joint marked by 2 small bracts. At the articula-

tion the peduncle bends sharply downwards, while the ripe pod bends sharply upwards again and thus becomes erect. It grows on the edges of the sidewalks and in the crevices of the bricks all over Asuncion. Also along the country roads, but outside of the city it attains a much larger size, with a corolla nearly 3 cm. in diameter, and the petals marked by six short purple stripes near the base inside.

Zanthoxylum Naranjillo, Gris., Symb. Flor. Arg., 76.

Asuncion (809). October.

A tall shrub 2-3 m. high, in dense thickets about Asuncion. The leaflets are minutely crenate, with a row of transparent dots, one in each crenature, and, when fresh, quite transparent along the venation. Flowers white, in large, terminal cymes. The stems and the rachis of the leaves armed with stout curved spines, an ugly customer to deal with.

Pilocarpus pennatifolius, Lam., Jard. Fleuriste, iii, t. 263.

Asuncion (466 and 635). February-April. = Balansa 2514, and Gibert 55.

The well-known Jaborandi, a medicinal plant of great value. The long racemes of dark, lurid flowers, sometimes 20 or 25 cm in length, are very striking. These contrast strangely with the dark green coriaceous shining foliage. The fruit is equally striking. It appears to be a large pod with a thick green shell, which dehisces on one side by 2 valves. Within appear 5 other pods, into which the 5 cells of the ovary have developed, each containing a shining black seed enclosed in a bladderly membrane that hardens in drying. A shrub about 1½ m. high, with smooth stem, branches, and leaves and greenish bark, common in the thickets around Asuncion.

Helietta longifoliata, Britton, n. sp.

Glabrous. Leaves opposite; petioles 2-3 cm. long; leaflets sessile, lanceolate or slightly oblanceolate, narrowed or cuneate at the base, 5-10 cm. long, 1-2 cm. wide, the margins entire, the tip inrolled into a slender, curved projection about 3 mm. long; inflorescence terminal, loose, the flowers numerous, about 2 mm. broad; samaras about 1.5 cm. long, the wing oblong, twice as long as the body.

Caballero (457). January. = Balansa 2515.

A tree 8 or 10 m. in height, occurring on the hillsides near Caballero, on the road from Villa Rica to Escoba. Flowers white.

SIMARUBEÆ.

Picramnia Sellowii, Planch. in Hook. Lond. Jour. Bot., v, 578.

Asuncion (823). October. = Balansa 2506.

A straggling shrub 1-1½ m. high, with pinnate leaves and minute, greenish flowers in long, compound, linear spikes. Leaves numerous, shining above; leaflets 3-4 pairs, the largest 6-7 cm. long and about 3 cm. wide.

MELIACEÆ.

Trichilia Cantigua, A. Juss. in St. Hil. Flor. Bras. Merid., ii, 53.

Asuncion (762); between Villa Rica and Escoba (448). January-July. = Balansa 4655 and 2532.

A tree 8-12 m. high. Leaves pinnate; leaflets 5 or 6 pairs and 1 odd one, oblong, glabrous, shining above, 6-8 cm. long, and 2-3 cm. wide. Flowers 3 mm. long, creamy-white, in small, close axillary panicles or racemes along the branches.

Trichilia elegans, A. Juss. in St. Hil. Flor. Bras. Merid., ii, 79, t. 98.

Asuncion (834). November. = Riedel, 532, from Brazil, and Balansa, 2530.

Differs from the preceding species in having numerous small, bright green leaves, the leaflets 2-2½ cm. long, 8-10 mm. wide, broader in the middle, sloping to both ends, nearly sessile, retuse or nearly truncate at the apex. Flowers minute, white, but little more than 1 mm. long, in axillary racemes; petals very deciduous, falling off at a touch. A rather smaller tree, but much more graceful, with more numerous blossoms.

Cedrela fissilis, Vell., Flor. Flum. iv, t. 68, 177.

Asuncion (629).

This tree is known all over Paraguay by the name of Cedar, although it bears no resemblance to the true cedar, except in its light, red-colored heart wood. It often attains a height of 20 m. or more, and is valued as the best cabinet-wood in the country, serving almost as well for that purpose as our red cedar, and therefore worthy of the name. It has long straggling branches. The long pinnate leaves give it an elegant appearance, and the great compound panicles of flowers, from 4 to 6 dm. in length, are equally striking. The ill-smelling leaves and flowers, however, are not

quite so attractive as the looks. The fruit is an obovate nut, 4-5 cm. in length, and $2\frac{1}{2}$ cm. in diameter, with a thin, greenish-white scurfy rind, looking somewhat like our butternut. It is one of the few deciduous trees in Paraguay, the fruit hanging on long after the leaves have fallen, which they do in April or May. The fruit partakes of the malodor of the leaves and flowers.

ILICINEÆ.

Ilex Paraguayensis, St. Hil., Mem. Mus., ix, 351.

Asuncion (636). Not in flower or fruit.

The famous Paraguay 'Tea or Jesuits' Tea, or Yerba Maté, as it is variously called. It does not grow wild in eastern Paraguay, but is found only in the yerbales along the Parana River in the western districts. It is occasionally cultivated in gardens at Asuncion.

CELASTRINEÆ.

Maytenus ilicifolia, Mart., Fl. Bras. xi, pt. 1, 8.

Lympio (735). May.

A shrub about 2 m. high. Only in bud when collected. Flowers apparently white. Leaves ovate or oblong, coriaceous, glossy, with a callous edge and many spiny teeth on the margins, nearly sessile, 4-10 cm. long, and 5 or 6 cm. wide.

Maytenus Vitis-Idæa, Gris., Symb. Fl. Arg. 83.

Pilcomayo River (1049). May.

A shrub 3-5 m. high, common in the thickets on the banks of the Pilcomayo. It has very thick, flabby leaves, almost circular in shape, so heavy that the shrub is bent nearly to the ground under their weight. Flowers small, yellowish-green, in small clusters along the branches. Fruit an oval, red berry, very scarce.

RHAMNEÆ.

Sageretia elegans (H. B. K.), Brong.

Pilcomayo River (907). February. = Balansa 2420.

A shrub 3-5 m. high, with smooth light-colored bark. Leaves on short petioles, opposite, ovate, coriaceous, serrulate, glabrous, shining, acute, 4-8 cm. long, and $1\frac{1}{2}$ -4 cm. broad, the nerves beneath prominent. Found only in fruit. Berry on a short pedicel, nearly

as large as a pea, red when ripe, 3-angled. This shrub is armed, at least below, with stout, straight spines.

Retanilla ?

Pilcomayo River (913).

Known to the natives as the Jacaranda or Caranda, a tree with a trunk about 20 cm. thick and 10 or 12 m. high. A striking object in the woods. I found it without flowers or fruit. The whole head presents the appearance of chevaux-de-frise, being composed, apparently, of long, stout spines, 8-25 cm. in length, thickened in the middle and very sharp at the apex. These are really the branches. Leaves reduced to 2 or 3 minute scales at the base of the branches, very caducous. The trunk has a dark shaggy bark, and the heartwood is bluish-black, densely hard, with a small ring of white wood next to the bark.

We suppose this to be a Retanilla, but Mr. N. E. Brown, of Kew, doubts that it belongs to that genus.

Gouania tomentosa, Jacq., Amer., 263.

Asuncion (644). April.

A tendril climber, clambering in dense masses over shrubs and small trees in thickets in the vicinity of Asuncion. Flowers white, in long, slender, supra-axillary spikes, very conspicuous. Fruit a globular, slightly 3-angled, fuscous-hairy capsule, 3-celled, with 3 large, flat seeds, one in each cell.

AMPELIDEÆ.

Vitis palmata (Poir.), Baker in Mart. Fl. Bras., xiv, pt. 2, 216.

Asuncion (138); Pilcomayo River (1091). Flower November; fruit May.

An interesting vine which I found climbing upon trees and fences in the neighborhood of Asuncion, and afterwards upon shrubs in the great laguna on the Pilcomayo River. It has deeply divided palmate leaves. Flowers small, wax-like, yellowish-brown, in umbel-like clusters. Fruit a pear-shaped, purple berry, 1-celled, 1-seeded. Exceedingly hard to preserve, as the leaves and flower clusters will disintegrate in spite of all endeavors. I never could keep one of those collected about Asuncion, although I tried repeatedly to press them, but for some reason had no difficulty with those of the Pilcomayo region.

Vitis sicyoides (L.), Baker in Mart. Fl. Bras., xiv, pt. 2, 202.

Asuncion (287). December.

A tendril climber which clambers very high over tall trees. The lower part of the stem appears twin, as it has a deep channel in the middle which seems to divide it into two parts, while the branches are merely angled or grooved. Leaves deltoid, cordate at base, with a broad sinus and rounded lobes, sharply serrate, smooth on both sides, on petioles 2-4 cm. long. Flowers small, waxy-yellow. Fruit a 1-celled berry, containing 2 flat seeds which lie parallel with each other across the cell, the sharp side uppermost.

SAPINDACEÆ.

Serjania fuscifolia, Radlk. Mon. Serj. 221.

Asuncion (772). May-June.

A liana with sulcate, fuscous-downy stem. Leaves biternate or triternate, on long fuscous-downy petioles; leaflets ovate, doubly serrate, nearly glabrous above and fuscous-downy beneath. Racemes much longer than the leaves; rachis fuscous-downy, axillary, the lower part naked and 8-10 cm. long, the upper flowering part of the same length. Flowers small, white. Fruit not seen. Tendrils at the base of the flowers.

Serjania glabrata, H. B. K., Nov. Gen., v, 110.

Asuncion (625). March. = Gibert 1036.

A liana 4-8 m. high. Differs from the preceding species in having glabrous stems, only the young branches being puberulent. Leaflets glabrous, lobed or with a few large teeth. Fruit a 3-winged samara, the wings confluent at the base, in dried specimens when the lobes are pressed together looking cordate-ovate, 2-2½ cm. long, and 1½-2 cm. broad. The wings are membranous and glabrous, each bearing at the apex a globose seed nearly as large as a pea.

The flowers are on longer peduncles than in no. 772, and in paniced racemes at the top of the stem, instead of being in solitary racemes among the leaves as in that; racemes much shorter.

Serjania meridionalis, Camb. in St. Hil. Fl. Bras. Merid., i, t. 76.

Asuncion (625 b). March.

Found only in fruit, which is much smaller than that of no. 625, the wings yellowish-brown when mature and striate, the samara in

the dried specimens being about $1\frac{1}{2}$ cm. long, and as wide or wider at the base.

Cardiospermum Halicacabum, L., Sp. Pl., 366.

Asuncion (650). April. Pilcomayo River (891). January.

Cardiospermum grandiflorum, Sw., Fl. Ind. Occ., ii, 698. (*C. retutinum*, H. and A.)

Asuncion (238). December.

A liana climbing by tendrils. Stem striate, angled, pubescent, becoming glabrate with age. Leaves ternate or biternate; rachis 2-4 cm. long. Leaflets ovate, 2- $2\frac{1}{2}$ cm. long, and $1\frac{1}{2}$ - $3\frac{1}{2}$ cm. wide, pubescent beneath, crenate-serrate or lobed, the teeth and lobes mucronate or with a callous point. Flowers white, 7 or 8 mm. high, numerous, in small corymbose clusters. Common peduncle 5-7 cm. long, striate, hirtulose. Tendrils twin at the summit of the peduncle under the flowers. Pod ovoid, 4 or 5 cm. long, 2- $2\frac{1}{2}$ cm. broad in the middle, pubescent, a light yellow when fully mature.

Paullinia elegans, Camb., St. Hil. Fl. Bras. Merid.

Asuncion (153, 387 and 764); Trinidad (737); Pilcomayo River (916 and 1092). November-June.

A climbing vine, running over shrubs and tall trees with coriaceous, shining, pinnate leaves, the pinnæ of 2 pairs and one odd leaflet. Flowers white, small, in axillary racemes, 8-10 cm. in length, on long peduncles. The stem is that of a strong, woody liana, with the tendrils generally two, at the base of the leaves. The fruit is the most conspicuous part of the plant, consisting of numerous bright red berries, as large as a cranberry, containing 3 shining black seeds, which are enveloped, like those of *Euonymus*, in a white, mealy aril that covers about one-half of the seed. The juice, though scanty, is milky, showing more clearly in the unripe fruit than in the stems.

Paullinia pinnata, L., Sp. Pl., 366.

Asuncion (373); Pilcomayo River (892). January.

This *Paullinia* differs from the preceding species in having winged petioles, pear-shaped and obtusely 3-angled fruit, with tendrils both on the stem and at the ends of the peduncles, the whole plant very glabrous. Leaflets oblong, with a few large obtuse teeth. Peduncles 8-10 cm. long.

Schmeidelia edulis, Camb. in St. Hil. Fl. Bras. Merid.

Asuncion (844). October.

A shrub with smooth dark-gray bark, covered with white dots, 1½–2 m. high. Leaves ternate; common petiole about 2 cm. long, downy; leaflets elliptical, glabrous above, downy on the veins beneath, pointed at either end, sessile or subsessile, irregularly serrate above, the largest collected 4½ cm. long and 2½ cm. wide. Found only in fruit. Berries small, red, in small axillary clusters, on peduncles 12 mm. to 2 cm. long.

Cupania vernalis, Camb. in St. Hil. Fl. Bras. Merid.

Asuncion (752). June. = Balansa 2473.

A tree with dark-grayish bark, smooth or somewhat fissured below, fuscous-downy on the young shoots, 10–15 m. high. Leaves alternate, pinnate; petioles 2–7 cm. long; petiolules very short; leaflets 5–7 pairs, oblong, rounded at the apex and base, the largest collected 10–12 cm. long and 3 or 4 cm. wide, serrate, shining above, a little downy on the prominent veins beneath. Flowers small, white, or greenish-white, in axillary compound racemes, the rachis and sepals downy. Flowers fragrant. Common name as given to me by a native Paraguayan, Petato.

Thouinia Paraguayensis, Britton, n. sp.

A stout, climbing, tendril-bearing vine, the young twigs densely and finely pubescent, angular. Leaves 3-foliate; petioles 3–4 cm. long; leaflets stalked, thick, densely and finely pubescent beneath, glabrate above, broadly ovate, truncate but decurrent on the petiole, obtuse at the apex, remotely serrate, 3–4 cm. long, and about as wide; flowers minute, in subglobose, compound cymes; cymes axillary, peduncled; samaras 3, 3 cm. long, the wing obliquely obovate, twice as long as the seed.

Road to Lambare in thickets (625 a). May.

Melicocca lepidopetala, Radlk., Sitz. Akad. Mun., 1878, 344.

Asuncion (817).

A large tree from 10 to 18 m. in height, often planted as a shade tree about dwelling-houses in Asuncion, for which it is well adapted by its numerous branches and crowded, evergreen leaves. The native name, as it was spelled to me by a Guaraní scholar is Ibápôbô, pronounced in English, as nearly as it can be represented, ivapuyu. It bears one of the most highly esteemed native fruits, which are often sold in the Asuncion market. This is about the size of a

plum, globular, with a thick, leathery rind, and a sweet, mucilaginous pulp that adheres closely to the seed. The meat is quite pleasant to the taste, but slightly astringent, and one may suck the pulp-covered seed as though it were a soft gum. The seeds are large, oval, with a soft shell, one, sometimes two, in the drupe. Parodi (Not. Pl. Us. de Corrientes y Paraguay, p. 54) states that the leaves are medicinal, and used in decoctions for mucous fluxes, owing their properties to an essential oil contained in the vesicular glands, which look like transparent dots, and to an astringent tonic principle which all the tissues contain. Flowers in September; ripe fruit in December.

Sapindus Saponaria, L., Sp. Pl., 367.

Asuncion (722). May.

In Paraguay this is a small tree 5-7 m. in height. Found only in fruit. The berries numerous, fleshy, greenish-yellow, about as large as marbles.

ANACARDIACEÆ.

Schinus lenticifolius, L., in March. Anac., 164.

Near Jaguaron (668). = Balansa 2523 a.

A small shrub about 1 m. in height, in large patches upon the open campo. The red, capsular fruit, about as large as peas, look almost exactly like those of the pepper tree (*Schinus molle*). The fruit has a thin, brittle shell, which easily crushes between the fingers, and contains a single, flattish seed covered with angles and grooves. In fruit April 8.

Duvaua dependens (Ort.), Kunth, Dict. Sci. Nat., Livr. 47.

La Plata, Arg. Republic (28). October.

Duvaua spinosa (Engler), Britton.

Schinus spinosus, Engler, in Mart: Fl. Bras., xii, pt. 2, 388, t. 81, f. 2.

Pilcomayo River (952). March.

A shrub 5 or 6 m. in height, and a great nuisance about our camp, as its short, stiff, stub-like branches are armed with sharp thorns, and when cut down it was impossible to burn it or to put it to any use. It seems to be all branches, as the leaves are few and quite small. The flowers are small, white, polygamo-dioecious, scattered along the branches, and looking much like those of our

Ilex verticillata. The fruit consists of a small, nearly globular berry, blackish-purple when ripe, containing a single seed which is flattish and irregularly grooved on the sides, and having a slight aromatic taste. When fully mature, the rind becomes dry and crushes into thin fragments under pressure.

I tried for several nights in succession to make a bonfire of a heap of these shrubs which our peons had cut down, and though every other shrub and tree in the region would burn readily, this was scarcely scorched.

Quebrachia Morongii, Britton, n. sp.

A large tree. Leaves simple, oblong, thick and coriaceous, entire, pale, reticulate-veined, obtuse at each end, mucronulate at the apex, 3-5 cm. long, 1.5-2 cm. wide, glabrous, petioles 3-5 mm. long, staminate flowers rather numerous, in small panicles; calyx campanulate, glabrous, about 1 mm. long, 5-lobed nearly to the middle, the lobes ovate-oblong, obtuse; petals 5, oblong, obtuse, apparently white with a green midrib, entire, about 3 times as long as the calyx, recurved at least when dry, slightly imbricated; disc annular, 5-lobed, elevated; stamens 5, alternate with the petals, inserted just outside the disc; filaments short, thickened below; anthers about the length of the filaments, versatile, 2-celled, the cells longitudinally dehiscent; pistil none in the single flower examined; fertile flowers not seen; samara oblong, slightly falcate, glabrous, 2-3 cm. long, the seed-bearing, lower portion rugose.

This description is drawn from the flowers of Mr. J. Graham Ker's No. 55, kindly sent me by Mr. N. E. Brown, of Kew, and the fruit of Dr. Morong's No. 914, both from the Pilcomayo River. The species differs from all the other described ones of the genus in its simple leaves. In the others they are pinnate.—N. L. B.

Known universally in Paraguay as Quebracho Colorado. Quebracho or axe-breaker, as the Spanish word imports, is a very suitable name, for the wood is almost as hard as iron. The tree grows to the height of 20 or 25 m., and 1-1½ m. in diameter at the base.

It is found all through the Chaco territory in Paraguay, along the Pilcomayo River, on which these specimens were gathered, and down the Paraguay River nearly to Corrientes in the Argentine Republic. It is extensively used for building purposes, forming solid logs which make admirable beams for bridges and other structures in which great strength is required. It is almost indestructible by time and weather. I saw doors made of the wood 150 years old, and they seemed as sound as ever. In the ruins of the churches in the old Jesuit Misiones in eastern Paraguay there are

beams of this wood still standing, which are at least 250 years of age. The wood is so heavy that it sinks in water like lead, and it is almost impossible to cut it with a knife. In an attempt to bore it with a common gimblet, I twisted the handle off before I had penetrated the wood half an inch. The tree is stocky, somewhat resembling the English elm in appearance, with a rough, shaggy, grayish bark. The wood is ground up in Paraguay and used for tanning purposes. The samaras are of a beautiful glossy red color. The foliage is usually covered with gray usnea-like lichens, the branches thick and bearing strong spines, so that it cannot be regarded as a very handsome tree, although invaluable in those regions as timber.

LEGUMINOSÆ.

Crotalaria anagyroides, H. B. K., Nov. Gen. vi, 404.

Gran Chaco (375). January.

Fruticose, 3-6 dm. high. Stems branched, striate, fuscous-pubescent. Leaves ternate, on petioles 3-10 cm. long; leaflets obovate or elliptical, entire, pubescent, varying greatly in size, from 2 to 8 cm. long, and 6 mm. to $2\frac{1}{2}$ cm. wide. Flowers yellow, in terminal racemes. Pods pubescent, 2- $2\frac{1}{2}$ cm. long.

Crotalaria incana, L., Sp. Pl., 716.

Asuncion (225); Pilcomayo River (1093). December-April.

Medicago denticulata, Willd., Sp. Pl., iii, 1414.

Buenos Aires (1). October.

Indigofera Anil, L., Mant., 272.

Asuncion (205). November-December.

This well-known plant of the East Indies was formerly cultivated largely in Paraguay for the manufacture of indigo, and is still used to some extent for that purpose. It has become quite extensively naturalized in the country.

Indigofera gracilis, Bong. in Ann. Nat. Hist., iii, 431.

Caballero (407). January. = Balansa 1568.

This species differs from the preceding in having simple linear leaves, few and scattered, 3-6 cm. long, 2-4 mm. wide. The flowers are purple, in long terminal spikes. A slender plant 3-5 dm. in

height, growing upon the open campo. It has a stout, shrubby root.

Indigofera sabulicola, Benth. in Mart. Fl. Bras., xv, pt. 1, 40.

Asuncion (185). November.

A small plant with thick, hard root, prostrate or ascending on sandy soil. The small flowers are purple in color, in close heads, or, when more developed, opening into short spikes. Leaves pinnate; leaflets cuneate or spatulate, retuse, mucronulate, 6-12 mm. long, 3-6 pairs and an odd one. Pods hairy, 13-15 mm. long. Many in dense terminal clusters.

Cracca cinerea (L.), Morong.

Galega cinerea, L., Amæn. Acad., v, 403.

Tephrosia cinerea, Pers., Syn., ii, 329.

Between Paragua and Luque (856). November-December.

A small shrub 15-30 cm. high, irregularly branching, with a tough, woody root, growing in dry soil. Flowers purple, downy, quite large for the plant, the petals 1-2 cm. in length. Leaflets 4-6 pairs and an odd one, pubescent, obovate, 10-18 mm. long, mucronate. Pods pubescent or glabrate, 3-5 cm. long, solitary or 1-4 in a cluster.

Sesbania exasperata, H. B. K., Nov. Gen., vi, 534.

Pilcomayo River (934). February-April.

A tall shrub-like, glabrous, much-branched plant, 2-2½ m. in height. Flowers light yellow, in short racemes on very long, naked, pendent peduncles. Leaflets 25-30 or more. Fruit in a long, loose panicle at the ends of the stem and branches, consisting of an elongated, narrow pod (often 25 cm. in length and only 4 mm. broad), with a sharp pointed apex and from 40 to 50 cross-partitioned cells, which contain as many small, square, flattish yellow seeds. When fully ripe, the leaves fall off and leave the plant covered with these long, pendent pods, thus imparting to it a very striking appearance. As the lower branches are the largest, the general outline is conical. The stem has a large pith in the centre, and the wood is soft. Not uncommon on the banks of the Pilcomayo.

Sesbania marginata, Benth., Mart. Fl. Bras., xv, pt. 1, 43.

Asuncion (621). February-March.

A cassia-like looking shrub, 2½-3 m. in height, common on the low lands around Asuncion. The flowers, which are quite hard to

catch, are very fugacious, small, yellow. The most peculiar thing about the plant is the fruit. This, notwithstanding the early disappearance of the flower, is quite abundant, and hangs on for several months. It consists of a 4-sided pod from 3 to 7 cm. in length, with 3-6 cross septa, containing as many oblong beans, each of which is imbedded in a light, greenish, dryish pulp. When dry the pods are sharply angled, and the angles corky. From 4 to 7 pods hang from a single peduncle. The stipules are even more fugacious than the petals, dropping off before the leaf is half developed.

***Æschynomene falcata*, D.C., Brod., ii, 322.**

Caballero (400). January.

Stems very slender, almost setaceous, striate, pubescent, 5 or 6 dm. high, branched, erect or ascending. Leaves pinnate, on petioles 2-4 mm. long; leaflets 3-5 pairs, obovate, entire, sessile, mucronulate, minutely pubescent, about 5 mm. long. Flowers 1 or 2, divergent, at summit of the branches, yellow, on a common setaceous axillary peduncle, 2-3 cm. long, and jointed and bracteolate in the middle. Loments 5-jointed, glabrous.

***Æschynomene Montevidensis*, Vog. Linnæa, xii, 83.**

Luque (310). December.

A shrub $2\frac{1}{2}$ -3 m. high, with glabrous, glaucous stems. Leaves scarcely 2 cm. long, with 20-30 pairs of minute, crowded, mucronate leaflets, minutely pellucid-punctate. Flowers bright yellow, in long, lax, nearly naked panicles. Loments glabrous, 3-10 jointed, callous margined on either side, 2-5 cm. long.

***Æschynomene sensitiva*, Sw., Fl. Ind. Occ., iii, 1256.**

Asuncion (191). November.

A shrub 1-1 $\frac{1}{2}$ m. high. Stems terete, striate, glabrous below, often hirsute and glandular on the young branches. Leaves with 10-20 pairs of pinnæ; leaflets crowded, 5-8 mm. long, oblong, mucronulate. Petioles about 5 mm. long, clothed with dark glands. Stipules greenish-purple, membranous, somewhat lunate, produced into flaps at the base, acute, fugacious. Flowers yellow, the petals striped with reddish or purplish veins. Sepals ciliolate, with dark glands on the margins. Loments 3-4 cm. long, callous margined, with 6-8 joints. Branches of this plant alternate, nearly erect, very short, 3-4 cm. apart.

Discolobium pulchellum, Benth., Ann. Mus. Vind., II, 106.

Gran Chaco (377). January. = Balansa 1527.

Stylosanthes Guianensis, Sw., Svensk. Vet. Akad. Handl., 1789, 296.

Asuncion (255); Caballero (399 b). December-January.

A suffruticose plant with strong ligneous roots, prostrate, ascending or erect, 1-5 dm. high. Stems terete, hirsute, with long, spreading, yellow hairs. Leaves ternate, on petioles 5-15 mm. long. Leaflets linear-lanceolate, entire, or with minute spiny serratures or ciliæ, spine-tipped, nearly sessile, with strong white ribs, the midrib hirsute, 15-25 mm. long, and 3-5 mm. broad. Stipules connate with petioles for half their length, 3-5 nerved, more or less hirsute, tipped with 2 hirsutely haired, stout awns. Flowers in close heads, small, yellow; bracts 3-pronged, hirsute or pubescent, looking much like the stipules. Pods flattish, with a long curved beak, many specimens, at least, containing only a single seed.

The variety in my specimens has much fewer leaves, narrower and longer (2-4 cm. long), and only pubescent bracts, but perhaps it is not the var. *gracilis* of Vogel. It seems, however, to vary decidedly from the type.

Stylosanthes Guianensis, Sw., var. *gracilis* (H. B. K.), Vog. Linnæa, xii, 66.

Caballero (399). January.

Arachis prostrata, Benth., Trans. Lin. Soc., xviii, 159.

Near Villa Rica (187). January.

A small prostrate shrub, with tough, woody roots which run deep in sandy soil, and stems 3 dm. or more in length. It has a bright yellow flower with a large spreading standard, the keel with its parts coalescing so as to show hardly any lines of division, solitary on peduncles 3-8 cm. long. Leaves with 2 pairs of pinnæ, which are oblong or obovate, mucronulate, the veins resembling those of some species of clover, parallel and running from the midrib at an angle of 45° to the margin. It flowers very freely, but seldom shows any fruit. Common in old fields all the way from Asuncion to Villa Rica. November-January.

Zornia diphylla (L.), Pers., var. *gracilis* (D.C.), Benth., Mart. Fl. Bras., xv, pt. 1, 83.

Gran Chaco (361); Caballero (398 a). December-January.

Stem slender, 3-5 dm. in height, from tough, woody roots,

minutely silvery dotted. Leaves binate, that is with a pair of linear, divaricate leaflets at the end of the petiole, but so few that the stem appears almost naked. Stipules peculiar, being acute, striate, and attached in the middle, that is with a flap below the point of attachment nearly as long as the upper part. Flowers in terminal spikes, each under a pair of bracts which are just like the stipules. Standard large, purple and yellow, with deeper purple stripes. Calyx of 5 segments, one of which is larger than the rest and ciliate hairy. Fruit a loment of 7 or 8 joints, each joint covered with prickles.

Zornia diphylla (L.), Pers., var. *latifolia* (D.C.), Benth., l. c., 81.

Caballero (398). January.

This form is quite leafy, the leaflets ovate-lanceolate, 2-3 cm. or more long, and 5-14 mm. broad. The delicate yellow flowers are nearly hidden by a pair of large, oval, striate bracts.

Melbomia albiflora (Salzm.), Kuntze, Rev. Gen. Pl., i, 97.

Asuncion (105 a). November-December.

This genus, so far as my experience goes, is very poorly represented in Paraguay. The species here noted has a very slender prostrate puberulent stem, 3-3½ dm. long. Leaflets round-ovate or ovate, 3-5 cm. long and 1½-3¼ cm. wide, sparsely hairy. Flowers pale rose color. Stipules free, cordate, lanceolate, very acute, strongly nerved. Loment 1-4 cm. long, of 2-7 very hairy joints.

Melbomia barbata (L.), Kuntze, Rev. Gen. Pl., 195.

Caballero (408). January.

Stem erect, much branched, very downy, 3-6 dm. high. Leaflets obovate, rounded, and retuse at the apex, glabrous above, pubescent beneath, 2-3 cm. long and 1-2 cm. or a little more in breadth. Stipules longer than in No. 105 a, lanceolate, acuminate, striate. Flowers small, rose-colored, in glomerate spikes or heads. Calyx woolly. Bracts like the stipules.

Melbomia cuneata (H. and A.), Kuntze, l. c., 197.

Asuncion (159); Pilcomayo River (937). November-February.

This plant, which grows in old fields around Asuncion, 1-1½ m. in height, occurs also on the campos along the Pilcomayo, where it attains a height of 3 m. The flowers are rose-colored, in great masses

at the top of the stem, and so great is the weight of the flowers and fruit at maturity that they almost bend the stalk to the ground. Stem much branched at the top, covered with a thick down, striate, stiff and hard. Flowers small, bluish-purple.

Meibomia supina (Sw.), Britton.

Hedysarum supinum, Sw., Fl. Ind. Occ., iii, 1264.

Hedysarum incanum, Sw., l. c., 1265, not Thunb.

Desmodium incanum, D.C., Prod., ii, 332.

Asuncion (105). November.

Cruminium Virginianum (L.), Britton, Bull. Torr. Bot. Cl., xviii, 269.

Asuncion (111 a). November.

Erythrina Crista-Galli, L., Mant., 99.

Luque (291). December-June.

Known in Paraguay as Ceibo. A shrub or small tree from 3 to 8 m. in height, common in wet grounds and along watercourses, much resembling our Tupelo in general appearance. Trunk, limbs, and petioles armed with small but strong hooked spines. The showy flowers are in terminal racemes, conspicuous not only for their bright red color but also for their curious elongated boat-shape, each of them mounted on a reddish-purple pedicel. The standard is nearly 6 cm. in length, emarginate, oval, with an open fold or curled projecting part on each side at the base, the edges slightly cohering over the other parts of the flower when young, but slightly spreading with age; keel undivided, closing over the stamens and style; laterals hidden under the large standard, each with 2 teeth, 1 tooth much larger than the other. Fruit a cylindrical, smooth pod, often 20 or 25 cm. in length, containing from 15 to 20 smooth, polished, bluish, slightly curved seeds. This tree is sometimes cultivated in gardens at Asuncion, but does not do so well as in the wild state. The bark of the trunk is thick and corky below, and sometimes employed as cork. I was informed by natives that a decoction of it was regarded as a good remedy for throat affections.

Galactia tenuiflora (Willd.), W. and A., Prod., i, 206.

Lympio (730). May.

The specimens collected show a slender twining vine which climbs over shrubs for 3 m. or more. Stems glabrous or pubescent. Leaf-

lets ovate, entire, glabrous above, appressed pubescent beneath, obtuse at either end, 2-4 cm. long and 1-1½ cm. wide. Peduncles usually longer than the petioles. Corolla light yellow. Pod pubescent, 4 or 5 cm. long.

Dioclea reflexa, Hook., f. Fl. Nigr., 306.

Caballero (472). January.

A liana with stems almost as large as cables, clambering over trees 12-16 m. in height, and overpowering them with its multitude of branches. It bears large spikes of magnificent bluish-purple flowers, but unfortunately the flowers, as well as the leaves, drop off in the process of drying, so that herbarium specimens afford but a very faint idea of the inflorescence as seen in its native woods. The fruit is a large silky fuscous-hairy legume.

Canavalia ensiformis (L.), D.C. Prod., ii, 404.

C. gladiata, D.C., l. c.

Asuncion (639 and 694). March-May.

A liana with a stout, strong stem, climbing over shrubs and trees 6-10 m. in height. Flowers in axillary racemes, yellow and purple, quite showy. The standard is a large, long, twisted body, curiously convolute and lobed; keel tubular, closed around the stamens and style, with a somewhat enlarged base, closely coiled up and 8 or 10 cm. in length. Fruit a narrow, sharp-pointed pod from 10-20 cm. in length, or often a ponderous bean-like pod, 25 cm. long and 3 or 4 cm. broad, flat, with 2 sharp, longitudinal angles near the top, concave in the centre, and containing from 10 to 20 small seeds lying crosswise and separated by thick partitions.

Phaseolus campestris, Mart.; Benth., Ann. Mus. Vind., ii, 141.

Pilcomayo River (904). February-March.

Reminding me of the sweet pea in looks, but with a flower much inferior to that in beauty. Twining about small plants and bushes. Stems and petioles fuscous-hairy. Flowers yellow, two or three together, on a hairy peduncle about 20 cm. in length, the standard round, emarginate, spreading, 1-2 cm. high. Fruit a fuscous-hairy pod, 5 or 6 cm. long and 5 mm. wide, containing 7 or 8 black, smooth, irregularly shaped seeds marked with the white scar of the hilum. This pea was very abundant about our camp on the Pilcomayo River.

Phaseolus erythroloma, Mart.; Benth. in Ann. Mus. Vind., ii, 141.

Asuncion (198); Pilcomayo River (993). November–April.

Stems stout, soft hairy, running over the ground or twining about herbs and shrubs. Leaflets of the ternate leaves rhomboidal, velvety downy. Just above each leaf is a conspicuous whorl of green, downy, subulate bracts, about 1 cm. in length. Flowers on peduncles 30 cm. in length, the lateral petals spreading, very dark reddish-purple, imparting that hue to the corolla; standard greenish, much smaller than the laterals. Fruit a hairy pod containing 18 or 20 lenticular seeds, shining, mottled black and pale yellow, marked with a white hilum scar. I found this at Asuncion in fields and pastures, and in thickets on the Pilcomayo climbing upon shrubs 5 m. high.

Phaseolus Truxillensis, H. B. K., Nov. Gen., vi, 451.

Asuncion (127, 695, 778, and 778 a). November–June.

Twining about herbs and shrubs. Flowers 1–2 cm. high, purple and yellow; standard large, roundish, emarginate; wings obovate and beautifully striped with purple. At the base of each leaflet is a flat, thick gland. Fruit a heavy pod 12 cm. in length and about 1 cm. wide, containing from 8 to 15 flattish seeds, undivided by septa. The whole plant is clothed with thick, fuscous hairs. Very variable in size and length of the stems, hairiness, and especially in the size of the leaflets. In some specimens the leaflets are lanceolate with subhastate lobes at the base, 3–4 cm. long and 15–18 mm. wide, in others they are rhombic-ovate, 12 cm. long and 8 cm. wide. At times the stem and leaves are nearly glabrous. At times the pod is much smaller than the dimensions given above and scantily pubescent.

Phaseolus prostratus, Benth., var. **angustifolius**, Benth., Mart. Fl. Bras., xv, pt. 1, 192.

Caballero (414). January.

Phaseolus rufus, Mich., Mem. Soc. Genève, xxviii, No. 7, 29!

Caballero (406). January.

A small twining plant, often trailing, in fields. The flowers are white or a very pale yellow. Leaflets round or oval, 2 cm. long or less. Not seen in fruit.

Rhynchosia Balansæ, Mich., l. c., 31.

Asuncion (646); railway track near Caballero (486). January-April. = Balansa, 1513. = Gibert, 1022.

Rhynchosia melanosticta, Gris., Pl. Lorentz, 76.

Asuncion (724). May.

Rhynchosia Texana, T. and G., Fl. N. A., i, 687.

Pilcomayo River (1023). May.

The *Rhynchosias* here enumerated are small shrubby plants, often with declining or prostrate stems, and racemes of yellow flowers. Fruit a small pod with several flattish seeds. Except *R. Texana*, which is twining or creeping, flowers a pale yellow, very small, solitary or 2 or 3 together in axillary clusters. Fruit a flat pod, 1 cm. long, containing a single seed. They all grow in dry soil.

Pterocarpus Michellii, Britton, n. sp.

Twigs glabrous. Leaves pale, petioled, 9-12 cm. long, 5-7 foliolate; leaflets stalked, broadly oblong, oval or slightly ovate, finely reticulated, rather thick, entire, rounded or truncate at the base, obtuse at the apex, 4-7 cm. long, 2-4 cm. wide; raceme dense, 10-15 cm. long, about 3 cm. thick, the rachis, pedicels, and calyx densely and finely pubescent with brown hairs; pedicels 4-5 mm. long; calyx oblique about 6 mm. long; corolla yellow, about twice as long as the calyx; legume glabrous, rugose, narrowly winged on one side, 3-4 cm. long and nearly as wide, about 1 cm. thick.

Gran Chaco, opposite Asuncion (379). January.

The same as Balansa's 1497, collected near the same place, and provisionally referred by M. Micheli to *P. Rohrii*, Vahl.

A fine large tree from 13 to 20 m. in height, with a branching, wide-spread head, and many shoots rising from the base. Covered at the time of my visit with racemes of bright yellow blossoms, which made it very conspicuous from a distance.

I visited this tree and others in the vicinity later in the season in the hope of getting fruit, but all of them were barren. The fruit described above is from Balansa's specimen.

Bergeronia sericea, Mich., l. c., 39.

Asuncion (285, 363 and 811). October-December.

An unarmed, stragglingly-branched shrub or small tree 3-10 m. in height. Bark gray, smooth or warty. Leaves unequally pin-

nate, with 5-7 pairs of leaflets. Flowers in racemes 8-10 cm. long, bluish-purple. Legume pluricelled, 2-8 cm. long and 6 or 7 mm. wide, grayish-downy, containing 1-6 long yellowish beans marked by the hilum, which is surrounded by a large aureole. This tree occurs in the Chaco, opposite Asuncion, and east of the city in open grounds.

Geoffroya striata (Willd.), Morong.

Robinia striata, Willd., Sp. Pl., iii, 1132 (1803).

Geoffroya superba, H. and B., Pl. Æquin., ii, 69, t. 100 (1809).

Pilcomayo River (888). January-April.

This is one of the most noticeable trees on the Pilcomayo. It sometimes attains a height of 13 m., with long, horizontal branches stretching out over the river, on the borders of which it grows. Bark rugged and dark colored, the wood very hard, not good for timber, as it is knotty and seldom over 10 or 15 cm. in diameter. Flowers in small axillary racemes, yellow, and leguminous in structure. This would hardly be supposed from the fruit, which is not a legume, but a drupe or stone-fruit. When fully ripe, this is from 2½ to 4 cm. in length, flattened-oval in shape, with a green, rather thick downy husk or rind, which turns yellowish when mellow, enclosing a thin, sweetish, edible pulp. The seed is a hard-shelled nut, nearly as large as the fruit, irregularly grooved. This contains a kernel which is much like an almond in shape and color. We tried roasting these stones in the fire, and found the meat quite pleasant to the taste. This in all probability gives the popular name to the tree, "Mani de los Indios" or Indian peanut, as it certainly has little resemblance to the peanut in any other respect.

The plant is curiously intermediate between the Leguminosæ and the Rosaceæ, in all respects belonging to the former by its flowers and to the latter by its fruit. The stones, however, do not dehisce along the edges as in the peach, but along the middle of the two flattish sides. It might well be regarded as belonging to a distinct order from the Leguminosæ. So far as the leaves are concerned, they might belong to either family. This tree was very abundant upon the part of the Pilcomayo between the Junta and the Falls, and we often gathered the fruit. I found only a few flowers, as we were a little too late in the season for them.

Gourliæa decorticans, Hook., Bot. Misc., iii, 208, pl. cvi.

Pilcomayo River, near the Falls (1024). May-June.

Very different in general appearance from the preceding species. Our peons called it an "algorroba." A small tree some 6 m. in height, much and stragglingly branched, all the shortest branches armed at the end with a sharp spine. The tree at the time of our visit was a mass of yellow flowers, the flowers not being in terminal racemes as in no. 888, but massed together in clusters of short racemes along the trunk and limbs, each raceme 3 cm. or less in length. One of the most noticeable things about the plant, in which it varies widely from 888, is the bark. The inner bark is green and smooth; as it grows older it rolls up and peels off in dry scrolls, leaving the young green bark in patches, thus imparting a singular appearance to the trunk. In all the specimens that I saw the flowers were infertile, dropping off and setting no fruit. We were in the vicinity for two months, at least, and I should have found fruit had the trees borne any.

Peltophorum dubium (Spreng.), Britton.

Cæsalpinia dubia, Spreng., Syst. Veg., ii, 343 (1825).

Peltophorum Vogelianum, Benth. in Hook. Jour. Bot., ii, 75 (1840).

Asuncion (685). April.

A tree with smooth bark, growing from 6 to 12 m. in height. Young twigs and inflorescence covered with ferruginous down. Leaves 20-30 cm. long, bipinnate; pinnæ oblong, numerous, 4-8 cm. long; leaflets 20-40 pairs, oblong, bright green, shining above, oblique at the base, 6-8 mm. long. Flowers in very long, terminal racemes, bright yellow, on pedicels 1-1½ cm. long. Fruit a flat, smooth, and glabrous legume, 6-8 cm. long, pointed at both ends, with 2 sharp edges, containing a few bean-like seeds. This tree is an abundant bloomer, and forms a conspicuous object in the woods about Asuncion when in blossom.

Cæsalpinia melanocarpa, Gris., Symb. Flor. Arg., 114.

Pilcomayo River (912). February.

A large tree 16 or 25 m. in height, known among the natives as *Guiaacán*. The leaves bipinnate, having 3-4 pairs of pinnæ and 1 odd one; leaflets about 10 pairs, very small, obtuse. I found it only in fruit, which consists of an oval or obovate, flattish pod 3-4 cm. in length and about 2 cm. in width, with 2-5 small flattish seeds lying crosswise. The tree has a very smooth, green, thin bark,

which is easily peeled off. The heart-wood is dark in color, somewhat bluish in tint, glossy when dry, the outer wood white, and all the wood very hard and susceptible of a fine polish.

Cæsalpinia pulcherrima (L.), Sw., Obs., 166.

Asuncion (150). November–February.

A very handsome shrub, with large, showy racemes of red flowers at the ends of the branches, much cultivated in gardens at Asuncion. 5 red sepals, somewhat obovate, alternate with the petals and about one-third as long; petals large, with broad, round, crimped summits, clawed, whitish on the edges, spread wide open in flower, red and pale yellow; stamens and styles filiform, much exserted. Flowers numerous and elegant in appearance. A thorny shrub with handsome bipinnate leaves. Fruit a legume bearing several large seeds.

Parkinsonia aculeata, L., Sp. Pl., 375.

Asuncion (151); Pilcomayo River (1094). November–December.

This thorny shrub, cultivated in Asuncion gardens, vies in beauty with no. 150. I found it growing wild on the banks of the Pilcomayo, but at that time without flowers or fruit. Very different, however, from its rival. The leaves, instead of being bipinnate, might almost be called pinnate phyllodia, as they consist of a very narrow blade 6–20 cm. long, bearing on the sides short oblong pinnae in pairs, 6–8 mm. apart. These leaves are very numerous, drooping, and impart an elegant appearance to the plant. Flowers in racemes at the ends of the branches, numerous, on pedicels about 2½ cm. long, light yellow. Sepals 5, reflexed in anthesis, one-third as long as the petals; petals 5, about equal, the standard of a brownish tint, all hairy at the base within. Stamens and styles filiform, exserted. Legume narrow, few seeded. Flowers not as abundant or showy as in no. 150, but the peculiar leaves give it an appearance almost as elegant. It is much used as a border along the garden sides and streets in the suburban portions of Asuncion, growing 3–8 m. in height. The numerous sharp spines with which it is armed secure it very effectually from molestation.

Cassia absus, L., Sp. Pl., 376.

Asuncion (700). May.

The *Cassias* are very numerous in Paraguay, the most of them tall, shrubby plants with showy yellow flowers, and long, many-seeded pods.

I note a few points of difference among those here enumerated. No. 700 is a glandular, much-branched *herbaceous* plant from 3 to 6 dm. high. The petiolar gland is erect, acute, one between the base of each pair of leaflets. Stamens 5-7, perfect, unequal. Fruit a small, flat, glandular-hairy legume 3-4 cm. long and $\frac{1}{2}$ cm. wide, containing 6-8 seeds. Found in old cultivated fields.

Cassia alata, L., Sp. Pl., 378.

Asuncion (643). April.

A coarse, rank, showy-flowered shrub, much branched, 2-3 m. high, cultivated in Asuncion gardens and running wild. Pinnæ 8-11 pairs; leaflets oblong or obovate, 6-10 cm. long, 3-6 cm. broad. Flowers very numerous, in long terminal racemes. Legume long, 2-winged, the wings on opposite sides and with many cross ribs which correspond to the septa, containing as many seeds as there are septa, 10-12 cm. in length and 1-1 $\frac{1}{2}$ cm. wide.

Cassia bicapsularis, L., Sp. Pl., 376.

Asuncion (631). March-April.

A smooth shrub 2-2 $\frac{1}{2}$ m. in height, growing in the environs of Asuncion. Leaflets large, 4 or 5 pairs, with a thick, greenish, oblong, top-shaped or almost globular gland between the lowest pair, and the whole leaf 8 or 10 cm. in length. Flowers showy, 2-3 cm. in diameter when expanded. Stamens 10, 7 perfect and 3 abortive. Pod nearly cylindrical, often 16 cm. long and only $\frac{1}{2}$ cm. in diameter, with 2 furrows on opposite sides. On the Pilcomayo River in fruit.

Cassia corymbosa, Lam., Encyc., i, 644.

Asuncion (776); Pilcomayo River (1095 and 1096). May-June.

A shrub some 2 m or more in height. Leaves with 2-4 leaflets and an oval or globular gland between the first pair. Flowers few, rather small. Pod 10-15 cm. long, 1 cm. in diameter, with 2 convex sides and 2 deep furrows. Not common.

Cassia leptocarpa, Benth., *Linnaea*, xxii, 528.

Asuncion (82). November.

A shrub with smooth, striate stem, some 2 m. in height, growing in thickets about Asuncion. Leaflets 5 or 6 pairs. Flowers moderately large, but showy. Stamens 10, in 3 groups, 2 long, 4 shorter, all 6 fertile, the other 4 short and abortive. Fruit a thick, angular

legume 15–20 cm. long, 3 mm. broad, very abundant. The petiolar gland at the base of the petiole, and none between the leaflets. Downy on the upper part of the stem, petioles, and leaflet margins.

Cassia mimusoides, L., Sp. Pl., 379.

Caballero (404); Pilcomayo River (938). January–March.

This species much resembles our North American *P. nictitans*, L., although often much larger, sometimes reaching a height of 6 dm. Stems suffrutescent at base, simple or branched. Flowers yellow, small, in clusters or solitary on the stem. Gland elongated, cup-shaped. Stem and leaves hirsute. Leaflets small, mucronate, 14–36 pairs, linear-oblong, oblique.

Cassia Morongii, Britton, n. sp.

Section *Chamaefistula*. A shrub 1½–2 m. high, the twigs, petioles, leaves and inflorescence densely pubescent. Branches striate or angled; leaves short-petioled 6–10-foliolate, 6–10 cm. long; leaflets 4 pairs, sessile, oblong-lanceolate, acutish and mucronate at the apex, rounded at the base, 3–4 cm. long, about 1 cm. wide; a sessile gland in the axil of one of the lower pairs; racemes 3–5-flowered, short-peduncled, terminal and in the axils of the uppermost leaves; pedicels 4–8 mm. long; flowers bright yellow, 1–2 cm. broad; legume stipitate, quadrangular, pubescent with scattered hairs, 5–6 cm. long, 6–7 mm. thick, the valves reticulated.

Pilcomayo River (1015). April. Resembles *C. tomentosa*, but the pod very different.

A tall, branching shrub, occurring sparsely on the banks of the Pilcomayo. Flowers showy, in axillary clusters. The pod has a sharp, subulate point, and contains from 30 to 40 small seeds lying crosswise in as many cells. This was found at the Falls and in one or two other places on the river, and always attracted attention by its bright yellow flowers.

Cassia mucronifera, Mart., Fl. Bras., xv, pt. 2, 116.

Villa Rica (613). January.

Stems and leaflets fuscous-hairy. Leaflets 2 or 3 pairs. Glands erect, oblong, between each of the 2 lower pairs of leaflets, not cup-shaped. Flowers smaller than in no. 82 or 350. A shrub 9 to 12 dm. in height, growing upon the open campo at Villa Rica. It has long, sharp and hairy stipules, not so deciduous as in most of the species.

Cassia oblongifolia, Vog., Syn. Cass., 23.

Asuncion (350); Pilcomayo River (1097). December–January.

This merits the specific name bestowed upon it by Vogel, for the leaflets of 4 pairs are decidedly oblong, being $3\frac{1}{2}$ cm. long by $1\frac{1}{2}$ cm. broad. It is a much branched shrub, $1\frac{1}{2}$ –2 m. in height, with a terete stem, downy on the young branches. Flowers large, conspicuous, in terminal, leafy racemes, the corolla often 4 cm. in diameter when expanded, and spread wide open rotately. Glands large, thick, one between each of the 2 lowest pairs of leaflets, or one only. Fruit a cylindrical pod 6–10 cm. long and some 6 or 7 mm. in breadth. Common in thickets.

Cassia occidentalis, L., Sp. Pl., 377.

Asuncion (41). November–December.

A shrub 12–15 dm. in height, common both in the streets of Asuncion and in fields on the outskirts of the town. Stem smooth, terete or angled above. The whole plant rather ill-smelling. Leaflets 4 or 5 pairs; petiole with a swollen articulation at its junction with the stem, and a large, purple gland on its upper side at that point. Flowers in small terminal clusters. Fruit a flat pod 7 or 8 cm. long, with a thick margin on each side; seeds oval, some 30 or more in the pod.

Cassia pilifera, Vog., Syn. Cass., 23.

Near Jaquaron (665). April.

A *Cassia* with the lowest stems and the largest flowers of any that I have seen in Paraguay. Stems not over 3 dm. in height, shrubby, with long, scattered white hairs, angled, often prone or bending over towards the ground. Leaflets in 2 pairs, large, oval, mucronate, ciliate on the margins and hairy on the veins beneath. Flowers very showy, bright yellow, often 6 cm. in diameter when expanded, frequently lying upon the ground from the bending of the stems. Fruit a narrow, linear, downy pod, 25 or more cm. in length. A large patch of this was found in the clearing around a native's house on the road between Pirayu and Jaquaron, some 30 miles from Asuncion.

Cassia rotundifolia, Pers., Syn., i, 456.

Asuncion (171). November.

A small, clover-like plant, from 13 to 18 cm. in height. Stem shrubbyish, covered with small, appressed, scattered hairs. Leaf-

lets 2, ciliate on the margins, rounded at the apex, narrowing and oblique at the base, sessile, with a weak spinulose stipel. Flowers very small, axillary, on a long peduncle, which is bent downwards at a sharp angle with the stem, bright yellow. Fruit a legume about 3 cm. long when ripe.

Cassia serpens, L., Sp. Pl., Ed. 2, 541.

Asuncion (236). December.

A small trailing, branching shrub, 10-20 cm. long, growing in open, sandy grounds. Roots thick, woody, apparently perennial. Stem pilose. Leaflets 4-5 pairs, oblong, cuspidate, oblique at the base, sessile, 3-5 nerved, 5-8 mm. long. Gland stipitate. Flowers bright yellow, solitary, on filiform pedicels $1\frac{1}{2}$ -5 cm. long. Stamens with long anthers and scarcely any filaments. Legume not quite 3 cm. in length.

Cassia splendida, Vog., Syn. Cass., 17.

Near Caballero (426). January.

A very large-flowered and showy shrub, 1-1 $\frac{1}{2}$ m. high, widely branched. Stem smooth. Leaflets in 2 pairs, some of them 9 cm. long and 4 cm. wide. Flowers almost as large as no. 665. Glands horn-like, one between each of the two pairs of leaflets. Stipules bristle-shaped.

Cassia Tora, L., Sp. Pl., 376.

Asuncion (175). November.

A shrub 1-1 $\frac{1}{2}$ m. in height, with a strong, rank odor. Stem terete below, 4-gonous above, striate, covered with small black glands or tubercles. Leaflets in 3 pairs, the gland thick, spotted with black, looking like a wart between the two lowest pairs. Flowers small, not over 1 cm. in diameter when expanded. Legume 8-10 cm. in length and 4 mm. wide, squarish, on articulated pedicels 2-3 cm. long, containing 25 or more greenish-yellow, rhomboidal, slightly shining seeds.

Bauhinia microphylla, Vog., Linnæa, xlii, 301.

Asuncion (284 a). December.

A stragglingly-branched shrub or small tree from 3 to 6 m. in height, armed with spines. The branches usually bend downwards. Bark purplish, smooth, striate. Leaflets a single pair,

small, at the end of a filiform petiole, a small spine projecting between them at the base. The stipules consist of small spines. Flowers greenish, in terminal racemes or clusters. The calyx is entire, splitting down on one side when the flower opens, the tube marked by 10 ridges. Legume 8-15 cm. long, with a fleshy pulp; seeds small, flattish, shining. The leaves are prettily marked with purple-branching veins. This shrub is not very abundant, occurring in thickets.

Piptadenia colubrina (Vell.), Benth. in Mart. Fl. Bras., xv, pt. 2, 282.

Asuncion (371, 804 and 829 a). Flower October; fruit January. A handsome tree with smooth lightish-gray bark, from 10 to 13 m. in height. It has a head of drooping limbs, and light, graceful foliage. Leaves bipinnate, with 10-25 pairs of pinnae; each pinna with 50 or more pairs of light green, minute, oblong leaflets. The main rachis is channelled above, and one-third of the way up the petiole there is a small, oblong, flat red gland which looks like an insect resting upon it. Flowers light yellow, in globular heads, axillary, in pairs. Fruit a large, flat pod, 4-17 cm. long, 2-3½ cm. wide, with raised borders on each valve, dehiscing on the lower side; the upper side, and sometimes the lower, wavy or irregularly and deeply notched, imparting a jointed look to it. The pod contains from 6 to 12 flat, dark brown, smooth seeds. This tree grows in sandy, open grounds. The native name was given to me variously, now as Yarupi, and now as Cypay, the y sounding something like the French u.

Piptadenia communis, Benth. in Mart. Fl. Bras., xv, pt. 2, 279.

Asuncion (756). Young fruit, June 20.

A tree similar to no. 371 in general appearance, in foliage, and fruit, but handsomer in shape, the bark whitish, very smooth, and the limbs rising upward and bending over in a graceful curve. The petiolar gland is small, oval, and cup-shaped. It attains a height of from 16 to 20 m., and forms a beautiful object in the monte around Asuncion. The leaves have only 6-9 pairs of pinnae, the ultimate segments a little larger than those of no. 371, somewhat falcate in shape. The native name, as I understood it, is Verayú.

Piptadenia rigida, Benth., Hook. Jour. Bot., iv, 336.

Asuncion (744 and 825). Flower November; fruit May.

A tree similar to the two preceding species, with very smooth, light-gray bark, growing from 10 to 16 m. in height, common in the vicinity of Asuncion. Petiolar gland green, elongated, cup-shaped. Flowers greenish-yellow, in axillary, cylindrical spikes 4 or 5 cm. in length. Pinnæ 2-6 pairs, ultimate segments somewhat falcate, dark green, 16-30 pairs. Legume 3-10 cm. long and 1-1½ cm. broad, containing 2-6 flat, round seeds, which are attached by long threads to the upper suture, and enveloped in a hyaline membrane.

Prosopis Algarobilla, Gris., Pl. Lorentz, 83.

Near Luque (851). December.

An ungainly, very thorny tree, with straggling branches, 5-7 m. high, growing on the open campo near the railroad track between Paragua and Luque. This is known to the natives as Espanilla, a name commonly given to spiny leguminous trees. Also often called Algarobo. Flowers white, in slender spikes 6-10 cm. long, either among the leaves or on naked branches. Legumes slightly curved, constricted between the seeds, 7 or 8 cm. long, containing 6-8 seeds. Leaves 2-5 cm. long, glabrous or the rachis puberulent; leaflets 10-25 pairs, oblong, 3-nerved, the lateral nerves on the margins, mucronulate, 3-5 mm. long, sessile. Branches very flexuous.

Prosopis campestris, Gris., Pl. Lorentz, 84.

Between Villa Rica and Escoba (481).

This tree, so far as my specimens go, differs from the preceding species only in having fewer and smaller leaves (2-3 cm. long), smaller leaflets (2-3 mm. long), and longer and much-curved legumes. Also called Espinilla.

Prosopis ruscifolia, Gris., Pl. Lorentz, 82.

Pilcomayo River (1098).

An algarobo 8-10 m. in height, very smooth; bark dark gray. Leaves pinnate, with 3 or 4 pairs of large, smooth, elliptical leaflets. Without flowers or fruit. The thorns of this tree are gigantic, some of them nearly a foot long and half an inch thick at the base, their wood densely hard, sharp-pointed, looking more like spears than thorns.

Neptunia pubescens, Benth., Hook. Jour. Bot., iv, 356.

Between Paragua and Luque (857). December.

A slender trailing shrub 20-35 cm. long, entirely unarmed. The leaves close at a touch as in *Mimosa*. It grows in hard dry soil. Leaves bipinnate, with 2-4 pairs of pinnae and 8-25 pairs of minute leaflets. Flowers bright yellow, exceedingly pretty when fresh, in solitary globose heads, on peduncles 3 cm. in length. Fruit a smooth pod 2-3 cm. long and 5 or 6 mm. broad, flat, 2-edged, containing 6-10 seeds, 2 or 3 together, shortly stipitate. Only a minute, scattered pubescence on the leaf rachis.

Acuan virgata (L.), Med. Theod. Sp., 62.

Desmanthus virgatus, Willd., Sp. Pl., iv, 1047.

Gran Chaco (202); Pilcomayo River (1099). November-February.

Stem branching, glabrous, angular, 1-1½ m. high. Leaves bipinnate, pinnae 2 or 3 pairs, with about 30 pairs of small, oblong, sessile leaflets on each pinnule. A large cup-shaped gland on the rachis at the base of the pinnae. Flowers small, greenish-white, in small terminal clusters. Legumes 3-6 in the cluster, 4-6 cm. long, about 4 mm. wide, acutely pointed, flat, turning black when ripe. Seeds in one row, numerous, flattish, chestnut colored, shining. This plant is very common in old fields in the neighborhood of Asuncion.

Mimosa asperata, L., Sp. Pl., Ed. 2, 1507.

Asuncion (143). August-September.

The *Mimosas* are numerous in Paraguay. I collected 9 species, and there are many more. They are usually small shrubs, very spiny, often trailing upon the ground, always with handsome heads of flowers. I give notes upon these species in order to show the differences among them, which are sometimes very striking.

No. 143 forms dense, almost impenetrable, thickets on the borders of the Paraguay River, in the lowlands near Asuncion. It is a thorny shrub 3-5 m. high, much-branched, the thorns straight or a little hooked, 3-6 mm. long on the stem and petioles. Leaves bipinnate, with 5-10 pairs of pinnae, some of the pinnae 8 cm. long and bearing 41 pairs of leaflets, the leaves often 20 cm. long. Flowers purple, in terminal racemes. Young shoots and stems fuscous-hairy. Fruit a large legume, 5-6 cm. long and 1 cm. wide,

thickly covered with fuscous hairs, usually 3-6 together and spreading divaricately, pluri-celled, a large flat seed in each cell.

Mimosa Balansæ, Mich., Mem. Soc. Geneve, xxviii, No. 7, p. 52.

Asuncion (1500). August-September.

A small shrub, 15-25 cm. high, with tough roots, growing on grassy knolls. Pinnæ 2, divaricate, at the apex of a petiole 10-15 mm. long. Leaflets 6-10 pairs, oblong, mucronulate, pubescent, 5 or 6 mm. long. Heads purple, on short peduncles. Legumes hairy, 10-15 mm. long, 2-3 seeded.

Mimosa conferta, Benth., Mart. Fl. Bras., xv, pt. 2, 331.

Between Villa Rica and Escoba (477). January.

This I did not find in flower, but the fruit is very peculiar, the legumes rolling themselves into balls, which are 3 cm. in diameter when mature. They are densely clothed with long, rather weak prickles. A shrub 1-1½ m. in height, stems and petioles covered with prickles like those on the fruit. Leaves of 2 pinnæ, at the end of a petiole; pinnæ 5-7 cm. long, with about 20 pairs of oblong-cuspidate leaflets.

Mimosa diversipila, Mich., l. c., 57.

Caballero (429 and 504). = Balansa 1463. January.

A fuscous-hirsute and lepidote species, with an angular, spineless stem 5-9 dm. high. Pinnæ 2, at the end of a very short petiole or sessile, 4-6 cm. long. Leaflets oblong, cuspidate, oblique, strongly lepidote and hirsute, about 8 mm. long, 12-20 pairs. Flowers racemously disposed on long naked terminal stalks. Heads globose, about 1 cm. in diameter, purple, on short peduncles.

Mimosa Morongii, Britton, n. sp.

Branches and petioles pubescent with spreading hairs; petioles slender, 1-2 cm. long; pinnæ 4-6, digitate, short-stalked, 1½-2 cm. long; leaflets approximate, 14-18 pairs, obliquely linear-oblong, acutish, 3-5 mm. long, 2 mm. wide, hirsute-pubescent beneath, glabrous above; peduncles axillary, longer than the petioles; heads globose-ovoid, 1-1½ cm. long; legumes sessile, 2-3-jointed, linear-oblong, acute, 1½ cm. long, 4 mm. wide, the joints papillose and somewhat pubescent. Similar to *M. digitata*, Benth.

Central Paraguay (728). May. The same as Balansa's no. 1478 from Trinidad, referred by M. Micheli to *M. hirsuta*, Spreng.

A small creeping plant, 15-30 cm. in length, growing in hard soil on the Gran Campo near Luque. Prickles few, small, straight, mostly just under the leaves. Flowers a light purple, the heads spreading and very pretty, especially in early morning when the fresh dew is upon them. The heads of flowers upon this small plant are quite striking, and its persistency upon the railroad track over which trains are daily passing, and over which many people are daily tramping, exhibits a toughness of vitality which deserves notice.

Mimosa polycarpa, Kunth, *Mim.* 8, t. 3.

Asuncion (101, 351, 773 and 779). Between Villa Rica and Escoba (455). November-May.

An erect, armed shrub 12-15 dm. in height, with beautiful, bluish-purple flowers. Stems striate, covered with small, dark glands, and armed with stout, curved or straight spines. Leaves bipinnate, or, rather, with 2 long pinnate divisions at the end of a petiole 1 cm. in length. Between these divisions is a projecting spine. Pinnæ with 30 or more pairs of leaflets, which are spiny-serrate, and with a projecting spine at the apex. Fruit a spine-clothed loment of 3 or 4 joints, usually borne in clusters, 4-12 or more in a cluster. Leaves very sensitive. Common in thickets.

Mimosa rixosa, Mart.; Benth. in Hook. *Jour. Bot.*, iv, 361.

Asuncion (131). November.

Creeping on the ground or climbing upon other shrubs. Stems slender, clothed with hirsute, spreading hairs and numerous downwardly curved prickles, which have a dilated base. Flowers a beautiful bluish-purple; heads 8-10 mm. in diameter, often twin, on peduncles 1-2 cm. long. 2 pairs of pinnæ at the end of a petiole 2-5 cm. long. Leaflets 2 pairs, oblong-elliptical or obovate, the first pair very unequal, one being 2-3 cm. long and 7-10 mm. wide, and the other 3 or 4 mm. long, all of them glabrous above and sparsely setose or hirsute beneath, callous and setose margined, the larger ones mucronate and the smaller aristate. Loments many in a cluster, very setose, 1-2 cm. long, few-seeded.

Mimosa Allentana, Morong, n. sp.

A low plant, with angular or striate ferruginous-hirsute stem. A close somewhat glandular down, under the spreading hairs. Leaves mostly conjugate, but occasionally with 2 pairs of pinnæ on divaricate petiolules; common

petiole 8-15 mm. long; secondary petiole about 5 mm., hairy like the stem. Pinnæ about 4 cm. long, often a little curved; leaflets 5 or 6 mm. long and 2 mm. wide, 15-25 pairs, oblong, sessile, oblique at the base, mucronulate, glabrous or minutely pubescent above, appressed-pilose beneath, ciliate with long hairs, 1- rarely 2-ribbed, the midrib approximate to the margin; cross-nerves distinct, 5 or 6 on each side of the midrib. Stipules persistent, lanceolate, very acute, striate, ciliate and pubescent, 5 or 6 mm. long. Flowers not seen. Bracts ciliate. Legumes 1-1½ cm. long, 4 mm. wide, with 2-4 joints, constricted between the joints, apiculate, strongly appressed-pilose all over.

Railroad track between Escoba and Caballero (1501). January.

Named for Dr. T. F. Allen, of New York, a generous donor to the equipment of the expedition.

Schrankia leptocarpa, D.C., Mem. Leg., 12.

Asuncion (85). November-December.

A stiff, angular-stemmed shrub, creeping on the ground, or running over bushes, to which it clings by its spines. Stems with numerous, small, hooked spines, 15-24 dm. in length. Leaves bipinnate, the rachis with a circle of spines at the base, and smaller spines along its face; 4 or 5 pairs of pinnæ, a weak spine between each pair; leaflets about 15 pairs, the secondary rachis ending with a weak spine. Flowers bright, bluish-purple, in heads, the long projecting stamens and styles giving them an elegant appearance. Fruit a narrow, straight legume 6 cm. long, having upon it 10 or more rows of straight sharp setæ; seeds black, shining, irregular in shape. The leaves of this plant are as sensitive as those of a Mimosa, closing at a touch. Common in thickets.

Acacia aroma, Gillies in Hook. Bot., iii, 206.

Pilcomayo River (931 and 1502). February.

A thorny shrub 1½-4 m. high. Leaves bipinnate, with spiny stipules. Spines on the stems long and sharp. Flowers yellow, in globular balls, about 1 cm. in diameter, and closely packed together. The long, bright yellow, exserted stamens form the visible part of the flower. Fruit a hairy legume, moniliform, 5-7 cm. long, with 5-8 joints. The flowers are not fragrant.

Acacia Bonariensis, Gillies, Hook. Bot. Misc., iii, 207.

Asuncion (49). November.

A very thorny shrub 2-5 m. high. Stem angled, smooth or minutely downy, covered with long, sharp, dangerous spines

Leaves bipinnate. Flowers light yellow, numerous, in slightly oblong (12-15 by 10-12 mm.) heads, which are racemosefy arranged at the ends of the branches. Legume 4-6 cm. long, 15 mm. broad, irregularly moniliform. The graceful foliage and elegant flowers of this shrub are pleasant to look at, but the spines inflict dangerous wounds, which are liable to cause gangrene in the hot climate of Paraguay. Common in thickets.

Acacia Farnesiana (L.), Willd., Sp. Pl., iv, 1063.

Asuncion (751). June-July.

The well-known "Aromita," which occurs in many parts of South America, on both sides of the Andes. It is a straggling shrub, 2-3 m. in height, armed with stout, dangerous thorns. Flowers a deep yellow, in small, globular, fuzzy-looking heads. These are much esteemed for their fragrance, and when placed in bureau-drawers or trunks impart a delightful odor to clothing. Fruit a turgid, fusiform pod, 3 or 4 cm. long, filled with a white, cottony substance, in which many small, lenticular seeds are imbedded. Cultivated in gardens and common in thickets.

Acacia ?

Pilcomayo River (1050).

A tall, slender tree some 25 feet high, with slate-colored bark on the trunk, and small hooked spines along the branches. Leaves delicate, bipinnate, with a small, round, flat gland one-third of the distance up the petiole. Pinnæ in 3 or 4 pairs, 5 cm. long; leaflets 3-5 mm. long, downy, mucronulate, 15-35 pairs, light green in color.

Acacia.

Suburbs of Asuncion (1503). = Balansa 1423.

Both M. Balansa's and Dr. Morong's specimens were collected only in fruit. N. L. B.

A small tree 4-6 m. high, glabrous, with gray bark and flexuous branches, the branches glabrescent or puberulent. Spines small, curved downwards, dilated at base, scattered or infra-petiolar. Leaves bipinnate, with 2-4 pairs of pinnæ, without glands; leaflets 10-15 pairs, glabrous, linear, acute at the apex, oblique at the base, 2-3 nerved, 3-5 mm. long, not quite 1 mm. broad. Common petiole 1-1½ cm. long, downy. Stipules subulate, deciduous. Flowers not seen. Legumes flat, glabrous, 2-4 cm. long, 8-10 mm.

wide, irregularly moniliform, containing 4-8 oblong, flat, fuscous, shining seeds.

Annesleya parvifolia (H. and A.), Britton.

Inga parvifolia, H. and A. in Hook. Bot. Misc., iii, 202.

Calliandra bicolor, Benth. in Hook. Jour. Bot., ii, 139.

Near Caballero (412). January.

A beautiful plant 15-25 cm. high, growing by the railway track. Leaves bipinnate; 4 or 5 pairs of pinnæ and 30 or more pairs of small leaflets. The flowers are exceedingly striking, a large cluster of them standing at the top of a long peduncle, the tubular corolla mingled red and purple, and surmounted by a mass of long, filiform or plumose purple stamens. 18 or 20 of these flowers are in the cluster, each on a short pedicel. I found only 2 or 3 of these charming plants, though I searched long for more. They must be rare. Fruit not seen.

Pithecolobium scalare, Gris., Symb. Flor. Arg., 123.

Asuncion (801). October.

A tree from 8 to 13 m. in height, with shaggy or broken, brown bark. Thorny, but often unarmed; the spines when they occur 2 together, diverging, at a leafy node. Leaves bipinnate; pinnæ 2-3 pairs, the pairs far apart. Flowers light yellow, looking much like those of an *Inga*, which I at first took it to be. They occur in axillary clusters, the corolla looking as though it were telescoped by the calyx, and the stamens long and exserted. On the rachis between the 3 pairs of pinnæ, and also on the secondary rachis between the pairs of leaflets are green scutelliform glands. In open grounds on the outskirts of the city. No fruit.

Pithecolobium Paraguayense, Benth., Trans. Linn. Soc., xxx, 574.

Lympio (736). May.

An unarmed shrub or small tree, with straggling branches, 3-6 m. in height. Stem smooth, grayish-white, warty. Leaves 4-binate, that is, with 2 pairs of binate leaflets, which are on a slender common petiole. Each pair on a divaricate petiolule, and each leaflet on a short articulated petiolule of its own. Not found in flower. Fruit a black, rough, or velvety pod, about 4 cm. long and 1 cm. broad, containing a single row of white, enamelled seeds, attached to the valves by threads. The pods dehisce along the lower suture, and the seeds are persistently attached by their threads. Thickets.

Pithecolobium cauliflorum (Willd.), Mart. Fl. Bras., xv, pt. 2, 450?

Gran Chaco (360). December.

Agrees well with this species as to foliage and flowers; but the pod is only 5 cm long and about 2.5 cm. broad. It is the same as Balansa's no. 1386, incorrectly referred by Micheli to *P. divaricatum*, Benth., of which I have seen the type in Herb. Kew.—N.L.B.

One of the most curious trees that I found in Paraguay. It is thickly, stragglingly branched, some 8 m. or more in height, very knotty, with white, broken bark. Entirely unarmed, but with a mass of strong, ungainly limbs. Leaves coriaceous, digitately bipinnate, that is, with 2 sets of pinnæ which diverge from the end of a common petiole or rachis, each with 2-6 leaflets. The flowers are large, white on the calyx and corolla tube, with numerous, showy, exserted purple stamens, in naked clusters on the old wood, frequently on very large limbs. Styles as long as the stamens, purple-colored above, and these with the numerous stamens (50 or more) are very conspicuous, especially as the flowers are borne on the old leafless portions of the branches. Fruit an arcuate, flat pod 3-6 cm. long, 2-3 cm. wide, containing 2-5 roundish, flat, smooth seeds, quite as curious as the flowers.

Enterolobium contortisiliquum (Vell.), Morong.

Minosa contortisiliqua, Vell., Flor. Flum., xi, t. 25.

Enterolobium Timbouva, Benth. in Hook. Loud. Jour. Bot., iii, 224.

Asuncion (271). November-December.

One of the most noble trees in Paraguay, known popularly as the Timbo. Frequently cultivated as a shade tree in the streets and gardens of Asuncion, and common on the open campos around the city. It grows to the height of 25 m., and its wood is used in the construction of boats and in cabinet-work. It has a smooth bark on the trunk, which on the branches becomes purplish, shining and warty. Leaves bipinnate, bright green, giving a light, elegant appearance to the tree. The branches rise in a beautiful symmetrical head, bearing the leaves near their ends. Flowers white with a delicate yellowish tinge, in clustered heads on a common peduncle. Fruit a large, reniform pod, the largest 6 cm. broad and 5 cm. long, pluricelled, containing many oval, hard seeds.

One of the few deciduous trees of Paraguay, the leaves dropping

off in April or June, and the fruit hanging on conspicuously till July and August.

Inga affinis, D.C., Prod., ii, 433.

Asuncion (528). October–January.

A small, rather handsome tree 5–8 m. in height, with long limbs and thick foliage. Leaves pinnate, with 4 pairs of pinnae, the leaflets elliptical or lanceolate, a little shining above, sessile, entire, the rachis between the pairs winged. Between each pair of leaflets is a cup-shaped gland. Fruit an edible legume, 8–10 cm. in length, with 2 thick, raised, fleshy margins, very downy, and with 10 or 12 septa, and as many seeds lying at right angles to the pod. Several pods on a peduncle. The flowers of this tree are large and conspicuous. The fruit eaten by the common people. Common in thickets. Native name Ingá.

COMBRETACEÆ.

Combretum Jacquini, Gris., Fl. Brit. W. Ind. Isd., 275.

Asuncion (822). October.

A bushy-headed and much-branched tree, with smooth, dark gray bark, 9–15 m. high. Leaves numerous, crowded, entire, opposite, coriaceous, dark green and shining above, lighter colored beneath, glabrous or the youngest pubescent beneath, 7–10 cm. long and 4–5 cm. wide. Flowers greenish-yellow, the racemes disposed in clusters on peduncles 2 or 3 cm. long. The inflorescence rusty pubescent and somewhat glandular. Calyx lobes and petals 4, the latter yellow. Stamens 8, much exerted. The young branches of this tree have the curious habit of ending in long naked twigs, which twine about themselves like a vine. Fruit not seen.

Combretum Loefflingii, Eichler, Mart. Fl. Bras., xiv, pt. 2, 110.

Caballero (450). January.

A large tree. Young branches, rachis, petioles, pedicels, and calyx lepidote. Leaves elliptical, 6–8 cm. long, 3–5 cm. wide, somewhat coriaceous, shining above, thickly lepidote beneath, on petioles about 1 cm. long. Flowers in lateral racemes 4–6 cm. long. Calyx and sepals reddish; stamens reddish-purple, much exerted, 3 or 4 times as long as the calyx. Petals much smaller than the calyx lobes and nearly hidden by them. Fruit a 4 or 5 winged

samara, which in the dried specimens appears about $1\frac{1}{2}$ cm. in diameter.

In flower at Caballero; in fruit among the hills on the road between Villa Rica and Escoba.

MYRTACEÆ.

Psidium Guajava, L., Sp. Pl., 470.

Asuncion (118). November-December.

The well-known Guava, or "Guyada," as it is written and pronounced in Paraguay, so common in the West Indies. It is common both in gardens and wild at Asuncion. The tree grows 5-7 m. in height. The fruit, much like a small apple in size and shape, is highly esteemed both as a fruit for eating and for making jelly. It is yellowish-green when mature, and has a pleasant aromatic odor and a soft reddish pulp full of seeds. Birds are extremely fond of it, and so are pet animals like monkeys. To my own taste the meat is rather insipid. The flowers are large, white, looking as much like the flowers of a *Rubus* as anything.

Psidium Kennedyanum, Morong, n. sp.

A small tree 5-7 m. high, generally bent downwards at the summit. It has the habit of *P. Guajava*, the outer bark scaling off and leaving a smooth, whitish-green surface beneath, something like our Buttonwood. Leaves opposite, glabrous, entire, elliptical, acute at either end, or the tip acuminate and sometimes curving upwardly, slightly revolute; midrib prominent beneath, veins and venules distinct, curving into a connected marginal vein, the same color on both sides, minutely pellucid-punctate; blades 3-7 cm. long, 1-2 cm. wide, on petioles 3-7 mm. long. Branches terete, or slightly compressed at the apex, glabrous. Flowers solitary, axillary, in peduncles about 2 cm. long. Calyx closed in bud, 6 or 7 mm. long, in anthesis rupturing to the disk in 4 or 5 very thick ovate lobes. Petals 4 or 5, white, free, oblong, obtuse, 8 or 9 mm. long. Stamens numerous; filaments filamentous; anthers capitate, fixed near the base. Style erect, 7 or 8 mm. long, about the length of the stamens; stigma capitate. Ovary 5-celled. Berry pyriform, 2-2½ cm. long, 1½ cm. broad, glabrous, minutely rough, many-seeded, surmounted by the remains of the calyx and the disk cavity, which is about 5 mm. broad.

Abundant in dense woods in some localities on the Pilcomayo River (890). January.

Called Guyada chica by our peons, who easily recognized its similarity to the common large Guava of the country. It is here named in honor of Dr. Geo. G. Kennedy, who generously contributed towards the expenses of my expedition.

Myrcia Guavira, Parodi, Cont. Flor. Par., iv, 142.

Near Asuncion (838).

A large fruit-bearing tree, found both wild and cultivated in Paraguay. The bark is silvery, breaking into long glistening fibres, at least on the young branches. Leaves opposite; sub-opposite or the lower alternate, glabrous, simple, entire, the margin callous or, on the older leaves, eroded, transparent along the venation, and minutely punctate with translucent dots, broadly elliptical or oval in outline, running into an acuminate point at the apex, sloping at base, the largest blades 12 cm. long by 7 cm. wide; on short, channelled petioles. The fruit is often sold in the Asuncion markets and greatly esteemed. It is yellow, as large as a plum, the flesh sweet and palatable, but slightly astringent, containing from 6 to 8 small, flattish seeds, to which the gum-like pulp closely adheres. The tree and the fruit are known popularly as the Guavirá. Fruit in October and November. The flowers I did not see.

Myrcia ovata, Camb. in St. Hil. Fl. Bras. Merid., ii, 229 ?

Pilcomayo River (894 a). = Balansa, 1305.

A shrub 3-5 m. in height, with brownish bark and clean erect, fuscous-downy branches. Flowers too young to make out. Leaves numerous, coriaceous, downy on midnerve below, pellucid-punctate, oval and pointed at both ends, opposite above and alternate below, on very short downy petioles. In woods.

Myrcia ramulosa, D. C., Prod., iii, 250. Ex descr.

Pilcomayo River (907 a). February.

A very branching shrub, with light-colored or brownish bark, 3-5 m. high. Young branches glabrous or minutely fuscous-pubescent. Leaves oval or ovate, opposite, entire, glabrous, coriaceous, obtusely acute at the apex, obtuse or somewhat acute at base, shining above, light green on both sides, pellucid-punctate, 2-4½ cm. long, 1-2 cm. broad in the middle; midrib prominent beneath and the surface reticulate veiny; petiole channelled, pubescent, 2-5 mm. long. Flowers not seen. Panicles lateral or terminal, axillary, 2-4 cm. long, 3-7 fruited, the lowest pedicels 5-8 mm. long. Berries when ripe red, 7 or 8 mm. in diameter, crowned with the calyx which has 5 small, roundish ovate, often minutely ciliolate, reflexed lobes, finally deciduous, leaving an orbicular operculum. The thin pulp is dotted with minute tubercles and sweetish to the taste.

Fruit 2-celled, each cell containing a single, yellowish seed with a shining membranaceous test.

Myrcia Assumptionis, Morong, n. sp.

A shrub 2½–4 m. or more high, with reddish, scaly or corrugated bark, much branched, the branches opposite and sometimes tetragonous above. Young branches compressed, white villous. Leaves numerous, opposite, pellucid-punctate, lanceolate, rounded or subcordate at base, sharply or obtusely acuminate at the apex, revolute when dry, 3–7 cm. long, 1–2½ cm. broad; nerves elevated on both sides and the midrib a little sulcate above; young leaves white villous below, especially on the midrib, soon glabrate. Buds silky canescent. Flowers small, white, in glabrous terminal panicles, 3–5 cm. long, many-flowered, the branches of the panicle 1–5 flowered, all the flowers pedicelled. Flower bud globose; calyx lobes shorter than the petals, ciliate, glabrous; petals glabrous, rounded above, 2 or 3 mm. long; calyx and petals reflexed in anthesis; stamens numerous, exserted; style about the length of the stamens. Bracts and bracteoles linear, 1–2 mm. long, ciliate, caducous. Ovary 2-celled. Berry about 5 mm. in diameter, red when ripe, containing a single bony seed.

In copses. Asuncion (260). December.

Eugenia camporum, Morong, n. sp.

A small shrub 5–6 dm. high, glabrous, the bark silvery-white, dotted by scattered dark glands. Young branches glabrous, reddish-brown, dotted with small, yellow, pellucid glands. Leaves opposite, entire, elliptical, coriaceous, revolute, pellucid-punctate, sometimes bearing a few scattered fuscous glands beneath, sessile, narrowed at either end, obtuse at the apex, 3–6 cm. long, 1–2 cm. broad; doubly limb-nerved, the veins distinct and the midrib prominent beneath and slightly sulcate above. Flowers not seen. Fruit a red berry as large as a strawberry, gland-dotted, 7–8 ribbed, containing a thin, red, sweet pulp, and one large flattened-globular seed about 1 cm. long; test crustaceous. Peduncles drooping, filiform, solitary or 3 or 4 together, axillary or from a defoliated node, 12–20 mm. long. The fruit is crowned with 4 oblong, coriaceous, gland-dotted, venose, concave sepals.

Very near *Stenocalyx glaber*, Berg., in Mart. Fl., xiv, pt. 1, 337, but differs from that species as described in its narrow elongated, obtuse leaves, number of the peduncles, and in other points. It seems also to be the "*Eugenia Micheli*?" of Parodi in Cont. Flor. Par., Fasc. iv, 122, but that species (*E. uniflora*, L.) has much shorter ovate or obovate leaves, and is a much taller shrub, with smaller fruit.

Near Asuncion, open grounds (832). Fruits in November.

Guarani name Nangapari-mi, fide Parodi.

Eugenia Parodiana, Morong, n. sp.

A branching glabrous shrub, 1-2 m. high, with whitish, scaly bark which is often dotted with small black glands. Young branches glabrous, often compressed, dotted with small yellow, translucent glands. Leaves opposite, entire, elliptical, 2½-6 cm. long, 1-2 cm. wide, narrowed at either end, obtuse at the apex, midrib prominent beneath, impressed above, veins and veinlets raised, with an arcuate marginal nerve, revolute when dry, pellucid-punctate, the punctuations elevated; on a narrowly winged petiole 2-5 mm. long. Flowers pedicelled, pedicels solitary or 2 pairs on a short raceme, glabrous, axillary or at a defoliated node on the branches, the pedicels and rachis of the racemes 4 or 5 cm. long. Flowers very small, calyx lobes glabrous or ciliolate, petals white, and with the disk pubescent, clawed, both calyx and petals reflexed in anthesis. Style as long as the stamens, uncinuate at the stigma. Bracts and bracteoles minute, ovate, ciliolate, caducous. Ovary 2-celled, the cells several ovuled, apparently ripening only one seed. Fruit not seen.

In sandy soil east of Asuncion (821). October-November.
= Balansa, 1314.

Eugenia uniflora, L., Sp. Pl., 470.

Pilcomayo River (894). January.

Compared with a specimen collected by Lorentz in the Argentine Republic and so named by Grisebach.—N. L. B.

A branching shrub about 3 m. in height, with grayish or brown bark. Flowers too young to be determined when first observed. Leaves (longest) 5 cm. long and 3 cm. wide, simple, entire, opposite, ovate, obtusely pointed at both ends, shining above and lighter green beneath, pellucid-dotted. I afterwards found good fruit. It is an edible, pleasant-tasting berry, depressed globular, slightly 7-8 angled, crowned with the oblong persistent calyx lobes, solitary or in axillary clusters along the stem, quite pulpy and bright red, with yellowish meat when ripe, containing a single flattish, crustaceous seed; on peduncles 2-3 cm. long. Birds are very fond of the fruit, and the crops of many "turkeys" that we killed were full of the berries. Common in thickets on the banks of the Pilcomayo.

Eugenia cauliflora (Mart.), D.C., Prod., iii, 273.

Asuncion (614). Fruit, March.

A well-known fruiting tree of Paraguay, called *Y-ba-pá-rá*, or, in English *Hivapuru*, by the natives. 5-8 m. high, with smooth, greenish bark. The flowers and fruit grow along the trunk, sometimes almost to the ground. Flowers very small, white, in short

clusters. Leaves opposite, pellucid-punctate, dark green above, ovate-lanceolate, acuminate, rounded at base, the largest 4 cm. long by 2 cm. broad. Petioles 2 or 3 mm. long, pubescent. Young leaves and branches pubescent. Fruit 1-1½ cm. or more in diameter, very dark purple when ripe, looking like a plum, with a white, somewhat astringent pulp that clings closely to the seeds. Seeds 2-4, irregularly shaped, soft-shelled. Often sold in the markets of Asuncion.

MELASTOMACEÆ.

Rhynchanthera rosea, Cogn. in Mart. Flor. Bras., xiv, pt. 3, 181.

Luque (293 a). December. Named by A. Cogniaux.

A square-stemmed plant about 6 dm. high, with showy rose-colored flowers and rough prickly stalk and linear leaves. Flowers in terminal racemes. Open grounds.

Tibouchina herbacea (D.C.), Cogn., l. c., 408.

Between Pirayu and Jaquaron (664). April. Named by A. Cogniaux.

A handsome purple-flowered plant 6-9 dm. high, growing on the open campo. Corolla smaller than in the other species collected, the petals being about 1 cm. in length. Stems and leaves densely villous and tomentose. It bears numerous blossoms in long terminal panicles.

Tibouchina gracilis (Bonpl.), Cogn., l. c., 386.

Luque (293); near Caballero (598). December-January.

A very showy-flowered plant, 3-6 dm. high, growing in open grounds. Corolla bright purple-red, the petals 2 cm. in length. Flowers in long terminal racemes. All the species are bristly hairy, the hairs rising from papillæ on the stem. In this species the hairs are prickly, white, spreading upwards or appressed, in no. 664 they are fuscous below and curve downwards.

Leandra atropurpurea, Cogn., l. c., pt. 4, 106.

Between Villa Rica and Escoba (456). January. Named by A. Cogniaux.

A shrub, 5-7 dm. high, with dark-setose stem and leaves, the hairs stiff and spreading. Leaves opposite, oval-lanceolate, the largest collected 10 cm. long and 5½ cm. wide. Petiole 1-2 cm.

long. Panicles 10 or 12 cm. long. Berries capsular, 4-7 mm. long, fuscous, setose and glandular-tomentose, 1 to many on each peduncle. Found only in fruit.

Miconia staminea (Desr.), D. C., var. **parvifolia**, Cogn., l. c., 231.

Caballero (502). January. Named by A. Cogniaux.

A shrub in dense thickets on the banks of the Tebicuary, near Caballero, 3-4 m. in height. Flowers large, yellow, in terminal panicles. Fruit a red berry. Leaves simple, smooth, oval, or elliptical, thick, the blade about 10 cm. in length. Upper part of the stem covered with a cinereous scurf.

According to M. Cogniaux (D.C., Mon. Phaner. vii, 725), *Miconia* is antedated by *Tamonea*, Aubl., Pl. Guian., i, 441 (1775), but the name does not appear on that page of our copy of Aublet's work, but is published on page 659 of the second volume, for the verbenaceous genus with which it is usually associated. *Leonicea*, Scop. (1777), is, however, doubtless an equivalent of *Miconia*, R. & P. (1794), and would be adopted here, but for the uncertainty which we feel concerning *Tamonea*, Aubl., which, if really anywhere in Aublet's book before page 659, ought to be taken up. We have failed to find it, but have concluded to allow *Miconia* to stand.—N. L. B.

LYTHRARIÆ.

Cuphea Balsamona, C. and S., Linnaea, ii, 363.

Asuncion (76). November.

A small plant 15-20 cm. high, with a stem 4-gonous above and terete below, growing in open, grassy grounds. Calyx somewhat inflated, with a gibbous swelling at the base, in which is a nectary. Petals 6, small, red, inserted on the calyx tube at its summit between as many small green projections. In fruit the pod and calyx burst open irregularly and emit the seeds, which are compressed, with 2 sharp and margined angles slightly cordate at the top, or, rather, the callous margins join cordately.

Cuphea spicata, Cav., Ic., iv, 56, t. 381.

Asuncion (136). November.

A glandular hairy herb about 3 dm. in height. Flowers in terminal racemes, the petals purple. The fruit is peculiar. Perianth persistent, closing as a pod over the ovary at maturity. The pod

contains 10 or more flat seeds arranged in a sort of head, lying imbricately upon each other in 3 or 4 rows and attached at the base, the uppermost covering the rest in a sloping direction, the whole surmounted by the persistent style and stigma. At maturity the seeds separate, and appear attached to the receptacle by minute stalks. The pod bursts open irregularly and the seeds with their stalks are thrust out. In open grounds.

Pleurophora saccocarpa, Kœhne, Engl. Bot. Jahrb., ii, 426.

Pilcomayo River (869). January. = Balansa 2218.

A shrubby, little, branching plant from 3 to 9 dm. in height. Flowers with red petals, numerous, crowded, in long racemes upon the stem and branches. Calyx enclosing the ovary in a sort of sack, whence the specific name. Stamens 6 or 7, filiform, much exerted, giving a graceful look to the flower. Found in open grounds at the Obraje de Pedro Gill.

Nesaea salicifolia, H. B. K., Nov. Gen., vi, 192.

Asuncion (129). November.

A shrubby, bushy-looking plant, common in low, open grounds and around watercourses. The bright yellow petals, long, exerted stamens, and numerous flowers impart a showy look to the inflorescence. Similar in its long slender leaves and willowy stem to the *Nesaea verticillata*, so common about our ponds.

Lagerstrœmia Indica, L., Sp. Pl., Ed. 2, 734.

Asuncion (837).

A handsome flowering shrub with roughish brown-colored bark, 5 or 6 m. in height, cultivated in gardens at Asuncion. Flowers in large terminal panicles or compound racemes, rose-colored, showy. Flower buds enclosed in a broad, somewhat membranous bract, and the flowers with 5 and 6 crimped and lobed petals. Flowering a large part of the year.

Punica Granatum, L., Sp. Pl., 472.

Asuncion (846).

The Pomegranate, or Granada, as it is called in Paraguay, is not a native of the country, but has been introduced probably from southern Europe. A shrub 3 or 4 m. high, with showy scarlet

flowers and a large edible fruit, often cultivated in gardens. It seems to flower at all seasons of the year, or, rather, at almost any season when the tree is old enough for the purpose.

ONAGRARIÆ.

Jussiaea decurrens (Walt.), D.C., Prod., iii, 56.

Caballero (425). January.

This was so determined after a comparison with specimens at Kew thus labelled, but it is very doubtful if it can be included in this species. The stems are very slender, 3-9 dm. high, angled but not winged. Leaves linear or lanceolate, the linear leaves 4-12 cm. long, 2-3 mm. broad, the others 3-5 cm. long and 7-10 mm. broad, all acute at both ends and sessile or shortly petiolate. The yellow flowers are large and showy, the petals often measuring $2\frac{1}{2}$ cm. in length, 3 times as long as the ovate, acute calyx lobes. The capsules appear to be those of *J. decurrens*, but they and the flowers are on pedicels 5 or 6 mm. long. Growing on the railroad track.

Jussiaea lagunæ, Morong, n. sp.

A shrubby plant occurring in the great laguna of the Pilcomayo River. Stem glabrous, terete below, angled and striate on the branches, 9-12 dm. high. Leaves alternate or fascicled, 1-nerved, glabrous or rough on the midrib and margins, entire, sessile, oblong-linear, acute at the apex, acuminate at the base, the largest collected 5 or 6 cm. long and 3 or 4 mm. wide. Flowers bright yellow, solitary, axillary, shortly pedicelled, 3 cm. high and 5 or 6 cm. in diameter when expanded; sepals 4, ovate, acute, $\frac{1}{2}$ as long as the petals, with 2 free, subulate bracteoles at the base; petals 4, nerved, rounded or with a shallow sinus at the apex; stamens 8, equal, longer than the style, included; disk well marked, the curved lines of the lobes strongly woolly; style produced. Capsules tetragonous, 8 nerved, clavate, slightly compressed and 2 or 3 mm. broad at the apex, $1\frac{1}{2}$ -2 cm. long, sloping at base into a pedicel about 5 mm. long. Seeds nearly round, flattish, scarcely $\frac{1}{4}$ mm. long, striate under the lens, very numerous.

Pilcomayo River (1035). May.

Jussiaea octonervia, Lam., Encyc., lii, 332.

Asuncion (137 a and 137 b). November.

A shrubby plant 12-18 dm. in height, common in wet grounds. The 4 petals broad obovate, emarginate, feather-veined, yellow and showy. Leaves mostly narrow linear-lanceolate, sometimes $2\frac{1}{2}$ cm. broad. Pods 8-nerved.

***Jussiaea Peruviana*, L., Sp. Pl., 388.**

Asuncion (137). November.

About as tall as no. 137 a, but a much larger and coarser shrub. Leaves $2\frac{1}{2}$ -4 cm. in breadth. Pods large, scattered, obovoid, 4-nerved and 4-angled. Both this and the preceding species are downy or hirsute, and common in low grounds.

***Jussiaea pilosa*, H. B. K., Nov. Gen., vi, 101, t. 532.**

Asuncion (771). May.

Hairy, branching, 3-5 dm. high, in water or on low lands. Leaves linear-lanceolate, $2\frac{1}{2}$ -7 $\frac{1}{2}$ cm. long. Flowers yellow, small, the corolla not much over 1 cm. in diameter when expanded. Pod long, linear, downy or nearly smooth. At Asuncion and on the Gran Campo 10 or 12 miles from Asuncion. Petals in this species 5. Stem stout and angled.

***Jussiaea repens*, L., Sp. Pl., 388.**

Asuncion (178 and 290). November.

A small creeping bog plant common in low lands, 8-20 cm. high, 5-parted. Corolla small, yellow, about 1 cm. in diameter.

***Jussiaea sericea*, Camb. in St. Hil. Fl. Bras. Merid., ii, 254.**

Luque (302); Caballero (427). December-January.

This is the broad-leaved form of the species alluded to in Flor. Bras.

A half-shrubby plant 6-9 dm. high, with silky and ferruginous-hairy, angular stem, numerous leaves, and large, sulphur-yellow or purplish-yellow flowers, with fugacious petals. Petals and calyx lobes 4; stamens 8. Style thick and fleshy; stigma large, globular or oval. Around each petal at the base, on the ovarian disk, is a semicircular hairy fringe. Leaves sometimes 12 mm. broad. Pod 4-celled, with numerous small seeds. In dry open grounds.

SAMYDACEÆ.

***Casearia sylvestris*, Sw., Fl. Ind. Occ., ii, 752.**

Asuncion (765). July.

A smooth shrub or small tree 5 or 6 m. in height, with gray bark. Leaves numerous, crowded, lanceolate, acuminate, alternate, pellu-

cid-punctate, 5-7 cm. long, serrulate, the teeth callous-tipped, shining on the upper surface, often hanging downwards and the pairs meeting back to back. Petioles 3 or 4 mm. long. Flowers very small, white, in axillary clusters, the clusters appearing like verticels, looking much like those of our *Ilex verticillata*. Apetalous; divisions of perianth 6. Anthers 10 or 12. Thickets.

Banara Brasiliensis (Schott.), Benth. Jour. Lin. Soc., v, App. 2, 91.

Near Asuncion (689). April.

A tree 8 or 9 m. high, with gray bark, conspicuous in the woods for its numerous yellow blossoms. Sepals 3, pubescent on the outside, alternating with 3 petals, the corolla 10 or 12 mm. in diameter when expanded. Stamens numerous, yellow, conspicuous. Leaves alternate, glabrous and shining above, pubescent on the nerves beneath, on petioles 1-2 cm. long, which bear 1 or 2 cup-shaped glands at the top; the largest blades about 15 cm. long and not quite half as wide; the serrulate teeth callous or with a small round gland beneath. Berry a little larger than a pea, containing many small seeds, which are distributed irregularly, imbedded in a fleshy pulp. Style persistent as a beak. Flowers in rather loose terminal panicles 8-12 cm. long. Young branches cinereous-pubescent.

Banara tomentosa, Clos., Annal. Sci. Nat., ser. 4, viii, 240. Ex descr.

Near Asuncion (750). = Balansa 2293 a and 2293 b.

A tree about 9 m. in height, with grayish bark, the young branches, inflorescence, petioles and leaves covered with close white stellate and single hairs. Leaves simple, ovate, abruptly and obtusely acuminate, 5-nerved from the base, the nerves prominent; the largest blades 15-20 cm. in length and 5 cm. broad, with dark callous serratures, or a black gland in their place. Found only in fruit, which consists of close, pyramidal, terminal panicles of yellowish-red berries with a juicy pulp in the interior, containing 6 or 8 small, minutely pitted, irregularly-shaped, dark-colored seeds, distributed at random through the pulp. The pulp stains the fingers purple. Berries 5 or 6 mm. in diameter. Panicles 4-6 cm. long. In woods.

TURNERACEÆ.

Named by R. A. Rolfe.

Turnera nervosa, Urban, Mon. Turn., 108.

Caballero (609). January.

A shrubby plant from 15 to 20 cm. high. Silky hairy on the inflorescence, especially on the flower buds, and smooth on the stem below. The floral leaves or foliaceous bracts are immediately below the flowers, so that the flowers appear without the adnate peduncle common to the genus. The cup-shaped glands large and conspicuous. A very delicate, large, light-purple corolla, 2 cm. long. Leaves oblong, glabrous above, pubescent on the midrib beneath, serrate above, the largest 3 cm. long and 1 cm. wide, biglandular at base. Petioles scarcely none. All the species and varieties here enumerated grow in dry soil, and have hard tough roots. All have somewhat vermiform, whitish or brownish pitted seeds.

Turnera ulmifolia, L., var. **cuneiformis** (Poir.), Urban, Mon. Turn., 138.

Caballero (608). January.

About as high as no. 609. Stem and leaves covered with long white or fuscous appressed hairs. Leaves oval, crenate-dentate, cuneiform at base, 2-4 cm. long, 1-2 cm. broad. Petioles 3-7 mm. long, white tomentose beneath and darker above. Flowers large, light yellowish-purple.

Turnera ulmifolia, L., var. **elegans** (Otto), Urban, Mon. Turn., 139.

Asuncion (222). December-January.

Stems very hairy with white appressed hairs, 2-3 dm. or more high. Leaves ovate or ovate-lanceolate, with large serrate teeth, the blades 3-6 cm. long, 1-2 cm. wide, biglandular at base, sloping into a petiole about 1 cm. long. Flowers large and showy, violet-colored, with a deep purple base inside, radiating on the petals above in lighter purple and yellowish lines. The corolla spreads wide open, about an inch in diameter. This plant is very abundant on the railroad track near Asuncion. I always found it inhabited by large black ants which resented disturbance.

Turnera ulmifolia, L., var. **Surinamensis** (Miq.), Urban, Mon. Turn., 143.

Pilcomayo River (1504). January.

This variety differs from the preceding forms in having a much taller stem (sometimes 5 or 7 dm. high), short or very short hairs on the main stem, leaves from linear to oblong-lanceolate, 2-4 cm. long, 5-15 mm. broad, and with petals of a single color.

Piriqueta cistoides (L.), Meyer, Ex Steud., Nomencl., Ed. 2, ii, 724.

Pilcomayo River (884). January.

Stems slender, angled, beset with stiff, spreading, tawny hairs, 2-4 dm. high. Leaves, petioles, and calyx covered with stellate down. The whole plant has a grayish aspect. Flowers small, yellow, axillary, solitary or somewhat clustered at the top; fruit on long peduncles, about the size of a pea. Growing among tall grass on the campo.

Piriqueta Morongii, R. A. Rolfe, n. sp.

Perennis. Rami glanduloso-setuliferi. Folia petiolata, lanceolato-ovata, subaouta, subserrata, glanduloso-hispidula, $1\frac{1}{4}$ - $1\frac{1}{2}$ poll. longa, 6-8 lin. lata; petioli $1\frac{1}{2}$ -2 lin. longi. Flores axillari, solitarii, heterostyli. Pedicelli glanduloso-setuliferi, 6-9 lin. longi. Calyx 4 lin. longus, hispidulo-hirsutus; tubus 1 lin. longus; lobi lanceolati, acuti; squamæ late suborbiculares, obtusæ, ambriato-dentatæ, $\frac{1}{2}$ lin. longæ. Petala violacea, obovata, 5 lin. longa. Stamina $2\frac{1}{2}$ lin. longa; antheræ oblongæ, apice recurvæ, basi profunde bifidæ. Ovarium sericeum; styli glabri, $1\frac{1}{2}$ lin. longi, apice breviter multipartiti. Capsula tuberculata, hirsuta; semina obovato-oblonga, recta v. parum curvata, læviter reticulato-striata.

Central Paraguay, Morong (220). In dry soil about Asuncion. December.

The species here briefly characterized is nearly allied to *P. Tamberliki*, Urban (known to me only by description), next which it may be placed, but it has far smaller leaves, and comes from a different region.

In addition to the description given by Mr. Rolfe, it may be said that the stems are 3 or 4 dm. in height. The corolla is violet, with deeper purple stripes on the outside, having a deep purple base on the inside, upon which rests a beautiful 5-pointed green star. It spreads wide open rotately at anthesis. Seeds nearly black when mature.

PASSIFLOREÆ.

Named by Dr. M. T. Masters.

Passiflora cœrulea, L., Sp. Pl., 959.

Asuncion (141). November–January.

Climbing over shrubs to a height of 6 m. or more. Very branching and leafy. Leaves small, smooth, 5–7 deeply palmately lobed. Flowers small, greenish-yellow. Fruit the size of a small hen's egg, orange-colored.

Passiflora fœtida, L., Sp. Pl., 959.

Asuncion (577); Pilcomayo River (935). January–February.

A charming little Passion-flower, 6–15 dm. high, climbing upon herbs or small shrubs. Flowers pure white or light purple, not larger than a silver half dollar when expanded, and enclosed in large, finely dissected involucre bracts, the ultimate segments of which are tipped with small glands. Stems hispid with yellow spreading hairs. Leaves cordate, mostly 3-lobed, the lobes sometimes angled or lobed, the 2 lower lobes much rounded at base. Fruit a bladder pod nearly half as large as a hen's egg.

Passiflora fœtida, L., var. **gossypifolia** (Desv.), Masters in Mart. Fl. Bras., xiii, pt. 1, 582.

Asuncion (223). December. = Gibert 1031.

Were it not for the determination of Dr. Masters, who hesitates about separating this from *P. fœtida*, var. *gossypifolia*, I should not doubt its distinctness, for it bears little resemblance to no. 577, of which it is called a variety. Stems climbing 3–7 m., densely and closely tomentose, as are also the leaves. Leaves 3-lobed, but very differently from 577. The 2 lower ones stand out hastately at right angles from the erect upper one, and have a very broad, shallow sinus below. Tendrils very stiff and strong, opposite the leaves. Flowers blue, small, the involucre bracts shorter than the flowers, the segments few, short and undivided, glandless. Stipules apparently obsolete. Not seen in fruit.

Passiflora Maximiliana, Bory, Ann. Sci. Phys. Gen., ii, 149, t. 24.

Pilcomayo River (896 and 1032). January–May.

Stem 4-angled, downy, climbing over low shrubs. The leaves quite curious, being composed of 2 long linear leaflets, which are

thoroughly united at the base, spreading divaricately so as to appear as if there were only a single leaf 7-15 cm. in length, standing at right angles to the petiole. This is 8-20 mm. wide at the widest part, and obtuse or acuminate, sometimes aristate at each end. Flowers very light purple, not over 4 cm. in diameter. Fruit about as large as a plum and dark purple when mature. I found this on the banks of the Pilcomayo near the "Junta," and very common in the water of the great laguna above the Falls, where its numerous dark berries were very conspicuous.

Passiflora Tucumanensis, Hook., Bot. Mag., t. 3636.

Pilcomayo River (1505). May.

Leaves glabrous, nearly equally 3-lobed, with a broad, rather deep cordate sinus at base. Flowers large, sepals greenish; petals light purple. Fruit not seen. Climbing 5-6 m. or more. In thickets.

Carica Papaya, L., Sp. Pl., 1036.

Asuncion (370). January.

This tree is usually called the Mamona or Mamon in Paraguay. It is the well-known Papaw of the West Indies, and has been extensively cultivated in tropical South America for centuries. The fruit, about as large as an apple, is much liked by the natives, but to me it seemed insipid. The juice is milky, and has many valuable properties, among others that of rendering tough meat wrapped in the leaves quite tender. I tried many experiments with the leaves, and found that they readily dissolved small cubes of fresh beef and the white of a hard-boiled egg. This juice is highly esteemed as a pepsin, and for other medicinal qualities. For an account of the tree and its ally (no. 389) and their chemical and medicinal properties, see my article on *Carica quercifolia*, in the Bulletin of Pharmacy for April, 1891, p. 163.

Carica quercifolia (St. Hil.), Solms. in Mart. Fl. Bras., Fasc. cvi, 178.

Villa Rica (389). January.

Much resembles the preceding species in general appearance, but the leaves are simple instead of being palmately 7-cleft as in that. It is somewhat smaller, being from 3 to 7 m. in height, and it is diœcious, whereas the other is monœcio-polygamous. The fruit is small and not edible, pulpy and perishable. It has the same prop-

erties as the Mamona, if anything even more active in dissolving meat fibres. The name Jacaratia is applied by the natives to this species, although it is not the true Jacaratia. A native of Paraguay, and common around Asuncion as well as Villa Rica.

CUCURBITACEÆ.

Named by A. Cognieux.

Momordica Charantia, L., var. **abbreviata**, Ser. in D.C. Prod., iii, 311.

Asuncion (45). November-May.

This vine is one of the most noticeable plants in the suburbs of Asuncion, climbing in thick masses over fences and shrubs to the height of 5 or 6 m. or more. Stem slender, glabrous, much branched. Leaves glabrous, deeply 5-cleft, the lobes broadened at the top and irregularly lobed or toothed. Flowers small, yellow, axillary, on long capillary peduncles. They are monœcious as in other *Cucurbitaceæ*, but instead of there being first a pistillate and then a staminate flower on the stem, those of one kind are on one branch, and the other on a different branch. The fruit is especially conspicuous. The ovary is green, covered with rows of spiny projections, running up into a long point upon which the flower is seated, 3 celled, several ovules in each cell, with a thick fleshy pulp. In the fruit 1, or sometimes 2, of these cells become abortive, and the ovary develops into a large, angular, oval body clothed with tubercles and spiny protuberances, which finally turns yellow, the pulp of which decays, leaving in the shrivelled shell 12-20 red flat-tish seeds, which stick like mucilage to each other and everything which they touch. These pepos hang on long, pendent peduncles, and at once attract attention. The roots are large, woody and tough, and are said to possess valuable medicinal properties, and similar virtues are attributed to the fruit. The pulp is quite nauseous both to the touch and taste.

Melothria Cucumis, Vell., Flor. Flum., i, t. 70, 29 ?

Pilcomayo River (1506).

A vine climbing 6 m. or more by tendrils in thickets. Leaves cordate, 4 or 5 inches in diameter, smooth, palmately 5-cleft, the 2 lower lobes hanging downwards below the others, all the lobes sparsely angled or toothed. Fruit oval, nearly as large as a hen's egg, blotched with white and green.

Melothria uliginosa, Cogn. in Mart. Fl. Bras., vi, pt. 4, 26.

Asuncion (761); Pilcomayo River (986). April-July.

This vine is rather delicate, climbing by thread-like tendrils over stumps and underbrush, or running along the ground and rooting at the nodes. Leaves broad-ovate, 5-lobed or angled, deep green, the surface sprinkled with silvery, hardly punctate, dots, and somewhat prickly hairs, ciliate on the margins. Petioles 2-5 cm. long, like the stems angular and often prickly haired. Flowers minute, rough downy on the exterior, yellow, and the 2 kinds on different branches on the same plant as in no. 45, or sometimes fully diœcious. Fruit an oval pepo 5-7 cm. long, 1-2 cm. in diameter, pointed at both ends, 3-celled, with many small seeds in each cell.

Cucurbitella cucumifolia (Griseb.), Cogn. in Mart. Fl. Bras., vi, pt. 4, 70.

Pilcomayo River (930, 936 and 1508). February-April.

A diœcious vine common on high banks along the Pilcomayo River. Leaves deeply 3-cleft, and the lobes toothed and lobed. Flowers rather small, yellow, mealy-granular on the outside of the petals. The plant runs several metres on the ground or over small shrubs and herbs. Fruit yellow, smooth, oval or obovoid, 3-4 cm. long, filled with small flattish seeds, brownish-black when mature. The plant has a large, thick, woody root which runs deep into the dry soil in which it grows. Leaves rough on both surfaces, deep green, on stout striate petioles, 3-4 cm. long, the petioles with 1 or 2 rows of minute hooked prickles. One can feel occasionally the same kind of prickles on the stems.

No. 1508, which is possibly a variety, has a leaf which is acuminate pointed at the apex, and the lateral lobes irregularly formed or none, 6-7 cm. long and 4-7 cm. broad, cordate. The leaves appear to be polymorphous in many of the specimens collected.

Cayaponia citrullifolia (Griseb.), Cogn. in Griseb. Symb. Flor. Arg., 135, var. **breviloba**, Griseb. in D.C. Monog. Phanerog., iii, 749.

Asuncion (190). November.

A rough, angular-stemmed tendril-climber with 3-5 palmately lobed leaves which have scattered, callous teeth on the margins, rough with short hairs, rugosely veiny beneath, nearly smooth above, 5-10 cm. long, 6-12 cm. broad. Flowers greenish-yellow. Not seen in fruit. The leaves are very irregularly lobed, all deeply cordate at base.

Cayaponia podantha, Cogn. in D.C. Monog. Phanerog., iii, 753.

Pilcomayo River (1027 and 1507).

A vine climbing over grasses and shrubs for several metres, both monœcious and diœcious, in wet, marshy grounds. The yellow flower is quite pretty, the corolla being about 2 cm. high and 3 cm. in diameter when open, the outer portion of the lobes green, pointed, nerved and hairy, while the inner lining is white with a broad border extending beyond the outer part and glandular hairy. Fruit 1-celled, oval, about $2\frac{1}{2}$ cm. long, with a thin, watery, white pulp; seeds several, large, flattish, in the centre of the pod. Leaves rough, deeply 3-lobed and 3-nerved, with spinous teeth on the margins, 5-7 cm. long and about as broad, the lobes obtuse, apiculate or aristate. No. 1507 has small lateral lobes or is simply angulate.

Lagenaria vulgaris, Ser., Mem. Soc. Phys. Genève, iii, 25, t. 2.

Asuncion (1588). January-May.

The form of the common gourd, the fruit of which serves in Paraguay as a vessel for drinking Yerba or "Paraguay tea," the national beverage. It is both cultivated and runs wild on the farms around Asuncion. The gourd or "mate," as it is popularly called, is ovoid, 6 or 8 inches in length, with a short neck. When young, it is bound with twine, and made to grow in various fantastic shapes. When ripe, the outer shell is carved with various ornamental figures, blackened with soot, often rimmed with silver, and used as a drinking-cup for the favorite beverage. The powdered or broken tea is crowded into the gourd, boiling-hot water is poured upon it, and the beverage is sucked through the "*bombilla*," a long tin or silver tube, which has a perforated bulb at the base.

BEGONIACEÆ.

Begonia semperflorens, Link and Otto, Io. Rar., t. 9.

Asuncion (145). November-December.

The Begonias are numerous in Paraguay, but this is the only species that I attempted to collect, as they are very succulent and exceedingly difficult to dry. This has a reddish fleshy stem, 3-9 dm. in height, common on the borders of thickets and along moist sandy roads. Flowers small, white, with a ruddy tinge, in terminal

clusters, on peduncles 2-7 cm. long, subtended by ciliate bracts. Leaves slightly diagonally reniform, the lower part projecting downwards. Stipules lunate, ciliate, acute. Whole plant very smooth.

CACTEÆ.

Cereus saxicolus, Morong, n. sp.

Growing among rocks, often reclining or creeping. Stem cylindrical, 1-2 m. or more in height, 2-3 cm. in diameter, glabrous. Costæ 9, somewhat sharply angled; furrows obtuse. Areoles 10 or 12 mm. apart, 5 or 6 mm. in diameter, the short yellowish wool becoming with age fulvous tomentum. Spines 6-11, stout, straight, the lowest 5 or 6 mm. long, the central one, or the 3 central, larger and 10-15 mm. long, all cinereous below and black at the tip. Flowers solitary, 6 or 7 cm. long, about 6 cm. in diameter when expanded, the outer scales small, round-ovate, sometimes ciliate, the uppermost greenish-purple; petals silvery-white. The flower is very showy, opening at night and closing soon after sunrise. Berry stipitate, oval, about 5 cm. long and 3 cm. in diameter; seeds small, black, shining, very numerous. The berry is edible, but rather dry.

This plant seems to differ from any of the species described in Flor. Bras., D.C. Prod., or Salm-Dyck's Cact. Hort. Dyck.

Near Trinidad (267). December.

Cereus Balansæ, K. Schum. in Mart. Fl. Bras., iv, pt. 2, 210.

Trinidad (268). December. = Balansa 2504.

Stem columnar, 5-8 cm. thick, growing upright among rocks 3 m. or more, with 4-5 angles and as many rows of spines; the spines in 5s, of unequal length (1-4 cm.). Flowers very handsome, some 15 cm. in length, the petals a brilliant white; peduncles 7 or 8 cm. long and covered with lanceolate scales, 2½ cm. in length. Fruit a large globular red berry, 6 cm. long and nearly as broad, the pulp fleshy, white, edible, full of small black, hard seeds. The flowers close soon after sunrise.

Opuntia nigricans, Haw., Syn., 189.

Asuncion (164). November-January.

Common on rocky cliffs by the Paraguay River, a much branched cactus, some 2 or 3 m. in height. The dark yellow spines, springing from a cushion-like disk, consist of 3-5 larger ones, divaricately spreading, unequal, the largest 1½ cm. long, and many smaller ones. Flowers with reddish-yellow corollas about 3 cm. high and 5 or 6 cm. in diameter when spread wide open, the sepals frequently of a

dark-purple tinge. Fruit a red, pear-shaped berry, 5-7 cm. long and 3-5 cm. in diameter. The joints of the stem are oblong-ovate, 10-20 cm. long.

Peireskia Bleo, D.C., Prod., iii, 475.

Asuncion (188). November-January.

One of the most striking plants in the region, often used as a hedge, for which it is admirably adapted by its thick foliage, its numerous, spreading branches, and its terrible thorns. Shrub-like, often growing into a small tree 6-8 m. high. Stems green, smooth. Leaves coriaceous, thick, nearly sessile, obovate or oblong, 5-10 cm. long, 4-5 cm. wide. The spines are in axillary clusters, the main one 4 or 5 cm. in length, very sharp and strong, wounds from which are very painful and apt to cause gangrene. The flowers, in terminal clusters, are white and rose-colored, as large as a Camellia blossom, very showy. Fruit a hard green nutlet, about $2\frac{1}{2}$ cm. in diameter, 1-celled, many seeded. Very difficult to preserve in Herbarium specimens, as the leaves and stems fall to pieces in drying. The common Spanish name of this species is Amapola, and the Guarani name Surubi-y.

FICOIDEÆ.

Tetragonia horrida, Britton, n. sp.

Decumbent, glabrous, stems angular, branched, 3-9 dm. long. Leaves fleshy, rhomboid-spatulate, obtuse at the apex, narrowed into a broad petiole, papillose, 4-6 cm. long, 2-4 cm. wide; flowers axillary, several together, sessile; fruit strictly sessile, dry, angular, 3-4 mm. long, crowned by the 4-7, unequal veiny, spiny calyx-lobes. Stamens 50.

Pilcomayo River (917). February.

Related to *T. expansa*, Ait., which occurs in southern Brazil and Uruguay.

This vicious-looking plant spreads upon the ground in large masses. Corolla small, some 6 mm. in height, whitish, with purple stripes, folded and ending in 5 short hardly apparent lobes. The persistent calyx, enlarging on the ovary, forms a spiny, burr-like fruit, which it is decidedly unpleasant to handle.

Sesuvium parviflorum, D.C., Prod., iii, 453.

Pilcomayo River (1042). May.

Growing in dry soil on the open campo. This species differs from the following in having an erect, suffruticose, dichotomously-

branched stem, terete below, linear leaves 1-2 cm. long, and crowded and sessile or subsessile flowers. It is regarded as a variety of *S. Portulacastrum* by Rohrbach in Mart. Fl. Bras., xiv, pt. 2, 310.

Sesuvium Portulacastrum, L., Sp. Pl., Ed. 2, 684.

Asuncion (789). October.

Succulent. Spreading on the ground 15-20 cm. Leaves linear or spatulate, 1-2 cm. long. Flowers small, pedicellate, the interior of the calyx lobes rose-colored. I found these little plants springing up in great numbers on the river-side where the land had been overflowed in the winter freshet, and from which the waters had receded. The bright rose-tinted perianth spreads wide open in the sun.

Mollugo verticillata, L., Sp. Pl., 89.

Asuncion (186). November-January.

This cosmopolitan plant is as abundant around Asuncion as it is in cultivated grounds in North America.

UMBELLIFERÆ.

Hydrocotyle leucocephala, C. and S., Linnæa, i, 364.

Asuncion (100). November.

A delicate plant, running over the ground under the shade of larger plants and rooting at the nodes. Flowers white, very small, waxy, in simple umbels, on long capillary peduncles. Stem, petioles and leaves sparsely pilose. Leaves crenate or lobed, very variable as to size, about 9-nerved.

Hydrocotyle ranunculoides, L., f. Suppl., 177.

Asuncion (241). December.

Common in miry places, pools, and rivulets, which form from streams that run down into the Paraguay from the high banks around Asuncion. Notable for its supposed medicinal virtues among the herb doctors of Asuncion. Called by quacks *Verdolaga palustre*, or *Herva do capitao*, in Guarani *Acaricoba* and *Caahay*. It is regarded as aperient and diuretic, and is employed for removing obstructions of the liver and bowels. Like thousands of the vegetable nostrums of the Paraguayans, its reputation is far beyond its real value.

Eryngium coronatum, H. and A. in Hook. Bot. Misc., lii, 350.

Between Paragua and Luque (852). December. = Balansa 1079 a.

Stem smooth, striate, 2-3½ dm. high. Leaves mostly radical, 5-10 cm. long, 1-1½ cm. wide, with numerous spine-tipped lobes, which are 4-15 mm. long and sometimes 2 mm. wide. Stem leaves under the branches similar but smaller. Involucral bracts 2 or 3, linear, spine-tipped, entire or sparsely spine-dentate. Heads cylindrical, 1-2 cm. long. Dry soil, open grounds.

Eryngium elegans, C. and S., Linnæa, i, 348.

Between Villa Rica and Escoba (419); Gran Chaco near Asuncion (576). January. = Balansa 1084.

Stem striate, glabrous, 2½-8 dm. high. Radical leaves numerous, oblanceolate, 7-25 cm. long, 1-2 cm. broad at the apex, beset with numerous sharp spiny teeth 4 or 5 mm. long. Involucral bracts 5-7 mm. long, with many spiny teeth. Heads globose, or globose-ovate, 5-6 mm. in diameter, in lax spreading corymbs 5-10 cm. broad and 12-15 cm. long. This corresponds very well with var. *microcephalum*, Urban, as given in Mart. Fl. Bras., xi, pt. 1, p. 11.

Eryngium paniculatum, Cav. in Delaroch Eryng., 59, t. 26.

Gran Chaco (436). January; Asuncion (840). October.

A stout, glabrous striate-stemmed plant, 1-2 m. high. Leaves 5-6 dm. long, 3½-4 cm. wide at the base, lanceolate, tapering into a long acuminate point, free from marginal spines on the sheathing part for 8-10 cm. Inflorescence very broad and lax, 2-3 forked, 10-30 cm. long and nearly or quite as wide. Heads oval, 8-15 mm. long, 7-10 mm. in diameter. Particularly distinguished by its broad forking panicle, and its long lanceolate radical leaves.

Eryngium multicapitatum, Morong, n. sp.

Stems 1½-3 m. high, fistulose, 7-8 mm. thick below, elevated striate, dark colored when dry. Radical leaves parallel-nerved, 3½-4 dm. long, 4-4½ cm. broad below, diminishing gradually to 2½ cm., oblong-lanceolate, shortly acuminate, the margins beset with single strong, upwardly-curved, fuscous spines 2-5 mm. long. Stem leaves under the peduncles very numerous, amplexicaul over the entire base, the lower 7 or 10 cm. long, diminishing to bracts 1½ cm. long, strongly parallel-nerved, spine-pointed, sparsely spiny-dentate, the teeth often double and canaliculate above, or the lower half of the leaf nude, turning white when dry. Inflorescence racemose, 30-40 cm. long; peduncles very numerous, 2 or 3 cm. apart, striate, often compressed or even anopital, 4-7 cm. long; corymbs 3-rayed, or the rays sometimes again forked and 1½-3 cm.

long. Involucral bracts 4-8, lanceolate, striate, spine-tipped, entire, 5-10 mm. long, 1-3 mm. broad at the base. Floral bracts much longer than the flowers, similar to the involucral bracts. Heads cylindrical, 10-15 mm. long, 6-10 mm. in diameter. Sepals oblong, apiculate, about 1 mm. long. Petals shorter, white. Stamens about the length of the petals. Styles about 3 mm. long. Not seen in fruit.

On the campo between Villa Rica and Escoba (451). January.

This species resembles *E. Glazovianum*, Urban, in stem and character of the cauline leaves, but is very different in its long racemose inflorescence, in the shape and size of the heads and in its radical leaves.

Eryngium Sanguisorba, C. and S., *Linnaea*, i, 339. Ex descr.

Near Luque (334). December. = Balansa 1080 a.

Appears to be one of the forms of this very variable species, judging from the description given by the authors. Stem slender, striate, naked except for a single bract near the centre, about 3 dm. high. Radical leaves linear, 8-12 cm. long, about 6 mm. broad at the sheathing base, 4 mm. above, acute, with small distant, callous or setose teeth about 2 mm. long and usually retrorse. Inflorescence terminal, 3-5 radiate, the rays with solitary heads. Heads dark rosy-purple, ovoid or somewhat cylindrical, 8-12 mm. long, 6-7 mm. in diameter. Involucral bracts 6-8, entire, spine-pointed, reflexed, 1-3 nerved; bracts of the peduncles 1, and of the rays 2, minute, opposite. Among bushes on the open campo.

Apium Ammi (Jacq.), Urban in *Mart. Fl. Bras.*, xi, pt. 1, 341.

La Plata, Arg. Republic (29); Asuncion (798). October-December.

ARALIACEÆ.

Didymopanax ?

Pilcomayo River (997).

A tree 9-16 m. in height, growing on the open campo. Collected without flowers or fruit. It has a very thick, light, fissured, corky bark, and I thought when gathered that it might prove a substitute for the bark of *Quercus suber*, but experts in New York inform me that it lacks one of the chief qualities of true bark, namely elasticity, and yet it might be of considerable value in all other respects. The leaves are thick, coriaceous, quinate, on a thick petiole 10-15 cm. in length; leaflets elliptical, entire, thick, glabrous, granulated on

both surfaces, the 2 lower on very short petiolules, and smaller than the others; the 3 upper on petiolules 6 cm. long; the largest leaflets 20 cm. long by 6 cm. broad, all light green in color. It is known popularly as Lepacho del campo, resembling the true Lepacho only in having quinate leaves.

RUBIACEÆ.

Ligustum ignitum (Vell.), Kuntze, *Rev. Gen. Pl.*, 287.

Lympio (731); Caballero (512). January-May.

A slender, climbing vine. Leaves glabrous, opposite, entire, ovate or ovate-lanceolate, acute or acuminate, shortly petioled, rounded at base, 2-4 cm. long, 1-2½ cm. wide. Flowers single, at the ends of long drooping peduncles, trumpet-shaped. Corolla dark red, about 4 cm. long, with 4 short oblong lobes. Capsule 2-celled, 2-seeded, 10-12 mm. long.

A showy-flowered vine in thickets.

Oldenlandia thesifolia (St. Hil.), Schum. in *Mart. Fl. Bras.*, vi, pt. 6, 269.

Near Luque (330). December.

A pretty little flower much resembling our *Houstonia cœrulea*, but decidedly different. The stems very slender, 6-10 cm. high; bending over or nearly prostrate, growing in wet grounds. The corolla is white, showing no trace of a yellow or blue tinge. No signs of dimorphism about the stamens or style. Flowers 1-3, in a pedicellate cluster at the top of the stem. Without radical leaves. Very hairy in the throat, style and stigma protruding through the hairs. Leaves ovate or nearly oval.

Machaonia acuminata, H. and B., *Pl. Æq.*, i, 101, t. 29.

Gran Chaco, near Asuncion (374 a). January-February.

An unarmed shrub 3-5 m. high, with light gray, warty bark. Leaves ovate-lanceolate, shortly petiolate, entire, acuminate, rounded at the base, at first pubescent, soon glabrate, lighter colored beneath, 5-7 cm. long, 2-3 cm. wide. Flowers small, white, in terminal pyramidal panicles. Twigs and perianth tube pubescent.

Machaonia spinosa, C. and S., *Linnaea*, iv, 2.

Asuncion (374); Pilcomayo River (883). January-April.

A shrub or small tree 3-5 m. high, with light gray, warty bark. Quite spiny, but the spines a sharp, hard projection at the ends of

undeveloped branches. Leaves small, opposite, with an interpetiolar stipule which consists of one large-based, stiff hair. Flowers small, white, in large irregular corymbs. The disk is in 2 parts, which rise around the ovary like a collar. Fruit splits into 2 rather long seeds.

Basanacantha spinosa (Jacq.), Schum. in Mart. Fl. Bras., vi, pt. 6, 376.

Asuncion (806); Pilcomayo River (893).

A thorny shrub in thickets. Corolla greenish-white, tubular, with 5 large, downy, recurved lobes. The most striking thing about the plant is the fruit, which is a large oval nut, 4-celled, each cell containing a single seed, the interior filled with a thick, white meat, covered by a separable rind, which is sprinkled on the outside with mealy dots, reminding one in appearance of the Cedrella nut, though without the offensive odor of that. I could not learn that it is ever eaten, even by the Indians. Flower October; fruit January.

No. 806 corresponds very well with var. *pubescens*, Schum., in Mart. Fl. Bras., l. c., 378, and no. 893 with var. *ferox* of the same author.

Chomelia Morongii, Britton, n. sp.

A shrub 3-9 m. high, with divergent, reddish, smooth branches, the young twigs pubescent. Leaves short-petioled, oval or ovate-oval, acute, acuminate or sometimes obtuse at the apex, narrowed at the base, pubescent, with short hairs on the upper surface and with matted spreading ones on the lower, 4-10 cm. long, 2-4 cm. wide; peduncles slender, pubescent, 1-1½ cm. long, 2-8-flowered; corolla tube slender, finely pubescent without, about 1½ cm. long, 4-5 times as long as the oblong, obtuse lobes; calyx-teeth short, unequal; style slender, glabrous; fruit oblong, 1 cm. long, 5 mm. wide, finely and densely velvety-pubescent.

Pilcomayo River (906). = Balansa 3165. Related to *C. pedunculosa*, Benth.

A beautiful unarmed shrub abounding in thickets on the borders of the river. Flowers pink colored, in small clusters, exhaling fragrance in wet weather. The lobes of the calyx are sometimes obsolete; the lobes of the corolla and the stamens sometimes 5, instead of the normal number 4. Berry dark purple, with a thin pulp, the 4 cells becoming compact when ripe and appearing to mature only a single consolidated bony seed. It is quite sweet to the taste, and was freely eaten by our company.

Chomelia obtusa, C. and S., *Linnaea*, 1829, p. 185.

Asuncion (157). November. = Balansa 1755 a.

A thorny shrub 3 or 4 m. high, with numerous, small, coriaceous, shining leaves. Flowers small, a lurid purple, on long, thread-like peduncles, almost hidden among the leaves. Fruit a purple, pulpy berry, containing a flat bony seed, grooved on one side. In dense thickets.

Chiococca brachiata, R. and P., var. *acutifolia*, Müll. Arg. in Mart.

Fl. Bras., vi, pt. 5, 53.

C. racemosa, H. B. K., not L.

Asuncion (657). April. = Balansa 1757.

A small unarmed shrub, 6-9 dm. in height, with glabrous, shining leaves, common in thickets. Flowers small, numerous, greenish, in axillary clusters. Fruit a light purple-colored berry with 2 flat seeds.

Coffea Arabica, L., Sp. Pl., 172.

Asuncion (212). Fruit December.

The coffee is cultivated to a very limited extent in Paraguay. For some reason it does not succeed well in that country. I am inclined to think that this is owing to the excessive humidity of the climate and the variation of the annual temperature. At any rate, I saw but very few attempts made at its culture, and the plants looked unhealthy, the leaves drooping and showing yellow spots as if attacked by a fungoid disease. Such berries as I saw ripened appeared inferior in size and, I was told, were of inferior quality. Probably if the right localities are chosen, and intelligent culture given, the coffee might do very well in Paraguay. As maté, however, is the favorite beverage, the people have little inducement to engage in coffee-raising.

Psychotria alba, R. and P., Fl. Per., ii, 58, t. 205, f. a.

Pilcomayo River (878 and 1059); Caballero (606). January-June. = Balansa 1736.

This shrub and no. 877 (*Psychotria crocea*) grew side by side, and so much resembled each other that at first I mistook them for the same thing, but a close examination shows that they are different species. This has white flowers, while those of 877 are light yellow. The branches green, in the other dark red. The persistent

disk on the summit of the fruit here is white, in that red. The fruit in this case is marked with 10-12 ribs, while in that there are 5-8 ribs.

Psychotria crocea, Sw., Prod., 44.

Between Villa Rica and Escoba (501); Pilcomayo River (877).
= Balansa 1738 a. January.

This is apparently not *Palicourea crocea*, Schlecht., Linnæa, xxviii, 525.

Psychotrophum, P. Br. Hist. Jam., 160, is undoubtedly an older name for the genus *Psychotria*, but we are retaining *Psychotria*, because we are uncertain about *Myrstiphyllum*, P. Br., l. c., 152, which Dr. Kuntze says is also an equivalent, and has 8 pages priority of place in Browne's work.—N. L. B.

Geophila violæfolia, D.C., Prod., iv, 537.

Near Pirayu (661). April.

A small trailing, somewhat succulent plant, growing in deep woods, the stems rooting at the nodes. Leaves opposite, entire, glabrous, cordate-ovate, acute or obtuse at the apex, the rounded basal lobes divergent, 3-6 cm. long, 2½-5 cm. wide, on petioles 3-10 cm. long. Found only in fruit. Flowers said by DeCandolle to be white, 3-7 or more in clusters at the end of an axillary peduncle about as long as the petioles. Fruit an oval, pulpy, purplish-black drupe, crowned with the persistent calyx, containing 2 coffee-shaped, bouy seeds.

Geophila herbacea (L.), Morong.

Psychotria herbacea, Sp. Pl., Ed. 2, 245.

Geophila reniformis, C. and S., Linnæa, 1829, p. 137.

Near Pirayu (669). April.

This species, found at the same time and place with no. 661, differs from that in having much more slender stems, smaller leaves, 2-3 cm. long and about as wide, the lobes smaller and approximate, shorter petioles and peduncles, fewer flowers (1-3), and scarlet drupes. Not at all succulent. Both species have 1 or 2 lines of short shaggy hairs on the petioles.

Spermacoce tenuiflor, L., Sp. Pl., 102.

Pilcomayo River (1057). June.

Borreria centranthoides, C. and S., *Linnaea*, III, 328.

Between Villa Rica and Escoba (610). January. = Balansa 1743 a.

A stiff square-stemmed plant 3-6 dm. high, with opposite or fascicled narrowly-elliptical leaves, which are from 2 to 4 cm. long and 5-12 mm. broad. Flowers small, white, in long, naked, compound, terminal cymes. Young branches and calyx more or less downy. Inflorescence 5 or 6 times trichotomous. Stipules with a short sheath and 5-7 setæ.

Borreria latifolia (Aubl.), Schum. in *Mart. Fl. Bras.*, vi, pt. 6, 61.

Caballero (605). January.

Differs from the preceding species in having opposite, broad lanceolate, acuminate leaves, 4-7 cm. long and $1\frac{1}{2}$ -3 cm. wide. Flowers white, in small axillary verticils along the stem for nearly its whole length. Stipules with 10 to 15 setæ. As I found it, it was not creeping, as in ordinary cases, but a weak-stemmed plant growing 2-2 $\frac{1}{2}$ m. high, and sustaining itself by leaning against shrubs in thickets.

Borreria ocymoides, D.C., *Prod.*, iv, 544.

Pilcomayo River (973). March.

This species has delicate stems, mostly prostrate, 2 to 6 dm. long. Leaves linear or linear-lanceolate, often cuspidate, $1\frac{1}{2}$ -3 $\frac{1}{2}$ cm. long, 2-6 mm. wide, revolute, 1-nerved, the nerve white and prominent beneath. Flowers white, minute, terminal or in small clusters in opposite leaf axils appearing whorled. Stipules with 6-9 rather long setæ.

Borreria Poaya, D.C., *Prod.*, iv, 549.

Caballero (611). January. = Balansa 1765.

Stems 2-3 dm. high, ascending, often much branched, glabrous or pubescent on the upper branches, or sometimes all rough. Leaves 2-4 cm. long and 5-20 mm. broad, very acute at the apex, sloping into a very short petiole. Flowers in terminal, somewhat globular clusters, or of several terminal verticils, with a pair of reflexed, foliaceous bracts beneath them; corolla purplish, 7-12 mm. long. Stipules with 1-3 rather large setæ.

Borreria tenera, D.C., Prod., iv, 543.

Asuncion (67); between Trinidad and Lymphio (727). November-May.

Stems nearly terete below, tetragonous above, 15-25 cm. high, much branched from the base, often ascending, with long tough roots. Leaves sub-setaceous, 1-nerved, often fascicled, sharply callous-tipped. Flowers white or often pale purple, in axillary or terminal verticils, the corolla about 5 mm. long. Stipular setæ 3-7, much longer than the sheath. Leaves about the length of the internodes. This rough-looking little plant is found growing along roadsides or on grassy knolls, in hard, dry or clayey soil, and its numerous verticils of flowers have a burr-like aspect.

Borreria verticillata, Meyer, Prim. Fl. Esseq., 83.

Asuncion (66 and 106). November.

A very variable species. Forms growing in dry soil or among grass, with a ligneous root and very thick, hard, knot-like, numerous stems, spreading on the ground or ascending 10-15 cm., with crowded leaves. Others are erect, 40-50 cm. high, with nodes 3-6 cm. long. Leaves verticillate, linear or linear-lanceolate, 1-3 cm. long, 2-5 mm. broad, revolute and retrorsely scabrous on the margins, acute at both ends; petiole scarcely any. Stems more or less pilose or scabrous on the angles. Flowers small, white, in dense, globular verticils, which are terminal or axillary and 5-10 mm. in diameter. Stipular setæ 4-7 as long as or longer than the sheaths. The prostrate forms of this species might be mistaken for no. 727, but the plant is much coarser, with larger leaves, thicker stems and larger flower verticils.

Richardia Brasiliensis, Gomez, Mem. Ipecac., 31, t. 2.

Asuncion (55). November.

A rough, prostrate plant, spreading 15 or 20 cm. on the ground, dichotomously much branched. Stems tetragonous, hispid or villous. Leaves obovate or sometimes oblong-lanceolate, 1-3 cm. long, 5-10 mm. broad, glabrous or scabrous above, ciliate, acute, attenuated into a short petiole. Stipular setæ 3-5, hispid, usually shorter than the sheath. Differs principally from *Borriera* in having terminal verticils of flowers seated upon large involucre bracts. In this case the bracts are 2, sessile, oblong, rounded at the apex, 2 cm. long, 1 cm. broad. Flowers minute, white. Calyx 6-lobed, the

lobes ciliate, persistent, half as long as the corolla. Lobes of corolla 6, acute, hairy on the lower side. Style 3-divided, with 3 capitate stigmas. Fruit muricate or hispid, 3-carpelled, 3-celled, 1 seed in each cell. Seeds pitted.

Richardia grandiflora (C. and S.), Britton.

Richardsonia grandiflora, C. and S., *Linnaea*, iii, 351.

Between Escoba and Caballero (422 and 413). January.

Differs from the preceding species in having stems setosely hispid, linear leaves 3-4 cm. long, very large heads, 2-4 acuminate, lanceolate involucrel bracts 2 cm. long, many acuminate hispidly ciliate floral bracts, and purplish or rose-colored flowers with a corolla 10-13 mm. long. The seeds are covered with pellucid, glandular tubercles. This plant grows in red, clayey soil on the railroad track between Escoba and Caballero, its fine large flowers forming a great contrast to the rough stems and bracts.

CALYCEREÆ.

Acicarpa tribuloides, Juss., *Ann. Mus.*, ii, 348, t. 58, f. 1.

Buenos Aires and Asuncion (2).

Common about Buenos Aires, and covering all the waste grounds in and around Asuncion. Its spiny leaves and burrs make it a great nuisance. It continues to flower and fruit all the season from early October to May.

COMPOSITÆ.

Pacourina edulis, Aubl., *Pl. Guian.*, ii, 800, p. 316.

Asuncion (224 a). December.

The main difference between this and the following form lies in the absence of lobes and spines on the leaves and scales. Leaves oblong-spatulate or lanceolate, 10-25 cm. along, sparsely spiny-dentate.

Pacourina edulis, Aubl., var. *spinoalissima*, Britton, n. var.

Similar to *P. edulis*, Aubl., but with elongated, lanceolate-oval leaves, often a foot or more long, which are deeply lacinate into triangular-lanceolate, spine-pointed lobes; outer bracts of the involucre tipped with short spines.

Asuncion (224). December. Same as Balansa's 862. This appears to be different from *P. cirsiifolia*, H. B. K.—N. L. B.

The most striking among the herbaceous Composites growing at Asuncion. It occurs abundantly in wet grounds along the river-side. A stout succulent stem 9-12 dm. high, the upper portion curling over gracefully. On the upper side is a row of 10 or more conspicuous heads nearly 3 cm. in diameter, the involucre scales green in the middle and white membranous on the edges, giving them the appearance of a string of rosettes. When open the flowers are very handsome, of a bright rose tint, the corolla lobes curved, the staminate tube and styles long exerted. Leaves lanceolate, often 3 dm. long, deeply cut into triangular, strongly spine-pointed lobes. Outer scales of the involucre also tipped with short spines. Leaves pellucid-punctate. Achenia ornamented with rows of glistening glands.

Vernonia Chamædrys, Less, *Linnaea*, 1829, p. 259.

Luque (339); Villa Rica (495). December-January.

Vernonia flexuosa, Sims, *Bot. Mag.*, t. 2477.

Caballero (467). January.

Vernonia graminifolia, Gard. in Hook. *Lond. Jour. Bot.*, vi, 421.

Pilcomayo River (1509). January.

Vernonia incana, Less, *Linnaea*, 1829, p. 277.

Trinidad (275). December. = Balansa 771.

Vernonia Platensis, Less, *Linnaea*, 1829, p. 312.

Luque (305); Caballero (591). December-January.

Vernonia scorpioides, Pers., *Syn.*, ii, 404.

Asuncion (767); between Villa Rica and Escoba (489). January-July.

Vernonia tricholepis, D.C., *Prod.*, v, 54?

Asuncion (53 and 53 a). November. 53 = Balansa 1128. 53 a = Gardner 3787, which number is quoted under *V. tricholepis* by Mr. Baker in *Mart. Fl. Bras.*, vi, pt. 2, 70.

Vernonia Tweediana, Baker, *Mart. Fl. Bras.*, vi, pt. 2, 99.

Asuncion (174 and 653). November-April.

Vernonia glabrata, Less, *Linnaea*, 1829, p. 294.

Asuncion (165); Luque (590). November-January.

The Vernonias are very numerous in Paraguay, all of them bearing heads of showy, purple flowers. I collected 9 species, only a small part of the number occurring in the country. Perhaps the most striking of them is *V. glabrata* (nos 165, 590), with many sessile heads 2 cm. in diameter, growing by fence rows and roadsides in the vicinity of Asuncion.

Another with ample leaves, rugose above and velvety hairy beneath, numerous crowded flower-heads, and strong stems over 3 m. in height, *V. Tweediana* (nos. 174, 653), abounded in waste grounds around Asuncion.

V. incana (no. 275) and *V. graminifolia* (no. 1509), both with long narrow, linear leaves, the panicles of flowers on long naked peduncles, are exceedingly graceful and ornamental species.

V. Chamædryas (nos. 339, 495) has a close, thyrus-like panicle of bright purple flowers. Leaves small, black or olive-green and shining on the upper surface, and white woolly beneath. Stem shrubbyish, 1-1½ m. in height.

***Elephantopus angustifolius*, Sw., Prod., 115.**

Asuncion (162 a); Luque (313); Pilcomayo River (1510).

***Elephantopus tomentosus*, L., Sp. Pl., 814.**

E. scaber, v. *tomentosus*, Schultz Bip., *Linnaea*, xx, 516.

Asuncion (258). December.

The two species of *Elephantopus* here noted are very different. *E. angustifolius* has its flowers in terminal wand-like spikes, sometimes 3½ dm. in length, the leaves oblanceolate, 1½-3 dm. long, the glomerules subtended by a single small ovate bract. *E. tomentosus* has its flowers in large terminal paniced corymbs, the leaves obovate, 10-13 cm. long, the glomerules much smaller, subtended by 3 large foliaceous bracts. Both occur in old fields and open grounds, the former very common in the vicinity of Asuncion and on the Pilcomayo River.

***Ademostemma triangulare*, D.C., Prod., v, 113.**

Trinidad (270); Pilcomayo River (1003). December-April.
= Balansa 865.

Noticeable for its lowest leaves, which are broad hastate-deltoid, sometimes 15 cm. long and as broad, and its corymbs of heads, which appear to be nearly all styles and stigmas, having 2 or 3 rows of small, appressed scales, numerous green tubular corollas,

a pappus of 5 minute red scales, and long exserted, pure white 12-divided styles, with clavate stigmas.

Stevia satureiæfolia (Lam.), Sch. Bip., *Linnæa*, xxv, 291.

Asuncion (107 a). November.

Eupatorium bartsiæfolium, D.C., *Prod.*, v, 147.

Asuncion (1512). = Balansa 952.

This differs from all the following species in its low stems (3-6 dm. high), its crowded, deltoid-ovate leaves only 2-3½ cm. long, scabrous above, with large ciliate, retrorsely revolute teeth, and heads 8 or 9 mm. long, scales in 3 rows, with a pubescent, slightly recurved tip. Achenia black, hispid on the angles. Whole plant glandular and fuscous-hispid.

Eupatorium betonicæforme (D.C.), Baker, *Mart. Fl. Bras.*, vi, pt. 2, 362.

Pilcomayo River (1511). April.

A coarse plant with scabrous, branching stems 6-9 dm. high. Leaves petiolate, opposite, cuneate, cordate or hastate at the base, more or less dentate. Heads small, shortly pedicellate, in dense corymbs 3 or 4 cm. long and broad. 30-40 flowers in the head.

Eupatorium Candolleianum, H. and A., *Comp. Bot. Mag.*, ii, 243.

Gran Chaco near Asuncion (366); Caballero (465). December-January.

These numbers were distributed by mistake as *E. steviæfolium*, D.C., some of which may be mixed with them.

A more delicate species, 4½-5 dm. high, with lanceolate, petioled, more or less serrate leaves, with small corymbs of flowers on spreading terminal branches. Styles much exserted, giving a feathery appearance to the head. Flowers reddish-purple, 30-40 in the head.

Eupatorium Christleanum, Baker, *Mart. Fl. Bras.*, vi, pt. 2, 298.

Asuncion (70). November.

Very glabrous, suffruticose, 6-12 dm. high. Leaves lanceolate, acuminate, cuneate at base, petioled, 3-nerved, entire or rarely few-toothed, the largest about 10 cm. long and 3 cm. wide. Flowers light blue, in small corymbs. Heads almost cylindrical, 6-8 mm. long, 9-10 flowered, with 4-5 rows of appressed, ciliate involucrel scales.

Eupatorium conyzoides, Vahl., Symb., iii, 96.

Asuncion (684). April. = Balansa 940 a.

Stems downy. Branches opposite, divaricate, nearly at right angles to the stem. Leaves petioled, unequally serrate or entire, triangular, acuminate, cuneate at base. Flowers blue. Corymbs large, di-trichotomous. Heads 15-20 flowered, 9 or 10 mm. long. Scales 3-5 nerved, appressed. Achenia scabrous. This occurs occasionally on the Florida coast (*Curtiss*).

Eupatorium densiflorum, Morong, n. sp.

Stems 6-12 dm. high, and with the branches striate and pubescent. Branches numerous, opposite, ascending at a sharp angle; internodes 1½-3 cm. long. Leaves numerous, opposite, lanceolate or linear-lanceolate, entire or sparsely and remotely serrulate, revolute, obtusely pointed at the apex, sloping at base into a short petiole, 3-nerved, glabrous above, pubescent and black glandular dotted beneath, the largest 10 cm. long and 2 cm. wide. Densely flowered. Flowers blue, the corymbs numerous on long terminal branches, the whole flower-bearing portion 20-25 cm. long. Heads scarcely campanulate, 7 or 8 mm. long, on peduncles 7-15 mm. in length. Involucral scales linear, acute, glabrous, 3-nerved, appressed, in 4 or 5 rows, the innermost 5-7 mm. long, a little surpassed by the white pappus. About 20-flowered. Achenia black, slightly pubescent on the angles.

Near *E. ivæfolium*, but differing from that species in the density of the inflorescence and leaves, the pubescence, and especially in the involucral scales.

Found at the Recoleta, near Asuncion (627). March.

Eupatorium hecatanthum (D.C.), Baker, l. c., 365.

Asuncion (280 b). December.

Easily distinguished by the red woolly appendages at the tips of the scales. Heads 50-80 flowered. Leaves long-petioled, broad cordate-hastate, deltoid in outline, crenate-dentate, 6-15 cm. long.

Eupatorium ivæfolium, L., Amœn. Acad., v, 405.

Trinidad (274); Pilcomayo River (1012). = Balansa 939. December-April.

Does not seem to differ from the forms of this species occurring in our Southern States.

Eupatorium læve, D.C., Prod., v, 169.

Asuncion (637). April. = Balansa 918.

The specimens obtained were from the garden of Herr Mangels, for many years German Consul at Asuncion. It has been exten-

sively cultivated in Paraguay for the manufacture of indigo, of which it makes an excellent quality, but is now seldom seen, except in the wild state. A shrub 12-15 dm. high, with white striate stem and large ovate-lanceolate, serrate leaves, the whole plant very smooth. Pappus tawny. Heads small, 15-20 flowered.

Eupatorium laevigatum, Lam., Encyc., ii, 408.

Pilcomayo River (951). March.

Stem 12-18 dm. high, viscous, much branched. Flowers blue, the corymbs with numerous crowded heads, on widely spreading terminal branches 25-35 cm. long. Heads cylindrical, 8-10 mm. long, with 4 or 5 rows of 3-5 nerved scales, about 20-flowered. Achenia black, glabrous. Leaves petioled, lanceolate or ovate-lanceolate, 4-12 cm. long, 2-5 cm. wide, acuminate, more or less serrate above the sloping base.

Some of this was probably distributed as *E. conyzoides*.

Eupatorium macrocephalum (D.C.), Less., Linnæa, 1830, p. 836.

Caballero (463); Pilcomayo River (1513). January-April.

The long naked peduncles, large heads, purplish involucral scales, purple flowers and long plumose purple styles of this plant bear a striking resemblance to *Liatris* when growing on the campo. Heads often 2 cm. high and as broad when in full flower, 75-100 flowered. Stems very glandular hairy or bristly, the hairs nodose and translucent.

Eupatorium macrophyllum, L., Sp. Pl., Ed. 2, 1175.

Asuncion (280 and 280 a). December.

This was one of the "stickiest" plants I ever encountered, the stems and leaves being covered with glandular hairs, and adhering so forcibly to the drying-paper that it required a daily change and nearly a month's drying to make herbarium specimens. Flowers very numerous, a bright purple, with long protruding yellow styles, giving them quite a variegated appearance. Heads 50-60 flowered. Leaves large, on long petioles, cordate-ovate, crenate.

Eupatorium multicrenulatum, Schultz Bip.; Baker, l. c., 335.

Villa Rica (482); Asuncion (632), January-March.

Suffruticose, like many other species growing in Paraguay. Stems from 1½ to 2 m. high, hoary with white down all over, with

large branching corymbs of small purple heads. Hairs on the peduncles and pedicels glandular. Leaves lanceolate, minutely serrulate, the largest 12-15 cm. long, 2-3 cm. broad. A striking plant upon the open campo where it grows.

Eupatorium pallescens, D.C., *Prod.*, i, 154.

E. glomeratum, D.C., l. c.

Asuncion (630 and 683); Pilcomayo River (957). March-April.

Stems stout, pubescent, striate, growing on the Pilcomayo to a height of 3 m. Leaves deltoid-ovate, 3-nerved, pubescent, serrate above the sloping base, the largest 16 or 18 cm. long, 5 cm. or more wide. Petiole alate above. Corymbs dense, the flowers massed glomerately. Flowers white. Heads 5 mm. long, 12-15 flowered; scales in 2 or 3 rows, downy, rounded, somewhat spreading, nerved. Achenia glabrous or sometimes minutely downy.

Eupatorium steviæfolium, D.C., *Prod.*, v, 158.

Gran Chaco near Asuncion (366 a). December.

Eupatorium urticæfolium, L., *f. Supp.*, 354.

Asuncion (774). May. = Balansa 936.

Stems 6-12 dm. high, covered with long, spreading, translucent, nodose hairs. Leaves ovate, cuneate at base, obtusely pointed, incised-dentate, 2½-7 cm. long, on petioles 6-25 mm. long. Flowers blue. Heads 20-25 flowered, in small corymbs on long, spreading branches. Common in old fields.

Eupatorium vernoniopsis, Schultz Bip.; Baker, l. c., 334.

Asuncion (107 and 109); Luque (589). = Balansa 784. November-January.

Stems striate, grayish-pubescent, often much branched at the top, sometimes simple, 9-18 dm. high. Flowers blue. Heads small, 8-10 flowered. Leaves opposite below, subopposite or alternate above, 2-5 cm. long, 1-3 cm. broad, crenate or serrate, pubescent on both sides, 3-nerved, the nerves prominent beneath, the teeth callous tipped.

Willoughbya cordifolia (L.), Kuntze, *Rev. Gen. Pl.*, 372.

Gran Chaco near Lympio (182 a and 182½). May.

This vine differs from the more common *W. scandens* in having the stems and leaves densely clothed with a grayish pubescence,

denser and larger clusters of flowers, larger heads (7-10 mm. long), and tawny pappus. The flowers are very fragrant, and attractive to insects, which were hovering over the blossoms in great numbers when collected.

Willoughbya scandens (L.), Kuntze, Rev. Gen. Pl., 371.

Asuncion (182); Pilcomayo River (1082). November-January.

Solidago polyglossa, D.C., Prod., v, 10.

Asuncion (111); Pilcomayo River (1080).

The only golden-rod which I found in Paraguay. Very abundant in all the waste grounds around Asuncion, and flowering the entire season from October to May. Of this genus I believe that not more than one or two species at the most are known to occur in all that part of South America. This plant is esteemed as a vulnerary by the common people, and hence was named *S. vulneraria* by Martius.

Aster subtropicus, Morong, n. sp.

A. divaricatus, T. and G., var. *graminifolius*, Baker in Mart. Fl. Bras., vi, pt. 3, 22. *A. exilis*, Ell., var. *australis*, Asa Gray, Syn. Fl., i, pt. 2, 203.

As found in Paraguay the plant which is commonly referred to this form seems sufficiently distinct from *A. divaricatus* to merit specific designation. It grows from 4 to 9 dm. high, with a stout, glabrous, often much branched stem. Leaves glabrous, lanceolate or linear-lanceolate, reduced on the branchlets to subulate bracts, entire or sparsely serrulate, the largest 6-8 cm. long and 5-8 mm. wide. The heads are usually much larger than in our North American plant, being often 8-10 mm. long, containing 50 or more flowers. Involucral scales in 4 or 5 rows, a little over 1 mm. in breadth, obscurely 1-3 nerved, rather abruptly acute, the innermost 7-8 mm. long, with green or rosy tips. Ray flowers small, pale blue, recurved, very fugacious. Disk flowers thread-like, scarcely surpassing the pappus. The pappus somewhat coarse and more copious than in *A. divaricatus*. Achenia pubescent.

This aster is much more stocky, the branches more massed, leaves and flowers more numerous than in the next species, of which it has been called a variety. It grows on the banks of fresh water and on uplands far inland.

Near Asuncion (620). March.

Aster exilis, Ell., Bot. S. Car. and Georgia, ii, 344.

Pilcomayo River (1081). February.

Growing in saline soil like the plant of this country. Much of the region along the Pilcomayo abounds in salt pools, and the

streams running from the Cordilleras to the Paraguay are brackish or strongly impregnated with salt.

Erigeron Bonariense, L., Sp. Pl., 863.

Gran Chaco near Asuncion (359). December-January.

It is difficult to see any difference between this species and a *Conyza*, as there is really no ligule on the ray flowers, or it is so minute as to be inappreciable. A tall coarse weed 12-15 dm. high, with a very large head of branches, some 5-7 dm. long, springing from nearly the same point. Heads small, apparently discoid, the flowers all threadlike, tubular and fertile. Flowers and pappus tawny. Stem stout, striate, rough on the striæ, pubescent among the inflorescence. Leaves linear, glabrous, serrulate, 6-12 cm. long. Common in the lowlands on the western side of the Paraguay.

Erigeron linifolius, Willd., Sp. Pl., iii, 1955.

Conyza plebeja, Phil. in Herb. Kew.

Conyza ambigua, D.C., Prod., v, 381.

La Plata, Arg. Republic (22); Asuncion (322 and 342). October-December.

Stems 3-9 dm high, hirsute, branching. Flowers white. Ray flowers nearly or quite without ligules. Pappus tawny. Peduncles and scales hirsute. Leaves linear, sparsely serrate, 5-7 cm. long, 1 mm. wide. Differs from the preceding species also in the lower, more stragglingly branched stems, and larger heads.

Conyza Chilensis, Spreng., Nov. Prov., 1818, p. 14.

Luque (343); Asuncion (628); Pilcomayo River (1514). December-January.

Heads much larger than in either of the 2 preceding species, 1-1½ cm. high, 1 cm. broad. Stems striate, and with the leaves and peduncles closely white hirsute, 7-10 dm. high. Leaves oblong-linear or obovate, more or less serrate and scabrous on both sides, 4-8 cm. long and 5 mm. to 2½ cm. wide, the lowest usually obovate, the uppermost linear. Ray flowers without ligules. Heads in small terminal corymbs, 20 or less in number.

Conyza triplinervia, Less., Linnaea, 1831, p. 137.

Villa Rica (497). January.

A suffruticose, glabrous species, 3-6 dm. high. Heads small, in large terminal paniced corymbs. Stems and leaves more or less

viscous. Cauline leaves ovate-oblong, sharply serrate, 3-nerved, petiolate, 6–12 cm. long.

Baccharis cognata, D.C., *Prod.*, v, 413.

Villa Morra near Asuncion (775). May.

Suffruticose, about 6 dm. high, glabrous. Heads small, clustered on short lateral branches, 12–25 flowered. Flowers white. Leaves obovate-cuneate, 1–2½ cm. long, 8–20 mm. broad, rigid, coarsely toothed, glabrous.

Baccharis dracunculifolia, D.C., l. c., 421.

Luque (318). December.

A shrub sometimes reaching a height of 2 m. or more. Bushy branched. Leaves numerous, sessile, linear-lanceolate, sparsely serrate, 2–3 cm. long, 3–5 mm. or more broad. Flowers thread-like, greenish in hue. Heads crowded, numerous, on short downy peduncles. Pubescent among the inflorescence.

Baccharis genistilloides, Pers., *Syn.*, ii, 425.

Caballero (437); between Asuncion and San Lorenzo (723). January.

A curious plant occurring on the open campo. It has the stems broadly or narrowly 2–3 winged, and the leaves reduced to scales at the joints of the wings. Flowers spiked in interrupted verticils. The leafless-looking stems and branches lend a gaunt, weird aspect to the plant.

Baccharis juncea, Desf., *Cat. Hort. Paris*, 1829, p. 183?

Pilcomayo River (1516). March.

Baccharis nana, D. Don., *Mart. Fl. Bras.*, vi, pt. 3, 56.

Asuncion (647). April.

A slender species, shrubby, 3–6 dm. high, scurfy above. Leaves linear-oblong, 1–2½ cm. long, 2–3 mm. wide, sparsely serrate above. Heads about 5 mm. high, pedicellate, axillary, scattered; scales 4 or 5 rows, obtuse or abruptly acute, ciliolate, membranous on the margins. A strict dry-looking plant, occurring in open grounds and old fields.

Baccharis notoserghia, Gris., Symb. Flor. Arg., 183.

Pilcomayo River (1009). April.

Called by our Guarani peons Escoba de los Indios, or Indian broom, because it serves admirably for making small brooms or brushes. A dry, sage-like plant, about 6 dm. high, very branching and bushy. Shrubby, with a terete, slate-colored stem. Leaves square, sharp-angled phyllodia, without blades. Corolla very small, the tube green below and whitish above, with minute lobes, buried in the abundant silky-capillary pappus. Very common on the campos at the Pilcomayo Falls.

Baccharis oxyodonta, D.C., l. c., 404.

B. triplinervia, D.C., l. c.

Asuncion (135); Pilcomayo River (1515). November-May.

6-9 dm. high, angular, glabrous or somewhat pubescent among the inflorescence, both stem and leaves very viscous. Leaves alternate, long-petioled, 3-nerved, acute at either end, entire or sparsely serrulate, 4-10 cm. long, 6-15 mm. broad, black glandular spotted on both sides. Heads about 6 mm. long, in small terminal corymbs; scales in about 3 rows, acute, 1-nerved; pappus tawny. This plant grows in low wettish grounds around Asuncion, and also occurs in the great laguna on the Pilcomayo River.

Baccharis Platensis, Spreng., Syst., iii, 165.

Pilcomayo River (1022). May.

Stem shrubby, strict, branching, glabrous below, pubescent above, striate, angular, about 9 dm. high. Leaves 5-10 cm. long, 7 mm. to 2 cm. wide, opposite, oblanceolate, puberulent, serrate above, 1-nerved or the lowest 3-nerved, abruptly acute at the apex and sloping at the base into a short petiole. Heads not quite 1 cm. high, glomerate at the ends of the branches and projecting divaricately; scales in 4 or 5 rows, obtuse, ciliolate. Common on the campo at the Pilcomayo Falls.

Baccharis sessiliflora, Vahl., Symb., iii, 97.

Luque (1517).

Baccharis subopposita, D.C., l. c., 413.

Asuncion (647 a); Pilcomayo River (1518 and 941). February-April.

It is possible that these numbers represent different species. The

leaves of 1518 are nearly entire, many of them subopposite; those of 941 are sharply dentate and but few of them subopposite; while the leaves of 647 a are opposite or alternate, entire or 1-5' dentate on each side, the upper ones linear. The plants are all much branched, the branches rising at a sharp angle. Stem branches and leaves covered with a granular scurf, or in 1518 lepidote. Heads sessile or pedicelled, 15-20 flowered; scales somewhat spreading, subacute or obtuse, ciliolate, white membranous on the margins.

Baccharis trinervis, Pers., Syn., ii, 423.

Pilcomayo River (1011). April.

One of the most common species in South America, found in many parts of Brazil, and spreading from Ecuador across the high lands of Bolivia, through Paraguay to the Argentine Republic. The leaves are large, lanceolate, entire, glabrous, shortly petioled and strongly 3-nerved.

Pluchea Quitoc, D.C., l. c., 450.

Asuncion (619). March.

Flowers pale purple, in large terminal cymes, exhaling an agreeable aromatic odor. Stems about 6 dm. high, strict, winged by the decurrent leaves. Common in marshy grounds.

Tessaria integrifolia, R. and P., Syst., 213.

T. mucronata, D.C., Prod., v, 456.

Near Asuncion (383). January.

A small tree 5-8 m. in height, occurring in clumps in the lowlands of the Chaco, opposite Asuncion. As described in Benth. and Hook. Gen. Pl., the flower of *Tessaria* does not accord precisely with my specimens. All the outer flowers of the head are abortive. The central flower only is perfect, large, solitary, surrounded by setaceous chaff. All are apparently destitute of pappus. Achenium somewhat 4-gonous and top-shaped. Corolla with 5 large, purple, mucronate lobes, which are united around the staminate column, enclosing them and the style. Style single, just protruding through the opening of the corolla and ending in a club-shaped stigmatic tip. Branches brownish in color. Bark smooth. Leaves oblanceolate, canescent on both sides.

The gentleman on whose farm these trees grow told me that his cattle were extravagantly fond of the leaves and young branches, and made desperate efforts to pull them down.

Pterocaulon angustifolium, D.C., l. c., 454.

Luque (314). December. = Balansa 834 a.

According to Benth. and Hook. Gen. Pl., only 13 species of *Pterocaulon* are known, 7 of which are Australian and the other 6 inhabitants of North and South America. Four of these are included in this list of Paraguay plants. The most interesting of them, perhaps, is no. 192, *P. virgatum*, D.C. This grows on the open campo both in Central Paraguay and on the Pilcomayo. The heads are in long, narrow, terminal spikes 10-25 cm. long, or in interrupted verticils, on long, nearly naked peduncles. Leaves few, linear, 5-10 cm. in length, dark green on the upper surface, revolute and white woolly beneath, decurrent in long green wings upon the stem. Between the wings, the stem is white woolly like the under surface of the leaves.

By the side of this on the campo are two other species, *P. capitatum* (no. 958 b) and *P. alopecuroideum* (no. 958 a), the latter with elliptical leaves about 2½ cm. long, and densely white woolly below, the heads in short, compact, terminal spikes. All the species are very peculiar in appearance, and at once attract attention by their forlorn, starved looks among the luxuriant growths of South America.

Pterocaulon capitatum (H. and A.), Britton.

Pluchea capitata, H. and A.

Pilcomayo River (958 b). March. = Balansa 838.

Pterocaulon virgatum (L.), D.C., l. c., 454.

Pilcomayo River (958); Asunción (192).

Pterocaulon alopecuroideum (Sw.), D.C., l. c.

Pilcomayo River (958 a). March.

Achyrocline satureoides (Lam.), D.C., Prod., vi, 220.

Gran Chaco near Asuncion (354). December.

While resembling *Gnaphalium* in general appearance, this genus is distinguished by its small heads, containing 5-8 flowers, and with 8-12 involucre scales, which close tightly over the flowers. The

species here noted has scattered leaves, the largest of which are 8 cm. long and $1\frac{1}{2}$ cm. broad. The heads are densely crowded in small terminal corymbs, of a glistening golden tint.

Gnaphalium cheiranthifolium, Lam., Encyc., ii, 752.

Trinidad (793). October.

Gnaphalium Indicum, L., Sp. Pl., Ed. 2, 1200.

Pilcomayo River (1519). January.

Gnaphalium purpureum, L., l. c.

Asuncion (32 and 32 a). October–November.

Gnaphalium spicatum, Lam., Encyc., ii, 757.

Caballero (602). January.

Of the species of *Gnaphalium* here noted, no. 793 is the most striking. It grows 4–9 dm. high, with a glandular, webby-haired stem, crowded, oblanceolate leaves 8–10 cm. long, and a densely crowded corymb of large heads. It reminded me in looks of an overgrown *Anaphalis margaritacea*. No. 32 is very common in open grounds both in Paraguay and the Argentine Republic. No. 602 is a slender, erect species, 3–6 dm. high, very silvery-white on the stem and leaves. Flowers in small clusters at the ends of nearly erect branches, the scales pale brown in tint

Acanthospermum hispidum, D.C., Prod., v, 522.

Asuncion (162). November.

We may well be thankful that of the 2 only known species (or 4 according to DeCandolle) of *Acanthospermum*, both of which are South American, but one (*A. xanthioides*) has found its way into our country. The sharp, 4-spined achenia, produced in great abundance, are very annoying. The bare-footed natives of Paraguay suffer very seriously from them sometimes, for wounds from thorns are dangerous things in a climate where even a scratch is liable to produce gangrene.

Ambrosia artemisiæfolia, L., Sp. Pl., 988.

Asuncion (133). November.

Xanthium spinosum, L., Sp. Pl., 987.

Asuncion (46). November.

Xanthium Canadense, Miller, Dict. Ed., 8.

Asuncion (807).

Enhydra Anagallis, Gard. in Hook. Lond. Jour. Bot., viii, 409.

Asuncion (79). November-February.

As none of this marsh-loving family are known in this country, readers of these notes may be interested to learn something about them. A succulent, spreading plant, growing abundantly in miry places along the borders of the Paraguay River at Asuncion, the stems hollow, rooting at the nodes, and sometimes running 3-6 dm. Flowers inconspicuous, in sessile, axillary heads, subtended by large foliaceous bracts. Involucral scales 4, large, whitish-green, often closing over the flowers so as to completely hide them. Ray flowers in 3 rows, white, pistillate, fertile, 3-toothed. Flowers of the disk perfect, the corolla greenish-white, the stamens and style exerted; stamens black; stigma small, feathery, not appendaged. Pappus none. Achenia smooth. Receptacle chaffy, the chaff large, very hairy and closely investing the flowers. As the native Paraguayans are great herb doctors, firmly persuaded that every known plant has its medicinal virtues, they prize a tea made by steeping the foliage of this plant as a remedy for various disorders of the bowels.

Eclipta alba (L.), Hassk., Pl. Jav. Rar., 528.

Asuncion (74). November.

Wulffia baccata (L. f.), Kuntze, Rev. Gen. Pl., 373.

Between Pirayu and Jaguaron (670). April.

A rough, hirsute plant, found in deep woods. The flowers are in small globular heads, the most conspicuous thing about them being the yellow paleæ, which are stiff, rough-pubescent, rising in a sharp point above the achenia when in fruit so as to present a bristly appearance to the head.

Blainvillea biaristata, D. C., Prod., v, 492.

Caballero (601). January. = Balansa 785.

This genus is distinguished by having heterogamous flowers, those of the ray obscurely or distinctly ligulate. Receptacle chaffy. Achenia subcompressed or triquetrous. Pappus of 2-3 bristles connate at the base. The species here noted is a weak plant 3-6 dm. high. Leaves opposite, ovate, acute at either end, sharply ser-

rate, hispidulous. Heads terminal or lateral, sessile or peduncled. Flowers pale yellow. Pappus of 2 very short, unequal bristles.

Stemmodontia brachycarpa (Baker), Morong.

Wedelia brachycarpa Baker in Mart. Fl. Bras., vi, pt. 3, 181.

Asuncion (52 and 819). October. = Balansa 855.

A rough hairy, branching plant 6-9 dm. high, with good sized, solitary heads on peduncles longer than the leaves. My specimens differ from the type in having petioles 1-8 mm. long. Leaves ovate or lanceolate, opposite, 3-nerved, serrate, $2\frac{1}{2}$ -5 cm. long. Rays 8, yellow. Pappus horny, cupulate. Achenia densely papillose. Abundant in the neighborhood of Asuncion, both in low grounds and uplands.

We are using the name *Stemmodontia*, Cass., for this genus, because *Wedelia*, Jacq. (1760), is a homonym of *Wedelia*, Læf. (1758), as pointed out by O. Kuntze.

Aspilia reflexa, Baker, l. c., 196.

Asuncion (1520). November. = Balansa 853.

Aspilia setosa, Griseb., Symb. Flor. Arg., 192.

Asuncion (464). January.

Aspilia silphioides, Baker, l. c., 197. Ex descr.

Asuncion (216). December.

The *Aspilia*s are hirsute plants, with large, solitary, yellow-flowered heads on long peduncles, reminding one in general of many of our smaller *Helianthi*. No. 1520 has showy flowers $2\frac{1}{2}$ cm. high, 4 cm. in diameter when expanded; rays 9-12; pappus of 2 scales. Stems 4-5 dm. high, branching, decumbent. Leaves sessile, serrate, hispidulous, 5-10 cm. long. No. 464 is smaller, only 3 dm. high, with a softer pubescence. Its leaves are entire or remotely serrulate, linear-lanceolate, sessile, somewhat obscurely 3-nerved, the largest 10-12 cm. long and $1\frac{1}{2}$ -2 cm. wide. Rays 10, golden-yellow, 2-toothed, about 2 cm. long. No. 216 has heads much smaller than in the preceding species, being only $1\frac{1}{2}$ cm. high, and $2\frac{1}{2}$ cm. when expanded. Leaves ovate-lanceolate, petioled, 3-nerved, serrate, the blades 6-10 cm. long, $1\frac{1}{2}$ - $3\frac{1}{2}$ cm. wide. Pappus of 1 or 2 long projecting bristles. Achenia 5 mm. long, flattish, 4-angled, hairy, narrowing to the base, with a smooth, shining, callous base, somewhat pitted or ridged on the faces. Whole plant very rough, growing to a height of 9 dm.

Echinocephalum latifolium, Gardn. in Hook. Lond. Jour. Bot., vii, 295.

Pilcomayo River (1054). June. = Balansa 857.

Somewhat like the *Wulffia* above described. Heads smaller, globular, with yellow rays, burr-like in aspect when in fruit, the paleæ pointed by a weak yellow spine. Leaves ovate or deltoid-ovate, opposite, dentate, the blades 5-8 cm. long, on petioles $1\frac{1}{2}$ - $2\frac{1}{2}$ cm. in length.

Verbesina Arnottii, Baker, l. c., 215.

Near Trinidad (845). November. = Gibert 1043.

A handsome plant, with large, solitary, sulphur-yellow heads, on naked peduncles 7-22 cm. long. Stems rough, often much branched, 3-6 dm. high. Leaves alternate, serrate, sessile, 3-5 cm. long, 6 mm. to 2 cm. broad. Rays about 12, often with a black line along the margins. Heads 2- $2\frac{1}{2}$ cm. high. Pappus of 3 awns. Receptacle with chaff longer than the achenia.

Verbesina encelioides (Cav.), A. Gray, Syn. Fl. N. A., i, pt. 2, 288.
Verbesina australis, Baker, l. c.

Asuncion (98). November.

Much branched, 3-6 dm. high, with many showy heads of deep yellow flowers. Heads 2 cm. high, $2\frac{1}{2}$ cm. in diameter when expanded. Leaves alternate or the lower opposite or subopposite, petioled, incisely serrate, acute or acuminate, cuneate or sometimes auriculate at base, white tomentose beneath, dark above, 3-8 cm. long, 2-4 cm. wide at base.

Verbesina sordescens, D.C., Prod., v, 613.

Asuncion (628 a). March. = Balansa 860 a.

Stems pubescent, much branched, 6-12 dm. high. Flowers smaller than in the preceding species, in large terminal corymbs, the peduncles 1-3 cm. long. Heads 1- $1\frac{1}{2}$ cm. high. Rays about 10, light yellow, striped. Leaves alternate or the lower opposite, sessile, dentate, the teeth callous, 7-15 cm. long, 2-4 cm. wide. In dry open grounds.

Spilanthes stolonifera, D.C., l. c., 621.

Asuncion (89). = Balansa 789 and 790.

This pretty little yellow-flowered composite, from 8 to 20 cm. in height, covers all the flats along the river-side near Asuncion. It

blossoms from November to April, and, in fact, even in July, in the depth of winter, specimens in flower could be obtained by careful search among the grass. Stems often creeping and rooting.

***Bidens pilosa*, L., Sp. Pl., 832.**

Asuncion (208); Pilcomayo River (959). November-March.

This plant fills the waste grounds and old fields around the city, and is as great a nuisance as our own Spanish Needles. I found specimens on the Pilcomayo River banks nearly 3 m. in height. This was distributed as *B. leucantha*, Willd.

***Isostigma Vailiana*, Britton, n. sp.**

Perennial, glabrous, stem prostrate or ascending, 10-15 cm. long. Leaves coriaceous, narrowly obovate at the base, laciniately 3-7 toothed at the apex, 4-7 cm. long, 8-12 mm. wide; peduncles erect, usually single and terminal, sometimes with an additional one or two lateral ones, 10-20 cm. high; heads discoid, 1-1½ cm. broad; involucre campanulate; scales in 3 rows, ovate, obtusish; flowers purple; corolla rather deeply 4-lobed; achenia flat, linear, slightly narrowed below, with two divergent, subulate awns at the apex; paleae linear, membranaceous, nearly as long as the achenia.

Limpio (734). May. Differs from other species of the genus in its 4-lobed corolla, all the described ones having 5-toothed corollas.

This rare plant, with large handsome dark purple heads, is named in honor of Miss Anna Murray Vail, by whose kindly assistance the work of arranging my Paraguay collection has been greatly facilitated.

***Calea clematidea*, Baker, l. c., 262.**

Asuncion (766). July. = Balansa 845.

***Calea uniflora*, Less., Linnæa, 1830, p. 159.**

Caballero (514). January. = Balansa 812.

This genus, which does not occur in the United States, is distinguished by having sagittate anthers, chaffy receptacles, and narrow, angled achenia crowned with a pappus of 5-20 chaff-like scales. No. 766 is very branching, the stems suffruticose, 4 or 5 dm. high. Leaves opposite, ovate, crenate-dentate, with truncate or subcordate base, pubescent, rugose beneath, the blades 3-4 cm. long, 1½-2 cm. wide, on short downy petioles. Flowers yellow in numerous small heads. Scales of the involucre broad, obtuse, appressed, imbricated, yellowish-green, striped, in 3 or 4 rows. Rays 4, with 3 or 4 teeth,

clawed. Pappus of many lanceolate, ciliate scales twice as long as the densely hispid achenia. No. 514 has much larger heads, solitary, on naked peduncles 8-20 cm. long. Rays numerous, 2 cm. long, light yellow, striped, entire or somewhat eroded at the tip. Pappus of about 15 linear-lanceolate, ciliate or lacerate scales, 5 mm. long, twice as long as the hispid achenia.

Both species grow in open grounds.

Porophyllum ruderale (Sw.), Cass. Dict., xliii, 56.

Porophyllum ellipticum, Cass., l. c.

Caballero (475). Asuncion (651). January-April.

Similar in most respects to no. 889, but the leaves are elliptical, long petioled, glaucous, 4-5 cm. long, 2 cm. wide or less. Achenia subulate, thickly clothed with short, upwardly pointing hairs. Pappus minutely hispid upwardly.

I have seen no description of the curious marginal markings of the leaves. They are apparently crenate, but in reality have a wavy outline caused by indentures or depressions, which have below them, sunk in the surface of the leaf, a brownish gland corresponding in curvature with the indenture.

Porophyllum lanceolatum, D.C., Prod., v, 649.

Pilcomayo River (889). January.

Stems rigid, striate, much branched, 6-9 dm. high. Leaves linear-lanceolate, alternate, entire, sessile or the lower shortly petioled, much attenuated at the base, 2½-5 cm. long, 5 mm. broad. Heads 2 cm. high, solitary, on peduncles 4-7 cm. long. Scales in a single series, linear, marked by 2 rows of dark sunken glands. These scales are so closely coalescent when growing as to appear but one tipped with 5 small lobes, but they separate in drying. Achenia linear, minutely striate, 8 mm. long. Scales, corollas, anthers, styles, and achenia all dark purple, causing the whole head to look almost black. An ill-smelling plant.

Tagetes glandulifera, Schrank., Pl. Rar. Monac., ii, t. 54.

Pirayu (671). = Balansa 912.

Certainly one of the most curiously constructed plants that I had the pleasure of examining in Paraguay. It grows in masses from 2 to 2½ m. high on the borders of woods. Leaves pinnate, the leaflets crenate, with yellow, often lunate glands beneath the crenatures, and 1-2 teeth in the marginal space between them, so that the

margin may be called compound, crenate and serrate. Stipules of 3-branched hairs, the same kind of hairs running up the petiole to some distance, and often dichotomously branching into 3 or 5 divisions. Involucre slender, cylindrical, 15 mm. long, consisting apparently of only one scale, the parts so completely coalescing that no lines of junction can be seen, leaving only 5 small lobes at the apex to mark their number. On this involucre are 5 rows of elongated yellow glands. The plant seems to have a great fancy for the number 5, there being often 5 branches to the stipular hairs, 5 lobes and 5 rows of glands on the involucre, 5 flowers in the head, 5 pappus scales, 5 corolla lobes, and 5 stamens.

Flowering from October to April.

Tagetes patula, L., Sp. Pl., 887.

Asuncion (81). November.

The French Marigold. This is not a native of Paraguay, but it sometimes escapes from gardens and grows spontaneously.

Soliva anthemidifolia, R. Br. Obs. Comp., 101.

La Plata, Arg. Republic (23). October.

Soliva sessilis, R. and P., Prod. Fl. Per., 113, t. 24.

La Plata, Arg. Republic (24).

Erechthites hieracifolia (L.), Raf. in D.C. Prod., vi, 294.

Asuncion (812); Pilcomayo River (1521).

The Fire-weed is found growing not only in its ordinary situations, but often in the streets, in the very heart of the city of Asuncion.

Erechthites valerianæfolia (Wolf.), D.C., l. c., 295.

Caballero (439). January.

With beautiful rosy-tinted, fleecy pappus. Leaves pinnate. Far handsomer than the rough fire-weed of our country.

Senecio Benthani, Griseb., Symb. Fl. Arg., 206.

Caballero (411); Pilcomayo River (848). November-February.

A very handsome flower. The heads large, rays crimson in color, reflexed in full flower, tips of the corolla lobes reddish, and the projecting staminate column and stigma yellow, thus giving a wonderful brilliancy of color to the flowers. It often climbs among trees upon which it leans to the height of 3 m. or more.

Senecio Hualtata, D.C., l. c., 417.

Buenos Aires (10). October.

Chaptalia integrifolia (Cass.), Baker in Mart. Fl. Bras., vi, pt. 3, 377.

Asuncion (710). May-July.

Chaptalia nutans (L.), Hemsl., Biol. Centr. Amer., Bot., ii, 255.

Asuncion (747). June.

This and no. 710 are quite similar and very interesting plants. They grow in the shade of trees on borders of forests and thickets. The large radical leaves, green above, white tomentose beneath, lie in a tuft upon the ground, and the scape produces a large, solitary flower at the summit. Ray flowers whitish, threadlike, fertile, with a long exerted style and double stigma. Disk flowers with a long filamentous tube, so slender as to appear like a bristle of the pappus. Pappus copious, soft, fleecy, white or bronze-tinted. No. 747 has lyrate-pinnatifid, more or less denticulate leaves, while those of 710 are entire or sparsely denticulate. The heads are at first nodding, and erect in fruit.

Trixis divaricata (H. B. K.), Spreng., Syst., iii, 501.

Asuncion (768). January-July.

Stems suffruticose, slender, sometimes growing to a height of 3 m., leaning on shrubs for support. Branches divaricate. Leaves alternate, narrow-lanceolate, entire, nearly glabrous above and white woolly beneath, auriculate, 2-15 cm. long, 5 mm. to 3 cm. wide. Inflorescence in very long (20-40 cm.), terminal, loose panicles. Heads 7-10 mm. high. Flowers all tubular, white. Scales in 2 series, the outer few and small, inner about 8, pubescent, ciliate. About 12 flowers in the heads. Pappus white.

Trixis ochroleuca (Cass.), H. and A. in Hook. Comp. Bot. Mag., i, 33.

Asuncion (842); Pilcomayo River (1010). November-April.
- Balansa 788.

Stem very slender, 20-30 cm. high. Leaves mostly in a radical tuft, obovate, rounded or acute at the apex, 4-12 cm. long, 1-3 cm. wide, unequally dentate, sloping into a short petiole. Cauline leaves much smaller, oblong, sessile, acute, sometimes cuspidate. Flowers in terminal corymbs, the branches erect, much divided, the ultimate peduncles 2-3 cm. long. Heads about 1 cm. high. Scales 1-seriate,

pubescent, with a purple, almost black tuft of hairs at the apex. Corolla white, bilabiate, the exterior lip much the largest and 3-toothed. The heads are numerous and very pretty.

Trixis verbasciformis, Less., *Linnaea*, 1830, p. 29.

Villa Rica (491). January. = Balansa 727.

A stout yellow-flowered, shrubbyish plant, 4 or 5 feet high, occurring in open grounds at Villa Rica. Flowers exceedingly numerous, very fragrant. Pappus copious, of deep copper-colored bristles. Lobes of the corolla of the same color. A showy, conspicuous species.

Jungia floribunda, Less., l. c., 38.

Luque (306). December.

A coarse plant 12-24 dm. high. Stem stout, pubescent. Leaves alternate, orbicular-cordate, deeply 5-8 lobed, palmately veined, nearly glabrous above, velvety pubescent beneath, on petioles 10-12 cm. long, the largest blades over 20 cm. long, and the same in breadth. Stipules large, roundish, broader than long, cordate or slightly lobed at base, dentate or angular. Flowers in large, spreading, many-forked panicles. Heads 8-12 mm. high, containing about 12 flowers. There are only about 5 small, pubescent involueral scales in one row. What seem to be an inner series of larger scales are really the outer row of paleæ, as they all envelop a flower. These are oblong, pubescent, 3 or more nerved, ciliate, 7 or 8 mm. in length. Each flower is closely invested by a rigid palea. Corolla white, bilabiate, the exterior lip larger, 3-toothed, the interior 2-parted. Achenia ribbed, slightly beaked, very slender, pubescent, 5 mm. long. Bristles of the pappus plumose.

Hypochæris lutea (Vell.), Britton.

Pentanthes lutea, Vell., *Flor. Flum.*, 350, viii, t. 91.

Hypochæris Brasiliensis, Griseb., *Symb. Flor. Arg.*, 217.

Asunción (799 and 843). October-November.

Stem slender, striate, pilose with scattered, spreading hairs, 20-30 cm. high. Leaves mostly in a radical tuft, pinnatifid or dentate, the largest 5-6 cm. long, 1-1½ cm. broad. Cauline leaves few, linear-lanceolate, clasping, hastate. Inflorescence loosely panicle. Heads solitary, 1½-2 cm. high; ultimate peduncles 3-10 cm. long. Scales biseriate, each with a white webby margin and green centre, the outer shorter. Corollas yellow or nearly white, ligulate, the

ligule bilabiate, one lip with 3 and one with 2 small teeth. Pale membranaceous, glabrous, acuminate, longer than the achenia. Achenia 7 or 8 mm. long, muricate, long-beaked. Pappus white or tawny, plumose. This plant has a milky juice, and the roots are very thick and large. The roots are sometimes used as chicory.

Sonchus oleraceus, L., Sp. Pl., 794.

Asuncion (193). November.

Picrosia longifolia, Don., Trans. Lin. Soc., xvi, 183.

Asuncion (146); Pilcomayo River (1522). November-May. = Balansa 867, and Mandon 287.

Picrosia differs from *Hypochaeris* in having entire leaves, the involucrel scales in one series, naked receptacles, beaks of the achenia very long and filiform, and the ligules nearly equally 5-toothed. The species here noted has weak, glabrous stems and heads solitary on long, naked peduncles. The heads when fully mature are 3 cm. long, subtended by several small bracts. Achenia fusiform, 14 ribbed, with a beak 5-8 mm. long. Pappus plumose, tawny. Ligules conspicuous, pure white. Juice milky. Leaves linear-lanceolate or oblanceolate, 10-30 cm. long, the radical with extremely long, slender petioles, and the cauline sessile and hastate. It often occurs in the streets of Asuncion, creeping from under the curbstones of the sidewalks, so weak that it can scarcely keep itself erect. I found it on the banks of the Pilcomayo with stems nearly 12 dm. long, reclining on the ground at full length. It is called chicory by the natives, and the roots used like those of no. 146 as a substitute for coffee.

CAMPANULACEÆ.

Lobelia Xalapensis, H. B. K., Nov. Gen., iii, 315.

Caballero (443). January.

20-30 cm. high. Small blue flowers in terminal racemes. Stem and branches slender, glabrous. Leaves alternate, ovate-deltoid, subcordate or truncate at base, irregularly crenate-dentate, 1-2 cm. long, 8-15 mm. broad, shortly petioled. Branches naked for 7-10 cm. at the summit.

Wahlenbergia linarioides (Lam.), A. D. C., Mon. Camp., 158.

Gran Chaco, near Asuncion (1523); Pilcomayo River (919). February = Balansa 2149.

Found in fruit only. Stems very slender, glabrous, much and stragglingly branched, $4\frac{1}{2}$ -6 dm. high. Leaves alternate, sparse, linear, sessile, acute; 3-15 mm. long. Pods many-nerved, 7 or 8 mm. long, on bracted pedicels 1-2 cm. long and crowned by 5 rigid, persistent sepals. Seeds brown, shining, nearly orbicular, $\frac{2}{3}$ mm. long.

PLUMBAGINEÆ.

Plumbago scandens, L., Sp. Pl., Ed. 2, 215.

Asuncion (691). May.

My specimens exhibited no tendency to climb, but were erect, 9-12 dm. high. A shrubby plant with alternate, oblong-lanceolate, entire, shining leaves, the largest 8-10 cm. long, 6 cm. wide, on short wing-margined petioles. Flowers in terminal spikes. Calyx tube 1 cm. long, shortly 3-4 lobed at the apex, with 5 green lines down the sides, alternating with white membranaceous nerves, beset with short, upright hairs each tipped by a small globular gland. Corolla white or slightly purplish, with a slender tube 2 cm. long; lobes 5, rotate, oblong. Stamens 4, much exerted; anthers blue. Capsule closely invested by the persistent, glandular calyx.

PRIMULACEÆ.

Anagallis cœrulea, Schreb. Spic. Fl. Lips., 5.

Buenos Aires (17). October.

Samolus floribundus, H. B. K., Nov. Gen., ii, 181.

Pilcomayo River (925). February

The plant which is so common in our country, and which has usually been mistaken for *S. Valerandi*, L. The Pilcomayo, on which it occurs, is a stream of brackish or, when low, of saline water.

MYRSINÆ.

Myrsine Guyanensis (Aubl.) Kuntze, Rev. Gen. Pl., 402.

Myrsine floribunda, R. Br.

Asuncion (757). June.

A shrub or small tree with grayish, somewhat corrugated bark, 3-6 m. high. Found only in fruit. Leaves coriaceous, glabrous,

alternate, entire, obovate, rounded and emarginate at the apex, the largest 8 cm. long, 2 cm. broad, sloping into a short petiole. Berries purplish, globular, 3-5 mm. in diameter, on pedicels 1-3 mm. long, containing a single, large bony seed. The leaves are clustered at the ends of the branches. I found the trees covered with flocks of birds feeding upon the fruit.

SAPOTACEÆ.

Chrysophyllum Martianum, A. D.C., Prod., viii, 161.

C. ebenaceum, Mart., var. *pedunculatum*, Miq. in Mart. Fl. Bras., vii, 100.

Asuncion (701 and 701 a).

A shrub or small tree 4-5 m. high. Young branches ferruginous-downy. Leaves thick, evergreen, glabrous (at least when old), alternate, entire, elliptical, rounded or often emarginate at the apex. On some trees all or nearly all the leaves are from 15 to 30 mm. long and $1\frac{1}{2}$ to 2 cm. wide, on others they vary from 3 to 4 cm. long and $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. wide. Petioles 2-3 mm. long, canaliculate above. Flowers small, in small clusters along the branches, on pubescent pedicels 2-4 mm. long. Calyx lobes rounded, pubescent, 5. Petals white, twice as long as the calyx. Fruit not seen. The flowering branches are mostly short and lateral.

Chrysophyllum maytenoides, Mart. in A. D.C., l. c.

Asuncion (841). May. = Gibert no. 8.

A tree very similar in appearance to no. 701. Leaves rather more numerous, but quite similar, the largest collected $2\frac{1}{2}$ cm. long, 8 mm. broad. Petioles 3-4 mm. long. Pedicels 3-5 mm. long, at least in fruit. Flowers not seen. Fruit a black, edible, sweet berry, about the size of a huckleberry, containing a single hard, brownish globular seed which has a large lunate, dark-bordered scar at the base.

Miquel states in Flora Brasiliensis that this species has a longer style than that of *C. Martianum*, and that the ovules are pendulous from the top of the cells instead of ascending from the base as in that.

Sideroxylon reticulatum, Britton, n. sp.

A glabrous shrub, 5-7 metres high, the branches densely leafy. Leaves coriaceous, short-petioled, obovate, rounded or obtuse at the apex, narrowed at the base, 6-10 cm. long, 2-4 cm. wide, entire, dark green both sides, finely

reticulate veined; flowers dioecious, solitary, axillary, white, about 3 mm. long; stamens 5; staminodia 5; fruit oval or pyriform, as large as a plum, the flesh greenish-yellow, sweet, containing 1-4, compressed, shining seeds about 15 mm. long and 6 mm. wide.

Asuncion (839). Same as Balansa's 2389 and 2391, Gibert's no. 46 from Asuncion, and Gardner's 1977 from Brazil. Near *S. Mastichodendron*. Possibly the same as *Lucuma laurifolia*, A. D.C. Called Aguay, but not the Argentine plant so known.

I found much of this growing along the course of the river Pilcomayo, where it becomes a tree from 8 to 13 m. in height, with leaves in some cases 26 cm. long and 3 cm. wide. The fruit is often sold in the market at Asuncion, and is much valued. The flesh, though sweet, is somewhat gummy, and may be sucked a long while in the mouth before dissolving. I was informed by physicians in Asuncion that the bark is used medicinally as a stimulant and for strengthening. The native name Aguay is pronounced something like *Arguaoo*. Fruits in January. The wild hog of the country or Peccary is quite fond of it, as we found droves of them under the trees devouring the fallen plums.

OLEACEAE.

Jasminum grandiflorum, L., Sp. Pl., Ed. 2, 9.

Asuncion (640). April.

This lovely Jasmine is often cultivated in gardens at Asuncion, where it is a great favorite. It also runs wild, and climbs over hedges and fence rows. The flower is large, deliciously fragrant, pure white, or in the unopened bud sometimes pink or reddish-purple. Leaves pinnate.

Jasminum revolutum, Sims, Bot. Mag., t. 1731.

Asuncion (836). November.

A shrub 3-7 dm. in height, often cultivated in Asuncion gardens, where it is known as *Jasmina*. Leaves pinnate, but the leaflets are larger than in no. 640. The flowers are yellow, and slightly fragrant. I did not see it wild. Probably not a native of the country, as it is credited in D.C. Prod. to Nepal.

Jasminum Sambac (L.), Ait., Hort. Kew, i, 8.

Asuncion (148); Pilcomayo River (1524). October-February.

A shrub from 1 to 3 dm. in height, bearing a pretty, pure white,

sweet-scented flower. From 2 to 7 flowers in a cluster on a common peduncle. This species has large, ovate, opposite, simple leaves. It is both cultivated in flower-gardens and runs wild in the country. I found it not only in the vicinity of Asuncion, but far up on the Pilcomayo.

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APOCYNACEÆ.

Thevetia neriifolia, Juss. ex Steud.; D.C., Prod., viii, 43.

Asuncion (642). April-May.

A shrub or small tree, 3-7 m. high, with milky juice and long, linear, glabrous, coriaceous leaves. The flowers are large and showy, bright yellow, on filiform, drooping peduncles. The twin ovaries become in fruit perfectly united so as to form a 2 or 4-celled triangular drupe, containing a thick, hard pulp or aril. This is suspended on a long, slender, drooping stalk, soon dropping off. It is sometimes cultivated along the borders of walks in gardens, where it makes a pretty object. It is the "*Cerbera Thevetia*" of Parodi's catalogue, named by him "*San Francisco de los Uagas*."

Thevetia Paraguayensis, Britton, n. sp.

Twigs and pedicels densely velvety-pubescent. Leaves oblanceolate, thick, obtuse and cuspidate at the apex, narrowed at the base, glabrate above, densely puberulent beneath, 6-10 cm. long, 2-3 cm. wide; petioles 3-4 mm. long; flowers racemose or corymbose; pedicels ascending, 1½-3 cm. long; calyx lobes lanceolate, acuminate, 7-8 mm. long, puberulent; corolla ampliate, about 4 cm. long, the limb longer than the tube; follicles ovoid, 3 cm. long, about 1½ cm. thick; seeds flat, 1½ cm. long, 1 cm. wide, 2-pointed.

Gran Chaco, near Asuncion (381). Nearest to *T. cuneifolia*, D.C., of Mexico. January-February. = Balansa 1356.

A shrub not so tall as 642, but with flowers much like that. The stigma is large, umbella-shaped, looking to me like an open parasol under the anthers. I did not see it in cultivation.

Aspidosperma Quebracho-blanco, Schlecht., Bot. Zeit., xix, 136.

Pilcomayo River (900).

This is a large tree with hard white wood and light-colored bark, much valued as timber. It has small elliptical, coriaceous, shining leaves, tipped with a weak spine. It is abundant in Paraguay, but I was unable to obtain it in flower or fruit. It is popularly known as Quebracho blanco.

Vinca rosea, L., Sp. Pl., Ed. 2, 305.

Asuncion (802).

Frequently cultivated in flower gardens at Asuncion, and often escaping upon the roadsides. A shrub 6-15 dm. high, with a showy rose-colored flower, blossoming all the year round.

Tabernaemontana australis, Muell. Arg. in Mart. Fl. Bras., vi, pt. 1, 84. Ex descr.

Trinidad (273). December-January. = Balansa 1358.

A small tree 6-8 m. in height, very interesting on many accounts. It has a milky juice, and smooth, light-colored bark. Flowers rather small, as white as snow, fragrant, the tube of the corolla of a yellowish tint, 5-angled, bulging outwardly near the centre, the snowy lobes large, rounded at apex, oblique at base, and curving around each other convolutely from left to right like a boy's paper wind-mill. Ovary of 2 closely united carpels, forming in fruit 2 follicles, firmly attached at the base. Follicles large, very milky when young, one-celled, with a thick rind which is rough on the outside with knobby protuberances. Seeds when young with an egg-shaped, pellucid, striped body on one side, and a crumpled body looking like the meat of an English walnut on the other side. In fruit the follicles dehisce laterally in 2 valves, spreading wide open, the crumpled body spoken of above becoming a red aril, which finally drops off, leaving in the shell many dark seeds which resemble the coffee berry in appearance. The people show their appreciation of this handsome tree by planting it in their flower-gardens. The Guarani name is *Curupicay*. The viscous, milky juice is said to yield caoutchouc, and is used as a bird lime. The wood is light and sometimes employed as a substitute for cork. Parodi states that the juice is used by quacks on wounds and as a remedy for snake-bites. He thinks that it may serve as a substitute for Aconite and *Rhus Toxicodendron*, and is good as a corrosive for warts.

Forsteronia Brasiliensis, A. D.C., Prod., viii, 436.

Asuncion (712); Pilcomaño River (1525). February-May. = Balansa 1369.

A liana climbing without tendrils over bushes and trees, the main trunk somewhat spiny, the branches long and withe-like. Flowers small, light yellow, in terminal spikes. Follicles twin, united at

base, divaricate, cylindrical, 10-20 cm. long, moniliform, 2-5 in a cluster. Seeds far apart, 8-15 in a follicle, elliptical, about 1 cm. in length, striate, with a beautiful, tawny silky plume of hairs at the summit, which spreads wide open when loosened. Juice not milky. Found in Central Paraguay, and far up on the Pilcomayo.

Forsteronia pubescens, A. D.C., l. c.

Asuncion (810). October.

Differs from no. 712 in having the young branches and leaves fuscous-pubescent, larger leaves (the largest 9 cm. long, $3\frac{1}{2}$ cm. broad), longer petioles (10 or 12 mm.), and very fragrant white flowers in terminal compound spikes 6-10 cm. long.

Echites trifida, Jacq., Hist. Stirp. Amer., 31, t. 24.

Near Asuncion (380); Pilcomayo River (895). January.
= Balansa 1372.

A liana similar in general appearance to no. 712, but with very different flowers and follicles. Corolla light purple, 2 cm. high, with 5 broad lobes, which lap over each other dextrorsely and curl downwards. Follicles cylindrical, not moniliform, tapering to a long sharp point, 25 cm. in length. Juice milky. Seeds clothed with very long, tawny, plumose hairs. Twining over shrubs $2\frac{1}{2}$ -3 m.

Macrosiphonia longiflora (Desf.), Muell. Arg. in Mart. Fl. Bras., vi, pt. 1, 140. Ex descr.

Between Villa Rica and Escoba (420). January.

Macrosiphonia verticillata, Muell. Arg., l. c., 141. Ex descr.

Between Villa Rica and Escoba (420 a). January.

These two species of *Macrosiphonia* grow on the open campo near Escoba, and are very peculiar and beautiful. Stems 20-30 cm. high. Flowers large, purple, solitary, on long terminal peduncles. The leaves in no. 420 ovate and opposite, in 420 a linear and verticillate, green above and white woolly beneath. Fruit long, somewhat moniliform follicles. Seeds covered with long, tawny, plumose hairs, which spread wide open when loosened. Tube of flowers campanulate, lobes several, very broad and spreading, with a crimped border. The dried specimens give a very poor appearance of the flower when fresh.

ASCLEPIADEÆ.

Araujia grandiflora (Mart. et Zucc.), Morong.
Schubertia grandiflora, Mart. et Zucc., Nov. Gen., i, 57.

Asuncion (654); Pilcomayo River (654a). January-April.
 = Balansa 1338, and Martius' Herb. Flor. Bras., 279.

A beautiful vine climbing over trees and shrubs 10 m. or more. Stem beset with tawny bristles, and that and the leaves discharging a copious milky secretion when wounded. Flowers in large clusters, the corolla white, showy, and fragrant, 4 cm. in length. Fruit a very large and heavy follicle 10-15 cm. in length, and covered with spiny protuberances.

Araujia sericifera, Brot., Trans. Lin. Soc., xii, 62.

Asuncion (777). May. = Balansa 1332.

Differs much from 654, though climbing and copiously milky like that. Whole vine, except the upper surface of the leaves, hoary with close white down. Flowers small, white, not conspicuous. Follicles as large as those of 654, but smooth and hoary white.

Araujia Stormiana, Morong, n. sp.

Climbing high upon trees. Stems terete, strong, canescent. Leaves opposite, very green and glabrous above, white tomentose beneath, hastate, the lobes obtuse, or sometimes merely dilated at the base, oblong-lanceolate above, the largest 16 cm. long, 6 cm. broad across the basal lobes, 2½ cm. broad at the middle; petioles 1½-2½ cm. long. Calyx lobes green, pubescent, oblong, obtuse, erect, about half as long as the corolla. Corolla 5-7 mm. high, 5-lobed, the lobes greenish-yellow, glabrous above, a little pubescent below, spreading rotately in anthesis, 5 mm. long. Corona 5-lobed, the lobes 2-toothed, the teeth projecting against the gynostegium, hairy at the base inside and usually filled with a honey secretion. Apex of the stigma 2-horned. Fruit not seen. The flowers are in axillary clusters on slender pedicels 5-8 mm. long.

This plant occurs with no. 1043 near the Pilcomayo Falls (1044). May. Named in honor of Prof. O. J. Storm, who commanded our Pilcomayo expedition.

Gothofreda oblongifolia, Morong, n. sp.

Stem not climbing, erect, white pubescent. Leaves opposite, oblong, rounded at base or semi-cordate, abruptly acute or cuspidate at the apex, pubescent on both sides, midrib prominent beneath, the blades 3-5 cm. long, 1-2½ cm. wide, on petioles 2-7 mm. long. Flowers on axillary peduncles 2-3½ cm. long, 8-12 in the umbel; pedicels pubescent, 4-7 mm. long. Calyx very deeply 5-parted,

the lobes erect, linear, acute, pubescent, not quite as long as the tube of the corolla, 1 or 2 glandular in each axil. Corolla about 7 mm. high, greenish, pubescent, the lobes ovate-lanceolate, pubescent at the junction with the staminal crown inside, at length reflexed. Segments of the crown connate with the throat and the gynostegium, light purple on the back and almost violet-tinted on the face, $\frac{3}{4}$ as long as the corolla lobes. Caudicle not dilated, the teeth erect and very short. Apex of the stigma entire, longer than the corolla lobes. Fruit not seen.

A half shrubby plant, 4-6 dm. high, with milky juice, growing in waste grounds at Asuncion (110). November.

Gothofreda eriantha (Dcsne.), Kuntze, Rev. Gen. Pl., 420.
Orypetalum erianthum, Dcsne., D.C., Prod., viii, 584.

Asuncion (655). April. = Balansa 1335.

Clambering over low bushes in thickets, and producing a great number of intertwisting branches. Flowers small, white, fragrant, in axillary clusters. Tube of corolla short, lobes long, linear, spreading. Stigma produced into 2 long, strap-shaped appendages. Stem, leaves, pedicels, calyx, and corolla all densely villous or woolly. Fruit a large conical, smoothish follicle. This plant, like many other Asclepiadaceous species, is an insect-catcher. On one occasion I found a large moth completely imprisoned by a flower, and struggling desperately to get loose, but in vain. It had thrust its proboscis into the corolla in search of nectar and was unable to withdraw it, although a powerful insect—in fact, as large as one of the smaller humming-birds, and for that reason called the humming-bird moth.

Gothofreda gracilis, Morong, n. sp.

A slender vine climbing over bushes and shrubs. All the parts except the petals grayish tomentose. Leaves opposite, cordate, acuminate, $1\frac{1}{2}$ -4 cm. long, 6 mm. to 2 cm. wide, on petioles 3-15 mm. long. Flowers greenish-white, axillary, in 2s, on peduncles 5 or 6 mm. long; pedicels 8-15 mm. long. Sepals 5, green, erect, subulate, with 1 or more glands in each axil, about 4 mm. long; corolla so deeply lobed as to appear of 5 separate petals, the lobes erect, oblong, obtuse at the apex, 10 or 12 mm. long, 2-3 mm. in breadth, glabrous on both sides. Scales of the crown barely adnate at the base with the corolla lobes, 5 or 6 mm. long, bifid half-way up, the divisions beautifully fringed. Caudicles scarcely dilated, slightly gibbous; the gland oval, very short. Gynostegium truncate, with 5 bluntish lobes at the top. This vine is much branched, twining densely upon itself. Fruit not seen.

Occurring at El Obraje de Pedro Gill on the Pilcomayo River (866). January.

***Asclepias campestris*, Desne., l. c., 566.**

Luque (333). December.

The petals of this species are greenish in the centre and white on the margins, thrice as long as the sepals, reflexed. Corona purplish in tint. Leaves entire, opposite, glabrous, elliptical, 6-8 cm. long, 2-3 cm. wide, nearly or quite sessile. Flowers 20 or more in the umbel. Fruit not seen.

***Asclepias Curassavica*, L., Sp. Pl., 215.**

Asuncion (47). November.

A beautiful species, reminding one of our *A. tuberosa*, which it much resembles in the color of its flowers. Common in copses around Asuncion. Flowers in small umbels, petals red and the hoods and gynostegium bright orange. It flowers nearly the whole season from November to April. Fruit a follicle much like that of *A. incarnata*.

***Asclepias mellodora*, St. Hil., Pl. Rem. Brés., 227.**

Caballero (603). January.

A low species with white flowers in large umbels. On the railroad track at Caballero and on the campo in the vicinity. The leaves are numerous, lanceolate, opposite, entire, slightly pubescent, acuminate, rounded at base, 10-12 cm. long, 1-3 cm. wide, nearly or quite sessile. Umbels numerous and very conspicuous when in flower. Follicles very similar to those of no. 47.

***Ditassa humilis*, Morong, n. sp.**

Many-branched from the base, suffruticose, from thick, ligneous roots. Stems very slender, 8-15 cm. high, grayish pubescent. Leaves opposite, entire, ovate, acute or acuminate and mucronate at the apex, truncate or more or less cordate at base, sparsely hispid on either side, hispid ciliate and more or less recurved on the margins, the pairs decussate, slightly overlapping each other, 6-15 mm. long, 3-5 mm. wide; petioles about 2 mm. long. Flowers white, 4 or 5 mm. high, in small umbels, 2-4 in the umbel, axillary or supra-axillary; peduncles 2-5 mm. long; pedicels 5 or 6 mm. long. Sepals subulate, somewhat longer than the tube of the corolla, hispid. Corolla deeply 5-parted, the lobes lanceolate, acuminate, 3 or 4 mm. long, hispid outside, glabrous within. Scales of the corona much longer than the gynostegium, mucous, the inner and outer ones about the same length. Apex of the stigma protuberant. The sepals are more or less but not conspicuously glandular in the axils. Pollinia as long as the glands; caudicles minute. Sepals and corolla lobes erect.

This little plant occurs on the Gran Campo among grass.
Near Luque (336). December. = Balansa 1375.

Morrenia odorata, Lind., Bot. Reg., t., 1838.

Asuncion (134); Pilcomayo River (1043). November–May.
= Mandon, Bolivia, 355, and Balansa 1341.

A noble vine climbing over shrubs and trees, found in thickets throughout the country. Flowers white, very fragrant. Inside of the corolla is an erect 5-lobed corona, the truncate lobes 2 toothed, projecting in a flap over the gynostegium. Stem and leaves canescent, copiously milky. Leaves opposite, cordate or hastate, abruptly curving into a long acute point, the largest 10 cm. in length. Fruit an immense ovate follicle, sometimes 10 cm long and 7 cm. broad at the base. Seeds black, somewhat angled and tuberculate, linear, 6 mm. long, surmounted by a soft white silky coma 4–5 cm. long. This plant is often cultivated in gardens at Asuncion, and the abundant coma is used for making pillows, for which purpose it is well fitted, as it is as soft as eider down.

Houlinia Fluminensis, Desno., l. c., 517.

Asuncion (183); Pilcomayo River (1037). November–May.

Stem glabrous below, pubescent above and on the inflorescence. Leaves deeply cordate, ovate, abruptly acute, glabrous, 5–7 cm. long, 3–5 cm. broad. Flowers in axillary clusters, 8–20 in the cluster; pedicels 1–1½ cm. long. Sepals erect, greenish in the middle, white on the edges, obtuse, not half as long as the corolla. Corolla lobes pointed, white without, dark purple or with purple lines in the middle of the interior and yellowish on the margins, 6 or 7 mm. long. Corona of 5 scales, inflexed at the top in a spoon-like projection. Stigma truncate. Fruit a smooth ovate pod 6–8 cm. long, 3–4 cm. broad at the base. This plant on the Pilcomayo was growing in the water of the great laguna, twining about shrubs that rose above the surface. At Asuncion it was in thickets. Probably the laguna was an overflow of water, though we did not remain there long enough to determine that.

Sarcostemma Bonariense, H. and A., Jour. Bot., 1834, p. 296.

Asuncion (681). April. = Balansa 136; collected also by Gibert.

Stems climbing over high bushes and trees, glabrous except on the young shoots. Leaves linear-lanceolate, acute and mucronate

at the apex, pubescent when young, becoming glabrate, the largest 6 cm. long by 2 cm. wide. Flowers creamy white, in umbellate clusters, 6-20 in the umbel, on peduncles as long as or longer than the leaves. Pedicels $1\frac{1}{2}$ -2 cm. long. Peduncles, pedicels, calyx, and corolla sericeous-pubescent. Corolla lobes ovate, obtuse, ciliate, 5 or 6 mm. long. Inner scales of the crown as high as the gynostegium, the exterior ones nearly entire. Stigma apiculate, the apex shortly bifid. Fruit a large ovate follicle, 6-8 cm. long, sometimes 2, united at the base. The flowers are very fragrant, and much frequented by wasps and other insects.

Sarcostemma bifidum, Fourn. in Mart. Fl. Bras., vi, pt. 4, 235. Ex descr.

Pilcomayo River (1526). January.

Climbing high. Stems mostly glabrous, the young shoots pubescent. Leaves oval, narrowed and rounded at the base, or the lowest cordate, obtuse, and strongly mucronate at the apex, glabrous above, more or less pubescent below, 4-5 cm. long, $1-2\frac{1}{2}$ cm. broad; petioles silky pubescent, 3-6 mm. long. Internodes 6-12 cm. long. Flowers white, in axillary umbels. Peduncles robust, 8-10 cm. long, 10-20 flowered. Pedicels about 2 cm. long, pubescent. Calyx and corolla silky pubescent, lobes of the former ovate, obtuse, surpassing the corolla tube, of the latter ovate, 5 or 6 mm. long and woolly ciliate as well as pubescent. Inner scales of the crown surpassing the gynostegium, the outer a mere border nearly entire or sinuous. Stigma conoidal, with a short bifid beak. Fruit a large ovate follicle like that of no. 681.

Sarcostemma carpophylloides, Morong, n. sp.

A very slender vine twining 2-5 m. or more over shrubs. Stems striate, very glabrous, much branched, the main stem below squarish, often brownish in color. Leaves delicate, opposite, glabrous, linear-lanceolate, acuminate, entire, 4-6 cm. long, 2-5 mm. wide, sloping acuminately into a capillary, channelled petiole 3-5 mm. long. Internodes 5-10 cm. long. Flowers white, few, in small axillary clusters, 2-4 in a cluster, 3 or 4 mm. high, and 5 mm. in diameter when expanded. Peduncles not over 10 mm. long. Calyx deeply 5-parted, greenish-yellow, the lobes obtuse, pubescent without, minutely glandular in the axils, $1-1\frac{1}{2}$ mm. long. Corolla deeply 5 parted, lobes erect, oblong, obtuse, slightly pubescent at the base within, about 3 mm. long. Scales of the corona pure white, adnate to the gynostegium, the inner cylindrical, higher than the gynostegium, the outer much smaller, 10 obovate-lobed. Stigma truncate or slightly conoidal. Follicles very slender, silky downy.

acuminately pointed at the apex, 3-6 cm. long, easily mistaken for leaves. Seeds flat, wing-margined, oblong, narrowing towards the base, papillose, 5 or 6 mm. long; coma white, plumose, 2-3 cm. long.

Pilcomayo Falls, Pilcomayo River (1004). April.

Exolobus patens, Four. in Mart. Fl. Bras., vi, pt. 4, 318, t. 94. Ex descr.

Pilcomayo River (1051). June.

A branching liana, in deep woods, running 10 or 12 m. over large trees, the stem 10-20 mm. in diameter. Flowers olivaceous in color, rotate, $2\frac{1}{2}$ cm. in diameter when expanded; petals acuminate, and 3 or 4 times as long as the ciliate sepals. The stigma is surmounted by a beautiful 5-pointed star. Follicle ovate, glabrous, 10-12 cm long, 6-8 cm. in diameter at the base, ridged by 4 sharp longitudinal wings, with a partial, broader wing between two of the others, the edges of all of them revolute. Seeds flat, obtuse, 7 mm. long, with thick winged margins, the attached plume very long and silky.

LOGANIACEÆ.

Spigelia Humboldtiana, C. and S., Linnæa, 1833, p. 200.

Pilcomayo River (966). March.

A low plant occurring in deep woods. The corolla is white, the flowers in terminal spikes 3-5 cm. long, two spikes together. Leaves verticillate, in 4s, the lowest smaller and opposite.

Buddleia tubiflora, Benth. in D.C. Prod., x, 433.

La Plata, Arg. Republic, and Asuncion (33). = Balansa 1018.

Buddleia Brasiliensis, Jacq. ex Spreng., System., i, 430.

Pilcomayo River (1527). = Balansa 1019.

This differs from the species common around Asuncion (*B. tubiflora*) in having the leaves more or less petioled, much smaller and axillary cymes, and a much smaller corolla. Both have handsome orange-colored flowers. *B. tubiflora* is used medicinally as an emollient by the Paraguayans. They flower from October to May, and sometimes grow to a height of 2 or 3 m.

GENTIANEÆ.

Limnanthemum Humboldtianum, Griseb., Gent., 347.

Near Asuncion (713).

A beautiful aquatic, common in pools northeast of Asuncion, flowering from January to May. Leaves almost as large as those of *Castalia odorata*, and often 2 or 3. Corolla white, beautifully fringed on the margins of the lobes, yellow inside below the lobes. Anthers black on the back and edges of the cells. Stigma large with 2 erect, crimped lobes. Ovary large, pointed, violet-colored.

HYDROPHYLLACEÆ.

Hydrolea spinosa, L., Sp. Pl., Ed. 2, 328.

Asuncion (228). December-January.

A coarse herb 6-9 dm. high, with many of the short lower branches ending in a sharp thorn. Flowers a bright blue. The whole plant covered with unequal glandular hairs, which adhere strongly to the drying-paper. Occurs in wet grounds.

BORAGINEÆ.

Cordia glabrata, A. D.C. Prod., ix, 473.

Asuncion (792). October.

A tree 8-13 m. high, with smooth bark, looking something like a poplar. Leaves large, round-ovate, thick, glabrous, shining above, lighter-colored beneath. Flowers a light purple, showy, in terminal corymbs.

Cordia hermanniæfolia, Cham., Linnaea, 1829, p. 484.

Asuncion (156); Pilcomayo River (987). November-April.

Very different from the preceding species. A straggling, rough hairy shrub 15-24 dm. high. Leaves alternate, ovate or ovate-lanceolate, serrate, lighter colored above, hispid on both sides, acute, 4-6 cm. long, 2-4 cm. broad, on short petioles. Flowers glomerate in small cymes; corolla very small, obscurely 5-lobed, yellowish-white, veined with a delicate lilac outside. Calyx hispid. Fruit oval, about 5 mm. long, when fully ripe turning red, and the 2 cells hardening into an apparently single seed.

Tournefortia psilostachya, H. B. K., Nov. Gen. et Sp., iii, 78.

Pilcomayo River (1041) May. = Balansa 2045.

A shrub about 12 dm. high, with long virgate branches rising from near the base. Flowers in paniced secund spikes, small, greenish-yellow. Drupes yellow when ripe.

Tournefortia Salzmanni, D.C., Prod., ix, 524.

Asuncion (800). October.

Similar in inflorescence to no. 1041, but this has 2 rows of secund spikes on the branches of the panicle, while that has only one row. A twining shrub, climbing 2-3 m. upon trees, with a velvety fulvous tomentum on the leaves beneath, white pubescent above. Stem also fulvous-tomentose. In thickets.

Heliotropium Curassavicum, L., Sp. Pl., 130.

Asuncion (790); Pilcomayo River (1058). October-June.

This *Heliotropium* with scirpoid racemes of bluish-white flowers sprang up abundantly on the muddy flats of the Paraguay after the subsidence of a freshet, and also occurred on the borders of a saline pool on the banks of the Pilcomayo known as Laguna de las Palmas.

Heliotropium Indicum, L., Sp. Pl., 130.

Asuncion (56). November-January.

This plant occurs abundantly in the streets and waste grounds of the city, becoming an unsightly weed.

Heliotropium leiocarpum, Morong, n. sp.

Suffruticose, 3-6 dm. high. Stems glandular, fuscous-tomentose, much branched. Leaves opposite, subopposite or occasionally alternate, more or less glandular downy and pubescent or sometimes strigose on both sides, ovate, entire, or somewhat crenate or wavy on the margins, obtuse at the apex, rounded or subcordate at the base; blades 3-10 cm. long, 1½-5 cm. wide; petioles 3-5 cm. long. Flowering racemes 3 or 4 together, 3-7 cm. long. Calyx deeply 5-lobed, the lobes subulate, glandular hairy, half as long as the corolla. Corolla bright blue, with a yellow eye at the base inside, very hairy in the throat, the tube spreading into a 5 crimped lobed border, 5 or 6 mm. high. Fruit depressed globose, smooth, glabrous, about 3 mm. long and a little wider, slightly longer than the persistent sepals, deeply furrowed on 2 sides, the lobes not divaricate or toothed at the top, splitting into 2 carpels, each 1-seeded.

This plant is more robust, with much more showy flowers than no. 56, and is common in waste grounds and copses about Asuncion (634 and 786). April–August. = Balansa 2037 and 2039. These were distributed as *H. Indicum*, L.

Heliotropium inundatum, Sw., Flor. Ind. Occ., i, 343.

Asuncion (77); Gran Chaco (77 a). November–January.

Heliotropium persicariaefolium (D.C.), Britton.

Heliophytum persicariaefolium, D.C., Prod., ix, 556.

Caballero (409); Asuncion (754). January–June.

This shrub sometimes attains a height of 2 m. Flowers small, white, in elongated bifid spikes. In open grounds, roadsides near San Lorenzo and Caballero.

Heliotropium fruticosum, L., Sp. Pl., Ed. 2, 187. Ex descr.

Pilcomayo River (1528). January. = Balansa 2035.

Fruticose. Stems slender, branching, appressed-hispid. Flowering branches opposite, 15–25 cm. long, covered with small bracts for their whole length. Spikes at their summit, short, solitary, more or less scirpoid. Flowers comparatively large, white. Calyx lobes unequal, oblong-lanceolate, about equal to the tube of the corolla, pubescent. Fruit pubescent, without a beak, splitting into 4 nutlets, each of which has a large pit on its face.

CONVOLVULACEÆ

Ipomœa acuminata (Vahl.), R. and S., Syst., iv, 228.

Asuncion (699).

A very pretty species, with slender stems and lilac flowers, twining over bushes and small shrubs. Common in Paraguay, and blossoming from November to May.

Ipomœa argyreia (Chois.), Meisn. in Mart. Fl. Bras., vii, 246.

Caballero (583 and 583 a). January.

One of the shrubby *Ipomœas*, of which several species occur in the country. This grows on the railroad track near Caballero, and is from 9 to 12 dm. in height. Leaves alternate, entire, oblong, obtuse or acute, mucronate. Corolla large, rose-colored.

***Ipomœa Assumptionis*, Britton, n. sp.**

Section *Strophipomœa*. Pubescent, twining, 1-2 m. long, stems terete; leaves slender-petioled, thick, hastate, entire-margined, obtuse and mucronulate at the apex, 6-9 cm. long, the basal lobes spreading or reflexed; peduncles shorter than the petioles, axillary, 1-2-flowered; flowers purple, 2 bracted, the bracts ovate, aristate; pedicels 5-15 mm. long, slender, bracted at the base; corolla purple, 3-4 cm. broad, tubular-funnel-form, the limb nearly 2 cm. broad; calyx-lobes aristate.

Gran Chaco, near Asuncion (584). = Balansa 1060. January-February.

***Ipomœa amnicola*, Morong, n. sp.**

Stem slender, terete, striate, glabrous, twining. Leaves glabrous, entire, cordate-ovate, the sinus large, basal lobes rounded and sometimes divaricate, running to a bluntly acuminate, mucronate apex, the largest blades 7 cm. long, 5½ cm. broad; petioles 3-6 cm. long. Peduncles about 2 cm. long, usually bearing 3 flowers on pedicels 1-1½ cm. long, both peduncles and pedicels thick. Flowers funnel-form. Calyx of 5 rounded, entire, nearly or quite equal, coriaceous, mucronate sepals, their edges becoming membranaceous, 4 or 5 mm. long. Corolla lilac, with purplish stripes outside and a deep purple interior base, obscurely 5-lobed, 2-2½ cm. long, about as broad across the mouth when expanded. Stamens and style included. Pod conical, 8-11 mm. long, about half as broad, 2-celled, usually containing 2 fuscous-pubescent seeds.

This species resembles *I. coccinea*, L., but differs decidedly in the shape and lack of horns on the sepals, the color and shape of the corolla, inclusion of the stamens and styles, as well as in other characters. Growing in thickets and hanging over the banks of the Pilcomayo, usually running over bushes (974). March-April.

***Ipomœa Batatas* (L.), Lam. Encyc., vi, 14?**

Asuncion (103). November.

***Ipomœa Bona-nox*, L., Sp. Pl., Ed. 2, 228.**

Asuncion (269). December-April.

***Ipomœa fistulosa*, Mart.; Choisy in D.C., Prod., ix, 349.**

Asuncion (80). November-March.

A stout shrub, growing on the lowlands on the banks of the Paraguay at Asuncion, 15-24 dm. in height. Many stems spring from the same root. Wood soft, with a large pith, and secreting a scanty milky juice. Flowers terminal, solitary or in small clusters.

Corolla very large and showy, a light purple or rose color without, and darker within. Capsules large, ovate, the 4 valves thick, brownish, opening wide in dehiscence, and containing 2-4 3-sided seeds, which are thickly clothed with a long fuscous wool.

Ipomœa Martinicensis (Jacq.), Mey. Essaq., 98.

Gran Chaco, near Asuncion (362). December-January.

Procumbent or twining, with white flowers but little over 2 cm. long. It reminded me at the time of collection of our *Convolvulus arvensis*. The leaves, however, are elliptical instead of being sagittate.

Ipomœa Morongii, Britton, n. sp.

Erect or ascending, minutely puberulent at least above, 0.5 m. or more long. Stems angled; leaves petioled, the lower large, sometimes 2 dm. long and nearly as broad, 3-lobed to the middle or beyond, the lobes lanceolate, acute or acuminate, entire or very nearly so, mucronulate; upper leaves ovate, entire or lobed; flowers corymbose, numerous; ultimate pedicels short; calyx-lobes ovate, obtusish, 4-6 mm. long; corolla funnel-form (blue?), abruptly narrowed within the calyx, 6-7 cm. long, 4-5 cm. broad at the summit.

Luque (303). Perhaps the Mio-Mio, of Parodi, Contrib. Fl. Par., i, 16.

One of the shrubby *Ipomœas*, growing 9-12 dm. in height, varying much in different localities. The flowers are large, rose-tinted, purple at the base within; the tube covered with white, appressed hairs. The corolla is sometimes 8 cm. in length, and nearly as much in diameter when expanded. It occurs in open grounds at Asuncion and near the railroad track at Luque, flowering from December to May.

Ipomœa trichocarpa, Ell., Bot. S. Car. and Georgia, i, 258.

I. conmutata, R. and S., Syst., iv, 228.

Asuncion (253). December.

Ipomœa tuberculata (Desr.), R. and S., l. c., 208.

Asuncion (237). = Balansa 1059.

Taken altogether the handsomest Morning-glory of the country. It grows everywhere in the woods, climbing over trees 10 m. or more in height, and hanging out a rich profusion of lovely flowers, which open at sunrise and continue open for half the day. The leaves are palmately 5-lobed, the 2 lower lobes divided, very gla-

brous and of a dark glossy green, on long petioles. Corolla 5-7 cm. long, funnel-form, a light bluish-purple without, and a deep, dark purple at the base within. Capsule depressed-globose, 2-celled, 4-seeded; seeds black, trigonous, puberulent, the hilum marked with a deep scar. Specific name from the stem, which is white and warty. Blossoms from December to May.

***Ipomoea umbellata* (L.), Meyer, l. c., 99.**

Asuncion (649). April.

Procumbent or twining over bushes, the stem purplish or dark green, covered with a close stiff down. Juice milky. Leaves cordate-sagittate, large, downy. Flowers a light yellow, umbellate, 20 or more in an umbel, on peduncles 8-15 cm. long. Corolla trumpet-shaped, with scarcely any lobes, about 3 cm. long. Capsules globular, 7 or 8 mm. high, 4-seeded; seeds fuscous with minute pubescence on the surface and silky pubescence on the angles.

***Jacquemontia Blanchetii*, Moric., Pl. Nouv. Amer., 41, t. 27.**

Asuncion (638 and 687). April-May.

Twining over herbs and shrubs, with pretty little, bright blue, campanulate flowers, in umbels of 5-20, on long peduncles. Common in thickets.

***Jacquemontia Paraguayensis*, Britton, n. sp.**

Erect, branching, at least 0.5 m. high, densely and finely brownish-pubescent throughout. Stems and branches terete; leaves short-petioled, oblong, obtuse and mucronate at the apex, obtuse or rounded at the base, entire, 3-4 cm. long, 1-1.5 cm. wide; peduncles axillary, shorter than the leaves, umbellately 2-5 flowered; pedicels 3-5 mm. long; calyx-lobes all alike, ovate-oblong, acute, about as long as the pedicels; corolla white, narrowly funnel-form or nearly tubular, 10-12 mm. long; capsule ovoid, glabrous, shorter than the calyx.

Between Villa Rica and Escoba (594). January.

***Jacquemontia tamnifolia* (L.), Griseb., Fl. Brit. W. Ind., 474.**

Asuncion (679). April.

Trailing on the ground for several metres in old cultivated fields. Stem pilose with long, appressed white hairs. Flowers in dense, fuscous-woolly heads, on peduncles 8-12 cm. long. Sepals 5, clothed with long hairs, nearly equalling the corolla. Corolla tubular, light blue, white-blotched, slightly projected beyond the calyx.

Evolvulus sericeus, Sw., Prod. Flor. Ind. Occ., 55.

Luque (340). October–January.

A little herb spreading flat on the ground for some 10 cm. or more, branching numerously from the base. Flowers small, in leafy racemes or scattered along the stem, bright white, the corolla spreading wide open, and looking as much like a pearl shirt button as anything to which I could liken it. Common in the hard soil of the railroad track near Luque.

Evolvulus mucronatus, Sw. ex Wickstr., Guadal., 62.

Pilcomayo River (1020). May.

A small creeping plant, with terete, hairy, branching stem, growing among undershrubs on the borders of the campo at the Falls of the Pilcomayo. Leaves sparse, alternate, simple, entire, elliptical, mucronulate, 2–2½ cm. long, on petioles 3 or 4 mm. long. Flowers small, solitary, axillary, on pedicels 8 mm. to 2½ cm. long, jointed about half-way up, with 2 small bracts at the joint. Sepals 5, oval, green, ciliate, about half the length of the corolla. Corolla white, campanulate, with 5 broad lobes of very delicate texture, 7 mm. high. This plant is so hidden by the shrubbery that it is easily overlooked.

Cuscuta trichostyla, Engelm., Trans. St. Louis Acad. Sci., i, 495.

Asuncion (259). November–December.

The only *Cuscuta* that I found in Paraguay. This was growing upon *Solidago polyglossa*. Flowers small, white, crowded in small, glomerated cymes. The capsule which Dr. Engelman did not see is yellow, the crust thin, depressed-globose, 5 mm. wide, 3 mm. high, not half covered by the persistent sepals, with a central aperture 1 mm. in diameter; seeds about 2 mm. long, minutely downy, flattened or obscurely 3-angled.

SOLANACEÆ.

Solanum aridum, Morong, n. sp.

Stem shrubby, terete, 3 dm. to 1 m. in height, sparsely branched, armed with straight acicular prickles, or sometimes unarmed or armed only at the base, glabrous below and stellately downy at the summit, usually leafless below. Leaves simple, alternate, oblong or ovate, obtuse, entire or with large teeth or occasionally lobed, pubescent, green above and white hoary below, most of the pubescence stellate; blade 3–5 cm. long and 1–2 cm. broad; petioles pubescent, 5–10 mm. long. Flowers solitary, axillary, on pedicels

about 1½ cm. long, thickening and elongating to 4 cm. in fruit. Calyx stellately pubescent, ¾ as long as corolla, the lobes nearly subulate, much longer than the tube. Corolla sulphur-yellow, plicate, deeply cleft, pubescent outside, 2 cm. in diameter when expanded. Calyx and corolla usually 5-lobed, occasionally 4-lobed. Filaments very short; anthers nearly 1 cm. long, the pores minute, looking upwards. Stigma green, capitate. Ovary 2-celled. Fruit very large, glabrous, yellow, 2-celled, globular, 1½-3 cm. in diameter.

The plant grows in dry or rocky places on the campo, and has a parched, dried appearance.

Falls of the Pilcomayo (1007). April-May.

Solanum atropurpureum, Schrank, *Syll. Pl. Nov.*, 200.

Pilcomayo River (871). January.

Stem shrubby, erect, beset with long, white or yellowish downwardly pointed spines. Leaves large, green, deeply 5-7 lobed. Flowers small, yellowish-white. Berry blotched white and green, 8-10 cm. in diameter.

Solanum boerhaaviæfolium, Sendtn. in *Mart. Fl. Bras.*, xiii, pt. 1, 48.

Between Pirayu and Jaguaron (34). April.

Stem shrubby, without spines, climbing on trees 3-5 m., very leafy. Flowers in cymes on capillary peduncles, white or very light blue. Berries black, about the size of those of *S. nigrum*.

Solanum Brittonianum, Morong, n. sp.

A shrubby, unarmed, glabrous plant. Stem erect below, twining at the top over the limbs of shrubs, 6-8 feet high, strongly flattened, angled. Leaves lanceolate, glabrous, entire, acute or somewhat obtuse, 5-10 cm. long and ½-2 cm. broad, sloping at base into a petiole 5-20 mm. in length. Flowers in large, terminal, laxly paniced cymes. Calyx one-third the length of the corolla, the lobes ovate or rounded, somewhat mucronulate, shorter than the tube. Corolla lobes much shorter than the tube, ovate, puberulent on the outside. Filaments somewhat flattened, scarcely 1 mm. long; anthers 6-8 mm. long, the terminal pores introrse, oblique. Style included; stigmas shortly clavate, entire or sometimes 2-lobed.

Banks of the Pilcomayo (1531). January.

Solanum Caavurana, Vell., *Fl. Flum.*, ii, t. 112.

Pilcomayo River (870). January.

Shrubby, erect, thornless, branching, about 6 dm. high. Leaves large, ovate-lanceolate, twin, on short petioles. Flowers small, white. Berries as large as peas, smooth, greenish.

Solanum Capsicastrum, Link., Cat. Hort. Berol.

Asuncion (617); Pilcomayo River (1529). = Balansa 2097.
January-March.

A low shrub, 3-6 dm. high, with rough, straggling stems. Flowers white, not over 5 mm. in diameter when expanded. Stem, petioles, and leaves covered with a close, white, glandular, stellate pubescence. Fruit solitary along the stem, or in small clusters, a smooth red berry somewhat larger than a pea. Common in thickets throughout Central Paraguay.

Solanum granuloso-leprosum, Dunal., D.C., Prod., xiii, pt. 1, 115.

Asuncion (139). November-January.

A tall thornless shrub, thick-stemmed, covered in all its parts with a hoary, scurfy, stellate pubescence. Leaves numerous, large, ovate-lanceolate, on long petioles, rough with stellate pubescence above, whitish beneath. Stipules very large, round or oval, on short stalks. Flowers in clusters, blue, on long peduncles. Berries globose, about as large as a pea. This is a very conspicuous plant on the borders of woodlands. The dense whitish stellate tomentum has a granular and scaly look, and hence the specific name.

Solanum Handelianum, Morong.

S. angustifolium, Lam., Illus. no. 2343, not Miller.

Asuncion (818). October-November.

Here named for Prof. Pablo Handel, of the Collegio Nacional at Asuncion, who frequently accompanied the writer in his botanical excursions in Paraguay, and by his knowledge of the country and the languages of the people, and his friendly assistance, contributed much towards the collection.

A shrubby plant, strict and erect below, twining on the limbs of shrubs above, 2-3 m. in height. Stem very smooth, strongly 5-angled. Leaves few, linear or linear-lanceolate, entire, glabrous. Flowers blue, in terminal bractless cymes. Berries black.

Solanum malacoxylon, Sendtn., l. c., 51.

Asuncion (181); Pilcomayo River (1530). = Balansa 2105.
October-May.

A tall, soft-stemmed shrub, with a large pith in the stem, growing sometimes 3 m. in height, entirely without thorns, very erect. Leaves glabrous, linear-lanceolate, 10-16 cm. long, acuminate, slop-

ing into a short petiole. Flowers light blue, in paniced cymes, on long drooping peduncles, showy. Berries purplish-black, smooth, with a bloom, somewhat larger than a pea. This plant was very abundant on the marshy borders of the Paraguay at Asuncion, and also in the water of the great laguna on the Pilcomayo River.

Solanum mammosum, L., Sp. Pl., 187.

Asuncion (102); near Luque (347). November-December.

A bushy shrub, 6-12 dm. in height. Stem and lower surface of leaves armed with straight, whitish-yellow spines, some of them nearly 2 cm. in length. Leaves very large, often nearly 2 dm. long by 1¼ dm. broad, deeply, many-lobed, stellately pubescent beneath. Flowers bluish-purple or almost white. Fruit large, at first blotched with green and light yellow, becoming yellow when mature, globular, smooth. Some of the berries which I measured were 3 cm. in diameter. Common on low grounds.

Solanum nigrum, L., Sp. Pl., 186.

Buenos Aires (9); La Plata, Arg. Republic (27); Asuncion (262). October-December.

Solanum nudum, H. B. K., Nov. Gen., iii, 33.

Asuncion (126). November-May.

A shrub, or sometimes growing into a small tree 5 m. high, much branched, glabrous, the young shoots pubescent. Leaves alternate or sometimes in 4s, often geminate above, ovate-lanceolate, acuminate, entire, glabrous above, downy beneath, 5-10 cm. long, 2-4 cm. wide, sloping into a petiole 2-4 cm. long. Flowers in axillary clusters, the pedicels 1-2 cm. long. Calyx lobes ovate, shorter than the corolla tube. Corolla about 1 cm. in height, of 5 deeply parted segments with a greenish line down the centre and purplish on the sides. Berries red, as large as peas. This shrub is quite conspicuous in the thickets around Asuncion for its foliage and its clusters of red berries. It bears scattered spines on the branches, but generally is unarmed on the stem.

Solanum oocarpum, Sendt. in Mart. Fl. Bras., x, 106.

Pilcomayo River (885). January.

A tall shrub, with whitish stellate-tomentose stems. Leaves very large, 5-7 lobed, stellate-pubescent on both sides, beset with

stout spines on the midrib beneath and the winged petiole. Stem armed with strong, straight or hooked spines. Flowers not seen. Berries as large as marbles, green, covered with a yellowish tomentum.

***Solanum Pilcomayense*, Morong, n. sp.**

A weak-stemmed, widely branching shrub, about 3 m. in height, supporting itself by the grasses and bushes among which it grows. Stem with 3 or 4 sharp angles or ridges, on which are often minute upwardly curved teeth that give a cutting edge to the ridge, otherwise smooth. Branches pubescent with small white, appressed hairs, or nearly glabrous. Leaves alternate, ovate, semi-cordate, entire or with a few small lobes, pubescent, especially below, the largest I collected 12 cm. long by 4 cm. wide, on petioles $\frac{1}{2}$ -2 $\frac{1}{2}$ cm. long. Flowers in small cymes, white or sometimes pale purple, not over $\frac{1}{2}$ cm. high. Calyx with 5 ovate lobes and scarcely $\frac{1}{2}$ as long as the corolla. Corolla deeply parted, the lobes ovate, obtuse. Anthers about 4 mm. long, the pores introrse, oblique. Style capillary, included; stigma capitate. Berries smooth, black, a little larger than those of *S. nigrum*.

This plant was found more or less all along the banks of the upper Pilcomayo, and even in the water of the great laguna where our voyage terminated (898). January-May.

***Solanum ranulosum*, Sendt., l. c., 45.**

Villa Rica (458). January. = Balansa 2119.

A handsome unarmed shrub 12-15 dm. high, the branches and leaves hoary with stellate tomentum. Leaves green above, white beneath, ovate-lanceolate, solitary or often geminate, one of them smaller, 3-8 cm. long, 1-2 $\frac{1}{2}$ cm. wide; petioles about 5 mm. long. Flowers white, numerous, in small axillary cymes. Berries small, black.

***Solanum sisymbriifolium*, Lam., Ill., no. 2386.**

La Plata, Arg. Republic (25); Asuncion (91); Gran Chaco (587).

***Solanum urbanum*, Morong, n. sp.**

A shrub 1-3 m. in height, unarmed. Stem angular, with gray bark, smooth below, the young shoots downy. Leaves entire, ovate-lanceolate, obtuse or acute at the apex, cuneate at the base, more or less pubescent on both sides, 3-6 cm. long and 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ cm. broad. Petioles 1-2 cm. long, alate-margined above, pubescent. Flowers in small clusters, somewhat racemose, occasionally solitary, among the leaves at the top of the stem and branches. Pedicels erect or drooping, 1-2 $\frac{1}{2}$ cm. long. Calyx pubescent, less than $\frac{1}{2}$ as long as the corolla, with 5, often 10, subulate lobes longer than the tube, thickening and

peristent in fruit. Corolla blue, with white lines running down the sides, about 1 cm. high, with 5 broad, scarcely apparent lobes, their tips with a velvety tuft of hairs. Stamens much shorter than the corolla, the anthers thick, incurved at the apex, a little longer than the filaments, somewhat unequal. Style curved; stigma capitate. Fruit a large, smooth, globular berry, nearly 3 cm. in diameter, with a thick, fleshy rind, 4-celled; seeds compressed, turning black.

This plant is quite common in the streets of Asuncion on the borders of the sidewalks, growing to a much greater size on the roadsides in the outskirts of the city.

Streets of Asuncion (147); suburbs of Asuncion (709). = *Balanus* 2104. November-May

***Solanum Villaricense*, Morong, n. sp.**

A bushy, widely branched shrub 8-12 dm. high, all the parts, even to the calyx and corolla, covered with white or tawny stellate pubescence. Stem terete, armed with straight, acicular spines, branching smooth and glabrous with age. Leaves lanceolate, somewhat obtuse, entire or occasionally a little lobed, lighter colored beneath, the blades 4-8 cm. long by 1-3½ cm. broad, sloping into a petiole 1-2 cm. in length. Flowers in large terminal cymes. Calyx ½ the length of the corolla, deeply cleft; lobes 5, as long as the tube, lanceolate-acuminate. Corolla white, 10-12 mm. high, and twice as much in diameter when fully expanded; lobes as long as the tube, ovate, mucronate-pointed. Filaments very short; anthers slightly pubescent, nearly 1 cm. long, the pores small, looking upwards. Fruit red, abundant, the berries as large as cherries.

This plant covers large tracts on the open hillsides at Villa Rica, and is quite conspicuous with its large white flowers and red berries (494). January.

***Solanum violaceifolium*, Schott, in Spreng. Syst. Veg. iv, 403.**

Pilcomayo River (920). February-March.

A creeping plant running for 6-9 dm., the stem rooting at the nodes, mostly under ground, glabrous and entirely free from spines or prickles. Leaves, as the specific name denotes, much like those of *Viola obliqua*, cordate-ovate, on petioles 3-8 cm. long. Flowers solitary, on axillary pedicels 2-5 cm. long, whitish; corolla spreading rotately ½-3 cm. in diameter, the 5 deeply cut lobes ciliate, eroded or a little limbate. Fruit a large oval berry, over 2 cm. long, yellow when ripe.

This plant grows on the sides of steep banks on the borders of the Pilcomayo River, in shady places, its long stems often running under leaf mould and loose soil, appearing here and there above ground.

***Physalis viscosa*, L., Sp. Pl., 163.**

Asuncion (115); Pilcomayo River (1533). November-February.

Occurs in door-yards and waste grounds around Asuncion, as well as far up the Pilcomayo in uninhabited districts. Birds, monkeys, and insects eat the fruit with avidity. I lost a good many specimens through cockroaches, which devour all the berries that are not protected. It is used in Paraguay medicinally, being regarded by the natives as an efficacious remedy for children's complaints. The fruit is often sold in the city market of Asuncion.

***Capsicum annuum*, L., Sp. Pl., 166.**

Asuncion (696). April-May.

Running wild in the waste grounds about the city. A shrub about 15 dm. high. The fruit is conical, 4-6 cm. in length, bright red when ripe, very hot to the taste. It is sold in the markets of Asuncion, and much relished as a flavoring for soups. Many medicinal virtues are attributed to it.

***Capsicum baccatum*, L., Sp. Pl., 166.**

Villa Rica (308); Pilcomayo River (961). January-March.

A shrub 6-9 dm. high. Berries yellowish or red when ripe, oval, sometimes 13 mm. long, intensely hot to the taste.

***Jaborosa integrifolia*, Lam., Encyc., iii, 169.**

Buenos Aires (6) October.

***Salpichroa rhomboides* (Oill. and Hook.), Miers in Hook. Lond. Jour. Bot., iv, 326.**

Asuncion (707). May.

Frutescent, 6-9 dm. high, growing in tangled masses by the roadsides. The flowers are small, white, nodding, with an urceolate corolla. Stems square, with a dead, dry look about them, the young shoots and branches green, bearing 2 rows of hairs which are curiously curled, nearly looped upwards. The older stems are weak and brittle, with a corky exterior.

***Lycium Tweediamum*, Orisb., Pl. Lorentz, 169.**

Pilcomayo River (1006). May.

A thorny shrub 1½-4 m. high, with many short, lateral, very brittle branches, sharply spinous at the apex. Flowers small, solitary, lilac. Fruit a small berry, red when ripe.

Lycium Merongii, Britton, n. sp.

A glabrous shrub. Leaves ovate or oval, thick, pinnately veined, 5-7 cm. long, 2-3 cm. wide, acute at the apex, narrowed at the base, crenulate on the margins, borne on petioles 3-10 mm. long; flowers about 3 mm. long, numerous, in dense clusters at the nodes; pedicels about 2 mm. long; corolla 4-lobed to about one-fourth of its length; stamens 4, inserted near the summit of the corolla-tube; stigma capitate; calyx 4-toothed, the teeth triangular, obtuse. Fruit nearly globose, 3 mm. in diameter.

Asuncion (161). November-May.

A straggling shrub, growing 3-4 m. high in the lowlands around Asuncion, and also near the road on the way to Lympio. The limbs are often flexuous, and the leaves shining on the upper surface. Strong spines occur at the ends of short lateral branches. The blood-red pulpy disk upon which the ovary is seated becomes dry and membranous in fruit. Fruit a dark purple berry.

Datura fastuosa, L., Sp. Pl., Ed. 2, 256.

Asuncion (652). January-May.

A favorite flower in Asuncion gardens where it sometimes grows to the height of 5 m. or more. Corolla light purple, very large and showy, double. It often escapes into waste grounds where it retains the double corolla, sometimes having as many as 3 corollas, one inside of the other. Running wild, it is very apt to have deformed fruit. Sometimes 2 or 3 imperfectly developed burrs coalesce in one.

Datura Metel, L., Sp. Pl., Ed. 2, 256.

Asuncion (69). October-February.

The common *Datura* around Asuncion, as frequent there as is our *D. Stramonium* here. A very beautiful flower, the corolla large, funnel-form, pure white and very fragrant.

Cestrum calycinum, Willd.; R. and S. Syst., iv, 808.

Asuncion (227); Caballero (445). December-January. = Tweedie 1193 and Balansa 2092.

A leafy shrub which sometimes grows into a small tree 5 m. or more in height. Flowers tubular, the corolla downy, greenish-yellow, 1 cm. or more in length.

Cestrum Parqui, L'Her., Stirp., iv, 73, t. 36.

Buenos Aires (16); Asuncion (257 and 369). November-December

Common both in the Argentine Republic and Paraguay. A very bushy shrub, 1-2½ m. high, with clusters of pale yellow, tubular flowers. Fruit an oblong purple berry-like capsule. Often grows in gardens at Asuncion, and common in thickets about the city.

Nicotiana glauca, Graham, Bot. Mag., t. 2837.

Asuncion (38).

Usually a shrub, but sometimes a small tree 5-7 m. in height. Stem and leaves glaucous, the latter ovate, acute at apex and rounded or cuneate at base, on petioles 3 or 4 cm. long. Flowers very numerous, in large, naked, terminal, drooping clusters or panicle racemes. Corolla yellow, tubular, 4 cm. long, glandular hairy on the outside. Fruit a thickish ovoid capsule, dehiscent in 5 valves at the apex.

Common in the lowlands and on the river banks, where it is very conspicuous. It is often found in small forms growing upon the tiled roofs of houses along the gutters at Asuncion. It blossoms from November to February, and even longer.

Nicotiana longiflora, Cav., Deser. Pl., 104.

Asuncion (44). November-February.

This tobacco is very common in the suburbs of Asuncion, and frequently grows in the streets and waste grounds of the city itself. The flower opens at night and closes early next day. Corolla with a slender tube 7 or 8 cm. in length, white or bluish-white. Foliage viscid-pubescent. The largest leaf which I noted was about 10 cm. long, and the largest described by DeCandolle is 23 cm. long by 7½ cm. wide.

Nicotiana longiflora, Cav., var. *grandifolia*, Morong, n. var.

This form is distinguished from the type by its magnitude, unequal calyx lobes, and its denser pubescence. The stems are nearly twice as thick, tube of the corolla 9 or 10 cm. long, lobes of calyx 15 to 20 mm. long, and the largest leaves are 4-5 dm. in length by 1½-2 dm. in breadth. Flowers nocturnal, and slightly fragrant when freshly open and wet with the morning dew.

The large leaves often lie flat on the ground, and when hung in the sun to dry cure like those of *N. rustica*. I have no doubt that they contain nicotine enough to make a very good tobacco, as they have all the taste of that while green.

Banks of the Pilcomayo (1533). February-May.

Petunia violacea, Lindl., Bot. Reg., t. 1626.

Asuncion (785). August-September.

As I always found this *Petunia* in the neighborhood of dwelling-houses and in waste grounds where house rubbish was dumped, I thought it probably a garden escape, but as it occurs native in Southern Brazil (Fl. Bras., x, 179) it may well be a native plant of Paraguay.

Bouchetia anomala (Miers), Britton and Rusby, Trans. N. Y. Acad. Sci., vii, 12.

Pilcomayo River (943). February-April.

An herb with thick tough roots, 4 or 5 dm. high, with many virgate, nearly naked branches. Stem, pedicels, and calyx rough pubescent. Leaves glabrous or pubescent, lanceolate, linear or the lowest spatulate, 1-5 cm. long. Flowers solitary, in a long raceme, opposed to a leaf or bract. Calyx $\frac{1}{2}$ as long as the corolla, with 5 linear lobes. Corolla about 1 cm. high, funnel-form, white, with 3 delicate purple lines down the lobes on the outside and yellowish at the base inside; lobes 5, broad. Pedicels 1-1 $\frac{1}{2}$ cm. long. Fruit a large, oval capsule, 3-celled, many-seeded, dehiscent by 4 valves.

Schwenkia Americana, L., Sys. Nat., iii, 62.

Asuncion (119). November-December. = Balansa 2171.

The *Schwenkias*, of which there may be 20 species, all but one confined to South America, were formerly classed in *Scrophulariaceae*, but now placed by Bentham and Hooker in *Solanaceae*. The species here noted is a frutescent plant about 6 dm. in height, with pubescent stem, leafy below, with a large terminal panicle of slender, naked branches. Leaves with blades 3-7 cm. long, rounded or semi-cordate at base, on petioles 5-19 mm. in length. The flowers are peculiar. Calyx scarcely 3 mm. long, with 5 minute ovate lobes. Corolla very slender, tubular, about 10 mm. long, lurid purple, 5-nerved, with a thick, green, glandular border that closes in 4 lobes over the stigma, from the 4 corners of which project 4 clavate teeth. Fruit a globular capsule, 3 or 4 mm. in diameter, 1-celled, many-seeded, dehiscent by 2 valves. Seeds pitted, commonly hexagonal.

SCROPHULARINÆ.

Angelonia integerrima, Spreng., Syst. Car. Pest., 235.

Asuncion (317). December. = Balansa 2145.

We have nothing resembling this genus in our country. Stem frutescent, 1 m. or more in height, glabrous, ascending or erect. Leaves opposite, entire, oblanceolate or lanceolate, acute or obtuse at the apex, sessile, 5-12 cm. long. Flowers blue, in long, terminal racemes (3 dm. or more). Calyx of 5 small, green sepals with membranous edges, closely appressed and about $\frac{1}{2}$ as long as the corolla, persistent in fruit. Corolla ventricose, gibbous at base, not quite 1 cm. broad, 5-lobed, the 4 lower lobes rounded and reflexed, the 5th a broad, keeled hood with 3 folds on the outside at the upper part, which are greenish at the top and in the interior. Hood surmounted by an erect lobe crimped below and with a white projection at base inside, prettily spotted with white and blue on the lower side. Stamens 4, inserted on the corolla near the base; anthers with 2 divaricate cells, opening by slits at the top, their edges blue; filaments blue at the base. Fruit a large, ovoid, pointed capsule. It is almost impossible to convey any intelligible idea of this curious flower by description. It is not only curious to the stranger from northern climes, but very beautiful.

Stemodiaera durantifolia (L.), Kuntze, Rev. Gen. Pl., 466.

Asuncion (78). November.

Herbaceous. Stem 3-4 dm. high, branched, the whole plant glandular hairy. Leaves opposite or in whorls of 3s or 4s, lanceolate, acute at apex, sessile, auriculate. Flowers azure blue, in long terminal spikes.

Wet grounds on the river banks.

Stemodiaera linearifolia, Morong, n. sp.

Stem square, the angles sharp or obtuse, 4 dm. to 6 dm. high, the whole plant very glabrous, much branched above. Leaves opposite or occasionally on the inflorescence in 3s or 4s, linear, obtuse at the apex, sessile or slightly amplexicaul, punctate-dotted, 2-7 cm. long and 2-7 mm. broad. Flowers in long, slender, terminal racemes, in whorls of 3, each subtended by a subfoliaceous ovate bract; pedicels scarcely 1 mm. long. Corolla blue, blotched with white, about 3 mm. high. Calyx with 5 subulate lobes. Style much exserted, stigma thick, laterally flat.

Pilcomayo River (1634). January. = Balansa 2169.

***Stemodia crassa hypolepis* (C. and S.), Kuntze, l. c.**

Near Trinidad (633). November.

My specimens were none of them over 4 dm. high. Flowers much like those of no. 78, azure blue, and the plant very viscous glandular, but the leaves small and spatulate.

***Stemodia crassa verticillata* (Miller), Kuntze, l. c.**

Asuncion (800a and 808); Pilcomayo River (973). October-March.

Herbaceous, 5-25 cm. high. Corolla azure, lighter colored within, the throat delicately fringed. This little plant has the odor of mint when freshly gathered.

In grassy grounds or in wet places in the woods.

***Monnina lanigera* (C. and S.), Kuntze, l. c., 463.**

Villa Rica (496). January.

A creeping or ascending bog plant, 5-15 cm. high. Stem densely villous. Leaves opposite, entire, orbicular-ovate, obtuse at the apex, amplexicaul, 8-15 mm. long. Flowers axillary, pedicellate, with 2 minute bracteoles under the calyx. Corolla blue.

***Monnina calycina* (Pursh.), Kuntze, l. c., 463.**

Asuncion (90); Pilcomayo River (1099). November-May.

Growing in marshes at Asuncion, and as an aquatic, mostly submerged, in the Pilcomayo River near the Falls.

***Scoparia dulcis*, L., Sp. Pl., 116.**

Asuncion (97). November.

***Scoparia pinnatifida*, C. and S., Linnaea, viii, 22.**

Asuncion (79). November-December.

***Veronica arvensis*, L., Sp. Pl., 13.**

La Plata, Arg. Republic (36). October.

***Buchnera elongata*, Sw., Flor. Ind. Occ., 1061.**

Near Asuncion (394). December-May.

***Gerardia communis*, C. and S., Linnaea, iii, 12.**

Asuncion (364); near Caballero (430). December-January.
= *Balanus* 2152.

A shrubby, much branched plant, 3 or 4 dm. high, with large purple flowers, common on the campos east of Asuncion as far as Villa Rica.

Gerardia gemistifolia, C. and B., l. c., 18.

Asuncion (931); Pilcomayo River (915). December-February.
= Balansa 2168.

A very showy suffruticose species. Stems with many opposite, erect branches, 5-10 dm. high. Flowers numerous, in long terminal racemes, large, purple. This plant made a great display along the low grounds on the borders of the Pilcomayo River, where it occurred for miles.

LENTIBULARIÆ.

Utricularia juncea, Vahl., Enum., i, 202.

Villa Rica (581). January. = Balansa 2071

Utricularia subulata, L., Sp. Pl., 18.

Luque (832). December. = Balansa 2075

GESNERACEÆ.

Achimenes tubifera (Hook.), Britton.

Glaucis rotifera, Hook., Bot. Mag., t. 3071.

Pilcomayo River (865). January.

A fine plant 6-9 dm. high. Leaves thickly clustered towards the base. Flowers racemed on long naked stems. Corolla white, funnel-shaped, the long tube (5-7 cm.) projecting at right angles from the calyx, with a short, obtuse spur projecting from the other side, which is filled with nectar. Fruit a conical capsule, 1-celled, containing a multitude of small oblong seeds looking like little worms.

On the open campo, at a place known as Obraje de Pedro Gill.

BIGNONIACEÆ.

Bignonia Horongii, Britton, n. sp.

An erect, branching, glabrous shrub. Leaves simple, sessile-oblancoate, thick, obtuse or rounded at the apex, narrowed at the base into a short petiole, entire, clustered at the ends of short, lateral branches, reticulate-veined, 3-5 cm. long, about 1 cm. wide; flowers terminating the short lateral

branches, solitary or in pairs, peduncled; peduncles slender, bracted, about 1 cm. long, lepidate; corolla about 3 cm. long, the tube abruptly narrowed above the base; calyx narrowly campanulate, lepidate, 1 cm. long; pod linear, subulate-tipped, glabrous, terete, 8-10 cm. long, 6-7 mm. thick; wings of the seed about as wide as the body.

Trinidad (276); Pilcomayo River (868). December-January.

Often growing into a small tree, 15 or 20 feet high, with a dark, wrinkled bark. Corolla bright yellow.

Bignonia Tweediana, Lindl., Bot. Reg., xxvi, t. 46.

Luque (719). May. = Gibert 1340.

The pods of this liana are flat, sometimes 5 dm. long by 1 cm. wide, generally in pairs.

Bignonia venusta, Ker, Bot. Reg., t. 249.

Asuncion (745). June-July.

A strong liana climbing by tendrils for 8 or 10 m. over trees. Flowers a deep yellow, in large terminal corymbs, very showy. Fruit a smooth, flat, 2-edged pod, 15 cm. or more in length, and 1-1½ cm. wide. Very common in thickets.

Bignonia Columbianna, Morong, n. sp.

Stem stout, glabrous, with grayish wrinkled and warty bark. Leaves ternate, a pair or several on a common stalk; common petiole slender, pubescent, 2-2½ cm. long; petiolules very slender, pubescent, 1-2 cm. long, the middle one longest; leaflets coriaceous, glabrous, oval, entire, obtuse and emarginate at the apex, rounded at base, 3-6 cm. long, 2-3 cm. wide. Flowers not seen. Fruit a flat pod, thick, with a very narrow raised border, acuminate pointed at the apex, 20-25 cm. long, 1-2 cm. wide, on stout stalks 2-3 cm. long, from 3 to 5 in a cluster. Seeds 3 cm. long, the scarious wing broader at the lower end, thickened along the outer side in the middle. Tendrils at the base of the leaf-bearing stalks.

Climbing upon trees on the banks of the Pilcomayo (1535). March.

Bignonia corymbifera, Vahl., Edl., ii, 45, t. 17. Ex descr.

Asuncion (166); between Villa Rica and Escoba (460); Trinidad (835). November-April. = Balansa 497 a.

A very showy species with large panicles of rose-purple flowers. Stems glabrous, striate, grayish, sometimes white-spotted, often purple tinted on young shoots, glabrous or minutely pubescent on the inflorescence. Variable in the size and shape of the leaves,

which are bifoliate or trifoliate, a simple tendril often taking the place of a leaflet. Leaflets always glabrous, shining above, reticulate-veiny, rounded or subcordate at base, abruptly acuminate at the apex, oval and ovate-lanceolate, 3-10 cm. long, 2-7 cm. broad. Calyx campanulate, loose, 5-8 mm. long, distantly 5 denticulate and 5-nerved. Corolla pubescent, 2-4 cm. long, obscurely bilabiate, the upper lip with 2 rounded, entire lobes, lower with 3 rather larger lobes. Style and stamens included. Fruit not seen. The flower buds and flowers are somewhat viscous, adhering to the drying-paper.

***Bignonia eximia*, Morong, n. sp.**

Very glabrous in all its parts. Stem striate. Leaves opposite, bifoliate, apparently coriaceous; petioles 1½-3 cm. long; petiolules 4-6 mm. long. Leaflets entire, elliptical, narrowed at both ends, acute and mostly cuspidate at the apex, 2½-4 cm. broad in the middle, 6-10 cm. long, reticulate-veiny on both sides. Pedicels axillary, 1-flowered, 3½ mm. long. Calyx campanulate, 4 or 5 mm. high, distantly denticulate. Corolla purple, infundibuliform, 5 cm. high, 5 cm. or more in diameter across the mouth when expanded, bilabiate, upper lip 2 and the lower 3-lobed, the lobes broad. Fruit not seen.

A very showy species, climbing tall trees.

On the highway between Villa Rica and Escoba (595). January.

***Bignonia*, species undetermined.**

Near Trinidad (736). October. = Balansa 499.

***Macfadyena cyanchooides* (Cham.), Morong.**

Delichandra cyanchooides, Cham., *Linnaea*, 1832, p. 658.

Spathodes? *Delichandra*, D.C., *Prod.*, ix, 205.

Between Villa Rica and Escoba (527); Lympio (732); Pilcomayo River (910). February-May.

This genus is tendril climbing, like most of the Bignonias, but differs from that genus principally in having a spatheaceous calyx, fissured on one side, with a colored involucre of 2 delicate foliaceous bracts just beneath the calyx. The species here noted has opposite, bifoliate leaves, with lanceolate, apiculate, coriaceous, shining blades. Flowers solitary or in clusters of 3-6; calyx and corolla red; corolla 4 or 5 cm. long, infundibuliform, curved; stamens and style exerted, presenting a very showy appearance.

Mollia populifolia* (D.C.), Britton.Bignonia populifolia*, D.C., *Prod.*, ix, 189.

Asuncion (1636). October.

A tendril climber, with large bifoliate, rounded leaves and clusters of large, showy yellow flowers. Calyx much inflated, spatheaceous, the fissure oblique, running to an aristate point on one side. Corolla infundibuliform, with a swelling tube and flaring, rounded lobes, often 6 or 7 cm. in length. Stem stout, warty, the branches striate. This plant is very conspicuous when in flower, and would make a beautiful object in gardens, though the Asuncionites never seem to have taken it for that purpose.

***Cuspidaria pterocarpa* (Cham.), D.C., *Prod.*, ix, 178.**

Caballero (596). January.

A genus closely allied to *Bignonia*, but differing in its tetramerous fruit, hirsute anthers, and uniformly cuspidate-lobed calyx, from which the generic name is derived by DeCandolle. The species here noted climbs over large trees without tendrils, so far as I could see, with bi-tri-foliate leaves, and lax, terminal racemes of showy funnel-shaped, yellow flowers. It is very ambitious, like all the South America lianas, and climbs to the very tops of the trees, and throws out its clusters of conspicuous flowers above their heads.

***Adenocalymna nitidum*, Mart. in D.C. *Prod.*, ix, 200.**

Asuncion (197). November-December. = Gibert 1106.

Stem glabrous, striate, cinereous-pubescent on the inflorescence. Leaves bifoliate; petioles and petiolules about equal, canaliculate. Leaflets rigid, glabrous, shining above, elliptical, rounded at the base, acute and cuspidate at the apex, 6-12 cm. long, 3-4 cm. wide. Calyx marked by 2-17 black, cup-shaped glands, which also occur occasionally on the bracteoles. Corolla 6 or 7 cm. in length, bright yellow, often shading off into white towards the summit, with a ventricose tube and a large flaring border having 5 broad, rounded, subequal lobes. Fruit a heavy, drooping capsule, 3-celled, somewhat tetragonous when young, becoming at maturity almost cylindrical and very hard, 20 cm. long and 3 cm. wide, usually 3 on a peduncle.

***Anemopygium flavum*, Morong, n. sp.**

A genus very similar to *Bignonia* in flowers, leaves, and stems, differing in having a thick pulvinate disk, stamens and styles always included, the calyx

always loose and campanulate, and usually truncate. It differs principally in the fruit, the capsule being broad ovate. The species here noted is a tendril-climbing shrub with ash-colored, striate, glabrous stems, hispid on the summits of the youngest branches. Leaves bi-tri-foliate; petioles 10-15 mm. long, striate beneath, hispid and canaliculate above; petiolules 5 or 6 mm. long, striate and glabrous beneath, canaliculate and hispid above like the petioles, the hairs dense and running up the thick midrib and lowest nerves of the upper surface of the leaflets. Leaflets coriaceous, entire, elliptical, very glabrous except as above stated, nerves prominent beneath, narrowed at both ends, mucronate at the apex, 3-5 cm. long, 1-3 cm. wide. Flowers 1-3, axillary, on striate, glabrous, or slightly pubescent pedicels 8-10 mm. long. Calyx glabrous, nerveless, or obscurely nerved at the base, loosely campanulate, truncate, with a membranous margin, 7 or 8 mm. long, yellowish in color. Corolla yellow, darker colored at base, glabrous, infundibuliform, the tube slender, 4 or 5 cm. long, spreading about 2 cm. across the lobes when expanded, the lobes large and rounded, somewhat ringent. Fruit not seen.

On the highway from Villa Rica to Escoba (597). January.
= Gibert 1104.

Pithecolobium cordifolium, Mart. in D.C. Prod., ix, 194.

Asuncion (168 and 749). = Balansa 465.

Climbing by tendrils over shrubs and trees. Stems smooth, hexagonal, the branches fuscous-downy. Leaves trifoliate; leaflets ovate or orbicular, cordate, downy. Calyx downy, truncate or 5-dentate, scarcely $\frac{1}{2}$ as long as the corolla. Corolla yellow, very close downy, smooth and dark at the base outside, curved, trumpet-shaped, the lobes broad, rounded, subequal, 4 or 5 cm. long, showy. Fruit a large, flattish, 2-celled, 2-valved capsule, densely echinate, 10-12 cm. long by 4 or 5 cm. broad, filled with broadly winged seeds, the wings silvery, delicate membranous and transparent. This is a fine liana, the flowers showy and the large echinate fruit very conspicuous.

Flowers November-February; fruit June-August.

Amphilophium paniculatum, H. B. K., Nov. Gen., iii, 140.

¹ Between Villa Rica and Escoba (446); Asuncion (753).

A tendril climber distinguished by having a double calyx, the outer spreading, with a sub-5-lobed, reflexed border, and the inner appressed and bilabiate. Corolla bilabiate, with a short tube about 2 cm. long, ventricose at the throat, upper lip galeate, bilobate, the lower 3-lobate. Fruit very different from that of 168, in company with which it grows, being a thick, subligneous, lenticular capsule,

which is 2-celled, 2-valved, smooth or nearly so, 10-15 cm. long and 4 or 5 cm. broad. The seeds are winged membranously as in 158, but yellowish in color. The valves when emptied of their contents look like small boats, and are used for holding beads, pins, and small ornamental objects.

Flowers January and February; fruit June-August.

Tabebuia araliacea (Cham.), D.C., *Prod.*, 12, 221.

Asuncion (740). May.

A large tree 10-13 m. in height, with grayish bark which is somewhat fissured below and smooth above. Fuscous-downy on the young branches and inflorescence. Leaves opposite, digitate, the leaflets 3-5, elliptical, acute or rounded at base, obtusely acuminate at apex, shining above, lighter and prominently nerved beneath, the largest about 10 cm. long and 5 cm. broad. Flowers in sessile corymbs, bright purple, large and conspicuous. Calyx thick, purplish, obscurely 5-lobed. Corolla funnel-form, tube ventricose above, somewhat bilabiate, upper lip with 2 rounded lobes, lower with 3 emarginate, rounded lobes. Sometimes the corolla is 6 cm. in length, spreading 3 or 4 cm. at the border, white downy outside and with translucent hairs within. A tree very common in the woods around the city, and when covered with its blossoms attracting great attention in the forest, as it is high enough to overtop most of its companions.

Tabebuia Avellanedae, Lor., *Griseb. Symb. Flor. Arg.*, 258.

Pilcomayo River (901).

One of the largest trees in Paraguay, common in the forests of the Pilcomayo region, growing at least 15 m. in height. It is popularly known as the Lapacho, and in the Argentine Republic as the Lapacho morado or colorado. I gathered the leaves only, as it flowers in August, a period when I was not on the river. Leaves digitate; leaflets 3-5, elliptical, abruptly acuminate, serrate, glabrous, the 2 middle ones the largest. Bark grayish. Wood very hard, bluish colored, considered a valuable timber for building purposes, nearly equalling the Quebracho colorado in that respect.

Tecoma ochracea, Cham., *Linnae*, vii, 623.

Asuncion (791). October. = *Balanse* 3337.

A fine tree growing in the woods near Asuncion from 10 to 13 m. in height, with brown bark on the trunk, silverish-gray on the

young branches. Flowers only seen, as the leaves do not appear till after flowering. The flowers are bright yellow, very numerous, 12-30 in a cluster. Calyx 5-dentate, about $\frac{1}{2}$ as long as the corolla, densely hirsute with long ochraceous hairs. Corolla trumpet-shaped, with 5 large, rounded, emarginate or eroded, subequal lobes, 5 or 6 cm. in length, many-nerved and glabrous without, and clothed with long ochraceous hairs in the interior. Fruit not seen. The great masses of yellow flowers on the naked branches make a splendid display at the time of blossoming.

PEDALINEÆ.

Cramiolaria integrifolia, Cham., *Linnaea*, vii, 725.

Near Asuncion (824). November. = Gibert 1021.

A coarse, branching herb, beset with glandular hairs which render it very adhesive to the drying-paper. Stem succulent. Leaves rounded-ovate and cordate, or somewhat reniform and much broader than long, the largest 7-10 cm. broad and 5-6 cm. long. The flower has a membranous spathe-like calyx. Corolla white, with a slender tube 10-13 cm. long and a large bilabiate limb, the upper lip 3-lobed, lower 3-lobed, the middle lobe very large, rounded. Not seen in fruit. Very much like our *Martynia*. Roadsides east of the city.

ACANTHACEÆ.

Thunbergia alata, Boj. in Hook. *Ex. Fl.*, t. 17.

Asuncion (688). April.

A slender vine, climbing over bushes. Leaves ovate, cordate-hastate at base, on alate petioles. Flowers very pretty, the tube of the corolla dark purple without and within, with 5 spreading lobes of a chrome-yellow, which are oblique to the tube.

Hygrophila lacustris, Nees, D.C., *Prod.*, xi, 86.

Trinidad (272); Pilcomayo River (1537). December-January.

Some of this was distributed as *Hygrophila conferta*, Nees.

Hygrophila oblongifolia, Nees, *Mart. Fl. Bras.*, ix, 21.

Luque (295). December.

Flowers light purplish-red, in many sessile axillary verticils for 3 or 4 dm. along the upper part of the stem. Stem square with excavated sides and 4 sharp angles below, very hairy, 6-12 dm.

margins white membranous. Calyx not $\frac{1}{2}$ as long as the corolla tube, deeply 5-parted. Corolla rose-purple, the tube slender, a little ampliate at the throat, smooth or slightly pubescent, ringent, the upper lip entire, the lower 3-lobed. Stamens 2, included or slightly exserted, on the corolla tube. Anther cells discrete, the one above the other. Capsule somewhat 4-sided, obconic, downy, 2-celled, 4-seeded; seeds subglobose.

Found in thickets, somewhat supported by bushes. Banks of the Pilcomayo River (1538). January. = Gibert no. 41.

***Stenandrium trinerve*, Nees, Mart. Fl. Bras., ix, 75.**

Between Paragua and Luque (854); Caballero (507). December. = Balansa 2467.

Acaulescent. Scape 5 or 6 cm. high. Flowers in short terminal spikes, with leafy bracts at the base of the spikes and flowers. Corolla about 1 cm. long, purple, with shades of deeper purple and yellow on the interior of the lobes. Fruit a 2-celled capsule, each cell with several flat, very hairy seeds. A pretty little plant growing in dry grassy soil on the railway track.

***Beloporone ramulosa*, Morong, n. sp.**

Suffruticose. Stems terete or squarish, swollen at the nodes, below glabrous or pubescent in lines, above pubescent, furnished with many erect, virgate branches, 7-10 dm. high. Leaves opposite, ovate-lanceolate, entire, acute, sloping at base into a petiole 3-20 mm. long, the uppermost passing into bracts and sessile, pubescent or lineolate or both, 2-10 cm. long, 1-3 cm. wide. Flowers mainly at the top of the branches in solitary, opposite, axillary spikes, the spikes about 2 cm. long. Bracts ovate, 1-1 $\frac{1}{2}$ cm. long, mucronate or cuspidate, hirsute, ciliate, attenuate at base. Bracteoles a little shorter than the calyx lobes. Calyx divided to the base, the segments linear, acuminate, $\frac{1}{2}$ as long as the corolla. Corolla 3 cm. long, deep red, downy outside, bilabiate, the upper lip entire, the lower with a long middle lobe slightly spreading on the sides into 2 lateral lobes. Stamens 2, exserted, the anthers discrete, one cell above and one lower, the cells appendaged below. Style longer than the stamens, stigma erect, flat.

In thickets. Asuncion (706). May. = Balansa 3296.

***Beloporone Amherstiae*, Nees, l. c., 139.**

Asuncion (200 a). December-April.

Stems frutescent, terete, glabrate or lepidote, very leafy, 6 dm. to 2 m. high. Leaves ovate, pubescent, sometimes lepidote above. Noticeable for its bright red narrow tubular, bilabiate corollas 2 or 3 cm. long, which make it conspicuous in woodlands.

Dianthera obtusifolia (Nees), Morong.*Rhytloglossa obtusifolia* Nees, Mart. Fl. Bras., ix, 120.

Caballero (435); Pilcomayo River (1031). January-May.

Herbaceous. Stem angular, 4 dm. to $1\frac{1}{2}$ m. high. Flowers bluish-purple, with a short tube and broad flaring lobes. The plant varies very much. The leaves are seldom obtuse in my specimens, but generally linear-lanceolate, acuminate, 4-10 cm. long and $\frac{1}{2}$ - $1\frac{1}{2}$ cm. broad. The specimens from Caballero grew on the railroad track, and are very glabrous, while those from the Pilcomayo grew in muddy places by the river-side, and are hispid hairy, sometimes even spiny, on the angles of the stem. The leaves of the latter are pellucid punctate, those of the former opaque. The flowers from the Pilcomayo were decidedly blue in color, while in the other they were of a rosy-purplish tinge. Perhaps several species are included in these forms.

Diapedium Pohlianum (Nees), Kuntze, Rev. Gen. Pl., 485.

Asuncion (200). December-April.

A showy plant, even more noticeable for its bright red flowers than no. 200 a, as the leaves are fewer, the internodes longer, and the flowers more numerous. The corolla is very slender, 2-lipped, $2\frac{1}{2}$ - $3\frac{1}{2}$ cm. long, 3 times as long as the linear, acuminate lobes of the calyx; lower lip with 3 very short lobes. All the parts, even the corolla, are densely pubescent. Growing with no. 200 a, and about the same height.

Diapedium Tweedianum (Nees), Kuntze, l. c. ?

Pilcomayo River (1539). May.

VERBENACEÆ.

Lantana Camara, L., Sp. Pl., 627.

Luque (344). December.

Lantana lilacina, Desf., Cat. Hort. Par., Ed. 3, 392.

Asuncion (50). November.

Lantana trifolia, L., Sp. Pl., 626.

Caballero (599). January.

Of these *Lantanas*, the most common is *L. lilacina*, with numerous heads of lilac flowers, bearing a berry which is blue when ripe.

The most showy is *L. Camara* with flowers of orange and yellow. *L. trifolia* is a coarse, rank plant, the leaves usually opposite, but sometimes in 3s, with rather small heads of lilac flowers on very long peduncles. They blossom from November to April.

Lippia angustifolia, Cham., *Linnaea*, vii, 377.

Pilcomayo River (860). January–April.

Stems square, 6–12 dm. high, appressed-hairy. Internodes long. Leaves opposite, narrowly lanceolate, appressed-hairy, serrate, sessile or shortly petioled, 6–10 cm. long, 1–1½ cm. wide. Heads small, on axillary peduncles. The small flowers are nearly concealed by the cuspidate-acuminate bracts. Corolla yellow, turning orange with age. Common on the campo among tall grass.

Lippia canescens, H. B. K., *Nov. Gen.*, ii, 263.

Pilcomayo River (905 and 1048). February–May.

A small prostrate shrub, with heads of purple flowers, and small obovate, serrulate leaves, running on the ground for 6 dm or more. The heads are conical or cylindrical, 1–3 cm. long, on peduncles 3–4 cm. in length.

Lippia nodiflora (L.), Mx., *Fl. Bor. Am.*, ii, 15.

Asuncion (163). November.

Lippia turneræfolia, Cham., *Linnaea*, vii, 217.

Luque (575). December.

Lippia urticoides, Steud. *Nomencl. ex Schauer*, in *D.C.*, *Prod.*, xi, 573.

Asuncion (242). December.

A shrub with light gray bark, 3–6 m. high. Leaves ovate, obtuse at apex, rounded or subcuneate at base, very rough like rhagreen above, downy and lighter colored beneath. Flowers white, very fragrant, in axillary or terminal racemes or spikes, densely and spirally arranged on the axis. Racemes numerous, often 10–16 cm. long. Branches and peduncles white pubescent, the branches 4-gonous. Calyx and minute pedicel woolly. This shrub is thickly covered with the flowering racemes when in blossom, and makes a great display on the lowlands at Asuncion where it occurs.

Lippia Recolleta, Morong, n. sp.

Suffruticose. Stem nearly simple, or with 1 or 2 long branches from near the base, terete below, tetragonous and deeply grooved above, densely papil-

lose-hispid, 3-6 dm. high, springing from thick ligneous roots. Leaves opposite, ovate or lanceolate-ovate, strongly crenate-serrate, acute or obtuse at the apex, sloping at base into a petiole 5-15 mm. long, densely hispid on both sides, about 7-nerved on each side, scarcely penninerved, the blades 3-7 cm. long, $1\frac{1}{2}$ - $2\frac{1}{2}$ cm. wide. Flowers in dense globular or ovate heads, the heads solitary, axillary, on hispid peduncles 3-5 mm. long. Bracts imbricated, cuspidate-acuminate, densely hirsute-ciliate and hispid, 2-3 mm. broad, 4 mm. long, nearly hiding the flowers. Calyx membranaceous, compressed, bifid, puberulent, dividing and falling off with the seeds at maturity. Corolla yellow, ampliate, 2-lipped, upper lip entire, lower lip 3-lobed, downy on either side under the lobes, about 3 mm. long, only the lobes showing under the acumen of the bracts. Seeds flattened-globose, $1\frac{1}{2}$ mm. long, pubescent, splitting at maturity into 2 hemispherical outlets.

The plant has a strong mint-like odor, and abounds in the neighborhood of the Recoleta, a well-known cemetery about 2 miles from Asuncion (62). October-November.

Valerianodes Jamaicense (L.), Med. Phil. Bot., i, 177.

Asuncion (108). November.

Common in the waste grounds of the city. The numerous long, slender spikes (12-33 cm.) give it a very striking look, although it is such a common weed that everybody at Asuncion wondered to see me gather it.

Verbena Bonariensis, L., Sp. Pl., 20.

Asuncion (173); Pilcomayo River (1540). November-April.

Verbena Peruviana (L.), Britton.

Erinus Peruvianus, L., Sp. Pl., 630.

Verbena chamadrifolia, Juss., Ann. Mus., vii, 73.

Asuncion (51). = Balansa 1024.

This scarlet-flowered, trailing *Verbena* seems to grow all over Paraguay, and nearly all the year round. I found it not only in copses about Asuncion, but also in the streets of the city, and far up on the Pilcomayo River. It was equally common a hundred miles east of Asuncion. The stems sometimes climb up among bushes for 6 dm. or more.

Verbena dissecta, Willd.; Spreng. Syst. Veg., ii, 750.

Asuncion (219). December-January. = Balansa 1025.

A trailing *Verbena* with bright lilac flowers and dissected leaves. Not quite so common as no. 51, but still frequently found around Asuncion and by the side of the railway as far as Luque.

Verbena intermedia, Gill. and Hook. in Hook. Bot. Misc., i, 166.

Pilcomayo River (1014). April.

Many stems from the same root, very slender and much-branched, erect, 4-5½ dm. high, the upper parts naked. Flowers blue, scarcely 3 mm. high, in terminal spikes not over 3 mm. wide and 5-15 cm. long. Leaves small, linear, serrate, and confined mostly to the lower part of the stems, or soon dropping off, giving a naked, dry look to the plant. The stems are tetragonous and rough to the touch.

Verbena littoralis, H. B. K., Nov. Gen., ii, 276.

Asuncion (128). November-December.

A tall, rough, square-stemmed weed, with long cylindrical spikes of blue flowers, common in fields. Leaves few, linear, sharply serrate. The upper parts of the stem and branches naked. The spikes are sometimes 12 or 14 cm. long.

Verbena venosa, Gill. and Hook., l. c., 167.

Asuncion (1541). November.

Verbena Morongii, Britton, n. sp.

Ascending, branched, 30 cm. or more high, the branches sparsely pubescent, sharply 4-angled. Leaves sessile, linear-lanceolate, acuminate at the apex, narrowed at the base, sharply serrate or the upper entire, pubescent with short, rigid, subulate hairs on the upper surface, glabrous or very nearly so beneath, 5-7 cm. long, 5-10 mm. wide; flowers in dense, oblong, terminal, peduncled heads; corolla 1.5 cm. long, the tube narrow, somewhat enlarged above, the limb spreading; bracts linear-lanceolate, acuminate, striate, very ciliate, about as long as the corolla tube.

Caballero (600). January.

This plant sometimes reaches twice the height given in the description. Flowers lilac or purple. It grows on the railroad track in company with no. 599.

Citharexylum myrianthum, Cham., Linnaea, vii, 117.

Asuncion (830). November. = Balansa 2090.

A tree from 3 to 10 m. in height, with smooth gray bark. Leaves glabrous, shining on the upper surface, elliptical, bearing 2 green, thick, wart-like glands at the base of the blade, the largest 14 cm. long by 6 cm. broad. Flowers white, in long, secund, drooping racemes. It bears a drupe about as large as a cherry.

Vitex cymosa, Bert. in Spreng. Syst. Veg., ii, 757.

Asuncion (797). October. = Balansa 1022.

A tree with grayish, rather smooth bark, 3 to 10 m. in height. Flowers in panicles at the summit of the previous year's branches. Corolla blue, with a yellow eye in the centre. Leaves digitate; leaflets 3-5. Quite showy when in blossom, as the flowers appear on young shoots before the new leaves. The Guarani name for this tree is *Taryma guazu*, commonly called *Taruma*. It is common in the waste grounds of Asuncion and in the woods about the city.

Clerodendron fragrans, Vent., Jard. Malm., t. 70.

Asuncion (615). February-March.

I saw this plant frequently in the neighborhood of dwelling-houses, and think it must be a garden escape, although everybody declared that it was wild. I am confirmed in this opinion by the fact that all the flowers are double, the stamens being converted into petals, and showing no appearance of anthers. It is herbaceous, growing from 1 to 2 m. in height, with large clusters of white and violet flowers. No fragrance was noticed in the flowers.

LABIATE.

Ocimum micranthum, Willd., Enum., 630.

Caballero (470); Pilcomayo River (965). January-March.

Peltodon longipes, St. Hil. in Benth. Lab., 63.

Between Escoba and Caballero (421). January.

Only 4 species of this genus are known, all of them occurring in Brazil and the neighboring countries. The one here noted is a small, trailing plant with opposite, round-ovate, obtuse, crenate leaves. Flowers in small heads on very long peduncles, the corolla dark purple. It grows in hard soil on the railway track near Caballero.

Hyptis brevipes, Poit., Ann. Mus., vii, 465.

Asuncion (75). November-December.

Herbaceous. Stem stout, square, 4-6 dm. high, rough hairy on the angles. Leaves ovate or ovate-lanceolate, acute, sloping at base into a short petiole, black dotted, sparsely hairy, the hairs long, appressed, jointed. Flowers light purple spotted, the upper

lip nearly white, in globular heads, the heads in opposite leaf axils, on short peduncles, bristly with the lanceolate bracts and calyx teeth. Common on the river-side.

Hyptis cinerea, Morong, n. sp.

Stem rather slender, tetragonous, deeply grooved in the centre and sulcate on the sides, cinereous-pubescent below and densely and closely hispid above, with many opposite, erect, strict branches, 6-15 dm. high. Leaves narrowly lanceolate, 6-10 cm. long, 5-15 mm. wide, acuminate, unequally and sharply serrate, pellucid-dotted, cinereous pubescent on both sides, sloping into a winged petiole 10-20 cm. long. Internodes on the stem 5-15 cm. long. Heads few, solitary, axillary, globular, 8-10 mm. in diameter, on peduncles 10-15 mm. long. Bracts equalling the heads or shorter, lanceolate, hispid. Calyx campanulate, 5 mm. long, glabrous between the nerves, ciliate on the margins; teeth longer than the tube, hispid. Corolla when in flower much exerted beyond the calyx, about 1 cm. long, spotted white and purple. Receptacle villous.

Approaches *H. brevipes*, but the leaves in that are glabrate and black spotted, ovate, the bracts ciliate and broader, the flowers scarcely surpassing the calyx, and the stems not grooved as in this.

Luque (304); Pilcomayo River (924). November-February. = Balansa 1006 a.

Hyptis dumetorum, Morong, n. sp.

Stems 8-12 dm. high, tetragonous, the angles obtuse, densely white villous, even woolly towards the top, strict, sparsely branching. Heads globose, solitary, in opposite leaf axils, the largest 10-14 mm. in diameter; peduncles pubescent, 8-20 mm. long. Bracts subulate, villous, shorter than the heads. Calyx slightly inflated in the middle, sparingly pubescent, 10-nerved, reticulate-veiny, elongated and strongly recurved in fruit, naked in the interior, the fruiting 6 or 7 mm. long; teeth straight, 3 times shorter than the tube, equal, pubescent. Corolla scarcely exceeding the calyx, purplish in tint. Receptacle woolly. Seeds oval. Leaves ovate, rounded or truncate at the base, unequally dentate, densely fuscons-villous, rugose veiny and almost woolly beneath, the lowest on short petioles, the uppermost sessile; blades 5-7 cm. long, 3-5 cm. broad at the base, the uppermost becoming sessile bracts 1-2 cm. long.

This species seems to approach *H. recurvata*, Poit., but that as described has naked receptacles, leaves always petioled, smaller heads and longer peduncles.

A conspicuous plant in thickets around Asuncion (633). March-April. = Balansa 1009.

Hyptis gracillipes, Britton, n. sp.

Erect, slender, 35 cm. or more high, much branched, the stems and branches puberulent. Leaves oblong, acute at the apex, narrowed at the base, serrulate or the upper entire, pubescent beneath, puberulent above, the upper 1.5-2 cm. long; lower leaves not seen; branches of the panicle slender, elongated; pedicels 1-flowered, filiform, 1½-2 cm. long; flowers minute, the corolla tube apparently not exceeding the calyx; calyx campanulate, minutely puberulent, reticulate veined, at length 2.5 mm. long, its teeth ovate, obtuse; nutlets oblong, smooth.

Near Asuncion (711 a). Related to *H. Salzmanni*, Benth. May.

Hyptis lappacea, Benth., Lab., 103.

Asuncion (75 b); Gran Chaco (585). November-February.

Stem simple, square, strict, rough, 4-6 dm. high. Leaves opposite, lanceolate, hispid, irregularly serrate, acuminate at both ends, petiolate, 6-12 cm. long, 8-20 mm. broad. Internodes 7-10 cm. long. Flowers white, in solitary, globular heads 8-12 mm. in diameter, on peduncles 5-20 mm. long, axillary below, glomerate above. Bracts lanceolate, acuminate, hispidulous, equalling the head. Calyx lobes rough-awned. The numerous heads have a very burr-like aspect.

Hyptis spicata, Poit., Ann. Mus., vii, 474.

Asuncion (48 and 711). November-May.

Much more slender than no. 75 b, the heads very small and arranged racemosely at the tops of the stems and branches, on capillary peduncles 2-4 mm. long.

Hyptis suaveolens, Poit., l. c., 472.

Asuncion (368). November.

Stems square, the angles armed with minute downwardly hooked prickles, growing 4 or 5 dm. high. Leaves rough with minute hirsute hairs, ovate, acute, serrate, cuneate at base, on petioles 1-2 cm. long. Flowers in small axillary heads, the corolla small, purple. Open grounds.

Hyptis vestita, Benth., Lab., 114.

Caballero (592). January. -- Balansa 978.

Whole plant covered with a white or tawny, scurfy tomentum. Flowers in close terminal spikes. Corolla purple. Stem 4-6 dm.

high. Leaves petiolate, broadly ovate, unequally crenate-dentate, fuscous above, whitish beneath, rugose-veiny. Open grounds.

Salvia cardiophylla, Benth., Lab., 721.

Asuncion (65); Pilcomayo River (1542). November–June.

Stem 4–6 dm. high, glabrous or downy. Leaves broad deltoid, obtuse or acute, truncate or cordate at the base, dentate. Flowers light blue, 3–6 in the verticil. The plant has a strong aromatic odor.

Salvia rigida, Benth., Lab., 269.

Between Villa Rica and Escoba (415). January. = Balansa 990.

This species has an erect, hirsute stem, 3–6 dm. high. Leaves crowded, downy, elliptical, acute at the apex, sessile, somewhat auriculate at the base, 2½–4 cm. long and 1–1½ cm. broad. Flowers white, in long terminal racemes, the pedicels 2 or 3 mm. long. Growing on the open campo.

Scutellaria rumicifolia, H. B. K., Nov. Gen. ii, 324.

Asuncion (58 and 826). October–January.

A small, much branched plant, 1½–2 dm. high. Flowers 3 or 4 mm. high, the corolla violet and white, the lower lip purple spotted. The flowers are very numerous, in long terminal racemes. Growing in grassy grounds on the outskirts of the city and even in the streets. On the edges of the sidewalk near my house I found plenty of it.

Leonurus Sibiricus, L., Sp. Pl., 584.

Asuncion (769). November–July.

This species, which occurs occasionally as a waif in our country, is quite common in the waste grounds of Asuncion. There it grows in large patches, 8–12 dm. in height.

Teucrium inflatum, Sw., Flor. Ind. Ooc., ii, 1003.

Asuncion (179). November–December.

This plant occurs abundantly on the low grounds near the river at Asuncion. It is a coarse-leaved, pubescent species, 4–6 dm. high. Flowers crowded in terminal spikes. Calyx inflated, very downy. Corolla a light purple.

PLANTAGINEÆ.

Plantago tomentosa, Lam., Encyc., v, 377.

Asuncion (160); Pilcomayo River (880). November-January.
= Balansa 3185.

Common in the waste grounds of Asuncion, where it rises 15-20 cm. high, but on the borders of the Pilcomayo I found leaves sometimes 30 cm. long, and scapes from 60 to 70 cm. high, the spike alone being from 30 to 35 cm. in length. Leaves ovate or oblanceolate; both they and the scapes from the same roots very numerous. Seeds in my specimens 3 and 4 in a pod.

NYCTAGINEÆ.

Mirabilis Jalapa, L., Sp. Pl., 177.

Asuncion (622). February-April.

Commonly cultivated in gardens at Asuncion, but not unfrequently running wild. The color of the flowers varies from deep red to purple, purple blotched and nearly white.

Boerhaavia decumbens, Vahl., Enum., i, 64.

Asuncion (93). November-December.

This occurs abundantly in the streets of Asuncion, on the edges of the sidewalks and in waste places. Indeed, I never found it outside of the city. A straggling, much-branched plant. Leaves broad ovate, acute at apex, rounded, truncate or semicordate at base, on a petiole about as long as the leaf, in pairs, one of them larger than the other, glabrous, lepidote, the larger 2-3 cm. long and the smaller 1-1½ cm. Flowers in naked, terminal panicles, the pedicels capillary. Flowers minute, greenish below, bright red above, 5-lobed, each lobe with a mucro rising from the centre of a notch. Fruit an obconic, 5-angled, 1-celled, 1-seeded capsule, 3 mm. long, lined with viscid appressed hairs. It was long before I could make out the character of these flowers, they are so minute, and they drop off the stems so easily, but the bright red speck was sufficiently conspicuous.

Bougainvillea glabra, Choisy, in D.C., Prod., xiii, pt. 2, 437.

Asuncion (367).

A fine shrub 2½-4 dm. high. Stem and branches armed at irregular intervals with slightly curved spines. Leaves simple,

entire, alternate, shining, elliptical or oval, acuminate at apex and sloping at base into a petiole about 1 cm. in length. Flowers very showy, numerous, in terminal clusters. The showy part of the flower consists of a large involucre of 3 ovate, purple bracts, 4 cm. long and 3 cm. wide. The real flowers inside of these bracts are quite inconspicuous, one attached to each involucral bract. This shrub makes a beautiful ornament in the gardens of Asuncion, blossoming profusely all the year round. It is a native of Brazil and said to grow wild in Paraguay, but I doubt it, at least at any noticeable distance from the Brazilian border.

Reichenbachia hirsuta, Spreng., *Syst. Veg.*, i, 94.

Asuncion (167). November-March.

A small tree 5-8 m. in height, placed by Sprengel and Choisy in this Order, but somewhat anomalous, and thought by Hooker to constitute a new family. Leaves thick, obovate, acute at both ends, green above, hoary with a white stellate tomentum beneath. Branches, peduncles, and exterior of the corolla covered with the same tomentum. Flowers in axillary clusters along the branches, 2-10 or more in a cluster, apetalous, tubular, 10 or 12 mm. long. Perianth with 4 small lobes, unequal, rotate in anthesis, yellowish above. Stamens 2, inserted on a disk beneath the ovary. Ovary 1-celled, 1-ovuled. Stigma penicillate. Fruit with a single flattish, black and shining seed in the persistent perianth. This grows on the borders of thickets and is also planted on the borders of fields.

Pisonia combretifolia, Mart. *Fl. Bras.*, xiv, pt. 2, 380.

Asuncion (686); Pilcomayo River (999). April-June.

A fine tree 10-20 m. high, 1 m. or more in diameter at the base, with brown or grayish, furrowed or shaggy bark on the trunk, downy on young branches and on the inflorescence. The limbs are nearly horizontal; the flowering twigs erect and crowded, giving to the tree the look of a flat topped head with several tiers of projecting branches below. Leaves numerous, opposite or scattered, glabrous, a little revolute, oval or obovate, obtuse at the apex, sloping at base into a petiole 1-2 cm. long, the largest blades 7 cm. long and 3½ cm. wide. Flowers creamy-white and very fragrant, in large paniced cymes at the summit of the branches. They are polygamo-dioecious. Bracteoles at the base of the corolla 5, minute, caducous. Perianth epigynous, normally of 5 segments, but often

varying to 6, 7, or 10, the segments ovate, 4 or 5 mm. long, spreading wide open in anthesis. Perfect flowers with well developed stamens, as many in number as the perianth segments and alternate with them. Style protruding through a fringe of hairs upon the summit of the ovary, and divided at the apex into 2 or 3 stigmatic portions. Ovary inferior, with 2 long 1-ovuled cells. I am more particular to describe the structure of these flowers because there is a good deal of confusion in the characters of *Pisonia* as given in the books, at least judging from my specimens. This tree is known among the natives as *Palo blanco* because both the wood and flowers are white.

ILLECEBRACEÆ.

Pentacæna ramosissima (D.C.), H. and A. in Hook. Bot. Misc., iii, 338.

Between Paraguay and Luque (858). December.

Creeping, many-branched from the base, with numerous small crowded, subulate, spiny-pointed leaves, $2\frac{1}{2}$ dm. high. Perianth segments in fruit 5 sharp spines. The plant reminds me in general appearance of our *Scleranthus annuus*. Growing in hard soil on the railway track.

AMARANTACEÆ.

Iresine celosioides, L., Sp. Pl., Ed. 2, 1456.

Asuncion (144). November-January.

Kokera paniculata (L.), Kuntze, Rev. Gen. Pl., 542.

Asuncion (746). June.

A slender-stemmed, branching herb, 8-12 dm. high, with naked racemes of flowers in small opposite or alternate clusters along the rachis. Flower axis rising from leaf axils, sometimes nearly 30 cm. long. Roadsides.

Amarantus chlorostachys, Willd., Hist. Amarant., xxxii, t. 10, f. 19.

Caballero (442); Pilcomayo River (980 and 1062). January-June.

This was found growing on the campos of the Pilcomayo River, frequently attaining a height of more than 3 m., with great panicles of spikes, some of them 5 dm. in length.

Amarantus viridis, L., Sp. Pl., Ed. 2, 1405.

Asuncion (335); Pilcomayo River (1018). = Balansa 1968.

The common Pigweed of the country, frequent in cultivated and waste grounds. To be seen the year round.

Pfaffia glauca (Mart.), Spreng. Syst. Veg. Cur. Post., 107.

Pilcomayo River (1066); Asuncion (140). November-June. = Balansa 1959.

Herbaceous. Stems widely branching, 8-12 dm. high, smooth below, downy on the inflorescence. Flowers in large loose panicle clusters, the clusters small and often on long naked peduncles. Perianth small, the segments white, the head composed of numerous, crowded, sessile flowers. Leaves linear or lanceolate, hoary with a close tomentum. The whole plant has a glaucous tint, and the long, widely branched, naked panicle of the inflorescence, with the small terminal flower heads, give it a peculiar appearance.

Pfaffia insulariflora (Mart.), Distr. Syn. Pl., i, 868.

Asuncion (144a and 184). November.

Mogiphanes rosea, Morong, n. sp.

Stem erect, branching, 20-40 cm. high, striate, strigose-pubescent, rising from large, fleshy or tuberous roots. Leaves opposite, ovate, entire, sessile, or the lowest pair on petioles about 3 mm. long, acute and mucronate, strigose-pubescent, the hairs jointed, midnerve below prominent; the largest 5 or 6 cm. long by 3-3½ cm. wide. Heads naked, nearly globose at first, becoming cylindrical, 1-2 cm. long. Flowers rose-colored. Bracts membranous, ovate, cuspidate, the upper margins dentate or fimbriate, keeled, the keel more or less pubescent, about 2 mm. long. Perianth segments acute, strongly 3-nerved, slightly pubescent, 5 mm. long. Filaments capillary, as long as or longer than the staminal tube; anthers ovate. Staminoidea broad and flat, surpassing the stamens, lacerate at the apex. Ovary oblong; style minute; stigma globular, obscurely lobed. Seeds cylindrical, shining, 3 mm. long.

This pretty flower occurs in open grounds around Asuncion, its rose-colored, long-peduncled heads at once attracting attention (221). = Balansa 1943. December-January.

Telanthera ficoidea (L.), Mart. Nov. Gen., ii, 52.

Pilcomayo River (922). February.

Corresponding very well to this species as described in Fl. Bras., v, pt. 1, 171. The segments of the perianth, however, are 5 mm. in length, with 3 strong, fuscous nerves, pubescent between the

nerves and on the margins nearly to the apex. The plant is herbaceous, with a slender, widely branching stem, which is glabrous below and pubescent at the summit. Flowers white, in small sessile, axillary heads. Leaves opposite, lanceolate, mucronulate, very glabrous, sloping at the base into petioles 5-10 mm. long, comparatively few, separated by long internodes. Seeds flat.

Telanthera phyloxeroides (Mart.), Moq., D.C. Prod., xiii, pt. 2, 362.

Asuncion (168). November.

A weak-stemmed herb in moist grounds, prostrate below and rooting at the nodes, the ascending portion 2-5 dm. high. Flowers silvery-white, in terminal heads, on peduncles 2-7 cm. long, very handsome. Heads globular or becoming cylindrical with age, 1-2 cm. long. Leaves glabrous, narrow lanceolate, mucronulate, narrowed at the base and sessile, 4-8 cm. long. The stems are glabrous below, fringed with 2 lines of hairs on the uppermost internodes. They are also somewhat swollen and ruddy at the nodes.

Alternanthera pilosa, Moq., l. c., 357. Ex descr.

Asuncion (40). November-February.

A creeping plant with numerous small sessile heads of white flowers in the axils of the leaves, the stems often rooting at the nodes and running for 10 cm. or more upon the ground. It is much branched, and appears as if in mats. The heads are entirely free from spines, globular or ovoid, 5-9 mm. in length. Leaves spatulate or obovate, the largest blades 2-3 cm. long and 8-10 mm. wide, sloping into a short petiole, scantily pilose beneath. The stems are pilose on the young branches, especially at the axils of the leaves and under the heads where they are almost woolly. Very common along the edges of the sidewalks in Asuncion and in the suburbs.

Some of this was distributed as *A. Achyrantha*.

Alternanthera pungens, H. B. K., Nov. Gen., ii, 306.

A. echinata, Sw. in Rees Cyc., Suppl. no. 10.

Asuncion (39): November-February.

This plant is prostrate, spreading on the ground for 3 dm. or more, rooting at the nodes, very branching in all directions. It is a much larger species than no. 40, though similar in habit, with longer stems and larger leaves, but unlike that it has echinate heads, the bracts and 2 of the perianth segments being armed with

long spines. Perianth with segments 6 or 7 mm. long. Heads silvery-white, densely woolly at the base. It occurs with no. 40.

Alternanthera Chacoensis, Morong, n. sp.

Stem decumbent and rooting at the lower nodes, compressed, striate, pilose, thickened and woolly at the nodes, the young shoots woolly, 3-5 dm. high, much branched. Leaves 2-6 cm. long, 8-20 mm. wide, opposite, entire, glabrous above, appressed-pilose beneath, pellucidly lined, obovate, acute and cuspidate at the apex, sloping into a petiole 5-15 mm. long, or the uppermost sessile. Heads sessile, axillary, about 5 mm. in diameter, not spinous. Sepals silvery white, oblong, obtuse, glabrous, equal, 1-nerved, sometimes obscurely tricostate at the base, about 3 mm. long. Bracts shorter. Stamens 3, much longer than the pistil; stamules entire.

This species approaches both *A. sessilis* and *A. paronychioides*, but differs from them in being ascending, in having obtuse and 1-nerved sepals and compressed and more woolly stems. The leaves, as in those species, are often in pairs of unequal size.

In the Chaco territory, Pilcomayo River (1587). February.

Gomphrena decumbens, Jacq., Hort. Schönbr., t. 482.

Asuncion (42, 73, and 73½). October-January.

A very pretty and interesting species, quite common in open places about Asuncion, and in the streets of the city. Stems erect, bushy-branched from the base and spreading, lanate, the long white hairs appressed. Heads terminal, subtended by a pair of leaves, at first ovate, elongating with age, woolly-haired under the bracts and perianth segments. The most common is no. 42, with silvery-white heads. No. 73 has purple heads. No. 73½ is a rare variety, with yellow heads, 1-2½ dm. high, with long, fleshy roots.

Gomphrena perennis, L., Sp. Pl., 224.

Pilcomayo River (923). February.

Herbaceous. Stem strigose-hairy, trichotomously branched. Perigonium tipped with yellow at the summit, all the sepals and bracts otherwise silvery-white and woolly at the base. The 2 lateral bracts crested and keeled on the back. Heads globular, on long naked peduncles, each head subtended by 1-2 broad, ovate, mucronate, strigose-hirsute bracts. Sometimes the peduncles are as much as 30 cm. in length, and bear 1 or 2 lateral heads as well as the terminal one. Leaves very few, mostly confined to the lower part of the stem, sessile, strigosely hairy, pellucid punctate, the

largest I collected 6 cm. long and 2 cm. broad. The absence of leaves from the upper part of the stem gives the plant a very straggling, naked appearance. When the lateral heads occur they are in pairs, and frequently run together so as to appear but one. A head that I measured was nearly 2 cm. in diameter.

We first named this *G. pulchella*, Mart., but we are indebted to Mr. N. E. Brown, of Kew, for a revision of the determination.

Froelichia lanata, Moq., l. c., 422.

Pilcomayo River (850). Decem̄ber. = Balansa 1947.

Herbaceous, with slender, scapose stems, several rising from the same root, 25-35 cm. high. Nearly all the leaves are in a radical tuft, 1 or 2 occurring upon the lower part of the stems. They are oblanceolate, acute at the apex, sloping into a long petiole, glabrous and opaquely dotted above, lanate beneath, 3-9 cm. long and 8-10 mm. wide at the summit. Scapes more or less lanate. Flowers in terminal spikes, the lower remote; perianth scarious-bracted and its segments very woolly as in all the species. On the campo near the railroad between Luque and Paragua, 12 or 15 miles northeast of Asuncion.

CHENOPODIACEÆ.

Chenopodium anthelminticum, L., Sp. Pl., 220.

Pilcomayo River (909 and 1543). January-February.

Our Guarani peons on the Pilcomayo River attributed great medicinal virtue to the Roman Wormwood, which grows profusely along the banks. I frequently saw them gathering the spikes and stripping the flowers and fruit into tin cups for the purpose of steeping them into tea.

Chenopodium glaucum, L., Sp. Pl., 220.

Pilcomayo River (918). January-February.

Chenopodium Tweedii, Moq., D.C. Prod., xiii, pt. 2, 63.

Pilcomayo River (1005). April.

Salicornia Gaudichaudiana, Moq., l. c., 145.

Pilcomayo River (887). January.

Fond of salt soil like all its relations, as it was growing only on the borders of a saline pool at the Laguna de las Palmas.

Boussongaultia baselloides, H. B. K., Nov. Gen., vii, 186.

Asuncion (623); Pilcomayo River (994). March-April.

A very slender vine twining over bushes and shrubs. The flowers are greenish-white, sometimes a dark maroon color, minute, spreading rotately in anthesis, in numerous, very slender axillary racemes, the racemes solitary or paniced. Leaves alternate, entire, glabrous, pointed at the apex, subcordate, petioled, the largest blades collected 6 cm. long by nearly as broad at the base.

PHYTOLACCACEÆ.

Rivina humilis, L., Sp. Pl., 121.

Asuncion (263 and 748); Pilcomayo River (1544). December-June.

Pettiveria alliacea, L., Sp. Pl., 342.

Between Villa Rica and Escoba (530); Asuncion (770); Pilcomayo River (948). January-May.

This plant, also occurring in South Florida, has a curious provision for the dissemination of its seed which is worthy of notice. The linear-cuneate achenium has at the blunt apex 4-6 little knees from which project as many weak spines, at first somewhat erect, afterwards hardening and becoming reflexed and appressed, $\frac{1}{2}$ as long as the achenium, or some 3 or 4 mm. in length. As the fruit is easily drawn out of the enveloping sepals and these spines readily catch upon passing animals, an excellent means of dispersion is afforded.

Microtea debilis, Sw., Prodr., 53.

Caballero (471). January.

Seguiera Paraguayensis, Morong, n. sp.

A tree 14-17 m. or more in height, with a rather slender trunk and dark gray bark, the branches smooth and with lighter colored bark. Found only in fruit. Leaves oval, entire, coriaceous, glabrous, obscurely but hardly reticulate-veined, the margins with a callous edge, emarginate and mucronate, rounded at the base, the largest blades collected 6 cm. long and 4 cm. wide: petiole about 1 cm. long. Stipules tuberculiform or a minute straight spine. Samara 2-2½ cm. long, thickened at the base and expanding into an obtuse wing 8-10 mm. broad, the wing angled, thickened and nearly straight on the upper side, and very thin, cristate and curved on the lower side, nerved on the face, the nerves sloping towards the lower margin and often branching.

Seeds round, flattened, with a black membranaceous testa, 4 mm. long. Fruit in axillary or terminal and panioled racemes, on capillary pedicels 5-8 mm. long.

Roadsides east of Asuncion (690). May.

Seguiera coriacea, Benth., Trans. Lin. Soc., xviii, 235. Ex descr.

Asuncion (645 and 660). April.

A half-climbing shrub, diffusely branched at the summit, $2\frac{1}{2}$ -3 dm. high, striate, glabrous below, the young branches and inflorescence tomentose. The samara, which has not been described, is $2-2\frac{1}{2}$ cm. long, the wing narrow at the lower part and much expanded above, rounded at the apex and 10-12 mm. broad, many and closely nerved on the faces. Seeds round, flattened, reddish colored, 5 mm. long. The stipules are straight, stout thorns, thick at the base, often 2 cm. long. The branches of the panicle are also frequently subtended by a thorn. It has ample panicles of white flowers, and produces samaras profusely. Common in thickets.

POLYGONACEÆ.

Polygonum punctatum, Ell., Bot. S. C. and Georg., i, 455.

P. acre, H. B. K., Nov. Gen., ii, 179, not Lam.

Asuncion (88); Pilcomayo River (1033). November-May.

Abundant in the lowlands on the river-side at Asuncion, and also occurring in the waters of the great laguna on the Pilcomayo River.

Polygonum acuminatum, H. B. K., l. c., 178, var. *microstemon*.

Meisn. in Mart. Fl. Bras., v. 14, t. 4, f. 2.

Pilcomayo River (1060). June.

Leaves of this species are linear-lanceolate, some of them over 20 cm. long, appressed-pubescent on both sides, sessile or subsessile. Fruit lenticular, black and shining. Ochreae long and setosely ciliate, the bristles nearly 1 cm. long. Stem terete, perfectly glabrous, except at the top, where it is hairy. Spikes thick, cylindrical. Flowers white.

Polygonum hispidum, H. B. K., l. c., 178.

Pilcomayo River (1026). May.

This species differs from no. 1060 in having a very hispid stem, ovate or lanceolate, acuminate and black punctate-dotted leaves, and the ochreae hypocateriform, with shorter ciliae. The spikes are thick and cylindrical, red like those of our Prince's Feather;

flowers rose-tinged; seeds flattish, almost oval, dark colored, not so smooth or shining as in *P. acuminatum*. Many of the stem hairs are glandular.

Not only on the banks, but often growing in the water. It was plentiful in the great laguna.

Muhlenbeckia sagittæfolia, Meisn., D.C. Prod., xiv, 148.

Pilcomayo River (1038). May.

A twining plant with glabrous stems and numerous long, loose spikes of small, greenish-white flowers, the spikes solitary, leafless, 6-15 cm. in length. Leaves with small capillary auricles or subhastate at the base, the highest linear, lowest oblong or cordate-ovate. Style short, trifid; stigmas fimbriate. Fruit glabrous, obtusely 3-angled. The sepals turn red in fruit.

The plant from which my specimens were gathered was growing on the top of an old palm stump which stood in the water of the great laguna on the Pilcomayo River, and at its root was nesting a colony of small red ants. How they got there through such an expanse of water was a mystery.

Coccoloba Paraguayensis, Lindau in Eng. Bot. Jahr., xiii, 218.

Asuncion (197 a). November-April. = Balansa 2000.

My specimens differ a little in some points from those of Balansa as described by Lindau. A shrub 1-2 m. in height, canescent; the branches glabrous, striate, rising at an angle more or less acute. Leaves of a tawny color, elliptical, coriaceous, entire, obtuse at the apex, narrowed and subcordate at the base, 5-10 cm. long and 2-4 cm. wide, strongly reticulate-venose, the veins prominent beneath, the lateral curving just before reaching the margin and running for some distance along the edge. Petioles about 1 cm. long, glabrous, canaliculate. Flowers white, alternate, in slender axillary racemes 5-10 cm. long, the rachis angular; pedicels $1\frac{1}{2}$ mm. long. Ochreæ caducous. Ochreolæ scarcely 2 mm. long, lax, cup-shaped, bilobed. Bracts 1 mm. long, acute, decurrent. Fruit obtusely 3-angled, conical, truncate at base, 5 mm. long and 5 mm. broad, rather loosely invested by the persistent sepals. Seeds fuscous, shining, smooth.

Coccoloba spinescens, Morong, n. sp.

A small tree with silvery gray bark, glabrous, 6-7 m. high, the young branches striate. Quite thorny, the thorns consisting of the sharp, indurated

ends of the short branches or branchlets. Branches at right angles to the stem. Leaves coriaceous, veined and colored like 197 a, but sometimes oval as well as elliptical, small, only 2-2½ cm. long and 1-1½ cm. broad, rounded or barely subcordate at the base, obtuse at the apex, on nearly capillary, downy, plane petioles 2-4 cm. long. Flowers minute, greenish-yellow, alternate, in nearly capillary racemes 3-4 cm. long, the rachis sharply angled, pedicels 1 mm. long. Ochreae caducous. Ochreae and bracts as in no. 197 a, but scarcely ½ mm. long. Perianth segments reflexed. Style short, 3-divided, curling downwards over the ovary; stigmas 3, capitate. Fruit ovoid, attenuate at both ends, 6 mm. long and 3-4 mm. in diameter, obtusely 3-angled, the persistent enclosing sepals closely appressed. Seeds black, shining.

Deep woods on the banks of the Pilcomayo River (882). January.

Coccoloba microphylla, Morong, n. sp.

A small tree, much branched, with dark, rugose bark, 5-8 m. high, glabrous, the young branches striate and lighter colored. Leaves oblong-elliptical, coriaceous, glabrous, dark green, obtuse at the apex, narrowed at the base, on glabrous, canaliculate petioles 5 or 6 mm. long, the blades 3-9 cm. long and 1½-2½ cm. broad. Flowers white, in axillary racemes 5-8 cm. long, not over 5 mm. high, commonly 2 contained in the same ochrea, mostly crowded on all sides of the rachis; pedicels 2-3 mm. long. Ochreae about 5 mm. long. Ochreae 3-lobed, 2 mm. long. Bracts obtuse. Styles 3, erect; stigmas 3, capitate. Fruit ovoid, obtusely 3-angled, 5-8 mm. long.

This, like the preceding species, grows in dense thickets on the banks of the Pilcomayo (899). — Balansa 2059. January.

ARISTOLOCHIAEÆ.

Aristolochia Giberti, Hook., Bot. Mag., t. 5345.

Near Luque (714). May.

A very handsome climbing vine, clambering over trees. The large round-cordate, glaucous leaves are on petioles 3-5 cm. long, having rounded, foliaceous, sessile stipules in their axils. The flowers are solitary, conspicuous for their shape and color. The 2 projecting lobes stand out of the inflated body at right angles, giving the flower the look of a duck or swan swimming in the water. For this reason it is popularly called *patito*, or little duck. Flowers greenish, striped or spotted with purple. The pods are cylindrical, 4 cm. long, 2 cm. in diameter, truncate at both ends, filled with thin, flat, obovate seeds.

PIPERACEÆ.

Named by M. Casimir DeCandolle.

Piper fulvescens, C. D.C., ined.

Asuncion (760). June.

A rather succulent, much branched suffrutescent plant, growing in large clumps in swampy places. Stem glabrous, angular, 1-2 m. high. The cylindrical spikes are numerous, 5 to 10 cm. long. Flowers white. Leaves succulent, alternate, broadly cordate-ovate, abruptly acute at the apex, palmately veined, the blades some of them 20 cm. long and nearly as broad; petioles 1-5 cm. long.

Piper Gaudichaudianum, Kunth., D.C. Prod., xvi, pt. 1, 277.

Asuncion (705). May.

A shrub 3-4 m. high, with greenish, downy, brittle stems, swollen at the nodes. Leaves minutely pellucid-punctate, lanceolate, obtusely acuminate, rough on the upper surface, 10-12 cm. long and 4 or 5 cm. broad, on short thick petioles. The lateral nerves, 3-5 on a side, arise from the midrib, sunken above and downy and prominent beneath. The rat-tail spikes are 8-10 cm. in length. Flowers androgynous, the staminate and pistillate mixed in various ways on the same spike. Woods at Villa Morra near Asuncion.

Piper medium, Jacq., Icon. Rar., i, 2, t. 8.

Asuncion (692). May.

Much like the preceding species in appearance, but differs in having broad elliptical leaves, which are 5-7 nerved from the base, 10-12 cm. long, 6 or 7 cm. broad, and glabrous on both sides. Spikes thicker. In thickets with no 705.

Peperomia Barbarana, C. D.C., Mem. Soc. Phys., xxvii, t. 11.

Caballero (393). January.

A small, branching, succulent plant, 15-25 cm. high. Spikes of minute flowers 10-12 cm. long. Growing in damp woods.

Peperomia nummulariæfolia, H. B. K., Nov. Gen., i, 66.

Caballero (392). January.

A delicate vine, climbing by rootlets upon old trees. Leaves small, orbicular, 5 mm in diameter, diaphanous. Flowers in slender spikes.

Peperomia pseudo-Diuidyguensis, C. D.C., l. c., t. 1.

Pilcomayo River (955). March.

A low succulent plant 20-30 cm. high, with downy stems and leaves. Spikes very slender, 4-8 cm. long, very numerous. This plant has a white rootstock, fibrously rooting at the joints, and with buds here and there from which new plants spring, running for a long distance under the leaves. It grows in deep woods under the shade of large trees. It differs from the preceding species in having a thicker and downy stem, elliptical, downy, 3 nerved leaves, sloping at the base, 3-7 cm. long, while no. 393 is smooth throughout, stems and leaves diaphanous, the leaves rounded and 5 nerved, $1\frac{1}{2}$ - $2\frac{1}{2}$ cm. long.

Peperomia radicans, C. D.C., l. c., t. 2.

Pilcomayo River (1545). March.

Growing with 955 and much like that. It differs in being much smaller, the stems rising from an erect rhizome, leaves elliptical or oval, $1\frac{1}{2}$ - $2\frac{1}{2}$ mm. long and 6-12 mm. broad, and with stems and leaves more densely villous.

LAURINE.E.

Ocotea acutifolia (Nees), Mez., *Jahr. Bot. Kon. Bot. Gart. Berl.*, v, 340.

Near Asuncion (758). June.

A small tree 3-7 m. in height, with grayish bark, glabrous, the young branches and inflorescence downy, with a yellowish-green tint. Leaves shining green above, lighter and slightly downy beneath, entire, elliptical, obtusely pointed at the apex and sloping at the base into a petiole 12-18 mm. long, the largest blades collected 10-16 cm. long and 4-6 cm. broad. Flowers in large, loose terminal panicles, light yellow, or yellowish-green, fragrant.

Growing by water-courses or in damp woods.

Ocotea laxiflora (Meisn.), Mez., l. c., 370.

Asuncion (152). November.

A shrub 3 or 4 m. in height, with yellowish-green branches. Flowers much like those of no. 758, but in more branched and laxer axillary panicles. Leaves glabrous, coriaceous, and shining as in that, but smaller, oblong-elliptical, the blades 7-10 cm. long and 2-2 $\frac{1}{2}$ cm. broad, the lateral nerves scarcely visible. Thickets.

LORANTHACEÆ.

Loranthus cordatus, Hoffmans. in Schultes Syst. vii, 128.

Gran Chaco near Asuncion (352). December.

A parasite growing in large bunches upon *Piptadenia rigida*, Benth. Leaves thick, opposite, coriaceous, lanceolate, obtuse, cordate-amplexicaul. Flowers in terminal clusters, dark red, tubular, 5 cm. long, the tube short, splitting into 6 linear lobes above, at length much longer than the tube. Stamens 6 on the corolla, and about as long, and they with the style exerted in anthesis. A singular and very handsome species. The host is sometimes called the Timbo, but is not the true Timbo, which is *Enterolobium contortissimum*.

Phoradendron acinacifolium, Mart. Fl. Bras., v, pt. 2, 117.

Pilcomayo River (1546). March.

A species which is distinguished by its oblong berries, 4-6 mm. in length. The leaves are obovate or often shaped like a cimera, whence the specific name.

Parasitic on the Quebracho Colorado.

Phoradendron Perottetii (D. C.), Eich. in Mart. Fl. Bras., v, pt. 2, 112.

Gran Chaco near Asuncion (358); Pilcomayo River (954). December-March.

A large mistletoe which occurs in the Gran Chaco opposite Asuncion on *Piptadenia* and on the Pilcomayo River on the Quebracho Colorado. It has very large, thick, elliptical leaves; the flowers arranged in jointed spikes along the stems.

Phoradendron rubrum (L.), Griseb. Flor. Brit. W. Ind., 314.

Asuncion (618). March.

Found only in fruit. Parasitic on *Lycium Morongii*. Leaves linear-oblongate, 3-8 cm. long and 1-1½ cm. wide, sessile or minutely petioled. Berries red, pulpy, mucilaginous.

Phoradendron obovatifolium, Morong, n. sp.

Branches alternate or sometimes opposite, tetragonous, striate, anapical, strongly flattened beneath the nodes; older stem becoming free from striæ and more or less terete. Leaves opposite, obovate, sometimes orbicular-obovate, rounded, obtuse, and mucronate, sometimes slightly emarginate at

the apex, narrowing and with the margins recurved at the base; the blades 12-17 mm. long, 8-16 mm. broad, 3-nerved, the nerves obscure or obsolete above, the midrib prominent below for the whole length of the blade, and the lateral nerves distinct or obscure; petiole 1-3 mm. long, axillary with the decurrent midrib. Spikes solitary, axillary, 8-12 mm. long, bearing 3-4 verticils of flowers, the flowers 3 or 4 pistillate and 1 or 2 smaller staminate in a verticill. Berries ovoid, verrucose, about 2 mm. long. The cataphyllary sheaths slightly bifid, the teeth obtuse and ciliate; bracteal sheaths nearly or quite truncate, not ciliate.

This species is apparently closely related to *P. Ottonis*, Eichler (Flor. Bras., v, pt. 2, 119), but differs from it in several particulars, and still more from *P. emarginatum*, Mart., with which Eichler associates *P. Ottonis*.

Growing with no. 358 upon *Piptadenia* in the Gran Chaco, opposite Asuncion (1582). December.

EUPHORBIACEÆ.

***Euphorbia heterophylla*, L., Sp. Pl., 453.**

Pilcomayo River (867 and 1547). January.

Growing on the campo at a wood-cutting station on the lower Pilcomayo, known as Obraje de Pedro Gill. Broad oval-shaped leaves.

***Euphorbia pulcherrima* (Graham), Willd., Boiss. in D.C. Prod., xv, pt. 2, 71.**

Asuncion (742).

This fine plant is cultivated largely in the flower-gardens of Paraguay. I do not think, however, that it grows wild in the country. It is a native of Mexico and Central America. It is conspicuous for the large showy red floral leaves, and sometimes grows 2½ m. high. It flowers nearly the entire year round.

***Euphorbia serpens*, H. B. K., Nov. Gen., ii, 41.**

Pilcomayo River (851). January. — Balansa 1686.

***Euphorbia thymifolia*, L., Sp. Pl., 454.**

Asuncion (64). November.

A small spreading, prostrate plant, growing in grassy grounds. Leaves opposite, oblong, obtuse, nearly or quite equilateral at the base, 1-nerved, glabrous or puberulent, 5-7 mm. long; petioles about 1 mm. long. Flowers minute; glands 4, small, concave,

stipitate. Capsules pubescent, about 1 mm. long; seeds in my specimens tetragonous, with even sides and no furrows of any kind.

***Euphorbia hypericifolia*, L., Sp. Pl., 454.**

Asuncion (372); Pilcomayo River (932). November–February.

The plants vary considerably. The stems and capsules, generally glabrous, are sometimes pubescent. Leaves occasionally linear, falcate, acute and entire, but usually they are well marked, and the seeds are entirely of this species. The plant often grows in the streets of Asuncion as well as in the suburbs. On the campo along the Pilcomayo it sometimes attains a height of 1 or 1½ metres.

***Phyllanthus orbiculatus*, L. C. Richard, Act. Soc. Par. 1792, p. 113.**

Asuncion (678). April.

Growing in old cultivated fields. Stem erect, slender, 15–20 cm. high. Juice watery, not milky as in *Euphorbia*. Flowers white, minute, axillary; pedicels in fruit reflexed and 2 mm. long. Leaves orbicular, alternate, glabrous, about 1 cm. in diameter. Capsules depressed-globose, smooth, 6-seeded; seeds pitted on the convex back.

***Phyllanthus Chacoensis*, Morong, n. sp.**

A tree 8–12 m. high, with crooked, straggling limbs, which begin near the ground and are often much crowded and horizontal, 3–4 dm. in diameter at the base, with much broken, shaggy gray bark; the wood very hard. Leaves pinnate, with 5 or 6 subopposite leaflets, the leaflets oval or nearly orbicular, entire, coriaceous, glabrous, shining, slightly cordate at base, 2–7 cm. long and 2–3½ cm. wide, nearly sessile. Flowers monœcious, about 2 mm. high, and on a pedicel of the same length, all on the old wood and appearing before the new leaves, in very slender racemes, which are usually densely crowded, and from 3 to 6 cm. long. Glands of the disk wanting. Perianth segments normally 4, purple and white or sometimes greenish, obovate, fringed at the apex. Staminate flowers normally with 4 free stamens opposite the segments. These, however, vary very much, and they and the perianth segments are 4, 6 and 7 in number, the segments separate or sometimes partly united. Pistillate flowers with a 2- or 3-celled ovary, each cell 2-ovuled. Style short, 2-divided, each division splitting into 2–4 stigmas, which curl downwards over the ovary. Fruit a small bluish, 2-celled drupe, which, when dry, has a thick corky putamen, oval, 5 or 6 mm. long.

In the Gran Chaco, opposite Asuncion (355). = Balansa 1712, and Fendler Panama 140 and 323. September–January.

***Jatropha vitifolia*, Mill., Dict.**

Trinidad (794). October. = Balansa 1720.

Soft stemmed, suffruticose, with copious milky juice, $\frac{1}{2}$ -1 m. high. Stem and lower surface of leaves beset with straight, transparent, 1-2 celled spines, which are about 1 cm. long, pulvinate at the base. Leaves alternate, palmately 3-5 nerved, the nerves prominent beneath, 5-7 lobed, the lobes cut-incised and spiny at the apex, on white spiny petioles 5-8 cm. long, the blades 8-14 cm. long and about as wide. The upper surface of the leaf smooth, green, white spotted. Flowers white, tube shorter than the 5 spreading lobes. At first the perianth is greenish below and spiny, afterwards becoming pure white and glabrous, large (2-2 $\frac{1}{2}$ cm high). Stamens numerous, in a column as if Malvaceous, with several series, one above the other. Style 2-divided, each division with several thread-like stigmas. Ovary spiny.

This very spinous plant is rather a dangerous thing to handle, notwithstanding its clusters of handsome flowers, for its needle-like spines can inflict a severe and smarting wound.

***Jatropha gossypifolia*, L., var. *breviloba*, Morong, n. var.**

Differs from the type as described in Fl. Bras. in having the leaves shortly 3-5 lobed, the ovary and exterior of the perianth laciniæ, and all parts of the plant, including the inflorescence, glabrous.

I append a fuller account of this species than has ever been given. It is usually a shrub 2-3 m. high, but sometimes when used as a shade tree, as it often is in Asuncion, it attains a height of 5-7 m. Leaves broad-ovate or orbicular in outline, palmately veined and subcordate, acute-aristate at the apex and on the sharp lobes. The stipules are peculiar, being setose, dichotomously divided, each branch tipped with a small round gland, often 1 cm. or more in length. The margins of the leaves, bracts, and laciniæ are setaceously ciliate and tipped with glands. Flowers in small terminal cymes, monœcious; staminate flowers with 5 petals yellowish-green on the margins, brownish-red in the middle, purple-striped below on the outside, spreading in anthesis, 5 mm. long; stamens 8, united below, dimorphous, 5 short and 3 long, the shorter ones shedding their pollen before the others open. Styles 3, united below, persistent, with 3 capitate stigmas. Fruit $1\frac{1}{2}$ cm long by 1 cm broad, truncate at the apex. Seeds flattened-cylindrical, boat-shaped on one face and angled on the other, glabrous, brownish in color, with

a large lobed caruncle at the lower end. When cut the stem exudes a copious watery milk.

One of the most striking plants on the lowlands near the river at Asuncion (71). November-December. = Balansa 1718.

***Croton glandulosus*, L., Sp. Pl., Ed. 2, 1425.**

Asuncion (113).

Common in waste grounds, and flowering from November to June.

***Croton lobatus*, L., Sp. Pl., 1005.**

Pilcomayo River (939). February.

Herbaceous. Stems glabrous, dichotomously branched, 4-6 dm. high. Leaves 3-5 lobed. Petioles 1-4 cm. long, with numerous minute glands at the summit.

***Croton migrans*, Casar., Nov. Stirp. Bras., Dec., 88.**

Caballero (518). January. = Balansa 1650.

A shrub about 3 m. high, with dark lepidote stem, much branched. Leaves scattered, numerous, dark green and glabrous above, silvery white lepidote below from base to apex, the minute scales dark, ciliate, with closely appressed, radiating silky white hairs; petioles 3 or 4 mm. long; the blades linear, $2\frac{1}{2}$ -4 cm. long and 2-4 mm. wide, keeled beneath, and with no appearance of lateral nerves. Racemes 2-4 cm. long, mostly staminate above, with 2-4 pistillate flowers below. Staminate flower 2 mm. high; stamens 9. Pistillate flower a little larger; styles 5. Fruit globular, 3 or 4 mm. long; seeds black, shining, lenticular.

Growing in swampy grounds.

***Croton rhamnifolius*, H. B. K., Nov. Gen., ii, 75.**

Caballero (503). January.

A shrub 3-7 m. high, with a tawny-haired stem. Leaves lanceolate, with tawny, stellate tomentum beneath, dark green and soon glabrate above, the lateral nerves distinct, blades 3-6 cm. long and 1-2 or more cm. wide; petioles 3-5 mm. long. Flowers in terminal racemes, 5-14 cm. long, the staminate above and pistillate below. Stamens about 15. Fruit globose, about 5 mm. long, stellate-tomentulose; seeds smooth, fuscous, flattish on one side. The whole inflorescence covered by a hoary, stellate tomentulum.

Croton Urucurana, Baill., Obs. Bot., iv, 325.

Asuncion (218); Villa Rica (612). December-February.

A shrubby plant 1-3 m. high, covered in all its parts, except the upper surface of the leaves, with stellate, hoary tomentum. Leaves broadly cordate-ovate, acuminate, entire or minutely and remotely denticulate, 6-18 cm. long and 4-12 cm. broad at the base; petioles 4-6 cm. in length. Flowers greenish-white, in long (20 or more cm.) terminal racemes. Stamens upwards of 15, much exerted. Capsule $4\frac{1}{2}$ mm. long and $5\frac{1}{2}$ mm. broad, containing 3 shining black seeds which are angled and furrowed longitudinally on the sides. The leaves of this plant are strongly aromatic when bruised.

Croton vulnerarius, Baillon, l. c., 326.

Asuncion (1548). June.

A shrub similar to nos. 218 and 612. Leaves not so large, denticulate. Racemes shorter (10-12 cm.). Seeds very different, being nearly flat, several ribbed on both sides and yellowish-brown in color, not shining.

Croton sparsiflorus, Morong, n. sp.

A low shrub $\frac{1}{2}$ -1 m. in height. Stem fuscous, branching irregularly, angular, lepidote, the scales deeply cut by 15-20 appressed radiating hairs. Leaves dark green, alternate, ovate-lanceolate, acute at the apex, cuneate at base, serrate, penni-veined, smooth above, sparsely lepidote beneath, with 2 patch-form glands $\frac{1}{2}$ mm. broad at the base; blades 3-6 cm. long and 1-3 cm. wide; petioles 1-2 cm. long. Stipules mere subulate points, caducous. Flowers in slender terminal racemes, 6-12 cm. long, the flowers continuous, pistillate below and staminate above, the pistillate much fewer. Staminate flowers scattered along the rachis, about 2 mm. high, the perianth segments 5, the outer ovate and glabrous, the interior white and smaller, woolly at base inside, stamens about 13. Perianth segments of the pistillate flower lanceolate, ciliate; inner segments none; ovary tomentose; styles 3, each 2-divided. Capsule angular-globose, 5 or 6 mm. long and 4 mm. broad, sparsely lepidote; seeds flattened-cylindrical, obtusely 2-angled, with a furrow on one side, truncate at either end, glabrous, slightly mamillate asperous, shining, 5 mm. long, the caruncle conspicuous. The young branches and petioles are densely white lepidote.

This plant is common in the waste grounds and streets of Asuncion, and also occurs on the campos along the Pilcomayo River.

Asuncion (43); Pilcomayo River (940). November-March.
= Balansa 1732 and Gibert 97.

Julocroton Gardneri, Muell., Arg. in Mart. Fl. Bras., xl, pt. 2, 276.

Asuncion (349); Pilcomayo River (1017). December-April.
= Gardner 2724, and Balansa 1646.

Shrubby, $\frac{1}{2}$ -1 m. high, glabrous below and stellately pubescent above and on the branches. Leaves crowded at the summit of the stem and branches, alternate, subopposite or sometimes in 3s, obovate, entire, palmately 3-5 nerved, minutely pubescent on both sides with stellate scales, pellucid-punctate, the largest blades collected 8 cm. long and 5 cm. wide; petioles 1-3 cm. long. Stipules setaceous, hairy. Flowers in dense terminal clusters, sessile, or the staminate on a short spike and nearly hidden by the crowded floral leaves. The stem and leaves have a grayish tint.

Julocroton Brittonianum, Morong, n. sp.

A shrub 5-10 dm. high. Stem branched, pubescent below, stellately tomentose above and on the branches. Foliage light colored, with a yellowish tinge. Leaves alternate or occasionally subopposite, ovate, acute at the apex, obtuse at the base, 3-5-nerved, serrate towards the apex, pubescent above and stellately tomentose beneath, 3-5 cm. long, 1-3 cm. broad; petioles stellately tomentose, 1-2 $\frac{1}{2}$ cm. long; stipules setaceous, hairy, caducous. Inflorescence densely tomentose, many of the hairs long and stellately tipped. Flowers inconspicuous, in loose terminal clusters, monoecious. Staminate flowers about 3 cm. high; calyx deeply divided, with 5 ovate lobes, on pedicels 2-3 mm. long; stamens 10, much exserted, densely pilose on the filaments, the alternate filaments with a small strap-shaped petal or petaloid appendage attached to them on the outside near the base. Pistillate flowers larger, sessile, the segments of the perianth long, lanceolate; styles long, 3-divided, each division split into 3 hairy stigmas; ovary large, 3-carpelled; seeds brownish-black when mature, rough, about 3 mm. long, convex on the back, obtusely angled on the face, marked by a large white caruncle at the hilum.

Differs from *J. Gardneri* in being more widely branched, with lighter colored foliage, smaller and serrate leaves, and otherwise, and from *J. pycnophyllus* in having the flowers in loose clusters instead of dense heads, smaller leaves, as well as in other respects.

Obraje de Pedro Gill, Pilcomayo River (864). January.

Julocroton pycnophyllus, Muell. Arg. in D.C., Prod., xv, pt. 2, 706.

Between Villa Rica and Escoba (593). January. = Balansa 1665.

A tall, branching, shrubby plant. Stem and branches compressed-angled, clothed with long ferruginous hairs which are stellate at the top. Leaves elliptical, undulate, palmately 5-nerved, densely clothed with ferruginous stellate pubescence on both sides, on petioles 5-10

mm. long; the blades 7-10 cm. long and $2\frac{1}{2}$ -4 cm. broad. Floral leaves linear-lanceolate. Flowers in dense, compact terminal spikes, which are cylindrical, narrowing at the apex, 3-5 cm. long and 1-2 cm. in diameter.

The whole plant has a yellowish appearance.

Argythamnia Montevidensis (Diedr.), Muell. Arg., *Linnaea*, xxxiv, 147.

Pilcomayo River (996). April.

A shrub about 4 dm high, with many stems springing from a procumbent, contorted base. Stem strict, scarcely branched, pubescent with straight, appressed hairs. Leaves alternate, narrow elliptical, more or less serrulate, with scattered hairs like those of the stem beneath, 3-5 cm. long and $1-1\frac{1}{2}$ broad, sessile or the lowest on minute petioles. Flowers monœcious, the 2 kinds together in axillary clusters. Inner laciniae of the perianth light yellow. Fruit a 3-carpelled capsule, the carpels looking like 3 little nuts joined together, 5 mm. broad, about 3 mm. long, villous. Seeds globose, obtusely 3-angled, a little wrinkled, nearly 3 mm. in diameter.

Caperonia palustris, St. Hil., Pl. Remarq., 245.

Asuncion (382); Pilcomayo River (1047); Caballero (438). January-May.

This genus differs principally from the preceding Euphorbiaceous genera in having its fruit in united triplets, the 3 cocci generally hispid or echinate. The species here noted is a coarse plant 6-9 dm. high, the stems beset with spreading, translucent setae, each tipped with a minute oblong head. Nos. 382 and 1047 have broad oval crenate-serrate leaves, while the leaves of 438 are long, narrow lanceolate and sharply serrate. The last differs so greatly from the other forms that it might almost be considered a distinct species.

Some specimens of 1047 were distributed as *C. castaneaefolia*, St. Hil., which very closely resembles this species.

Manihot Aipi, Pohl., Pl. Bras., i, 29.

Asuncion (390).

Cultivated extensively and sometimes spontaneous in Paraguay. Known as *Mandioca dulce*, or the sweet or innocuous Manioc. A shrubby plant with smooth stems and deeply 6-7-parted leaves, 1- $1\frac{1}{2}$ m. in height. The roots are greatly esteemed as vegetables, looking when boiled for the table something like parsnips. They

are also used for feeding cattle. The meal made by grinding them and drying the pulp, called farina, forms the principal subsistence of the common people. A delicious bread known as chipa is manufactured from it, and it serves as many purposes as wheat flour does in this country. It may be grown most of the year.

Manihot utilissima, Pohl., l. c., 32.

Asuncion (391).

So strongly resembles the preceding species that an unpractised eye cannot tell them apart. The natives, however, readily distinguish them by small differences in color and position of the leaves on the stem. In properties they are opposites, for the juice of this species is a deadly poison. It is known as *Mandioca brava*, and is cultivated to some extent in Paraguay. When the juice is expressed from the grated pulp, and that is dried over the fire or in the sun, it becomes a wholesome article of food. Indeed, some persons expressed to me a preference for the meal made of this species, but I never could discover any difference in taste between the two.

Grown the year round.

Bernardia pulchella, Muell. Arg. in Mart. Fl. Bras., xi, pt. 2, 392.

Caballero (607). January. = Balansa 1688.

A tall shrub or small tree. The fruit as in *Caperonia* in 3 cocci, but these are only minutely pubescent. The staminate flowers are in slender spikes 3-4 cm. long, usually on a different stem or another part of the stem from the pistillate; stamens 8-12. Pistillate flowers few or solitary. Leaves elliptical, narrowed at both ends, sessile, serrate on the upper half, 6-13 cm. long and 2-4 cm. wide, appressed-pubescent on the nerves beneath.

Acalypha communis, Muell. Arg., *Linnaea*, xxxiv, 23.

Pilcomayo River (1549). February.

Acalypha communis, Muell. Arg., var. *hirta*, Muell. Arg. in Mart. Fl. Bras., xi, pt. 2, 350.

Asuncion (189). November.

Suffruticose, usually not quite a metre in height, but sometimes growing into a shrub 2-2½ m. high. A very variable species as to pubescence, shape of leaves, length of petioles, and thickness of the spikes. The form growing in old fields and by the wayside at

Asuncion (var. *hirta*, Muell. Arg.) has lanceolate leaves, acute at the apex, rounded or slightly cordate at the base, crenate-serrate, sparsely pubescent, 5-9 cm. long and 1-2 cm. broad, on petioles 1-3 cm. long; stems covered with long spreading hairs and also a close retrorse tomentum. The form on the Pilcomayo has broad ovate leaves, cuneate or rounded at base, and petioles sometimes 8 cm. long; stems with long, scattered, spreading hairs. Staminate spikes slender, 2-6 cm. long, usually on the stem below the pistillate, both kinds numerous. Pistillate spikes and flowers much larger than the staminate. The long exserted, rose-red and thread-like fringed styles are quite ornamental, and lend a beauty to this rough weed which it would not otherwise possess.

Acalypha hederacea, Torrey, Bot. Mex. Bound. Survey, 200.

Luque (345). December. = Balansa 1691.

A small creeping plant, occurring among grasses and underbrush. Leaves ovate or orbicular, 1-1½ cm. long. Staminate flowers in long, slender spikes, and the pistillate solitary or 1 or 2 in the axils of the leaves or at the base of the staminate spikes. In Texas and Mexico, as well as in Paraguay.

Acalypha ruderalis, Mart.

This was brought back from Kew under the name here given, but we have been unable to find any work in which it is so named or cited.

Caballero (460). January.

Inflorescence as in no. 345, but the stems are erect, 3-4½ dm. high, and the leaves ovate or elliptical, crenate, acute at either end, pubescent on both sides, 2-6 cm. long and 1½-3 cm. wide; petioles 1-1½ cm. long.

Acalypha agrestis, Morong, n. sp.

Suffruticose, 3 dm. to 1 m. in height, the stem and young branches hispid with spreading hairs mingled with a close tomentum, sulcate and more or less compressed above. Leaves alternate, ovate-lanceolate, rounded and subcordate at base, acuminate at apex, crenate-dentate, 5-7 palmately nerved, appressed pubescent above, softly villous beneath, the hairs lying along the nerves in an appressed fringe, blades 6-10 cm. long and 3-5½ cm. wide; petioles hispid, 2-4 cm. long. Stipules setaceous, hispid, much shorter than the petioles. Staminate spikes erect, with compactly crowded flowers, axillary, about 2 mm. thick and 3-4 cm. long, on short peduncles; floral bracts

long ciliate; segments of perianth 5, minutely pubescent, not $\frac{1}{2}$ mm. high. Pistillate spikes terminal, thicker, 6-8 cm. long; floral bracts 7-8 divided nearly to the base, glabrous; perianth segments 3, ovate; ovary tawny-hirsute; style parted shortly above the base into 15-18 much exserted purple threads. Fruit not seen.

A species nearly related to *A. communis*, Muell. Arg.

Central Paraguay (1578). March.

Ricinus communis, L., Sp. Pl., 1007.

Asuncion (121).

The Castor-oil Bean is very common on the river banks and in the woods around Asuncion. It frequently grows into a small tree 5 or 6 m. high, and may be found in flower or fruit the greater part of the year.

Tragia Sellowiana, Muell. Arg., *Linnaea*, xxiv, 178.

Near Asuncion (709). May.

A climbing herb, suffruticose below, with very slender fuscous-haired stems. Leaves far apart, ovate, cordate, acute, dentate, palmately nerved, 5-10 cm. long, sparsely white pubescent on both sides, on petioles 3-6 cm. long. Flowers monœcious, in biparted racemes, the branches of distinct sexes; the common peduncle naked. Stipules lanceolate, small. Fruit of 3 silky-haired, globose cocci; seeds globose, yellow or brownish spotted, nearly 4 mm. in diameter. In thickets.

Stillingia sylvatica, L., var. **Paraguayensis**, Morong, n. var.

Varies very decidedly from the Florida form (Chap. Flor., 404). A tree 5-8 m. high. Stem single, alternately branched, with smooth gray bark. Juice milky. Leaves willowy, alternate, glabrous, lanceolate, acute at either end, 4-10 cm. long, 8-15 mm. wide, crenate-serrulate, the serratures appressed and ending in a gland, often biglandular at the base of the blade; petioles 5 or 6 mm. long. Stipules very small, ovate, scalelike. Spikes terminal, monœcious, sometimes all staminate, or again with only a few pistillate flowers at the base, 6-8 cm. long. Glands not cup-shaped at all, but flat, 1-2 mm. wide. Bracts yellowish-green, broader than long, sometimes fimbriate. Style short; stigmas 3, longer, curled downwardly, stigmatic on the upper side. Fruit a large 3-celled capsule, each cell containing a single flattish, black, smooth seed enveloped in a scarlet pulp, the seed about 5 mm. long.

In flower at Asuncion, October, November; in fruit on the Pilcomayo River, January (814). = Balansa 1711.

Sapium glandulosum (L.), Morong.*Hippomane glandulosa*, L., Sp. Pl., 1191.*Hippomane biglandulosa*, L., Sp. Pl., Ed. 2, 1431.*Sapium biglandulosum*, Muell. Arg., *Linnaea*, xxxii, 116.

Asuncion (196). November-December.

A tree some 13 or more m. in height, with ashen-gray bark much roughened and broken into lines on the trunk. The milky juice is so copious that it is shed all over the ground when the leaves are bruised by the wind. Leaves willow-like, alternate, the blades deep green, coriaceous, serrulate, 10-16 cm. long and about 2 cm. wide, biglandular at the base; on petioles 5-20 mm. long. Stipules small, round, membranous, with ciliate or jagged edges. Flowers in spikes at the ends of the branches, small, yellow, monœcious and diœcious; when monœcious the pistillate flowers are at the base of the staminate spikes. Staminate flowers with a perianth deeply 2- or 3-divided, when 2-divided with 2 stamens, when 3-divided with 3 stamens. Fruit a fleshy capsule, 2-celled, containing 2 large seeds. In fields, suburbs of Asuncion.

Sebastiania brachyclada, Muell. Arg. in D.C. Prodr., xv, pt. 2, 1178.

Banks of the Tebicuary River (500). January.

A very leafy shrub about 5 m. high, the short lateral branches ending in stiff, sharp thorns. Leaves coriaceous, glabrous, obovate, oval or elliptical, entire or here and there with minute serrulations, slightly revolute, the blades 2-4½ cm. long and 1-2 cm. wide, on petioles about 5 mm. long. Flowers monœcious, the staminate small, yellowish, 1-3 under broad, somewhat dentate bracts, in spikes 1-2 cm. long at or near the ends of short branches. Pistillate flowers among the leaves on the stem, solitary or several together in a cluster, on a peduncle 1-2 cm. long. Capsule pedicelled, glabrous, depressed-globose, 3-carpelled, with a thick, hard shell, about 8 mm. broad; seeds nearly ovoid, glabrous, brownish, about 4 mm. long, with a small, black, peltate caruncle at the base.

Sebastiania corniculata (Muehl. Arg.), Baillon Obs. Bot., l. c.

Asuncion (154). November.

Herbaceous, or subligneous at base, much branched, about 6 dm. high. Leaves numerous, alternate, narrowly elliptical, bristly serrulate, glabrous and silvery dotted above, pubescent beneath, rounded at base, acute and mucronulate or sometimes obtuse at apex, 2½-4 cm. long and 6-16 mm. broad, on petioles 2-5 mm. long. Staminate flowers minute, red, distichous, in setaceous spikes along

the stems. Pistillate flowers larger, solitary, near the base of the staminate spike. Fruit a 3-carpelled capsule 4 mm. long and about as broad, nearly glabrous, each carpel with 2 minute horns at the top; seeds flattish, glabrous, dark colored, about 3 mm. long, with a white peltate caruncle at the base.

Actinostemon Luquense, Morong, n. sp.

An unarmed shrub 3-4 m. in height, with brownish-warty or black-spotted, fissured bark. Leaves glabrous, elliptical, apparently exstipulate, crenulate-serrate, the teeth with callous points, furnished with small glands near the midrib above and with scattered glands beneath, more or less revolute on the margins, the largest blades collected about 7 cm. long by 3 cm. wide; petioles 5 or 6 mm. in length. Bracts decurrent, biglandular at the base. Staminate flowers small, yellow or greenish-yellow, in slender terminal spikes 5-10 cm. long, 1-3 flowers from a single bract; calyx of several minute scales or wanting; stamens 3-10; anthers broader than long, 2-celled, opening longitudinally. Rachis of the spikes sharply angular, fuscous. Pistillate flowers much larger, 1-3 at the base of the spike, apparently without a calyx; ovary often 3-angled, glabrous, armed about half-way up by several irregularly dentate and sharp-toothed scales, slightly spreading at the top; styles thick, connate at the base, 3-divided above, the divisions curling down over the ovary and longer than that. Fruit a very hard, thick-shelled, glabrous, globose capsule, 3-carpelled, 7 or 8 mm. long, containing 1 seed in each cell; seeds glabrous, globose, fuscous, 3 or 4 mm. in diameter, with a small peltate caruncle at the base.

Thickets, near Luque (720). May.

URTICACEÆ.

Celtis Tala, Gill., Ann. Sci. Nat., 1848, p. 410.

Pileomayo River (1045 and 816). October-May. = Mandon 1096 from Bolivia.

A spiny shrub 3-5 m. or more in height, with smooth, ashen-gray bark and flexuous branches. Leaves numerous, simple, oval, serrulate near the top, mucronulate, subcordate, the veins white and prominent beneath, 3-nerved, 3-5 cm. long and 2-3 cm. broad; petioles 3 or 4 mm. long. Flowers white or greenish-white, minute. Fruit a yellow, pulpy, 1-seeded berry. In thickets.

Trema micrantha (Sw.), Blume, Mus. Bot., ii, 58.

Asuncion (213). November-December.

A tree of moderate size. Young branches pubescent. Leaves in 2 ranks, or nearly so, ovate-lanceolate, acuminate and mucronate, cordate at base, 3-nerved, serrulate, rough to the touch above and

soft pubescent beneath, the largest about 10 cm. long and 4 cm. wide, on petioles about 5 mm. long. Flowers greenish, very small, in short cymes along the branches, polygamous. Fruit a small yellow 1-celled, 1-seeded drupe

This tree generally grows in open fields, and bears crowded branches and leaves. It is ungraceful in appearance.

Morus alba, L., Sp. Pl., 986.

Asuncion (787).

One of the many forms of the white mulberry, bearing dark purple fruit. Not a native of Paraguay, but introduced and growing freely into a fine large tree. Like most other people, the Paraguayans have tried experiments in manufacturing silk, and this tree was introduced for the purpose of feeding the silk-worm, but a manufacture of that kind, even if all the requisite means were easy to be obtained, would never suit such an indolent, unenterprising race, and the industry soon perished. Some of the trees, however, are left and are found here and there in the country. In fruit August.

Ficus Radula (Miq.), Morong.

Pharmacosyia Radula, Miq. in Hook. Lond. Jour. Bot., vii, 64.

Asuncion (245).

A noble tree, often growing nearly 25 m. in height. Bark grayish, very smooth. Leaves alternate, simple, entire, coriaceous, glabrous on both sides, oval, entire, the margins slightly revolute, abruptly acute at the apex, narrowed at the base, the blades 8-18 cm. long and 5-8 cm. broad; petioles $1\frac{1}{2}$ -5 cm. long. Receptacle on a short peduncle, about the size of a pea, becoming in fruit a syconium nearly 2 cm. in diameter, and filled with small white seeds which are marked with a prominent raphe. The wood is hard, and the whole tree abounds with milk, which often exudes copiously of its own accord in the hot sunshine. Once when botanizing in the woods near Asuncion I heard the pattering of what seemed to be rain-drops. Surprised at this, as the sun was shining brightly, I followed the sound, and found that the noise proceeded from milk-drops, falling one by one from this tree. The ground was fairly white beneath its boughs. Fruit only found. December-January.

Ficus, Sp.

Asuncion (1550). = Balansa 1986.

Foliage only collected.

Coilotalpalus peltata (L.), Britton.*Cecropia peltata*, L., Annon. Acad., v, 410.

Near Luque (717). May-June.

One of the most striking and beautiful trees in the forests of Paraguay, the umbrella-like head and the large peltate silvery-lobed leaves showing finely against the green foliage of its companions. It has a naked columnar stem, rising to a height of 10-15 m. Leaves orbicular in outline, 20 cm. or more in breadth, deeply 9-11 lobed, the lobes green and somewhat rough above, and with a silvery-white tomentum beneath, on petioles 15-20 cm. long. Flowers dioecious, in cylindrical spikes, sunk in the surface of the rachis; the pistillate spikes generally 4 on the same peduncle, and about 10 μ m. long and 1-1½ cm. thick; the staminate smaller, 10 or more together, 5 cm. long and 3 or 4 mm. thick. The large spathe-like stipules which enclose the buds, also white tomentose, are very conspicuous.

Ants are very fond of the fresh flowers of this tree, and I nearly always found them running over it in great numbers.

Urtica spathulata, Sm. in Rees Cyc., no. 17.

Buenos Aires (11). October.

I did not see this nettle in Paraguay, but it is very abundant about Montevideo and Buenos Aires, and doubtless occurs farther north also. It is a small prostrate or ascending plant, with numerous small orbicular incisely dentate leaves. The prickles are very numerous and exceedingly irritating, leaving a stinging sensation which lasts for hours.

Urera baccifera (L.), Gaudich. Bot. Voy. d'Uranie, 497.

Near Pirayu (663). April.

A tall, succulent-stemmed shrub, 3-5 m. in height, with a copious watery milky juice. Leaves very large, round-ovate, slightly cordate at base, abruptly acute at the apex, sinuate-dentate, rugose above, very rugose and veiny below, armed with stinging hairs, 30-40 cm. long and 15-20 cm. broad, on armed petioles 10-15 cm. long. Flowers dioecious in axillary, widely branching panicles. Fruit a small, round, watery, white, berry-like utricle, containing a single flat seed. The stem is armed near the base with short, broad thorns, and naked to the inflorescence which bears many small stinging prickles.

Urera Caracasana (Jacq.), Weddell, D.C. Prod., xvi, pt. 1, 89.

Asuncion (120); Pilcomayo River (873). November-May.

A climbing shrub, often prostrate or hanging over banks for 2 or more metres. It has a rather slender stem, and is armed more or less on the leaves and inflorescence with small stinging hairs. Leaves coarse, cordate, ovate, crenate-dentate, 10-15 cm. long and 8-10 cm. broad, on short petioles. Flowers in rather small axillary cymes. The red berry-like utricles which it bears abundantly are the most noticeable part of the plant, and are often seen in thickets or hanging over the banks along the Paraguay River at Asuncion. Common also on the Pilcomayo River, supported by other shrubs.

Parietaria debilis, Forst., Flor. Ins. Austr. Prod., no. 387.

Pilcomayo River (1052). June.

Looks much the same as our Southern plant, and found in similar situations in shady woods.

SALICINEÆ.

Salix Chilensis, Molina, Sag. Stor. Nat. Chil., i, 163 (1782).

Salix Humboldtiana, Willd., Sp. Pl., iv, 657 (1806).

Asuncion (788); Pilcomayo River (1061). June-September.

This willow is popularly called Sauce real in Paraguay, and grows from the Amazon to Patagonia on both sides of the Andes. Generally it is little more than a shrub 5-8 m. in height, but on the banks of the Pilcomayo, I saw large trees at least 15 m. high. Leaves linear acuminate, glabrous, the midrib prominent below, with a fine lateral nerve on each side near the margin, serrulate, 5-14 cm. long and 5 or 6 mm. wide.

HYDROCHARIDEÆ.

Limnobium Sinclairi, Benth., Bot. Voy. Sulphur, 175.

Ponds near Asuncion (1559). = Mandon 596 a, from Bolivia. November-December.

A small plant, with round oval leaves, floating on the surface of the water. The leaves are covered on the upper surface with rows of small tubercles.

ORCHIDEÆ.

Named by R. A. Rolfe.

Pleurothallis, Sp.

Caballero (394). January.

An epiphyte clinging to the bark of trees. Leaves very thick, 6-8 cm. long and 1-1½ cm. broad, somewhat keeled, many-nerved, black spotted on the upper surface, on jointed petioles rising from the rootstock, and 10-12 cm. long.

Eulophia maculata, Reichb. f.

Pilcomayo River (968). March.

Scapes stiff, erect, sparsely bracted, 4-5 dm. high, from thick, white, cottony, granulated roots. Leaves radical, elliptical, very thick, light green, blotched with deeper green, somewhat channelled in the centre, spiny pointed, sheathed at the base by several bracts, the largest over 3 dm. long and about 5 cm. wide. Flowers 2 cm. high, 5-15 in the spike, 1 or 2 spikes springing from the same bract, 1 longer than the other; lip larger than the other segments of the corolla, with 2 small rounded lobes at its base, the lobes purple-striped inside and whitish outside, the upper portion curved downwards, with 2 spots of reddish-purple inside, whitish outside; spur curved, clavate. Ovary enlarging to 3 cm. in fruit. In deep, damp woods.

Catasetum fimbriatum, Lindl.

Pilcomayo River (875). January.

Scapes slender, bracted, 4-5 dm. high. Flowers purple, in a terminal raceme, each on a bracted pedicel 3 or 4 cm. long, the perianth 5 or 6 cm. long and 4 or 5 cm. broad; petals and sepals narrow, oblong, acute, greenish and covered with minute purple dots, the lateral sepals reflexed; lip large, inflated, expanding into a broad and fringed apex, which curves over itself; spur large, blunt. The flower of this orchid is exceedingly interesting in its contrivances for securing insectivorous agency in its fertilization. They are similar to those of a related species described by Darwin in his *Fertilization of Orchids*, p. 322. Wet grounds.

Oncidium ?

Caballero (397). In fruit January.

Oncidium ?

Caballero (394 a); banks of the Tebicuary River (510); Pilcomayo River (1551). January.

An epiphyte very common on trees in moist woods in many parts of Paraguay, throwing up scapes from 10 to 20 cm. high, with many lateral racemes of flowers. Flowers small, purple, sessile. Found mostly in fruit. Pod oblong, about 5 mm. in length. The leaves are very thick, elliptical, keeled, 4-12 cm. long and 12-20 mm. broad, many-nerved, acute at either end.

The plant forms large bunches of roots, leaves, and stems on the trunks and limbs of trees.

Ornithocephalus, Sp.

Caballero (510 a). January.

Campylocentrum, Sp.

Pilcomayo River (1552). January.

Common on trees in the Pilcomayo forests. The stems run along the trunk, throwing out long roots, lateral flowering branches, and other stems at intervals. Leaves narrow lanceolate, 4-7 cm. long. Flowers in lateral spikes, 2-ranked, each under a small bract; the ovary slender, 6-8 mm. long, surmounted by a purplish perianth about 2 mm. long, the segments acute; the spur short, blunt, upturned. Many of the long white-corticated roots dangle in the air for 10-18 cm., giving a strange, straggling appearance to the plant.

Habenaria Gourlieana, Gill., Lindl. Gen. and Sp. Orch.

Pilcomayo River (861). January.

Stem 4 or 5 dm. high. Leaves lanceolate, 15-20 cm. long, running into acute, sheathing bracts above. Flowers pale yellow, numerous, in a short raceme at the summit of the stem; ovary very long and slender; sepals broad ovate; petals much longer, almost capillary; lip about as long and narrow as the petals, 3-lobed, the middle lobe much the longest; spur over 10 cm. in length, clavate at the tip, the lower end generally hidden under the long, acute floral bracts. The ovary is about 3 cm. long, and on a pedicel about the same length. Flowers somewhat nodding, the very narrow and projecting petals and lip, together with the extraordinarily long and slender spur, giving them a peculiar appearance. In moist, open woods.

SCITAMINEÆ.

Named by J. G. Baker.

Maranta arundinacea, L., Sp. Pl., 2.

Caballero (401); Pilcomayo River (1553). January.

The well-known Arrowroot, a reed-like plant growing in damp or marshy open woods. Stems very smooth and glabrous, with long internodes, widely and dichotomously branching, 5-8 dm. high. Leaves lanceolate, rounded or slightly cordate at base, acute at apex, the largest collected $3\frac{1}{2}$ dm. long and 7 cm. broad, on sheathing petioles as long as the blade. Inflorescence much forked. Perianth with 3 green separate calyx-like outer segments, enclosing a bluish corolla. Capsule about 1 cm. long, crowned with the persistent calyx and without corolla. The flowers easily drop off, and it is hard to preserve them. The root out of which the farinaceous substance known as Arrowroot is made is a large, hard, somewhat tuberous rhizome. It is not common enough in Paraguay to be of much service to the people.

Thalia geniculata, L., Sp. Pl., 1193.

Asuncion (555). February.

Stems reed-like, very smooth and glaucous, about 3 m. high. Leaves solitary or few, 3-5 dm. long, on long, sheathing petioles. Flowers in long, lax, terminal panicles, a pair enclosed in a 2-valved spathe 15-17 mm. long; inner segments of the corolla 1 white and membranous and longer, and the other 2 red, the 3 outer red; sepals minute, membranous, very light purple, striped.

Canna glauca, L., Sp. Pl., 1.

Asuncion (378); Pilcomayo River (847 and 1554). December-May.

No. 378 has deep red flowers, and 847 and 1554 yellow flowers, as we find them in our flower-gardens. The two are considered as belonging to the same species, but as I found them growing wild in Paraguay, I was led to question whether they are identical. They occur in different localities, never in the same clump. The red-flowered form usually has smaller flowers, the corolla rarely exceeding 6 cm. in length, while those of the other are sometimes 10 cm. long; the petals too, as a general rule, are narrower and the floral bracts larger than in the yellow-flowered form. I found the floral

bracts of the red-flowered form often broadly obtuse at the apex and covered with a white mealy or waxy substance, peculiarities which I never saw in the other. Still these differences may not hold in other regions. The plants grow both in wet grounds and on dry banks.

BROMELIACEÆ.

Named by J. G. Baker.

Bromelia Pinguin, L., Sp. Pl., 285.

Asuncion (341). December.

This plant has an immense rosette of numerous spine-tipped leaves pointing in all directions, and bristling like so many lances, some of them $1\frac{1}{2}$ m. in length, beset down the sides with upwardly hooked spines, forming a barrier which neither man nor beast attempts to break through. The central part of this rosette is of a deep scarlet color, and can be seen from a long distance. Flowers purplish or bluish, closely arranged about a fleshy caudex, 10-12 cm. thick and 15-20 cm. high. Fruit a succulent, edible berry, 3 or 4 cm. long and 2 or 3 cm. in width, looking somewhat like a fig. The plant is known under the native name *Caraguata*, and is often called the wild pine-apple. It is a noted object in Paraguay, as the leaves have been used time out of mind by the natives for making fishing-nets and lines, and a coarse, strong cloth is woven out of the fibres. It has also been used in recent years in the manufacture of paper. The plants often cover the ground for acres.

Ananas sativus, Lindl., var. **microcephalus**, Baker, Handb. Bromel., 23.

Trinidad (831); Pilcomayo River (1555). November-January.
= Balansa 609.

The basal rosette very similar to that of no. 341, but the leaves are fewer in number, and none of them scarlet colored as in that, or so long. Flowers on a thick central stem, which is scurfy dotted below, 3-6 dm. high, bearing smaller leaves like those of the rosette. Flowers in a thick oval head 8-10 cm. long, each subtended by a pink-colored, spine-edged bract. Sepals reddish; petals purplish. The fruit is harsh and unpalatable. This without much doubt is the original wild form of the cultivated pine-apple. The leaves are used like those of no. 341 in textile manufactures. Found in similar situations as that, but rarer.

Æchmea bromeliæfolia (Rudge), Baker in Benth. and Hook. Gen. Pl., iii, 664.

Caballero (523). January.

Growing as an epiphyte upon trees in damp woods at Caballero. It is a very large plant, with a rosette of 12-20 silvery-green leaves at the base, which with the stem reach a height of 1-1½ m. Leaves 3 dm. long and 5-8 cm. wide, the margins unarmed, bluntly pointed at the apex. Peduncle about 3 dm. long. Flowers purplish, in a cylindrical or somewhat conical spike, 5-8 cm. long and 2½ cm. thick, imbedded in a white cottony tomentum. The peduncle bears 5 or 6 foliaceous, acuminate bracts, 8 or 10 cm. long, which are somewhat silvery woolly. A striking plant.

Æchmea distichantha, Lam., Jard. Fleur., t. 269.

Asuncion (741); Pilcomayo River (1556). February-May.

Leaves 15-20, like those of no. 341 in a large rosette, about 4-5 dm. long and 3-5 cm. broad, armed with sharp, curved, black spines on the margins and a large straight spine at the apex. Flowers in a dense oblong panicle 10-18 cm. long, on a bright red peduncle 3-9 dm. high, the 3 sepals red and the 3 petals bright blue, longer than the sepals. The peduncle is beset with leaves passing upwards into foliaceous bracts. Fruit a dry, indehiscent, 3-celled berry, containing many small seeds in each cell. This plant occurs abundantly on porphyritic ledges 2 miles east of Asuncion, and also on the banks of the Pilcomayo River. Though it is neither epiphytic nor parasitic, yet it often grows high up on the trunks and limbs of trees. Like the *Bromelia* and *Æchmea* already noted, the leaves of this species furnish excellent material for textile fabrics and cordage. They show, however, none of the scarlet tint by which the leaves of the former are made so conspicuous.

Tillandsia bryoides, Griseb., Symb. Flor. Arg., 334.

Between Villa Rica and Escoba (492); Pilcomayo River (1086). January. = Balansa 617 a.

A small epiphyte, with densely tufted leafy stems which have the look of a moss. Leaves linear-subulate, densely scaly. Flowers small, numerous, racemed, on short scapes, rose colored.

Tillandsia dianthoidea, Rossi, Cat. Modoct., 1825, t. 1.

La Plata, Arg. Republic (35). October.

A small epiphyte with lilac flowers, occurring in the Argentine Republic, but not found in Paraguay by me.

Tillandsia glutinosa, Mart., R. and S., Syst., vii, 1225.

Caballero (513). January.

A fine large epiphyte on trees near the Tebicuary River at Caballero. The plant is 1 or 1½ m. high; the stem about 12 mm. thick, clothed with silvery leaves 3-6 dm. in length. Peduncle 4 or 5 dm. long, very branching, covered with bracts 3-5 cm. long, and each flower under a similar bract. Flowers spicate, all erect, large, yellow. The plant very showy.

Tillandsia Hilaireana, Baker, Handb. Brom., 199.

Between Villa Rica and Escoba (493). January.

A beautiful epiphyte about 20 cm. high, with densely tufted, rigid, channelled, long pointed, silvery, lepidote leaves which are about 10 cm. long. Flowers spicate, on a scape 10 or 12 cm. high. Petals red. This occurs with no. 492, but is larger and more showy. It is also abundant on the Pilcomayo River, and our party frequently gathered the flowers, and hung them upon the posts of our camp and along the cabin sides of our steamer for ornament.

Tillandsia Lorentziana, Griseb., Pl. Lor., 223.

Pilcomayo River (902). April. — Balansa 4744.

A conspicuous epiphyte on the trees along the upper Pilcomayo. Leaves rigid, coriaceous, 10-20 cm. long, channelled, 2 cm. broad at the base, long acuminate and curling up at the end like a pig's tail, striate, densely white lepidote, about 20 on the short, thick stem. Flowers in lateral spikes on a peduncle nearly 7 dm. in length. Petals blue and purple striped, rounded and recurved at the apex, white in the interior of the tube, 2½ cm. high and 2 cm. broad when expanded; calyx, if so called, of 3 reddish parts closely appressed to the tube of the corolla.

Tillandsia recurvata, L., Sp. Pl., Ed. 2, 410.

Gran Chaco opposite Asuncion (292 b); between Villa Rica and Escoba (492 a); Pilcomayo River (876 and 1085). January-May.

One of the most common epiphytes growing in Paraguay. It appears to be very widespread, occurring all the way from Florida to Chile and the Argentine Republic. It is a small, densely caespitose plant, with subulate, channelled, white lepidote leaves, and solitary or 1-3 olive-colored flowers on capillary peduncles. It sometimes covers the trunks and limbs of trees so densely that the bark can scarcely be seen.

Tillandsia usneoides, L., Sp. Pl., 287.

Pilcomayo River (886). January-May.

This is common on some parts of the Pilcomayo, but not so abundant nor so luxuriant as in our Southern States. A lichen growing by its side rivalled it in length.

Tillandsia vernicosa, Baker, Jour. Bot., 1887, p. 241.

Gran Chaco, near Asuncion (554). January.

Leaves in a dense rosette, ensiform, acuminate, 7-20 cm. long, channelled, pale green, glossy, finely lepidote, very thick and rigid in texture, the outer spreading widely. Spikes densely crowded on scapes 15-20 cm. high. Flowers white, or at least the petals.

IRIDEÆ.

Cypella gracilis (Klatt), Baker, Jour. Lin. Soc., xvi, 129.

Named by J. G. Baker.

Between Trinidad and Asuncion (277). = Balansa 536.

It is difficult to convey any idea of the very irregular and beautiful flower of this little bulbous plant. The outer segments of the perianth are oblong, about $2\frac{1}{2}$ cm. in length, with a basin-shaped base which is stiffer than the upper part, yellow, slightly purpletinged at the base inside. The 3 inner segments are much shorter, clawed, incurved at the apex in a fold which is rolled inwardly and pointed, purple blotched. Stamens 3; filaments stout and thick; anthers black on the cell margins, cohering to the stigma at the top. Stigmas appendaged much as in *Iris*. Stems slender, about 20-25 cm. high, 2-leaved, and with several acute bracts above. Pedicels bracted. Flowers spreading when open. Abundant on the campos northeast of Asuncion.

Sisyrinchium Chilense, Hook., Bot. Mag., t. 2786.

Buenos Aires (13). October.

I did not see this species in Paraguay, but as it is common in Chile and about Montevideo and Buenos Aires, it may be looked for northwards. The stem is glabrous, somewhat stout, 3-4 dm. high, ancipital. Leaves linear-ensiform, acuminate, 3-10 cm. long. Flowers several from the same spathe, on capillary pedicels, small, bluish-purple, with darker purple stripes, the 3 outer segments with 5 and the 3 inner with 3 stripes; a yellow eye at base of the corolla

tube inside. Petals oblong, subspatulate, retuse, mucronate, and with the ovary and pedicels slightly glandular pubescent.

Sisyrinchium micranthum, Cav., Diss., vi, 144, t. 191, f. 2.

Asuncion (63). October–November. = Balansa 552, 552 a, and 556.

A small species 7–12 cm. high, with many stems from the fibrous roots, very glabrous. Leaves linear ensiform, 3–5 cm. long and 1–2 mm. broad. Perianth 6 mm. long, the segments obtuse and cuspidate at the apex, yellow, with 3–5 light purple sunken lines within, and 2 small purple spots at the base. Stamens united for their whole length, the anthers enclosing the 3 stigmas. Flowers on capillary pedicels, 3–7 springing from the same spathe. Abundant in grassy plats near the Recoleta Cemetery at Asuncion.

Sisyrinchium vaginatum, Sprong. Syst., i, 166.

Caballero (468). January.

Stem very slender, 25–30 cm. high, dichotomously branching, bearing only sheathing bracts 10–15 mm. long. Spathes 1-flowered. Flowers yellow, glabrous; pedicels capillary, scarcely as long as the spathe, glabrous. Among grass on the campo.

AMARYLLIDEÆ.

Zephyranthes Bakeriana, Morong, n. sp.

A delicate plant rising from an underground tunicated bulb. Bulb ovoid, 1½–2 cm. in diameter, the tunics fuscous and the neck 5 mm. long. Scape and leaves from a pair of membranous radical sheaths, which are fuscous and warty at the tips. Leaves 1–4, much longer than the scape, produced with the flowers, linear, 2 mm. broad. Scapes 10–12 cm. high, glabrous, slender, erect or slightly declined. Flowers solitary, large and showy; tube none or minute; perianth segments 3–4 cm. long, elliptical, about equal, pointed at the apex, membranous, yellowish-white, with many purple stripes. Stamens 6, 3 scarcely more than one-half as long as the others; filaments separate to the base and epigynous; anthers versatile, curved upwardly when dry, the cells confluent. Style longer than the stamens, slightly dilated at the apex and divided into 3 stigmas. Capsule obovoid, scarcely lobed. Pedicel nearly or quite 2 cm. long. Spathe about 2½ cm. long, tubular in the lower half, the upper open part bifid.

On the Gran Campo, about 5 miles east of Asuncion (254).
December–January.

Fourcroya Cubensis, (Jacq.), Haw., Syn. Pl. Suco., 73.

Asuncion (805).

This Cuban plant is not unfrequent on the borders of gardens and in hedges at Asuncion, where its tall flower stalks in full blossom make a great display. It bears a large rosette of rigid green glabrous leaves, 30 or more in number and 2 m. or more in length, margined by large deltoid, hooked spines. The flower stalk is from 3 to 5 m. high, covered with large, fragrant, bell-like blossoms, the corolla white externally and greenish inside. It seems to be propagated exclusively by bulblets, which are large and numerous, often beginning to sprout while still on the stalk. The fibre, like that of the Caraguata, is employed in the manufacture of textile fabrics.

In flower March-April. Bulblets collected in October.

No. 998, from the Pilcomayo River, April 11, 1890, collected only in fruit, is probably of this order, but is not identified.

DIOSCOREÆ.

Dioscorea pedicellata, Morong, n. sp.

Twining over shrubs for 3-6 m. The whole plant very glabrous. Stems slender, rarely branching, strongly angular. Leaves alternate, entire, cordate-ovate, the sinus broad and the lobes rounded, abruptly acute and aristate at the apex, 7-9-nerved, the 2 lowest nerves bifid or sometimes trifid, 10-12 cm. long and nearly as broad at the base; petioles 4-6 cm. long. Staminate racemes axillary, 1-2 in an axil, usually simple but sometimes once divided, 7-10 cm. long, the rachis nearly capillary and strongly angular like the stem. Staminate flowers alternate, solitary, on pedicels 2-5 mm. long, the pedicels subtended by 1, sometimes 2, or even 3 minute, lanceolate membranaceous bracts. Perianth about 3 mm. high, the tube not half as long as the lobes, the lobes oblong, obtuse, greenish-purple in color, spreading open rotately in anthesis. Stamens 6, of minute, sessile anthers, central in the bottom of the perianth. Pistillate flowers and fruit not seen.

Deep woods on the banks of the Pilcomayo (975). March.

LILIACEÆ.

Smilax Assumptionis, A. D.C., Monog. Phan., 1, 132.

Lympio (733); Pilcomayo River (1557). January-May.

A tendril-climber running over trees and shrubs; spines few, stout and straight. Leaves coriaceous, elliptical-ovate, subcordate,

obtuse and mucronate at the apex, largest collected 10 cm. long and 4 cm. wide. Staminate flowers greenish-yellow, sometimes brownish-purple, red in the bud. Berries 4 or 5 mm. in diameter, dark red, on pedicels 5 or 6 mm. long.

Nothoscordum flavescens, Kunth., Enum., iv, 459.

Luque (715).

A small bulbous plant 8-15 cm. high, the bulbs small, ovoid, deep underground. Leaves narrowly linear, surpassing the scapes, appearing with the flowers. Flowers in small umbels, 2-5 in an umbel, the pedicels unequal, capillary, 10-18 mm. long. Perianth 6-8 mm. high, with a short tube; the 6 lanceolate lobes somewhat longer, yellow, 1-nerved, the nerve green on the inside and purplish outside. Spathe white, membranous, tubular below, bifid on the open portion above, much shorter than the pedicels.

This pretty little flower decorates the sandy campos east of Asuncion nearly all the year round.

PONTEDERIACEÆ.

Pontederia cordata, L., Sp. Pl., 288.

Villa Rica (490); Luque (301); Pilcomayo River (1040). December-May.

As common in water and miry places throughout Paraguay as in the United States. Called Aguapi in the native tongue.

Piaropus crassipes (Mart.), Britton.

Pontederia crassipes, Mart., Nov. Gen., i, 9, t. 4.

Eichornia crassipes, Solms-Laubach in D.C. Mon. Phan., iv, 527.

Trinidad (265). December-January.

A showy aquatic common in pools near Asuncion and other parts of Paraguay. A long running stem rooting in the mud throws up at intervals leaves or scapes. Sometimes a set of leaves and a scape grow erect from a large body of fibrillate roots. Leaves of a firm texture, like those of *Pontederia cordata*, various in shape, broadly obovate or subreniform, sloping abruptly into the petiole, or occasionally subcordate, the blades 3-5 cm. long, 3½-6 cm. broad; petioles 6-20 cm. long, frequently with an oval inflated sac near the middle, or plauze for their whole length, sheathing at the base. Scape somewhat longer than the leaves, with a foliaceous bract

just under the flowers. Flowers large, spicate, 5-15 on the spike. Perianth with a closed, slightly recurved tube about 2 cm. long, 6-lobed, the lobes as long as the tube, of a fine bluish-purple tint, rounded or obovate, the 3 exterior somewhat larger, the uppermost marked by a round yellow eye in the centre; 3 of the stamens longer than the other 3, inserted near the sinuses of the lobes; anthers dark blue. Style longer than the stamens in all the specimens that I collected; stigma capitate, hairy. Glandular on the perianth lobes and also on the tube, style, and filaments. This plant is popularly known as Aguapi, and also as Camalote, names which appear to be applied indiscriminately to all the species of *Eichornia* and *Pontederia* in Paraguay.

Some of this was distributed as *E. azurea*.

Piaropus azureus (Sw.), Raf. Fl. Tell., Part 2, 81.

Eichornia azurea, Kunth., Enum., iv, 129.

Pileomayo River (859 and 964). March.

Heteranthera reniformis, R. and P., Fl. Peruv., 43.

Asuncion (320). December.

XYRIDEÆ.

Named by Mr. Heinrich Ries.

Xyris tortula, Mart., Flora, xxiv, Bibl. 2, p. 55.

Caballero (520). January.

A species about 3 dm. high, with slender terete, twisted scapes and small, ovoid, 6-10 flowered heads. Leaves about half as long as the scapes, twisted spirally, rigid, erect, sulcate, 1 mm. or less in width. Scapes and leaves rising from a compact, dense tuft of black bracts.

Xyris communis, Kunth., Enum., iv, 12.

Luque (329). December. = Balansa 562 a.

Scape 3 to 6 dm. high, slightly 2-winged above, 1-angled below, a little rough on the angles and wings. Heads somewhat conical, $1\frac{1}{4}$ - $1\frac{3}{4}$ cm. long and 1 cm. broad. Scales orbicular, obtuse, fuscous on the edges and with a cinereous rasped space in the centre near the apex. Lateral sepals with showy fringes on the keels. Leaves

one-third as long as the scapes, 5-7 mm. wide, bluntly acute, many and irregularly nerved. Wet grounds.

Seubert in Fl. Bras., iii, pt. 1, p. 220, regards this as only a variety (v. *procera*) of no. 582.

Xyris laxifolia, Mart., Flora, l. c.

Villa Rica (582). January. = Balansa 563.

Similar to no. 329, but with more numerous and larger leaves, at least in the specimens collected. Scapes 6-8 dm. high. Heads conical, 1½-2 cm. long. Leaves 5-15 mm. broad. Superficies of scapes and leaves often marked with purple-fuscous lineolæ. Growing in bogs. The probability is that both this and no. 329 are forms of *X. communis*, Kunth.

MAYACACEÆ.

Mayaca Sellowiana, Kunth., Enum., iv, 32.

Villa Rica (498). January. = Balansa 2364.

With erect stem, 3-6 cm. high. Peduncles capillary, 1-3 cm. long. Flowers solitary, rose-colored. Leaves 3 or 4 mm. long, almost setaceous. Capsules 6-seeded. In bogs.

COMMELINACEÆ.

Commelina platyphylla, Seub., var. **Balansal**, Clarke in D.C., Monog. Phan., iii, 177.

Asuncion (239). December-January. = Balansa 593.

A branching herbaceous plant, 8-20 cm. high, with pure white flowers. Stems angular, somewhat compressed above, more or less pubescent. Leaves numerous, somewhat crowded, oblong, usually obtuse, amplexicaul, the lowest often eared at the base, 4-10 cm. long and 1-2 cm. broad. Spathes 1-2 cm. long, complicate, obtuse, sometimes 3 cm. or more broad. Varies from the type in having obtuse leaves and oblong seeds. Common in shady places along the railway track.

Commelina Virginica, L., Sp. Pl., Ed. 2, 61.

Asuncion (54). November-January.

Tradescantia Fluminensis, Vell., Flor. Flum., 140, t. 152.

Buenos Aires (15). October.

I collected this plant at Buenos Aires, but it also occurs in Paraguay. Stems decumbent, much branched, sulcate, compressed, glabrous, 4 or 5 dm. high. Leaves sessile, ovate-lanceolate, acuminate, 3-5 cm. long. Sepals scabrous-pubescent, or glabrous on the back. Flowers white.

Tradescantia glandulosa, Seub. in Mart. Fl. Bras., iii, pt. 1, 253.

Asuncion (261). December.

A small plant with striate, glabrous, or glandular-pubescent stems, $1\frac{1}{2}$ - $4\frac{1}{2}$ dm. high. Leaves elliptical, mucronate, with long white ciliae at the amplexicaul base, and glandular ciliate above, 3-5 cm. long and 2-3 cm. broad. Flowers very small, in umbellate clusters at the summit of the stems and branches, the sepals and pedicels glandular hairy. Flowers about 3 mm. high, the petals white, the sepals greenish. When fresh the stems are a little succulent and nearly or quite terete, becoming angular and compressed in drying. In shady or moist grounds.

PALMÆ.

Acrocomia sclerocarpa, Mart., Palm. Bras., 66, t. 56 et 57.

Asuncion (233).

One of the most common palms in Paraguay, popularly called C'oco. It is a monœcious tree growing 8-12 m. high, armed on the trunk with many rows of long spines (some of them 10 cm.), which, as the tree ages fall off, often leaving the trunk nearly bare. The fronds are pinnate, from 1 to $1\frac{1}{2}$ m. long; pinnæ green, coriaceous, in 2 opposite rows, 1-2 cm. apart, 3-4 dm. long and about $1\frac{1}{2}$ cm. wide; rachis triangular, armed with sharp spines 2-4 cm. long. Staminate flowers in numerous long aments or spikes above; pistillate few, sessile at the base of the branches; spathe single, long, and husk-like. Drupe globular, 3 cm. or more in diameter, surrounded by a thin separable rind, inside of which is a soft yellow, edible pulp; seed an exceedingly hard nut containing an edible meat which tastes like that of the cocoanut.

This is a valuable tree, the nuts yielding an excellent oil, and the meat forming a favorite article of food among the Paraguayans. Piles of the extracted kernels are offered for sale in the Asuncion

market; and many mills for expressing the oil are seen in the country. The pinnæ are used as in many other palms in the manufacture of hats, chair bottoms, and other domestic articles.

Flowering in October and November; fruiting in December and January.

Cocos australis, Mart., Hist. Nat. Palm., iii, 289.

Asuncion (233 a).

Equally common with no. 233, and popularly known as the *Pindo*, but entirely unarmed. It resembles the *Coco* in height and general appearance, but has longer drooping fronds, and is altogether a handsomer tree. Fruit smaller, oblong-ellipsoidal, 2-2½ cm. long and about 1½ cm. in diameter, with a fibrous husk on the outside and a hard, crustaceous nut within, the kernel tasting like the meat of the cocoanut. The nuts yield oil equal to that of no. 233, but are rarely used for that purpose. It makes a beautiful shade tree and is a great ornament in parks and gardens. The fronds are largely used in the decoration of dwelling-houses and churches on festive occasions. On Palm Sunday crowds may be met on the streets bearing the green fronds in their hands.

Flowers in January; fruit May-July.

Phœnix dactylifera, L., Sp. Pl., 1188.

Near Trinidad (803).

The *Date Palm* is occasionally seen in cultivated grounds around Asuncion, but although it seems to grow vigorously, it never, so far as I know, perfects its fruit. In flower October.

Copernicia cerifera, Mart., Orbig., 41, t. 1, f. 3.

Pilcomayo River (1073).

Commonly known in Paraguay as *Palma negra*, and in Brazil as *Caranda*. This tree abounds in great numbers along the banks of the Pilcomayo River and throughout the Gran Chaco. It has a straight slender trunk 10-15 m. high, 12-13 cm. in diameter. When young the stem is covered below with the bases of the petioles, but these fall off at maturity leaving the trunk bare and smooth. Wood black, dense, and hard, forming a valuable timber, which is used all over Paraguay for roof timbers and fence posts. Leaves erect, plaited, fan-shaped, the surface covered with a whitish waxy substance, which is scraped off and made into the well-known

Carnauba wax. The leaves are 7 or 8 dm. in length and about as broad, split nearly to the middle into slender rays, on stout hemispherical petioles armed with strong straight or hooked spines. Flowers small, white, in large, branching panicles, the staminate above and the pistillate below. Drupe ellipsoidal, pointed at the base, about $1\frac{1}{2}$ cm. long and 1 cm. in diameter, smooth and olive colored at maturity.

This is considered with good reason one of the most valuable trees in Paraguay. Not only does it furnish strong, durable timber and wax, but its berries are eaten by the Indians, the tender vertex of the caudex makes an admirable cabbage, and its leaves are employed for various purposes, such as thatching, making fans, straw-braid, thread, fishing-lines, cordage, and the like.

In flower January; fruit April-May.

Copernicia alba, Morong, n. sp.

This palm is very similar in general appearance to *C. cerifera*, but is quite distinct in several characters. Stem low, frequently not over 3 m. high, and seldom reaching a height of 10 m., the diameter 15-18 cm., clothed nearly to the summit of the trunk with the bases of the old leaf stalks. The head is much larger than that of *C. cerifera*, containing many more leaves. In the inflorescence the two do not vary essentially, except that *C. alba* has a more densely woolly tomentum on the flowers and rachis. The flowers are smaller, and the floral bracts much longer and more acute. The fruit of this species is obtuse at the base, that of *C. cerifera* distinctly pointed, in other respects the same. In the wood of the two lies the principal difference, and this is very striking. The wood of *C. cerifera* has a very close, compact grain, making a solid log, when first cut slightly brown, afterwards becoming black, and hence called Palma negra; that of *C. alba* soft and spongy, very loose and cellular in grain, and absolutely unfit for timber, white in color and hence popularly known as Palma blanca. The roots of the two exhibit a structural difference as remarkable as that of the stems. The brown wrinkly cuticle of Palma negra encloses a thick, very dark colored, loosely cellular cortex, a separable heart wood of parenchymatous tissue and minute, black woody bundles pressed compactly together, entirely without open spaces or air-cells. In Palma blanca, the cuticle is whitish in color and smooth, the cortex thick, friable and yellowish in color, while the heart wood is composed of white parenchymatous tissue penetrated by many large open spaces or air-cells. Nothing shows the difference between the white and black palms more perfectly than this structural dissimilarity.

Common with no. 1073 on the banks of the Pilcomayo (1079).
Flower January; fruit April-May.

Copernicia rubra, Morong, n. sp.

Intermediate in characters between *C. cerifera* and *C. alba*, but decidedly different from both. Stem 10-13 m. high, and 18 cm. or more in diameter, clothed nearly to the top of the trunk with the bases of the old leaf stalks, never smooth as in *C. cerifera*, and always much thicker. The head is large and rotund in outline like that of *C. alba*. The inflorescence is very similar to that of the other two species, except that the tomentum is of a more rusty tinge. The drupes are larger and globular or slightly oval in shape, obtuse at both ends, instead of being ellipsoidal as in the others. The wood is reddish-colored, and more compact than in *C. alba*, but never hard and solid as in *C. cerifera*, hence popularly known as Palma colorada. It is seldom used as timber.

The peons of our party distinguished these 3 species of palms at a glance, though they were mingled in the groves upon the banks of the Pilcomayo. Palma negra, however, is much the most numerous, *P. colorada* being rather rare.

Pilcomayo River (1078); Central Paraguay (738). Flower January; fruit April-May.

TYPHACE.E.

Typha angustifolia, L., Sp. Pl., 971.

Between Villa Rica and Escoba (532); Pilcomayo River (1025). January-May.

No. 1025 has unusually broad leaves for the species, being from $1\frac{1}{2}$ to 2 cm. wide. The spikes in some cases are 2 cm. in diameter and 9 dm. in length, the pistillate and staminate flowers occupying nearly equal spaces on the rachis. This was growing in vast numbers in the great laguna on the Pilcomayo River, and was one of the weeds which so densely choked the stream that we were unable to force our boats through.

AROIDE.E.

Pistia Stratiotes, L., Sp. Pl., 963.

Asuncion (180). November-December.

The form called by Engler in Flor. Bras. *cuneata*, with obversely triangular leaves, rounded and commonly emarginate at the apex. Common in pools about Asuncion.

Xanthosoma Riedelianum, Schott., *Est. Bot. Zeit.*, 1865, p. 33. Ex descr.

. Luque (294). December.

Named by N. E. Brown.

A large showy bog plant 6-9 dm. high. Leaves light green, the blades somewhat panduriform and sagittate, 4-5 dm. long and 1-2 dm. broad, obtusely pointed, the basal lobes about $\frac{1}{2}$ as long as the leaf and rounded, the sinus usually broad; primary lateral nerves 5-7, curving into a common marginal nerve, which runs at unequal distances from the margin. Petiole rounded below and flat above, much longer than the blade. Flowers solitary, on scapes shorter than the leaves; spathe 25 cm. long, the lower part greenish and convolute, the upper half spreading open and pure white; spadix one-half or two-thirds as long as the spathe, the pistillate flowers at the base, occupying about one-quarter of the length, the perfect staminate flowers at the apex, and a space of abortive staminate flowers between the two. The flowers reminded me of our common house *Calla* when I first looked at them, though not spreading open so widely, and the spadix being slate-colored instead of golden. In miry bogs or water at Luque.

LEMNACEÆ.

Lemna minor, L., *Sp. Pl.*, 970.

Pools in the vicinity of Asuncion (1558).

ALISMACEÆ.

Sagittaria Montevidensis, C. and S., *Linnaea*, ii, 156.

Asuncion (177). November-January.

The common *Sagittaria* of southern South America. It resembles our *S. sagittæfolia* in habit and aspect, but is at once distinguished by the deep purple spot at the base of the flower inside. The leaves are almost as variable as those of our species, but are sometimes enormously large. I met with specimens 1-1½ m. high, having leaves 6 dm. or more in length and as broad at the base. The spikes are sometimes 5 dm. long, bearing 12-15 verticils of flowers. Pistillate flowers in 2 or 3 verticils at the base of the spike, with shorter and much thicker peduncles than the staminate, recurved in fruit. Veins of the leaves prominent and often rough with erect glands. In water or miry bogs.

Echinodorus grandiflorus (C. and S.), Mich. in D.C. Monog. Phan., iii, 57.

Caballero (508); Pilcomayo River (853). December-January.

A bog plant with scapes 7-9 dm. high, striate, rough with glandular tubercles. Leaves ovate or oval, cordate, obtuse at the apex, prominently 9- or 10-nerved, glabrous, largest about 15 cm. long and 13 broad, on petioles similar to the scapes, 20-30 cm. long. Flowers white, in 8-10 remote whorls, 5-7 in the whorl; the 3 exterior bracts separate, many and strongly nerved, ending in a long subulate summit, as long as or longer than the pedicels. Pedicels 10-15 cm. long. Rootstock creeping; roots fibrous. A very variable plant as to size, smoothness, and number of verticils.

No. 508 was collected in dry and rather dusty ground near the railway track at Caballero, and 853 in pools between Paragua and Luque.

Echinodorus subalatus (Mart.), Griseb., Cat. Pl. Cub., 218. Ex descr.

Pilcomayo River (1039). May.

Growing in water in the great laguna on the Pilcomayo River. Scapes 6 dm. to 1 m. or more high, striate and with 3 sharp angles, which become subulate among the inflorescence. Inflorescence simple or branching below. Flowers 4-7 in a verticil; the 3 exterior bracts slightly coalescent below, lanceolate, ending in a long subulate point, longer than the pedicels. Pedicels 5-10 cm. long. Sepals with a broad membranous margin. Petals white, obtuse at the apex, 2-3 cm. in diameter when expanded. Stamens about 20, at length contorted. Leaves elliptical, glabrous, attenuated at either end, 3-7 nerved, 10-25 cm. long and 4-8 cm. broad, marked by pellucid lineolæ, which are often obscure or obsolete. Petioles angled like the scapes, and nearly as long, the striæ when young sometimes minutely glandular pubescent. Rootstock thick and hard, with many long fibrous roots, the rootlets often bearing many small white tubers.

Limnocharis nymphoides (Willd.), Mich., l. c., 91.

Trinidad (266). December-February.

An aquatic with very beautiful light yellow flowers, but so delicate are the petals that I never succeeded in preserving any in the dried specimens. Flowers solitary, on a long scape rising from a

joint of the rhizome. Sepals 3, green, oblong, one-half as long as the petals. Petals broad and obtuse at the apex, cuneate at the base, 3 cm. long, with a darker yellow tint at the base inside. Stamens numerous in several series, very dark purple; anthers black-purple. Styles 6, enlarged at base, whitish below, black-purple above; stigmas 2-lobed. Leaves on a long petiole similar to the scape, the blade nearly orbicular, entire, subcordate or sloping into the petiole, 3-6 cm. in diameter. The plant has a long rootstock running in the mud beneath the water or floating, rooting at the nodes and throwing up flower stems and leaves from the joints, growing in shallow pools 3-4 dm. deep. Juice milky.

NAIADACEÆ.

Lilæa subulata, H. and B., Pl. Æq., 1, 221.

Buenos Aires (20). October.

Ruppia maritima, L., Sp. Pl., 127.

Pilcomayo River (903). January-February.

Abundant in the bed of the upper Pilcomayo on a sandy mud bottom, in brackish water, the plant 6-9 dm. long.

ERIOCAULEÆ.

Dupatya caulescens (Poir.), Kuntze, Rev. Gen. Pl., 745.

Luque (331). December.

Stem 3-5 cm. high, from the summit of which numerous scapes spring, 3-10 cm. high. Scapes 3 ribbed, glabrous. Leaves rather loose, linear, $1\frac{1}{2}$ -2 cm. long, 2-4 mm. broad, acuminate or slightly mucronate, when young puberulent, glabrescent with age. Heads about 4 mm. in diameter. Involucral bracts and the segments of the outer perianth glabrous, acute, silvery-white. Sheaths about as long as the leaves, obliquely fissured.

This little plant grows in miry places, not very common. It is the only one of the order that I found in Paraguay, though many others must occur along the northern borders of the country.

CYPERACEÆ.

Cyperus bromoides, Link., Jahrb., iii, 85.

Between Escoba and Caballero (416). January.

Cyperus Balansæ, Maury, Mem. Soc. Phys. Gen., xxxi, 130, t. 39.

Named by C. B. Clarke.

Central Paraguay (1560).

Stout, 1' m. high; stems triquetrous, glabrous. Umbels simple. Heads sessile or on rays 2-7 cm. long. A tall, conspicuous marsh sedge.

Cyperus cinereus, Maury, l. c., 127, t. 361.

Caballero (433). January.

Cyperus Concepcionis, Steud., Syn. Pl. Glum., pt. 2, 42.

Caballero (565). January. Named by C. B. Clarke.

Cyperus elegans, L., Sp. Pl., 68.

Luque (297 b). December.

Cyperus esculentus, L., Sp. Pl., 67.

Gran Chaco (1561). October.

Common in wet cultivated fields.

Cyperus flavus (Vahl.), Bœckl., Linnæa, xxxvi, 384.

Asuncion (123); Caballero (123 b); Villa Rica (578). January.

Cyperus ferax, Rich., Act. Soc. Hist. Nat. Par., i, 106.

Asuncion (243). December.

Cyperus giganteus, Rottb., Gram., 38?

Asuncion (353 and 562). December.

A very conspicuous species with stout, terete, leafless stems 2-3 m. in height. Flowers in a dense, compound, leafy head at the summit of the stem, 3 or 4 dm. high, spreading as widely. Primary rays 40-50 or more, 10-20 cm. long, triquetrous, glabrous, the secondary 1-2 cm. in length. Spikes narrow, flat, 2-3 cm. long, and 5 mm. wide, 3 or 4 small flowers in a spikelet, all much overtopped by the long acuminate, erect bracts. Involucral bracts 5-15 mm. broad at the base, not sheathing, erect, 3-3½ dm. long, striate,

rough on the margins, tapering to an acuminate point; involuclals narrower, about one-half as long. Sheaths of the rays about 3 cm. long, reddish at the apex, obliquely fissured. The spikes are almost buried out of sight among the bracts, which look like a broom.

The two numbers referred to this may represent different species, and I am uncertain whether either of them is the true *C. giganteus*, Rottb.

Cyperus Haspan, L., Sp. Pl., 66.

Villa Rica (580); Luque (297 a). December–January.

Cyperus Jenmani, C. B. Clarke, ined.

Pilcomayo River (1069). January–April. = Spruce 6418. Named by C. B. Clarke.

An elegant species with slender, glabrous, triquetrous stems $4\frac{1}{2}$ –6 dm. high, many from the same root. Flowers straw-colored, in compound umbels. Spikes 5–18 in a cluster, flat, 1–2 cm. long, sessile or on rays 2–10 cm. long and raylets 4–5 mm. long, 10–30 flowers in a spike. Involucral bracts not sheathing, narrow, rough on the margins, tapering to a long acuminate point, 1 or 2 of them much longer than the flowers, in some cases nearly half as long as the stems.

This very strongly resembles *C. Capituensis*, Maury, l. c., 129, t. 38.

Cyperus Luzulæ, Rottb., Gram., i, t. 13, f. 2.

Asuncion (244). December. Collected also at Cordoba by Hieronymus.

Cyperus nodosus, Willd., Enum., i, 72.

Asuncion (364). December–January.

Stem slender, rather weak, obscurely triquetrous, glabrous, with 2 or 3 short sheathing leaves near the base, 6–6 $\frac{1}{2}$ dm. high, from a hard tuberous rootstock. Flowers in loose simple umbels, the rays filiform, unequal, 1–4 cm. long. Spikes 3–7, linear, unequal, 1–2 $\frac{1}{2}$ cm. long, 10–30 flowered. Fruit chestnut-colored.

Cyperus Olfersianus, Kunth., Enum., ii, 10.

Asuncion (86 and 567). November.

Cyperus polystachyus, Rottb., Descrip. Icon., 39, t. 2, f. 1.

Asuncion (84 a, 84 b, and 566). December.

Cyperus prolixus, H. B. K., Nov. Gen., 1, 206.

Caballero (432). January.

Stems stout, triquetrous, rough near the bracts, 3-4 dm. high, branching at the summit into a long decompound umbel. Rays triquetrous, 8-10 or more, 12-24 cm. long, and again branching into 2-6 raylets, which are 6-10 cm. long. Flowers in densely crowded panicles. Spikelets loosely 5- or 6-flowered, on bracted pedicels 2 or 3 mm. long, the rachis flexuous. Glumes 5-8-nerved on the back, membranous on the margins, 3-4 mm. long. Involucral bracts foliaceous, not sheathing, 7 or more, 1 or 2 of them longer than the inflorescence; involucels shorter than the raylets. The plant forms a very large, widely spreading inflorescence.

Cyperus radiatus, Vahl., Enum., ii, 369.

Pilcomayo River (1068). January-April.

Stems several, glabrous, striate, triquetrous below, compressed above, 6-7 dm. high. Leaves nearly or quite as long as the stems. Inflorescence in simple umbels, the spikes numerous and crowded, radiating from the summit of the rays. Rays unequal. Spikes somewhat cylindrical, $1\frac{1}{2}$ -2 cm. long. Spikelets 2-3 mm. long. 10-14-flowered, on peduncles of about the same length; flowers minute, crowded, the glumes squarrosely spreading. Bracts numerous, foliaceous, much longer than the flowers. Stems and leaves straw-colored when dry, and the flowers yellowish-green.

Cyperus Surinamensis, Rottb., Descrip. Icon., 35, t. 6, f. 5.

Asuncion (244 a and 564); Pilcomayo River (1562). December-January.

Cyperus, Sp.

Central Paraguay (83).

Related to *C. Surinamensis* and *C. Luzulæ*. Appears to be the same as a plant collected by Schweinitz in Surinam.

Kyllingia odorata, Vahl., Enum., ii, 289.

Asuncion (60). November.

Kyllingia obtusata, Presl, Reliq. Hæncck., i, 183.

Asuncion (95 a). November.

Eleocharis acicularis (L.), R. and S., *Syst. Veg.*, ii, 154.

Asuncion (87). November. Named by C. B. Clarke.

Eleocharis capitata (Willd.), R., Br. Prod. Flor. Nov. Holl., 225.

Asuncion (87 a). November.

Eleocharis geniculata (L.), R. and S., l. c., 224.

Pilcomayo River (862 and 1036). January–May.

An elegant species, 1–1½ m. high, with many stout stems from the same root, the sheaths at the base red, and the pure white feathery looking heads 2–4 cm. long. This forms a conspicuous object among the grasses which choke the waters of the great laguna.

Eleocharis mutata (L.), R. and S., l. c., 155.

Luque (298); Villa Rica (499). December–January.

Eleocharis nodulosa (Roth.), Schultes, Mant., ii, 87.

Luque (298 b); Pilcomayo River (1084). December–January.

Eleocharis sulcata (Roth.), Nees in Mart. Fl. Bras., i, 98.

Asuncion (249). December. Named by C. B. Clarke.

Dichromena ciliata, Vahl, Enum., ii, 240.

Between Villa Rica and Escoba (474). January.

Fimbristylis capillaris (L.), A. Gray, Man. Ed. v, 567.

Asuncion (94 b and 130); Caballero (130 b, 561, and 568). November–January.

Fimbristylis complanata (Retz.), Link, Hort., ii, 292.

Asuncion (94); Luque (296). December.

Stems 3–6 dm. high. Leaves and bracts sheathing, some of them half as long as the stem, 3–5 mm. broad. Umbels 2 or 3 times compound. Wet grounds.

Fimbristylis diphylla (Retz.), Vahl, l. c., 289.

Luque (299 a); Caballero (299 b). December–January.

Fimbristyllis monostachya (L.), Hassk. Pl. Jav. Rar., 61.

Gran Chaco (863). January-March.

Fimbristyllis squarrosa, Vahl, l. c., 289.

Asuncion (357); Pilcomayo River (879). January.

Scirpus Cubensis, Poepp. and Kunth, in Kunth Enum., ii, 172.

Asuncion (563). December.

Scirpus robustus, Pursh., Fl. Am. Sept., i, 56.

Pilcomayo River (927). February.

Fuirena incompleta, Nees, Mart. Fl. Bras., ii, 107.

Luque (328). December.

A tall species. Stem simple, soft, triquetrous, $4\frac{1}{2}$ -6 dm. high, sheathed by 3 or 4 leaves. Leaves keeled, revolute on the margins, with a closed sheath which has a membranous ligule at its top that throws the blade nearly at right angles to the stem. Flower heads in clusters, which are sessile or in umbels. Scales 3-nerved below the awn. Wet grounds.

Platylepis Brasiliensis, Kunth, l. c., 269.

Asuncion (95). November-January.

A genus not found in our country. It is distinguished by having terminal spikes, and the stipitate flowers and fruit enclosed in a flat or triquetrous scale which exceeds the glumes, and the absence of setæ. The species here noted is a small, slender plant 15-20 cm. high, with the narrowly linear leaves crowded at the base and shorter than the culms. Spikes closely crowded in a globose or ovoid head, 7-10 cm. long, subtended by 2 spreading bracts much longer than the head. Scale compressed, broadly and membranously winged, tipped with an awn about one-third of its length. Nutlet dark, oblong, slightly angled on one side, tipped with the remains of the style, 1 mm. long.

This little plant, with its small white heads, dots the grass lands about Asuncion and Villa Rica in large numbers.

Rynchospora Amazonica, Poepp. and Kunth, in Kunth Enum., ii, 292.

Near Lympio (1564); Caballero (1563). January-May. Named by C. B. Clarke.

With slender stems 2-6 dm. high. Spikelets in lateral axillary clusters on long peduncles, or in terminal long peduncled panicles, 3-5 in a cluster, ovoid. Glumes chestnut colored. Radical leaves one-third as long as the stem or shorter.

Rynchospora corymbosa (L.), Britton, Trans. N. Y. Acad. Sci., xi, 84.

Villa Rica (559). January.

Stems triquetrous, 20 cm. or more in height, having at the summit a large, loosely spreading 2 or 3 times compound panicle of spikelets, twice as long as the stem and spreading for 25 or 30 cm. This is composed of 2 or 3 fascicles of umbels 4-6 cm. apart; the uppermost the largest, its rays 10-15 cm. in length; raylets 3-5 cm. long, and often again divided into shorter branches. Fascicles subtended by 1-4 foliaceous bracts, 1 of them 10-40 cm. long. Spikelets 2 or 3 in a cluster, at the ends of the ultimate divisions. Glumes chestnut-colored. A very striking plant. In wet places.

Rynchospora glauca, Vahl, l. c., 233:

Luque (300). December. Named by C. B. Clarke.

Rynchospora scaberrima, Beck., Fl., 1860, p. 452.

Luque (311); Gran Chaco (1565). December-February. Named by C. B. Clarke.

Spikelets in several compound umbelled fascicles along the stem, the uppermost largest, all with numerous umbels, and subtended by foliaceous bracts much larger than the flowers. Leaves firm, 8-13 mm. wide and longer than the culm, very rough. A coarse species with rough, triquetrous stems 3-12 dm. high. Spikelets narrow lanceolate, acute, 3-5 mm. long, 3-12 or more in a cluster, dark chestnut-colored.

Rynchospora tennis, Link, Jahrb., iii, 76.

Luque (1566). December.

Rynchospora Urbani, Beckl., Cyp. Nov., i, 26.

Luque (560). December. Named by C. B. Clarke.

Scleria hirtella, Sw., Fl. Ind. Occ., i, 93.

Caballero (424). January.

Scloria pratensis, Lindl. in Nees, l. c., 179, t. 23.

Asuncion (246). Named by C. B. Clarke.

Culms 5-7 dm. high, triquetrous, rough on the angles. Stem leaves 8-30 cm. in length, long-sheathed, 3-nerved, 5-8 mm. wide. Flowers shortly pedicelled, on long, branching peduncles, the staminate and pistillate in separate spikelets. Glumes grayish margined, with a dark chestnut centre, broad-ovate, mucronate. Nutlets globose, white and shining, 2 or 3 mm. in diameter.

Wet places at Asuncion, Villa Rica, and in the Chaco opposite Asuncion.

Carex Bonariensis, Desf. in Poir. Lam. Encyc. Supp., iii, 250.

Pilcomayo River (1076). February. Named by L. H. Bailey.

With very long weak culms, often recurving or nearly reclined, rough on the angles, 3-5 dm. high. Leaves nearly as long as the culms, 1-3 mm. wide. Spikes 2 or 3, closely crowded in small terminal heads.

In the woods and among grass on the campo.

Carex involucrata, Boott, Illus. Car., ii, 77, t. 210.

Luque (316). December. Named by L. H. Bailey.

The spikes 3 or 4, disposed as in no. 1076. Culm a little stouter and not so high as in that. Leaves as long as or longer than the culm, 2-4 mm. broad. In dry grounds, old fields, among grass. Common at Luque and Trinidad. These 2 carices are the only species which I found growing in Paraguay.

GRAMINEÆ.

Paspalum barbigerum, Kunth, Gram., i, 24.

Pilcomayo River (962). March.

Paspalum conjugatum, Berg, Act. Helv., vii, 129, t. 8.

Asuncion (247). December.

Paspalum distichum, L. Syst., Ed. 10.

Asuncion (548); Trinidad (1567). November-December.

Paspalum orianthum, Nees, Agrost. Bras., 38.

Gran Chaco near Asuncion (557 a).

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Paspalum fasciculatum, Willd. in Flügge, Mon., 69.

Gran Chaco near Asuncion (535). December-January.

Culms tall and stout, growing 1- $\frac{1}{2}$ m. high. It has a long tough root, and is very difficult to eradicate in clearing fields. It is, however, valued as a pasturage grass when young.

Paspalum inaequivalve, Raddi, Agrost. Bras., 28.

Asuncion (248). December. = Fr. Miller no. 72.

This species spreads over the ground in long running culms, sometimes forming mats, throwing up erect or ascending stems here and there which are 15-25 cm. high. Spikes few, short, and some distance apart. It occurs in shady places or wet grounds.

Paspalum intermedium, Munro in Herb. Kew.

Pileomayo River (1019). May.

Culms stout, glabrous, 1-1 $\frac{1}{2}$ m. high. Spikes in a long (15-25 cm), closely crowded, terminal raceme, purplish in color, 2-6 cm. long. Leaves nearly as long as the culm, sharply keeled, rough on the margins, covered with a mealy granulation when fresh. Common in clumps on the campos along the Pileomayo River.

Paspalum lividum, Trin., ex Schl., Linnæa, xxvi, 383.

Pileomayo River (1584). January.

Paspalum ovatum, Nees, l. c., 43.

Between Villa Rica and Escoba (549). January. = Balansa 110.

Paspalum paniculatum, L., Sp. Pl., Ed. 2, 81.

Between Villa Rica and Escoba (553). January.

Paspalum plicatulum, Mx., Fl. Bor. Am., i, 45.

Near Asuncion (1580). December.

Paspalum repens, Berg, Act. Helv., vii, t. 7.

Asuncion (282). November.

An aquatic grass, creeping by running rootstocks on the bottom, and sending up many floating stems. The sheaths are inflated and seem to act as floats. Spikes narrowly linear, terminal. Cattle are so fond of this grass that they will wade far into the water to get a bite of it.

Paspalum simplex, Morong, n. sp.

Culm slender, simple, 7-10 dm. high, striate, glabrous. Sheaths glabrous, open, and with long silky hairs at the mouth. Blade of the leaf linear.

glabrous, rough on the margins, tapering to a long acuminate point, 12-30 cm. long, 2-5 mm. broad; ligule short, fuscous. Spikes 4-10 at the summit of the culm, linear, 3 or 4 cm. long, scarcely 2 mm. broad, with long silky hairs at the base; rachis glabrous. Spikelets 2 mm. long, on minute pedicels. Empty glume only 1, strongly 3-nerved, boat-shaped, as long as the flowering glume, translucent; flowering glume 3-nerved. Grain slightly rough under the lens.

Pilcomayo River (1583). February.

Paspalum virgatum, L., Sp. Pl., Ed. 2, 81.

Caballero (516); Asuncion (557); Pilcomayo River (969).
January-June.

This grass in Paraguay grows sometimes nearly 2 m. in height. It has a stout stem and long, broad leaves. On account of their sharp cutting edge the people call it *Paja corta dura*, or grass that cuts. It is largely used for thatching houses, and I was told that if well laid it would shed the rain perfectly and last ten years.

Eriochloa punctata (Lam.), Hamilt., Prod., 5.

Asuncion (283); Pilcomayo River (971). December-March.

Panicum amplexicaule, Rudge, Pl. Guian., i, 21, t. 27.

Luque (541); Pilcomayo River (1030). December-May.

Growing in miry places or in water. Culms glabrous. Stem leaves amplexicaul, 1-3 cm. broad at the base, 14-30 cm. long, tapering to a sharp acuminate point. In young plants before the culms appear the leaves sheath each other at the base. Panicle narrow, of many densely flowered spikes, the spikes cylindrical, some of them 20 cm. or more in length, the panicle 30 cm. or more long. Glumes strongly rough-awned, and rough on the mid-nerve.

Panicum auriculatum, Willd. in Spreng. Syst., i, 322.

Caballero (515); Asuncion (693). January-May.

No. 515 is referred here with hesitation. No. 693 = Balansa 114.

Growing in miry places or in water, stout, 1-1½ m. high. Stem leaves short, auriculate, and very broad (sometimes 4 cm.) at the base. Panicle close, 3-5 cm. broad and 2½-4 dm. long, composed of many rather loosely flowered cylindrical spikes 2-10 cm. long

Panicum capillare, L., Sp. Pl., 58.

Pilcomayo River (1568). February.

Panicum chloroticum, Nees, in Trin. Diss., ii, 236.

Named by N. E. Brown.

Pilcomayo River (1002). April.

Some of this was distributed as *P. elephantipes*, Trin.

An aquatic species, with floating culms 2-3 m. Sometimes nearly 5 m. in length. Stem leaves 13-25 cm. long. Panicle widely spreading, 2-5 dm. long, the branches rising singly or 2-3 from the main rachis, and 15-25 cm. long, many forked. Spikelets much scattered, solitary, on short pedicels along the ultimate branches. It was mainly owing to this grass that we could not get our little steamer through the great laguna on the Pilcomayo, and so were compelled to abandon our voyage and return to Asuncion. It choked the channel of the river with an impenetrable mass of vegetation.

Panicum Crus-Galli, L., Sp. Pl., 56.

Pilcomayo River (963); Asuncion (743 and 539). January-May.

Panicum demissum, Trin., Sp. Gram., t. 319.

Caballero (519). January.

A small grass with very slender erect or nearly prostrate stems 8-12 cm. high. Leaves 1-2 cm. long, lanceolate, acute. Spikelets in a loose, spreading, terminal panicle $1\frac{1}{2}$ -3 cm. long, each on a pedicel 3-7 mm. long.

Panicum glutinosum, Sw., Prod., 24.

Caballero (405 a). January. = Balansa 1.

Apparently so named because the roots are tubercled and glutinous, causing the sandy soil in which the plant grows to adhere to them. The inflorescence and general appearance of the plant much like those of our *P. virgatum*. This, however, grows in shady woods.

Panicum insulare (L.), Meyer, Fl. Esseq., 60.

P. leucopharum, H. B. K., i, 97.

Asuncion (176); Pilcomayo River (983). November-April.

Panicum latifolium, L., Sp. Pl., 58.

Asuncion (755, 780, and 641); Pilcomayo River (1569). January-April.

This is a very different plant from the species commonly called

P. latifolium in this country, which should be *P. Walteri*, Poir. It is really a cane, often growing 3 or 4 m. high, the culm with hollow joints, glabrous, and nearly as thick as the thumb, with a dark ring at the joints, leaning downwards at the summit. Leaves rounded and with a tuft of silky hairs at the junction with the sheath, lanceolate, long acuminate, 6-15 cm. long, 1-3 cm. broad in the middle, more or less pubescent on the blade and sheaths. Panicle with divergent lateral branches, 5-20 cm. long. Spikelets solitary on short pedicels, 3 or 4 mm. long, the lower empty glume half as long as the upper, puffed outwardly as if inflated, 5-nerved, the upper as large as the flowering glume, 5-7-nerved, both glumes with a tuft of down at the apex. The fruit when ripe becomes perfectly black, very smooth and shining, and dropping off at a touch. A striking plant, occurring usually in swampy thickets.

***Panicum laxum*, Sw., Prod., 23.**

Gran Chaco near Asuncion (537); Pilcomayo River (977) March.

A delicate weak-culmed grass 1-1 $\frac{1}{4}$ m. high. Panicle loose, 25 cm. or more in length. Spikelets hardly 1 mm. in length, loosely strung along the capillary rachis; the glumes whitish; pedicels hardly 1 mm. long. Wet places in woods.

***Panicum megiston*, Schultes, Mant., ii, 248.**

Gran Chaco near Asuncion (813); Pilcomayo River (1072).
October-June.

A fine grass, growing with stout, glabrous culms, 1-1 $\frac{1}{4}$ m. high. Stem leaves 10-15 cm. long, 18-28 mm. broad, tapering to a sharp acuminate apex, sparsely hairy and rough on the sheaths with minute tubercles. Panicle 3-4 dm. long, 5-18 simple, drooping branches rising together in whorls from the main rachis and 10-12 cm. in length. Spikelets solitary or 2 or 3 together, about 3 mm. long, sessile or on minute pedicels, strung along on the rachis at some distance from each other. Upper empty glume as large as the flowering glume, strongly 5-7-nerved. Occurs in deep woods or on their borders, and forms a most excellent pasturage grass for cattle.

***Panicum Numidianum*, Lam., Encyc., 49.**

P. barbinode, Trin., Act. Petrop., 1835, p. 256.

Asuncion (779 a).

This species is more common in Brazil than in Paraguay. It is cultivated in fields at Asuncion under the name Paja Angora,

Angora grass, and used as green fodder for horses. In good soil it yields fine crops, being cut down in sections as wanted, and growing all the year round. It attains a height of 1-1½ m., and is softly pubescent, the panicle 8-20 cm. long and mostly glabrous.

Panicum paucispicatum, Morong, n. sp.

Culm geniculate, striate, pubescent, especially on the branches, 2-6 dm. high. Branches spreading. Sheaths striate, downy, marked with a dark ring at the top. Blade of the leaf lanceolate, acute, or acuminate, cordate and amplexicaul at the base, ciliate, pubescent, many nerved, 4-7 cm. long, 9-18 mm. broad at the base; ligule short, fimbriate. Spikes few and distant, 2-4 cm. long; rachis triquetrous, the angles sharp, very downy. Pedicels with a ring of projecting hairs just under the spikelets. Spikelets about 8 mm. long; empty glumes downy, pointed, strongly 3-7-nerved, the lowest half as long as the flower. Sterile flower hyaline, nerved. Flowering glume tipped with a sharp awn-like projection which is 1 mm. long.

Similar in appearance to *P. zizanioides*, but differing from that in its marked pubescence, the size and numbers of the spikelets, number of nerves on the glumes, and especially in the peculiar projection at the apex of the flowering glume.

Wet grounds in the Chaco opposite Asuncion (1573). January.

Panicum polygonatum, Schrad. in Schultes, Mant., ii, 256 f

Pilcomayo River (1574).

Panicum Potamium, Trin., Diss., ii, 239.

Caballero (441); Luque (534). December-January.

Panicum proliferum, Lam., Encyc., iv, 747.

Caballero (543). January.

Panicum recalvum, Kunth, Gram., i, 39.

Pilcomayo River (1570). June. = Balansa 144.

Panicum rivulare, Trin., Diss., ii, 213.

Caballero (517); Pilcomayo River (517 a). January.

A tall coarse grass, growing in bogs at Caballero. Also collected at the ford on the Tebicuary River on the road between Villa Rica and Escoba. Culm 1¼-2 m. high, glabrous. Panicle large, loose, and spreading, 3½-8½ dm. long, 15-20 cm. broad. Spikelets small, crowded on the branches of the panicle. Leaves 6-10 cm. or more in length, with a very rough cutting edge, tapering to an extremely long acuminate point.

Panicum sanguinale, L., Sp. Pl., 57.

Asuncion (558). November-January.

Panicum spectabile, Nees, Agrost. Bras., 262.

Pilcomayo River (1070). April. = Balansa 156.

Growing in water. A thick culmed grass, 4 or 5 dm. high. Leaves rough on the edges with minute bristles and sometimes with small tubercles also, 3-5 dm. long and 1-2 cm. broad, the uppermost much longer than the panicle. Panicle close, 15 cm. long and 2½ cm. broad. Spikes simple, erect, disposed alternately around the rachis, about 3 cm. long. Main rachis strongly angled, hispid with short hairs, and with longer ones just under the spikes. Spikelets 5 or 6 mm. long, sessile, disposed closely and in several rows about the rachis of the spike. Flowering glume 5-7-nerved, with a long hispid awn, and hispid on the nerves.

Panicum sulcatum, Aubl., Pl. Guian., i, 50.

Caballero (444); Pilcomayo River (1572). January-February.

Culms terete, pubescent, sulcate, 1-1½ m. high. Leaves, especially on young plants, very beautiful, being nearly glabrous, strongly striate longitudinally or even plicate, 3-6 dm. long and 2½-5 cm. broad in the middle, the blades bright green in color; sheaths downy, with long white hairs in a tuft at the summit and along the margins. Spikes in a close panicle 3-4 dm. long, very bristly with upwardly barbed setæ 1-2 cm long which rise from the base of the pedicels.

Panicum trichanthum, Nees, Agr. Bras., 210.

Named by N. E. Brown.

Luque (317); Pilcomayo River (1571). December-January.
= Balansa 46 and 46 a.

Panicum vestitum, Kunth, Gram., i, 39.

Between Villa Rica and Escoba (552). January.

Cæspitose. Stems strict, 2-3 dm. high; panicle short; the glumes 3-4 mm. long, clothed with long silky hairs. Rising from a hard, somewhat tuberous base, and fibrous roots. Leaves narrowly linear, half as long as the culm; the culm mostly naked.

On the open campo between Villa Rica and Escoba.

Panicum virgatum, L., Sp. Pl., 59.

Caballero (405); Gran Chaco near Asuncion (538). January.

Panicum zizanioides, H. B. K., Nov. Gen., i, 100.

Gran Chaco near Asuncion (536); Pilcomayo River (1001).
January-April.

Grows in masses along the edges of water-courses, in the water and on the banks. It is an open, spreading plant, creeping at the base, 3½-8 dm. high. Leaves 7-13 cm. long, amplexicaul at the base of the blade. Panicle 10-13 cm. long, with several, unequal, nearly erect spikes. Spikelets scattered along the rachis, usually 2 together, 1 on a pedicel 1 mm. long, and the other on a pedicel 5 mm. long. Lowest glume ¾ as long as the spikelet, 3- or obscurely 5-nerved, infolding the spikelet at the base. All the glumes glabrous. Whole plant glabrous except on the margins of the leaf sheaths.

Panicum, sp.

Caballero (521). January.

Oplismenus setarius (Lam.), R. & S., Syst. Veg., ii, 481.

Asuncion (248 a); Luque (315). December.

Chamæraphis caudatus (Lam.), Britton.

Panicum caudatum, Lam., Encycl., iv, 2.

Pilcomayo River (1575). January-February.

Cæspitose. Culms numerous from a hard base, strict, slender, angular, mostly glabrous. Leaves narrowly linear, glabrous, revolute, nearly as long as the culms. Panicle spiciform, simple or subsimple, 4-8 cm. long. Spikelets whitish, 2 mm. long. Longest seta about 1 cm.

In hard soil on the campos of the Pilcomayo River.

Chamæraphis glauca (L.), Kuntze, Rev. Gen. Pl., 767.

Near Asuncion (540). December-April.

Chamæraphis Italica (L.), Kuntze, l. c. ?

Asuncion (207). November-December.

Chamæraphis setosa (Sw.), Kuntze, l. c., 768.

Setaria macrostachya, H. B. K., Nov. Gen., i, 110.

Between Villa Rica and Escoba (546); Asuncion (658); Pirayú (673); Pilcomayo River (1574). January-April.

A grass striking in appearance and of common occurrence in Paraguay. The culms are sometimes nearly 3 m. high, and the leaves 30-45 cm. long and 2-3 cm. broad, strongly sulcate, almost plicate. Panicle 20-30 cm. long and 3-4 cm. broad, branches single, 1-1½ cm. long, the inflorescence looking as though it were all bristles. Setæ very numerous, 1-2½ cm. long. Spikelets 2-2½ mm. long.

Chamæraphis paucifolia, Morong, n. sp.

Culm terete, glabrous or slightly rough, striate or nearly smooth, 1-2 m. high, with a dark ring at the nodes; internodes 15-25 cm. long. Leaves few, striate, with the sheaths minutely rough, nearly as long as the stem, revolute, running to a long acuminate point. Ligule reduced to delicate white hairs. Panicle terminal, spiciform, densely cylindrical, 10-20 cm. or more in length, and about 1 cm. wide, on naked peduncles 3-5 dm. long. Spikelets sessile or on minute pedicels, on the rachis or on very short lateral branches, closely crowded, glabrous, about 3 mm. long, acute, slightly recurved and spreading. Empty glumes white, the lowest about 1 mm. long, the second a little longer, 5-nerved, both barely pointed and having a curiously puffed appearance. The flowering glume as long as the flower, acute, 5-nerved, whitish. Palea wrinkled transversely, very thick and hard, purplish when mature. Setæ 1 or 2 under each spikelet, 10-12 mm. long. This plant usually grows in tufts. The culms are often branched below, and the branches flower-bearing.

On the campo at Caballero (418), and on the Pilcomayo River (982). January-April.

Cenchrus echinatus, L., Sp. Pl., Ed. 2, 1150.

Asuncion (96). November.

Cenchrus myosuroides, H. B. K., Nov. Gen., i, 115.

Asuncion (214). November-December.

A fearful thing to encounter when the burs are ripe, as the plant is nearly as high as one's head, and the thickly crowded spike is sometimes 25 cm. long. I have had my clothes so completely covered with the burs that it took me nearly an hour to pick them off.

Old fields in the vicinity of Asuncion.

***Pennisetum purpurascens*, H. B. K., Nov. Gen., i, 113.**

Pilcomayo River (1576). March–April.

A handsome species. Culms sometimes 1 cm. in diameter at the base, hard and hollow-jointed like a cane, glabrous, and as much as 3 m. in height. Leaves numerous, 3–5 dm. long, 1–2 cm. broad. Spikes often reddish or purple in color, sometimes 25 cm. or more in length, frequently recurved. Spikelets densely crowded. Setæ very numerous, 10–15 mm. long.

***Pennisetum setosum* (Sw.), L., in Pers. Syn., i, 72?**

Asuncion (208 a); Pilcomayo River (991). February–April.

A fine grass, much valued for pasturage when young. Culms 1–2½ m. high. Inflorescence in a long, plumose spike (15–25 cm.), which has a rich yellow or purplish tint, frequently recurved. Spike 1–1½ cm. wide. Similar to no. 1576, but much more graceful, and with shorter and narrower spikes. It presents a beautiful appearance when standing on the banks of the Pilcomayo River, where it is very common.

This was first determined and distributed as *P. Sieberi*, Kunth.

***Olyra pauciflora*, Sw., Fl. Ind. Occ., i, 125.**

Caballero (505). January.

A genus of grasses with 1-flowered, monœcious spikelets, the staminate in the lower part of the panicle, or rarely in a distinct panicle, and with a single glume. Pistillate flowers 3-glumed. The species here noted is, according to Swartz, an inhabitant of the island of Jamaica. It has a culm 2 or 3 dm. high. Leaves ovate, acute, rounded or truncate at base, 4–6 cm. long and 2½–3 cm. broad at the base, on a minute pedicel, the sheaths closely involute. Panicle 6–8 cm. long, the branches in verticils of 6–10, the lowest ¾ as long as the panicle. Glumes aristate. Leaves very green, striate, glabrous, shining on the upper surface.

***Pharus latifolius*, L., Sp. Pl., Ed. 2, 1408.**

Between Villa Rica and Escoba (449). January–March.

This seems to be the plant described in Chap. Fl. Supp., p. 661, but it certainly is not aquatic as he declares his plants to be, as it grows in the woods, often in very dry woods. It occurs abundantly in the monte on the banks of the Pilcomayo, as well as in Central Paraguay. The panicle is small, not over 10 cm. long, the branches

widely spreading. It is a bad thing to handle, as the fruit-bearing glume is densely covered with small hooked hairs, and the fruit adheres to everything it touches, even to the drying-paper, so that it is very difficult to preserve complete specimens.

Tripsacum dactyloides, L., Sp. Pl., Ed. 2, 1378.

Pirayu (675). April.

Luziola Peruviana, Pers., Syn., ii, 575.

Asuncion (195). November.

Luziola Spruceana, Benth. in Mart. Fl. Bras., ii, pt. 2, 18.

Near Asuncion (556). February. = Spruce 536.

An aquatic with long sheathing leaves, the sheaths much inflated, and the leaves much longer than the culms. Monœcious. Staminate panicle terminal, 5-6 cm. long, loose and spreading, on culms almost filamentous, about 20 cm. long. Pistillate panicle below, much larger, the branches setaceous, dichotomous.

Oryza latifolia, Desv., Journ. Bot., 1813, 77.

Pilcomayo River (949). February.

An aquatic occurring in pools in deep woods on the Pilcomayo River. Culms $1\frac{1}{2}$ -2 m. high. Leaves 3-3 $\frac{1}{2}$ dm. long, $1\frac{1}{2}$ -4 cm. broad at the base, midnerve white and prominent, dark purple at the junction of blade and sheath, otherwise green, rough on the margins, otherwise glabrous; sheaths 20-25 cm long, closely investing the culm. Panicle 25 cm. long, composed of simple erect branches 8-10 cm. long, rising 1-4 together from the rachis, with a tuft of silky hairs at the base of each cluster. Spikelets white, 6 or 7 mm. long; empty glumes subulate, 3 mm. long; flowering glume keeled and laterally 2-nerved. Keel and nerves green, hispid, with a very long hispid awn; palet similar, apiculate.

Arundinella Martinicensis, Trin., Diss., ii, 62.

Between Villa Rica and Escoba (544). January.

A strong, rank grass 3-9 dm. high, with rigid revolute acuminate leaves 2-3 dm. long. Panicle close, 2-3 $\frac{1}{2}$ dm. in length, 3-5 cm. wide, the branches 6-12 cm. long. Spikes crowded. Spikelets geminate, on unequal pedicels, 3 mm. long, 1-flowered; upper empty glume longer than the lower and longer than the flower, 5-nerved, keeled, slightly recurved. Palet with a tuft of hairs at the base,

awned, the awn delicate, bent at the summit, the lower half chestnut-colored like the palet, and white above.

On the campos between Villa Rica and Escoba.

Saccharum Cayennense (Beauv.), Benth., Jour. Linn. Soc., xix, 66.

Between Caballero and Escoba (417). January.

Culms stout, $1\frac{3}{4}$ - $2\frac{1}{2}$ m. high, yellowish, shining, glabrous, except at the joints, which are enclosed in a ring of long white hairs. Leaves linear, 2-3 cm. long, 6-8 mm. wide, fuscous pubescent on both sides, strongly nerved, midnerve large, becoming 5 or 6 cm. long above. Sheaths longer than the blades, pubescent above. Panicle spiciform, nearly cylindrical, interrupted, 10-25 cm. long, about 2 cm. wide. Branches 1-2 cm. or less in length, glomerate, densely crowded, solitary or 1-3 branched, the racemes subglobose. Spikelets about 4 mm. long. Glumes 4, the outer one oblong, white, shining, coriaceous, densely ciliate at the base and apex and on the margins with rufous hairs longer than the spikelet, indistinctly 3-4-nerved near the apex; the other glumes chartaceous and smaller, the second slightly pilose. One of the most interesting grasses in Paraguay. The long, fluffy, bronze-colored, soft and velvety haired panicle is exceedingly beautiful. In bogs near the railroad track between Escoba and Caballero.

Saccharum holcoides (Nees), Hack. in Mart. Fl. Bras., ii, pt. 3, 254.

Luque (327). December.

This species differs from the preceding more in habit than in the floral characters. Culms slender, glabrous, fringed with a ring of white hairs at the joints, about 6 dm. high, with 2 or 3 nodes. Leaves shorter than the culm, glabrous, except on the upper margins of the sheath, revolute. Panicle flattish, not cylindrical, 8-12 cm. long; branches 2-3 cm. long, simple or nearly so, spreading. Spikelets 4 mm. long, ciliate with bronze-colored hairs like no. 417, but the hairs not so dense and shorter than the spikelet. Outer glume bare of hairs on the back, pointed and minutely bidenticulate at the apex, with 4 green nerves which run the whole length of the glume. Near wet rocks with the water dripping upon it from above.

Some of this was distributed as *S. Cayennense*.

Pappophorum macrostachyum, Schrad. in Schultes Mant., ii, 342.

Pilcomayo River (1071). April.

Culms stout, sulcate, glabrous, 10-15 dm. high. Leaves $4\frac{1}{2}$ -7

dm. long, glabrous, sulcate, the margins setulose-rough; sheaths glabrous or a little pilose at the mouth, as long as the blades; nodes 2 or 3. Panicle at first enclosed in a foliaceous bract as long as itself, the largest 8 dm. long and 6 cm. broad, tapering to an acuminate apex, more or less nodding; branches very numerous and crowded, simple or compound. The 2 lower glumes silvery-white, papyraceous, 1-nerved, 3 or 4 mm. long, apiculate, much surpassed by the setæ of the paleas. Lower palea divided into about 13 setæ. Caryopsis elliptical. A fine grass, the long silvery-white panicles very showy.

Andropogon condensatus, H. B. K., Nov. Gen., i, 188.

Asuncion (206). November-December.

Common in old fields at Asuncion. Culms rigid, about 1 m. high. Panicle spreading widely at the summit, 10-15 cm. long. Racemes much exserted from the spathes. Flowers white and fleecy.

Andropogon lateralis, Nees, Agrost. Bras., 329.

Asuncion (230). December.

A harsh slender-stemmed grass, 10 or 12 dm. high. The flowers are borne along the stem at intervals in small, long-peduncled panicles, 2-3 branched. Spikes 4-6 cm. long. Hairs on the spikelets rather scanty. Awns twisted at the base, slender, bent about $\frac{1}{4}$ of the way up. The culms are caespitose, with a tuft of short leaves at the base.

Andropogon leucostachys, H. B. K., Nov. Gen. i, 187.

Caballero (469). January. = Balansa 279

Regarded by Hackel as a form of *A. Virginicus*, L., but differing in having much longer spikelets and with shorter hairs on the callous base of the first glume. It seems to me also to have much larger panicles and longer racemes. Usually 3-4 panicles of fleecy flowers at long intervals on the stem. Culm 4-5 dm. high. Common on the open campo around Caballero and Villa Rica.

Andropogon Minarum (Nees), Kunth, Enum., i, 507.

Between Villa Rica and Escoba (488 a). January.

Culms rather stout, 5-9 dm. high. Panicle densely spiked, oblong-obovate, 12-28 cm. long and 4 or 5 cm. broad, the branches somewhat verticillate. Distinguished by its chestnut-colored, twisted, hairy awns, 4-6 cm. long. These are very conspicuous, and seem

to occupy the whole panicle. Glumes white, with a sharp, slightly curved, callous, white-hairy point at the base. These cling close to the fruit and have the remarkable hygrometric property of untwisting in wet weather and retwisting when dry, so that the sharp point bores its way into the earth. Persons who keep sheep complain that these sharp-pointed seeds actually bore their way into the sides of the animals.

Andropogon Neesii, Kunth, Enum., i, 491.

Near Caballero (423). January.

Andropogon nutans, L., Sp. Pl., 1045.

Between Villa Rica and Escoba (545, 547); Pilcomayo River (926). January–February.

No. 547 is nearly the ordinary *A. nutans* of the United States. It has light yellow panicles, and occurs on the campo near Villa Rica. Nos. 545, 547 belong to the form called by Häckel (Mon. Phan., vi, 529) *β. agrostoides*, with spikelets about 4 mm. long; awns 4–7 mm. long, deep yellowish-brown in color. All of them are exceedingly handsome when in flower. On the campos near Villa Rica and the Pilcomayo River.

Andropogon saccharoides, Sw., Fl. Ind. Occ., 205, var. **laguroides** (D.C.), Hack. in Mart. Fl. Bras., ii, pt. 3, 293.

Luque (326); Pilcomayo River (1083 and 1008). December–April.

This grass sometimes grows to a height of 4 m. in Paraguay, with a panicle over 30 cm. long. The spathe-like floral bract is very rigid, and rarely fully opens till the flowers are dropping off.

Andropogon Sorghum (L.), Brot., Fl. Lus., i, 88.

Asuncion (203). November.

Not exactly *Sorghum vulgare*, but the form called by Häckel *corymbosus*. It runs wild in fields in the vicinity of Asuncion. Culms 2–2½ m. high. Panicle 30–40 cm. long, very lax, the lowest branches drooping. Spikelets obovate, very hairy, or at maturity the glumes shining, interruptedly hairy, brownish-red or black, 5 or 6 mm. long. Awns 5–8 mm. long, bent about half-way up. The leaves are sometimes 7 dm. long and 6 or 7 cm. broad. It was probably introduced into Paraguay by immigrants, but it seems to thrive very well as a naturalized grass.

Rottbœllia Balansæ, Haek., in Mart. Fl. Bras., ii, pt. 3, 312.

Near Villa Rica (542). January. = Balansa 291.

Culms hard and dry, 1-1 $\frac{3}{4}$ m. high, growing in tussocks on the campo near Villa Rica. This is one of the most common grasses upon the plains of Paraguay, and usually presents a stiff, harsh aspect, affording but little nutriment for cattle, except when very young.

Rottbœllia compressa, L. f., Suppl., 114.

Pilcomayo River (874). January. = Balansa 646.

Aristida implexa, Trin., Act. Petrop., 1836, 48.

Between Villa Rica and Escoba (488). January.

Culms nearly or quite glabrous, 1 m. or more in height, cæspitose. Leaves as long as or longer than the culms, narrowly linear, very revolute, appearing nearly cylindrical when dry. Panicle close, 25-30 cm. long. Empty glumes 2-2 $\frac{1}{2}$ cm. long, bluish, rough on the keel and with a rough bristle. Awns of the flowering glume nearly 10 cm. long, straight, much twisted. A strawy-looking species among the hills and woods.

Aristida complanata, Trin., l. c., 1829, 85. Ex descr.

Asuncion (648). April.

A slender species with nearly glabrous compressed culms 5 or 6 dm. high. Leaves narrowly linear, 2 mm. broad, nearly or quite glabrous, tapering to a long, hair-like point, very revolute. Panicle contracted, 15-20 cm. long, 1-1 $\frac{1}{2}$ cm. wide, with 3 or 4 branches. Empty glumes purplish, membranous, barely bristle-pointed, the lower 1-nerved or obscurely 3-nerved at base, 12 mm. long. Awns 20-25 mm. long, very slender, not twisted, straight. A delicate, cæspitose plant, occurring in old fields.

Sporobolus Indicus (L.), R. Br., Prodr., i, 170.

Asuncion (365); Caballero (551). December-February.

Chloris distichophylla, Lag., Gen. et Spec., Nov. 4.

Asuncion (142). November.

Chloris polydactyla (L.), Sw., Prodr., 26.

Pilcomayo River (1586). April. Named by Dr. Geo. Vasey.

A very handsome species growing along the borders of the Pilco-

mayo. Culms 1-1½ m. in height. Distinguished by its numerous finger-like, soft-haired spikes which are 10-15 cm. in length. Sometimes as many as 25 of these spring from the apex of the stem. The fleecy hairs and the needle-like awns of the flowering glume and palea impart a fuzzy appearance to the spikes.

Trichloris fasciculata, Fourn., Enum. Mex. Pl. Gram. 142.

Pilcomayo River (984). April. = C. Wright, Texas 764.

This grass occurs in Mexico and crosses the boundary into Texas. It is quite common along the banks of the upper Pilcomayo. The flowers are in densely crowded verticillate spikes at the top of the culm. The plant appears in the Paraguayan form to have much longer spikes (12-18 cm.) and a stouter and taller (1½-2½ m.) culm than in any of the Mexican specimens that I have seen. The very slender awns are sometimes 15 mm. long.

Eleusine Indica (L.), Gærtn., Fruct et Sem., i, 8.

Asuncion (61). November-January.

Eleusine Indica (L.), Gærtn., var. *brachystachya*, Trin., Sp., t. 72.

Asuncion (68).

Both of these forms grow in the streets of Asuncion, as well as in grassy places in the suburbs. The variety has much shorter and broader panicles, the spikelets closely crowded, and 1-3 spikes, while the type has 3-5 narrowly linear spikes. Sometimes erect and 20-30 cm. high, but usually prostrate with ascending culms 6-15 cm. high.

Leptochloa virgata, (L.), Beauv., Essay., 71.

Asuncion (211, 211 a); Caballero (440); Pilcomayo River (970). January-April.

This grass has a hard, smooth, reed-like culm 1-1½ m. high. Panicle 15-30 cm. in length. Spikes drooping, slender, 5-12 cm. long, 1-3 rising together from the rachis. Glumes and paleas often purple-tinged. Culm occasionally branching, thickened at the branch nodes. Panicle sometimes on long naked peduncles, sometimes sheathed by a leaf.

Tricuspis latifolia, Griseb., Pl. Lorentz., 211.

Near Pirayu (674); Pilcomayo River (928). February-April.

This grass grows abundantly on the edges of the monte on the overhanging banks of the Pilcomayo. Culms with hard, smooth,

hollow joints like a reed, often as much as 3 m. high. Leaves somewhat shorter than the culm, 2-3 cm. wide. Panicle very large, loose and spreading, 20-40 cm. long. Spikes on long branches, rising 1-3 or more together from the rachis, beginning to flower half-way up. These branches are filiform, 10-20 cm. in length, gracefully drooping. The specimens from Pirayu (674) had a closer panicle, presenting a more compact and bristly appearance than those of the Pilcomayo.

Diplachne verticillata, Nees.

Pilcomayo River (981). April-June.

Very common on the low grounds near the Pilcomayo River. It grows 1-1½ m. high. Panicle strikingly glaucous, sometimes over 30 cm. long, bearing from 35 to 50 slender spikes 5-10 cm. long, rising singly or several together from the rachis. Panicle rigid, 6-8 cm. broad; spikes nearly erect. Spikelets 1½ cm. long, appressed, on the upper side of a rachis scarcely ¼ mm. wide, 4-8 flowers in a spikelet. Culm quite brittle at the joints, often branched below and sending up several flower stems.

This is very similar to, if not identical with, *D. imbricata* of Texas and Mexico.

Gynerium argenteum, Nees, Agrost. Bras., 462.

Pilcomayo River (950). March-April.

The well-known Pampas grass. It grows in large clumps all along the Pilcomayo River and down the Paraguay to Uruguay. The culms sometimes measure 2-2½ cm. in diameter at the base, and attain a height of 4½ m. The plumes are 5-7 dm. in length, generally of a silvery-white, but frequently of a delicate rose tint. The leaves are narrowly linear, running into a long sharp apex, ½-1½ m. in length, rising in a rosette about the base of the culms and gracefully curving over towards the ground. Usually several culms grow together in a tussock.

The masses of this showy grass impart a wonderful beauty to the solitudes of the Pilcomayo forests, looking like plumed sentinels guarding the entrance to nature's treasures.

Gynerium saccharoides, H. B. K., Pl. Æquin., ii, t. 215.

Pilcomayo River (1065). June.

Much inferior to no. 950 in beauty, but equally conspicuous. Culms 3-5 m. high, over 2½ cm. thick at the base, not hollow, but

filled with a rather tough pith. Leaves distichous, numerous, 70 cm. or more long and 5 cm. or more in breadth at the base, giving one the idea of a large cornstalk. Panicle often over 14 dm. long, composed of numerous branches, some of which are over 5 dm. long, beginning to bear flowers 4-7 cm. from the base. The long branches of the panicle blow out on one side in the wind like a banner, and this and the large, close-veined leaves impart a strange as well as gigantic appearance to the plant. Guarani name "*Cuygua*."

***Arundo Donax*, L., Sp. Pl., 81.**

Asuncion (680); Pilcomayo River (1064). June.

Culm smooth, hollow and jointed like a reed, 13-20 mm. thick at the base, and 3-4½ m. high. Leaves 2-ranked, the largest 5 dm. or more in length and 4-5 cm. broad at the base, acuminate, glabrous on the margins as well as on the surface. Flowers in a dense, contracted panicle 5½-8 dm. in length, composed of numerous closely disposed capillary branches, arranged on all sides of the rachis, and bearing innumerable spikes and spikelets. Outer glumes chestnut-colored, bristle-tipped, 10-12 mm. long; the inner clothed with white silky hairs. This grass is commonly known in Paraguay as "*Caña Castilla*" and is the native *Caña*, but it would be impossible to get juice from the culms like that of the sugar-cane, which is the true *Caña*. It may have been named *Castilian* sugar-cane in derision of the Spaniards, who are not loved in Paraguay.

***Eragrostis Bahiensis*, Schultes, Mant., ii, 318.**

Asuncion (256). December.

A caespitose grass with slender culms 3-5 dm. high. Leaves very short. Panicle laxly branched, 10-16 cm. long, the branches drooping; the spikes containing from 10 to 25 lead-colored spikelets. Panicle on naked peduncles 15-25 cm. long. This grass occurs in dry grounds, and is highly valued for pasturage.

***Eragrostis hypnoides* (Lam.), B. S. P., Prel. Cat. N. Y., 69.**

Near Asuncion (356). December.

***Eragrostis Neesii*, Trin., Act. Petrop., 1831, p. 405.**

Luque (338). December-January.

Dwarf, 15 cm. high at the most. Leaves short, in a radical tuft, or 1 or 2 at the base of the culm, covered with long, spreading white

hairs. Panicle close, 3 or 4 cm. long, with 3-5 short branches below; 5-7 flowers in the flat spikelets; glumes and paleas mixed purple and white. One of the feeding grasses for cattle on the Gran Campo, about 5 miles east of Asuncion.

Poa airoides (Nees), Kunth, Enum., i, 360.

Asuncion (550). January.

Growing in dry open thickets in the Chaco opposite Asuncion. Culms 3-5 dm. high. Panicle very diffuse, as long as or longer than the culms. One I measured was 7 dm. in length, with numerous branches, some of them 15 cm. long, 1-4 rising together from the rachis. Flowers minute, 1 or 2 in a spikelet; the spikelets on capillary peduncles, and greatly scattered. Nerves of the flowering glume nearly or quite obsolete. Glumes lead-colored and scantily hairy at the base. A fine grass for mantel ornamentation.

Bromus unioides (Willd.), Nees, Agrost. Bras., 470.

La Plata, Argentine Republic (21). October.

Chusquea tenella, Nees, Linnaea, ix, 492?

Near Asuncion (755 a). June.

Without flowers or fruit. Found with no. 755 in swampy woods near Asuncion. A lower and more slender culm than 755; leaves short, glabrous, nerved, lanceolate, rounded or semicordate at base, on a short petiole; the sheaths slightly open, hairy fringed at the mouth. Short branches and leaves fasciated at the nodes, the culms often tapering into a long, very slender termination, and the nodes much longer than the leaves, sometimes 20 cm. A *Chusquea* without doubt, and corresponding, so far as these specimens go, to *C. tenella*, as described in Flor. Bras.

EQUISETACEÆ.

Equisetum giganteum, L., Sp. Pl., Ed. 2, 1517.

Pilcomayo River (1000). April.

SALVINIACEÆ.

Salvinia auriculata, Aubl., Pl. Guian., ii, 969.

Asuncion (289, 1579). December. = Balansa 1122.

FILICES.

Named by Elizabeth G. Britton.

Alsophila atrovirens, Presl., Tent. Pter., 61.

Between Villa Rica and Escoba (478). January.

The only tree fern that I met with in Paraguay, though there must be other species. The stem is 1-1½ m. high, and 7-12 cm. thick.

This was first determined as *A. armata*, Presl., and so distributed. We are indebted to Mr. J. G. Baker for the correction.

Dicksonia cicutaria, Sw., Flor. Ind. Oco., iii, 1965.

Between Villa Rica and Escoba (571). January.

Adiantum thalictroides, Willd.; Schlecht. Adumbr., 53.

Between Villa Rica and Escoba (447). January.

Cheilanthes chlorophylla, Sw., Vet. Acad. Handl., 1817, p. 76.

Asuncion (169); between Villa Rica and Escoba (572, 572 b, 781). November-May.

Cheilanthes microphylla, Sw., var. *elongata*, (Willd.), Baker.

Asuncion (232). = Balansa 359.

Cheilanthes radiata (L.), J. Smith in Hook. Journ. Bot., iv, 169.

Caballero (569). January.

Pteris denticulata, Sw., Prod., 129.

Asuncion (284, 698). May.

Pteris pedata, L., Sp. Pl., 1532.

Caballero (170). January.

This grows in deep woods on the banks of the Pilcomayo River as well as in similar places about Asuncion and Caballero.

Blechnum Brasiliense, Desv., Berl. Mag., v, 330.

Luque (309). December.

Blechnum occidentale, L., Sp. Pl., 1534.

Between Villa Rica and Escoba (1577). January.

Asplenium Gibertianum, Hook., Sp. Fil., iii, 199.

Asuncion (739). May.

A handsome little plant. Fronds 10-15 cm. in length, bipinnate below or the pinnæ bipinnatifid above, ending at the apex in a long linear projection, which roots at the tip and throws up a new plant. Deep damp woods near Asuncion.

Asplenium lunulatum, Sw., Syn. Fil., 80.

Between Villa Rica and Escoba (386). January.

Dryopteris aculeata (L.), Kuntze, Rev. Gen. Pl., 812.

Between Villa Rica and Escoba (573). January. = Balansa 323 a.

The form of the species referred by Mr. Baker (Mart. Fl. Bras., i, pt. 2, 462) to *Aspidium aculeatum*, var. *phlegopteroidesum*.

Dryopteris Martinicensis (Spreng.), Kuntze, l. c.

Aspidium macrophyllum, Sw., Syn. Fil., 43.

Between Villa Rica and Asuncion (385). January.

Dryopteris parasitica (L.), Kuntze, l. c., 811.

Aspidium molle, Sw. in Schrad. Journ., ii, 34.

Luque (307). December.

Dryopteris unita (L.), Kuntze, l. c.

Asuncion (250). December.

Dryopteris villosa (L.), Kuntze, l. c., 814.

Near Asuncion (783). May.

Polypodium angustum, Mett., Polyp., 90.

Caballero (395). January.

Polypodium incanum, Sw., Syn. Fil., 35.

Between Villa Rica and Escoba (533); Pilcomayo River (1088). January-February.

Polypodium latipes, Langsd. & Fisch., Icon. Fil., 10, t. 10.

Between Pirayu and Yaguaron (784); near Asuncion (828). April.

The fronds of this fern exhale a delicious aroma when drying, something like that of Melilot. I was consulted by natives in

Paraguay anxious to know if the plant could not be used in making perfume.

Polypodium lycopodioides, L., Sp. Pl., 1542.

Caballero (396). January.

Climbing upon the trunks of trees for a distance of 3-5 m. in damp woods. Found with nos. 511 and 574, which have a similar habit. Dead prostrate trees are often completely covered with these plants, which seem to derive abundant sustenance from the decaying bark.

Polypodium geminatum, Schrad. in Gött. Gel. Anz., 1824, p. 667.

Ex descrip.

Caballero (511). January.

Polypodium Plumula, H. B. K., Nov. Gen., 1, 8.

Caballero (524); near Asuncion (726). January-May.

Polypodium vacciniifolium, Langed. & Fisch., Icon. Fil., 8, t. 7.

Caballero (574). January.

Gymnogramme calomelanos (L.), Kaulf., Enum. Fil., 76.

Luque (308). December.

Gymnogramme trifoliata (L.), Desv., Berl. Mag., v, 305.

Near Luque (312). December.

A golden fern, with trifoliate or binate leaves. The pinnae are linear-lanceolate, 4-8 cm. long, on a short pedicellate rachis. I saw this rarely in the streets of Asuncion, and it is abundant in dry or wettish grounds.

Gymnogramme tomentosa (Lam.), Desv., l. c., 304.

Pilcomayo River (1087). February-March.

Ancimia Phyllitidis, Sw., Syn. Fil., 155.

Between Villa Rica and Escoba (782). January.

Ancimia tomentosa, Sw., Syn. Fil., 157.

Asuncion (234). December.

Lygodium venustum, Sw. in Schrad. Journ., 1801, 303.

Between Villa Rica and Escoba (483). January.

MUSCI.

Named by Elizabeth G. Britton.

Campylopus introflexus (Hedw.), Mitt. Journ. Linn. Soc., xii, 84.
Falkland Islands (1398).

Tortula serrulata, Hook. and Grev., Brewster's Edinb. Journ., i, 291,
t. 12.
Falkland Islands (1399).

Tortula læta, Kunze in C. Muell. Syn., i, 574.
Central Paraguay (1397).

Barbula pallido-viridis, C. Muell.
Central Paraguay (1391). = Balansa 3562. Named by E.
Bescherelle.

Barbula muricola, Hampe.
Central Paraguay (1372). = Glaziou, Brazil, 7454.

Macromitrium phyllorhizum, C. Muell.
Central Paraguay (1378). = Balansa 59.

Bryum membranaceum, C. Muell.
Central Paraguay (1382). = Balansa 74.

Rachopilum tomentosum (Hedw.), Mitt., l. c., 333.
Central Paraguay (1389). = Balansa 3677.

Hookeria subdepressa, Besch., Rev. Bryol., xii, 19.
Central Paraguay (1386). = Balansa 3689.

Erpodium Paraguense, Besch.
Central Paraguay (1385). = Balansa 3644.

Ectropothecium rutilans (Brid.), Mitt., l. c., 519.
Central Paraguay (1388). = Glaziou 7453.

Plagiothecium Villa Ricæ, Besch. Named by C. H. Wright.
Central Paraguay (1371). = Balansa 1210.

Hypnum tenuirostre (Schwæg.), Mitt., l. c., 547, var. **Pariguariense**, C. Muell.

Central Paraguay (1374). = Balansa 3687.

Hypnum turgidicaule, C. Muell., Rev. Bryol., xiv, 57, name only.

Central Paraguay (1376). = Balansa 3680.

Hypnum microphyllum, Hedw., Sp. Musc., t. 69.

Central Paraguay (1383).

Lasia coronata, Mont., var. **tenuis**, C. Muell.

Central Paraguay (1377). = Balansa 3669. Named by E. Beschereille.

Hypnum subnudum, C. Muell., Rev. Bryol., xiv, 57, name only.

Central Paraguay (1373). = Balansa 3679 a.

Raphidostegium Kegelianum, C. Muell., Linnaea, xxi, 198.

On trees at the junction of the El Dorado (1380). = Burchell 2575.

Sematophyllum circinale (Hampe), Mitt., l. c., 486.

Central Paraguay (1390). = Balansa 3692.

Fissidens subcrispus, Besch., Rev. Bryol., xii, 17.

Central Paraguay (1392). = Balansa 69.

Fissidens Hornschuchii, Mont., Ann. Sci. Nat. (II), xiv, 342.

Central Paraguay (1394). = Gardner 18.

CORRECTIONS.

Page 48. Before **Castalia Gibertii**, insert the ordinal heading—**NYPHÆACEÆ**.

Page 56. For **Sida pandiculata**, read **Sida paniculata**.

Page 69. Before **Zanthoxylum Naranjillo**, insert the ordinal heading—**RUTACEÆ**.

Page 205. 15th line, for Paraguay read Paragua.