BOTANY.—*The Venezuelan mahogany, a hitherto undescribed species of the genus* Swietenia. H. PITTIER, Bureau of Plant Industry.

It is interesting to note how many groups of trees well known for their industrial or other economic uses have thus far escaped the attention of botanists. This is especially true in the case of tropical woods, and the principal reason seems to be that collectors, taking it for granted that plants universally used by man are too well known to deserve critical study, seldom secure the herbarium material which is indispensable for their proper botanical identification.

Among many examples of this kind may be mentioned the Venezuelan mahogany, a stately tree which is rather abundant in the basal region of Venezuela, from sea-level up to about 1,000 meters. Besides being extensively used locally, it has for some time been exported to Europe and the United States. The only attempt at its scientific classification was that of Dr. A. Ernst, who in 1883, inh is report on the Venezuelan National Exposition, considered it identical with the Santo Domingo mahogany (*Swietenia Mahagoni* L.). From this species, however, it differs widely in the size and dehiscence of the fruit, the size, shape, and texture of the leaflets, and the details of the flower structure.

Since 1913, when for the first time I had an opportunity to observe this tree *in situ*, I have been able to study it over an extensive territory. From the first it seemed to me specifically distinct from the real mahogany, of which several individuals, grown from seeds brought directly from Santo Domingo, are to be seen in the vicinity of Caracas. I was struck principally by the dimension of the capsules and by their mode of dehiscence. Heretofore the basal dehiscence noted in the true mahogany has been considered one of the diagnostic characters of the genus. In the Venezuelan species, however, the capsules open as often from the apex as from the base, and I have noticed that such is the case also with *S. macrophylla*, which I have had occasion to observe in Panama.

After my first trip to Venezuela the above observations were reported to the then best recognized authority on the family Meliaceae, Casimir de Candolle, whose death science has lately had to lament. Mr. de Candolle's views confirmed mine. In a letter he referred to the necessity of revising the generic definition of *Swietenia* as to the mode of dehiscence of the capsule, and expressed his intention of describing the Venezuelan species as new. This he seems not to have been able to do, for which reason I now proceed to give my own description, dedicating the species to the memory of that illustrious botanist, whose friendship I am proud to have enjoyed for nearly forty years.

Swietenia Candollei Pittier, sp. nov.

A tree up to 40 meters high, the trunk erect, 120 cm. in diameter at the base, covered with rimose bark, the crown more or less elongate-ovoid. Leaves abruptly pinnate, glabrous, the rachis 15 to 22 cm. long, terete, slender, the petiolar part 7 to 8.5 cm. long; leaflets 3- or 4-jugate, opposite, subcoriaceous, inequilateral, the petiolules slender, canaliculate, 6 to 12 mm. long, the blades ovate to elliptic-lanceolate, acute or subacute at the base, long and narrowly cuspidate at the apex, 4 to 11 cm. long, 2 to 4 cm. broad, shining above, dull and paler beneath.

Inflorescence axillary, entirely glabrous, 10 to 15 cm. long, the peduncles 5 to 6 cm. long, the flowers pediceled, yellowish white, the bractlets minute, caducous; pedicels 3 to 6 mm. long, slender, erect; calyx short, cupular, the 5 lobes ovate-rounded, obtuse; petals (imbricate in bud) inequilateral, obovate, obtuse, 5 to 6.5 mm. long, about 3 mm. broad, reflexed in anthesis; stamen tube tubular-urceolate, 4 mm. long, the teeth narrow and acuminate, the anthers subsessile, ovoid-oblong; disk crenulate, 0.8 mm. high; pistil about 4.5 mm. high, glabrous, the ovary ovoid, the style rather slender, the stigma discoid, 1.5 mm. in diameter, entirely exserted from the stamen tube at full anthesis.

Fruiting peduncles 10 to 24 cm. long; capsule distinctly obpyriform, 13 to 14 cm. long, 8 to 9 cm. in diameter, pale brown outside, with a rugose surface; valves 5, opening mostly from top to base, ligneous, 7 to 8 mm. thick, with a white inner coating adhering loosely to the seeds; central column about 11 cm. long, club-shaped and 5-winged, light and spongy; cells 5, provided at the top with a double series of spongy, dark brown scales, the 9 to 12 perfect seeds inserted on these by a hilum at the apex of the wing, 2 to 4 of the upper seeds being generally undeveloped and imperfect; wing basal, about 7 cm. long and 2.5 cm. broad, papyraceous, thicker on the outer margin, two fibro-vascular bundles here connecting with the hilum; body of the seed more or less flattened, rounded at the tip, about 2.4 cm. long, 1.5 cm. broad, 5 to 8 mm. thick, entirely smooth and of a rich brown color,

with an agreeable odor when fresh; embryo 2 cm. long, 1.2 cm. broad, flattened, yellowish white, with a dark umbilical area on the outer thicker margin.

Type in the U. S. National Herbarium, no. 601496, collected at La Trinidad de Maracay, State of Aragua, Venezuela, at an altitude of about 440 meters, in flower, January 31, 1913, by H. Pittier (no. 5789).

The purpose of the spongy suberose tissue surrounding the embryo is to store moisture for the promotion of germination.

To my knowledge, *Swietenia Candollei* is spread in the basal region all over the coastal range of Venezuela and in the interior valleys north of the llanos. A tree which is presumably this species is reported to exist in the Orinoco Valley also, and along the foot of the Andes in the region of Lake Maracaibo, but until we have specimens it is not possible to affirm that there is but a single species in these regions. Several other timber trees belonging to diverse genera are in the local market under the name *caoba*, which is the Spanish equivalent for mahogany.

The Venezuelan mahogany is often seen along streets and in parks, as for instance in Valencia, in the State of Carabobo. It is used also for shade or as a windbreak in cacao plantations and in former times was planted extensively in the live hedges bounding the sections of the larger estates. It strikes root readily from stakes and, as it has proven profitable in the past, ought to be propagated now, because of its economic value.

BIOLOGY.—*The Bioclimatic Law.*[1] ANDREW D. HOPKINS, Bureau of Entomology.

In 1718 Dr. Jacob Bigelow, who was then Rumford professor and lecturer on *materia medica* and botany in Harvard University, published a paper[2] based on evidence secured from the reported dates of the blooming of the peach tree at different places between Montreal, Canada, and Fort Clairborne in Alabama Territory. In this paper Dr. Bigelow suggested that the difference in the time of the event between the northern and southern extremes of the country was not less than two months and a half. This suggestion served to stimulate further studies along this line by botanists in Europe and especially in Germany, and finally led to the founding of the science of periodical phenomena under the designation of Phenology.

[1] Read before the Biological Society of Washington, November 29, 1919.

[2] Memoirs Amer. Acad. Arts and Sciences 4, Part I.