NEW SPECIES IN THE BAMBOO GENUS PHYLLOSTACHYS AND SOME NOMENCLATURAL NOTES

F. A. MCCLURE [1]

IN 1945 eight new species of the genus *Phyllostachys* were described [2] from the collection of living plants maintained by the U. S. Department of Agriculture at one of its field stations, the Barbour Lathrop Plant Introduction Garden, near Savannah, Georgia. Since that time, among the phyllostachid bamboos growing there, four additional species presumed to be new to science have advanced sufficiently in their development toward maturity to show characteristics of a distinctive nature. The following Latin descriptions [3] were prepared on the basis of living plants growing under the respective U. S. D. A. Plant Introduction numbers cited. Type specimens are deposited in the U. S. National Herbarium, duplicates in the herbarium of the National Arboretum.

Phyllostachys bissetii McClure sp. nov. FIG. 1.

Culmi usque ad 6.75 m. alti et 25 mm. diametro; *internodia* viridia usque ad 33 cm. longa (in culmo 6.75 m. alto, ut exemplo electo, internodio duodecimo maximo longitudine) omnia glabra vel inferiora saepius sursum setis erectis brevissimis parce sparsa, delapsis tegentibus vaginis laxe pruinosa; *nodi* pulvino cicatriceque modice et subaequaliter eminentes, cicatrice glabra. *Culmi vaginae* ad apicem truncatum sensim rotundatae vel angustatae, dorso glabrae (inferiores tantum primo interdum dorso pubescentes marginibus ciliatae) virides saepe vino passim tinctae haud maculatae; *auriculae* plus minusve valde evolutae (ambae alterutra interdum obsoletae) ovatae vel oblongae vel late falcatae margine *setis* rigidis scabris radiatim dispositis munitae; *ligula* brevis vino tincta, apice leviter convexa, margine plus minusve asymmetrica, setis hispido-albidis fimbriata; *vaginarum laminae* infimae anguste subtriangulae superiores gradatim usque ad formam lineari-lanceolatum mutantes, apice naviculiformes, inferiores appressae vel raro valde reflexae, superiores plus minusve patentes. *Foliorum vaginae* nonnullae auriculatae; *auriculae* margine setis radiatim fimbriatae; *ligula* modice evoluta; *foliorum laminae* lanceolatae vel oblongo-lanceolatae, subtus sparsim et invalide scabrae. *Inflorescentiae* desunt.

[1] Plant Introduction Section, Horticultural Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture.

[2] McClure, F. A. The vegetative characters of the bamboo genus Phyllostachys and descriptions of eight new species introduced from China. Wash. Acad. Sci. J. **35**: 276–293. 1945. (Sept. 15).

[3] A field manual under preparation will provide English descriptions and a field key for the identification of all of the bamboos of this genus known to be under cultivation in the Western Hemisphere.

Type in U. S. National Herbarium, Nos. 2177861–2 (2 sheets), collected by *F. A. McClure* (No. 21801), April 22, 1955 at the U. S. Barbour Lathrop Plant Introduction Garden where the plant is cultivated under P. I. 143540. The description is based on the living plants in a colony about 13 years old. Propagating material of this bamboo, from plants under cultivation at Chengtu, Szechwan province, China, was secured by John Tee-Van and brought to this country late in 1941 for the Plant Introduction Section of the U. S. Department of Agriculture.

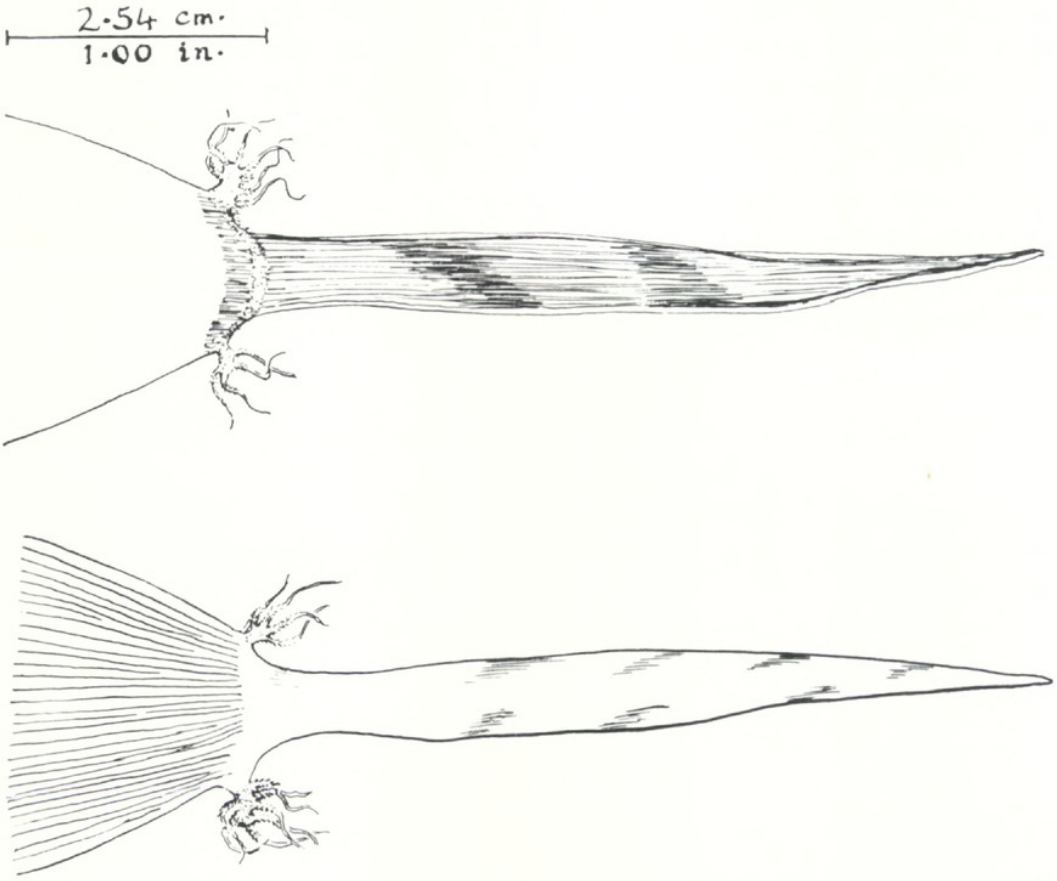

FIG. 1. *Phyllostachys bissetii* McClure sp. nov. Inner (above) and outer aspects of the apex of a mid-culm sheath.

The specific epithet signalizes the outstanding contribution to the development of popular interest in bamboo culture and utilization made by David Bisset as Superintendent of the U. S. Barbour Lathrop Plant Introduction Garden.

Phyllostachys bissetii is in some respects rather similar to *Ph. aureosulcata*, from which it is distinguished by the very sparse instead of dense pubescence of the lower internodes of the culms, by its lack of sharply defined color-striping in the culm sheaths, and by minor differences in the shape of the apical structure of the culm sheaths. Moreover it lacks the yellow color-panel on the groove, a stable feature characteristic of the

internodes of young culms of *Ph. aureosulcata*. *Phyllostachys bissetii* is one of the first to initiate the growth of new shoots in spring. According to Mr. Bisset, it has shown signs of being one of the hardiest of the phyllostachids under observation at the Barbour Lathrop Garden.

In 1941, during the course of the New York Zoological Society's expedition to Australia and China, of which he was the leader, Mr. Tee-Van received two young Giant Pandas as a gift from the Chinese people to the American people. During their long voyage across the Pacific, these animals were fed with leafy branches of this bamboo and several other kinds. However, the bamboo on which the Giant Panda is known to feed *in its native habitat* is another species, a member of the genus *Sinarundinaria*. Unfortunately plants of the latter species introduced by Mr. Tee-Van at the same time did not survive.

Phyllostachys decora McClure sp. nov. FIG. 2.

Culmi usque et ultra 7 m. alti et 30 mm. diametro, virides, delapsis tegentibus vaginis nodis et internodiis sursum primiter setis perbrevibus retrorsis sparsim scabris deinde sensim glabrescentibus, primo haud vel

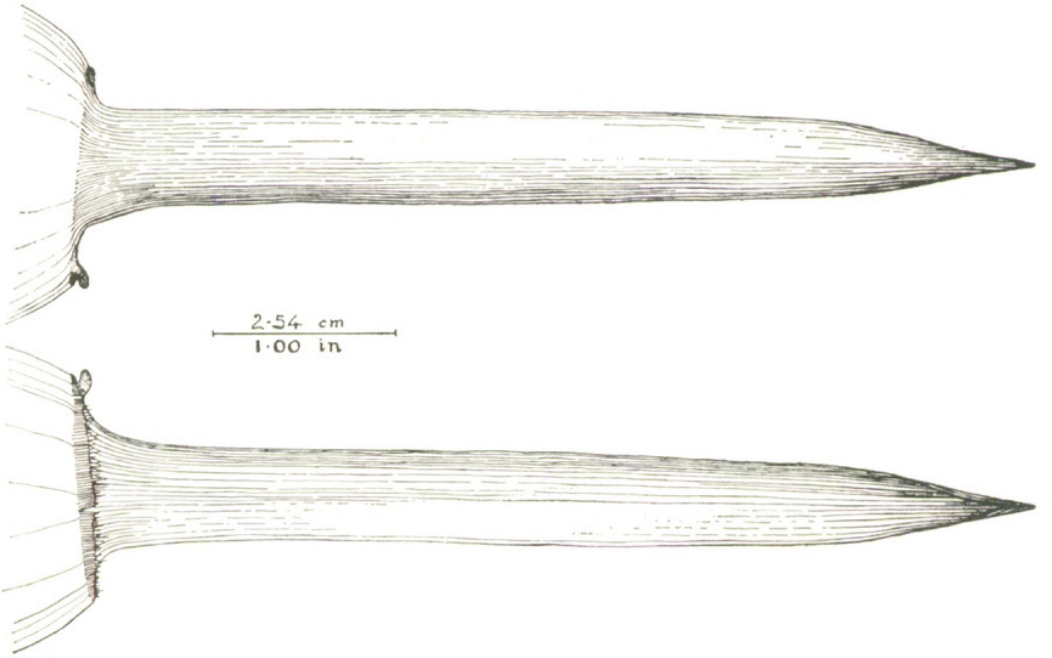

FIG. 2. *Phyllostachys decora* McClure sp. nov. Inner (below) and outer aspects of apex of a mid-culm sheath.

leviter glaucescentibus deinde sub nodos dense pruinosi; *internodia* interdum leviter striata, usque ad 15.8 cm. longa (in culmo 7.2 m. alto, ut exemplo electo, internodio undecimo maximo longitudine); *nodi* pulvino cicatriceque modice et subaequaliter eminentes, cicatrice glabra. *Culmi vaginae* ad apicem latum truncatumque subito rotundatae dorso glabrae haud pruinosae, immaculatae vel maculis minutis fuscis sparsim maculatae,

et porro colore saturato-viridi, viridi pallidiori alboque in longitudinem variegatae, interdum omnino paene albae, secundum margine purpura notatae; *auriculae* 1 vel 2 vel nullae, variabiles, angustatae falcatae fuscae nudae vel setis paucis invalidis fuscis margine fimbriatae; *ligula* primiter purpurata latissima et comparate brevis, apice truncata vel leviter undulata vel invalide convexa margine ciliis albis et setis crassis scabris fuscis fimbriata; *vaginarum laminae* late lanceolatae usque ad liguliformes, apice subito acutae, infimae appressae superiores appressae vel plus minusve patentes interdum invalide undulatae. *Foliorum vaginae* invalide auriculatae, *auriculis* plerisque parvis saepe obsoletis; *setae orales* paucae fragiles et fugaces; ligula vix exserta primiter purpurata; *foliorum laminae* subtus invalide et sparsim scabrae.

Type in U. S. National Herbarium, Nos. 2177856–8 (3 sheets), collected by *F. A. McClure* (No. 21757), April 16, 1953, from a colony cultivated under P. I. 128789 at the U. S. Barbour Lathrop Plant Introduction Garden. The description is based on the living plants in a colony about 15 years old.

Plants of this bamboo from the Hoi Wai Monastery, Lung Chi Mt., near I-Ming, Kiangsu province, China, where it is known by the Chinese (National) vernacular name *Mei Chu* (Beautiful Bamboo), were sent by the writer to the U. S. Department of Agriculture in 1938.

This species is readily distinguished from all the others of which the vegetative characteristics are known by the broad, truncate apex of the culm sheath and the broad but short purple ligule exserted on each side of the strap-shaped sheath blade.

Phyllostachys elegans McClure sp. nov. FIG. 3

Culmi usque paene ad 10 m. alto et 54 mm. diametro, omnino glabri; *internodia* viridia inferiora comparate brevia, superiora usque et ultra 30 cm. longa (in culmo 9.88 m. alto, ut exemplo electo, internodio vicesimo primo maximo longitudine) graciliter striata, primiter laxe et copiose pruinosa; *nodi* pulvino colorato et cicatrice glabra modice et subaequaliter eminentes. *Culmi vaginae* versus apicem angustum sensim angustatae, dorso glabrae vel interdum in lateribus scabrae vel sparsim setosae, marginibus glabrae vel subtiliter ciliolatae, primiter omnino manifeste pruinosae, dilute luteo-virides, secundum nervos purpura laeviter tinctae et porro maculis parvis fuscis discretis vel in lineis directis junctis dorso omnino notatae; *auriculae* ambae alterutra nunc defectae nunc valde evolutae, falcatae, apicem tantum secundum marginem crebre dispositis *setis* longis curvis munitae; *ligula* apice convexiuscula, comparate angusta, ca. 2 mm. alta demptis setis marginalibus, margine undulato setis pallidis crassis subglabris fimbriata; *vaginarum laminae angustae* liguliformes canaliculatae apice attenuatae pleraeque valde crispae et reflexae. *Foliorum vaginae* vulgo auriculatae; *auriculae* margine *setis oralibus* munitae; *ligula* exserta vulgo purpurata; *foliorum laminae* late lanceolatae basi rotundatae

apice abrupte acuminatae, vulgo 100 × 17 mm. interdum usque ad 180 × 22 mm., subtus ubique dense puberulae.

Type in U. S. National Herbarium, Nos. 2177863–4 (2 sheets) collected by *F. A. McClure* (No. 21802), April 24, 1955, from the colony cultivated under P. I. 128778 at the U. S. Barbour Lathrop Plant Introduction Garden. The description is based on the living plants in a colony about 15 years old.

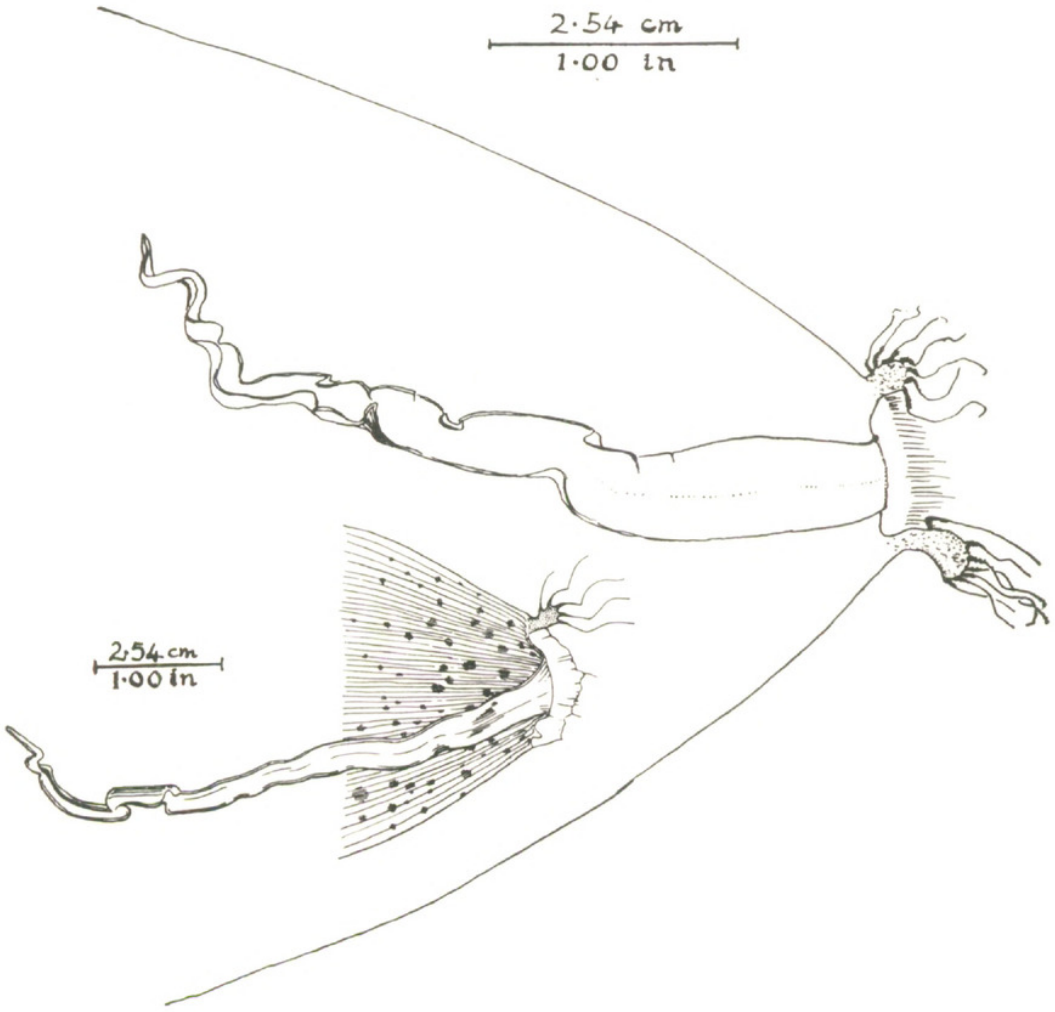

FIG. 3. *Phyllostachys elegans* McClure sp. nov. Outer aspect of apex of a mid-culm sheath: above, intact specimen; below, specimen showing but one well-developed auricle and a ligule from which most of the marginal bristles have been lost.

The type colony of this bamboo was developed from propagating material secured at Ta Ts'it, near Hung Mo Mt., Tan District, Hainan Island, China, sent by the writer to the U. S. Department of Agriculture in 1938. The local Chinese (Cantonese) name *Fa Chuk* (Flowered or Embroidered Bamboo) alludes to the conspicuous maculation of the culm sheaths. An earlier introduction, representing what appears to be a somewhat less vigorous strain of the species, is P. I. 110511, secured by the

writer at Mung Haang, Ts'ing-yuen District, Kwangtung province, China, and sent to the U. S. Department of Agriculture in 1936.

This species resembles *Ph. viridi-glaucescens* A. & C. Riv. in the appearance and variability of its culm sheaths; those of *Ph. elegans*, however, show a distinctly shorter ligule. Plants of these two species show little similarity in general appearance and *Ph. elegans* may be distinguished readily in the field by the more strongly tapered culms, the marked striation of the internode surface, and the visibly shorter internodes in the lower part of the culms. The leaf blades of the new species are smaller (shorter but proportionately broader) than those of *Ph. viridi-glaucescens*, and, in contrast with the latter, distinctly puberulent throughout the lower surface. The Chinese (Cantonese) vernacular name used in Mung Haang — *Man Sun* or *Man Chuk* (Elegant Shoot or Elegant Bamboo) — is the basis of the specific epithet.

Phyllostachys glauca McClure sp. nov. FIG. 4

Culmi usque et ultra 10 m. alti et 4 cm. diametro; *internodia* viridia, omnino glabra, delapsis tegentibus vaginis primo pulvere albo pulchre pruinosa, haud striata, usque et ultra 40 cm. longa (in culmo 10.22 m. alto, ut exemplo electo, internodio quarto decimo maximo longitudine) recta vel rarissime supra basin nonnulla leviter anfracta; *nodi* pulvino cicatriceque modice et subaequaliter eminentes, cicatrice glabra. *Culmi vaginae* ad apicem angustum truncatum sensim rotundatae vel angustatae dorso glabrae, ubique virides cum vino plus minusve valde suffusae, maculis fuscis (praesertim in basi apiceque) parce maculatae, raro paene immaculatae; *auriculae setae oralesque* raro evolutae; *ligula* fusca, lata et comparate brevis, apice truncata vel leviter undulata, raro (infimae tantum) concava, margine ciliata raro (praesertim superiores) invalide fimbriata; *vaginarum laminae* lanceolatae usque ad lineari-lanceolatae in apice hebete acuto subito angustatae, planae vel leviter naviculiformes, inferiores reflexae superiores patentes. *Foliorum vaginae* plerumque haud auriculatae; *ligula* valde evoluta primo saepius leviter purpureo-tincta; *foliorum laminae* subtus primiter secundum costam parce pilosae alibi subglabrae vel glabrescentes. *Inflorescentia* desunt.

Type in U. S. National Herbarium, Nos. 2177865–6 (2 sheets), collected by *F. A. McClure* (No. 21803), April 24, 1955 at the U. S. Barbour Lathrop Plant Introduction Garden where the plant is cultivated under P. I. 77011. The description is based on the plants in a colony about 27 years old.

Rhizomes of this species, from a garden in Nanking, Kiangsi province, China, were sent to the U. S. Department of Agriculture by the writer in 1926. They gave rise to rooted plants that survived quarantine and ultimately became established as P. I. 77011 at the U. S. Barbour Lathrop Plant Introduction Garden.

The specific epithet alludes to the distinctive misty green color of the young culms which is due to their evenly distributed overall covering of white powder. By this character this bamboo can readily be recognized in the field, even at a considerable distance.

This species is very similar to *Ph. flexuosa* in many respects. The ligules of the culm sheaths in *Ph. glauca* are broader and shorter in proportion, and fringed on the margin with minute cilia rather than bristles; they are somewhat more durable (less fragile) on drying. The blades of the culm

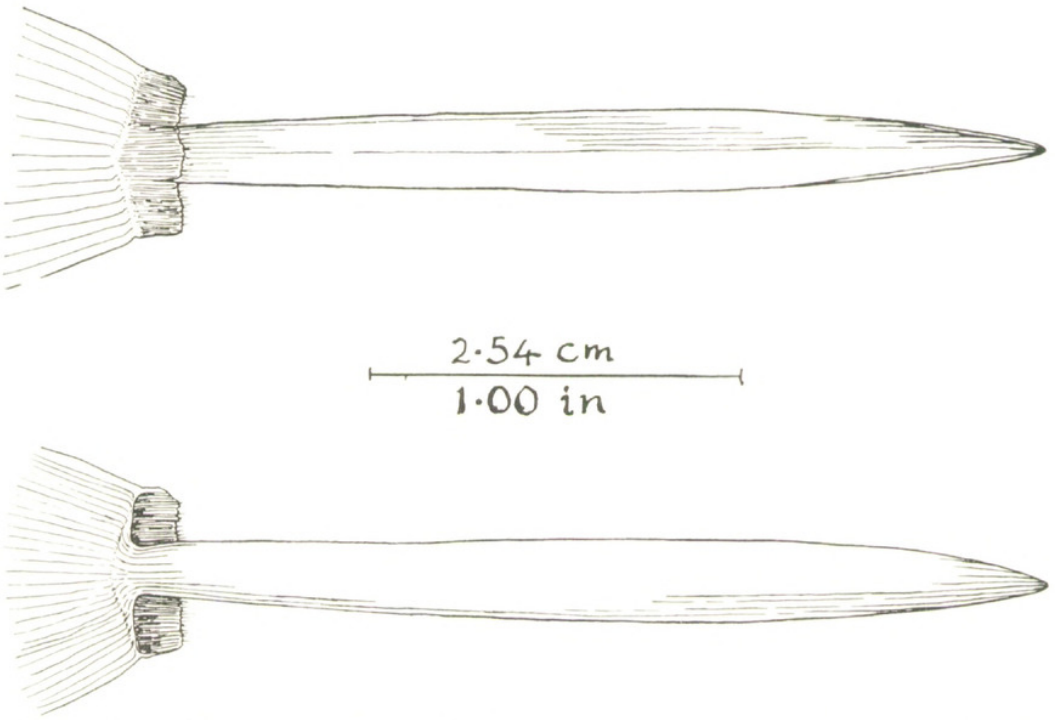

FIG. 4. *Phyllostachys glauca* McClure sp. nov. Inner (above) and outer aspects of a mid-culm sheath.

sheaths (particularly in the lower half of the culm) are appreciably broader in proportion to their length, and more abruptly narrowed at the tip than those of *Ph. flexuosa*. The culm sheaths in *Ph. glauca* are appreciably thicker and tougher in texture, and generally show fewer and more discrete dark spots than those of *Ph. flexuosa*. Plants of *Ph. glauca* (P. I. 77011) show greater vigor and larger ultimate stature than those of *Ph. flexuosa* (P. I. 52686 and 116965) under apparently identical growing conditions.

NOMENCLATURAL NOTES

Because of faulty original documentation, several of the names currently used for entities in the genus *Phyllostachys* are in need of critical examination. Among these are the following:

Phyllostachys edulis (Carr.) H. de Leh. (Houzeau de Lehaie is referred to hereinafter also as Houzeau). See discussion under *Ph. pubescens*.

Phyllostachys mitis A. & C. Riv. See discussion under *Ph. viridis*.

Phyllostachys reticulata (Rupr.) C. Koch. See discussion under *Ph. bambusoides.*

Phyllostachys sulphurea var. *viridis* R. A. Young. See discussion under *Ph. viridis.*

Phyllostachys bambusoides S. & Z., K. Bayer. Akad. Wiss. Abh. 3: 746, *pl. 5, fig. 3.* 1843. (Type species of the genus; based on a flowering specimen)

? *Bambusa reticulata* Rupr., St. Petersb. Acad. Mem. VI Sci. Nat. 3: 148. 1839. (Based on a sterile leafy specimen); *Phyllostachys reticulata* (Rupr.) C. Koch., Dendr. 2(2): 356. 1873.

Madake of Japanese gardens.

From available evidence there appear to be grounds for reasonable doubt that Ruprecht's species is the same as *Phyllostachys bambusoides* S. & Z., the Chinese bamboo known universally in Japanese gardens as *Madake.* If the problem involved only the matter of priority, *Ph. reticulata* (Rupr.) C. Koch would clearly be the correct name for this bamboo. However, the identity of the type of *Bambusa reticulata* Rupr., which is the basis of *Ph. reticulata,* has not been clearly established. So the taxonomist is still confronted with the question, is it the *Madake* of Japanese gardens, or is it something else?

Let us consider the evidence, beginning with Ruprecht's description and notes (loc. cit.)

"59. B. reticulata n. sp. Culmi ramulis foliiferis *dense* fasciculatis, laevigatis, nitidis, nodis biannulatis parum tumentibus; vaginis inferioribus aphyllis, superioribus foliolo brevissimo sub 2 lineali appendiculatis, supremis 4–5 foliiferis, omnibus striato-sulcatis, *vix* compressis, glabris, margine subciliatis, ore *fimbriatis*, fimbriis mox evanescentibus; foliis lineari-lanceolatis (6–8: 48–70) acuminatis, basi in petiolum longiusculum (sub 2 lin.) attenuatis, firmis, pergamenis, glaberrimis, supra striatis, *subplicatis*, subtus glaucescenti-cinereis.

V. sp. japonica (veros. c. Nangasaki lecta): Langsdorf!

"Ad ramulos (juniores ?) nunc descriptos haud cum dubio pertinent folia, omnibus proprietatibus descriptis similia, sed omni dimensione *majora*, pedalia et ultra, 2–3 poll. *lata*, inferiora magis ovata, latiora, superiora lanceolata, petiolo 6 lin. ad insertionem articulato, tumido, 2 lin. lato; lamina basi inaequalitera, secus costam mediam subtus valde prominulam ad latus magis evolutum, imprimis basi breve puberulo-tomentosa; nervis in q.l. 14 primariis, secundariis 9–11 venulis transversis (ut supra) creberrimis, anastomosantibus, inde parenchyma in *quadrotula minima* supra et subtus dispartientibus. (B. reticulata.)"

The last paragraph of the description, a very long one consisting of numerous references and many quotations from existing literature, has been omitted here for economy of space, since it sheds no light on the question under consideration.

Let us first direct our attention to the formal description (the first paragraph) ostensibly based on Langsdorf's specimen cited immediately

thereafter. "Culmi ramulis foliiferis *dense* fasciculatis" describes a character not found in any known species of *Phyllostachys*. Again, the statement "vaginis inferioribus aphyllis, superioribus foliolo brevissimo sub 2 lineali appendiculatis, supremis 4–5 foliiferis" is based on a condition that would not be found in any known species of *Phyllostachys* since in this genus the branch sheaths are promptly deciduous and fall away progressively as the leaf blades develop.

It requires no further analysis to make it clear that Ruprecht's description includes characters from at least one genus other than *Phyllostachys*. It cannot, therefore, be relied upon to clarify the specific identity of his type specimen if the specimen actually is a species of *Phyllostachys*.

But what of the type specimen itself? Immediately after the formal description Ruprecht cites a single specimen in words that, freely translated, say, "I have seen a Langsdorf specimen from Japan (apparently collected near Nagasaki)." The writer has not seen this specimen, but it presumably is still extant, along with the other material Ruprecht had before him, judging from the statements in the paragraph that follows the formal description. The type apparently consists of a sterile leafy branching specimen. No mention is made of flowers.

It is perfectly feasible to describe and identify bamboos on the basis of sterile vegetative material alone, *given adequate specimens of the critical structures*. It is only rarely, however, and in special cases, that a positive identification of a bamboo, or the differentiation of two closely related species, can be made on the basis of *sterile leafy branches alone*. That Koch, who transferred the specific epithet "reticulata" from *Bambusa* to the genus *Phyllostachys*, had an entirely erroneous idea of the nature of the latter genus is apparent from his comments that accompany the transfer (op. cit., p. 356–357).

Granted, however, for the sake of exploring the possibilities, that the Langsdorf specimen (Ruprecht's type) may represent a species of *Phyllostachys* (a group in which the *generic* determination can be made with confidence on the basis of adequate specimens of leafy branches) the specimen in question may be expected to represent one of the four species of that genus (all of Chinese origin) known to have been established in cultivation in Japan since early times. If the texture and dimensions of the leaves attributed to the specimen by Ruprecht in his diagnostic description are taken at face value, *Ph. pubescens* and *Ph. nigra* (including its forms) are ruled out, leaving *Ph. bambusoides* and *Ph. aurea* as possibilities. Here a critical complication arises. *Phyllostachys bambusoides* and *Ph. aurea* have very similar foliage. In recognition of this and other similarities (particularly in the inflorescence) of these two bamboos, Makino (Bot. Mag. Tokyo 11: 158. 1897) made the latter a variety of the former. Ohki, who made an exhaustive study of the systematic importance of spodograms in the leaves of Japanese bamboos (Tokyo. Univ. Fac. Sci. J. Sec. III Bot. 4: 1–130, *43 figs.* 1932) does not undertake to differentiate these two species by his method. However, to the writer, they are easily distinguishable by their culm sheaths and culm characters as well

as by their inflorescences. The writer considers them to be quite distinct species even though he is not able to separate them with confidence on the basis of sterile leafy branches alone.

The "reasonable doubt" mentioned at the beginning of this discussion focuses itself on the question, "Does the Langsdorf specimen, the type of *Bambusa reticulata* Rupr., represent the *Madake* of Japanese gardens, i.e. the plant known as *Phyllostachys bambusoides*, or is it something else?" The foregoing appeal to the available evidence leaves this question still unanswered. The reasonable doubt that clouds our view can be dispelled only by a positive identification of the Langsdorf specimen (connecting it with a known entity), supported by mention of one or more taxonomic characters by which it differs from comparable specimens of the other species with which it might be confused.

Current usage in Japan preponderantly favors the name *Ph. reticulata* (Rupr.) C. Koch for *Madake*, although Japanese taxonomists have offered no satisfactory documentation of their identification of Ruprecht's type. The preponderance of usage in Europe and the United States generally has favored the name *Phyllostachys bambusoides* for *Madake*. Until the type of *Bambusa reticulata* Rupr. can be shown to be unmistakably identical with this species, the writer can see no reason for displacing the well-founded name *Phyllostachys bambusoides* S. & Z. with the very inadequately documented *Ph. reticulata* (Rupr.) Koch.

The typical form of *Ph. bambusoides* is represented at the U. S. Barbour Lathrop Plant Introduction Garden by plants under P. I. 40842. This introduction is doubtfully reported (USDA Inventory of Seeds and Plants Imported, p. 89, *pl. vi.* 1915) to have reached this country via India, in 1890. Other introductions representing this typical form of the species are P. I. 12180 and 128787.

Phyllostachys pubescens Mazel ex H. de Leh., Bambou, p. 7 (Jan.) 1906; Nakai, J. Jap. Bot. 9: 27–29, *pl. 6.* 1933 (excl. syn.)

Phyllostachys edulis H. de Leh., Bambou, p. 39 (Jan.) 1906. (not ? *Bambusa edulis* Carr., Rev. Hort. 37: 380. 1866.)

Mosochiku of Japanese gardens.

TYPE: None cited. Neotype in U. S. National Herbarium, Nos. 2177859–60 (2 sheets), collected by *F. A. McClure* (No. 21800) April 17, 1955, from a colony cultivated under P. I. 80034 at the U. S. Barbour Lathrop Plant Introduction Garden.

Origin: China; introduced into Japan about 1737. (Satow, E. Asiat. Soc. Japan. Trans. 27(3): 35. 1899) ". . . In Europe it was confined until 1904 to the garden of the late M. Mazel at Prafrance, where it arrived around 1880, after the visit of the late M. Riviere." (H. de Leh. op. cit. p. 39)

In the United States the name *Phyllostachys edulis* (Carr.) H. de Leh.,

based on *Bambusa edulis* Carr., has generally been used for this plant. A translation of the original French description (Carr. loc. cit.) follows:

"*Bambusa edulis*; *B. mitis* hort. This species, the young shoots of which are said to be eaten as are those of hops, is a native of China. It is very vigorous and very hardy and belongs to the group *nudicaules*. Its characteristics follow:

"Stems erect, much branched, green. Bud sheath very large, soon becoming yellow; sheaths ciliate blackish, prolonged a little beyond the point of origin of the leaf blade. Leaves slender, very finely serrulate and almost ciliate on the margin, of a clear green above, glaucescent beneath, very long-acuminate at the apex."

Carriere left no type and supplied no illustration of this bamboo. From his very generalized and incomplete description one cannot, without making bold and unfounded assumptions, guess even the generic affinity of his bamboo, let alone its specific identity. The character "much branched" ascribed by Carriere to his plant excludes it from the genus *Phyllostachys* where the branches are paired at each node.

Houzeau's statement about the date of the first introduction of *Phyllostachys pubescens* into France by Mazel in about 1880 (op. cit. p. 9; see also quotation above in the paragraph beginning "Origin:") makes it extremely unlikely that this species was available to Carriere in 1866. The possibility that he may have had plants of it that originated from propagules of the heterocyclic form discussed below has been considered. However, this possibility also shrinks to extreme improbability when we consider the evidence.

Carriere did not describe *Bambusa heterocycla* until 1878, twelve years after he described *B. edulis*. If both the species and the heterocyclic form had presented themselves to his attention either simultaneously or contemporaneously, he would almost certainly have focused on the heterocyclic form first. His conspicuous record (Rev. Hort. passim) for bringing horticultural novelties to light in advance of their having been described by taxonomists supports this view. In any case, the original application of the name *Bambusa edulis* still remains uncertain.

In January, 1906, Houzeau (op. cit., p. 38) discovered that Japanese botanists had been applying the name *Phyllostachys mitis* A. & C. Riv. to the *mosochiku* of Japan, and that Makino's description of it (Makino, T., Bot. Mag. Tokyo **15**: 68. 1901) corresponded perfectly to the bamboo Houzeau himself had just described as *Ph. pubescens* Mazel (op. cit. p. 7). This discovery lead Houzeau to prepare an article, "Les deux Phyllostachys mitis" (op. cit. p. 38–39) in which he presented pertinent facts and made an adjustment in the nomenclature that he deemed appropriate. He was in a position to do this since he had in his collection living plants of the two bamboos involved; the true *Ph. mitis* A. & C. Riv., and the controversial *mosochiku* of Japan. The point of present concern is that Houzeau abandoned the name *Ph. pubescens* Mazel which he had just set up for the *mosochiku*, and substituted for it the new combination *Ph. edulis* (Carr.) H. de Leh.

An attempt is made in the following lines to reconstruct the mental process by which Houzeau was led to do this in the face of the demonstrated uncertainty of the application of Carriere's name.

Probably upon recognizing his *Ph. pubescens* in Makino's description under the name *Ph. mitis* he first re-read the Rivieres' description of *Ph. mitis*. Here he saw the synonym [*Bambusa*] *edulis* given. Although no authority was cited by the Rivieres for the name *edulis*, Houzeau probably was led to look up the original description of *Bambusa edulis* by Carriere. (He may have been influenced in this by the fact that Makino (loc. cit.) had given *Bambusa edulis* Carr. in his synonomy.) Carriere gives *B. mitis* as a synonym for his *B. edulis*. The psychological impact of this reciprocal citation of synonomy seems to have convinced Houzeau that he had discovered the reason why the two bamboos in question had become confused in the minds of the Japanese botanists. He seems to have been drawn irresistibly to the perfectly apparent solution: "If one of the two confused bamboos (both of which he had growing in his garden) is *Phyllostachys mitis* the other must be made *Phyllostachys edulis*!" He put this idea into effect at once. Unfortunately, in doing so he overlooked the implications of the fact he recorded earlier in the same article relating to the first introduction of *Ph. pubescens* into France about 1880 (*vide supra*). Evidently, however, he soon realized that his action in changing the name had been hasty, for he promptly reverted (op. cit. p. 55 et seq.) to the use of the name *pubescens* for the plant he had temporarily called *Ph. edulis*. This retreat from the use of the name *edulis* and the subsequent concurrence of Japanese usage are significant testimony to the fact that the application (content) of the name *edulis* is not satisfactorily documented, and still remains obscure.

In the light of the foregoing account, it is of interest to turn attention at this point to the fact that Lindley (Penny Cyclop. 3: 357. 1835) described, under the name *Bambusa pubescens* Loddiges, a bamboo "obtained by the English from the collections of France." The writer has examined a photograph of the type of *Bambusa pubescens* Loddiges ex Lindl. which is preserved in the University Herbarium, Cambridge, England. The specimen is only a sterile leafy twig but it is possible to assert with confidence that it clearly is not a species of *Phyllostachys* and so has nothing to do with *Ph. pubescens* Mazel ex H. de Leh.

Article 75 of the International Rules of Botanical Nomenclature (1952) reads as follows: "A name of a taxon must be rejected if it is used with different meanings and so becomes a long-persistent source of error." In the sense of Article 75 the combination *Phyllostachys edulis* and the name *Bambusa edulis* on which it is based appear to be *nomina rejicienda*.

A bizarre form of this species, the tortoise-shell bamboo, or *kikkuchiku* of Japan, known as the Lohan Chu in China, has been given taxonomic status as *Bambusa heterocycla* Carr., *Phyllostachys edulis* var. *heterocycla* (Carr.) H. de Leh., *Ph. pubescens* var. *heterocycla* H. de Leh. etc. Being based on a "monstrosity," however, these names must all be rejected. (Internatl. Rules Bot. Nomencl. Art. 77. 1952)

Phyllostachys viridis (Young) McClure comb. nov.

Phyllostachys sulphurea var. *viridis* R. A. Young, Wash. Acad. Sci. J. **37**: 345. 1937.

Phyllostachys mitis A. & C. Riv. Soc. Acclim. B. Ser. III **5**: 689. 1878, quoad descriptionem tantum; haud *Bambusa mitis* Poir. necque *Arundo mitis* Lour.

TYPE: ". . . deposited in the U. S. National Herbarium, nos. 1682470 and 1682471, collected in Plant Introduction Garden, Savannah, Ga., January 11, 1937, by *D. A. Bisset*; grown from material obtained in 1928 from Gaston Negre, Generargues, France, under the name *Phyllostachys mitis*." (Young, loc. cit.) This species is represented at the U. S. Barbour Lathrop Plant Introduction Garden by the original colony under P. I. 77257.

Origin: "China; introduced [into France] in 1840 by M. de Joncigny and in 1855 or 1856 by M. Montigny, French Consul at Shanghai, who is said to have imported it from Cochinchina." (Houzeau de Lehaie, Bambou, p. 39, 1906. Notes on *Phyllostachys mitis* A. & C. Riv. in an article entitled "Les deux Phyllostachys mitis.")

The above-mentioned reference to Cochinchina as a source of Montigny's plants probably is not well-founded, as no documented record of the occurrence of the species in Cochinchina has come to light. However, this reference to Cochinchina may have been what led the Rivières to take up the name *Arundo mitis* Lour. (Fl. Cochin. p. 57. 1790). On the basis of material collected in Annam by Dodo and Parrant, E. D. Merrill (Amer. Phil. Soc. Trans. **24**(2): 85. 1935) identifies *Arundo mitis* Lour. as a species of *Dendrocalamus*.

The name *Phyllostachys sulphurea* var. *viridis* Young is untenable because the name *Ph. sulphurea* belongs to a specifically distinct plant. The latter is treated elsewhere in this paper under *Ph. bambusoides* cultivar ALLGOLD (P. I. 89701). The plant (represented by P. I. 89718) misidentified by Houzeau (Bambou p. 99 et passim. 1906) as *Ph. sulphurea* becomes cultivar. ROBERT YOUNG of *Ph. viridis* (see p. 195).

HORTICULTURAL FORMS

The following entities that have heretofore been given taxonomic status as varieties or forms appear to belong in a more informal category, to which the term "cultivar" is applicable.

Phyllostachys bambusoides S. & Z.

CULTIVAR: CASTILLON

Reference to this entity will be found in the literature under the following botanical names: *Bambusa castilloni* Marliac ex Carr. Rev. Hort., **58**: 513. 1896. *Phyllostachys castillonis* (Marl.) Mitf., Garden **47**: 3. 1895. *Ph. bambusoides* var. *castillonis* Makino, Bot. Mag. Tokyo **14**: 63. 1900. *Ph. quilioi* var. *castillonis* H. de Leh., Bambou, p. 29. 1906. *Ph. nigra* var.

castillonis (Mitf.) Bean, Kew Bull., p. 232. 1907. *Ph. reticulata* var. *castillonis* (Marl.) Makino, Bot. Mag. Tokyo **26**: 21. 1912.

The CASTILLON bamboo is distinguished from the typical form of the species by the color pattern of the culms, culm sheaths, and leaves, as follows: Ground color of culm internodes (and branches) bright golden yellow (sometimes suffused with dilute wine in the lower part of the culm); the internodes of culms and branches show a broad green panel on the groove above each bud or branch insertion (and in analogous positions where buds or branches do not occur); culm sheaths have a greenish yellow background and a few green stripes. Occasional leaf blades show cream stripes. The ultimate culm size of this form is considerably less than that of the typical form of the species. CASTILLON differs from ALLGOLD principally in having the sulcus of the culm internodes green, and in having green striping always present outside the sulcus.

The colony of CASTILLON (P. I. 42659) under cultivation at the U. S. Barbour Lathrop Plant Introduction Garden is derived from plants purchased from the Yokohama Nursery Company, Japan, in 1916.

"This form is native to China. . . . It was introduced into Japan in the early days" (Nakai, T., J. Jap. Bot. **9**: 240. 1933. Transl. Katsura, ed. R. A. Young. 1936). By 1886 it was established in cultivation in France (teste Carriere, loc. cit.). Tsuboi says that he found a culm of this bamboo (as a spontaneous mutation) in a forest of *Phyllostachys bambusoides* in Yawata-Mura, Gifu-ken, Japan (Illus. Jap. sp. Bamb. ed. 2, p. 6, 1916. Transl. Katsura, ed. R. A. Young. 1935).

CULTIVAR: ALLGOLD.

References to this entity will be found in the literature under the following botanical names: *Bambusa sulphurea* Carr., Rev. Hort. **45**: 379. 1873. *Phyllostachys sulphurea* A. & C. Riv., Soc. Acclim. B. Ser. 3, **5**: 773. 1878. *Ph. castillonis* var. *holochrysa* Pfitz., Deut. Dendr. Ges. Mit. **14**: 60. 1905. *Ph. quilioi* var. *castillonis holochrysa* Regel ex H. de Leh., Bambou, p. 118. 1908. *Ph. bambusoides* var. *castilloni holochrysa* (Pfitz.) H. de Leh., Congr. Internat. de Bot. 3. Actes **2**: 228. 1912. *Ph. reticulata* var. *sulphurea* Makino, Bot. Mag. Tokyo **26**: 24. 1912. *Ph. bambusoides* var. *sulphurea* Makino ex Tsuboi, Illus. Jap. Sp. Bamb. ed. 2, p. 7, *pl. 5*. 1916. *Ph. reticulata* var. *holochrysa* (Pfitz.) Nakai, J. Jap. Bot. **9**: 34. 1933.

ALLGOLD differs from the CASTILLON Bamboo in lacking the green panel on the sulcus of culm and branch internodes, and in having the green striping otherwise *very sparse, often lacking entirely*. The purely golden phase is the one illustrated by Tsuboi (loc. cit.). It is believed to be the one Carriere had before him when he described *Bambusa sulphurea* (loc. cit.) since he makes no reference to green stripes. Tsuboi (loc. cit.) mentions a plant of *Phyllostachys bambusoides* var. *sulphurea* he had in his own garden, "segregated from the roots of Ginmeichiku" i. e. from the CASTILLON Bamboo. This fact is interesting, and may be significant in view of the circumstance that plants of the bamboo here named ALLGOLD,

purchased by the U. S. Department of Agriculture from V. N. Gauntlett in 1930, were received under the name *Ph. bambusoides* var. *castilloni.* They are growing at the U. S. Barbour Lathrop Plant Introduction Garden under P. I. 89701.

CULTIVAR: SLENDER CROOKSTEM.

References to this entity will be found in the literature under the following botanical names:

Phyllostachys bambusoides S. & Z., illustrated as an abnormal culm. Tsuboi, Illus. Jap. Sp. Bamb. ed. 2, *pl. 58.* 1916. *Ph. reticulata* forma *geniculata* Nakai, J. Jap. Bot. 9: 34. 1933. *Ph. bambusoides.* Variety Slender Crookstem. USDA. Some bamboos growing at the U. S. Barbour Lathrop Plant Introduction Garden, Savannah, Georgia. Mimeo. p. 7, 1947.

SLENDER CROOKSTEM is distinguished from the typical form of the species by the occurrence, in a high percentage of the culms, of a curve (sometimes compound) near the base. The culms are often more slender in relation to their height than those of the typical form of the species; the culm nodes are generally less salient. Buds are borne at a lower level on culms of comparable size, and frequently more of the lower buds remain dormant than in the culms of the typical form of the species. There is often a more copious development of hairs on the culm sheaths, and these often develop on sheaths of culms of smaller size than in the typical form of the species.

Nakai's bamboo, described as differing from the typical form of the species in having more slender culms, of which the lowest part is "always zigzag" in form, appears to be the same as SLENDER CROOKSTEM now growing at the U. S. Barbour Lathrop Plant Introduction Garden under P. I. 146420. The plants under this number came from rhizomes secured in Kwangtung province, China, and sent to the U. S. Department of Agriculture by the writer in 1925.

Phyllostachys nigra (Lodd.) Munro

CULTIVAR: HENON.

References to the HENON Bamboo will be found in the literature under the following botanical names:

Bambusa puberula Miq., Mus. Bot. Lugd. Batav. Ann. III, 2: 285. 1866. *Phyllostachys puberula* (Miq.) Munro, Gard. Chron. (n. s.) 6: 773. 1876. *Ph. henonis* Mitf., Garden 47: 3. 1895. *Ph. nigra* var. *henonis* (Mitf.) Stapf apud Rendle, Linn. Soc. Bot. 36: 443. 1904.

The HENON Bamboo is, in all probability, the "biological parent" of *Phyllostachys nigra* itself and of all the entities associated with it in the literature as taxonomic varieties or forms. However, since the black-stemmed one was the first to be named (*Bambusa nigra* Loddiges ex Lindl., Penny Cycloped. 3: 357. 1835) it becomes the "taxonomic species" now called *Phyllostachys nigra* (Lodd.) Munro. The others (including the

HENON Bamboo), since they do not differ from it, or among themselves, in any morphological characters whatsoever, are, therefore, properly treated under that name as cultivars.

The HENON Bamboo is represented at the U. S. Barbour Lathrop Plant Introduction Garden by plants under P. I. 24761, 66787, and 75158.

CULTIVAR: BORY.

References to the BORY Bamboo will be found in the literature under the following botanical names:

Phyllostachys boryana Mitf., Garden 47: 3. 1895. *Ph. puberula* var. *boryana* Makino, Bot. Mag. Tokyo 14: 64. 1900. *Ph. nigra henonis* forma *boryana* Makino, Bot. Mag. Tokyo 26: 26. 1912.

The BORY Bamboo differs from the HENON Bamboo solely in the slightly smaller ultimate size of the culms of the former, and in their development during the first year or so of a few scattered, irregularly shaped dark spots on the lower internodes. The BORY Bamboo has a larger mature culm and its spots are much larger and spaced much farther apart than those of the typical form of the species.

The BORY Bamboo is represented at the U. S. Barbour Lathrop Plant Introduction Garden by plants under P. I. 77258, purchased from Gaston Negre, Generargues, France, in 1928.

Phyllostachys viridis (Young) McClure

CULTIVAR: ROBERT YOUNG.

This spontaneous, apparently stable mutant, here named the ROBERT YOUNG Bamboo, differs from *Ph. viridis*, from which it originated, in having a smaller mature stature and a distinctive coloration. The culms and branches are at first sulphur-green, with darker green stripes on the lower internodes and a narrow dark green band immediately below each sheath scar. The sulphur-green background gradually turns to old gold and the green stripes persist. The culm sheaths are slightly paler than those of the species, and occasionally show a slender green stripe or two. Occasional leaf blades show cream stripes.

The ROBERT YOUNG Bamboo is in cultivation at the U. S. Barbour Lathrop Plant Introduction Garden under P. I. 89718. Plants of it were received by the U. S. Department of Agriculture from V. N. Gauntlett & Co., Chiddingfold, Surrey, England, in 1930. No record of its introduction into Europe has been found. It could have appeared there, *de novo*, as a mutation from the species, whose introduction is recorded. The stock from which the Gauntlett plants came probably originated as a spontaneous variation in one of the introductions of the parent species from China. The ROBERT YOUNG Bamboo has been observed to originate spontaneously (personal observation, May, 1955) from propagating material of *Ph. viridis* in the nursery at the U. S. Barbour Lathrop Plant Introduction Garden.