

TRANSACTIONS  
OF  
THE LINNEAN SOCIETY.

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- I. *A Monograph of the Bambusaceæ, including Descriptions of all the Species.* By COLONEL MUNRO, *Companion of the Bath, Knight of the Legion of Honour and the Mejidie, F.L.S. &c.*

(Plates I.–VI.)

Read November 15th, 1866.

MY numerous friends in all parts of the world have for so many years intrusted me with their extensive and valuable collections of Grasses, that I have long been extremely anxious to make the knowledge which I have acquired in examining these specimens, which may be counted by tens of thousands, of some use to botanists generally. Up to the present, I fear, all I can say is that, in addition to some short papers published in different 'Transactions,' I have carefully examined all Grasses sent to me, and to the best of my judgment authenticated and named a very large number in the Hookerian Herbarium, the British Museum, the Museum of Trinity College, Dublin, A. Gray's and Bentham's own herbariums, and also some of the Canadian and New York herbariums.

My roving life as a soldier has hitherto, of course, interfered much with any long-continued systematic study, such as would be necessary to complete a monograph of any of the divisions of the Gramineæ sufficiently carefully and fully to be worthy of being offered to botanists generally.

Recently I have had more leisure, and access, through the liberality of my friends, to the best botanical libraries in England. I therefore have now much pleasure in making a beginning, by offering to the Linnean Society a memoir on the Bambusaceæ, a very important division of Gramineæ, although in the number of species it is exceeded by many (indeed nearly all) other divisions. Ruprecht, in 1839, published an excellent memoir on Bambuseæ, in the fifth volume, second series, of the 'Proceedings' of the Imperial Academy of St. Petersburg, which really, as far as the species then known are concerned, is quite exhaustive of the subject. I will not, therefore, attempt to enter into the interesting details of the earlier history of Bamboos, of their general structure, or the writings of Rumph, Rheede, and others of the older botanists on the subject.

Every one who has travelled in the countries where the Bamboos prevail can give instructive accounts of the multitudinous uses to which they are applied. During the last summer very many gardeners, in England even, have been in the habit of using almost daily a Bamboo which is sold abundantly in Covent Garden and elsewhere, for sticks for supporting plants, instead of the old-fashioned green ones. This is, I believe, a species of *Phyllostachys*. Rumph says that the Malays, in his time even, believed that the hollow stem of a Bamboo was the original womb of Man. The seeds and young shoots of Bamboos are eaten by men, the leaves as fodder by horses; and these leaves again, in some countries form the principal portion of the roofs of the houses, and the stuffing of comfortable beds, as the split stems do the mats for the floors in a large number of houses, in Madras especially. Good cordage and paper is made from the fibre, good houses and furniture, and even fishing-contrivances from the stems. A valuable medicine, *Tabasheer*, which, I believe, still bears a high price, is found in the joints of several species, especially, according to Roxburgh, in that of the *Melocanna bambusoides*, the cavity between the joints of which is nearly filled with it. The natives call it *Chuna Lime*. Sir Emerson Tennent, in the first volume of his work on Ceylon, mentions one very curious use to which Bamboos are applied in Malacca. He says, "In the Malayan peninsula the living Bamboo has been converted into an instrument of natural music, by perforating it with holes, through which the wind is permitted to sigh in the most charming manner." . . . "Mr. Logan, in 1847, in approaching the villages of Kandingu, contiguous to the frontier of the European settlement of Malacca, heard sounds, some soft and liquid like the notes of a flute, and others deep and full, like the tones of an organ. On drawing near to a clump of trees, a slender Bamboo, 40 feet in height, was observed; and it was ascertained that the musical tones issued from it, and were caused by the breeze passing through perforations in the stem. The instrument thus formed is called by the natives *Bulu perindu*, or plaintive Bamboo. Those which Mr. Logan saw had a slit in each joint, so that each stem possessed fourteen or twenty notes." I will not, however, enter into further details on this interesting and utilitarian part of the subject, quite agreeing, as I do, with Dr. Hooker, who says, in his 'Himalayan Journals,' that it would take many pages to describe the numerous purposes to which the various species of Bamboo are put. The Chinese, it is said, use the Bamboo for nearly everything they require, even to packing the tea which they send all over the world.

Ruprecht, who had, apparently, free access to the Willdenow Herbarium, the specimens in the British Museum collected in Nepal by Wallich, in 1821, and the Peninsula Bamboos, collected by Wight, describes nine genera and sixty-seven species in all, of which he had seen fifty-five in flower. Of these I have been obliged to reduce about five, thus leaving fifty. In the following pages I have described upwards of 170 species of twenty genera, showing how largely our knowledge of this family has increased in the last twenty-five years. Yet there are many more, doubtless, still to describe, judging from the leaves that I have seen of several species, which I have been unable to make much use of without the flowers.

The difficulty of procuring the flowers of Bamboos is often very great. Roxburgh, an

excellent observer, states that he never more than once saw *Bambusa Balcooa* in flower; and I have only seen four specimens of it in the very large collections I have had access to. Humboldt, referring to this subject, says, "Mons. Mutis herborized for twenty years in the country where *Bambusa Guadua* formed marshy forests, several leagues broad, without being able to procure a flower;" and the flowers of this species, I would observe, are still very rare. Humboldt mentions as an interesting fact, that Bonpland found it *once* in flower. I have seen a few flowering specimens, collected by Mr. Spruce on the Rio Negro, near the Cassiquiare River, the very locality indicated by Humboldt. This rarity of flowering specimens had often induced me to believe that the Bamboos generally, with one notable exception, unlike most Grasses, were extremely limited in their distribution.

However, some of the species which flower annually, as the male Bamboo (*Dendrocalamus strictus*), and can thus be easily collected, are ascertained to be widely distributed: *D. strictus* is found over a large portion of India, North and South, East and West, Burmah, Tenasserim, and Japan.

Some of the *Arundinariæ* also, which die down to the ground every year and, springing up again, flower annually, are often found in Collections. Flowering specimens of the true *Bambusa arundinacea* are also common in herbariums, although the plant takes a long time in coming to the flowering state. It is, however, very widely spread, and always must attract attention when in flower. I may here mention that Dr. Hooker is of opinion that this Bamboo does not flower at any prescribed age, as is commonly supposed, but at any period when full-grown and the circumstances of the season are favourable to its flowering.

This opinion is confirmed by numerous statements from various careful observers, collected together in the 13th and 14th volumes of the Journal of the Agricultural and Horticultural Society of India. The late Sir W. Sleeman stated, as a fact observed by himself, that in 1836 all the large Bamboos in the Deyrah-Dhoon, which had been the principal feature of beauty in the valley for the last twenty-five years, ran to seed and died. Those which had been transplanted during the previous season, and those transplanted twenty years previously, all died together. He also adds that it was generally believed in the valley that a man who had seen two seedings of the Bamboo must be about sixty years old. Dr. Wallich mentions that a celebrated grove of Bamboos, which surrounded the city of Rampore, in Rohilcund, blossomed universally in 1824, and every stem died; and he was informed that the same event had happened forty years previously. Mr. Spilsbury states that all the Bamboos between Jubbulpore and Mundlah seeded in 1839, and died shortly afterwards. Similar facts as to the death of whole forests of Bamboos after flowering are mentioned about the *Melocanna bambusoides* (*Bambusa baccifera*, Roxb.), which flowered generally in Tipperah, Rungpore, Arracan and Chittagong, 1863-66, and died immediately afterwards, causing considerable inconvenience in Tipperah in following years, in consequence of the absence of all Bamboo fitted for building-purposes. In opposition to these statements, Dr. Anderson, the able Superintendent of the Botanical Gardens at Calcutta, states that in 1857 and 1858 many of the Bamboos near Calcutta and on Parasnath flowered and seeded, but in no case that he

was aware of, did a general death of the Bamboo follow. So far as he observed, only the flowering-shoots died; and their place was taken by young shoots springing from the roots; but during the flowering and seeding the foliage almost entirely disappeared. He adds that when the *Bambusa gigantea* at Calcutta, after thirty years, flowered for the first time in 1861, the plants, although weakened, remained alive.

How important an event the general flowering of the Bamboo is, may be learnt from the perusal of the astonishing, but authentic, accounts contained in the Journal above referred to. Amongst these facts it is stated that in 1812, in Orissa, a general flowering of the Bamboo took place, and prevented a famine. The seed gave sustenance to thousands, and very many subsisted entirely on it. Hundreds of people were on the watch day and night to secure the seeds as they fell from the branches. Mr. Shaw Stewart, the Collector, of Canara, on the western coast of India, states that in 1864 there was a general flowering of the Bamboo in the Soopa jungles, and that a very large number of persons, estimated at 50,000, came from the Dharwar and Belgaum districts to collect the seed. Each party remained about ten or fourteen days, taking away enough for their own consumption during the monsoon months, as well as some for sale; and adds that the flowering was "a most providential benefit during the prevalent scarcity." Mr. Gray, writing from Malda in 1866, says, "In the south district, throughout the whole tract of country, the Bamboo has flowered, and the seed has been sold in the bazaar at thirteen seers (twenty-six pounds) for three rupees, rice being ten seers, the ryots having stored enough for their own wants in addition. Hundreds of maunds (the maund being 100 pounds) have been sold in the English bazaar at Malda; and large quantities have been sent to Sultangunge and other places twenty-five to thirty miles distant, showing how enormous the supply must have been." Mr. Gray adds, "The Bamboo harvest has been quite providential, as the ryots were on the point of starving."

I have divided the Bambusaceæ into three divisions:—The first the one generally adopted, namely, *Triglossæ* or *Arundinariæ*, in which all the species have 3 stamens and 3 squamulæ, and the stems are invariably without thorns. In this there are 8 genera:—ARUNDINARIA, containing about 30 species; THAMNOCALAMUS, found only in the Himalayas; PHYLLOSTACHYS, a beautiful genus found in Japan, Amoy, China, and the north of Burmah, with very peculiar foliage, and likely to be popular in cultivation; ARTHROSTYLIDIUM, AULONEMIA, MEROSTACHYS, PLATONIA, and CHUSQUEA,—the latter containing upwards of 30 species, and ascending nearly as high in the Andes as *Arundinaria* does in the Himalayas.

The second division of true Bamboos contains only 5 genera:—NASTUS; BAMBUSA, with 26 species; GUADUA with 10 (this genus is very closely allied to *Bambusa*, and is principally distinguished by its locality, being found only in South America); GIGANTOCHLOA (also very close to *Bambusa*); and OXYTENANTHERA, a genus which I have found it necessary to create, to contain some species distinguished by a very long linear fruit, and very long pointed anthers.

The third division consists of berry-bearing Bamboos, in 8 genera. These are all extremely interesting from their peculiar fruit. The pistil generally appears to be contained in an envelope somewhat analogous to the sac, or utricle, or perigynium,



which contains the seed of *Carex*. In the young state this is so closely attached to the style that it is almost impossible to separate it; in advancing to maturity it increases in various ways. In *MELOCANNA bambusoides* it becomes very fleshy, and the fruit attains the size of a largish pear, whilst the seed remains comparatively small. This is the case, to a less extent, in *BEESHA* of Rheede, whilst in some of the other genera it forms a very thin covering to the seed, which is often, at maturity, inwardly quite free, and easily detached, as in *PSEUDOSTACHYUM*, figured at Tab. IV., *SCHIZOSTACHYUM acutiflorum*, and perhaps in other species; for, unfortunately, perfect seeds are very rare. The scutellum is concealed by the envelope referred to above, and is not visible externally, except, perhaps, in some of the species of *DENDROCALAMUS*; whereas in true Bamboos the seed is very generally like Oats or Wheat, linear or oblong linear, with a distinct furrow down one side, with the scutellum very visible below; and the style articulated at the top of the fruit, and never persistent. In *Schizostachyum acutiflorum* above referred to, a very curious bundle of hairs is to be found at the scutellum; and the pericarp in this instance is quite loose and rugose, and the fruit oblong. I have not seen perfect fruit in any other species of *Schizostachyum*, which I often cannot help thinking is an imperfect state of *Melocanna*, or some allied genus.

The fruit of *PSEUDOSTACHYUM* is in form exactly like the seed of *Anagallis arvensis*, and the whole plant is very curious in appearance. In *BEESHA*, *TEINOSTACHYUM* and *CEPHALOSTACHYUM* the fruit is long-beaked, and in the two latter genera tapering at the base. *BEESHA* of Rheede (*Ochlandra* of Thwaites) is distinguished by its numerous stamens, frequently 20 and upwards, dimorphous spiculæ, the fertile one being very frequently sessile near the main axis. One species of this genus is remarkably well figured by Rheede in plate lx. vol. v. of the 'Hortus Malabaricus.' *Teinostachyum* has very long spiculæ, containing several perfect flowers, whereas in *Cephalostachyum* there is only one perfect flower in the spiculæ, a number of which are collected together in dense heads. *DINOCLOA* has a very small, rounded, beaked fruit, and has smaller flowers than perhaps any other species of the whole family, but has a large branching panicle. It approaches very closely to some species of *Chusquea*, from which genus it is very easily distinguished at first sight, by having 6 stamens and a trifold style. In the remaining genus, *DENDROCALAMUS*, perhaps most readily distinguishable from *Bambusa* by its very long, slender style, and the absence of true squamulæ, the fruit is of two forms; and I might probably have been justified in forming some of the species into another genus, but I have been very anxious to avoid the multiplication of genera as far as possible.

In *D. strictus* and its allies the fruit is very smooth, as if polished, on the surface, except at the extreme top, suddenly pointed into a short, sharp, and rather hairy persistent beak. In *D. giganteus* and its allies the beak is very soon caducous; the fruit is hairy at the upper end, and not at all polished, and the scutellum is outwardly visible below on one side.

Having given full descriptions of the genera and species in the following pages, I will not enter into further details here.

I have not, with the exception of *Platonia*, included in *Bambusaceæ* any genus which

has not the leaves articulated at the base, below the petiole. For this and other reasons I have not included the following genera, which are sometimes placed in Bambusaceæ by authors:—*Pariana*, Aublet; *Orthoclada*, P. de B.; *Uniola*, Linn.; *Diarrhena*, Rafin.; and *Streptogyna*, P. de B. I feel considerable doubts about the latter genus, which has articulated leaves, and several points of structure analogous to Bambusaceæ; but the presence of awns in the paleæ, and the short oblique-pointed callus, induce me to believe, in the absence of perfect fruit, that the plant is most nearly allied to *Arundo*.

In describing the flowers of Bambusaceæ I have made use of the word "palea" in place of flowering glume, as recommended and used by our excellent President, Mr. Bentham; and I have done so with great diffidence, believing, as I do, that the lower palea is in some sense a flowering glume, and in some of the Bamboos especially it is extremely difficult to distinguish between the glume and the lower flowers with only one palea. However, in general, as soon as the flower becomes hermaphrodite the distinction is well marked. In using the word "palea" I have, I confess, paid some attention to expediency, which, I think, ought not altogether to be neglected in works on systematic botany. The word has the advantage of being short, and, whether accepted generally or not, is certainly understood by all botanists; and by its use I have hoped to assist many who are accustomed either to it or to a term of similar purport, as distinguished from "glumes," in the writings of nearly all the principal authors on Gramineæ, as Palisot de Beauvois, Robert Brown, Trinius, Kunth, Nees ab Esenbeck, Steudel, and others. The word "palea" is also, I think, correct, as it originally means chaff, and in many Grasses the chaff is as much composed of the lower palea as of the upper one, to which alone our President confines the term. In some species of *Schizostachyum* there is no upper palea.

I have followed Kunth, Endlicher, and other authors in using the word "squamulæ" for those portions of the flowers of Grasses which may be considered analogous to petals in other plants. These have been called by various botanists "scales," "nectary," "lodiculæ," "parapetala," &c. In Bambusaceæ these are very interesting, and of considerable value in defining species and genera. They are generally present, and in the division *Triglossæ* or *Arundinariæ*, I believe, always so. In *Dendrocalamus*, *Dinochloa*, one species, at least, of *Schizostachyum*, and *Oxytenanthera* they are always absent. In *Beesha* the squamulæ are numerous. In *Pseudostachyum* three squamulæ are sometimes increased to five, and, with the two paleæ, are persistent and spreading, and assume the appearance of a five- to seven-petalled flower; to which deception the fruit, as already mentioned, shaped exactly like the seed-pod of *Anagallis arvensis*, lends its aid. In *Gigantochloa*, a genus in which the stamens are monadelphous, there are occasionally one or two irregularly-shaped scales, which are never nerved, and appear to me to be adventitious, and to owe their origin either to a separation of a portion of the staminal tube or some other unexplained cause. I always find that the first squamula to become deficient is that which is opposite to the upper palea. It is also remarkable that, in most instances where the squamulæ are deficient altogether, the upper palea loses its tendency to be keeled and few-nerved, and becomes rounded on the back and many-nerved. And I would here observe that the flowers of Bamboosæ require very

careful examination, and give much trouble from the time they take to moisten thoroughly. Several spiculæ should be examined, as they often vary much in structure in the same panicle. Sometimes squamulæ will be found in the lower flower, and not in the upper, and sometimes this will be reversed. As a rule, the penultimate hermaphrodite flower is the most perfect, and often, in many-flowered spiculæ, the only one that produces seed. Abnormal flowers are by no means uncommon occurrences; I have sometimes seen two or three pistils instead of one, and very often I find the points of the anthers becoming gradually prolonged into imperfect styles.

The spathes or large sheaths which cover the nodes of the lower portions of all Bamboos, vary much in size and appearance, and will, I think, afford good characters when they are more studied and better known. Dr. Brandis has paid considerable attention to this subject; but these sheaths do not appear, in general, to have attracted the notice of collectors. In the Palm-house at Kew the spathes of *Bambusa vulgaris*, and of *Dendrocalamus giganteus*, are in great perfection, and will show at once how greatly these portions of the plants differ in various species. Another and very curious, almost unique, feature in several species of Bamboo, principally found in Java and the adjoining islands, may be mentioned. I allude to the fibres which hang down from the lower nodes of the older stems. The lowest of these sometimes enter the ground and become rooted, whilst others become two inches and more in circumference, and are frequently converted into spines, bending downwards, which seem well to deserve the name of "horrid." This is stated to occur most conspicuously in *Bambusa maxima*, Poir., the flowers of which, unfortunately, are unknown.

In the description of species I have used the word "rhachilla" to signify the small rhachis or axis of the individual spicula. I will only add that, in every instance where I have had access to a specimen, I have described the species from actual examination by myself; and to all these I have added V. S. When I have not seen a specimen, I have added S. V. (*specimen visum*) by the author from whom I have taken the description.

The geographical distribution of the Bamboo is very interesting. One species only, under the several names of *Bambusa vulgaris*, *B. Thouarsii*, *B. surinamensis*, and *B. Sieberi*, is found in both hemispheres; and I am in considerable doubt as to which it is a native of. I have seen it collected by Wallich in Silhet, by Hooker in Chittagong, but marked by both as cultivated; from Ceylon, apparently wild; from the Mauritius, I think, cultivated; abundantly from the West Indies naturalized; and, cultivated, from several parts of South America. This is the only thoroughly cosmopolitan species, and is to be seen in great perfection near the centre staircase in the Palm-house at Kew. The whole of many of the genera of the subtribe *Triglossæ*, namely *Arthrostylidium*, *Merostachys*, *Aulonemia*, *Platonia*, and *Chusquea*, in all containing nearly 50 species, are confined to the Western hemisphere, some of the *Chusqueæ* attaining an elevation of 10,000 to 12,000 feet above the sea. *Phyllostachys* and *Thamnocalamus* are found only in the East; and the remaining genus *Arundinaria* is found in both hemispheres, some of the species attaining to great elevations in the Himalayan and adjoining mountains. *Arundinaria spathiflora* and *A. racemosa* have been found by Hooker and

Thomson on Singalelah, a mountain on the Islumbo pass, between Eastern Nepal and Sikkim, at an elevation of 11,000 feet. The distribution of many of these *Arundinaria* seems to be limited more by elevation than by any other cause. At the same time I would observe that at least three or four species appear to be peculiar to Ceylon, one to the Neilgherries, and one or two to Hong Kong. Jameson mentions that *Chusquea aristata*, Munro, makes its first appearance at 13,000 feet elevation on the eastern chain of the Andes, and that at 15,000 feet it completely covers the whole surface, forming what the natives call a "Carizal," impenetrable to man or beast, and continuing upwards to nearly the limits of perpetual snow. It is certainly very curious that a tessellated *Chusquea* should attain this great elevation on the Andes, and a tessellated *Arundinaria* should occur nearly as high in the Himalayas.

The whole of the eight genera of the berry-bearing Bamboos are to be found only in the East, some species of the genera *Cephalostachyum*, *Dendrocalamus*, and *Pseudostachyum* attaining considerable elevations. Of true Bamboos, *Guadua* (if it is a good genus) is confined entirely to America, and the whole of the other species of this division, with the sole exception mentioned above of *Bambusa vulgaris*, are confined to Africa and the East. I have only seen one uncultivated Bamboo from Africa in flower; and that was found in Angola by Dr. Welwitsch, and is most probably the same as *Bambusa abyssinica* of Richard. Ruprecht certainly describes *Bambusa capensis*, and Burchell's herbarium contains one good specimen in flower; but I believe this is a cultivated plant, probably introduced from India, called *Bambusa vulgaris* by Nees, and identical with *Bambusa Balcooa* of Roxburgh. I have also seen some leaves of a species of *Arundinaria* from the Cape, called by Nees *Nastus tessellatus*. Flacourt mentions that a whole province of Madagascar is called Galembulu, from a species of Bamboo called Bulu which is prevalent there; and Ellis also, in his book on Madagascar, says that four very beautiful different kinds of Bamboo contribute much, by the extreme elegance of their growth, to the beauty of the scenery in that island. I have, through the kindness of M. Brongniart, been permitted to examine the Bamboos collected in Madagascar, belonging to the Muséum d'Histoire Naturelle de Paris, containing flowering specimens of three species, which are, strange to say, all berry-bearing Bamboos. One of them is marked "Voulou of the natives," and is probably the same as the Bulu referred to by Flacourt. It is *Beesha? capitata*, Munro, *Nastus capitatus* of Kunth. Another is a new species of *Cephalostachyum*, a genus found in the Eastern Himalaya and Tenasserim. And the third is a slender one which I had previously named *Schizostachyum parvifolium*, from a specimen collected by Gerrard. It is probably the plant described by Ellis as "an elegant slender creeper, with a stem scarcely as thick as a quill, growing 9 to 10 feet long, and hanging in most elegant festoons from tree to tree alongside of the roads." I have seen from the Mauritius *Nastus borbonicus*, which Bory describes as covering a vast extent of country in the higher portions of the island, also *Melocanna bambusoides* and *Bambusa vulgaris*. Numerous species are found in Ceylon and India, and the most gigantic of all in Tenasserim and the islands of the Eastern Archipelago. A specimen of the stem of *Dendrocalamus giganteus* (*Bambusa gigantea*, Wallich), in the British Museum, received from Pulo Geum, measures  $25\frac{3}{4}$

inches in circumference. This species has now flowered abundantly in the Calcutta Botanical Gardens, and is thriving extremely well in the Palm-house at Kew. Dr. Brandis, who has collected nineteen species of Bamboo in Burmah, Pegu, and Tenasserim, fourteen of which I have seen specimens of, although only eight were in flower, and therefore capable of identification, states that one species, which I believe to be hitherto undescribed, and have called after the discoverer *Bambusa Brandisi*, attains a stature of 120 feet, with a circumference of 27 inches. Another species is said to be 3 feet in circumference. Oldham sent home six species of Bamboo from Formosa; and several are found on the continent of China and in Hong Kong, which has one or two species peculiar to itself. The Sandwich Islands produce a new species of *Schizostachyum*, collected by the botanists attached to Wilkes's expedition; but unfortunately, although the spiculæ are very numerous, not one appears to be quite perfect. Another species, of the same genus probably, but in leaf only, is found in several of the Polynesian Islands, as I have seen specimens from the Feejee Islands, Samoo, and Tahiti. Several species are found in the Philippine Islands, the few that I have seen flowers of being berry-bearing Bamboos.

In the whole extent of North America, north of Mexico, there is only one species of uncultivated Bamboo, namely *Arundinaria macrosperma*. In all Europe there is not one native species; and, as mentioned elsewhere, from the vast continent of Africa, only one native species, in flower, is known in herbariums.

One fact in the distribution of the curious species *Pseudostachyum polymorphum*, "Purphok" of Sikkim, is interesting, as Griffiths mentions that it was found in Upper Assam, associated always with the Tea-plant.

Hooker states that "Pao," *Dendrocalamus edulis*, has a very marked limit in elevation, ascending to 4000 feet, where it abounds, flowering yearly, after which it is succeeded by "Poyang" (*Cephalostachyum capitatum*) and "Prang" (*Arundinaria Hookeriana*). The latter, according to Hooker, ascends to 6000 feet and upwards, and produces seed abundantly. The fruit, a dark long grain, like rice, is boiled and made into cakes or into beer.

In the description of the genera and species, I have followed the plan adopted by Hooker and Thomson in the 'Flora Indica;' namely, after the name of the plant I have given as short a diagnosis as possible, followed by the synonymy and the habitats of the plant. I have then given a full description in Latin, and added a few remarks, occasionally, in English as to the habits and uses of the plants, and any remarkable peculiarities in structure, &c. I have used Latin as far as possible, as I was much struck by the remarks of several foreign botanists at the recent botanical congress in London, who complained that the English botanists used too much of their own language in modern systematic works on botany. I have, in many instances, added the native names of the various species, as I have been requested to do so; but I would observe that I consider them very uncertain; and indeed I find that the generic name even is given very differently by collectors in the same country: for instance, with collectors in Java, Horsfield and Harskaal, Rumph and Blume, all use different Javan words for the Bamboo generically. Dr. Hooker states that a dozen kinds of Bamboo are

known to the Lepchas by different names, and that in Khasiya the natives enumerate fourteen different kinds, the names of which are detailed at p. 268 of the second volume of the 'Himalayan Journals.' Most of these I have been able to identify with scientific names. With such careful observers as Hooker and Thomson these native names are of great value; but apparently "non cuique datum" with similar care and facility to express native sounds in European languages.

A large number of Bamboos are now in cultivation, and perhaps twenty species at Kew alone. I am informed there are at least fifty in Paris. Few of these, perhaps of *Arundinaria* only, are hardy in England, or even in the warmer parts of Ireland. Dr. Moore mentions, in the 'Treasury of Botany,' "that several brakes of *Arundinaria falcata* were planted in the county of Cork, in 1848, and that, in ten years, the canes had reached a height of from 16 to 20 feet, being about a foot in circumference at the base. The joints of the stems were nearly of equal growth, and owing to this regularity presented a curious appearance, to those particularly who had not seen tropical vegetation." A fine plant of *Guadua latifolia* is stated to be growing in the Botanical Gardens at Berlin.

There is a specimen preserved in the British Museum of *Bambusa vulgaris*, which is stated to have grown forty feet in forty days at Chatsworth, the noble seat of the Duke of Devonshire.

I have throughout this paper made considerable use of Ruprecht's excellent memoir on Bambuseæ in the Russian 'Transactions' already referred to, but have in all cases marked with " " any paragraphs which I have copied verbatim.

## BAMBUSACEÆ

*Monographice descriptæ Auctore Colonel WILLIAM MUNRO.*

BAMBUSACEÆ, Kunth in Mém. du Mus. xi. 75 (1815); Rœm. et Sch. Syst. Veg. ii. 850 (1817); Link in Hort. Berol. ii. 308 (1833); Trinius in Act. Acad. Cæs. Petrop. ser. vi. Sc. Nat. vol. i. 613 (1835); Steud. Syn. 329 (1855); Miquel in Fl. Ind. Bat. iii. 360 (1855), et in Ann. Mus. Lugd. Bat. ii. 284 (1866). BAMBUSEÆ, Nees in Agrost. Bras. 520 (1829); in Linnæa ix. 461 (1834); in Lindl. Nat. Syst. 2nda edit. 383 (1836); in Fl. Afr. Aust. 460 (1841); Ruprecht in Act. Acad. Cæs. Petr. ser. vi. Sc. Nat. vol. iii. 2nda Part. p. 90 (1840). *Bambusineæ*, Agardh, Aph. 153 (*fide* Nees). *Festuceæ*, Subtribus II. *Bambuseæ*, Endl. Gen. 102. *Festuceæ*, Subtribus *Bambusidæ*, Lindl. in Veg. King. 3rd ed. 116 (1853). *Festucearum genera*, Kunth in Enum. 426 (1833).

Gramina fruticosa vel arborescentia, *culmo* nunc excelsissimo, 120-pedali et ultra, nunc alte scandente, nunc humili, pedali, fistuloso vel raro fere solido, sæpissime ad nodos ramosissimo, spinoso vel inermi. In nonnullis e nodis culmi inferioribus "multæ fibrillæ lignosæ progerminant, quarum inferiores, veræ radices, in terram intrant, superiores spinas, bene dictas 'horridas,' mentiuntur." In plurimis speciebus in culmorum vetustiorum cavitare concretiones siliceæ, *Tabasheer* dictæ, inventæ sunt, sed nunquam in sectione "*Triglossæ*." Iterum in multis locis culmi vel turiones (surculi) tam numerosi sunt ut sylvulas vel etiam sylvas densas fere inpenetrabiles constituent.

*Folia* præ plantæ statura minora, omnia nisi in *Platonia* basi articulata, sæpe cito decidua, interdum *venulis transversis* impressis conspicue *tessellata*.

*Vagina* sæpissime apice fimbriatæ, *ligula* semper præsentæ, nunc brevi, nunc longiore et quandoque *fimbriis* ciliata.

“*Inflorescentia*: panicula perraro valde composita, sæpius contractior et depauperata, denique in quibusdam ad formam racemi aut spicæ (in aliis verticillatæ in aliis simplicis) quin ad pedunculum monostachyum redacta” (Nees.)

*Spiculæ* multifloræ vel paucifloræ vel sesquifloræ, nunquam unifloræ. Nisi in subsectione “*Arundinaria*” omnium flosculi inferiores 1 vel plurimi, abortivi, univalves, sæpe glumas referentes. Interdum quasi in *Panicis* spiculæ deorsum tantum, in plerisque quasi in *Arundineis* quibusdam sursum deorsumque, in subsectione “*Arundinaria*,” quasi in *Festuceis* plerisque, sursum tantum imperfectæ. *Palea* inferior semper plurinervis, superior 2-6- plurinervis, carinata vel ecarinata, interdum (rarissime) deficiens.

*Squamulæ* typice 3, interdum plurimæ, abortu 2 vel nullæ.

*Stamina* 3-6 vel plurimæ, filamentis basi liberis vel monadelphis.

*Styli* plerumque ima basi conjuncti, vix unquam indivisi, sæpissime 2-3-4-fidi.

*Caryopsis* libera vel in sectione “*Baccifera*” perigynio arcte inclusa.

*Bambusaceæ*, ob characteres supra enumeratos, meo sensu, ab omnibus aliis graminum tribubus bene distinctæ sunt.

Genera *Bambusacea* in sectiones tres dividua sunt.

1. TRIGLOSSÆ, Link. in Hort. Berol. i. 248 (1827); Nees in Agros. Bras. 520 (1829). *Arundinaria*, Nees in Linn. ix. 466 (1834), et in Lindl. Nat. Syst. et in Fl. Afr. Aust. 463, Rupr. l. c. 111, Steud. Syn. 331, Miquel. l. c. 361.

*Culmus* semper inermis, fistulosus, teres vel in “*Phyllostachy*” semiteres, sæpissime fruticosus, vix arborescens, sæpe scandens, e nodis ramosissimus, interdum nanus, *Tabasheer* nunquam fundens: in *Platonia* tantum herbaceus enodosus. *Panicula* in multis depauperata, simpliciter racemosa vel fere spicata, etiamve subrotunda capitulum referens, in aliis thyrsoidæ decomposita, amplissima effusaque; sæpissime basi nuda, interdum vagina folii terminalis (e. g. *Merostachys*) vel foliis ipsis (in sect. *Rettbergia*, *Chusqueæ*) vel spatha vel bracteis perpauca (e. g. *Thamnocalamus* et *Phyllostachys*) quasi involucrata: in plurimis terminalis i. e. ex apice ramorum vel ramulorum foliiferorum egrediens; in perpauca (*Arundinariis* quibusdam et *Thamnocalamo*) culmi floriferi et foliiferi discreti sunt. *Spiculæ* plurifloræ vel raro sesquifloræ, in subsectione prima sursum, in aliis vel deorsum vel utrinque imperfectæ. *Glumæ* ut plurimum paucinerviæ, interdum minimæ vel obsoletæ, nunquam gemmiparæ, sæpe consistentia et colore flosculis perfectis alienæ. *Palea* superior semper bicarinata. *Stamina* 3, basi libera, connectivo nunquam elongato. *Squamulæ* 3 semper adsunt. *Stylus*, plerumque cito, supra basin 2-3-partitus. *Caryopsis* ovalis oblonga aut lineari-oblonga, sulco laterali notata, scutello extus conspicuo.

Gramina subsectionis primæ, *Arundinaria*, in hemisphærio utroque; omnia alia hujus sectionis tantum in occidentali crescent.

Nees has principally trusted to the form of the upper palea, which he describes as compressed and boat-shaped, to distinguish this section from true Bamboos, in which, he says, the upper palea is depressed and broader at the back. I, however, do not find this distinction of sufficient value, as both forms are found indiscriminately in the upper palea of all the three sections. Link describes *Triglossæ* as having 3 stamens, and spiculæ with 1 or 2 bracts at the base, and thus distinguished from *Bracteifloræ*, which have 6 stamens and several bracts. Grisebach, at p. 529 of the ‘Flora of the British West-India Islands,’ includes 3 genera of this section (*Triglossæ*), namely

*Arthrostylidium*, *Chusquea*, and *Platonia*, in *Bromeæ*, in consequence of the "stigmas projecting laterally from the flower." In the numerous specimens I have examined I have never observed any tendency to such a structure, as I understand it; nor is there any represented in the numerous dissections contained in the plates attached to Ruprecht's memoir.

2. BAMBUSEÆ VERÆ, Nees in Agros. Brasil. 531 (1829); in Linnæa, l. c. 465; in Lindl. Nat. Syst. l. c., in Fl. Afr. Aust. l. c. 461; Miquel, l. c. 361. *Bracteifloræ*, Link. Hort. Berol. i. 249 (1827), *partim*.

*Culmus* spinosus vel inermis, crassus, fistulosus, rarissime solidus, teres, arboreus, elatus, vel raro suffruticosus, nunquam scandens, non raro "Tabasheer" fundens. *Inflorescentia*, vel scapus radicalis (*Bambusa Balcooa*, teste Roxb.), vel panicula vasta culmum interdum præaltum sæpe spinescentem foliis denudatum terminans, ramosa et ramosissima, ramis simpliciter vel composite spicatis vel laxiusculis, adjectis rarissime hinc et inde ramulis foliiferis; vel, ut in *Nasto*, *Guaduis* quibusdam et paucis aliis, panicula ramorum terminalis subsimplex spiculis perpaucis pedicellatis vel sessilibus. *Spicula* pluriflora, sæpe multibracteata, sursum deorsumque imperfecta, interdum biformis, rarissime dioica. *Glumæ* multinerviæ, inferiores, nisi in *Nasto*, fere semper gemmiparæ; omnes flosculis inferioribus sæpe plurimis sterilibus unipaleaccis simillimæ. *Palea* superior bicarinata vel dorso rotundata ecarinata. *Stamina* typice 6, filamentis basi liberis vel monadelphis, antherarum connectivo vel obtuso vel apiculato. *Squamulæ* typice 3, abortu 2, vel raro plane deficientes. *Stylus* vel brevis et brevissimus cito trifidus vel basi plus minus longe simplex et apice tantum 2-3-fidus. *Caryopsis* ovalis vel oblonga vel (præcipue in *Oxytenanthera*) anguste lineari-oblonga, sulco longitudinali notata, scutello extus visibili. *Pericarpium* a semine non distinguendum.

Gramina hujus sectionis in utroque hemisphærio crescunt.

Link's name of *Bracteifloræ* for this section claims precedence in point of date; but it includes all the species both of this section and the following one, and therefore I thought I was justified in adopting Nees's name. Link, moreover, does not use his own name in his amended classification of Gramineæ in the 2nd volume of the 'Hortus Berolinensis,' published six years after the first. In this last enumeration he only uses one word, *Bambusaceæ*, to include the whole tribe of Bamboos.

### 3. BACCIFERÆ, Munro.

*Culmus* inermis (an semper?), fistulosus, rarissime solidus, teres, interdum arboreus elatus, interdum suffruticosus, sæpe scandens, raro *Tabasheer* fundens. *Inflorescentia* vel panicula ampla decomposita, laxa, e. g. *Pseudostachyum* et *Dinochloa*, vel spiculis secus ramos ramulosque in verticillos densissimos congestis, e. g. *Dendrocalamus*, vel spiculis in spicas compositas elongatas basi longe bracteatas aggregatis, e. g. *Melocanna bambusoides*, vel capitulum densum terminale foliis supremis basi dilatatis suffultum, e. g. *Cephalostachyum capitatum*, vel panicula subsimplex terminalis pauciramia interdum fere spiciformis, e. g. *Beesha* et *Schizostachyum Blumii*. *Spicula* basi sæpe valde composita vel eximie prolifera, ultima (vera) sæpe pauciflora flosculis 1-2 perfectis, in *Teinostachyo* et *Dendrocalamo* multiflora. *Glumæ* multinerviæ, inferiores sæpissime gemmiparæ. *Palea* superior raro deficiens, e. g. *Schizostachyum Blumii*, sæpissime involutissima et non raro ecarinata, sæpe apice bimucronata. *Stamina* 6, vel plurima, e. g. *Beesha*, basi libera, connectivo obtuso vel apiculato. *Squamulæ* typice 3, interdum plurimæ, nunc deficientes. *Stylus* basi semper longe simplex, in perigynii rostro arcte inclusus, demum 2-3-fidus stigmatibus sæpe revolutis. *Fructus* interdum maximus, *bacciformis* vel *pomiformis*, in perigynio inclusus, hinc scutellum extus non visibile.

In hemisphærio orientali tantum genera hujus sectionis obvia sunt.



## Sectio I. TRIGLOSSÆ. Confr. supra, p. 11.

*Conspectus Generum.*

Subsectio I. ARUNDINARIÆ. Spiculæ sursum imperfectæ. Stylus 2-3-fidus.

Culmi teretes. Glumæ fere semper paucinerviæ. Stylus cito supra basin 2-3-fidus.

Folia venulis transversis nullis vel conspicuis. Inflorescentia sæpe simplex vel raro composita, ramis ultimis nunquam basi bracteis longis velatis

1. *Arundinaria.*

Folia venulis transversis inconspicuis. Inflorescentia panicula ramosissima ramis ultimis basi longe bracteatis . . . . .

2. *Thamnocalamus.*

Culmi semiteretes. Glumæ multinerviæ. Stylus longe supra basin 3-fidus.

Folia venulis transversis conspicuis. Paniculæ ramis alternis basi bracteatis, glumis apice foliaceis imbricatis . . . . .

3. *Phyllostachys.*

*Merostachys* would be placed in this subsection by such authors as consider the two lower barren flowers to be glumes.

Subsectio II. ARTHROSTYLIDIÆ. Spiculæ sursum deorsumque imperfectæ. Stylus fere ad basin bifidus.

Venulis transversis nullis. Spiculæ multifloræ.

Spiculæ fere cylindricæ, pedicellatæ vel sessiles, in racemo simplici vel paniculato dispositæ . . . . .

4. *Arthrostylidium.*

Spiculæ compressæ, in panicula ramosissima laxè divaricata . . . . .

5. *Aulonemia.*

Venulis transversis subtus prominulis. Panicula subspicata.

Spiculæ 2-3-floræ glumis obsolete . . . . .

6. *Merostachys.*

Subsectio III. CHUSQUEÆ. Spiculæ deorsum imperfectæ, 3-floræ. Stylus cito bifidus.

Culmus nodosus, foliis angustis basi articulatis . . . . .

7. *Chusquea.*

Culmus herbaceus enodosus, foliis latis basi inarticulatis . . . . .

8. *Platonia.*

The structure of the spiculæ in these two genera approaches very closely to that of Paniceous grasses; and, what is still more remarkable, the inflorescence of several species both of *Chusquea* and *Platonia* bears such a great resemblance to certain species of *Panicum* that they might very readily be mistaken for them by casual observers.

## I. ARUNDINARIA.

Michaux, Fl. Bor.-Amer. i. 74 (1803). *Miegia*, Pers. Syn. Pl. i. 101 (1805). *Ludolfia*, Willd. in Berl. Verh. (1808), 320. *Triglossum*, Fisch. in Catal. Hort. Gorenk. (1812). *Macronax*, Rafin. in N. Y. Med. Rep. v. 350.

*Spicula sursum imperfecta*, intra glumas breve pedicellata, 3-5-12-flora, rhachilla articulata, flosculis imbricatis distichis distantibus (nisi 1-2 terminalibus) tabescentibus, omnibus bipaleaceis hermaproditis vel rarissime infimo masculino. Glumæ valde variabiles, acutæ vel obtusæ, interdum distantes, ut plurimum paucinerviæ, inferior raro abortu deficiens, superiore semper brevior. Palea inferior acuminata vel acuto-mucronata, concava, multinervia, glabra vel hirsuta, membranacea, superiorem bicarinatam dorso anguste canaliculatam æquans vel superans. Stamina 3, brevia. Squamule 3, conspicuæ, membranacæ, ovatæ vel lanceolatæ, ciliatæ, acutæ vel obtusæ. Stylus basi integer cito in stigmata 2-3 pilis simplicibus plumosa divisus. Caryopsis ovalis vel oblonga vel lineari-oblonga, tereti uscula, postice sulco profundo notata.

Gramina cosmopolitana, culmo tereti, suffruticosa, raro arborescentia, nunquam nisi in *A. distante* scan-

dentia; ramis interdum ad nodos fasciculatis vel fere verticillatis. Folia plerumque parva *venulis transversis* nunc *obscuris* nunc *quam maxime conspicuis tessellata*. Inflorescentia plerumque *terminalis*; interdum *simplicissima*, racemo spiculis 1-4 fere spicato; interdum *racemus compositus decompositusque* laxus amplissimus axillis glandulosis; interdum *ramuli floriferi basi fere aphylli*, ad nodos dense fasciculati vel verticillati sunt, horum ramulorum pauci proliferi et hinc quasi compositi sunt, sed *ramulis ultimis nunquam basi longe bracteatis*. Denique in nonnullis speciebus culmi floriferi et floriferi diversi sunt.

The greatest caprice has been shown in the alteration by successive botanists of the name of this genus, especially when it is considered that no doubt was entertained by them of the identity of the original species, *Arundinaria macrosperma*. Michaux originally called it *Arundinaria*; and Persoon, writing very shortly afterwards, quotes Michaux's name, but alters it to *Miegia*. This name could not stand, because it had been previously, in 1789, adopted by Schreber for quite a distinct genus of grasses. Consequently Willdenow altered the name, in 1808, to *Ludolfia*, assigning as a reason for so doing the great resemblance which the original word *Arundinaria* bears to Linnæus's genus *Arundo*. Smith, in Rees's 'Cyclopædia,' adopts the same argument. Fischer, an excellent botanist, in 1812, created the generic name *Triglossum*, of a single spicula of which he gives a very fair drawing in 'Catalogus Horti Gorenkis.' He says the genus is distinct from *Ludolfia* in having all the flowers hermaphrodite, with 3 squamulæ. Both these characters are especially peculiar to *Arundinaria*, and the drawing is evidently that of a spicula of *Arundinaria macrosperma*.

*Conspectus Specierum.*

Sect. I. *Inflorescentia terminalis, i. e.* rami ramulive basi foliiferi apice floriferi.

Folia venulis transversis *valde conspicuis tessellata*. Stylus cito 3-*fidus*.

Spiculæ multi- (plus quam 5-) floræ.

Panicula simplex semelve composita, plerumque racemosa, *paucispiculata*.

Vaginæ apice *fimbriatæ*.

Arborescens vel suffruticosa, foliis  $\frac{1}{3}$ -2 poll. latis, panicula depauperata, spiculis longis 1-3-5, *palea inferiore* plus minus, semper margine, *hirsuta* . . . . .

1. *A. macrosperma*.

Suffruticosa, foliis maximis 6 lin. latis, *panicula 7 poll. longa*, radiis longissimis, *palea inferiore subglabra* . . . . .

2. *A. radiata*.

Suffruticosa, foliis 4-6 lin. latis, *panicula 2-3 poll. longa*, rhachi *glabra, palea inferiore fere glabra* vel hirsutiuscula . . . . .

3. *A. racemosa*.

Vaginæ *efimbriatæ*. Suffruticosa, foliis 10-11 lin. latis, panicula 2-3 poll. longa, rhachi pubescente, *palea inferiore subhirsuta* . . . . .

4. *A. Kurilensis*.

Panicula composita, ramis *multispiculatis* densis adpressis, inexpansa.

*Palea inferiore fere glabra* . . . . .

5. *A. Japonica*.

Folia *tessellata*, sed venulis transversis *minus conspicuis, margine membranaceo*. Stylus cito 2-*fidus*.

Panicula decomposita expansa axillis plus minus glandulosis.

Internodia culmi apice vix hirsuta, foliis angustis, vaginis hirsutis, spiculæ 2-3-5-floræ, fere glabræ . . . . .

6. *A. Wightiana*.

- Internodia apice glabra, foliis latis, vaginis glaberrimis, spiculæ  
3-4-floræ, glabræ . . . . . 7. *A. longiramea*.
- Internodia pilis reversis hirsuta, spiculæ 5-8-floræ, pubescentes vel  
hirsutæ . . . . . 8. *A. floribunda*.
- Internodia apice fusco lanata, spiculæ 5-6-floræ fere glabræ . . . . . 9. *A. Griffithiana*.
- Folia *tessellata* venulis transversis *valde conspicuis, margine cartilagineo*.
- Stylus cito 2-*fidus*. Panicula *decomposita* . . . . . 10. *A. Walkeriana*.
- Folia venulis transversis nullis vel obsoletis.
- Panicula simplex, semper terminalis.
- Spiculæ *solitariae* paucæve *mutantes 2 poll. longæ* . . . . . 11. *A. glaucescens*.
- Spiculæ 5-6, in *racemo* terminali, 4-5 *poll. longæ* . . . . . 12. *A. macrostachya*.
- Spiculæ 3-4 *sessiles* fere *spicatae 8-12 lin. longæ* . . . . . 13. *A. distans*.
- Panicula vere simplex (spiculis 2-5), vel in ramulis foliiferis terminalis,  
vel basi aphylla circa nodos dense fasciculata . . . . . 14. *A. verticillata*.
- Panicula semel bisve composita, in ramulis fasciculatis, terminalis.
- Panicula ramis pedicellisque brevibus, crassis. Spiculæ 3-floræ . . . . . 15. *A. debilis*.
- Panicula ramis pedicellisque longis, tenuibus. Spiculæ sub 4-floræ  
pubescentes, glumis longissime acuminatis . . . . . 16. *A. acuminata*.
- Panicula ramis 3-4 longis demum repandis. Spiculæ 6-11-floræ, glumis  
valde inæqualibus vix acutis . . . . . 17. *A. Trianae*.
- Panicula amplissima decomposita. Folia lata ciliis vaginæ longissimis.
- Stylus cito trifidus . . . . . 18. *A. amplissima*.
- Sect. II. *Culmi foliiferi et floriferi distincti, hinc inflorescentia totum culmum  
floriferum occupat, ramulis basi aphyllis circa nodos fasciculatis, vel simpli-  
cibus vel proliferis compositis.*
- Folia, venulis transversis nullis vel obsoletis, angusta.
- Folia subtus circa costam pilosa. Glumæ longæ spiculam sæpe subæquantes . . . . . 19. *A. falcata*.
- Folia subtus glabra. Glumæ vix dimidium spiculæ attingentes . . . . . 20. *A. Khasiana*.
- Folia, venulis transversis, subtus præcipue, prominulis, 11-12 lin. lata.
- Spiculæ 2-3-floræ. Folia sub 6 lin. lata . . . . . 21. *A. intermedia*.
- Spiculæ sesquifloræ. Folia 6-12 lin. lata . . . . . 22. *A. Hookeriana*.
- In hoc conspectu, *Arundinariae* solæ quarum flores noti sunt inclusæ. Species statu foliifero tantum  
notæ ad calcem generis locatæ sunt.

1. *A. MACROSPERMA*, Michaux, Fl. Bor.-Am. i. 74. Culmi nodis hirsutis vel in var.  $\beta$ . sub-  
glabris, foliis  $\frac{1}{3}$ -2 poll. latis, tessellatis, spiculis compressis  $1\frac{1}{2}$ -3 poll. longis, 5-8-15-  
floris plus minus hirsutis.
- a. arborescens*, culmus 10-20-35 (fide A. Gray)-pedalis, ramulis numerosis floriferis, fere spicigeris, sæpe  
fasciculatis, foliis  $1\frac{1}{2}$ -2 poll. latis, Rœm. et Sch. Syst. Veg. ii. p. 846; Mant. ii. 465, iii. 670;  
Nees, Agr. Bras. 526; Kth. Enum. 426, var.  $\beta$ , et Suppl. tab. 33. fig. 4; Ruprecht, *l. c.* 112, tab. i.  
fig. 2; Trin. *l. c.* 622; A. Gray, Man., 2nd edit. 568; Steud. *l. c.* 334. *A. gigantea*, Chapm. in Fl. S. U.  
States, 561; Schult. (fide Steudel). *Arundo gigantea*, Walt. Carol. 81 (1785). *Miegia macrosperma*,  
Pers. Syn. i. 102; Pursh, Fl. Am. Sept. i. 59. *M. gigantea*, Nutt. Gen. N. Amer. p. 39. *M. mari-  
tima*, Willd. (fide Steudel). *M. arundinacea*, Torrey, MS. et herb. *Nastus macrosperma*, Raspail,  
Ann. Sci. Nat. v. 458, t. 8. fig. 1. *Ludolfia macrosperma*, Willd. in Mag. *l. c.* 320; Dietr. Spec.  
i. 24; Spreng. Syst. i. 233. *Festuca grandiflora*, Lam. Illustr. i. 191. *Macronax*, Rafinesque, *l. c.*
- $\beta$ . *suffruticosus*, spicis vel racemis paucioribus interdum solitariis culmum terminantibus, foliis  $\frac{1}{3}$ -1 poll.  
latis. *Arundinaria tecta*, Muehl. Desc. 491 (1817); Schult. Mant. ii. 465; Ruprecht, *l. c.* 111, tab. ii.

fig. 1  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ ; Chapman, *l. c.* 561; Steudel, *l. c.* 334. *A. macrosperma*, var., Nees, Kunth, A. Gray, *l. c.*, P. de B. Agrost. p. 144, tab. xxv. fig. 7. *Arundo tecta*, Muehl. *l. c.* 81. *Miegia macrosperma*, Nutt. Gen. 39. *Miegia pumila*, Nutt. fide Ruprecht, *l. c.* et herb. *Ludolfia tecta*, Dietr. *l. c.* *Tri-glossum bambusinum*, Fisch. *l. c.*

*Hab.* America sept., frequens. Vidi specimina e Philadelphia!; Florida!, Chapman; Kentucky!, Short, Carey; New Orleans, Drummond, 474!, Elliott; Texas! Lindheimer; Georgia!, Arkansas! Nuttall, Elliott, Schweinitz; Carolina! Frazer. In Europa culta.

*Culmus* arborescens vel suffruticosus, nodis plerumque hirsutis, in var. *a* ramis 3-4-pedalibus. *Folia* lanceolata basi rotundata in petiolum attenuata, nervis secundariis 6-14; venulis transversis crebris, 4 lin.-2 poll. lata, 3-7 poll. longa, marginibus serratis, undique scabra, dorso pubescentia. *Vagina* internodiis breviores, superiores subsemipedales, striatæ, sulcatæ, ore ligulatæ et appendiculato-fimbriatæ, uno margine longe ciliatæ, ligula truncata hyalina lacero-ciliata, fimbriis rigidis 1-3-linearibus scabris deciduis. *Panicula* subracemosa, pauciflora, spiculis 1-5, vel in culmo solitaria vel in ramulis plurimis, quasi paniculatis, ad nodos fasciculatis, terminalis. *Spiculæ* compressæ, lineari-lanceolatæ, 10 lin.-3 poll. longæ, 5-8-15-floræ, sæpe dense pubescentes, raro subglabræ, semper margine plus minus hirsutæ membranaceæ nervosæ. *Glumæ* valde variabiles, inferior  $1\frac{1}{2}$ -3-lin. longa, acuta vel obtusa, interdum deficiens, superior 3-8 lin. longa, flosculum proximum vel subæquans vel duplo et etiam 3-plo brevior. *Palea* inferior, 9-11-nervia, lanceolata, acuminata, margine longe fimbriata, transverse venulosa, superiore apice bimucronata paulo longior. *Squamulæ* inæquales, lanceolatæ, basi coloratæ, venosæ, margine ciliatæ vel fere glabræ. *Ovarium* apice attenuatum in stylum, basi integrum, cito in stigmata 3 divisum. *Caryopsis* oblonga.

This grass certainly varies very much in form; and there is a very great difference in the appearance of the small purplish-coloured nearly glabrous spiculæ of the variety called "colorata" by Ruprecht, compared with the large pale-coloured densely pubescent spiculæ, nearly 2 inches long, generally found in dwarf specimens, terminated by a single panicle. Intermediate forms, however, abound; and I quite coincide with Pursh, Nuttall, and A. Gray in considering that all these forms belong to one and the same species. This variation in form will to a certain extent account for the fact that this one species bears no less than nine different generic and nineteen specific names. I have already referred to the needless alterations that have been made in the generic name. Carey mentions that this grass, which was once common in Kentucky, has become now nearly extinct there.

2. *A. RADIATA*, Ruprecht, *l. c.* 115, tab. xv. fig. 9. Culmi nodis glabris, foliis tessellatis, vaginis fimbriatis pubescentibus, panicula spithamæa radiis solitariis longissimis monostachyis, gluma superiore flosculo infimo plane simili, Steud. *l. c.* 335.

*Hab.* In sylvis umbrosis Brasiliæ, Riedel, s. v., Ruprecht.

"*Culmus* erectus ramis ad nodos glabris ramulos simplices foliiferos apice floriferos emittentibus. *Folia* lanceolata, maxima 4 lin. lata, 5 poll. longa, basi rotundata, subsessilia, læviuscula, viridia, nervis secundariis subobsoletis, utroque latere 5-6, venulis transversis valde pellucidis inferne prominentibus distantibus. *Vaginæ* pubescentes sulcato-striatæ, ore fimbriatæ, fimbriis 2-linealibus. *Panicula* (juba) spithamæa, radiis solitariis longissimis erectis monostachyis. *Spiculæ* sub 7-lineales, teretilineares, subglabræ, 4-5-floræ. *Gluma* superior flosculo infimo plane similis. *Flosculi* brevissime pedicellati, subglabri. *Palea* inferior lineari-obovata, apice longe mucronata vel subulata, 5-nervia; superior minima, hebetata, nonnisi in flosculis 2do, 3tio, et 4to inventa."

I have not seen any specimen of this; and Ruprecht states that the specimen he saw was too young to have any of the genitalia perfect. If the lower flower has only one palea, the plant would belong to *Arthrostylidium*, from which, however, the tessellated leaves would appear to keep it distinct.

3. *A. RACEMOSA*, Munro. Culmi internodiis apice scabris; foliis tessellatis; vaginis fimbriatis, inter strias pubescentibus, demum glabrescentibus; panicula 2-3 poll. longa, rhachi glabra, spiculis subpollicaribus, 4-5-floris.

*Hab.* Himalayas, Darjeeling, Birch Hill! 6000 ped. s. m.; Sinchul! 8000 ped.; Sikkim, Islumbo Pass! 11,000 ped. Thomson, Mainom! 6000-8000 ped. ("Pummoon" incolis); E. Nepal, Yalloong! 10,000 ped. ("Pat-hioo" incolis), Hooker: v. s.

*Culmus* teres, 2-4-pedalis, pallide cæruleus, internodiis sæpe vix bipollicaribus, apice scabris vel scabriusculis, ramulis foliiferis florigerisque ad nodos fasciculatis. *Folia* lineari-lanceolata, basi obtusa vel sæpe in petiolum brevem attenuata, 4-6 lin. lata, 2-4 poll. longa, apice setaceo acuminata, nervis secundariis utrinque 3, venulis transversis supra subtusque conspicuis; juniora subtus pilis longis hirsuta, demum glabra. *Vagina* striatæ, inter strias primum pubescentes, demum glabræ, membrana brevi ciliatula terminatæ, ligulatæ, oreque ciliis paucis longis fimbriatæ. *Panicula* simplex, rhachi glabra in ramulis terminalibus longe exserta; spiculis 3-4; pedicellis angulatis, 1-1½ poll. longis. *Spiculae* glabræ vel hirsutiusculæ, 4-5-floræ, intra glumas pedicellatæ, subpollicares; rhachillæ articulis hirsutis flosculis fere æquilongis. *Glumæ* valde variabiles, plerumque breves vel brevissimæ, obtusæ vel acutæ, inferior sæpe fere obsoleta. Palea inferior caudato-acuminata sub 9-11-nervis, fusca, margine apicem versus ciliata, sub lente scaberulo-hispida; superior brevior, apice bimucronata, carinis apices versus extus ciliatis. *Squamulae* vix inæquales, basi venosæ, oblongæ, obtusæ, apice longe ciliatæ. *Stylus* vix ullus, cito in stigmata 3 divisus. *Fructus* maturus linearis, sub 3 lin. longus, apice attenuatus, sulco longitudinali notatus.

This species has very rarely been found in flower; and when in foliage only it is extremely difficult to distinguish it from *Thamnocalamus spathiflorus*, Munr., *Arundinaria spathiflora*, Trin. The best marks of distinction are the roughness of the stem below the nodes, the long points to the leaves, and the membrane at the top of the vagina and below the articulation of the petiole, which is only slightly hairy. The leaves have often long hairs below.

4. *A. KURILENSIS*, Ruprecht, in Bull. Petersb. viii. (1850) 121. Panicula simplici racemosa, 2-3 poll. longa, rhachi pubescente; foliis tessellatis, 10-11 lin. latis; vaginis efimbriatis.—Steudel. *l. c.* 335.

*Hab.* Ins. Ouroup Kurilarum, s. v. Ruprecht.

*Culmus* suffruticosus, 6-8-pedalis et diametro 3 lin., internodiis culmi floriferi 3 poll. longis, ramulis erectis adpressis. *Folia* majora 5 poll. longa, 10-11 lin. lata, basi rotundata, ovato-acuminata, supra glabra, subtus pallidiora, margine fimbriata, nervis secundariis utroque latere 6-7, venulis transversis pellucidis, interstitiis quadratis. *Vagina efimbriata*, quod notatu dignum inter *Arundinarias*, ligula conspicua 1 lin. longa. *Racemus* simplex, 2-3 poll. longus, spiculis 4-5, pedicellis 2-4 lin. longis. *Rhachis hirsuta*, pilis adpressis pallidis, qui in rhachilla fere sericei sunt. *Spiculae*, flosculis omnibus nisi infimo delapsis, ½ poll. longa. *Glumæ* pilis adpressis hirsutæ; inferior valde variabilis, sub 1 lin. longa; superior 2-4 lin. longa, basi angustata, apice in mucronem acuminata. *Palea inferior ovata*, 7-9-nervis, costata, superior 3-4 lin. longa, bicarinata. *Stylus* cito in stigmata 3 divisus.

I have not seen any specimen of this plant, and have copied the preceding description from that given in German by Ruprecht in the Transactions referred to above. The plant is said to be commonly called Chup-tatt by the inhabitants, who use it for arrow-heads and several other purposes. It is found in *Ouroup*, one of the Kurile Islands, in 46° N. lat., and is believed to have been introduced from some of the islands still further north, and is therefore probably the most northern species known of the whole family. It is closely allied in some respects both to *A. macrosperma* and *A. racemosa*, from both of which it is distinguished by the absence of cilia to the vaginæ, and from the latter by the hairy rhachis and broader leaves. Ruprecht mentions that he had not seen any perfect spiculæ.

5. *A. JAPONICA*, Sieb. & Zucc., MS. apud Steud. *l. c.* 334. Panicula composita, ramis adpressis; spiculis numerosis, 1-2 poll. longis; foliis tessellatis,  $\frac{1}{2}$ -1 poll. latis, 3-9 poll. longis.—A. Gray in Parry's Exped. 328; Miquel, Prol. Fl. Japon. Annal. Mus. Bot. Lugduno-Batav. ii. 284; *Bambusa Metake* Sieb. et Hort.; *B. mitis* Hort. Paris. var. cult. spiculis 20-floris, 4 poll. longis.

*Hab.* In Japonia, ins. Kiusiu! ins. Nippon, *Burger*; Simoda! *Williams*; Java (fide *Steud.*). In hortis Europæ cult. ! v. s. et v.

*Culmus* 6-8-12-pedalis, suffruticosus, ramis striatis, glabris, ramulosis, fasciculatis, ramulis inæqualibus infra florentiam pubescentibus, internodiis 2-3 poll. longis, apice glaucescentibus. *Folia* lanceolata, apice setaceo acuminatissima, basi in petiolum brevem attenuata,  $\frac{1}{2}$ -1 poll. lata, 3-9 poll. longa, marginibus scabris, nervis secundariis utroque latere 4-6, venulis transversis, creberrimis, tessellata, subtus pallidiora vel glaucescentia, glabra vel dense puberulo-scaberula. *Vaginæ* sæpe glaucescente dense adhærente minute puncticulata tectæ, striatæ, coloratæ, apice ciliis perpaucis, cito deciduis, fimbriatæ, ligula conspicua producta coriacea extus subhirsuta. *Panicula* composita, ramis vel multo vel paucio spiculatis, adpressis, plerumque brevibus, angulis villosis vel pubescentibus vel in cultis glabrioribus. *Spiculæ* 2-10-20-floræ, angustæ, sæpe subcylindricæ, 1-4 poll. longæ, rhachillæ articulis brevibus albo hirsutis. *Glumæ* inæquales, lanceolatæ, flosculis breviores; inferior 4-5-nervis, margine interdum ciliata; superior sub 9-nervis, margine glabra. *Palea* inferior sub 15-nervis, lanceolata, dorso convexa, mucronato-acuta, viridis vel colorata serotina fuscescens, sub lente scaberulo-hirsutiuscula, margine glabra; superior interdum æquilonga vel raro multo brevior, depressa, apice bimucronata, bicarinata, carinis conspicue ciliatis. *Squamulæ* 3, longæ, æquales, lanceolatæ, ciliatæ, basi nervosæ. "*Antheræ* defloratæ petaloideo-explanatæ, persistentes vel caducæ" (*Steud.*). *Stylus* cito trifidus, in stigmata 3 elongata. *Ovarium* oblongum, in stylum attenuatum.

This seems to have a range of about 4 (degrees from 32° to 36° N. lat.) in Japan; and I am therefore surprised that I do not find a specimen of it in Kämpfer's herbarium. It is said to be called Niga-sasa (one of Kämpfer's names) in the island of Nippon, and Me-take, and Sika-take in the island of Kiusiu. In the specimens I have seen collected in Japan, the main and partial rhachis are both very hairy; whereas in those cultivated at Kew, where this plant appears to be quite hardy, the rhachis is smooth; and in some of the specimens the lower palea, which is generally 4-5 lines long, becomes nearly an inch long, whilst the upper one retains its usual length. Miquel, in the 'Annales' above referred to, says that, as far as description goes, *Bambusa reticulata*, Ruprecht, does not differ from *A. Japonica*; but I believe Ruprecht's plant to be more closely allied to a broad-leaved state of *Phyllostachys bambusoides*.

6. *A. WIGHTIANA*, Nees in Linnæa, ix. 482. Panicula decomposita, ramis patulis, axillis glandulosis; foliis tessellatis, margine membranaceo, 4-4½, raro 8 lin. latis; vaginis hirsutis; spiculis 2-8-floris, fere glabris.—Ruprecht, *l. c.* 116, tab. iii. fig. 10.; Steud. *l. c.* 335, non Benth. in Fl. Hong., nec Thw. in Enum. Pl. Zeyl. *A. hispida*, Steud. *l. c.* 335. *A. moliniformis*, Hochst. in Herb. Hohenacker, no. 1282!

*Hab.* Ind. or: in montibus Nilghiri! *Wight*, no. 213! 1797! *Schmid!* *Hohenacker!* v. s.

*Culmus* suffruticosus, ad nodos ramosissimus, 6-8-pedalis, crassitie 2½-lineali, internodiis 2-4 poll. longis, apices versus e tuberculis asperis vel glabris, nodis ipsis vix hirsutis, ramulis in fasciculo quam plurimis ½-1 ped. longis, fere omnibus paniculam terminalem gerentibus, 1-2 foliiferis tantum, in his folia majora sunt. *Folia* ovato-lanceolata, acuminata, subtus glaucescentia et sæpe basin versus ad costam glandulosa, plerumque 1½-3 poll. longa, 4-5 lin. lata, raro (in ramulis sterilibus) 8-9 lin. lata, 4-6 poll. longa, basi rotundata vel cuneata brevi-petiolata (petiolo basi subtumido), margine membranaceo scabro vel scaberrimo vel tandem glabrescente, nervis secundariis utrinque 4-6, venulis transversis pallidioribus sat crebris. *Vaginæ* striatæ, sæpe coloratæ, nunc tuberculis hispida, nunc glabrescentes (in eodem ramulo), ore ciliis 1-2-3 longis fimbriatæ, ligula elongata vel brevissima. *Panicula* terminalis 4-6 poll. longa, decomposita, effusa, ramis patentibus vel divaricatis, axillis omnibus conspicue glandulosis, ramulis ultimis paucifloris. *Spiculæ* in pedicellis longis vel longissimis, 2-5-floræ, pallidæ vel coloratæ, fere glabræ vel hirsutiusculæ, 4-6 lin. longæ, rhachillæ articulis subclavatis, scabro-hirsutis. *Glumæ* nervosæ, acuminatæ vel obtusæ, apice ciliatæ; inferior plerumque acuto-mucronata, 2-5-nervis; superior basi 7-nervis, acuminata. *Palea* inferior sub 5-7-nervis, mucronata, primo adpectu glabra, sub lente scaberulo-hispidiuscula; superior subæquilonga, apice bicuspidata. *Filamenta* 3, antheris luteis. *Stylus* cito bifidus. *Squamulæ* ovatæ obtusæ vel acutæ (fide *Ruprecht* in icone), margine fimbriatæ, nervosæ.

This species appears to be confined to the Neilgherries, where it covers the outer slopes of the hills to some extent, especially towards Sisparah. *A. Wightiana*, or *Wightii* of the 'Hongkong Flora,' is my *A. longiramea*, and is easily distinguished by its habit, long branches of the panicle, and large very smooth leaves and vaginæ. *A. Wightiana* of the 'Enumeration of Ceylon Plants' is my *A. Walkeriana*, separated from all its allies by the thickened cartilaginous margin of the deeply tessellated leaves.

7. *A. LONGIRAMEA*, Munro. Paniculæ compositæ vel decompositæ, ramis divaricatissimis, infimis longissimis (4-8-poll.), pedicellis sæpe 2 poll. longis; foliis usque ad 15 lin. latis, tessellatis; vaginis demum lævissimis; spiculis 3-4-floris, glabris.—*A. Wightii*, Benth. in Fl. Hongk. 434.

*Hab.* Hong Kong, *C. Wright!* *Hance*, no. 1945! v. s.

"*Culmi*, crassitie pennæ anserinæ, e rhizomate repente oriuntur" (*Hance*), "ad nodos ramosi" (*Wright*), internodiis apice glabris. *Folia* lanceolataa cuta, basi subcuneata in *petiolum* brevem utroque latere rugulosum attenuata, glabra, subtus pallidiora, majora 6-9 poll. longa, 9-15 lin. lata, minora (infra paniculam locata) 2½-4 poll. longa, 4-6 lin. lata, nervis secundariis utrinque 5-7 inconspicuis, venulis transversis distantibus, præcipue subtus, conspicuis. *Vaginæ* primum striatæ demum lævissimæ, ciliis perpaucis fimbriatæ, ligula brevi. *Panicula* ½-1-pedalis et ultra, ramis glabris simplicibus vel compositis, infimis 4-6 poll. longis, divaricatissimis, axillis glandulosis; pedicellis 1-2 poll. longis, interdum flexuosis. *Spiculæ* 3-4-floræ, glabriusculæ, 6-8 lin. longæ. *Glumæ* glabræ, margine inconspicue ciliatæ; inferior subacuta, membranacea, hyalina, 3 lin. longa, vix carinata, nervis 1-3 utrinque conspicuis;

superior similis, obtusiuscula, 4 lin. longa, carinata, utrinque 3-4-nervis. *Palea* glabræ vel apice hirsutiusculæ; inferior membranacea, convoluta, acuta, utrinque nervis 3 validis et 3 tenuioribus ante apicem desinentibus notata, ad basin, *more insolito, biappendiculata*; superior subæquilonga, bicarinata, fere obtusa, apicem versus longe ciliata. *Squamule* 3, magnæ, inæquales, duæ majores, lanceolatae, coloratæ, nervosæ, basi crassæ, apice fimbriatæ. *Stylus* cito bifidus.

This species is confined to Hong Kong. At page 434 of the 'Hongkong Flora.' Benthams states that he had inserted the plant on my authority. I then considered it to be *A. Wightiana*, having only seen a portion of a panicle collected by Wright. I have since seen much better specimens collected by Hance, and find that it is evidently quite a distinct species, for reasons already detailed in describing *A. Wightiana*. Hance's specimens indicate a distinct habit of growth—namely, nearly simple culms springing from a creeping root-stock, terminated by a single long panicle, or bearing large leaves only. Wright, however, mentions in a note that the culms were "branching at the nodes."

8. *A. FLORIBUNDA*, Thw. in Enum. Ceyl. Plants, 475. Paniculæ decompositæ, ramis plerumque adpressis, foliis 3-7 lin. latis, tessellatis; vaginis primum pilis longis hirsutis; spiculis 4-6-8-floris, pubescentibus.

*Hab.* Ceylon, Maturatte Dist! 5000 p. s. m., *Thwaites*, C. P. 2624! v. s.

*Culmi* ad nodos ramulosi, erecti, suffruticosi, 2-5-pedales, internodiis 2-4 poll. longis, apicibus pilis reversis hirsutissimis. *Folia* lanceolata, acuminatissima, glabra, margine serrata, nervis secundariis utroque latere 3-4, venulis transversis sat crebris et conspicuis tessellata, plus minus in petiolum basi sub-tumidum attenuata. *Vaginæ* striatæ, sæpe, et præsertim inferiores, pilis longis bulbosis hispidæ, tandem glabrescentes, margine sæpe coloratæ, apice ciliis longis plurimis fimbriatæ, ligula brevissima. *Panicula* in ramulis culmi terminalis, 4-6 poll. longa, ramis plerumque adpressis, rarissime sub-expansis, glabris, angulatis, in axillis parce glandulosis. *Spiculæ* in pedicellis inæqualibus (brevibus vel longis), 4-6-8 floræ, pollicares vel ultra, subsericeo pubescentes. *Glumæ* inæquales, acutæ, nervosæ, apice ciliatæ; inferior minor, 2 lin. longa. *Palea* inferior 3½ lin. longa, adpresse pubescens, nervosa, subulato-acuminata; superior subæquilonga, apice bicuspidata. *Squamule* 3, inæquales; 2 oblique-lanceolatae, basi coloratæ, nervosæ, margine ciliatæ; tertia angustior vix nervosa, ciliata. *Stylus* cito bifidus in stigmata 2 pulcherrime plumosa. *Fructus* maturus purpureus, 1¾ lin. longus, linearis, apice hirsutiusculus, residua styli bifidi basi coronatus.

This approaches very closely indeed to *A. Wightiana*, and has the same habit of growth. It is most easily distinguished by the generally adpressed branches of the panicle, and the much longer, almost silkily pubescent spiculæ, containing generally 6-8 flowers.

9. *A. GRIFFITHIANA*, Munro. Paniculæ ramis brevibus demum reflexis axillis hirsuto-glandulosis, pedicellis plerumque brevissimis; spiculis 5-6-floris, fere glabris; foliis membranaceis, tessellatis, setaceo longe acuminatis; internodiis culmi apice lanatis, nodis ipsis interdum spinosis et barbatis.

*Hab.* Ind. or. in mont. Khasia., Moflong! *Griffith*! (Assam Dep. no. 39), *Hooker*! v. s.

*Culmus* fistulosus, 4-6-pedalis, internodiis 2-5 poll. longis, striatis, sulcatis, apice fusco-lanatis, cæterum glabris; nodis prominulis, inferioribus sæpe verticillo spinarum cinctis; spathis internodia plus minus superantibus apiculo lanceolato sub 1 poll. longo terminatis, margine longe fimbriatis,



dorso glabriusculis vel basi hirsutis. *Ramuli* ad nodos semiverticillati, superiores (culmi) floriferi fere aphylli, inferiores foliiferi tantum. *Folia* membranacea, glabra, subtus pallidiora, margine tenui-serrata, lineari-lanceolata, longe setaceo-acuminata, basi attenuata, 2-6 poll. longa, 4-8 lin. lata, nervis secundariis utrinque 4-5, venulis transversis crebris elevatis tessellata. *Vagina* striatæ, dorso glabræ, apice ciliis fimbriatæ, ligula subbrevis extus hirsuta. *Panicula* in ramulis subternis (basi bracteis vel spathulis carinis hirsutissimis vaginatis) ad nodos fasciculatis vel aphyllis vel foliis cito deciduis terminalis, 3-4 poll. longa, ramis paucis brevibus (2-3-poll.) demum refractis, axillis hirsuto-glandulosis. *Spiculae* intra glumas pedicellatæ, in ramulis basi incrassatis paucae, plerumque brevissime pedicellatæ, 5-6-floræ, 1-1½ poll. longæ, angustæ, glabræ, rhachillæ fragilis articulis longis clavatis hirsutis. *Glumæ* acutæ, apice scabræ vel hirsutæ, inferior basi 5-nervis, superior longior (4-4½ lin.) 7-nervis. *Palea* inferior acuminatissima, mucrone caduco, 7-8 lin. longa, nervosa, glabra; superior subbrevior, bicarinata, bimucronata, carinis ciliatis. *Squamulæ* longe fimbriatæ, subæquales, vix venosæ. *Stamina* 3, antheris interdum apice pauci-setosis, connectivo vix elongato. *Stylus* cito bifidus. *Ovarium* lineari-oblongum, vix rostratum.

This species is quite unlike any other known to me, and is well distinguished by its woolly and occasionally prickly nodes. It is the only one, I believe, in the genus with spinous joints or the hairy points to the anthers described above, although these latter appendages are found in many other genera of Bambusaceæ. It appears to have been only once found in flower—namely, by the Assam Deputation for the examination of the Tea-plant, under Wallich and Griffith. There is a good specimen (leaves only) in the Kew Museum, No. 605, in which the prickly nodes can be very well seen; and some unusually large specimens of the nodes are also preserved in spirits. Hooker, in his 'Himalayan Journals,' vol. ii. p. 291, mentions a wood of "prickly Bamboo" near Moflung.

10. A. WALKERIANA, Munro. *Paniculæ* decompositæ, ramis adpressis, axillis inferioribus glandulosis, superioribus hirsutis; spiculis 3-4-floris, glabris; foliis crassis eximie tessellatis, marginibus cartilagineis fimbriatis; ramulorum sterilium vaginarum ciliis numerosis, plicatis.—*A. Wightiana*, Thw. in En. Pl. Zeyl. p. 444, non N. ab E.

*Hab.* Ceylon, *Mrs. Walker*, no. 96! 1304! *J. Watson*, 215!; Adam's Peak, *Thwaites*, 429!; Pedrotalagalla! *Thwaites*, 3860! v. s.

*Culmus* mihi ignotus, internodiis supremis 1½-2 poll. longis, glabris, ramulis plerumque 1-3, interdum plurimis ad nodos fasciculatis. *Folia* ovata acuta, utrinque eximie tessellata venulis transversis creberrimis, apice pungentia, basi rotundata, subito petiolata, 2-4 poll. longa, 5-8 lin. lata, glabra, subtus vix pallidiora, margine cartilagineo pilis longis ciliato, nervis secundariis utrinque 5-6. *Vagina* striatæ, glabræ, apice quasi subito transverse abscissæ, in ramulis (sterilibus præcipue), utrinque ciliis pallidis multis plicatis fimbriatæ, ligula brevi. *Panicula* decomposita, 4-5 poll. longa; ramis virgatis, angulatis, glaberrimis; axillis inferioribus glandulosis; superioribus hirsutis; pedicellis, nisi terminali longiore, spiculis brevioribus. *Spiculae* coloratæ, glabræ, 3-4-floræ, 10-12 lin. longæ, intra glumas breviter pedicellatæ, callo hirsuto, articulis rhachillæ compressis pubescentibus. *Glumæ* vix inæquales, apices versus margine ciliatæ; inferior vix acuta, nervo 1 valido et 4 inconspicuis; superior nervis 3 validis et 4 inconspicuis, acuminata vel fere obtusa. *Palea* inferior basi pilis stipata, 9-nervis, nervis plurimis ante apicem evanescentibus, glabra, oblonga acuta et ciliata; superior æqualis, apice obtuso vix bifida, subhirsuta, bicarinata, carinis superne ciliatis. *Squamulæ* 3, membranaceæ, obtusæ, nervis meandrinis basi nervosæ, margine ciliatæ, duæ majores. *Stylus* basi tumidus, in stigmata 2 lata compressa cito divisus. *Ovarium* apice constrictum.

The thickened cartilaginous margin of the leaves distinguishes this from all the species previously described. In this respect some of the species, of which the leaves only are known, approach it, and especially one which I have described as *A. densifolia*, and which, being, as it is, a native of Ceylon, may possibly be a peculiar state of this plant—although it appears to me to be well distinguished by its remarkably narrow small leaves, in which the tessellation is sometimes very indistinct.

\*\* *Folia venulis transversis nullis vel inconspicuis.*

11. *A. GLAUDESCENS*, P. de B. Agros. 144 & 152. “Spica terminali simplici, spiculave solitaria bipollicari nutante, 6–9-flora; foliis lanceolatis, basi truncatis, glaucis, brevibus vel subtus pubescentibus.”—R. et Sch. S. V. ii. 846; Nees, Agros. Bras. 526; Kth. l. c. 426; Rupr. l. c. 113, tab. i. fig. 3; Harsk. Cat. Hort. Bogor. 19; Steud. l. c. 334, et in Zoll. Cat. 56; Miquel, l. c. iii. 413. *Ludolfia glaucescens*, Willd. Mag. l. c. 320; Spreng. S. V. i. 328; Link. Hort. Berol. i. 248 & ii. 308. *Panicum glaucescens*, Lam. En. Méth. iv. 749. *P. arborescens*, Linn. (fide Nees), sed R. et Sch. l. *suprà* c. recte aiunt, *P. glaucescens* et *arborescens* Lam. et Hort. non Linn.! *Triglossum arundinaceum*, Fisch. et R. et Sch. l. c. 846. *Bambusa glauca*, Blume, teste Ruprecht, l. c. 160, in Indice, et Roem. et Sch. S. V. vii. 1355.

*Hab.* Ind. or.? China? In hortis Europæ et Javæ cult. s. v. Ruprecht.

“*Culmus* suffruticosus, 3–5-pedalis, ramulis dichotomo-fasciculatis. *Folia* in apice ramulorum confertissima sub 8-na, verticaliter disticha, ovato-lanceolata, 1–1½ poll. longa, 3 lin. lata, basi cordato-rotundata, glauca, inferne vel undique, imprimis subtus, albido-glauca, lævia vel brevissime puberula, nervis primariis 2, secundariis 7, margine scaberrima. *Vaginæ* striatæ, glabræ, ore fimbriatæ. *Spiculæ* solitariæ paucæve, nutantes, 2-poll., nitidæ, 6–9-floræ, basi vaginis seu bracteis nonnullis interdum laminigeris tectæ, glumis simillimis, flosculis dissitis, 5–6-linealibus, ovatis acutis, aliis dorso aliis lateribus compressis, articulis rhachillæ 2-lin., glabris. *Palea* superior inferiore subduplo brevior.”—*Ruprecht.*

I have never seen a specimen of this plant, but judging from description alone, cannot help believing that the plant is really a species of *Bambusa*, and probably identical with *B. nana*, Roxb., a plant introduced to the Botanic Gardens at Calcutta from China. *Bambusa glauca* of Loddiges and Blume is probably the same; and Roemer and Schultz, having seen specimens of *B. glauca*, sent to them by Blume himself, but without flowers, state that they cannot distinguish it from *Arundinaria glaucescens*, which they had been acquainted with for many years in gardens, but had never seen in flower. Link says it had only flowered once in cultivation. Lamarck says it had grown in the Paris Gardens for many years, but had never flowered. Ruprecht certainly says he had seen dried flowers, sent to him by Reichenbach, and figures two spiculæ; these are exactly like some spiculæ I have seen of *Bambusa nana*, Roxb., or *glauca* Blume, sent from the Gardens of Java, under the name of *Ischurochloa floribunda*. I am unable to understand Ruprecht's dissection of the spicula in the figure above quoted, as 3 ovaries are represented in one flower, and there is no explanation in the text of the figures. *Panicum arborescens*, Linn. Herb., quoted by Nees as a synonym, is a decided species of *Panicum*, the same as *P. notatum*, Retz.; but attached to the specimens in Linnæus's Herb. is a small piece of

*Phyllostachys bambusoides*. Fl. Zeyl. 43, also quoted by Nees, is *Panicum ovalifolium*, Poir. Thw. C. P. 889!

12. A. MACROSTACHYA, Nees in Linn. ix. 481. "Foliis lineari-lanceolatis subtus scabris, racemo terminali, spiculis 5-6 retrofractis, 4-5 poll. longis." Rupr. *l. c.* 113 tab. i. fig. 4; Steudel, *l. c.* 334.

*Hab.* In Brasilia, *Sellow*, s. v. Ruprecht.

"*Rami* graciles, scabriusculi, ad nodos ramoso-subdichotomi. *Folia* lineari-lanceolata, 2 poll. longa, 2½ lin. lata, basi rotundata, subtus scabra, sparse puberula, nervis primariis obsoletis, secundariis 15, interstitiis punctatis. *Vaginæ inferiores* dense pubescentes, ore tenuissime fimbriatæ. *Spiculæ* 5-6 in racemo terminali brevipedicellatæ, alternæ (inferiores quidquam geminæ), retrofractæ, longissimæ, 4-5-poll., coloratæ, nervosæ, sub 9-12-floræ, flosculis dissitis (inferiore quidquam inani et 1-paleaceo, *Nees*) 8 lin. longis articulo rhachillæ 5-lineali glabro insidentibus. *Glumæ* membranacæ, paleis multo breviores, ovatæ, mucronatæ. *Palea* superior inferiore fere duplo brevior." *Squamulæ* inæquales, apice fimbriatæ. *Ovarium* apice pubescens (teste icone).

13. A. DISTANS, Trin. in Act. Petr. *l. c.* 621 et icon 349. "Culmo scandente, foliis lineari-lanceolatis subtus glaucescentibus, spiculis 3-4 brevipedicellatis vel sessilibus in spicam terminalem dispositis, glumis fere obsoletis."—Rupr. *l. c.* 114, tab. ii. fig. 6; Steud. *l. c.* 335.

*Hab.* Brasiliam: in umbrosis montis Itacolumi, *Riedel*, s. v. Trinius et Ruprecht.

"*Culmus* altissimus scandens, basi diametro ½ poll., ramis filiformibus, internodiis plus minus palmaribus; ramulis 3-5, rarius solitariis, palmaribus—spithamæis, apice floriferis e nodis glabris erumpentibus, divaricatis vel recurvis. *Folia* e basi ovata lineari-lanceolata, 1-2½ poll. longa, 2-3 lin. lata, mucronulato-acutata, brevipetiolata, glabra, subtus glaucescentia et interdum scabriuscula, latere dimidio nitida, margine scaberrima, costa inferne tantum conspicua, nervis primariis obsoletis, secundariis in tota lamina 24-30. *Vaginæ* striatæ glabræ, margine ciliolatæ, ore fimbriatæ ciliis pluribus 1-2, linealibus, ligula brevissima. *Spiculæ* 3-4, sessiles vel brevipedicellatæ, in spicam terminalem dispositæ, 8-12 lin. longæ, coloratæ, 2-4-floræ, rhachilla glabra. *Glumæ* 2, pusillæ, vix nisi lentis ope conspicuæ, a flosculis remotæ, oblongæ acutiusculæ, enerves, inferior paulo brevior et angustior. *Palea* sæpe patentes, inferior acutissima, glabra, 7-nervis, superior paulo brevior (multo minor fide Ruprecht), apice obtuso bifida. *Squamulæ* 3, acutiusculæ, obsolete nervatæ, dense fimbriatæ. *Stamina* 3. *Stylus* cito bifidus. *Ovarium* lineari-oblongum, apice attenuatum. Rudimentum terminale nullum (fide Trin.)."

I have not seen any specimen of this; but from Trinius's drawing and the description, it evidently approaches very closely to *Arthrostylidium*.

14. A. VERTICILLATA, Nees in Agros. Bras. 523. Ramulis semiverticillatis, numerosis, nunc foliosis apice floriferis nunc aphyllis floriferis tantum, spiculis sæpe 2 poll. et ultra longis, in racemis 2-5, lineari-lanceolatis, 5-9-floris, foliis lanceolatis utrinque scabris.—Kunth, Rev. Gram. ii. 483, tab. 155, 156; Enum. i. 427: Rupr. *l. c.* 115, tab. 3. fig. 7: Trin. in Act. Petrop. *l. c.* 623: Steud. *l. c.* 335. *Ludolfia verticillata*, Dietr. Spec. ii. 25.

*Hab.* Brasiliam, *Sellow*!; Goyaz, *Burchell*, no. 6412! (specimina pulcherrima!), v. s.

*Culmus* 10–15-pedalis, inanis, fistulosus, lævigatus, nitidus, inferne diametro 2 lin., internodiis 6–11-poll. glaberrimis, apice sæpius laxè pendulus. *Ramuli*  $\frac{1}{3}$ –1 ped. et ultra longi, numerosi, usque ad 40, ad nodos glabros semiverticillati, superiores foliosi, apice floriferi, inferiores sæpe aphylli. *Folia* lineari-lanceolata, basi inæquilatera, rotundata vel subattenuata in petiolum brevem lutescentem, plerumque 3–4 poll. longa, 4–6 lin. lata, interdum, perpauca (ad apicem culmi), 7–8 poll. longa et 9 lin. lata, utrinque et margine scabra, subtus pallidiora, nervis secundariis 4–6 fere obsoletis, tertiariis 3–5. *Vaginæ* fere glabræ, superne nervosæ, ore ciliis fragilibus (apicibus cito caducis) fimbriatæ. *Panicula* terminalis depauperata, racemosa, sub 3-pollicaris, laxa, erecta vel nutans, spiculis 2–5 plerumque 3, rhachi pedicellisque (spiculis brevioribus) pubescenti-scabris. *Spiculæ* intra glumas longe stipitatæ, lineari-lanceolatæ,  $1\frac{1}{4}$ – $2\frac{1}{2}$  poll. longæ, pallide stramineæ, glabræ, 5–9-floræ, flosculis 1–3 terminalibus tabescentibus, rhachillæ articulis pubescentibus apice sericeo-barbatis. *Glumæ* inæquales, acuminatæ, flosculo inferiore 3–4-plo breviores, multinervosæ. *Palea* inferior herbacea, 6–8 lin. longa, lanceolata, subulato-acuminata, sub 13-nervis, nervis alternis tenuioribus et abbreviatis, colore glumarum; superior brevior vel fere æquilonga, apice obtusa, 8–10-nervis, carinis, præcipue basin versus, ciliatis. *Squamulæ* 3 inæquales (1 multo minor), lato-oblongæ, obtusæ, margine minute fimbriatæ, basi colorato-nervosæ et callosæ. *Stamina* 3, filamentis basi callosis, antheris longis demum exsertis. *Stylus* basi subbulbosus, et hirsutus, attenuatus et non longe supra basin in stigmata 2 (fide Nees 3) pulchre plumosa divisus. *Fructus* maturus 5-linearis, oblongus, (pericarpio inclusus, fide Kunth) au morbosus?, glaber, apice residua styli basi coronata.

This is the most beautiful of the whole genus; and the apparent structure of the fruit is quite unique. Burchell's fine specimens contain many fruits nearly ripe; and there is certainly an appearance of a pericarp, which, unless it is due to disease, I am unable to explain. The structure, however, is quite different from that of berry-bearing Bamboos. There is no beak enclosing the base of the style, which is decidedly articulate at the apex of the fruit. The scutellum and longitudinal sulcus are outwardly perceptible after long maceration. In very young specimens the base of the style is as conspicuously swollen as it is in *Bambusa tulda*. Burchell says it is called "Taquára mirim," and grows near rivulets in woods.

15. A. DEBILIS, Thwaites in Enum. Pl. Zeyl. 375. Foliis parvis, glabris, vel superne pilosis, nervis transversalibus, interdum, sed raro, quam minime conspicuis, panicula simplici, pedicellis plerumque brevissimis, axillis glandulosis, spiculis subglabris 3-floris, glumis longis.

*Hab.* Ceylon, Prov. Centr. 6000–8000 p. s. m., Thwaites, C. P. N. 1!; Dr. Maxwell!; Wight, no. 1348! Thomson! v. s.

*Culmi* valde elongati (2–5 lin. in diam. Thw.), internodiis 2–6 poll. longis, apice glabris vel pilis longis hispidis. *Folia* parva,  $1\frac{1}{2}$ –3 poll. longa, sub 3 lin. lata, lineari-lanceolata, pallida, margine uno vel utroque ciliata, apice acutissima, glabra vel superne pilosa (pilis longis), basi acutata vel subtruncata, nervis secundariis utrinque 2 sæpe inconspicuis, venulis transversalibus distantibus, quam minime conspicuis, sæpe obsoletis. *Vaginæ* glabræ vel plus minus hispidæ, ore ciliis 2–4 fimbriatæ, ligula brevi. *Paniculæ* subsimplices ramos paucifloros semiverticillatos terminantes, rhachi angulata, pedicellis plerumque brevissimis sæpe obcuneatis, axillis glandulosis. *Spiculæ* 3-floræ, sub 6 lin. longæ, rhachillæ articulis scabris, fere glabræ. *Glumæ* subacutæ, mucronatæ, 6–7-nerviæ, pilosulæ, inferior parum brevior, pallidæ vel coloratæ, superior paleam inferiorem subæquans. *Palea* inferior 7-nervis, mucronata, apice hirsutiuscula, superior apice acuminata, carinis fere glabris, longior. *Squamulæ* inæquales, angustæ, colorato-nervosæ. *Stylus* cito bifidus in stigmata 2 subpurpurea.

The foliage of this plant is used at Newera Ellia as a fodder for horses (*Thw.*). The length of the glumes at once distinguishes this from *A. distans*, which in some respects it approaches.

16. *A. ACUMINATA*, Munro. Foliis linearibus *angustissimis* glaucis, paniculæ subsimplicis ramis pedicellisquæ sæpissime gracilibus, spiculis sub 4-floris, pubescentibus, glumis *longissime setaceo-acuminatis*.

*Hab.* Mexico, Dep. Vera Cruz! *Leibmann*, no. 73! v. s.

“*Culmus* 12–20-pedalis, basi digito parum crassior” (*Lieb.*), vix fistulosus, internodiis (superioribus) 2–3 poll. longis, glabris vel superne pruinoso-glaucis, ramulis 3–5 poll. longis, ad nodos sub 3, fere omnibus proliferis, ultimis floriferis. *Folia* angustissima, 2–3½ poll. longa, vix lineam lata, glauca, basi vix attenuata, apice acutissima, margine serrulata, non raro subtus basin versus pilis longis hirsuta, cæterum glabra, nervis secundariis utrinque 1–2. *Vaginæ* profunde striatæ, subglabræ, ore ciliis brevissimis inconspicuis fimbriatæ, ligula brevi. *Panicula* subsimplex, ramis paucis tenuibus angulatis scabro-hirsutiusculis, pedicellis inæqualibus brevibus vel longis, axillis eglandulosis. *Spiculæ* 3–4-floræ, 8–10 lin. longæ, pubescentes, rhachillæ articulis apice sericeo-barbatis. *Glumæ* inæquales, nervosæ, *longissime setaceo-acuminatæ*, apice fimbriatæ; inferior 3-nervis; superior sub 5-nervis, 4½ lin. longa (acumine bilineali scabro incluso). *Palea* inferior semipollicaris, longe acuminata, 7-nervis, dorso hirsuto-pubescentis, (dempto acumine) superiorem fere enervosam obtusam inter carinas apice tantum hirsutam vix superans. *Squamulæ* subæquales, obovatæ, obtusæ, longe fimbriatæ. *Stylus* cito bifidus in stigmata 2 longa basi nuda apice pennata. *Ovarium* infra stylum constrictum.

I have seen only the upper portions of the stem of this plant. In the style of the inflorescence it approaches *A. debilis*, *Thw.*; but from this and all other species of the genus it is readily distinguished by its extremely narrow leaves and very long points to the glumes. In this latter respect it resembles several species of *Chusquea*.

17. *A. TRIANÆ*, Munro. Foliis lanceolatis subtus glaucis, venulis transversis nullis, vaginis sæpissime superne viscosis ore longe fimbriatis, paniculæ terminalis compositæ ramis sublongis demum refractis, spiculis *heterogeneis* 6–12-floris, glumis valde inæqualibus, inferiore minima.

*Hab.* N. Grenada, Andes de Bogota! Alt. 2800 p. s. m., *Triana*! v. s.

*Culmi* (pars superior tantum adest) internodiis 2–3 poll. longis glabris, ad nodos ramulos 1–2 sesquipedales gerentibus. *Folia* lanceolata, 4–5 poll. longa, 5–9 lin. lata, apice longe acuminata, basi inæquilatera, angustata in petiolum sublongum flavescens, tactu aspera, margine asperrima, subtus glauca, nervo centrali supra medium ægre discernendo, secundariis uno latere 2–3, altero 3–4. *Vaginæ* striatæ, sæpe (præsertim superiores) superne *viscidæ*, ore ciliis longis multis fimbriatæ, ligula vix ulla. *Panicula* bis terve composita, 4–5 poll. longa, *ramis inferioribus* 3 poll. longis, tandem *refractis*, rhachi glabra, pedicellis plerumque spicula brevioribus. *Spiculæ heterogeneæ* plurimæ, 4–6-floræ, flosculis omnibus bipaleaceis, sed sæpe masculis tantum, paucæ 8–12-floræ, flosculis omnibus, nisi supremis 2–3, tabescentibus, hermaphroditis, vel raro infimo masculo bipaleaceo, glabræ vel subviscosæ, articulis rhachillæ brevibus fere glabris. *Glumæ* inæquales, basi lutescentes, inferior minima 1-nervis, superior sub 5-nervis, 3 lin. longa, carinata. *Palea* inferior nervosa sub 7-nervis, mucrone brevissimo acuminata vel subobtusa, glabra nisi utrinque ad basin ubi pilis sublongis hirsuta; superior in flosculis masculis brevissima, in perfectis inferiorem æquans, bicarinata, carinis superne

tantum serratis. *Squamulæ* 3 æquales ovatæ obtusæ, apice fimbriatæ, hyalinæ. *Stamina* 3 filamentis brevibus. *Stylus* cito bifidus in stigmata 2 brevi-plumosa. *Ovarium* (immaturum) in stylum attenuatum.

In many respects, especially the heterogeneous spiculæ and the vanishing of the midrib of the leaves above the middle, this species approaches *Arthrostyloidium maculatum*, Rupr., affording another indication of the proximity of the two genera. However, the very long cilia to the vaginæ and short ligulæ at once distinguish this from Ruprecht's plant. M. Triana's specimens contain very few perfect spiculæ.

18. A. AMPLISSIMA, Nees in Linnæa, ix. 479. Foliis ovato-lanceolatis 2-3 poll. latis, venulis transversis nullis, panícula decomposita amplissima, spiculis 3-5-floris.—Rupr., *l. c.* 116, tab. i. fig. 11; Steud. *l. c.* 335.

*Hab.* in Brasilia, Sellow!; Organ Mnts., alt. 4000-5000 p. s. m., Gardner, 709! & 5911! v. s.

*Culmus* altus (*Rupr.*) 6-pedalis (*Gardner*) fistulosus, crassitie pennæ cygneæ, an ramosus? *Folia* ovato-lanceolata, crassa, 2-3 poll. lata, 6-8 poll. longa (ramulorum sterilium 2 poll. lata, 3 poll. longa, fide Rupr.), apice attenuata, basi rotundata, breviter petiolata, scabra, subtus glauca, densissime elevato-punctata, asperula, nervis secundariis utrinque 9-11, tertiariis 7-8, venulis transversis nullis. *Vaginæ* sulcato-striatæ, sæpe punctatæ, glabræ, ore ciliis longis rigidis flexuosis scabris fimbriatæ. *Panicula* terminalis decomposita, *sesquipedalis*, 9-11 poll. lata, amplissima, effusa, ramis *patentibus* vel divaricatis, rhachi glabra, axillis bulbosis, pedicellis longis. *Spiculæ* lanceolatæ, 5-6 lin. longæ, compressiusculæ, chartaceæ, fusco-griseæ vel pallidæ, 3-5-floræ, flosculis acutiusculis nervosis glabris vel sub lente hirsutiusculis, rhachillæ articulis glabris. *Glumæ* lanceolatæ acutæ, inæquales; inferior duplo minor, 1-nervis; superior sub 5-nervis, spicula duplo brevior. *Paleæ* subæquales, fere glabræ, inferior vix acuta, nervis 5-7 inconspicuis; superior obtusa, bicarinata. *Squamulæ* subæquales, lanceolatæ, acutiusculæ vel obtusæ, membranaceæ, longe fimbriatæ, dorso pubescentes. *Stylus* cito bifidus in stigmata 2 (3, fide Rupr.) basi nuda apice brevi-plumosa. *Ovarium* oblongum in stylum subito attenuatum.

The specimens which I have seen of this species contain each a panicle with 1 or 2 leaves, and therefore give no information as to the habit of the plant. Gardner says that it grows 6 feet high, and is found in the virgin forest and in moist rocky places. Ruprecht describes and figures the style as trifid, and the squamulæ quite smooth; but in the specimens which I have examined, including one from Sellow, the style is decidedly bifid, and the squamulæ are much fringed.

Section II. *Culmi foliiferi et floriferi distincti, quotannis florigerentes, hieme necati, vere e surculis progerminant.*

19. A. FALCATA, Nees in Linnæa ix. 478. Culmo florente aphylo, ramulis simplicibus vel compositis, semper gracilibus, ad nodos semiverticillatis, racemulis ultimis falcatis, spiculis 2-4-floris plus minus longe pedicellatis, glumis nervosis superiore flosculum infimum subæquante, foliis angustis subtus circa costam pilosis, venulis transversis nullis.—Rupr. *l. c.* 115, tab. iii. fig. 8; Steud. *l. c.* 335; *A. interrupta*, Trin. in Act. Petr. *l. c.* 620; *A. utilis*, Cleghorn, in Journ. Agr. Soc. of India, xiii. 388 (1865); *Ludolfia falcata*, Nees. Quoad inflorescentiam variat  $\alpha$ . ramulis floriferis fere simplicibus falcatis,  $\beta$ . ramulis floriferis proliferis compositis interdum valde elongatis.

*Hab.* in Himalaya et Nepalia: var. *a.* Nepal! *Wallich*; Mussoorie! *Falconer*! *Royle*, no. 315!; Nynce Tal., alt. 5000-7500 p. s. m., *Strachey* 477!; Dalhousie, in Chumba, Him., *Pinwell* 279! Var. *β.* Nepal, Cheesapong! *Wallich*, *Cat.* 5035!; Mussoorie, *Falconer*!; Kedarkanta, *Falconer*!, *Munro*! In summa valle Jumnae, *Jacquemont* 790! N.W. India!, *Royle in Herb. Hook.*! Folia tantum, Landour! *Thomson*; Nynce Tal, *Thomson*, 1020! in montibus Khasia; Nurtiung, *Hooker*!; Sariong (var. ramulis foliiferis pendulis), *Thomson*! Kew et Cork cult., vide *supra*, p. 10. "Nigala" incolis, fide *Royle et Cleghorn*; "Prong," fide *Thomson*. V. v. et s.

*Culmus* 6-10-pedalis (in cult. 16-20, teste *Moore, l. c.*), quotannis e surculis oriens, basi 2-3 lin. diametro, spathis striatis glabris subsemipedalibus apiculo unciali, internodio infimo brevissimo 3-5 lin. longo tomentoso-barbulato, 2-3 sequentibus 1-2 poll., supremis 4-5 poll. longis, nodis (in eodem culmo) hirsutis vel glabris; in florente culmo ramulis numerosis filiformibus basi brevi-bracteatis, primum simplicibus 2-3 poll., deinde proliferis compositis sæpe sesquipedalibus; in foliifero ramulis filiformibus plerumque proliferis, ad nodos semiverticillatis. *Folia* angusta, 2-3 vel raro 4-6 lin. lata, 3-4-6 poll. longa, apice setaceo-acuminata, basi in petiolum attenuata, glaucescenti-viridia, glabra, nisi *subtus circa costam* ubi pilosa sunt, nervis secundariis utrinque 3-4, venulis transversis nullis. *Vagina* striata, inferiores usque ad basin soluta, superne purpurascens vel pallida, pilis longis sæpe hirsuta, apice ciliis perpaucis cito deciduis, raro fimbriata, ligula elongata. *Panicula* falcata, (in var. *a.*) basi bracteata, longe pedunculata, spiculis 4-7 plus minus longe pedicellatis, simpliciter racemosa, axillis sæpe pilosis; in var. *β.* racemis brevioribus, spiculis 3-4 (nisi terminali), brevi-pedicellatis. *Spicula* intra glumas sessiles, 6-8 lin. longæ, 2-4-floræ, plerumque flosculis 2 perfectis cum rudimento tertii, articulis rhachillæ obcuneatis sub lente tantum pubescentibus, flosculis fere dimidio brevioribus. *Glumæ* membranaceæ, inæquales, nervosæ, apice ciliata; inferior minor, 1-3-5-nervis, acuminata, sæpe toto margine fimbriata; superior 7-9-nervis, vix acuta, flosculum infimum fere æquans. *Paleæ* sub lente scaberulæ; inferior nervosa, 7-9-nervis, acutiuscula, membranacea, apice hirsuta; superior subæqualis vel raro longior, apice vel acuto vel bifido, bicarinata, et utrinque præterea binervis. *Squamulæ* 3, æquales, obtusæ, ovata, fimbriata et nervosæ. *Stamina* 3, antheris demum exsertis, filamentis sæpe explanatis. *Stylus* in stigmata 2 a basi longe plumosa cito bifidus. *Ovarium* lineari-oblongum in stylum attenuatum.

This is an extremely variable plant; and it is only after the examination of numerous specimens, collected at different periods of the year and in all stages of intermediate variation, that I feel persuaded I am right in placing them all in one species. When first the plant appears in the spring, the branches of the flowering stem are nearly simple, bearing at the nodes longish racemes, with a few short bractæ at their base, the whole inflorescence not exceeding 5 or 6 inches in breadth. As the season advances, many of these simple branches become proliferous, and are often 1 foot and a half in length, bearing at all their nodes 3 or 4 racemes much shorter than those first produced. At last the inflorescence becomes very much branched, and presents an appearance totally unlike that seen in the young shoots; and this compound form is the state represented by *Wallich's* No. 5035! collected in December 1820. *Trinius* described his *A. interrupta* from specimens preserved in the British Museum, collected by *Wallich* in the earlier part of the previous year; but, shortly before *Trinius's* paper appeared, *Nees* described the plant, from some of *Royle's* specimens, as *A. falcata*. Speaking of this plant, *Royle*, in his 'Illustrations of the Botany of the Himalayas,' says, "One of the Bamboo tribe, which in the hills is used for the same purposes as the bamboos in the plains, is found commonly at elevations from 7500 to 10,000 feet; its annual stems are yearly beaten down by the

falls of snow, which protect its perennial roots from excessive frost. This does not, however, belong to the genus *Bambusa*, but is nearly allied to *Chusquea* of Humboldt, found in the cold mountains of Quito and Santa Fe de Bogota." This plant has an extensive range in the Himalayas, as will be seen from the various localities quoted above. Falconer's herbarium contains numerous specimens of it in various stages of growth; and it may therefore be the plant he intended as "*Thamnocalamus*," and not the one which I have described as a genus under that name. This species approaches very closely to *A. Khasiana*, which is best distinguished from it by having leaves quite smooth below, and by the violet colour of the stem and branches, whilst in *A. falcata* the whole plant has a pale yellowish hue, except in the young spiculæ and vaginæ, which are occasionally purplish.

20. *A. KHASIANA*, Munro. Culmo florente aphylo; ramulis plerumque compositis, longis, sæpe  $1\frac{1}{2}$ -2-pedalibus, validis; spiculis, nisi terminali, brevi-pedicellatis, 2-3-floris, glumis nervosis flosculo inferiore multo brevioribus; foliis angustis, subtus glaberrimis.

*Hab.* Khasia, Chillong, alt. 5800 p. s. m., *Griffith*, no. 1058!; Churra! Syong, no. 1466!; alt. 5700 ped., *Hooker*!; Assam 1089! *Masters*. "Namlang" incolis, fide *Hooker*, v. s.

"*Culmus inermis, gracilis, 8-12-pedalis*" *Griff.*), internodiis valde variabilibus, 2-6 poll. longis, in florente juvenili approximativis, ramulis foliiferis violascentibus. *Folia* subtus glaberrima viridia, ceteroquin ut in *A. falcata*. *Vaginæ* pallidæ, plerumque glaberrimæ, apice eimbriatæ, ligula sæpe elongata obtusa. *Panicula* falcata, ramosa, semper brevis,  $1\frac{1}{2}$ -3 poll. longa, basi bracteata, multæ circa nodos culmi vel ramulorum proliferorum dense aggregatæ, spiculis 5-7, pedicellis omnibus, nisi terminali, brevibus, crassis, infimis 1-2 fere obsolete (spiculæ sessilibus). *Spiculæ* 2-3-floræ, sæpe nigrescentes, articulis brevibus albo hirsutis. *Glumæ* inæquales, apice fimbriatæ; inferior minor, membranacea; superior 5-7-9-nervis, apice brevissime mucronata, dimidium flosculi infimi nunquam attingens. *Palea* inferior nervosa, nervis 7-9 validis, apice brevissime mucronata, margine ciliata et lateribus interdum pubescens; superior fere semper multo longior, carinata, dorso subscabra. *Squamula* basi coloratæ, nervosæ, apice longe fimbriatæ, obtusæ vel subacutæ. *Stylus* in stigmata 2 vix longe plumosa cito bifidus, interdum crure uno iterum divisus. *Ovarium* lineari-oblongum, basi attenuatum.

As already stated above, this species is very closely allied to *A. falcata*; but it has always a different look. The leaves are invariably glabrous below; the glumes are also much shorter than in *A. falcata*, as also are the spiculæ and pedicels. The branches of the panicle are much denser and more imbricated; and the plant appears to be of stronger growth generally. The specimens which I have seen were collected in August and October; and therefore, having never seen young states of the plant, I do not know whether the branches are ever simple, as they are in the early growths of *A. falcata*.

21. *A. INTERMEDIA*, Munro. Culmo florente aphylo?, ramulis inferioribus compositis basi longe nudis, superioribus fere sessilibus, paniculis sæpe compositis, longis, plerumque erectis, spiculis 3-5-floris, glabris, foliis lanceolato-linearibus, supra scabris, 6-12 lin. latis, venulis transversis subtus plus minus conspicuis, petiolo supra hirsuto.

*Hab.* Sikkim! alt. 7000-8000 ped. s. m., *Hooker*, v. s.

*Culmus* 6-8-pedalis?, eximie fistulosus, pallidus, internodiis sæpe semipedalibus, nodis hirsutis vel subglabris, ramulis foliiferis floriferisque, inferioribus 1-3-pedalibus, 2-4-nodosis, floriferis supremis



sæpe brevibus, 2-5 poll. longis. *Folia* lineari-lanceolata, 6-12 lin. lata, 4-6 poll. longa, subtus pallida et sæpe basin versus ad costam pilosa, supra vel utrinque scabra, apice acuta, basi attenuata in petiolum, vel supra tantum vel supra subtusque scabro-hirsutum, nervis secundariis utroque latere 3-5-7 venulis transversis subtus plus minus conspicuis, distantibus. *Vaginæ* sulcatæ, glabræ, apice sæpe biauriculatæ et ciliis plus minus longis fimbriatæ, ciliis caducis demum quasi efimbriatæ, infra petiolum membrana ciliata terminatæ, ligula conspicue elongata obtusa. *Paniculæ* plerumque compositæ, rarissime apicem culmi versus simpliciter racemosæ, sæpe 5-pollicares, ad nodos culmi vel ramulorum dense semiverticillatæ, basi bracteis hyalinis membranaceis bracteata, sæpissime erectæ, adpressæ et plerumque internodia superantes, axillis barbatis, pedicellis spiculis brevioribus. *Spiculæ* 7-12 lin. longæ, basi flavæ, apice coloratæ, 3-5-floræ, rhachillæ articulis longis hirsutis apice fimbriatis. *Glumæ* nervosæ, pallidæ, membranaceæ, vix acutæ, apice ciliatæ; inferior 7-nervis (an semper?); superior longior, basi 7-9-nervis, apice hirsuta. *Palea* inferior nervis 7-9 conspicuis notata, glumam superiorem duplo superans, apice vix acuta et hirsutiuscula; superior sæpe longior, bimucronata, apice tenui-ciliata, inter carinas binervosa. *Squamulæ* 3, basi subcallosæ, perspicue colorato-venosæ, apice ciliatæ. *Stylus* cito bifidus. *Ovarium* lineari-oblongum, medio subtumescens, apice coloratum.

In foliage this approaches *A. Hookeriana*, and in the structure of the spiculæ *A. falcata* and *A. Khasiana*; it is, however, quite distinct from all three, and when in flower is readily distinguished by its generally adpressed and often compound racemes. Dr. Hooker appears to have only once collected the plant in flower, and the specimens I have seen are consequently all from one flowering and one leaf-bearing culm.

22. *A. HOOKERIANA*, Munro. Culmo florente aphylo, ramulis superioribus subsimplicibus, inferioribus proliferis, spiculis fere semper sesquifloris, perspicue 3-5-carinatis, interstitiis hirsutis, foliis lineari-lanceolatis, sub 6 lin. latis, venulis transversis subtus vix conspicuis.

*Hab.* Sikkim, alt. 4000-6800 ped. s. m., Yoksun!, "Praong" incolis, *Hooker*, v. s.

*Culmus* 12-15-pedalis, gracilis, fistulosus, diametro interdum 5-6 lin., internodiis 2-6 poll. et ultra longis, ramulis floriferis basi bracteatis, supremis (culmi) brevibus 2-3 poll., inferioribus proliferis pedalis et ultra, nodis hirsutis vel raro subglabris. *Folia* (dubia) lineari-lanceolata, 4-6-10 lin. lata, 5-6 poll. longa, glaucescentia, utrinque glabra, vel raro subtus basin versus hirsuta, apice acuminata, basi subito attenuata in petiolum brevem, nervis secundariis 3-4 cum venulis transversis subtus inconspicuis. *Vaginæ* striatæ, glabræ, apice efimbriatæ, ligula elongata conspicua sæpe colorata. *Panicula* basi bracteata, simplex, subfalcata, spiculis 6-10, pedicellis plerumque longis, multæ ad nodos culmi vel ramulorum dense fasciculatæ. *Spiculæ* typice sesquiflora, rarissime flosculis duobus perfectis, sub 4 lin. longa, intra glumas sessilis callo hirsuto, dorso perspicue 1-5-carinata. *Glumæ* pallidæ, membranaceæ, inconspicue nervosæ, inferior 3-5, superior 5-7-nervis, nervo centrali interdum subconspicuo. *Palea* inferior involvens, crassa, nervo centrali et 2-4 lateralibus demum nitidis, 3-5-costata, interstitiis hirsutis; superior æquilonga, apice hirsuta, profunde sulcata. *Squamulæ* æquales, oblongæ, magnæ, basi callosæ et colorato-venosæ, apice longe ciliatæ. *Ovarium* breve, in stylum cito bifidum attenuatum. "*Fructus* longus, coloratus, oryzæ similis, edulis," *Hooker*.

In many respects this approaches *A. falcata*; but the peculiar angled or ribbed spiculæ distinguish it from all other species. These angles often become much polished, whilst the spaces between are hirsute. Unfortunately there are no leaves attached to the flowering specimens; and my only authority for the foliage are some leaves collected at "Yoksun" in Sikkim, and marked "Praong" by Dr. Hooker. In the 'Himalayan

Journals,' Dr. Hooker states that he found a plant of "Praong" at the top of the pass above "Neongong," at an elevation of 6800 feet, in full seed; and adds, "The 'Praong' sends up many flowering branches, and but few leaf-bearing ones from the roots; and after maturing its seed, and giving off suckers from the root, the parent plant dies. The fruit is boiled, and made into cakes or into beer."

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ARUNDINARIÆ cognitæ steriles (*foliifera tantum*), igiturque, quoad genus, dubiæ.

\* Folia supra subtusque perspicue tessellata, venulis transversis creberrimis, interstitiis in *A. callosa* et *A. Hindsii* oblongis, in reliquis fere quadratis.

23. *A. CALLOSA*, Munro. Foliis lineari-lanceolatis, 8-12-17 lin. latis, 8-9 poll. longis, margine membranaceo, venulis transversis subdistantibus, *petiolo* basi *calloso*.

*Hab.* Himalaya in montibus Khasia, Moflong! alt. 6000 ped. s. m. ("prickly-jointed Bamboo"); Myrung, alt. 5650 ped., no. 1504! "Uskong" incolis, *Hooker*, v. s.

*Culmus* "12-pedalis," internodiis apices versus interdum "spinoso barbatus" (*Hooker*), plerumque tandem flavo-hirsutis, nodis prominulis glaberrimis. *Folia* lineari-lanceolata apice longe acuminata, basi subcuneata et attenuata in petiolum flavescentem ima basi *callosum*, subtus pilosa vel glabra, subconcoloria, nervis secundariis utrinque 6 conspicuis, venulis transversis crebris elevatis, interstitiis oblongis. *Vaginæ* apices versus dense fusco hirsutæ, inferne subglabræ, membrana brevissima ciliata terminatæ, non auriculatæ sed utrinque ciliis sublongis fimbriatæ, ligula brevi.

The long leaves, with the secondary nerves very strongly marked, distinguish this at once from all the species of *Arundinaria*, of which the leaves only are known. In *Herb. Hooker.* this is marked as "prickly-jointed Bamboo," and it is added that "some of the bearded nodes are preserved in bottles in the Kew Museum." I have already, at p. 21, referred to these curious nodes; but it is possible that they may belong to this species instead of to *A. Griffithiana* as I suppose, although I cannot, in any of the dried specimens, discover traces of any spinous processes, whereas in *A. Griffithiana* they are often to be found.

24. *A. HIRSUTA*, Munro. Foliis lanceolatis, 4-10 vel raro 14 lin. latis, 2-6 poll. longis, margine cartilagineo, subtus pallidis hirsutis vel demum glabrescentibus, vaginis plerumque hirsutis, apice auriculis reversis biappendiculatis.

*Hab.* Himalaya, in montibus Khasia, Myrung! alt. 5600 p. s. m. "apud saxa," *Griffith*; Syong! 5700 p., Moflong! 6000 p. "in sylvis, humilis culmis spinosis," *Hooker*, v. s.

*Culmus* 2-4-pedalis, "fastigiatus ramosus spinosus" (*Hooker*), internodiis sub 2 poll. longis, sæpissime (et præcipue apices versus) strigoso-hirsutis, nodis ipsis glabris. *Folia* lanceolata, plerumque 2-4 poll. longa et 4-7 lin. lata (interdum majora sunt usque ad 14 lin. lata et 6 poll. longa), acutissima, basi attenuata in petiolum brevem et latum, margine cartilagineo longe fimbriato, subtus pallida et sæpe pilis longis hirsuta, nervis secundariis utrinque 4-6, venulis transversis creberrimis, interstitiis quadratis. *Vaginæ* sulcatæ, superne pilis longis hirsutæ vel hirsutissimæ, raro demum glabrescentes,

apice membrana pilis interdum rigidis vel etiam spinescentibus ciliata terminatæ lateribusque auriculis duabus reversis conspicuis et ciliis subrigidis longe fimbriatis appendiculatæ, ligula elongata sæpe nigrescente.

In the dried state many of the leaves of this species assume a reddish hue on the upper surface. The specimens from Moffong are marked by Hooker as having "spinous stems." The cilia terminating the membrane below the petiole, as well as those fringing the auricles, occasionally become much elongated and stiffened; but these could scarcely be called spinous, and in the numerous dried specimens I have had access to I can find nothing approaching to spines or likely to become so under any circumstances.

25. *A. TESSELLATA*, Munro. Foliis lineari-lanceolatis, 5-9 lin. latis, 2-5 poll. longis, margine membranaceo setuloso-ciliato, utrinque pallidis et glabris, vaginis dorso glabris, apice ciliis pallidis fimbriatis, ligula elongata fimbriata.—*Nastus tessellatus*, Nees, Fl. Afr. Aust. 463; Steud. Syn. 333.

*Hab.* in Africa austr. Zeyher! "In monte Winterberg (terræ Caffrorum) alt. 5000-6500 p. s. m., Ecklon; "in monte Katberg, alt. 500 p.," Drège! v. s.

"*Arborescens*, in humidis 15-20-, in siccioribus 5-10-pedalis," culmo fistuloso, "internodiis 1½ poll. longis." *Folia* lineari-lanceolata, glabra, acuminata, basi rotundata vel attenuata in petiolum brevem subhirsutum, nervis secundariis utrinque 3 subinconspicuis, venulis transversis creberrimis, areolis depressis subquadratis. *Vagina* pallidæ, striatæ, margine superius et circa os ciliatæ, ligula plerumque elongata (brevi, fide Nees) truncata et ciliata.

This plant appears to be widely dispersed in the extreme south of Africa; and a whole range or district is called "Bambusbergen," apparently after it. It has also a remarkable and unusual range of elevation, from 500 to 6500 feet above the sea. Unfortunately, however, Drège's remark still holds good, "nunquam cum flore aut fructu a nobis inventa est." I have therefore no authority for placing the plant in *Arundinaria* except the very great resemblance it bears in habit and general appearance to that genus, and especially to *A. macrosperma*, from which it is principally distinguished by its glabrous leaves and elongated ligule. Nees, to a certain extent, confirms my opinion when, in describing this plant, he says, "Monendum tamen *Chusqueæ* habitum præ se ferre hoc gramen."

26. *A. HINDSII*, Munro. Foliis angusti-lineari-lanceolatis, 4-5 lin. latis, 3-6 poll. longis, coloratis, margine subcartilagineo vel lævi vel brevissime serrulato, vaginis demum glabris, utrinque ciliis paucis, 4-5, fimbriatis.

*Hab.* Hongkong! Hinds (1841) in *Herb. Bentham*, v. s.

*Culmus* (pars superior, 1½-pedalis, tantum adest) fistulosus, ramosus, internodiis 2-3 poll. longis, glaberrimis, ramulis 2-3, subsemipedalibus, ad nodos subprominulos fasciculatis. *Folia* angusta, setaceo-acuminata, basi attenuata in petiolum glabrum striatum, utrinque glabra, subconcoloria, nervis secundariis utrinque 3, venulis transversis crebris elevatis, interstitiis oblique oblongis. *Vagina* striatæ, coloratæ, marginibus tenuissime ciliatis vel glabris, apice ciliis paucis sublongis fimbriatæ, ligula inconspicua dorso hirsuta.

I have seen only one specimen of this, collected by Hinds; and it seems curious that so conspicuous a plant should not have attracted the attention of other collectors. The very narrow, dark-coloured, conspicuously tessellated leaves at once distinguish it from *A. longiramea*, the only other species of *Arundinaria* which I have seen from Hongkong. It does not closely resemble any *Arundinaria* I am acquainted with.

27. *A. DENSIFOLIA*, Munro. Foliis sessilibus, lanceolatis, spinoso-acuminatis, densis, brevibus, 1-4 lin. latis,  $\frac{1}{2}$ -1 $\frac{1}{2}$  poll. longis, margine cartilagineo pulchre fimbriato, utrinque glabris, vaginis striatis, interstitiis hirsutis, apice efimbriatis.

*Hab.* Ceylon, *Watson*, no. 25! *Dr. Maxwell!*; Pedrotalagalla (in paludosis), *Thomson!* v. s.

*Culmus*  $\frac{1}{2}$ -3-pedalis, internodiis numerosis subsesquipollicaribus, spathis coloratis dorso hirsutis superatus, ramulis virgatis, 5-8, brevibus, ad nodos glabros, fastigiatis. *Folia* dense imbricata, interdum brevissima, 5 lin. longa, maxima 1 $\frac{1}{2}$  poll. longa, acumine pungente scabro terminata, crassa, nervis secundariis inconspicuis, venulis transversis sat crebris, interstitiis impressis subquadratis, interdum, nisi folia madida sint, hæ venulæ occultæ sunt. *Vaginæ* breves, striatæ, interstitiis pilis sublongis hirsutæ, apice efimbriatæ vel brevissime ciliatæ, ligula inconspicua.

This may possibly be a peculiar state of *A. Walkeriana*, as I have already suggested in describing that species at p. 22. I think, however, that the absence of cilia (which are generally more conspicuous in young than in old states of Bamboo), the extremely small leaves with such very long points, the absence of any distinct secondary nerves, and the occasionally obscure tessellation of the leaves, afford good marks of distinction.

28. *A. MICROPHYLLA*, Munro. Foliis parvis, lineari-lanceolatis vel fere lanceolatis, 1-2 lin. latis, sub 1 poll. longis, *brevimucronatis*, margine submembranaceo fimbriato vel glabro, vaginis striatis subhirsutis apice longe fimbriatis.—*Bambusa microphylla*, Griffith, Jour. i. 242, 259 et alibi (nomen tantum).

*Hab.* Bootan, Sanah, alt. 7000 p. s. m., no. 623!, aliisque locis ad alt. 6000-10,000 p., *Griffith*, v. s.

*Culmus* 2-4-pedalis, cæspitosus, internodiis 2-3 poll. longis, glaberrimis, ramulis ad nodos crebris semiverticillatis. *Folia* angusta, membranacea, lineari-lanceolata, acuta, subtus pilis longis hirsuta vel plerumque glabra, nervis secundariis utrinque 2 vix conspicuis, venulis transversis crebris vix elevatis. *Vaginæ* sæpe coloratæ, superne hirsutæ, apice ciliis longis fimbriatæ, ligula subinconspicua.

Griffith, in his account of his journey from Assam to Bootan, constantly refers to this plant as growing at considerable elevations, and "forming large patches in wet places." In describing the vegetation of the Dhonglaila Pass, he says, "the sward commences at 10,000 feet, and is common at 9500, where it is principally clothed with the *Bambusa microphylla*." This and the preceding species have the smallest leaves of all the Bamboos I am acquainted with.

\*\* *Folia* subtus vix distincte tessellata, venulis transversis paucis distantibus vel subobsoletis.

29. *A. SUBERECTA*, Munro. Foliis lanceolato-linearibus, angustis, sub 3 lin. latis, 2-3 poll. longis, utrinque glabris, venulis transversis quam minime conspicuis, vaginis striatis, glabris, apice longe fimbriatis et sæpe biauriculatis.

*Hab.* In Himalaya, in montibus Khasiæ, Moosmai-Churra, alt. 4000 p. s. m., *Griffith*, no. 558!; Kalapaneë, alt. 4500 p. s. m., *Hooker*, no. 1407! v. s.

*Culmus* "10-15-pedalis, suberectus, nutans," vix fistulosus, internodiis glaberrimis 4-6 poll. longis, ramulis proliferis 5-9 poll. longis ad nodos glabros fasciculatis. *Folia* angusta, subsetaceo-acuminata, basi attenuata, margine uno alterove brevissime serrata, concoloria, nervis secundariis utrinque 3-4, venulis transversis distantibus, vix elevatis, interdum ægre discernendis. *Vaginæ* striatæ, usque ad basin solutæ, glabræ, membrana brevissime ciliata terminatæ, apice longe fimbriatæ vel interdum biauriculatæ, ligula conspicua sat brevi.

This approaches *A. falcata* and *A. Khasiana* in the form and size of the leaves, but it is distinguished from both by the fringe at the top of the vaginæ and the presence of transverse veinlets on the lower surface of the leaves; in this latter respect it approaches *A. Hookeriana*, of which, however, I can scarcely believe it to be a narrow-leaved state. *Griffith* certainly mentions that he found it growing on the banks of the Moosmai waterfall; and it is well known that plants growing in such situations often assume peculiar forms.

A. SPATHIFLORA, Trin. = *Thamnocalamus spathiflorus*, Munro.

A. STOLONIFERA, Kurz, e "China et Japonia," in Cat. of Plants in Bot. Garden, Calcutta (1865), = *Bambusa puberula*, Miq., fide Miquel in Ann. Mus. Bot. Lugd. Batav. ii. 285, = *Phyllostachys nigra*, Munro, vide p. 38 seq.

## II. THAMNOCALAMUS.

Falconer, MS. (nomen tantum) in herb. Hooker. et herb. Strachey.

*Spicula sursum imperfecta*, 1½-8-flora, in racemo simplici *spatha vel bractea longissima involucreto*, brevipedicellata. *Glumæ* acutæ, paucinerviæ, spiculis suis vix ½ breviores. *Palea* inferior acuta vel longe acuminata, supremam vel æquans vel longe superans. *Squamulæ* 3 fimbriatæ. *Stylus* cito supra basin trifidus. *Caryopsis* linearis vel lagenæformis.

Cæteroquin quoad spiculas ut in *Arundinaria*.

Gramina Himalayana, culmo plerumque tereti suffruticoso vel fere arborescente, nodis vix prominulis. *Folia* parva vel *inconspicue* vel *conspicue tessellata*, vaginis fimbriatis vel efimbriatis. Inflorescentia *panicula* maxima *decomposita* laxa, ramis gracilibus longis multinodis, ramulis ultimis, ad nodos, racemos 1-4 subsessiles, *spatha ipsis multo longiore velatis*, gerentibus. Interdum in *T. Falconeri* racemi intra spatham basi *multibracteati*, et rarissime circa nodos ramorum dense fasciculati sunt.

The structure of the spicula in this genus is so very similar to that of *Arundinaria*, that I should not have separated the two following species from that genus had I not been persuaded that so excellent a botanist as the late Dr. Falconer must have had good reasons for separating the genus *Thamnocalamus*. Unfortunately I can find no definition of the genus by Dr. F., nor any specimen in flower of either species in his herbarium; but, as I have already stated, it contains numerous specimens, in all stages of growth, of *Arundinaria falcata*, which may therefore be the plant he intended as *Thamnocalamus*. It appears to me that this genus can only be well distinguished from *Arundinaria* by its inflorescence, as described above. The spathes, which sometimes have a foliaceous appendage, are remarkably persistent in *T. spathiflorus*, but much sooner caducous in *T. Falconeri*.

*Conspectus Specierum.*

Folia inconspicue tessellata, vaginis efimbriatis.

Spicula fere semper  $1\frac{1}{2}$ -flora . . . . . 1. *T. Falconeri*.

Folia conspicue tessellata, vaginis sæpe fimbriatis.

Spicula 4-8-flora . . . . . 2. *T. spathiflorus*.

1. *T. FALCONERI*, Hook. fil. MS. Foliis, subtus tantum inconspicue tessellatis, in petiolum sublongum supra sulcatum attenuatis; spiculis glabris, fere semper  $1\frac{1}{2}$ -floris, in racemo 5-7.—*Bambusoides*, Wall. Cat. 5040! *Bambusa floribunda*, Munro, in herb. Trin. Coll. Dublin.

*Hab.* In Himalaya: Nipal! *Wallich*; Kumaon, Madhari Pass! alt. 8000 ped. s. m., *Strachey et Winterbottom*. v. s.

*Culmus* suffruticosus, excelsus, fistulosus, internodiis 4-8 poll. longis glaberrimis, ramulis fere filiformibus sed validis, subsemipedalibus, plurimis ad nodos fasciculatis. *Folia* angusta, tenuia, pallida, 3-6 lin. lata, 3-4 poll. longa, petiolata, apice subsetaceo-acuminata, supra striata, subtus utrinque nervis secundariis 2-3, venulis transversis distantibus quam minime conspicuis tessellata. *Vaginæ* glabræ, apice quasi subito abscissæ, efimbriatæ, ligula elongata dorso subhirsuta. *Inflorescentia* omnino generis, ramis primariis pedibus et ultra, racemis brevibus 10-12 lin. longis, spiculis 3-4 lin. longis, glabris, 5-7, brevissime pedicellatis, fere semper sesquifloris, rarissime  $2\frac{1}{2}$ -floris. Hi racemi, intra spathas sub  $1\frac{1}{2}$  poll. longas sæpe cito deciduas, plerumque basi multibracteati, bracteis extremis brevibus gradatim incrementibus; interdum ad nodos ramorum racemi dense fasciculati sunt. *Glumæ* inæquales, membranaceæ, 1-3-nerviæ, apice fimbriatæ. *Palea* inferior 5-7 nervis, brevimucronata, margine subfimbriata, superiorem bicarinatam dorso sulcatam apice bifidam et ciliatam vix æquans. *Squamule* subæquales (1 sublongior), oblongæ, basi nervosæ, apice longe ciliatæ. *Stylus* basi subbulbosus cito in stigmata 3 longa pennata divisus. *Fructus* immaturus lineari-oblongus.

This appears to have been found only twice in flower—once by *Wallich*, in 1821, in Nepal, but without any specified locality. This specimen was a magnificent one, with a panicle evidently several feet in length. The second occasion was by *Strachey* and *Winterbottom*, on one of the lower passes of Kumaon. The leaves are unusually thin, and the abrupt termination of the vaginæ, in a straight line below the petiole, affords a good mark of distinction when the plant is found in leaf only. I am unable to state, from the specimens I have seen, whether the flowering and leaf-bearing culms are generally distinct as in Section 2 of *Arundinaria*. There are two or three short leaf-bearing branches scattered occasionally amongst the flowering ones; but these are not sufficient to indicate the general habit of the plant, although they serve to identify the foliage. The same remark applies also to the following species.

2. *T. SPATHIFLORUS*, Munro. Foliis utrinque conspicue tessellatis, petiolatis; spiculis hirsutis, 4-8-floris, in racemo plerumque 1-3.—*Arundinaria spathiflora*, Trin. in Act. Petrop. l. c. (1835), 617 et icon 350!; Rupr. l. c. 114, tab. ii. fig. 5; Steud. Syn. 334. *A. procera*, Wall. MS. in herb. Mus. Brit.! *Bambusa macro*, Wall, MS. in herb. Hook.! “Genus novum *Bambusæ affine*,” Wall. Cat. 5041!

*Hab.* In Himalaya: Nipal! (florigerens), *Wallich*! Kumaon, *Falconer*!; Gurhwal, Dudatoli! alt. 8500 ped. s. m., *Strachey, Munro*!; Simla, Hattu! alt. 8400 ped., *Thomson*!; Sikkim, Singalelah! alt. 10000 ped., *Hooker*; Bootan supra Chupcha in sylvis 9500-10000 ped., *Griffith*! v. s.

*Culmus* procerus, fistulosus, interdum subsemiteres; internodiis 4-6 poll. longis, lævissimis; ramis 1-1½-pedalibus, lignosis, glabris; ramulis semiverticillato-fasciculatis, coloratis, nitidis, filiformibus sed validis, spithamæis ad pedalibus. *Folia* lineari-lanceolata, 3-4 lin. lata, 2-4 poll. longa, glabra, acuminata, basi in petiolum brevem attenuata, utrinque punctulis exasperata, læte viridia, nervis secundariis utroque latere 3; venulis transversis creberrimis, supra et subtus valde prominulis, diaphanis, interstitiis quadratis. *Vaginæ* striatæ, glabræ, ore *longe ligulatæ*, fimbriatæ vel fere efimbriatæ, ad insertionem petioli brevipilosæ. *Inflorescentia* omnino generis, racemis basi ebracteatis, spathis stramineis 2-3 poll. longis, involutis, maximam partem non nisi e spiculis 2 formatis, quarum altera sessilis, altera pedicellata. *Spiculæ* plus minus hirsutæ, 9-12-lineales, 4-8-floræ, intra glumas distincte pedicellatæ, rhachillæ articulis apice barbatis. *Glumæ* inæquales, membranacæ, 1-5 nervis, superior (9 nervis fide Trin.) 4½ lin. longa. *Palea* inferior longe acuminata, 8 lin. longa, dorso scabro-hirsuta, 7-9 nervis; superior distincte brevior, bicostata et præterea utrinque et inter costas binervis. *Squamulæ* 3, lanceolatæ, inconspicue nervosæ, vix inæquales, duæ latiores, superne fimbriatæ. *Stylus* cito trifidus (bifidus interdum fide Trin.) in stigmata 3 plumosula. *Fructus* (immaturus) lineari-oblongus vel lagenæformis.

This has apparently never been found in flower except in Nepal, by Wallich, in 1821, which may be accounted for by the fact that no European has since that date visited some parts of Nepal into which Wallich was allowed to send his collectors. I feel considerable doubts about the identity of the plants, in leaf only, from the more western Himalayas, Sikkim, and Bootan. In all of these the vaginæ have much longer cilia, the ligules are shorter, and the leaves are thicker in substance; but I have been unwilling on these grounds alone to create new species.

### III. PHYLLOSTACHYS.

Siebold et Zuccarini, Abh. Akad. der Wiss. Münch. (Math.-Phys. Clas.) iii. 745, t. 5. fig. 3 (1843); Endl. Gen. Pl. Suppl. iii. 58 (1843).

*Spicula sursum imperfecta*, intra glumas distincte pedicellata, 3-5-flora, flosculo terminali tabescente, minimo, in *spica simplici glumis imbricata* sessilis. *Glumæ* multinerviæ, valde variabiles, inferior plerumque apice foliaceo terminata; superior longitudine varians, rarissime deficiens. *Palea* inferior multinervia, acuminata vel rarius, uti glumæ, in laminam foliaceam extensa, hirsuta vel glabra, superiorem bicarinatam, apice bicuspidatam, æquans vel superans. *Stamina* 3, primum inclusa et *plicata*, dein *longe exserta* et pendula. *Squamulæ* 3, lanceolatæ, apice fimbriatæ. *Stylus* basi simplex, *longe supra basin* in stigmata 3, filiformia, serrulato-plumosa, longe exserta divisus. *Ovarium* longe stipitatum, tunc obovatum et in stylum longe rostratum attenuatum.

Gramina arborescentia, in *Japoniana*, *China* et *Himalaya* crescentia, culmo *semitereti*, nodis prominentibus; ramulis foliiferis semiverticillatis, plerumque multinodosis, interdum brevissimis, apice folia 2 vel pauca gerentibus, basi squamis inanibus serius deciduis obtectis. *Folia* breviter petiolata, pulcherrime *tessellata*, supra glabra vel tactu subaspera, subtus plerumque pallida et sæpe præsertim basin versus pubescentia. Inflorescentia paniculæformis, ramis primariis apice plerumque iterum foliosis, ramulis basi squamis obtectis, ultimis sursum spiculas 2-5 alternas ferentibus.

This well-named genus is readily distinguished from all the *Triglossæ* by its very long style, simple for a considerable distance from the base and then divided into 3 very long revolute stigmas, and by its semiterete stems. The details of the structure of the spiculæ are remarkably well figured in the plate of the Munich Transactions referred to above.

*Species floriferae (2 tantum cognita).*

- Spiculæ latæ, glumis inferioribus persistentibus, sæpissime apice in laminam foliaceam extensis. Folia margine uno fimbriata . . . 1. *P. bambusoides*.
- Spiculæ angustæ, glumis inferioribus cito caducis, plerumque apice simpliciter acuminatis. Folia margine utroque fimbriata . . . . . 2. *P. Stauntoni*.

1. *P. BAMBUSOIDES*, Sieb. & Zucc. *l. c.* 745. Culmo superne lævissimo, flavido, foliis plerumque 3-4 poll. longis, supra glabris, margine uno quasi setoso-fimbriatis, spiculis 3-4-floris, glumis in spiculis infimis semper apice foliaceis, bracteis involucrentibus brevibus obtusis.—Steudel, *l. c.* 339; Miquel, *l. c.* 284. *Bambusa reticulata*, Rupr. *l. c.* 148. *B. bifolia*, Sieb. MS. in herb. Zuccarini (var. foliis angustis, ciliis vaginæ obsoletis).  $\beta$ . "forma uberior, foliis vulgo majoribus et spiculis longius pedicellatis." *P. megastachya*, Steud. in Flora, Bot. Zeit. 1846, 21, et *l. c.* 339; Walp. Ann. i. 946. *P. macrantha*, Sieb. et Zucc. in Flora, 34 (teste Miquel). *Bambusa reticulata*, var. *macrophylla*, Rupr. *l. c.*

*Hab.* in Japonia, Kæmpfer, herb. in Mus. Brit. fol. 98! 99! Langsdorf, Siebold, Pierot, Buerger!; China, Amoy! no. 2073, J. de Grijs; Himalaya, Mishmee, Premsong! Griffith; var. foliis latis albo-marginatis, Japonia, Kæmpfer, herb. fol. 70! Veitch!; ins. Kiusiu, Pierot. v. s.

*Culmus* arundinaceus, elatus (Siebold) vel 10-12-pedalis (Griff.) inermis, semiteres, flavidus, superne lævissimus; nodis prominentibus, glaberrimis; ramis multinodosis, interdum brevissimis, semiverticillatis, iterum ramulosis, ultimis in statu florifero spicas sessiles ferentibus. *Folia* oblongo-lanceolata, basi rotundata vel attenuata, petiolata, apice acutissima, nunc disticho-alterna nunc 2-3 ad ramulorum apices aggregata, plerumque 4-9 lin. lata et 3-4 poll. longa, interdum (teste Miquel), in ramis sterilibus, 3 poll. lata et 1 ped. longa, supra glabra, subtus pallida et sæpe præcipue basin versus pubescentia, uno margine setoso-ciliata setis distantibus, nervis secundariis utroque latere 5-6, vel interdum 14 (Miq.), venulis transversis creberrimis, pulchre tessellata. *Vaginæ* striatæ, plerumque glaberrimæ, sæpe usque ad basin solutæ, "in apice truncato pubescentes et setis rigidulis, 1-2 lin. longis, demum deciduis (interdum obsoletis) munitæ;" superne uno margine ciliatæ, ligula plus minus conspicua. *Inflorescentia* valde variabilis, sæpe (foliis caducis) aspectu paniculæ subbipedalis amplæ et lucidæ, radiis irregulariter spiciferis, sed (meo sensu) vera terminalis in ramulis ultimis, ima basi bracteis obtusis brevibus et lævibus obtectis, spicis fertilibus 3-5 sessilibus, simpliciter racemosa. *Spica* glumis imbricata, 1-2 poll. longa, spiculis 3-5 fertilibus, interdum, teste Steudel, adjectis infra spiculis plurimis (6-9), repetito involucrentibus, sterilibus. *Spicula* fertilis 3-5-flora, 10-12 lin. longa. *Glumæ* multinerviæ, inferior in spiculis infimis multo major, apice in laminam foliaceam extensa, in spiculis (et sæpe spicularum flosculis) supremis brevior et simpliciter acuminata fit; superior, in spiculis infimis brevis, inæquilatera, oblique acuta, gradatim, in eadem spica, longior et bicarinata fit et tandem inferiorem æquat; attamen, in spicula suprema, non raro deficitur. *Palea* inferior hirsutiuscula, nervosa, acuta, raro, uti glumæ, in appendicem foliaceam extensa; superior angustior, subæquilonga, apicem versus bicarinata et bimucronata. *Squamulæ* lanceolatæ, basi attenuatæ, hyalinæ, inconspicue venosæ. *Stamina* 3, filamentis tandem longissimis, antherarum connectivo apiculato. *Stylus* longissimus, primum indivisus, sub anthesin dimidia pars superior in stigmata 3 divisa. *Ovarium* glabrum, basi stipitatum, apice in stylum longum attenuatum.

I believe I am right in referring some flowering specimens of a Bamboo in Kæmpfer's herbarium in the British Museum to this species; but unfortunately they are not in



good condition, and none of the spikes are perfect. I have seen a good and perfect flowering specimen from Amoy; but all the others which I have had access to are in leaf only. From the descriptions given by Miquel and others, taken, I presume, from living plants in Japan, this species appears to vary extremely both in inflorescence and foliage. This I can readily believe, from an examination of the Amoy specimen, which exhibits most interestingly the gradual development of leaves into flower-bearing organs. When this is taking place, it is easy to understand that a great amount of variation is likely to occur. In the specimen I have referred to, the lowest glumes generally and the lowest paleæ occasionally have the appearance of miniature leaves, with vaginæ, ligules and cilia, enveloping, however, perfect fertile spiculæ; as progress is made towards the top of the spike, the ligule first, then the cilia, and finally the leaf-like extension disappears, and the uppermost glumes assume the ordinary shape and form of those organs. The bracteas, however, at the base of the flowering branchlets do not seem to be subject to much change. Griffith's specimen is interesting from the western locality in which it was found; writing of it at p. 38 of his Journals, he says, "Great part of the side of the hill below Premsons village is covered with a small hard Bamboo, which forms excellent walking-sticks." A leaf-bearing specimen of this plant, without any specified locality being affixed, is attached in Linnæus's herbarium to his *Panicum arborescens*, as already mentioned at p. 22. According to Pierot, Buerger, and others, this species appears to bear the Japanese names of Kuma Sasa, Kura Take, and Higama Take. *Bambusa kumasasa* of Zollinger, Steudel, and others is certainly a different species, which I have called *Phyll. kumasaca*. Moreover Siebold, in his account of the economic plants of Japan, in the 12th volume (1830) of the Batavian Transactions, when describing 16 species of Bamboo under their Japanese names, says that all arboreous Bamboos are called "Take" or "Metake," and all herbaceous ones "Sasa;" whereas this species is stated to bear both affixes.

2. P. STAUNTONI, Munro. Culmo superne striato, viridi, foliis 1-2½ poll. longis, supra tactu asperis, margine utroque fimbriato-serratis, petiolis supra subtusque hirsutis, spiculis 2-3-floris, glumis caducis, bracteis longis membranaceis.

*Hab.* China! *Sir G. Staunton.* In herb. Hook. ex herb. Brown. v.s.

*Culmus* gracilis, fistulosus, superne sulcato-striatus, viridis, semiteres, uno latere canaliculatus. *Folia* lineari- vel oblongo-lanceolata, apice acuta, basi attenuata in petiolum brevem hirsutum, 2-3 ad apices ramulorum locata, 4-6 lin. lata, 1-2½ poll. longa, utroque margine setoso-fimbriata, subconcoloria, supra tactu aspera, subtus basin versus tantum pubescentia, nervis secundariis utroque latere 2-4; venulis transversis creberrimis, conspicuis, elevatis. *Vaginæ* striatæ, superne pilis paucis hirsutæ, apice membrana ciliata terminatæ, auriculisque duabus ciliis sublongis persistentibus fimbriatis appendiculatæ. *Inflorescentia* (foliis omnibus caducis) paniculæformis, flexuosa, internodiis apice hirsutis, ramis iterum ramulosis, ultimis (basi bracteis longis hyalinis acutis velatis) spicas 1-3 subsesquipollicares gerentibus. *Spiculæ* in spica 3, subdistantes, 2-3-floræ, flosculis 1-2 infimis fertilibus, 6-9 lin. longæ, pedicellis rhachillæque articulis hirsutis. *Glumæ* cito caducæ, inferior interdum appendice foliacea terminata, ambæ plerumque acuminatæ, sæpe flosculis breviores et apices versus hirsutæ. *Palea* inferior multinervia, superne hirsutissima, apice attenuata et mucronata; superior brevior, basi *biauriculata* bicarinata, superne hirsutissima, apice profunde bifida. *Stamina* imperfecta.

*Squamulæ* 3, inæquales, 1 multo minor, lanceolata, apice longe fimbriatæ. *Stylus* basi subbulbosus, primum simplex, demum superne in stigmata 3 divisus. *Ovarium* immaturum longe stipitatum, in stylum attenuatum.

In the only specimen I have seen, which was collected, I presume, in Lord Macartney's expedition in 1792, almost all the lower glumes have fallen, and scarcely a single spicula is perfect.

Duæ sequentes, tantum steriles cognitæ, culmo semitereti et habitu peculiari, probabiliter *Phyllostachyos* species sunt.

3. *P. NIGRA*, Munro. Culmo superne nigrescente, subsolido, foliis angustis, fere lineari-lanceolatis, vaginis ore appendiculato-fimbriatis.—*Arundarbor nigra*, Rumph, Amb. iv. 17? *Bambusa nigra*, Lodd. Cat. (1823); Rœm. et Sch. *l. c.* vii. 2. 1355; Lindl. in Penny Cyclop. vol. iii. (1835); Rupr. *l. c.* 147; Steud. *l. c.* 331. *B. puberula*, Miq. in Ann. *l. c.* 285. *Arundinaria (Phyllostachys) stolonifera*, Kurz, MS. et Cat. Hort. Bot. Calcut. 79 (1865). *A. diversifolia*, Kurz, MS. *fide* Miq. *l. c.*

*Hab.* China, Japonia! *Siebold, Buerger, Textor*; ins. Nippon Osakka in oryzetis, *Pierot*. In hortis Europæ, Chinæ et Indiæ orientalis culta. v. v. et s.

*Culmus* interdum nanus, 4-5-pedalis, interdum (cultura) 25-pedalis, internodiis brevibus, 4-6 poll. longis, subsolidus, semiteres, uno latere fere plano, superne nigrescens vel nigro maculatus; nodis prominentibus, sæpe rugulosis; ramulis tenuibus sed validis, multinodosus, "apice conferte (vulgo) paucifoliis," ultimis, basi, bracteis obtusis gradatim elongatis stipatis. *Folia* lineari-lanceolata, apice acuminata, basi rotundata vel attenuata, breviter petiolata, margine uno vel utroque setoso-ciliata, plerumque 2-3 poll. longa et 4-6 lin. lata, interdum (teste Ruprecht) 4-6 poll. longa et 6-10 lin. lata, membranacea, supra glabra, subtus parum pallidiora et sæpe tota superficie pubescentia, semper basin versus secus nervum medium pilosula, nervis secundariis 3-5-7, venulis transversis creberrimis. *Vagina* striatæ, sursum subdilatatæ, superne margineque puberulæ vel tandem glabrescentes, membrana ciliata terminatæ, oreque ciliis paucis, sublongis, demum deciduis fimbriatæ, ligula ovata, obtusa, brevisetosa, plus minus producta.

The leaves in this species are much thinner than in any other of the genus; and although they vary much as to pubescence, the midrib is invariably hairy on the underside towards the base, as is the case in *Arundinaria falcata*. Rumph states that he had never seen specimens exceeding 6 feet in height; and Ruprecht states that it only grows 4-5 feet high, although he assigns to it a diameter of 2 inches. However, there was a very fine specimen in the Crystal Palace, 25 feet high, which I have seen and examined; but unfortunately it was one of the numerous splendid plants destroyed in the late disastrous fire. The stems, although slender, are nearly solid, and appear to be generally used for such purposes as require great strength and toughness. Chairs, pipe-stems, and walking-sticks are often seen in England made from the culms of this species. Miquel, in the 'Annales' referred to, gives no less than fifteen Japanese names for this plant, and says that it varies very much. I cannot, however, understand his remark, "Haud longe distare videtur *Bambusa stricta* Roxb.," unless it has reference to the culm being nearly solid. No two plants can be much more unlike in appearance.

4. P. KUMASACA, Munro. Culmo semitereti, superne pallido, ramis apice 1-foliatis; vaginis brevissimis, fere obsoletis.—*Bambusa kumasaca*, Zoll. Herb. Steudel. l. c. 331; Miq. Fl. Ind. Bat. iii. 419; Ann. l. c. 286.

*Hab.* Japonia, Siebold, Buerger! Veitch!; ins. Kiusiu, Surasi ("Ko-sasa" incolis), Pierot. In Java cult., Zollinger. v.s.

*Culmus* (pars superior sesquipedalis tantum adest) fere simplex, flexuosus, internodiis glabris, pallidis,  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longis, nodis prominentibus. Rami  $\frac{1}{2}$ – $1\frac{1}{2}$ -pollicares, terni vel quaterni, fasciculati, 2–3-nodosi, basi bracteis membranaceis, ramis ipsis (foliis exceptis) longioribus, bracteati, apice 1-foliati, "rarius pauciramulosi, paucifoliati." *Folia* oblonga vel ovato-lanceolata, 2–4 poll. longa, 5–10 lin. lata, spinoso-acuta, basi in petiolum, dorso carinatum, 3 lin. longum attenuata, marginibus spinoso-serrata, supra glabra, subtus vix pallidiora, pubescentia vel demum glabrescentia, nervis secundariis utrinque 6–7; venulis transversis creberrimis, punctulis minutis subasperatis. *Vaginæ* brevissimæ, vix  $1\frac{1}{2}$  lin. longæ, apice truncato, ciliatæ, ligula fere obsoleta. "Species singularis," "peculiaris certe formationis et vix dubie distinctum genus" (Steud.).

This is certainly unlike any Bamboo I have seen. The branches in the specimens which I have had access to, although divided into 3 internodes, do not exceed  $\frac{1}{2}$  an inch in length, and bear a single leaf at their extremity. However, from the general appearance of the plant, I feel persuaded that it belongs to *Phyllostachys* or a closely allied genus.

#### IV. ARTHROSTYLIDIUM.

Ruprecht, l. c. 117; Steudel, l. c. 335.

*Spiculæ sursum deorsumque imperfectæ*, sæpe cylindricæ, multifloræ, pedicellatæ vel sessiles, distantes vel approximatae, in racemos simplices vel paniculatos dispositæ, rhachillæ articulis semper comparative longis, flosculis sæpe cito articulatim secedentibus. *Flosculi* 1–2 inferiores 1-paleacei, neutri, sequentes perfecti, terminales 1–2–3 tabescentes. *Glumæ* 2 breves vel brevissimæ. *Palea* inferiores sæpe acuminatæ. *Squamulæ* 3 fimbriatæ, obtusæ vel acuminatæ. *Stamina* 3. *Styli* 2, basi plerumque conspicue discreti (laterales fide Grisebach), stigmatibus pilosis vel plumosis. *Ovarium* glabrum, oblongum.

Gramina Americæ æquinoctialis et insularum Indiæ occidentalis incolæ, arborescentia vel suffruticosa, foliis latis vel angustis vel minimis, foliorum costa inferne tantum conspicua, nervis secundariis subobsoletis, venulis transversis nullis.

This genus, which derives its name from the peculiar readiness with which the perfect flowers, except perhaps the lowest, fall off in the spicula, is not in that way to be distinguished from some species of *Arundinaria*; but the lower barren flower, with only 1 palea, keeps it well distinct from that genus. It does not approach any other genus of the "Triglossæ," except *Aulonemia* Goudot, which is scarcely to be distinguished except by its peculiar habit and long loose spreading diffuse panicle.

#### Conspectus Specierum.

Sect. I. Panicula decomposita, spicis pluribus fasciculatis.

- |                                                  |                          |
|--------------------------------------------------|--------------------------|
| Vaginæ fimbriatæ. Spiculæ conformes . . . . .    | 1. <i>A. Hænkei</i> .    |
| Vaginæ efimbriatæ. Spiculæ heterogeneæ . . . . . | 2. <i>A. maculatum</i> . |

## Sect. II. Racemus fere simplex, vel raro semel compositus.

Spiculæ longæ, 1½ poll. et longiores.

- Folia lata . . . . . 3. *A. longiflorum*.  
 Folia angusta . . . . . 4. *A. Schomburgkii*.

Spiculæ minores, subdistantes.

- Folia lata . . . . . 5. *A. excelsum*.  
 Folia angusta, supra pubescentia, 3-5 poll. longa . . . 6. *A. pubescens*.  
 Folia angusta, subtus pubescentia, 1-2 poll. longa . . . 7. *A. Burchellii*.  
 Folia angusta, glabra . . . . . 8. *A. Cubense*.  
 Folia capillacea. . . . . 9. *A. capillifolium*.

Spiculæ minores, approximatae, fere imbricatae.

- Racemus 5-8 poll. longus . . . . . 10. *A. fimbriatum*.  
 Racemus vix 2 poll. longus, spiculis pubescentibus . . . 11. *A. racemiflorum*.  
 Racemus 1½ poll. longus, spiculis glabris . . . . . 12. *A. Trinii*.

1. *A. HÆNKEI*, Rupr. *l. c.* 117, tab. iii. fig. 12. "Foliis ovatis, latis, vaginis fimbriatis; spiculis conformibus, longe pedicellatis, basi attenuatis, sub-5-floris."—Steud. *l. c.* 335.

*Hab.* Peru, *Hænke*. s. v. Ruprecht.

"*Internodia* glabra, crassitie pennæ anserinæ. *Folia* ovata, 3½ lin. lata, fere pedalia, basi rotundata, brevipetiolata (1-2 lin.), chartacea, viridia, ad margines non nisi scabra. *Vaginæ* glabræ, auriculato-fimbriatæ. *Panicula* terminalis, subpedalis, pyramidalis, e spicis pluribus fasciculato-racemosis patentibus. *Spiculæ* 7-8-floræ, longe pedicellatæ, distantes, sub 6 lin. longæ, conformes, basi attenuatæ; flosculis opacis (non nitidis), nervosis, acutis. *Palea* floris inferior obtusiuscula. *Squamule* apice tantum longe fimbriatæ."—*Rupr.*

In the diagnosis Ruprecht says, "Vaginæ eligulatæ sunt;" in a note he says, "ligula ½-1-poll. lacera membranacea."

2. *A. MACULATUM*, Rupr. *l. c.* 118, tab. 5. "Foliis ovato-lanceolatis, vaginis efimbriatis, spiculis *heterogeneis*, pedicellatis."—Steud. *l. c.* 336. *Guadua parviflora*, Presl in Reliq. *Hænk.* i. 257; *Kth. Enum.* 434. *Bambusa parviflora*, Rœm. et Sch. *l. c.* 1349.

*Hab.* In Peruviae montibus Huannoccensibus, *Hænke*. s. v. Ruprecht et Presl.

"*Internodia* crassitie pennæ anatinæ, ultrapedalia, glabra, ad nodos scabriuscula. *Rami* ad nodos solitarii, 1-2-pedales, paniculam cum foliis 3-5 gerentes. *Folia* ovato-lanceolata, majora 1-1½ poll. lata, 8-9 poll. longa, petiolo vix lineam longo scabro insidentia, apice in acumen longum producta, basi attenuata, margine retrorsum spinuloso-scabra. *Vaginæ* striatæ, scabriusculæ, efimbriatæ, apice utrinque in auriculam culmo adpressam protractæ. *Ligula* ½-1 poll. longa, lacera, membranacea, alba. *Panicula* terminalis, 10-12-pollicaris, erecta, patens, spicis pluribus fasciculato-racemosis, rhachi striata, glabra. *Spiculæ* pedicellatæ, distantes, 4-6 lin. longæ, heterogeneæ, in apice ramorum superiorum fœmineæ perfectiores, flosculis bivalvibus, maculis coloratis adpersis, obtusis; reliquæ masculæ triandræ, acutæ, macriores, glumis et floribus inferioribus acuminato-subulatis. *Palea* superior inferiorem æquans, binervia, bicarinata, glaberrima, obtusissima. *Squamulæ* oblique acutæ, apice fimbriatæ."—*Ruprecht et Presl.*

Ruprecht, in the figure above quoted, gives very full details of the structure of the curious spiculæ of this plant. I have already mentioned, at page 26, that *Arundinaria Trianae* approaches this in some respects, especially in the heterogeneous spiculæ.

3. *A. LONGIFLORUM*, Munro. (Tab. I.) Racemo simplici; spiculis plurifloris, *longissimis*; foliis latis, glabris, vaginis ore longissime fimbriatis.

*Hab.* Venezuela, Colonia Tovar! 6000 ped. s. m., *Fendler*, 1621! *Moritz*, 1393! 1685! v. s.

*Culmus* "mediocris" (Moritz), glaber, fistulosus. *Spatha* fusca, fere glabra, 6 poll. longa, apiculo lanceolato fere pedali. *Rami* floriferi foliiferique ad nodos fasciculati. *Folia* adulta late lanceolata, striata, 8-9 poll. longa,  $1\frac{1}{2}$ -2 poll. lata (fig. A); plurima, præcipue in ramulis brevibus, minora sunt,  $1\frac{1}{2}$ - $3\frac{1}{2}$  poll. longa (fig. B); omnia glaberrima, petiolo fusco, glabro vel piloso, subito petiolata sunt. *Vagina* striatæ, apice ciliis validis, basi latis, longissime fimbriatæ. *Racemus* in culmo vel ramulis lateralibus terminalis, spiculis 6-12, sessilibus, approximatis et rhacheos internodiis multo longioribus. *Spicula* plusquam 2 poll. longa, 10-14-flora, lævissima, glumis brevibus, vix acuti; flosculis 1-2 infimis unipaleaccis, neutris, reliquis brevioribus (fig. 1); rhachillæ articulis glaberrimis. *Palea* inferior (flosculi fertilis) 6 lin. longa, dorso glabra, convexa, apice attenuata, breviter mucronata, utrinque nervis 1-3 notata (figg. 2, 3), sæpe purpurascens; superior subæqualis, apice pilis comata, bicarinata et inter carinas pulcherrime ciliatas hirsutiuscula (fig. 4). *Squamulæ* 3, subæquales, nervosæ, lanceolatæ, acuminatæ, superne margine fimbriatæ (fig. 5). *Stamina* 3, antherarum loculis apiculatis (figg. 4, 5). *Styli* 2, basi discreti, stigmatibus 2 longis plumosis (fig. 5). *Ovarium* (immaturum) lineari-oblongum, infra apicem nigrescentem constrictum.

One of Moritz's specimens is marked "Nastus Chusquea," H. B. K.; but that is a very different plant, and is *Chusquea scandens*, Kth. Moritz states that this plant is called "Cariza" by the inhabitants; but I find that this same name is used for several (six or seven) distinct kinds of Bamboo. This is a strikingly pretty grass, far surpassing the remainder of the genus in appearance.

4. *A. SCHOMBURGKII*, Munro. Racemo simplici, spiculis 6-8-floris,  $1-1\frac{1}{2}$  poll. longis; foliis subtus glaucis, longis, angustis; vaginis ore longe setosis.—*Arundinaria Schomburgkii*, Bennett in Linn. Trans. xviii. 562; Steud. l. c. 335.

*Hab.* In Guiana, alt. 6000 ped. s. m., in montibus, ex quibus fluvii Orinoco, Parima et Rio Negro emergunt, *Humboldt*, *Schomburgh*! v. s.

*Culmi* cæspitiosi, stricti, erecti, 50-60-pedales, diametro  $1\frac{1}{2}$ -pollicari, tenues, ramosi, apice nutantes, læte virides, lævissimi; rhizomate valido, articulato, subterraneo. *Internodium infimum* sæpe usque 16-pedale, sequentia 15-18 poll. longa. *Rami* verticillati, 3-4-pedales, gracillimi. *Folia* lineari-lanceolata, acuminata, glabra, 8-9 poll. longa, 5-6 lin. lata, in petiolum brevem glabrum flavum attenuata, subtus glauca, nervo medio prominente, secundariis 4-5 vix conspicuis. *Vagina* glabræ, ore utrinque longe setosæ, ligula brevissima pilosa. *Racemus* simplex, terminalis, 7-9 poll. longus, spiculis paucis (5-6), distantibus, sessilibus. *Spicula* 6-8-flora, glabra,  $1-1\frac{1}{2}$  poll. longa, flosculo infimo neutro. *Glumæ* breves, acuminatæ. *Palea* inferior (flosculi fertilis) 6-8 lin. longa, superne utrinque nervis 2-3, striata, dorso convexa, apice longissime setaceo-acuminata; superior multo brevior, apice acuto nec bifido, pilis comata, fere plana, vix carinata, glabra. *Squamulæ* lineari-lanceolatæ, acutissimæ, *efimbriatæ*. *Stamina* 3, antherarum loculis *setaceo acuminatis*. *Stylus* cito bifidus in stigmata 2 pulchre plumosa. *Ovarium* (immaturum) apice pubescens et attenuatum.

Mr. Bennett's paper in the Linnean Transactions contains a very interesting account, by Mr. Schomburgk, of this species, which is called "Curata" by the natives. The lowest internode, which sometimes attains the extraordinary length of 16 feet, far surpassing that of any other Bamboo known, furnishes the "Sarbian," or blow-pipe through which the poisoned arrows are blown by the natives of Guiana. M. Humboldt states that these "Sarbian" are much prized by their owners, and are often handed down as heir-looms. The plant is said to have a very limited range, and to have been found, after very careful search, in only three localities on the sandstone mountains from which the three rivers mentioned above flow. In the specimen in the British Museum the lowest joint is 12 feet 6 inches long.

5. *A. EXCELSUM*, Grisebach in Fl. Brit. W. Ind. Isl. 529. Racemo simplici, spiculis sub-6-floris, brevipedicellatis, 6-12 lin. longis; foliis latis, vaginis ciliis deciduis fimbriatis, nodis culmi glabris.

*Hab.* In ins. Caribbæis, Dominica, *Imray!*; Trinidad! "Las Cuevas Hills, Tocuche," *Grisebach.* v. s. *Culmus* 60-80-pedalis, diametro 6-12-poll., *internodiis glabris*, ramis floriferis fasciculatis 3-5 poll. longis. *Folia* lanceolata vel oblongo-lanceolata, acuminata, 3-5 poll. longa, plerumque 9 lin. lata, raro angustiora (3 lin. lata), subglabra, basi rotundata, petiolata, petiolo glabro, margine scabra, nervo medio vix conspicuo, secundariis 5-6. *Vaginæ* striatæ, interstitiis subscabris, glabrescentes, apice ciliis 1-4 lin. longis fulvis deciduis fimbriatæ. *Racemus* simplex, rhachi flexuosa, uno latere sulcata, terminalis, spiculis 6-8 distantibus brevipedicellatis. *Spiculæ* sub-6-floræ, 12-6 lin. longæ, articulis rhachillæ apice fimbriatis, flosculo infimo neutro reliquis subbreuiore. *Glumæ* breves, pallidæ, membranaceæ, mucronatæ, fere enerves. *Palea* inferior (flosculi fertilis) nervoso-striata, membranacea vel interdum hyalina, apice subobtusa vel brevissime mucronata; superior longior, apice attenuata, vix bifida, bicarinata, superne carinis ipsoque apice hirsutis. *Squamulæ* 3, lanceolatæ, apice fimbriatæ. *Stamina* 3, antheris obtusis. *Styli* ad basin discreti. *Ovarium* (immaturum) lineari-oblongum, infra apicem constrictum.

This is closely allied to *A. pubescens* and *A. Cubense*. The main rhachis of the raceme assumes a peculiar zigzag appearance, exactly resembling in this respect *Festuca divaricata*, Desf.

6. *A. PUBESCENS*, Ruprecht, *l. c.* 119, tab. iv. fig. 14. Racemo simplici, spiculis 4-9-floris, 9-12 lin. longis, sessilibus, remotiusculis; foliis angustis, 3-5 poll. longis, *superne pubescentibus*.—*Steud. l. c.* 336; *Grisebach, l. c.* 529.

*Hab.* In ins. Caribbæis, Trinidad, *Lockhart!*; summis montibus "Tocuche," *Grisebach*; Venezuela, Galipan, *Moritz*, 327!, var. glabra? *Fendler*, 1628! alt. 2000 p. s. m. v. s.

*Culmus* —pedalis, internodiis (crassitie  $\frac{1}{4}$  lin.) pedilibus, "pubescenti-asperrimis" vel "scabris," vel demum glabrescentibus; "ramulis floriferis ad basin nonnunquam foliolo uno alterove auctis, et sterilibus foliigeris, spithamæis, subrigidis, erectis divaricatisque, e nodis densissime erumpentibus." *Folia* lineari-lanceolata, 4-9 lin. lata, 3-5 poll. longa, basi rotundata vel parum attenuata, petiolata, viridiuscula, subtus et margine scabra, *superne pubescentia* vel *puberula*, nervis secundariis 3 sub-obsolete. *Vaginæ* inter nervos prominulos scabriusculæ, margine ciliatæ, ore fimbriis densis cinnamonæo-fuscis 2 lin. longis deciduis fimbriatæ. *Racemus* simplex, pedunculatus, in ramulis basi paucifoliatis terminalis, spiculis sæpe distantibus, sessilibus vel brevissime pedicellatis. *Spiculæ*

9-12 lin. longæ, glabræ, 4-9-floræ, chartaceæ, complanatæ, flosculis 1-2 infimis neutris, rhachillæ articulis sulcatis apice glabris. *Glumæ* sublongæ, setaceo acuminatæ, dorso carinatæ, glabræ. *Palea* inferior (flosculi fertilis) lanceolato-acuminata vel mucronata, nervosa, 4 lin. longa, glaberrima; superior vix brevior, dorso canaliculata, apice obtuso pilosa. *Squamulæ* 3, oblongæ, obtusæ, apice fimbriatæ. *Stamina* 3, loculis obtusis. *Styli* fere ad basin discreti. *Ovarium* lineari-oblongum, infra apicem constrictum.

Moritz's specimen is marked as "Cariza" of the inhabitants, a name, as already mentioned at p. 41, given to *A. longiflorum* and many other species. I entertain considerable doubts about the identity of Fendler's specimens, which are in leaf only. The leaves are more glabrous above, and the secondary nerves more numerous and more strongly marked below, than in the Trinidad specimens.

7. A. BURCHELLII, Munro. Racemo simplici vel *composito*, spiculis distantibus, *longipedicellatis*, *glumis hirsutis*, foliis minimis 1-2-3 poll. longis, *subtus pubescentibus*.

*Hab.* In Brasilia, Corcovado montes, no. 1434!; Serra de Cubatao, no. 3696! (culmus foliiferus tantum), *Burchell.* v. s.

*Culmus* 6-8-10-pedalis, apice filiformis, tenuissimus, internodiis superioribus 7 poll. longis, apices versus punctis elevatis scabris. *Rami* plerumque basi 2-3-nodosi, geniculati, reclines, ad nodos dense fasciculati, ramulis florigeris numerosis, basi nudis, apice paucifoliatis, 6-10 poll. longis. *Folia* angusta, lineari-lanceolata, 1-2 vel raro 3 poll. longa, 1-3 lin. lata, petiolo supra hirsuto vel glabro sæpe nigrescente petiolata, supra tactu scabra, subtus plus minus dense pubescentia glaucescentia, margine scabra, nervis secundariis inconspicuis. *Vaginæ* in ramulis floriferis, glabræ vel punctis minutis subexasperatæ, ore ciliis pallidis longis numerosis fimbriatæ. *Racemus* vix e vagina suprema exsertus, simplex vel ramis inferioribus 1-2 compositis, 1-2 poll. longus, spiculis distantibus, longipedicellatis, refractis, *pedicellis hirsutis*. *Spicula* pauciflora? flosculis omnibus (in speciminibus visis), nisi infimo fertili, delapsis. *Glumæ* hirsutæ, nervosæ, ovatæ vel oblongæ. *Palea* inferior 5-7-nervis, attenuata, subobtusata; superior sublongior, dorso profunde canaliculata, apice hirsuta. *Squamulæ* oblongæ, dorso hirsutæ, nervosæ, fimbriatæ. *Stamina* 3, loculis subobtusis. *Stylus* ad basin, tandem callosam, indivisus, sed cito supra in stigmata 2 brevipilosa partitus. *Ovarium* basi stipitatum, apice scabrescens et residua styli basi coronatum.

In inflorescence this plant closely approaches many species of *Chusquea*. Unfortunately there is not a single perfect spicula on any of Burchell's otherwise good specimens. Every flower has fallen off from the spicula except the lowest fertile one and the longish pedicel of the following one; and even those which are left are in an imperfect state. I cannot always perceive the lowest neutral floret, the presence of which would principally keep this species distinct from *Arundinaria*, to which genus better specimens may prove it to belong.

8. A. CUBENSE, Rupr. *l. c.* 118, tab. iv. fig. 13. "Racemo simplici, spiculis subapproximatis, sessilibus, 4-5-floris; foliis 3-4 poll. longis, glabris, angustis."—Steud. *l. c.* 336.

*Hab.* In Cuba, prope Havannam? *Ramon de la Sagra.* s. v. Ruprecht.

"*Culmus* —pedalis, ramulis foliigeris apice floriferis, ad nodos inferiores, spicis aphyllis 3-4-nis auctis, rigidis. *Folia* lanceolata, 3-4 poll. longa, 4 lin. lata, inæquilatera, basi cordata, petiolata petiolo lineali flavescens, viridia, *glabra*, subtus scabriuscula, nervis secundariis obsoletis. *Vaginæ* inter

nervos obsolete prominulos dense brevipubescentes, margine ciliatæ, ore ciliis linealibus pallidis fimbriatæ. *Spica* elongata, spithamæa et ultra, basi aphylla aut foliolo aucta, spiculis sessilibus subapproximatis. *Spicula* 4-6 lin. longa, chartacea, glabra, 4-5-flora, in superiore parte ramulorum longiorum polyantha, in ramulis brevioribus oligantha, flosculis duobus infimis neutris. *Glumæ* angustæ, acuminatæ. *Palea* inferior lanceolata, subulato-acuminata, cinereo-obscura, nervosa; superior brevior, obtusa, superne carinis fimbriata. *Stamina* 3, loculis obtusis. *Styli* ad basin discreti. *Ovarium* infra apicem constrictum."—*Rupr. descr. et icon.*

9. *A. CAPILLIFOLIUM*, Grisebach in Enum. Plant. Wrightian. Cubensium, in Mem. Amer. Acad. Scien. and Arts, new series, vol. viii. 521 (1862). Racemo simplici, spiculis valde distantibus, pedicellatis, *foliis capillaceis*.

*Hab.* Cuba, "supra arbores et fruticeta scandens," *Wright*, no. 738! v. s.

"*Caulis* scandens, internodiis gracilibus, vix lineam diametro, lævibus, ramulos foliatis, dense fasciculatos vulgo excedentibus. *Folia* flexilia, tenuissima, *capillacea*, 3-6 poll. longa, canaliculata, glabra, margine scabriuscula. *Vaginæ* breves, læves, ciliis albidis flaccidis 1-2 lin. longis ore fimbriatæ. *Racemus* depauperatus, spiculis 1-4, valde distantibus, ramulis terminalis. *Spicula* breviter pedicellata, 2-6-flora, flosculis 1-2 infimis neutris deorsum decrescentibus. *Palea* inferior (flosculi fertilis) lineari-attenuata, apice obtusiuscula, superne nervata, rhachillæ articulis clavatis triplo longior."

The extremely narrow capillaceous leaves distinguish this at once from all the other species of the genus. I imagine this to be the plant referred to by Ruprecht at p. 118 as a peculiar state of *A. Cubense*, where he says, "Singularis adjacet pars culmi sterilis, internodiis 5-poll., lævigatis, ramulis ad nodos densissime compacteque verticillatis, brevissimis (1½-poll.), angustissimis; vaginis 2-3 glabris, ore albido pilosis, in folia (relative) longissima (2-pollicaria), angustissima (⅓ lin.), filiformia, flexuosa productis."

10. *A. FIMBRIATUM*, Grisebach, *l. c.* 521, racemo 5-7 poll. longo, spiculis *imbricatis, glabris*; foliis 2-4 poll. longis, *glabris*; vaginis ore *longissime* fimbriatis.

*Hab.* In Cuba Orient.: "prope villam Monte Verde in sylvis densis," *Wright*, no. 1554! v. s.

*Culmus* 1-3-pedalis, ramorum internodiis gracilibus, lævibus. *Folia* lineari-acuminata, basi subito brevipetiolata, glabra, 2-4 poll. longa, sub 2 lin. lata, patentia, margine glabra. *Vaginæ* læviusculæ, ore fimbriis pallidis sub 6 elongatis patentibus inæqualibus (*longissimis* 10 lin. longis) fimbriatæ. *Racemus* contractus, terminalis, 5-7 poll. longus, spiculis linearibus, brevissime pedicellatis, imbricatis. *Spicula* 3-5-floræ, 6-8 lin. longæ, glabræ. *Glumæ* parvæ, inferior brevissima. *Palea* inferior lineari-acuminata, nervosa.

A low-growing grass, extremely like *Garnotia scoparia* in habit, easily distinguished at sight by the very remarkable long fringes of the vaginæ.

11. *A. RACEMIFLORUM*, Steudel, *l. c.* 336. Racemo simplici, vix 2 poll. longo, spiculis approximatis, sessilibus, *pubescentibus*, foliis angustis, 1-2 poll. longis, subtus plus minus *pubescentibus*, vaginis fimbriatis.

*Hab.* Mexico, *Giesbreght*, no. 234, *Liebmann*, 72!; Venezuela?, Colonia Tovar, alt. 6500-7500 ped. s. m., *Fendler*, 1624! v. s.

*Culmus* gracilis, elegantissimus, cæspitosus, 20-30-pedalis, internodiis interdum pedalibus et ultra, apice hirsutis. *Rami* ad nodos numerosi, verticillati, ramulis simplicibus vel divisis, glabris, tenuibus.



*Folia* angusta, lineari-lanceolata, acuta, viridi-glaucescens, 1-2 poll. longa, 1-3 lin. lata, basi subattenuata in petiolum flavescens pilosum vel glabrum, supra glabra, vel uno latere pubescentia, subtus scabra (*Steud.*) vel, præcipue basin versus, plus minus pubescentia, nervis secundariis inconspicuis. *Vaginæ* pubescentes vel subglabræ, apice parce fimbriatæ. *Racemus* simplex, secundus, arcuatus, terminalis, vix 2 poll. longus, rhachi hirsuta, spiculis pluribus sessilibus fere imbricatis. *Spicula* pubescens, linearis, 2-4-5-flora; flosculo infimo 1-paleaceo, neutro, palea ovata subito mucronata, reliquis brevior. *Glumæ* 2, lineares, distantes, mucronato-acutissimæ, dorso pubescentes. *Palea* inferior (flosculi fertilis) pubescens, acuminata, nervosa. Genitalia evoluta nunquam vidi.

I have never had an opportunity of examining a perfect spicula of this plant; but I believe that it is generally 3-flowered, with only 1 (the intermediate one) fertile. Fendler's Plant has no flowers, and the leaves are more glabrous than in the Mexican specimens, but I believe it to be the same. Fendler says it is found only in the highest mountains of Venezuela. This species is very closely allied to the following:—

12. A. TRINII, Rupr. *l. c.* 119, tab. iv. fig. 15. Racemo simplici, *pollicari*, spiculis approximatis, sessilibus, *glabris*, foliis  $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. longis, subtus (basin versus tantum) pubescentibus, vaginis *efimbriatis*.—*Steud. l. c.* 336. *Arundinaria parviflora*, Trin. Act. Petr. *l. c.* 619.

*Hab.* In Brasilia: Yponema, *Riedel*; Minas Geraes, *Claussen!* v. s.

*Culmus* valde inanis, ramulis innumeris, filiformibus, tenuibus, erecto-patulis, subsimplicibus, pedalibus, apice floriferis, inferne foliosis, ad nodos fasciculatis. *Folia* angusta, lineari-lanceolata, acuta, glaucescentia,  $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. longa, 2-3 lin. lata, basi parum attenuata in petiolum hirsutum, margine aspera, supra glabra, subtus (basin versus tantum) pubescentia, costa nervisque secundariis (in tota lamina sub 7) subobsoletis. *Vaginæ* inter nervos prominulos tenuissime undulato-scabræ, superne margine ciliato-scabræ, *efimbriatæ* (fimbriatæ fide Rupr.) breviligulatæ. *Racemus* simplex, terminalis, subpollicaris, spiculis sub 8, approximatis, sessilibus. *Spicula* pallide straminea, 5 lin. longa, subcylindrica, glabra, 3-6-flora, flosculo infimo subulato neutro, palea acuminata 5-nervia, rhachillæ articulis brevibus. *Gluma* inferior linearis, apice scabra; superior longior, 3-nervis, apice acuminata. *Palea* inferior (flosculi fertilis) 7-nervis, attenuata, apice scabro, nervosa, dorso glabra, margine superne tenuissime ciliata; superior subobtusata, longior. *Squamulæ* 3, inæquales, duæ majores, apice attenuatæ et fimbriatæ. *Stylum* et *ovarium* nunquam vidi.

Steudel and Ruprecht both state that it is probable that *Chusquea? leptophylla*, Nees in Linn. ix. 489, may be the same as *A. Trinii*; but I think the size of the leaves alone keeps it distinct. Ruprecht describes this plant as having "vaginæ fimbriatæ;" but that is certainly not the case in Claussen's specimens, which I have seen. This species is evidently very closely allied to the preceding, *A. racemiflorum*, and is principally distinguished by the glabrous spiculæ, of rather different structure, and leaves with decided ligules and no fringe to the vaginæ. Ruprecht's drawing is evidently made from an abnormal spicula, as, in the analysis, one stamen is represented as becoming converted into a style.

## V. AULONEMIA.

Goudot, Ann. Sc. Nat. 3<sup>me</sup> sér. v. 75; Steudel, *l. c.* 338.

*Spicula* sursum deorsumque imperfectæ, multifloræ, flosculo infimo neutro unipaleaceo, compressæ, in paniculis, longe ramosis, laxis, *divaricatis*, ad ramulorum apicem congestis. *Gluma* inferior 3-nervis,

acuminata; superior 7-nervis, ovato-obtusa et subito breviter mucronata. *Palea* inferior 7-nervis, ovata, subito mucronata, hirsuta, margine ciliata; superior concava, medio quasi plicata, binervia, nervis ciliatis. *Stamina* 3, antheris linearibus. *Stylus* basi filiformis, cito in stigmata 2 plumosa divisus. *Squamule* 3, inæquales, postica brevior, ovata, obscure 3-nerviæ, ciliatæ. *Ovarium* sessile, oblongum, glabrum.

Gramen alte scandens, in America australi tropica indigenum, foliis latis, vaginisque longissime fimbriatis. Inflorescentia panicula terminalis, laxa, divaricata.

This genus, consisting of one species, is principally to be distinguished from *Arthrostylidium* by its lax inflorescence.

A. QUEXO, Goudot, *l. c.* 75, t. 4. Foliis latis; vaginis glabris, ore ciliis longis numerosis fimbriatis; spiculis longis, paleis inferioribus subhirsutis.—Walp. Ann. i. 947; Steud. *l. c.* 338.

*Hab.* New Granada, Carthagenæ! in sylvis frigidis, Venezuela, 3000 p. s. m., *Fendler*, 2496! v. s.

*Culmus* cylindricus, glaber, striatulus, alte scandens, ramis pendulis. *Folia* plana, late lanceolata, acuta, brevissime petiolata, 10 poll. longa, 2-3 poll. lata, striata, nervis secundariis utrinque 6-7. *Vagina* sulcato-striatæ, superne hirsutæ, ore ciliis 6-10 lin. longis numerosis fimbriatæ. *Panicula* fere pedalis, ramis divaricatis, subquadrangularibus, scaberrimis, axillis callosis. *Spicula* sub-10-flora, 1½ poll. longa, rhachillæ articulis glabris, flosculo infimo neutro, palea una obtusa. *Gluma* inferior brevissima hirsuta. *Palea* inferior (flosculorum fertilium) superne nervosa et hirsuta (glabra fide Goudot), margine ciliata, apice rotundata et mucrone apiculata. *Stylus* fere ad basin divisus. Reliqua generis.

This is stated to be called "Queco" by the natives, and to flower in February and March. There is occasionally a very long linear bract at the base of some of the spiculæ.

## VI. MEROSTACHYS.

Sprengel, Syst. Veg. i. 132; Endlicher, Gen. Plant. no. 907.

*Spicula sursum deorsumque imperfecta*, vix pedicellata, 3-4-flora, cum rudimento longe (vel in *M. capitata* brevi-)pedunculato, flosculis 2 infimis unipaleaceis neutris (glumis auct.) valde inæqualibus et dissimilibus, 1 vel rarissime (in *M. Claussenii* et *M. speciosa*) 2 sequentibus bipaleaceis, hermaphroditis. Hæ spiculæ vel in spica terminali, subfalcata, simplici, unilaterali solitariæ ternæve, imbricato-biseriatæ vel in capitulum densum aggregatæ sunt. *Glumæ* fere obsoletæ. *Palea* inferior (flosculi fertilis) acuta vel acuminata vel rostrato-acuminata, multinervis, plerumque adpresso-hirsuta, superiorem, dorso profunde sulcatam, vix æquans vel superans. *Stamina* 3 vel abortu 2 (*Nees*). *Squamule* 3 membranacæ, integræ, superne ciliatæ. *Stylus* basi interdum crassus et bulbosus, cito bifidus in stigmata 2 superne dense plumosa vel simpliciter pilosa. *Ovarium* glabrum, sæpe trigonum.

Gramina in Brasilia et Peruvia indigena, arborescentia vel alte scandentia, ramis fasciculatis, plerumque simplicibus, basi sæpe bracteatis, e nodis culmi erumpentibus. *Folia* plerumque lata, breviter petiolata, venulis transversis obscuris, inferne tamen prominulis: "in pagina inferiore, fascia occurrit, singularis, quæ in *M. Kunthii*, ob folia subtus eximie glauca, magis visibilis est" (*Rupr.*). *Vagina* ore nudæ vel fimbriatæ. Inflorescentia terminalis, in sect. i. spica simplex unilateralis, in sect. ii. capitulum densum.

This genus is quite unique in appearance, and may be considered a Chlorideous form of Bambusaceæ. The glumes of Ruprecht are scarcely ever visible; and Sprengel, Nees,

Kunth, and Endlicher have described the two lowest flowers as glumes, and the ordinary spicula as 1-flowered, with a barren terminal rudiment. I am, however, of opinion that Ruprecht is correct in considering ("ex analogia cum Rettbergiis," and several species of *Chusquea*) that the true glumes are reduced to a minimum, and that the apparent glumes are really two barren flowers. Sprengel also suspected that the only species he was acquainted with was diœcous; but I have not seen any indications of such being the case in any of the specimens of the different species which I have examined. In some very rare instances I have observed two perfect hermaphrodite flowers in the spiculæ of *M. Claussenii* and *M. speciosa*, the other portions of the spicula remaining unaltered.

*Conspectus Specierum.*

Sectio I. Spiculæ in spica terminali simplicis, unilaterales.

- Spiculæ ternæ, vaginæ ore fimbriatæ . . . . . 1. *M. ternata*.  
 Spiculæ solitaria, vaginæ ore fimbriatæ.  
   Fimbriis basi æqualibus.  
     Flosculo secundo longe *rostrato*-acuminato, hermaphrodito patente  
       vix brevior . . . . . 2. *M. speciosa*.  
     Flosculo secundo vix acuminato, hermaphroditum adpressum fere  
       æquante . . . . . 3. *M. Claussenii*.  
     Flosculo secundo vix acuto, hermaphrodito fere duplo brevior . . . . . 4. *M. brevispica*.  
     Fimbriis *basi plumosis* . . . . . 5. *M. sparsiflora*.  
 Spiculæ solitaria, vaginæ ore nudæ.  
     Flosculis 2 inferioribus glabris . . . . . 6. *M. Neesii*.  
     Flosculis 2 inferioribus pilosis . . . . . 7. *M. Kunthii*.

Sectio II. Spiculæ in capitulum densum terminale congestæ . . . . . 8. *M. capitata*.

1. *M. TERNATA*, Nees in Agros. Bras. 529. Spiculis *ternis*; palea inferiore flosculi fertilis brevissime *mucronata*, scabra, flosculum secundum neutrum duplo superante; vaginis apice fimbriatis.—Kunth, *l. c.* 429; Rupr. *l. c.* 126, tab. x. fig. 28; Steud. *l. c.* 338.

*Hab.* In Brasilia: in sylvis, alt. 1200–1800 ped. s. m., præsertim super Serra do Mar, prov. St. Pauli, Rio de Janeiro, Minaes Geraes ("Tagaora" incolis), *Martius*. s. v. Nees et Ruprecht.

"*Culmus* 20-pedalis, crassitie 3–5 pollicum, ramis verticillatis, glabris, ramulis florentibus lævibus. *Folia* oblongo-lanceolata, 7–9 poll. longa,  $\frac{3}{4}$ –1½ poll. lata, acuminata, basi etiam acuta, glabra, subtus pallidiora, nervis secundariis utrinque 10–11, fascia obsoleta. *Vaginæ* striato-sulcatæ, basi glabræ, apicem versus pubescenti-scabræ, ore breviter (*Rupr.*) vel fibris longis subcirrhosis (*Nees*) fimbriatæ. *Spica* subrecta, 5-pollicaris, exserta, rhachi dorso *glabra*; spiculis ternis, biseriatis, imbricatis, 6-linealibus. *Spicula* lanceolata, patens, flosculo infimo vix 1½ lin. longo, 1-nervi, carinato; secundo hermaphrodito, duplo brevior, mucronato, 9-nervi, pallide fusco, viridi punctato. *Palea* inferior (flosculi fertilis) ovata, 9–11-nervis, brevissime mucronata, pubescenti-scabra, viridi punctata, amplectens superiorem paulo longiorem, glabram, apice tantum scabram. *Squamulæ* 3, obovatæ, apice ciliatæ, albæ, basi subplicatæ ferrugineæ et paullo crassiores. *Stylus* brevis, crassus et fere bulbosus, stigmatibus longis, filiformibus, pubescentibus. *Germen* conico-trigonum, glabrum."—*Ruprecht et Nees*.

The native name "Tagaora" is not peculiar to this species, but is used for two other species of this genus as well as for *Guadua tagaora*, *G. virgata*, *Arundinaria verticillata*,

and, according to Trinius, for *Chusquea pinifolia*, *Nastus barbatus*, *Arthrostyloidium Trinii*, and *Schizostachyum capitatum*.

2. *M. SPECIOSA*, Sprengel, Syst. Veg. i. 564 (1825), non Kunth. Spiculis solitariis, flosculo secundo, pilis fusciscentibus obsito, longe rostrato-acuminato, hermaphroditum hirsutum fere æquante, vaginis ore longe fimbriatis fimbriis basi æqualibus.—Rupr. *l. c.* 126, tab. x. fig. 29; Steud. *l. c.* 338. *M. (speciosa?* Spr.), Nees, *l. c.* 530, descr. ad specim. Spreng. in herb. reg. Berol. *M. cirrhosa*, Nees, MS. (Rupr.).

*Hab.* in Brasilia æquinotiali, *Sellow!* v. s.

*Culmus* —pedalis, ramulis sub  $1\frac{1}{2}$ -pedalibus, teretibus. *Folia* superiora ovato-lanceolata, basi inæquilatera, 5-6 poll. longa, sub 1 poll. lata, cito caduca, subtus lævigata, nervis secundariis utrinque 6-8, fascia obsoleta. *Vaginae* striato-sulcatæ, transversim ruguloso-asperæ, ore fimbriis, inferne æqualibus, rigidis, nitidis, stramineis, longe fimbriatis. *Spica* falcata, 5-6 poll. longa, rhachi hirsuta, spiculis solitariis, imbricatis, secundis, vaginam supremam sæpe duplo superans. *Spicula* 10 lin. longa, flosculo primo lineari-subulato, carinato-uninervi, utrinque adpresse piloso, 3-4 lin. longo; secundo multo majore, ovato-lanceolato, subplano, extus pilis subadpressis fuscis hirsuto, 5-10 lin. longo, 2-3 lin. lato, apicem longe rostrato-acuminatum versus ciliato, hermaphroditum fere subæquante. *Palea* inferior, flosculi fertilis horizontaliter patentis ovato-lanceolata, breviter et subulato-aristata, 8-10 lin. longa, pilis fuscis, rigidis, longis obsita et præsertim apicem versus dense ciliata; superior brevior, mutica vel apice bidentata, glabriuscula vel apicem versus pilis obsita. *Squamula* 3, vel abortu 2 (fide Nees), obovatæ, obtusæ, fimbriatæ vel glabræ (*Nees*). *Stylus* cito bifidus in stigmata 2 penicillato-villosa. *Ovarium* lineari-trigonum, glabrum, in stylum attenuatum.

The flattened second sterile flower, placed at a more acute angle with the rhachis than the hermaphrodite one, gives this plant a remarkable appearance, quite distinct from *M. Claussenii*, to which species alone it approaches. I find in one of *Sellow's* specimens in herb. Bentham the second perfect hermaphrodite flower, which I had first observed in *M. Claussenii*.

3. *M. CLAUSSENI*, Munro. Spiculis solitariis, flosculo secundo pubescente, apice attenuato, hermaphroditum pubescentem rhachi adpressum fere æquante; vaginæ ore fimbriis basi æqualibus longe fimbriatæ; foliis subtus præcipue basin versus hirsutis.

*Hab.* In Brasilia: Minas Geraes! *Claussen*; Organ Mont., *Wilkes!* ("Tacuari" incolis), no. 4238! *Miers.* v. s.

*Culmus* elatus, "50-80-pedalis, diametro 4-5-pollicari, apice pendulus" (*Miers*), internodiis apice scabris; ramis  $1-1\frac{1}{2}$ -pedalibus, basi hirsutis, circa nodos dense verticillatis. *Folia* ovato-lanceolata, acuminatissima, basi plus minus inæquilatera et attenuata in petiolum hirsutum subbilinealem,  $4-5\frac{1}{2}$  poll. longa, 10-12 lin. lata, margine serrulato, scaberrima, supra (præsertim uno latere) scabra, subtus (præcipue basin versus) hirsuta, nervis secundariis utrinque 5-7, inferne conspicuis, venulis transversis interdum vix manifestis. *Vaginae* superiores subglabræ, margine superne oreque fibris vel fuscis vel albidis, longis, basi æqualibus fimbriatæ. *Spica* falcata, sæpe folio supremo superata, sub 4 poll. longa, rhachi dorso hirsuta, spiculis solitariis, adpressis, dense imbricatis. *Spicula* 8-9 lin. longa, præter rudimentum terminale, 3-4-flora; flosculis 2 interdum hermaphroditis; flosculo inferiore sterili 1-3-nervi, lineari-lanceolato, vix  $1\frac{1}{2}$  lin. longo; secundo multi(15)-nervoso, acuto, flosculum hermaphroditum pilis pallidis brevissimis adpressis pubescentem fere æquante. *Palea* inferior (flosculi

fertilis) apice attenuata et nervosa, superiorem breviorē, ad apicem bifidam, hirsutam involvens. *Squamulæ* 3, vix æquales, apice lanceolatæ, brevifimbriatæ. *Antheræ* nigrescentes. *Stylus* basi simplex, cito divisus, stigmatibus vix plumosis.

The leaves in this species are always conspicuously hairy near their base below, and are thus distinguished from all others of the genus. Mr. Miers says that it grows abundantly in the Organ Mountains, hanging in graceful festoons from the height of 50 to 80 feet along the margin of the forests.

4. *M. BREVISPICA*, Munro. Spiculis solitariis, flosculo secundo vix acuto hermaphrodito fere duplo breviorē, vaginis hirsutis ore longe fimbriatis.

*Hab.* in Peruvia prope Tarapoto!, *Spruce in herb. Bentham.* v. s.

*Culmus* —pedalis, ramis fasciculatis, tactu asperis. *Folia* oblongo-lanceolata, sub 4 poll. longa, sub 6 lin. lata, basi vix inæqualia, petiolata, glabra. *Vaginæ* hirsutæ vel apicem versus *hirsutissimæ*, ore fimbriis plurimis stramineis longe fimbriatæ. *Spica* falcata, 1½–2 poll. longa, rhachi viridi, hirsuta, spiculis solitariis, secundis. *Spicula* subcurvata, 6 lin. longa, flosculo infimo sterili brevissimo, secundo hirsuto, nervoso, apice rotundato, brevissime mucronato, hermaphrodito hirsuto subobtusō ⅓ vel ½ breviorē. *Palea* inferior (flosculi fertilis) pilis sublongis fuscis hirsuta, apice vix acuta, superiorem obtusam, basi glabram, apice tantum subhirsutam, subæquans. *Squamulæ* latæ, oblongæ, obtusæ. *Stylus* basi simplex, vix cito in stigmata 2 pulchre plumosa divisus. *Ovarium* subtrigynum, apice fere rostratum.

The short spike and very hirsute vaginæ distinguish this at once from all the other species. It appears also to be the only one found out of Brazil.

5. *M. SPARSIFLORA*, Rupr., *l. c.* 127, tab. x. fig. 32. “Spiculis solitariis, distantibus, flosculis sterilibus hermaphroditum superantibus, fimbriis vaginæ *breviplumosis*.”—Staud. *l. c.* 338.

*Hab.* in Brasilia, “ad sinum omnium sanctorum,” *Riedel.* s. v. Ruprecht.

“*Folia* lineari-lanceolata, 5–7 poll. longa, 7–8 lin. lata, pellucida, subtus glabra, nervis secundariis 6 prominentibus. *Vaginæ* obsolete striatæ, læviusculæ, ore tenuiter fimbriatæ, fimbriis parvis, *inferne brevi-plumosis*. *Spica* exserta, recta, 2–4-pollicaris, spiculis solitariis, *distantibus*. *Spicula* (nondum sat evoluta) 5 lin. longa, flosculis 2 inferioribus (in icone valde inæqualibus) chartaceo-coriaceis, flosculum tertium, subglabrum, involventibus, *eumque superantibus*.”—Rupr.

6. *M. NEESII*, Rupr. *l. c.* 127, tab. x. fig. 31. “Spiculis solitariis, flosculis duobus inferioribus glabris (Rupr.) vel strigosis (Nees), secundo hermaphroditum superante, vaginis ore nudis.”—Staud. *l. c.* 338. *M. speciosa*, Nees, *l. c.* 527, non Sprengel nec Kunth.

*Hab.* in Brasilia, *herb. reg. Berol.* s. v. Nees et Ruprecht.

“*Culmus* (pars crassitie calami communis adest) æqualis, lignosus, tuberculis minutis asperrimus, ramis ex singulo nodo 24–30, adscendentibus, pedibus, omnibus apice monostachyis. *Folia* lanceolata, sub 4 poll. longa, 10–12 lin. lata, glaberrima, margine scabriuscula, subtus læviuscula, glauca, petiolata, petiolo glabro fuscescente, nervis secundariis utrinque 5–6, fascia obscura. *Vaginæ* striato-sulcatæ, lævigatæ, apice oblique truncatæ, ligulatæ, *ore nudæ*. *Spica* falcata, incurvata, 5–7-pollicaris, rhachi strigoso-sericea, spiculis solitariis, imbricatis, secundis, erecto-patentibus, in juventute vagina inclusa,

ætate e latere erumpens. *Spicula* 7–8–10 lin. longa, flosculis inferioribus glabris (fide Rupr.), extus strigosis (Nees), infimo brevior lanceolato-acuminato; secundo ovato-oblongo, in cuspidem longam aristæformem attenuato, 7–9-nervi, hermaphroditum pilosiusculum subæquante vel superante. *Palea* inferior (flosculi fertilis) ovato-oblonga, subulato-acuminata, coriacea, carinata, fusco-hirsutula, apicque præsertim villosa-ciliata; superior subæquilonga, lævissima, chartacea, mutica, obtusa. *Squamule* 3 obconicæ, truncatæ, apice ciliatæ, albæ. *Stamina* 2–3. *Stylus* bulbosus, apice bifidus in stigmata 2 glabriuscula (Nees), plumosa (Trin.). *Germen* trigonum, glabrum.”—*Nees et Ruprecht*; *Stuedel, l. c.*, ait, “Video in specimine omnino descriptioni congruente, ad oras vaginarum, setulas rigidas: vix species diversa.”

Judging from description alone, I think this species is scarcely sufficiently distinguished from *M. speciosa*, Spreng., the only difference of any consequence being the absence of a fringe at the mouth of the vagina. But Ruprecht had seen specimens of both, which I have not. I must, however, mention that in the text Ruprecht describes both lower neutral flowers as longer than the hermaphrodite one; whereas in his figure 31 the lowest flower is shown to be very much shorter, which it doubtless is.

7. *M. KUNTHII*, Rupr. *l. c.* 127, tab. x. fig. 30. “Spiculis solitariis, flosculis 2 inferioribus pilosis, secundo hermaphroditum nigro-hirsutum superante, vaginis ore nudis.”—*Stued. l. c.* 338. *M. speciosa*, Kth, Rev. Gram. i. 139, 333, t. 79! optima; Enum. 429, Supl. 354, non. Spreng.

*Hab.* in Brasilia, in sylvis montium pr. Rio Janeiro, *Beyrich*. s. v. Kunth et Ruprecht.

“*Culmus* 20–30-pedalis, ramulis longissimis, glabris, duris, superne foliosis. *Folia* lineari-lanceolata, 6–7 poll. longa, 1 poll. lata, apice angustato-acuminata, basi rotundata, subtus glaucescentia, nervis secundariis utrinque 6–8, undique papilloso-scabris, margineque superiore fascia 2 lin. lata cinerea nitida cincta. *Vagina* sulcato-striatæ, glabræ, lævigatæ, ore nudæ, ligulatæ. *Spica* subrecta, 5-pollicaris, spiculis solitariis, secundis, imbricatis, vagina suprema duplo brevior, exserta. *Spicula* 7–8 lin. longa, flosculis 2 inferioribus pilosis, infimo subulato brevissimo, secundo lanceolato, incurvo, setaceo-acuminato, nervoso, hirsuto, hermaphroditum nigro-hirsutum vix æquante vel superante. *Palea* inferior (flosculi fertilis) hirsuta, subobtusa; superior vix brevior, apice bifida, *hirsuta*. *Squamula* 3, superne ciliatæ, duæ laterales oblique oblongæ, tertia minor æquilatera. Media inter *M. speciosam* Spr. et *M. Neesii* Rupr.”—*Kunth et Ruprecht*.

Sect. II. *Spiculæ in capitulum densum congestæ.*

8. *M. CAPITATA*, Hooker, Icon. Pl. t. 273, 274 (1840). Spiculis in capitulum glomeratis, foliis latis, oblongis, vaginis ore longe fimbriatis.—*Chusquea fimbriata*? *Stued. l. c.* 338, var. foliis angustioribus. *Chusquea (Rettbergia) glomerata*, Munro in herb. Trin. Coll. Dublin.

*Hab.* in Brasilia, Rio Janeiro, *Gardner*, no. 136! *Tweedie*, 1324, *Riedel*. v. s.

*Culmus* scandens, gracilis, ramulis subpedalibus, multifoliatis, apice capitulum gerentibus, e nodis erumpentibus. *Folia* lata, oblonga, basi valde inæqualia, 4–6 poll. longa, 9–15 lin. lata, acuta, glabra sed tactu aspera, nervis secundariis a tertiariis non discernendis, petiolata, petiolo supra hirsuto. *Vagina* superne sæpissime hirsutæ, ore pilis longis validis rigidis rufis fimbriatæ. *Capitulum* densum, 1½ poll. diametro, multispiculatum, folio brevi quasi involucratum. *Spiculæ* pedicellatæ, 6–7 lin. longæ, flosculis 2 inferioribus neutris, hermaphrodito duplo brevioribus. *Flosculus* infimus sterilis,

5-nervis, carinatus, in subulam longam scabram abrupte acuminatus; secundus similis, sed longior et 7-nervis. *Palea* inferior (flosculi fertilis) 17-19-nervis, apice longe rostrato-acuminata, plerumque dorso subglabra, sed semper ad margines pilis fuscis hirsuta; superior sublongior, bicarinata, carinis ciliatis vel hirsutis, utroque latere 4-nervia, apice plus minus conspicue bifida. Flos terminalis 1-palaceus, magis evolutus quam in reliquis speciebus, pedicello brevi. *Squamulae* 3, lanceolatae, superne fimbriatae, inaequales, duae latiores, fere enervosae. *Stylus* basi simplex, stigmatibus superne divergentibus. *Ovarium* immaturum.

The details of the structure of this curious species are remarkably well represented in Sir William Hooker's drawing above quoted, although I do not find the squamulae united at the base as there shown. There are occasionally some abortive spiculae mixed with the others; and sometimes, indeed often, both paleae of the fertile floret have green herbaceous points, which in the upper palea are sometimes remarkably divergent; and in those cases it is considerably longer than the lower palea. Gardner says this grass is common in low woods about Rio, rising to a considerable height, climbing among and supporting itself on the branches of shrubs amongst which it grows. I have but little doubt that this is Steudel's *Chusquea fimbriata*, which, at any rate, is certainly not a *Chusquea*, in consequence of the terminal incomplete flower.

Duæ sequentes, tantum absque floribus notæ, ægre discernendæ sunt.

9. M. SELLOVII, Munro. "Culmo primario exasperato, vaginis ore herbaceo-barbatis, foliis glaucescentibus serrulato-scaberrimis."—Nees, Agr. Bras. 531, adnot. iii.; Rupr. l. c. 127, adnot.

*Hab.* Paraguay in acumine montis Cabo do Butucaray, *Sellow.* s. v. Nees.

The herbaceous beard to the vaginae, which, I confess, is a term I do not quite understand, appears to keep this distinct from other species, although Nees considered it might be a young state of one of the three he has described.

10. M. BURCHELLII, Munro. Foliis lineari-lanceolatis, 1-3-5½ poll. longis, 7-9 lin. latis, supra glabris, subtus glaucescentibus, glaberrimis sed punctulis minutissimis tactu subasperis, vaginis glabris, superne uno latere oreque fibris pallidis longis fimbriatis.

*Hab.* in Brasilia australi, pr. Santos ("Taquârra vel Taquârri miri" incolis), no. 3243! *Burchell.* v. s.

"*Culmus* solidus vel farctus (maturus cavus est), gracilis, 30-40-pedalis, apicem versus flagelliformis, pendulus, non ramosus sed verticillatim ramulosus" (Burchell), internodiis supremis filiformibus, vix ¼ lin. diametro, pilis reversis per totam longitudinem asperrimis. *Rami* vel ramuli (fide Burchell, 10-12) foliiferi tantum visi, basi strigoso-hirsuti et bracteis imbricati, apice 4-foliati, 6-9 poll. longi, diametro culmum superantes, ad nodum quemque semiverticillati. *Folia* (ramorum) infima pollicaria ovato-lanceolata, superiora lineari-lanceolata, fere setaceo-acuminata, basi attenuata in petiolum brevem nigrescentem, margine aspera, supra glabra sed nervis 2-3, margine uno setulis brevissimis subasperis, subtus glaucescentia, glaberrima, punctulis minutissimis vix tactu aspera, nervis secundariis utroque latere 7. *Vaginae* subglabrae, superne uno margine oreque fibris pallidis longis, sæpe subcirrhosis, fimbriatae.

The internodes which I have seen of this species are extremely rough to the touch,

and not thicker than packing-threads, although they have several branches at each node of the usual thickness. This may possibly be a peculiar state of one of the species already described; it appears to me, however, to differ from all the four species which have a simple fringe of longish fibres at the mouth of the vaginæ. *M. brevispica* is distinguished by having hairy vaginæ. *M. Claussenii* has leaves hairy below. *M. speciosa* has longer and broader leaves, with the vaginæ transversely rugose; and, finally, *M. ternata* would appear to differ in having smoother branches, much thicker stems, and longer and broader leaves, with more numerous secondary nerves below.

## VII. CHUSQUEA.

Kunth, Syn. Plant. Æquin. i. 252 (1822); Enum. 427; Endl. Gen. Plan. no. 906. *Rettbergia*, Raddi, Agrost. Bras. 17, t. i. fig. 1, Nees in Mart. Fl. Bras. 535. *Dendragrostis*, Nees in Linnæa, ix. 487. *Nasti*, sp., H. B. K., nov. gen. et sp.; Rœm. et Sch. l. c. 7. 2. 1360. *Arundinaria* sp., Nees in Mart. Fl. Bras. 525. *Arundinis* sp., Poir. Encycl.

*Spiculæ deorsum imperfectæ*, (exc. *Ch. Venezuelæ*) racemo pedicellatæ, intra glumas sessiles, *rhachilla obsoleta*, 3-floræ, vel rarissime in statu abnormali 4-floræ, flosculis 2 (vel in *Ch. oligophylla* subinde 3) inferioribus unipaleaceis, neutris; *terminali bipaleaceo hermaphrodito*. Interdum in *C. andina*, *C. tenella* et *C. capituliflora* spiculæ 4-floræ, flosculis duobus terminalibus perfectis. Interdum (teste Raddi) in *C. Gaudichaudii* "spiculæ monoicæ, masculæ et fœmineæ in eadem panicula sparsæ." *Glumæ* 2, vel fere obsoletæ (*Dendragrostis*, Nees), vel parvæ vel elongatæ (in *C. tenuiflora* et *C. aristata* spiculam æquantem et superantes), membranaceæ, paucinerves. *Flosculi* 2 neutri, 1-7-nerves, plerumque acuti, sæpe mucronati. "Hermaphroditi paleæ 2 membranaceæ, subæquales; inferior subcarinato-concava, acuto-mucronata, plerumque multinervia; superior parinervia, dorso superne sulcato-subbicarinata, emarginato-bifida." *Stamina* 3. *Squamulæ* 3, plerumque obtusæ et apice ciliatæ, membranaceæ, nervosæ vel enervosæ, subæquales. *Styli* 1-2, plerumque ad basin usque discreti, breves, stigmatibus vel pilosis vel interne plumosis vel villosis, pilis ramosis. *Caryopsis* lineari-oblonga, compressa vel teres, glabra, libera.

*Gramina*, orbis novi, in Mexico tropica, Panama, insulis Caribbæis, et America australi, tropica et extratropica, usque ad gradum 42° lat. aust.; nunc in locis maritimis, nunc in regionibus montanis excelsis crescentia. *Culmus*, in *Ch. andina* nanus, 2-pedalis, in plurimis suffruticosus vel arborescens, 6-20-pedalis, interdum altissimus, scandens, ramis fasciculatis sæpe pendentibus. *Folia* plerumque angusta et parva, interdum minima, brevissime petiolata et articulata, venulis transversis subtus nullis vel obscuris, vel raro plus minus conspicuis. *Vaginæ* plerumque efimbriatæ, in *Ch. tenella*, *C. simpliciflora*, et forsitan aliis fimbriatæ. Inflorescentia *terminalis*, vel racemus subsimplex, vel panicula plus minus depauperata, vel thyrsoides, vel panicula decomposita, ramis adpressis aut divaricatis, vel in sect. 2 panicula subrotunda, capitulum referens.

I have already, at page 13, referred to the interesting and suggestive fact of the resemblance borne by several species of this genus and its close ally *Planotia* to some species of *Panicum*, occasioned, as I imagine, by the terminal flower of the spicula, as in all Paniceæ, being the most perfect one. I have examined numerous spiculæ of different species of *Chusquea* and *Planotia*, and I have never discovered the least trace of an elongation of the axis into the terminal imperfect flower, which is, I believe, universally, except perhaps in some few genera of Bamboos, found in all other genera of the great tribe of grasses called "Poaceæ" by Robert Brown in his remarks on the Botany of Terra Australis. From the tribe Paniceæ, which contains all the remaining genera of grasses,



*Chusquea* and *Planotia* are distinguished by having *three* squamulæ, the *two* lowest flowers of the spicula neutral, and the spicula itself articulated above, instead of below, the glumes.

\*  
*Conspectus Specierum.*

Sect. I. Panicula vel simpliciter racemosa, vel plus minus composita et decomposita, *oblonga*, contracta vel divaricata. "Stigmata pilosa" (Rupr.). *Chusquea* propriæ et *Dendragrostis* (species glumis potissimum minimis), Nees in Linnæa, l. c. 486, 487.

- Racemus simplex, spiculis 3-5, *pedicellatis*. Folia *lata* . . . . . 1. *C. tenella*.  
 Racemus simplex, spiculis 3-4, *pedicellatis*. Folia *angusta* . . . . . 2. *C. simpliciflora*.  
 Racemus fere simplex, spiculis 5-10, *pedicellatis*. Folia *angustissima* . . . . . 3. *C. abietifolia*.  
 Panicula subracemoso-divaricata, simplex, spiculis *sessilibus* . . . . . 4. *C. Venezuelæ*.  
 Panicula *brevis*, semel bisve (vel interdum in *C. Cumingii* magis) composita, *ramis adpressis* non patulis.  
 Glumæ *brevissima*, obtusæ. Palea inferior mucronato-acuta . . . . . 5. *C. pinifolia*.  
 Glumæ *brevissima*, obtusæ. Palea inferior *longissime acuminata* . . . . . 6. *C. Purdieana*.  
 Glumæ *acuta, conspicua*. Folia subtus *non* tessellata . . . . . 7. *C. Cumingii*.  
 Glumæ *longe cuspidata*. Folia *tessellata* . . . . . 8. *C. uliginosa*.  
 Glumæ *breves*, acutæ vel obtusæ. Panicula pollicaris. Culmus bipedalis.  
 Folia *tessellata* . . . . . 9. *C. andina*.  
 Glumæ *breves*, acutæ vel obtusæ. Panicula 1-3-pollicaris. Culmus 15-20-pedalis. Folia *tessellata* . . . . . 10. *C. culeou*.  
 Panicula *brevis*, bis terve composita, ramis *laxifloris, patulis*.  
 Glumæ fere *obsoletæ*. Folia subtus *pubescentia*, angusta . . . . . 11. *C. uniflora*.  
 Glumæ fere *obsoletæ*. Folia *glabra, lata* . . . . . 12. *C. Galeottiana*.  
 Glumæ *breves*, obtusæ vel acutæ. Folia *glabra, angusta* . . . . . 13. *C. montana*.  
 Glumæ *acuta, conspicua*. Folia ovato-lanceolata . . . . . 14. *C. oligophylla*.  
 Panicula *elongata*, bis terve *magisve* composita, apice fere spicata, ramis *densifloris*, in *C. aristata* infimis compositis.  
 Glumæ *breves*. Folia *non* tessellata . . . . . 15. *C. spicata*.  
 Glumæ *breves*. Folia *tessellata* . . . . . 16. *C. tessellata*.  
 Glumæ *longissima*. Folia *tessellata* . . . . . 17. *C. aristata*.  
 Panicula *elongata*, bis terve composita, ramis *laxifloris, vix* patulis.  
 Glumæ *obsoletæ*. Folia subtus *glabra* . . . . . 18. *C. Fendleri*.  
 Glumæ *breves* sed *conspicuæ*. Folia subtus *pubescentia* . . . . . 19. *C. Dombeyana*.  
 Panicula *decomposita*, ramis plerumque *brevis* et patulis.  
 Glumæ *obsoletæ*. Folia basi *subcordata*, fere *sessilia* . . . . . 20. *C. anelytra*.  
 Glumæ fere *obsoletæ*. Folia basi *attenuata*, petiolata . . . . . 21. *C. Wilkesii*.  
 Glumæ *breves*, obtusiusculæ. Flosculi neutri nervosi . . . . . 22. *C. scandens*.  
 Glumæ *breves*, obtusiusculæ. Flosculi neutri fere enerves . . . . . 23. *C. pallida*.  
 • Panicula *decomposita*, ramis, interdum valde, *elongatis*.  
 Glumæ inæquales, superior longe acuta. *Rhachis* paniculæ fere *glabra* 24. *C. Mulleri*.  
 Glumæ *cuspidata*, spiculis *breviores*. *Rhachis* *hirsuta* . . . . . 25. *C. quila*.  
 Glumæ *cuspidata*, spiculas *æquantas*. *Rhachis* *scabro-hirsuta* . . . . . 26. *C. tenuiflora*.

Sect. II. "Panicula contracta, subrotunda (raro ovalis), capitulum referens. Folia ramulorum florentium inferiora et superiora decrescentia, his basin capituli arcute involucrantibus. Stigmata villosa, ramosa" (Rupr.). *Rettbergia*, Raddi et Nees.

Glumæ minutæ, <i>obtusa</i> . Rhachis paniculæ <i>dense pilosa</i> . . . . .	27. <i>C. Sellowii</i> .
Glumæ <i>acuta</i> , breves. Rhachis <i>glabra</i> . . . . .	28. <i>C. Gaudichaudii</i> .
Glumæ <i>acuminato-subulata</i> , breves. Rhachis <i>dense pubescens</i> . . . . .	29. <i>C. capituliflora</i> .
Glumæ setaceæ, longæ, <i>spiculam æquantés</i> . . . . .	30. <i>C. capitata</i> .

1. *C. TENELLA*, Nees in Linnæa, ix. 492. Racemo simplici; spiculis 3–5, coloratis, pedicellatis; glumis brevissimis, obtusissimis; foliis *latis*, vaginis *ore fimbriatis*.—Rupr. *l. c.* 121, tab. vi. fig. 17; Steud. *l. c.* 336. *C. (Dendr.) tenella*, Nees, *l. c.*

*Hab.* in Brasilia, *Lhotsky, Sellow!* v. s.

*Culmus* gracilis, internodiis longis, “floriferis quandoque foliis, demum deciduis, interstinctis.” *Folia* late lanceolata, 4–5 poll. longa, 12–15 lin. lata, raro angustiora 6–8 lin. lata, inæquilatera, brevipetiolata, glauca, subtus scabra. “*Vaginæ* glabræ, fusco punctatæ, *ore* margineque dense *ciliato-fimbriatæ*, ligula *obliqua* vel *oppositifolia*, elongata, excisa.” “*Racemi* basi bracteati, aphylli, e nodis setuligeris culmi fasciculatim erumpentes, falcati, penduli, pollicares,” spiculis 3–5 pedicellatis, rhachi glabra. *Spiculæ* oblongo-lanceolatæ, obtusiusculæ, coloratæ, 3–4 lin. longæ, nervoso-costatæ, glabræ. *Glumæ brevissima*, obtusissima. Flosculi 2 neutri, acutiusculi, inconspicue nervosi, flosculo hermaphrodito scabro, fere obtuso, subduplo breviores. *Palea* inferior 7-nervis; superior 4–6-nervis. *Squamulæ* 3, longæ, ovatæ, apice longe fimbriatæ, basi venosæ, subinæquales, tertia angustior. “*Stigmata* 2, longa, capillaria, semiplumosa. *Ovarium* lanceolatum, acuminatum.”

The specimens of this which I have seen, from Sellow in herb. Hooker. and herb. Bentham., are evidently in an abnormal condition, with small leaves scattered along the internodes, bearing racemes below the leaves, opposite to and above the leaves. The vaginæ are not fringed in these specimens. Nees states that there are sometimes two perfect hermaphrodite flowers in the spicula besides the two sterile flowers.

2. *C. SIMPLICIFLORA*, Munro. (Tab. II.) Racemo simplici, spiculis 3–4 *pallidis* pedicellatis, glumis brevissimis obtusis, foliis *angustis* inæquilateris, vaginis *ore fimbriatis*.

*Hab.* in Panama isthmo. “In sylvis densis,” *Sutton Hayes*, 661! *Seemann*, 426! *Triana!* v. s.

*Culmi* 50–80-pedales, scandentes, apice filiformes (fig. B), dumeta fere impenetrabilia formantes, internodiis semper gracilibus, interdum tenuissimis, scabris vel lævibus, 4–6–7 poll. longis. *Ramuli* floriferi breves basi subaphylli, superne folia 2–3 brevissima gerentes, rarissime proliferi circa nodos culmi dense fasciculati, adjectis interdum ramulis foliigeris tantum paucis, 8–9 poll. longis (figg. A, B). *Folia* inæquilatera, apice basique attenuata, margine serrata, vix petiolata, supra tactu scabra, subtus strigosa et basin versus hirsuta, nervis secundariis tota lamina 9, majora 2½ poll. longa et 4–5 lin. lata, minora vix lineam lata et 3–5 lin. longa (fig. B, magn. nat.). *Vaginæ* striatæ, inter strias hirsutæ vel hirsutissimæ, demum glabrescentes, ore margineque longe setoso-fimbriatæ, ligula brevi. *Racemus* brevis, vix pollicaris, simplex, spiculis pedicellatis subpatulis 3–4, rhachi glabra. *Spicula* pallida, acuta, 3–4 lin. longa, inconspicue nervosa, glabra, glumis 2 brevissimis obtusis, interdum hirtis (fig. 1). Flosculi 2 neutri acutiusculi, hyalini, hermaphrodito glabro ½–⅓ breviores. *Palea* inferior acuta, hyalina, inconspicue nervosa, superiorem acutam basi 4-nervem (nervis 2 ante apicem evanidis) subæquans (figg. 1, 2). *Stamina* 3, antherarum loculis apiculatis (figg. 2, 3). *Squamulæ* 3, teneræ, longe fimbriatæ, nervosæ (figg. 3, 4). *Stylus* basi simplex, superne divisus in stigmata 2 interne plumosa (fig. 4). *Caryopsis* matura, teres, lineari-oblonga, apice subattenuata, fusca.

In description, this approaches very closely in many respects to *C. tenella*, but it is extremely different in appearance, and may be easily distinguished by its pale-coloured

membranous spiculæ and much smaller leaves. It appears to be very abundant on the Isthmus of Panama, and especially near the Lion Hill station of the Pacific Railroad.

3. *C. ABIETIFOLIA*, Griseb. in *Flora Brit. West-Indian Islands*, 529. "Racemo fere simplici, spiculis 5-10 pedicellatis, glumis valde inæqualibus," foliis angustissimis spinoso-acuminatis, vaginis ore nudis.—*Arundo*, no. 5, P. Browne, *Civil and Nat. Hist. Jamaica*, 139 (teste Grisebach).

*Hab.* in Jamaica, *Wilson!*; Ind. occid., *Swartz*. Vidi folia tantum in herb. Hooker. s. v. Grisebach.

"*Culmus* alte scandens," internodiis glabris 3-5 poll. longis, 2 lineas diametro, ramulis foliiferis (internodiis 1-3-6 lin. longis) fasciculatis. *Folia* disticha,  $\frac{1}{2}$ -2 poll. longa,  $1\frac{1}{2}$ -2 lin. lata, linearia, rigida, subsessilia, glaucescentia, margine cartilagineo serrulato-scabra, apice spinoso-acuminata, nervo centrali subtus prominente, secundariis a tertiariis non discernendis. *Vaginæ* margine ciliatæ, demum glabrescentes, dense imbricatæ, ore biauriculatæ, eligulatæ. *Racemus* brevis, folia æquans, fere simplex, patulus, spiculis 5-10 pedicellatis, pedicellis 1 lin. longis, rhachi angulata scabra. *Spicula* lanceolato-acuminata, 3 lin. longa, glumis valde inæqualibus, inferiore subobsoleta. Flosculi neutri inæquales, inferior glumam superiorem æquans; superior amplectens, 5-nervis, acuminatus, flosculum hermaphroditum lineari-acuminatum puberulum 3-nervem æquans. *Palea* superior bicarinata, acuminata, inferiore paulo brevior.

Having seen only leaf-bearing specimens of this, I have taken the description of the inflorescence and its details from Grisebach. He, however, mentions only "three sterile glumes;" but as the plant, if it is really a *Chusquea*, must have had four, I have presumed that the lowest one was very small and nearly obsolete, and have so described it. The foliage bears a remarkable general resemblance to that of some species of *Coniferæ*.

4. *C. VENEZUELÆ*, Steud. *l. c.* 337. "Panicula subracemoso-divaricata, simplici, spiculis sessilibus, foliis lanceolatis."

*Hab.* in Venezuela, *Funck et Schlim*, no. 494. s. v. Steudel.

*Culmus* —, "ramis ad nodos 3-4-nis, supremis binis vel solitariis. *Folia* sparsa, lanceolata, acuta, 1-4 poll. longa, 2-4 lin. lata, brevipetiolata, glaucescenti-viridia, concoloria, tenuistriata, scabriuscula. *Vaginæ* apice fimbriatæ, margine nudæ. *Panicula* subracemoso-divaricata, simplex, rhachi glabra; spiculis 3-floris, 2-5 lin. longis, ad angulos rhacheos sessilibus. *Glumæ* membranaceæ, nervosæ, acutiusculæ, flosculis multo breviores. *Palea* inferior 5-7-nervis, acuta; superior (flosculi fertilis) margine ciliata."—*Steudel*.

I know nothing of this plant except from Steudel's description, given above verbatim. It is the only species in the whole genus with sessile spiculæ; and on this account I think it probable that it may belong to the genus *Arthrostylidium*.

5. *C. PINIFOLIA*, Nees in *Linnæa*, ix. 490. Panicula semel composita, depauperata, contracta, vix pollicari, glumis minimis obtusis, palea inferiore mucronato-acuta, foliis lineari-subulatis pungentibus.—*Trin.* in *Act. Petrop. l. c.* 614, icon. 340!; *Rupr. l. c.* 121, tab. ix. fig. 18; *Steud. l. c.* 336. *Arundinaria?* *pinifolia*, Nees in *Agrost. Bras.* 525; *Kth. Enum.* 427. *Ludolphia pinifolia*, *Dietr. Sp.* 2. 25. *Dendragrostis pinifolia*, Nees in *Linn. l. c.*

*Hab.* in Brasilia, *Sellow*!; in monte Itacolumi et Serra de Carassa, alt. 5000–6000 ped. s. m., *Riedel*; in altissimis petrosis, Serra do Itambe da Villa et alibi in districtu Adamantum provinciæ Minarum, alt. 3000–4000 ped., *Martius*; Organ Mts. in summis, *Gardner*, no. 5910! v. s.

*Culmi* 4–6-pedales, solidi, “fruticeta densissima struentes;” internodiis brevibus, 1–2 poll. longis, nigro maculatis, dense ramulis semiverticillatis ad nodos creberrimis, inferne adpressis, stricte arrectis, superne latoribus et dense foliosis tectis. *Folia* linearia, subulato-acuminata, quasi acerosa, rigida, sessilia, ramulorum suprema ultrapollicaria, inferiora breviora, vix lineam lata, utrinque glabra, subtus 7–11-nervia, nervis secundariis a tertiariis vix distinguendis. *Vaginæ* striatæ, lateribus hirsutæ vel demum glabrescentes, apice biauriculatæ, ligula nulla. *Panicula* semel composita, depauperata, lineari-oblonga, densa, plus minus pollicaris, spiculis distincte pedicellatis, rhachi pedicellisque puberulis. *Spicula* 3-linealis, subfusiformis, obtusiuscula vel acutiuscula, opaca, demum fuscescens. *Glumæ* ovatæ, minutæ, obtusæ. *Flosculi* neutri subæquales, 3-nerves, mucronulato-acuti, sub lente dorso asperiusculi, discolores in specim. e *Sellow*, concolores in spec. e *Gardner*, hermaphrodito brevissime strigoso-hispido fere dimidio vel  $\frac{1}{2}$  breviores. *Palea* inferior mucronato-acuta, 7-nervis, superiorem obtusam obsolete quadrinervem subæquans vel superans. *Squamulæ* apice fimbriatæ, inferne nervatæ. *Stylus* fere ad basin divisus, stigmatibus plumosulis. “*Ovarium* lanceolatum, in stylum simplicem attenuatum” (Nees).

Trinius states that this is one of the numerous plants called “Taquarra,” as I have already mentioned at p. 48.

6. C. PURDIEANA, Munro. *Panicula* semel composita, 2–3-pollicari, spiculis *pubescentibus*, glumis brevibus obtusis, palea inferiore flosculi hermaphroditi *longissime acuminata*, foliis angustis subtus *non tessellatis*.

*Hab.* in Nova Granada, “in humidis Monte del Moro, prov. Velez,” *Purdie*. v. s.

*Culmus* apice nutans, internodiis inferioribus crassis, asperis, spathis hirsutis involutis, semipedalibus et ultra, superioribus gradatim minoribus sub 3 poll. longis, ramulis numerosissimis, sub 8 poll. longis, ad nodos inferiores densissime fasciculatis. *Folia* ramulorum floriferorum lineari-lanceolata, basi attenuata, vix petiolata, apice setaceo-mucronata, margine vix serrata, 1–2 poll. longa, 1–1 $\frac{1}{2}$  lin. lata, glabra, nervis secundariis utroque latere 2 subtus conspicuis, venulis transversis *nullis*. *Vaginæ* glabræ, sæpe coloratæ, ligula brevi dorso pubescente. *Panicula* terminalis, semel composita, ramulis paucispiculatis, adpressis, sub 2 poll. longa, lineari-oblonga, rhachi scabriuscula. *Spicula* angusta, brevipedicellata, 5 lin. longa, pubescens. *Glumæ* 2, breves vel brevissimæ, obtusæ, coloratæ, hirsutiusculæ. *Flosculi* neutri nervosi, inæquales, superior  $\frac{1}{3}$  longior sub 3-linealis, oblongi, apice mucronati, 5–7-nerves, dorso pubescentes vel hirsuti et margine ciliati. *Palea* inferior floris hermaphroditi 5 lin. longa, dorso inferne glabra, superne pubescens, 7–9-nervis, apice subulato-acuminata; superior paulo brevior, fere glabra, superne tantum subbicarinata, apice bisubulata. *Squamulæ* 3, oblique lanceolatæ, nervosæ, toto margine fimbriatæ. *Stylus* cito bifidus in stigmata 2 plumosa.

Purdie says this is called “Carisa” by the natives; but that appears to be a word used for many species, indeed for cane-brakes generally. The long-pointed lower palea distinguishes this from all other species with short glumes.

7. C. CUMINGII, Nees in Linnæa, ix. 487. *Panicula* plerumque semel bisve, raro magis composita, contracta, lineari-oblonga, 1–3-pollicaris, glumis *lanceolatis cuspidatis*, foliis angustis, margine cartilagineo, subtus *non tessellatis*.—Rupr. *l. c.* 122, tab. vii. fig. 19 (tab. ix. fig. 19, dubia); Steudel, *l. c.* 336; Em. Desv. in Gay, Fl. Chili, vi. 448, tab. 83. fig. 1; Walp. Ann. vi. 1044. *Arundo quillinga*, Molina (fide Cuming).

*Arundo canila*, Mol. (Steud.). "Modum crescendi repræsentat Lütke, Iter, 1835, atl. tab. ii." (Rupr.). *C. parvifolia*, Philippi in Linnæa, xxxiii. 239.

*Hab.* Chili, Valparaiso, *Cuming*, 639! *Bridges*! *Capt. King*! *Bertero*, no. 816, *Pœppig*, *Kastalsky*, *Wilkes*!; Conception, *Mertens*.—*Gardner*, 5410! in Hb. Bentham. v. s.

*Culmus* 8-10-pedalis, erectus, superne nutans, internodiis sub 3-4 poll. longis, lævigatis, stramineis vel purpurascens; ramulis patulis, pedibus vel 2-pollicaribus, basi foliiferis, apice floriferis, dense fasciculatim erumpentibus, "sterilibus quibusdam divaricatis vel flexuosis." *Folia* lanceolata vel lineari-lanceolata, apice mucronato-acuminatissima, plana vel involuta, tenuia vel firma, pungentia, subrigida, sessilia, margine cartilagineo vix serrata, subtus glabra, concoloria, nervis secundariis 2-3 utroque latere, venulis transversis nullis, 1 poll. et ultra longa,  $1\frac{1}{2}$ -3 lin. lata. *Vaginæ* vix striatæ, glabræ, apice subbiauriculatæ, ligula brevi. *Panicula* lineari-oblonga,  $1\frac{1}{2}$ -2-3 poll. longa, contracta, plerumque semel bisve composita, interdum magis composita, thyrsoides, rhachi pedicellisque brevibus tenuiter puberulis, subteretibus. *Spiculæ* sæpe monoicæ, coloratæ vel sæpius pallidæ, ovato-lanceolatæ, nitidæ, obsolete nervosæ, 3-3 $\frac{1}{2}$  lin. longæ. *Glumæ* lanceolatæ, cuspidatæ, plus minus carinatæ, rarissime pubescentes, flosculo infimo vix duplo breviores. *Flosculi* neutri inæquales, cuspidati, 3-5-nervi; superior longior, hermaphrodito, glabro, sæpe colorato, 7-nervi,  $\frac{1}{3}$ - $\frac{1}{2}$  brevior. *Palea* superior apice obtuso bifida. *Squamulæ* subinæquales, lanceolatæ, basi venosæ, superne fimbriatæ. *Stylus* plerumque cito bifidus in stigmata 2 plumosa.

This plant varies considerably both in foliage and inflorescence. The specimens collected at Valparaiso in Wilkes's Expedition exhibit a very small prostrate form, which I believe to be *C. parvifolia* of Philippi. Ruprecht has given two drawings of the structure of the spicula, which do not agree with each other: plate vii. fig. 19 represents the ordinary state of the plant, and is quite correct in all details; plate ix. fig. 19, bearing the same name, is incorrect in many respects, and the second neutral flower is represented as having two paleæ.

8. *C. ULIGINOSA*, Philippi in Linnæa, xxx. 207. *Panicula* bis terve composita, lineari-oblonga, 2-4 poll. longa, ramis adpressis, glumis lanceolatis cuspidatis, *superiore flosculum infimum fere æquante*, foliis angustis subtus *tessellatis*.

*Hab.* Chili, Valparaiso, Puerto Monti! in uliginosis ("kleine Quila" incolis), *Philippi*. v. s.

*Culmus* vix 6-pedalis, ramosissimus; internodiis foliiferis glabris, 7 poll. longis, diametro 3 lin., basi spatha striata, adpresse hirsuta, involutis; floriferis sub 5 poll. longis, glabris, tenuioribus. *Ramuli* foliiferi (nondum sat evoluti) sub 3 poll. longi, oligophylli; florigeri fere aphylli, 3-6 poll. longi. *Folia* lineari-lanceolata, basi attenuata in petiolum brevem, apice mucronato-acuta, margine cartilagineo crasso serrata, rigida, glaucescentia,  $1\frac{1}{2}$ -2 $\frac{1}{2}$  poll. longa, 2-3 lin. lata, nervo centrali subtus valde conspicuo, secundariis 2-3 utroque latere, *venulis transversis* plus minus conspicuis *tessellatis*. *Vaginæ* striatæ, hirsutiusculæ, apice tenuiter ciliatæ, ore nudæ, ligula conspicua ciliata. *Panicula* bis terve composita, ramis adpressis, lineari-elongata, 2-4 poll. longa, rhachi pedicellisque sublongis angulatis scabriusculis. *Spiculæ* coloratæ, ovato-lanceolata, dorso scabra, inconspicue nervata, 3 lin. longa. *Glumæ* inæquales, lanceolatæ; superior longe cuspidata, 3-nervis, dorso scabra, flosculum infimum acuminatum subæquans. *Flosculus* secundus hermaphrodito 7-nervi subglabro parum brevior. *Palea* superior bicarinata, 6-nervis, inter carinas pubescens. Genitalia carie destructa in speciminibus a me visis.

In many respects this is very closely allied to *C. Cumingii*; but the foliage appears

sufficiently distinct to separate it from that species, in the leaves of which I have never observed any trace of tessellation.

9. *C. ANDINA*, Philippi in Linn. xxix. 103. Panicula fere simplici, *subunciali*, rhachi pubescente, glumis acutis vel obtusis, flosculo infimo duplo brevioribus, foliis angustis, longe acuminatis, subtus *tessellatis*.—Walp. Ann. vi. 1044.

*Hab.* Chili, in "Andibus, depart. Chillan ad limitem nivis perpetuæ," *Germain!* v. s.

*Culmus* erectus, humilis, vix *bipedalis*, ramis fasciculatis, densissime foliosis. *Folia* coriacea, lineari-lanceolata, 13–18 lin. longa, 2–2½ lin. lata, apice longe acuminata, margine coriaceo serrata, subtus 5-nervia, nervo mediano valde prominente, venulis transversis valde conspicuis *tessellata*. *Vaginæ* imbricatæ, striatæ, glabræ, ligula producta, ovata. *Panicula* subuncialis, fere simplex, radii brevissimis, rhachi dense pubescente, fere villosa, spiculis fere *sessilibus*. *Spicula*, glumis exemptis, glaberima, nitida, plerumque violacea, 3–3½ lin. longa, interdum 4-flora, flosculis 2 superioribus 2-paleaceis et hermaphroditis. *Glumæ* sæpe pubescentes, ovatæ, acutæ vel obtusæ, flosculis neutris, acuminatis, 1–3-nervibus, duplo breviores. *Palea* inferior (hermaphroditis) neutris ½ longior, conspicue 7-nervosa, apice acuminata, superiorem subæquans.

This species also approaches very closely to *C. Cumingii*, but is distinguished by its tessellated leaves and dwarf habit. I have never observed in any other species of *Chusquea* two perfect flowers in the spiculæ, although Nees observes that they are sometimes found in *C. tenella*.

10. *C. CULEOU*, Em. Desv. in Gay, Fl. Chili, vi. 450, tab. lxxxiii. fig. 2. Panicula spiciformi-contracta, 1–3 poll. longa, rhachi hirsuta; glumis plerumque obtusis, flosculo infimo plus quam duplo brevioribus; foliis angustis, subtus tessellatis et sæpe pubescentibus.—Walp. Ann. vi. 1044. *C. breviglumis*, Philip. in Linn. xxix. 103; Walp. l. c. 1043.

*Hab.* Chili, Valdivia, "in sylvis humidis," Gay; *Lechler*, 2920!; "Cordillera de Chillan," *Germain!* (*C. breviglumis*). v. s.

*Culmus* erectus, 15–20-pedalis et ultra (fide Gay), orgyalis (fide *Germain* ad *C. breviglumem*, Philip.), robustus, internodiis glabris vel superne scabriusculis, 3–4 poll. longis; ramis erectis, 3–7 poll. et ultra longis, densissime fasciculatis, polyphyllis. *Folia* coriacea, lanceolata vel "lineari-elliptica," apice mucronata sed vix attenuata, basi "nunquam attenuata" vel subcuneata, margine coriaceo, 1–3 poll. longa, 2–3 lin. lata, supra glabra, subtus interdum (non semper) pilis longis hirsuta, nervis 5 conspicuis, medio valde prominulo, venulis transversis crebris plus minus conspicuis tessellata. *Vaginæ* imbricatæ, striatæ, glabræ, ligula ovato-rotundata, producta. *Panicula* stricta, spiciformi-contracta, radiis densifloris, 1–3 poll. longa (1–1½, fide Desv.); rhachi hirsuta, fere villosa, spiculis *subsessilibus*. *Spicula* 2½–3–4 lin. longa, pubescens vel glabra, violacea vel pallida, subacuta. *Glumæ* 1-nerves, pubescentes vel glabræ, inæquales; inferior subobtusa; superior acutiuscula, flosculis neutris acuminatis 3-nervibus plus quam duplo brevior. *Palea* inferior (hermaphroditis) 7-nervis, tenuissime pubescens vel glabra, in apice obtusiusculo mucronata, superiorem æquans. *Squamulæ* inæquales; duæ latiores, basi 3–4-nerves, superne margine pilis longis ciliatæ; tertia angustior, 1-nervis (*Gay in icone*).

This approaches very closely to *C. andina*, which is very probably only an alpine form of this species. It is also nearly allied to *C. Cumingii*; and I am unable to assign any good distinguishing character to *C. breviglumis* of Philippi. The latter appears to be a

dwarfer plant; but that may be accounted for by Germain's specimens having been collected at a considerable elevation above the sea.

11. *C. UNIFLORA*, Steud. Syn. 337. Panicula *brevi, patula, laxa*, glumis fere obsoletis; spiculis obtusiusculis, 2-3 lin. longis; foliis angustis, membranaceis, subtus *pubescentibus*.

*Hab.* in Nova Granada, Marignita, *Linden*, 893!; Ecuador, Quito, in Andibus, *Spruce*, 5940! v. s.

*Culmus* "solidus, diametro 1-pollicari, arcuatus, 20-pedalis, sæpe ramosissimus, ramis sarmentoso-imbri-catis;" ramulis plerumque 6-9 poll. longis, interdum proliferis bipedalibus, ad nodos fasciculatis. *Folia* lanceolata, acuta, basi in petiolum attenuata, sub 1-2 poll. longa, raro longiora, 2-4 lin. lata, membranacea, supra tactu aspera, subtus pubescentia, nervis secundariis utroque latere 2. *Vagina* striatæ, margine, superne præsertim, ciliatæ, ligula elongata pubescente. *Panicula* semel bisve composita, 1½-3 poll. longa, laxa, diffusa, radiis solitariis, radiolis sæpe unispiculatis, in ramulis basi geniculatis (sæpe pendulis) oligophyllis terminalis; rhachi pedicellisque longis, spiculas subæquantibus, punctulis minutis asperis, vel interdum longe pilosis. *Spicula* 2-3 lin. longa, subobtusa, nitida, glumis minimis, fere obsoletis. *Flosculi* neutri subæquales, ovati, brevissime mucronati, inconspicue nervati, hermaphrodito lævi, fere duplo breviores. *Palea* inferior subobtusa, nervosa, cito dorso fissa; superior apicem versus bicarinata et bifida. *Squamula* lanceolatæ. *Stylus* cito bifidus.

The lower palea soon becomes split into two, and gives a very peculiar appearance to the spicula. Steudel, in describing the plant as with solitary branches, can only have seen one of the very numerous branches that are fascicled together at all the nodes.

12. *C. GALEOTTIANA*, Rupr. Bull. Brux. ix. 2. 246 (nomen tantum). Panicula *patula, laxa*, glumis fere obsoletis, spiculis obtusis, 5-6 lin. longis, foliis *lato-lanceolatis, glabris*.

*Hab.* Mexico, Oaxaca, 8000 ped. s. m., *Galeotti*, no. 5749! v. s.

*Ramuli* 12-16 poll. longi, unifoliati (duo tantum adsunt). *Folia* lato-lanceolata, 2-4 poll. longa, 6-10 lin. lata, in petiolum attenuata, membranacea, glabra, nervis secundariis utroque latere 3-4. *Vagina* striatæ, glabræ, ligula brevissima. *Panicula* laxa, patula, *semel composita*, nutans, rhachi hirsuta, radiis solitariis, radiolis 1-2-spiculatis, pedicellis spiculis (5-6 lin. longis) brevioribus vel raro æquantibus. *Glumæ* minimæ, fere obsoletæ. *Flosculi* neutri subæquales, multinerves (omnes in specimine viso imperfecti), hermaphrodito glabro breviores. *Palea* inferior 9-nervis, vix acuta; superior subobtusa, apice bifida, dorso conspicue canaliculata.—*C. unifloræ* proxima.

The specimens of this are unfortunately imperfect; but it is evidently a good species, with larger spiculæ than any other species of the genus.

13. *C. MONTANA*, Philippi in Linn. xxxiii. 298. Panicula *patula, laxa*, glumis brevibus conspicuis, spiculis violaceis; foliis angustis, subtus glabris, margine cartilagineo.

*Hab.* Chili, Valdivia, in montibus supra Corral, *Krause!* *Philippi*. v. s.

*Culmus* 6-9-pedalis, ramosissimus, internodiis scabris, ramulis 6-9 poll. longis ad nodos fasciculatis, ramulo uno alterove interdum prolifero polyphylo. *Folia* lineari-lanceolata, 2-2½ poll. longa, 2-3 lin. lata, glabra, basi attenuata, apice mucronata, margine subcartilagineo, nervis secundariis utroque latere 2, subtus *conspicuis*. *Vagina* conspicue striatæ, glabræ, margine ciliatæ, ligula elongata, glabra. *Panicula* laxa, patula, 2-3 poll. longa (4 poll., fide Philippi), semel bisve composita; rhachi angulata, subhirsuta; radiis solitariis; radiolis sæpe unispiculatis; pedicellis spiculas sub 3 lin.

longas, acutas, violaceo-coloratas, pubescentes æquantibus. *Glumæ* breves, obtusæ vel acutæ. *Flosculi* neutri subæquales, conspicue 3-5-nervati, acutissimi, pubescentes, flosculo hermaphrodito nervoso acuto pubescente vix duplo breviores.

This comes very close to *C. uniflora*, Steud., and is really only to be distinguished from it by the more conspicuous glumes and glabrous leaves with a thickened margin, and the secondary nerves very strongly marked.

14. *C. OLIGOPHYLLA*, Rupr. in Act. Petrop. l. c. 124, tab. vii. fig. 23. "Panicula patente, brevi, spiculis pallidis coriaceis, glumis acutis conspicuis, foliis ovato-lanceolatis, vaginis inferioribus ad nervos retrorsum hispidis."—Steud. l. c. 337.

*Hab.* in Brasilia. s. v. Ruprecht in herb. Mus. Pragensis.

"*Culmi* —pedales; internodiorum pars inferior setulis nigris divaricatis obsita; spathis persistentibus, 5-pollicaribus, striatis, ad nervos retrorsum hispidis; ramulis subternis, spithamæis, oligo(2)-phyllis. *Folia* ovato-lanceolata, 6 lin. lata, 3 poll. longa, brevipetiolata, viridia, subtus pallidiora glaucescentia. *Vaginæ* inferiores ramulorum quandoque setulis nigris obsitæ. *Panicula* patens, oblonga, rhachi glabra, semel bisve composita, radiolis solitariis paucifloris, spiculis pedicellatis. *Spicula* pallida, opaca, coriacea, 2-3-linealis, subtilissime punctata, terminalis, subinde 4-flora, flosculo tantum supremo bipaleaceo hermaphrodito. *Glumæ acutæ*, flosculis neutris distincte 7-11-nerviis duplo breviores. Hi flosculi hermaphrodito duplo minores. *Squamulæ* subæquales, apice fimbriatæ. *Stylus* ad basin simplex, superne divisus in stigmata 2 intus plumosa. Valde affinis *C. Gaudichaudii*."—Ruprecht.

15. *C. SPICATA*, Munro. Panicula elongata, spicata, rhachi hirsuta, glumis brevibus obtusis; foliis lineari-lanceolatis, basi subcordatis, apice subulato-acuminatis, non tessellatis.—*C. humilis*, Lechler MS.

*Hab.* Peru, Sachapata in Cordillera, Lechler, 2154! 2640! 2694! (var. glumis hirsutis). v. s.

*Culmus* erectus, internodiis vix sesquipollicaribus, ramulis polyphyllis, 14-16 poll. longis, erectis, apice spicigeris, ad nodos dense glomeratis. (Variat humilis, culmus vix 10 poll. longus, basi repens, ramis solitariis.) *Folia* lineari-lanceolata, 2-2½ poll. longa, 2 lin. lata, basi cordata et petiolata, apice longissime subulato-acuminata, glabra, nervis secundariis subtus inconspicuis. *Vaginæ* striatæ, superiores imbricatissimæ, lateribus pubescentibus, inter strias superne discolores vel (in var. *humili*) violaceæ, ligula brevi. *Panicula* spiciformis, 1½-5 poll. longa, basi interdum interrupta, rhachi hirsuta, pedicellis brevissimis. *Spicula* acuta, 1½-2½ lin. longa, plus minus pubescens; glumis brevibus, obtusis, hirsutis vel glabris. *Flosculi* neutri acuminati, subscabri, margine vix conspicue ciliati, hermaphrodito (acuto, apice nervoso et inter nervos pubescente) vix ½ breviores.

No. 2154 of Lechler contains portions of a large plant of some height; 2640 and 2694 are from very dwarf plants; but I cannot point out any distinction of consequence. The spike of this plant is extremely like that of *Panicum interruptum*, Willd.

16. *C. TESSELLATA*, Munro. Panicula elongata, spicata, rhachi hirsuta; glumis brevibus, obtusis, hirsutis; foliis lanceolatis, basi obtusis, apice subulato-acuminatis, subtus conspicue tessellatis.

*Hab.* in Nova Granada, "Andes de Bogota; Paramo de Cruz Verde, alt. 3000 ped. s. m.," Triana!; "in montibus ad orient. Bogotæ, Guadalupe," Holton, 97! v. s.



*Culmus* suffruticosus, erectus, subsolidus, internodiis  $1\frac{1}{2}$ –2-pollicaribus; ramis paucis, erectis, adpressis, cito divisus in ramulos oligophyllos, 6–16 poll. longos, apice spicigeros. *Folia* lanceolata vel lineari-lanceolata,  $1$ – $2\frac{3}{4}$  poll. longa,  $1\frac{1}{2}$ –3 lin. lata, basi obtusa, vix petiolata, apice longissime subulata, margine serrata vel basin versus pilis longis fimbriata, subtus venulis transversis crebris conspicue tessellata et sæpe pubescentia. *Vagina* striatæ, hirsutæ, subconcolores, margine sæpe longe fimbriatæ, ligula brevi, hirsuta, obtusa, ciliata. *Panicula* spiciformis, vix basi interrupta, angusta, fusca, 4–6 poll. longa, rhachi hirsuta, pedicellis brevissimis. *Spicula* sæpe monoicæ, acutæ, vix 3 lin. longæ, pubescentes vel hirsutæ; glumis brevibus, hirsutis, obtusis. *Flosculi* neutri mucronati, dorso scabriusculo-hirsuti, conspicue nervosi, inæquales; longior hermaphroditum glabriorem superans vel vix æquans. *Palea* inferior mucronata, superiorem fere membranaceam involvens.

This approaches the preceding species, *C. spicata*, in many respects, but is at once distinguished by the conspicuously tessellated leaves. M. Triana says it is called "Carisa" in Bogota.

17. *C. ARISTATA*, Munro. *Panicula* elongata, apice fere spicata, ramis inferioribus compositis; glumis aristatis, longissimis, flosculos multo superantibus; foliis lato-lanceolatis, subtus conspicue tessellatis.

*Hab.* Ecuador, Quito, in Andibus, alt. 13000–15000 ped. s. m., Jameson, no. 92! v. s.

"*Culmi* erecti, 5–6-pedales, fruticeta impenetrabilia struentes." (Partem superiorem simplicem tantum vidi.) *Folia* lato-lanceolata, 6–8 poll. longa, 9 lin. lata, glaberrima, basi vix attenuata, subito articulata, apice acuta, margine coriaceo, subtus venulis transversis crebris elevatis conspicue tessellata. *Vagina* glabræ, vel juniores hirsutæ, ligula nulla. *Panicula* terminalis, 9 poll. longa, fere jubalis, apice subspicata, radiis inferioribus sub 3-pollicaribus, compositis, subfalcatis, rhachi hirsuta, pedicellis basi glandulosis, brevibus, spiculas vix æquantibus. *Spicula* ovata, (glumis exclusis) vix 3 lin. longa, subpubescens. *Glumæ* 6 lin. longæ, enerviæ, basi latæ, attenuatæ in aristam longissimam scabram. *Flosculi* neutri subæquales, acuminati, scabri, fere enervii, hermaphroditum scabriusculum, apice 3–5-nervosum æquantes. *Squamula* 3, basi callosæ et multinervosæ, apice lanceolatæ enervosæ. *Stylus* cito bifidus, stigmatibus divaricatis et recurvis.

A very curious grass, resembling some species of *Echinochloa* in general appearance. Jameson says, "It is a tall reedy grass, found only on the Eastern chain of the Andes. At 13,000 feet it first makes its appearance, in irregular patches; at 15,000 feet it completely covers the whole surface, forming what the natives call a 'carizal,' impenetrable to man or beast. It continues upwards nearly to the limits of perpetual snow."

18. *C. FENDLERI*, Munro. *Panicula* elongata, angusta, longe exserta, composita, ramis laxifloris adpressis, glumis *obsoletis*, flosculis neutris paucinerviis; foliis angustis, subtus *glabris*.

*Hab.* Venezuela, in colonia Tovar, alt. 6000–7900 ped. s. m., Fendler, 1627!; Ecuador, "a litore usque ad 12,000 ped. s. m.," Jameson, no. 9! v. s.

*Culmus* solidus, diametro basi semipollicari; spathis magnis, longe acuminatis, subsericeo tomentosus; internodiis longis, glabris vel superne scabriusculis. *Rami* basi geniculati, alii foliiferi tantum, segregati,  $1$ – $1\frac{1}{2}$ -pedales, foliis 5–6, alii floriferi, breviores, foliis 1–2, ad nodos subtumidos fasciculati. Interdum ramuli foliiferi abortivi, brevissimi, cito recurvi, spiniformes fiunt. *Folia* in ramulis foliiferis sub 4 poll. longa, in floriferis brevioribus sæpe 1 poll. et ultra longa, 2–4 lin. lata, lineari-lanceolata, basi attenuata, apice longe setaceo-acuminata, margine longe serrata, glabra, nervis secundariis 6–8 conspicuis. *Vagina* glabræ, margine sæpe ciliatæ, interdum nudæ, ligula conspicua,

sublonga. *Panicula* elongata, lineari-oblonga, 4-5 poll. longa, semel bisve composita, ramis solitariis, adpressis, paucifloris, laxifloris; pedicellis spiculis brevioribus; rachi angulata, *glabra*. *Spicula* acuta, 3-5 lin. longa, glumis obsoletis. *Flosculi* neutri plerumque 3-nervii, mucronati, margine tenuiciliati, hermaphrodito glabro vix  $\frac{1}{2}$  breviores. *Palea* inferior nervis 7 conspicuis, acuta; superior subbrevior, binervia, bicarinata, carinis tenuiciliatis, apice bifida.

This is very close indeed to the following species, *C. Dombeyana*, and is principally to be distinguished by its extremely small, almost invisible glumes, smoother rhachis, and more glabrous leaves, with more strongly marked secondary nerves. Fendler says, "this grass spreads in many places of the primeval forest so as to exclude all other plants, and even deadens shrubs and trees, forming cane-brakes or 'carizals.'" Jameson asserts that the plant is found from the level of the sea up to 12,000 feet elevation.

19. *C. DOMBEYANA*, Kunth, Gram. ii. 553, tab. 191! *Panicula* elongata, angusta, ramis erecto-patulis, *laxifloris*, glumis *parvis sed conspicuis*; foliis angustis, subtus *pubescentibus*, "*venulis transversis obsoletis*, tamen sat crebris" (fide Ruprecht).—Enum. 428; Suppl. 350; Trin. in Act. Petrop. l. c. 616; Rupr. l. c. 123, tab. vi. fig. 22; Steud. l. c. 337.

*Hab.* Peru, *Dombey*; in Nova Granada, Bogota! Tolima! *Goudot*; Ecuador, "in sylvis ad flum. Chanchar, alt. 4000-6000 ped. s. m.," *Spruce*, no. 6093!

*Culmus* solidus, 9-10-pedalis, arcuatus, ramosissimus, ramis teretibus obsolete scabriusculis, ramulis floriferis subpedalibus, subdiphyllis ad nodos fasciculatim erumpentibus. *Folia* lanceolata, basi in petiolum brevem complanatum attenuata, apice acuminato-subulata, margine incrassato serrato cincta, 2-3 $\frac{1}{2}$  poll. longa, sub 3 lin. lata, supra *glabra*, viridia, subtus tenuiter *pubescentia* glaucescentia, nervis secundariis 6-8 subinconspicuis ("venulis transversis hyalinis obsoletis, tamen sat crebris," fide Rupr.). *Vaginæ* sulcatæ, *glabriusculæ* vel inferiores hirsutæ, superne sæpe margine longe ciliatæ, ligula rotundata, brevi vel sublonga, hirsuta vel *glabra*. *Panicula* elongata, oblonga vel lineari-oblonga, 3 $\frac{1}{2}$ -5-pollicaris, interrupta, ramis erecto-patulis, ramulisque abbreviatis, cum rhachi angulata vel teretiuscula *pubescenti-villosis* vel scabris. *Spicula* 2 $\frac{1}{2}$ -3 lin. longa, sessilis vel breviter pedicellata, colorata, *pubescenti-hirtella*, glumis *parvis sed conspicuis*, *obtusis* vel raro acutis, externe *pubescentibus*. *Flosculi* neutri 3-5-nervii, acutati, apice ciliati, hermaphrodito subpuberulo  $\frac{1}{3}$ - $\frac{1}{2}$  breviores. *Palea* inferior (hermaphroditi) nervis 7-8 prominulis, superne violascens, acutata; superior brevior vel longior, quadrinervia, superne bicarinata, apice bidentata et puberula. *Squamula* inæquales, duæ oblique ovatæ, tertia minor ovato-elliptica. *Stylus* cito bifidus in stigmata 2 plumosa.

The preceding species may prove to be a form of this; but in *Chusquea* the length of the glumes usually affords good characters. In this species they are conspicuous, and sometimes a line and upwards long, whereas in *C. Fendleri* they may be said to be almost altogether absent.

- 19 bis. *C. LIGULATA*, Munro. *Panicula* elongata, angusta, ramis erecto-patulis, *laxifloris*; glumis inæqualibus, acutis, *superiore 2 lin. longa*; flosculo *secundo neutro* hermaphroditum *æquante*; foliis angustis, subtus *glabris*, venulis transversis *nullis*, ligula elongata.

*Hab.* in Nova Granada, prope Bogota, *Lindig*, no. 1125! (ex herb. Mus. Paris.); ins. Juan Fernandez? in fruticetis et sylvaticis montium editiorum, *Bertero*, no. 1431! (folia tantum). v. s.

*Culmus* gracilis, ramulis floriferis 9–12 poll. longis. *Folia* angusta, lineari-lanceolata, basi rotundata vel cuneata, in petiolum brevem basi subtumidum attenuata, apice setaceo-acuminata, margine serrata, 3–5 poll. longa, 3–5 lin. lata, utrinque glabra, supra interdum tactu scabra, nervis secundariis 6 inconspicuis, venulis transversis nullis. *Vaginæ* sulcatae, glabrae, margine laeves, membrana infra petiolum terminatae, longe ligulatae. *Panicula* elongata, 4–5 poll. longa; ramis 1–2 poll. longis, laxis, adpressis; rhachi angulata, scabro-hispidula; spiculis plus minus longe pedicellatis. *Spicula* 5–6 lin. longa, fusca, scabro-hirsutiuscula; glumis acutis, inaequalibus, superiore 2 lin. longa, carinata. *Flosculi* neutri inaequales, nervoso-costati, inferior nervis 5; superior nervis 5–7, apice obtuso, hermaphroditum involvens et æquans vel etiam superans. *Palea* inferior flosculi fertilis neutris glabrior et minus conspicue nervosa, 7–9 nervis; superior subæquilonga, bicarinata et præterea binervia. *Squamulae* superne fimbriatae, subinæquales, duæ latiores. *Stylus* cito bifidus in stigmata 2 plumosa.

This species is certainly allied to the preceding in general form, habit, and appearance; but it has much longer glumes, and the spiculæ are nearly twice the length and have much longer pedicels. The second neutral flower is also unusually long and enveloping. The leaves are more glabrous, and the ligula considerably longer. The preceding pages were printed before I had an opportunity of seeing, through the kindness of M. Brongniart, a flowering specimen of this plant; and it is consequently not included in the "Conspectus Specierum" at p. 53, but should be placed between nos. 19 and 20.

20. C. ANELYTHRA, Nees in Linn. ix. 491. *Panicula* decomposita, ramis brevibus densifloris demum divaricatis, glumis obsoletis; foliis basi subcordatis, fere sessilibus, subtus dense strigosis.—Rupr. l. c. 120, tab. vi. fig. 16; Steudel, l. c. 336. *Dendragrostis anelythra*, Nees, l. c.

*Hab.* in Brasilia, Sellow! v. s.

*Culmus* lignosus, ad nodos ramosus, ramulis paucis (2–5), subpedalibus, inferne geniculato-nodosus et dense foliosis. *Folia* lanceolata, 2½–3 poll. longa, 3–4 lin. lata, basi subcordata, arcte sessilia, stricte patentia, glaucescentia, ad petiolum barbata, subtus ad nervos dense strigosa, nervis secundariis a tertiariis ægre discernendis. *Vaginæ* tota longitudine sulcato-striatæ, pubescenti-scabrae, apice biauriculatae et in ligulam obtusam productæ, efimbriatæ. *Panicula* decomposita, attenuata, pyramidalis, 5–6 poll. longa, rhachi hirsutissima, ramis pubescenti-villosis, racemosis, densifloris, demum divaricatis. *Spicula* lanceolato-acuminata, 3 lin. longa, flavescens, glabra; glumis minimis, ad callositates redactis. *Flosculi* neutri subæquales, inconspicue 3–5-nervati, acuti, hermaphrodito ½ breviores. *Flosculo* neutro secundo interdum (teste Ruprecht in icone) bipaleaceo. *Palea* inferior (flosculi fertilis) 5 nervis, acuta, superiorem binerviam, anguste carinatam, apice bidentatam vix æquans. *Squamulae* obovato-cuneiformes, acutæ, longe ciliatæ et penicillato-barbatæ. *Stylus* ad basin usque divisus, stigmatibus longis, longe plumuloso-ciliatis. "Habitus multo magis Paniceæ cujusdam acutifloræ ac *Chusqueæ*."—Rupr.

This grass has quite the habit and appearance of *Panicum proliferum*, Lam., and has a different look from all other species of *Chusquea*.

21. C. WILKESII, Munro. *Panicula* vix decomposita, ramis lævibus divaricatis tandem refractis, axillis glandulosis, glumis fere obsoletis; foliis basi attenuatis, subtus (basin versus) uno latere ad costam pilosis.

*Hab.* in Brasilia, Organ Montes, Wilkes. v. s.

*Culmus* scandens, fistulosus, internodiis 7 poll. longis, hirsutiusculis vel superne (infra nodos) hirsutis,

ramulis 6-8, valde inæqualibus, ad nodos fasciculatis, brevioribus (floriferis tantum) 4 poll. longis, reliquis subpedalibus, inferne foliosis, superne floriferis. *Folia* lanceolata, 3-4 poll. longa, 4-6 lin. lata, *basi attenuata*, apice setaceo-acuminata, margine serrato asperrima, supra scabra, subtus strigoso-hirsuta, punctulis minutis aspera, et basin versus uno latere ad costam pilosa (ut in *C. leptophylla*, Nees), nervis secundariis 8, vix conspicuis. *Vaginæ* inferiores hirsutæ, superiores glabrescentes, margine superne longissime fimbriatæ, infra petiolum *membrana conspicua alba* terminatæ, ligula elongata. *Panicula* vix decomposita, 2-3-pollicaris, vix (in ramulis foliiferis) e vagina suprema exserta, foliis superata, rhachi strigoso-hispida, ramis brevibus divaricatis et cito refractis, axillis glandulosis, pedicellis brevibus vel brevissimis. *Spicula* acuta, 3 lin. longa, pubescens vel hirsuta, *glumis fere obsoletis*. *Flosculi* neutri subæquales, paucinervi, ovati, mucronati, carinati, margine ciliati, hermaphrodito pubescente duplo breviores. *Palea* inferior (flosculi fertilis) mucronata, nervis 7 conspicuis, inter nervos strigoso-hispida; superior sæpissime longior, bicarinata et inter carinas hirsuta, apice bifida, bimucronata. *Stylus* cito bifidus in stigmata 2 divaricata. *Ovarium* (immaturum) subtrigonum.

This approaches *C. anelythra* in many respects, but is easily distinguished by its foliage, which is very dissimilar. The nearly obsolete glumes separate it from *C. scandens* and *C. pallida*. Nuttall, in his MS. notes on the grasses collected in Wilkes's Expedition, has marked this plant as constituting a "new genus," having apparently overlooked the very diminutive glumes.

22. *C. SCANDENS*, Kunth. Syn. i. 254. *Panicula* decomposita, *rhachi angulata scabra*, ramis brevibus divaricatis, axillis glandulosis, *glumis brevibus obtusis* vel acutis, *flosculis neutris distincte nervosis*, foliis lineari-lanceolatis, glabris.—Enum. 428 et Suppl. 350; Trin. in Act. Petrop. l. c. 616; Rupr. l. c. 123, tab. vi. fig. 21; Steud. l. c. 337. *C. Jamesoni*, Steud. l. c. 337. *Nastus chusque*, H. B. K., Nov. Gen. i. 201 (1815); Rœm. et Sch. Syst. vii. 2. 1360. *N. chusquea*, Rasp. Ann. d. Sc. Nat. v. 442. *Bambusa chusque*, Poir. Enc. Suppl. v. 494. *Mustelia arundinacea*, Cav. ined. teste Steud. Nomencl. 361.

*Hab.* Ecuador, Quito, "in montanis frigidis prope St. Fé de Bogota, monte Quindiu Loxæ," *Humboldt, Bonpland*; "prope Tambello," *Jameson*, no. 630!; in Nova Granada, *Linden*, 252! (e *Triana*); "in montibus juxta Bogota," *Holton*, no. 104! *Lindig*, no. 1047!; Peru?, *Jameson*. v. s.

*Culmus* scandens, altissimus, gracilis, internodiis asperis, ramulis dense fasciculatis, glabris, nitidis, valde inæqualibus, 4-12 poll. longis, interdum proliferis bipedalibus. *Folia* lanceolata vel lineari-lanceolata, 3-4 poll. longa, 4-5 (rarissime 9) lin. lata, in petiolum attenuata, angustato-subulata, margine lævi vel vix serrato, membranacea, glabra vel subtus pilis paucis sparsis vix pilosa, supra viridia, subtus pallidiora, nervis secundariis 6-8 conspicuis. *Vaginæ* glabræ, infra petiolum membrana elongata sæpe ciliata terminatæ, ligula brevi vel plus minus elongata (nulla, teste Kunth). *Panicula* decomposita, sub-3-pollicaris, plerumque longe exserta, ramulis patentibus cito divaricatis, subsecundis, abbreviatis, sæpe densifloris, axillis glandulosis, rhachi angulato-scabra, pedicellis brevibus. *Spicula* (sæpe pulchre variegata) lanceolato-cylindræa, 2-3 lin. longa, acuminato-subulata, glabra vel pubescens, *glumis parvis, obtusis* vel superiore longiore acuta. *Flosculi* neutri *distincte nervosi*, ovati, apice subulati, colorati vel pallidi; superior hermaphrodito parum brevior. *Palea* inferior (flosculi fertilis) multinervia, mucronato-subulata (basi eximie lutescens, fide Rupr.); superior binervia, apice bifida, laciniis subulatis. *Stylus* cito bifidus. *Squamule* inæquales, ovato-oblongæ, membranacæ, glabræ.

This appears to be a long, slender, decidedly climbing plant. The branchlets occa-

sionally become very compound, and are upwards of 2 feet in length; the panicles then are very long, peduncled, and the leaves are longer; and this is the form seen in no. 252 of Triana.

23. *C. PALLIDA*, Munro. Panicula decomposita, rhachi pilis longis hirsuta, ramis brevibus, primum adpressis demum divaricatis, glumis brevibus obtusis, flosculis neutris fere enervibus, foliis fere ovato-lanceolatis vel lanceolatis, glabris.

*Hab.* in Nova Granada; Sta. Martha! Purdie; Venezuela, "inter Caracas et La Guayra," alt. 1500 ped. s. m., Fendler, no. 1625! (folia tantum). v. s.

*Culmus* elatus, solidus, internodiis validis lævissimis, spathis glabris apice foliaceis involutis, ramulis numerosis subpedalibus fasciculatis, ramorum nodis pilis (sæpe longis et refractis) hirsutis. *Folia*, in ramulis floriferis, fere ovato-lanceolata, in foliiferis lanceolata, 3-5 poll. longa, 4-9 lin. lata, basi vix attenuata, apice setaceo-acuminata, margine aspera, membranacea, concoloria, supra tactu scabra, subtus glabra vel sub lente strigosa, nervis secundariis 8 conspicuis. *Vaginæ* glabrescentes, maculatæ, striatæ, margine ciliatæ (ciliis interdum basi bulbosis, supremis longis refractis), infra petiolum membrana chartacea terminatæ, ligulatæ. *Panicula* decomposita, 3-6 poll. longa, rhachi pilis longis hirsuta, ramulis mox patentibus, brevibus, spiculis brevipedicellatis. *Spicula pallida*, hyalina, 5 lin. longa, subpubescens, mucronato-acuminata, glumis 2 minimis obtusiusculis. *Flosculi* neutri membranacei, glaberrimi, vel uninerves, vel enerves, mucronati, apicibus sæpe divergentibus, hermaphrodito fere duplo breviores. *Palea* inferior (flosculi fertilis) nervis 7-9 conspicuis, glaber vel nervorum interstitiis pubescens, mucrone brevi scabro subulata, dorso sæpe cito fissa; superior brevior, leniter nervosa, carinata, breviter bifida.

This approaches *C. scandens* very closely, but appears to be distinguished by its broader leaves, much more hairy rhachis, larger, paler-coloured, and transparent spicula, and shorter nerveless neutral flowers.

24. *C. MULLERI*, Munro. Panicula decomposita patente, ramis elongatis, rhachi fere glabra, spiculis  $4\frac{1}{2}$  lin. longis, glumis mucronatis inæqualibus, superiore duplo longiore, foliis lato-lanceolatis, utrinque glabris, nervis secundariis subtus inconspicuis.

*Hab.* in Mexico, Vera Cruz, Orizaba, Muller, no. 2024! v. s.

*Culmi* pars superior (abnormalis, sesquipedalis) tantum adest. *Folia* glaucescentia, lato-lanceolata, 4-5 poll. longa, 4-6 lin. lata, basi attenuata, apice acuminata, margine serrata, glabra, subtus pallidiora, striata, nervis secundariis inconspicuis. *Vaginæ* glabræ sed margine longe ciliatæ, ligula elongata, hirsuta. *Panicula* (juvenilis) aperta, decomposita, radiis paucis solitariis, rhachi pedicellisque (spiculis fere dimidio brevioribus) glabris. *Spicula* glabra, 4-5 lin. longa, glumis inæqualibus, inferiore acuto-mucronata vel tridentata, superiore duplo longiore mucronata. *Flosculi* neutri glabri, colorati, trinerves, apice attenuati, hermaphrodito distincte nervoso, glabro, acuminato fere  $\frac{1}{3}$  breviores. *Palea* superior (flosculi fertilis) glabra, canaliculata.

I have only seen one specimen of this, sent by Dr. Meisner to the Kew Herbarium, evidently composed of two proliferous branchlets. I have no doubt, however, that it is a good species. It approaches *C. scandens* in some respects.

25. *C. QUILA*, Kth. Gram. i. 138, 329, t. 77. Panicula decomposita, ramis demum elongatis, cito patulis et divaricatis, rhachi hirsuta, spiculis 2-3 lin. longis, glumis cuspi-

*datis subæqualibus*, flosculis neutris  $\frac{1}{3}$ – $\frac{1}{2}$  brevioribus, foliis lanceolatis, subtus *puberulis* vel *pubescentibus* venulis transversis plus minus conspicuis.—Enum. 428; Suppl. 351; Trin. in Act. Petrop. l. c. 616; Rupr. l. c. 123, tab. ix. fig. 20; Steud. Syn. 336. *C. pubescens*, Steud. l. c. 337. *C. Valdiviensis*, Em. Desv. in Gay, Fl. Chil. vi. 446; Walp. Ann. vi. 1044. *C. intermedia*, Steud. in Lech. Fl. Chilensis (nomen tantum). *Arundo quila*, Poir. Enc. vi. 274; Rœm. et Sch. Syst. Veg. Mant. ii. 479. An etiam *A. quila*, Molina, Geog. Nat. and Civil Hist. of Chili, i. 126 (1809)? *Nastus quila*, Rœm. et Sch. Syst. vii. 2. 1361.

*Hab.* in Chili, *Dombey*; Valparaiso, *Capt. King!* *Wilkes!*; Valdivia, *Bridges*, 821! *Philippi!* *Lechler*, 525! & 525 a!; ins. Chiloe, *Capt. King!* *Anderson!* v. s.

*Culmus* ramosissimus, elatus, internodiis sæpe 9 poll. longis, faretis, lævigatis vel apice scabris; ramulis floriferis patulis, 6–15 poll. longis, subcompressis, vel 4–5-phyllis vel polyphyllis, ad nodos fasciculatis. *Folia* herbacea, lanceolata vel lineari-lanceolata, 2–4–6 poll. longa, 3–4–7 lin. lata, basi cuneata, interdum inæquilatera, apice acutato-subulata, margine cartilagineo remote spinuloso, supra glabra, subtus glaucescentia, puberula vel pubescentia, pilis longis sæpe inspersis, nervo centrali prominulo, secundariis 6–10, venulis transversis subinconspicuis vel in var. *Valdiviensi* conspicuis pellucidis. *Vaginæ* glabræ, apice pilosiusculæ, margine ciliatæ, infra petiolum membrana brevi ciliata terminatæ, ligula ciliato-pilosa. *Panicula* 2–6 poll. et ultra longa (pedalis teste Steud. ad *C. pubescens*), rhachi angulata, pubescente vel hirsuta, ramis cito patulis, sæpe densifloris, inferioribus interdum  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longis, pedicellis brevibus. *Spicula* ovata, 2–3 lin. longa, pallida vel colorata, subnitida vel puberula, glumis cuspidatis subæqualibus, flosculis neutris  $\frac{1}{3}$ – $\frac{1}{2}$  brevioribus. *Flosculi* neutri subæquales, 3–5-nerves, cuspidati, sæpe discolores, hermaphrodito glabro vel pilis brevibus adpressis hirtis  $\frac{1}{3}$ – $\frac{1}{2}$  breviores. *Palea* inferior (flosculi fertilis) nervis 7 distinctis, acuto-mucronata; superior brevior vel longior, 4–6-nervis, apicem versus subbicarinata, apice emarginata. *Squamulæ* hyalinæ, inferne 4–5-nerves, apice obtusæ et piliferæ. *Stylus* cito bifidus in stigmata 2 plumosa. *Fructus* immaturus lineari-oblongus, glaber vel puberulus (teste Steudel).

I have fortunately had numerous specimens of this plant to examine, and feel, after careful comparison, that I am justified in considering all the species named above to be either identical with or mere varieties of the original *C. quila*. Kunth's drawing represents an unusual state, with the panicle shorter and less compound than it generally is. Lechler's no. 525 contains a specimen of this state. *C. Valdiviensis*, which has the transverse veinlets more conspicuous and the spiculæ more hirsute than usual, has, I think, been created by a misapprehension of Philippi's as to what the true *C. quila* is; for in Linnæa, xxix. 103, he says that "in *C. quila* glumæ aristatæ sunt, spiculam subæquantas." I do not know what his authority is for this statement, which certainly does not coincide with Kunth's description or figure. I must refer to this again in describing the following species. This plant is stated by various collectors to be called by the inhabitants "Quila," "Kili," or "Keelee."

26. *C. TENUIFLORA*, Philippi in Linnæa, xxx. 206. Panicula decomposita, elongata, gracili, ramis demum divaricatis, rhachi *scabro-hirsuta*, glumis longis spiculam æquantibus vel superantibus, foliis angustis subtus *glabris* vel *puberulis*.—*C. quila*, Em. Desv. l. c. 447 (non aliorum)? *C. ciliata*, Philip. l. c. xxxiii. 299?

*Hab.* in Chili, Valdivia, San José in nemoribus, Santiago in maritimis, *Philippi!*; Chiloe, *Germain.* v. s.

*Culmus* ramosissimus, 6-12-pedalis, internodiis 5 poll. longis, fere glabris; spathis sub 3 poll. longis, striatis, glabris; ramulis tenuibus, plerumque 7-9 poll. longis, interdum sesquipedalibus, sub-4-phyllis, fasciculatis. *Folia* herbacea, lineari-lanceolata, 2-4 poll. longa, 3-4-5½ lin. lata, basi attenuata, inæqualia, apice sensim acuminata, margine valde serrato, subtus glabra vel pilosa, nervis secundariis duobus in uno latere, tribus in altero, costa parum prominente, venulis transversis vix conspicuis, pellucidis. *Vagina* superne fere glabræ, inferne hirsutiusculæ, margine subhirsutæ vel longe fimbriatæ, ligula producta. *Panicula* 6-8 poll. longa, angusta, rhachi scabro-hirsuta; radiis principalibus elongatis, primum adpressis, demum divaricatis, interdum laxifloris; pedicellis hirsutis, brevissimis. *Spicula* ovata, 3 lin. longa, pallida, sub lente strigoso-hispida, glumis subtrinervis, setaceo-acuminatis, spiculam æquantibus. *Flosculi* neutri lanceolati, cuspidati, glumis breviores, subtrinerves, hermaphroditum vix æquantibus. *Palea* inferior (flosculi fertilis) oblonga, mucronata, superne 5-7-nervis, interdum margine ciliata; superior brevior, binervis, subobtusata. *Squamula* oblongæ, obtusæ, apice pilis paucis fimbriatæ, fere enervosæ. *Stylus* basi simplex, tunc divisus in stigmata 2 gracillima pulchre plumosa.

I imagine this to be the plant which was considered by Em. Desvaux and Philippi to be the true *C. quila*, and that this misapprehension, already referred to, induced them to describe *C. Valdiviensis* and perhaps *C. ciliata* as new species. I believe that *C. tenuiflora* is a young state, and *C. ciliata* a more advanced state of the same plant. In one of the specimens, of what I believe to be this species, in Herb. Kew. (sent from Chili by Philippi, but without a name), the branches are nearly 2 feet, and the panicle 7-8 inches long; and altogether the plant appears to have a habit of growth very different from that of the other allied species.

Sect. II. "Panicula contracta, subrotunda (raro ovalis), capitulum referens. Folia superiora interdum basin capituli arcte involucrentia." *Rettbergia*, Raddi et Nees.

27. *C. SELLOVII*, Rupr. *l. c.* 125, tab. ix. fig. 26. "Capitulis terminalibus suborbiculatis, rhachi pedicellisque dense pilosis, glumis minutis obtusis pilosiusculis, foliis lanceolatis concoloribus."—Stead. *l. c.* 337.

*Hab.* in Brasilia, *Sellow.* s. v. Ruprecht.

"*Culmus* farctus, tenuissimus, filiformis, debilis, scandens, ramulis ad nodos subternis, 2-3-pollicaribus, diphyllis, inferne capitulo brevipedunculato, aphylo, recurvato plerumque auctis. *Folia* lanceolata, concoloria, chartacea, 2 poll. longa, 4 lin. lata, basi apiceque attenuata, margine setulis paucis, remotis, longioribus, demum deciduis obsita, venulis transversis, subtus sæpe anastomosim perfectam exhibentibus, nervis secundariis 2 subobsoletis. *Capitulum* suborbiculatum, diametro 7-lineali, rhachi pedicellisque dense pilosis. *Spicula* 2 lin. longa, maculata, glumis minutis, pilosiusculis, obtusis, flosculo infimo chartaceo, obsolete striato 3-4-plo brevioribus; flosculo secundo opaco, scabro, chartaceo, hermaphrodito obtuso distincte brevior. *Palea* superior (flosculi fertilis) multinervis, dorso canaliculata, obtusa. *Stylus* cito bifidus in stigmata 2 pilosa."—Rupr. desc. et icon.

28. *C. GAUDICHAUDII*, Kunth, Rev. Gram. i. 138, 331, t. 78. "Panicula ovato-oblonga, rhachi glabra, glumis acutis brevibus, paleis obtusiusculis, foliis ovato-lanceolatis."—Enum. 428, Supl. 352; Rupr. *l. c.* 124, tab. ix. fig. 24; Steud. *l. c.* 337. *Rettbergia bambusæoides*, Raddi, Agros. Bras. 17, t. i. fig. 1 (analysis spiculæ tantum); Nees in Agros. Bras. 536.

*Hab.* in Brasilia, Rio de Janeiro, Corcovado Mont., *Raddi*, *Gaudichaud*, *Mertens*. s. v. Ruprecht et Kunth.

“*Culmus* altissimus, ramosus, scandens?, ramulis ad nodos subternis, subpedalibus ( $1\frac{1}{2}$  lin. latis), pleio-(9) phyllis. *Folia* ovato-lanceolata (Kunth), lineari-lanceolata (Rupr.),  $3-3\frac{1}{2}$  poll. (teste Kth.), 6-8 poll. (teste Rupr.) longa, utrinque glabra, subtus pallidiora, basi inæqualia, cuneata, apice angustato-acuteata, nervis secundariis 9, venulis transversis rarissime vel non anastomosim plenam referentibus. *Vaginæ* compressæ, carinatae, superne ciliatæ, ligula prominente, oblique rotundata, glabra. *Panicula* patens, ovato-oblonga, bipollicaris, *rhachis* glabra. *Spicula* (interdum monoica, teste Raddi) oblonga, pedicellata, castaneo-fusca, coriacea, nitida, 4-5 lin. longa, glumis acuminatis, brevibus,  $1-1\frac{1}{2}$  lin. longis, carina scabris. *Flosculi* neutri obtusiusculi, glabriusculi, obsolete 7-nervii, inæquales, superior hermaphrodito parum brevior. *Palea* inferior (flosculi fertilis) flosculis neutris simillima, sed major; superior subæquilonga, ad dorsum superne sulco hirtello notata, 6-nervia. *Squamulæ* angustæ, integræ, apice pilis longis ciliatæ, inæquales, duæ trinerviæ, tertia brevior 1-nervia. *Stylus* cito bifidus in stigmata 2 pilosa (Rupr.), unilateralia, intus plumosa (Kunth).”—*Ruprecht et Kunth*, descr. et icon.

I am only acquainted with this plant from Kunth's drawing, and Ruprecht's and Kunth's descriptions. Nees says he never saw the plant, and, quoting Raddi's words verbatim, states that he cannot but doubt the correctness of them. Judging from Kunth's drawing, I cannot consider that the plant should be placed in the section defined by having “panicula contracta capitulum referens.” It appears to me that it should have been placed next to *C. oligophylla*, to which it is evidently closely allied. It will be observed that the two descriptions by Kunth and Ruprecht differ in many respects, especially as to the size and form of the leaves. Kunth states that he described and figured his plant from a specimen sent by Gaudichaud. Ruprecht does not state from what particular specimen his description was made.

29. *C. CAPITULIFLORA*, Trin. Act. Petrop. *l. c.* 613, icon. 339. “Capitulis terminalibus, *rhachi pedicellis*que dense pubescentibus, glumis acuminato-subulatis, carinis ciliatis, paleis nervosis subobtusis, foliis ovato-lanceolatis.”—Rupr. *l. c.* 125, tab. ix. fig. 25; Steudel, *l. c.* 337.

*Hab.* in Brasilia, Rio Janeiro in sylvis umbrosis (“Quixiame” incolis), *Riedel*. s. v. Trinius et Ruprecht.

“*Culmus* altissime scandens, crassitie 1-lineali, teres, ramulis ternis vel numerosis, fasciculatis, spithamæis, folii (5)-geris, patentibus, imo quandoque declinatis. *Folia* ovato-lanceolata (maxima 3 poll. longa, et 5 lin. lata), viridia, concoloria, basi apiceque attenuata, venulis transversis (subtus) raro anastomosim perfectam exhibentibus. *Vaginæ* glabræ, ligulæ loco margine subauriculato-productiusculo. *Capitulum* suborbiculatum, diametro 8-lineali, folio supremo parvo stipatum, rhachi pedicellisque dense pubescentibus. *Spicula* ovato-oblonga, 3-4-linealis, plus minus obtusa, glumis acuminato-subulatis, nervosis, scabriusculis, ad carinam ciliatis, flosculo infimo duplo brevioribus. *Flosculi* neutri inæquales, 7-9-nervii, nervoso-striati, glabri, obtusi, interdum minutissime mucronulati, inferior paulo vel  $\frac{1}{4}$  brevior; secundus hermaphroditum obsolete nervosum, nitidum, coriaceum, obtusum æquans vel parum superans. Rarissime accedit *flosculus neuter tertius*, vel etiam spiculis alteris flosculi 2 hermaphroditi occurrunt. *Palea* superior inferiore paulo brevior, bicostata, et præterea utrinque binervis. *Squamulæ* 3, subæquales, inferne nervatæ, superne fimbriatæ. *Stylus* ad basin bifidus in stigmata 2 pubescenti-plumosula.”—*Trinius et Ruprecht*.



30. *C. CAPITATA*, Nees in Linnæa, ix. 489. Capitulis terminalibus densissimis, rhachi pedicellisque *puberulis*, glumis *setaceis, longis, spiculam* æquantibus; foliis lanceolatis, basi rotundatis.—Rupr. *l. c.* 125, tab. viii.; Steud. *l. c.* 338. *Rettbergia capitata*, Nees, *l. c.*

*Hab.* in Brasilia, *Sellow! Lhotsky.* v. s.

*Culmus* scandens, rigidus, crassitie lineali, ramulis creberrimis e nodis fasciculatim erumpentibus, spithamæis, aliis sterilibus 3-4-phyllis, aliis subaphyllis, aliis foliiferis floriferisque. *Folia* ovato-lanceolata 3-4½ poll. longa, 3-6 lin. lata, glabra, basi rotundata, nervis secundariis 6-8 subtus parum conspicuis, "venulis transversis anastomosim dimidiam exhibentibus." *Vaginæ* glabræ, ligula brevi rotundata. *Capitulum* suborbiculare, 6-10-lineale, ad basin foliolis 2 suffultum, rhachi pedicellisque striato-sulcatis puberulis. *Spiculæ* 3-4 lin. longæ, compressæ, carinatæ, ovatæ, flavido-stramineæ, fasciculis parvis, ad rhachim communem dense et subsecundo dispositæ, imbricatæ, glumis setaceis flosculos omnes æquilongos attingentibus. *Flosculi* neutri basi nervosi, acuti, subpubescentes. *Hermaphroditi* palea inferior 5-nervis, apice subobtusum mucronulata; superior apice bifida, æquilonga. *Squamulæ* valde inæquales, emfimbriatæ (teste Rupr. in icone).

CHUSQUEÆ *cognitæ steriles (foliiferæ tantum) igiturque dubiæ.*

31. *C. LEPTOPHYLLA*, Nees in Linn. ix. 489. Foliis linearibus, elongatis, acuminatis, basi inæquilatero-cuneatis, 5-nervis, glaucis, subtus basin versus *uno latere pilis longis hirsutis*.—Rupr. *l. c.* 119, et Steud. *l. c.* 336, sub *Arthrostylidium Trinii*.

*Hab.* in Brasilia, *Sellow.* v. s. absque floribus.

*Culmus* crassitie pennæ cygneæ, ramulis numerosis, 6-18 poll. longis, glabris, filiformibus, e nodis compressiusculis et scrobiculato-punctatis erumpentibus. *Folia* angustissima, 1½-5 poll. longa, vix 2 lin. lata, basi attenuata, inæquilatera, apice setaceo-acuminata, margine supero ciliata, glauca, nervis secundariis utroque latere 2-3, subtus, ad basin, petiolum versus, *uno latere dense pilosa*. *Vaginæ* glabræ, striatæ, ore bilobæ ciliatæque, ligula *nulla*.

I have already stated, at p. 45, that Ruprecht and Steudel thought it probable that this plant might be a sterile state of *Arthrostylidium Trinii*, but that I did not coincide with them. The specimens that I have seen bear a general resemblance to several species of *Chusquea*, especially to *C. Dombeyana*. In *C. Wilkesii* the leaves, which are 4-6 lines broad, are hairy below on one side only; and the same one-sided pubescence is found occasionally in the narrow-leaved *Guaduas*. Nees does not mention this pubescence on the lower surface of the leaves, but says that they are fringed on one margin and smooth on the other.

32. *C. HETEROPHYLLA*, Nees in Linn. ix. 488. "Culmo *tetragono* pubescenti-scabro, foliis aliis *lanceolato-linearibus*, aliis *ovato-acuminatis*, acutissimis, sessilibus, supra scabris, *subtus* glaucis, *glabris*."—Rupr. *l. c.* 122 (in not. ad *C. pinifolia*); Steud. *l. c.* 336.

*Hab.* in Brasilia, *Sellow.* s. v. Nees et Ruprecht.

"*Culmus* obtuse tetragonus, scaber, infra nodos fusco hirto-tomentosus et nigro maculatus (ut in *C. pinifolia*), ramulis e nodis dense fasciculatis, patulis. *Folia* lanceolato-lineararia, acutissima, sessilia, supra

scabra, subtus glauca, glabra, parum transparentia, nervis secundariis a tertiariis non discernendis, mox convoluta, diutius persistentia, inferiora ramulorum propullantium *ovato-acuminata*, imbricata, 6-7 lin. longa et 2 lin. lata. *Vaginæ* striatæ, scabræ, sursum versus subpuberulæ."—Nees et Ruprecht.

This plant, as described, is evidently in an abnormal condition; and I think it is very probable that Ruprecht is correct in considering that it may be a state of *C. pinifolia*, with some of the leaves very much broader than usual. Nees, however, considers that it is more nearly allied to *C. Cumingii*.

C. AMPLOPANICULATA, Steud. Syn. 337; Miq. Fl. Ind. Bat. iii. 414=*Dinochloa Tjan-korreh*, Busè.

C. FIMBRIATA, Steud. l. c. 338=*Merostachys capitata*, Hook.

### VIII. PLANOTIA.

Munro. *Platonia*, Kunth, Gram. i. 139, 327, t. 76! (sed non Martii). *Chusqueæ*, subgen. *Platonia*, Nees in Linn. ix. 486; Endl. Gen. Plantarum, no. 906.

*Spicula deorsum* imperfecta, 3-flora, intra glumas sessilis vel brevissime pedicellata, *rhachilla obsoleta* vel subinconspicua, flosculis 2 inferioribus neutris 1-paleaceis, *terminali bipaleaceo, hermaphrodito simillimis*. *Glumæ* 2, plerumque breves, in *P. acuminatissima* longissimæ. *Flosculi* neutri acuti vel obtusi. *Palea* inferior flosculi fertilis coriacea, paucinervis, acuta aut obtusa, nunc divergens, nunc superiorem, sæpe obtusam et dorso convexam, obsolete binervem, involvens. *Stamina* 3. *Squamulæ* 3, membranaceæ, vel multinerves obtusissimæ, vel paucinerves lanceolato-acuminatæ. *Stylus* plerumque cito fere ad basin bifidus, stigmatibus basi nudis, superne plumosis, divergentibus. *Caryopsis* vel ovalis vel ovato-oblonga et rostrata.

Gramina *herbacea* in Nova Granada, Quito et ins. Trinidad, in montibus excelsis crescentia. *Culmus* subenodosus, simplex, 6-10-pedalis. *Folia* basi inarticulata et valde attenuata, forsan omnium graminum maxima, 2-15 ped. longa, 3-12 poll. lata. *Vaginæ* sæpe ore *biappendiculatæ*. *Inflorescentia* panicula thyrsoidea vel decomposita, patula vel contracta, folia superans, pedicellis plerumque brevibus, in *P. aperta* longissimis.

Many of the preceding pages had been printed before I observed that the same word, *Platonia*, had been adopted by three different authors for three very different genera; and the question of priority then arose. *Platonia* of Rafinesque, probably the first in point of date, is absorbed in *Lippia*, Linn. (Verbenaceæ). *Platonia*, Martius, Nov. Gen. et Sp., published in the same year (1829) as Kunth's genus of Gramineæ, has been retained as a genus of Guttiferæ at p. 174 of Bentham and Hooker's 'Genera Plantarum;' and it is therefore certainly desirable that a new name should be adopted for Kunth's genus. I have accordingly altered the word as little as possible, and adopted an anagram, *Planotia*, containing the same letters. Widely different opinions are entertained about this genus by different authors. Nees, Endlicher, and others have considered it a section of *Chusquea*. Ruprecht, at p. 120 of the monograph so constantly referred to, says, "*Platonia* vero natura sua valde a *Chusquea* distat," and does not include it amongst the Bamboos. Grisebach says, "*Platonia* is less related to *Chusquea* than to *Uniola*, and more distantly to *Phalaris*." In my opinion *Planotia* must be placed next

to *Chusquea*, from which, as far as the structure and details of the spicula are concerned, it can scarcely be distinguished, although in inflorescence and foliage the two genera are widely apart; and I have already, at pp. 52 and 53, stated in what respects these two genera differ from all other grasses.

*Conspectus Specierum.*

Panicula plus minus densa, pedicellis *brevibus*.

Glumæ breves, *subrotundo-ovatae*, mucronatæ. Flosculi neutri *acuti*.

Palea inferior superiorem involvens. Folia 9–10 lin. lata . . . . . 1. *P. elata*.

Glumæ lanceolatæ; superior longa. Flosculi neutri mucronati. Palea

inferior *divergens*. Folia supra medium 2 poll. lata . . . . . 2. *P. virgata*.

Glumæ breves, subhirsutæ. Flosculi neutri *obtusi*. Folia 3–12 poll. lata 3. *P. nobilis*.

Glumæ *longissima*, spiculam duplo et ultra superantes . . . . . 4. *P. acuminatissima*.

Panicula laxa, aperta, pedicellis *longissimis* . . . . . 5. *P. aperta*.

1. *P. ELATA*, Munro. "Panicula 13–14-pollicari, ramosissima, contracta, ramis fasciculatis approximatis, rhachi angulata hispido-scabra, glumis *parvis, subrotundo-ovatis, acuminatis*, foliis 9–10 lineas latis, vaginis hirtellis demum glabris."—*Platonia elata*, Kunth, Gram. i. 139, 327, t. 76! Enum. 429; Suppl. 353; Steud. l. c. 338.

*Hab.* in Quito, "Loxa in frigidis," *Humboldt, Bonpland* (3351). s. v. Kunth.

"*Culmus* erectus, 4–5-pedalis (Kunth), 12–18-pedalis (Bonpl.), simplex, teres, sulcato-striatus, glaber, basi foliosus. *Folia* longissima, culmo parum breviora, lanceolato-lineararia, apice angustato-acutata, plana, inferiora angustiora et canaliculata, *cum vagina continua*, striato-nervosa, nervo medio crasso subtus prominente, coriacea, glabra, margine obsolete serrulato-scabra, 9–10 lineas lata. *Vagina* sulcatæ, hirtellæ, tardius glabræ, ligula ovata, obtusa, glabra. *Panicula* elongata, 13–14-pollicaris, ramosissima, contracta, ramis fasciculatis, approximatis, brevibus, adpressis, rhachique angulata hispido-scabris; spiculis vix 2 lin. longis, ovato-ellipticis, pedicellatis. *Glumæ* parvæ, subrotundo-ovatae, acuminatæ, fuscæ, nitidulæ, glabræ; inferior brevior, subcarinata. *Flosculi* neutri ovato-elliptici, acuti, obsolete trinervi, læves, glabri, flosculo fertili breviores. *Palea* inferior (flosculi fertili) coriacea, glabra, subrotundo-ovato-acuta, obsolete nervosa, superiorem obsolete binerviâ, apice bilobam vix superans. *Squamulæ* 3, subrotundæ, ciliatæ, glabræ, inferne *multi-nerviæ*. *Styli* 2, terminales, breves, recurvati, stigmatibus subplumosis. *Ovarium* (immaturum) cylindraceo-oblongum, subarcuatum."—"Descrip. secundum specimen Humboldt." (*Kunth*).

This plant, as represented by Kunth in his fine drawing, has very much the general appearance of a large *Eragrostis*, and is extremely like *P. acuminatissima*, which, however, is well distinguished by its long glumes.

2. *P. VIRGATA*, Munro. Panicula pedali, rigida, ramis supremis densissime imbricatis, inferioribus erecto-patulis, rhachi dense pubescente, glumis *lanceolatis, acutis, superiore flosculum infimum æquante*, foliis supra medium 2 poll. et ultra latis, vaginis glabris.—*Platonia virgata*, Grisebach, l. c. 530.

*Hab.* in Trinidad, Tocuche, *Dr. Crueger*! v. s.

*Culmus* basi foliosus, glaber, cylindricus, 6-pedalis, diametro 2 lin. *Folia* lanceolata, breviter mucronata, margine serrato-scabra, 2–2½ ped. longa, supra medium 2 poll. lata, basi longe attenuata, utrinque

glabra, sed supra tactu scabra, nervis secundariis a tertiariis non discernendis, venulis transversis distantibus, sat conspicuis. *Vaginæ* glabræ, ore ciliatæ et biappendiculatæ. *Panicula* elongata, 12-14-pollicaris, attenuata, superne densissima, ramis inferioribus subpollicaribus, distantibus, erecto-patulis, rhachi angulata, sulcata, pilis sublongis dense pubescente, spiculis brevi-pedicellatis. *Spicula* 2½ lin. longa, intra glumas brevissime pedicellata, fusca, nitida, glumis lanceolatis, uninervis, acutis, inæqualibus, superiore flosculum infimum neutrum subæquante. *Flosculi* neutri patuli, dorso nitidoglabri, margine hirsuti et fimbriati, subnerves, fere spinoso-mucronati, superior hermaphroditum subæquans. *Palea* inferior (flosculi fertilis) patula, obsolete trinervis, apice mucronato-acuta, superne hirsuta, superiorem coriaceam, obtusam, dorso convexam, subhirsutam paulo superans. *Stamina* 3. *Squamulæ* 3, inæquales, tertia multo minor, obtusissimæ, multinerves, apice tenuiter, fimbriatæ. *Stylus* fere ad basin divisus, stigmatibus basi nudis, superne plumosis, divergentibus. *Ovarium* (immaturum) ovali-oblongum, birostratum.

This approaches *P. elata* very closely, principally differing in the size of the leaves and the divergent lower palea. In general form and habit it bears a most striking resemblance to *Leptochloa Wightiana* of Nees.

3. *P. NOBILIS*, Munro. *Panicula* decomposita, maxima, 4-pedali et ultra, ramis decompositis, glumis *brevibus hirsutiusculis*, flosculis *neutris obtusis*; foliis basi inarticulatis, *maximis* interdum 15 *ped. longis* et 3-12 *poll. latis*.

*Hab.* in Nova Granada, Paramo de Rinz ("Sorbitana" incolis), *Purdie!* v. s.

*Culmus* erectus, simplex?, basi foliatus, fistulosus. *Folia*, forsân omnium graminum maxima, 5-15 ped. longa, 3-12 poll. lata, multistriata, subglabra vel margine scabra, basi attenuata, vaginantia, inarticulata (an semper?). *Panicula* (pars suprema 4-pedalis tantum visa) maxima, decomposita, rhachi angulata, sulcata, hirsuta, ramis 5-9 poll. longis, decompositis; pedicellis hirsutis, brevibus vel sæpe subobsoletis. *Spicula* 1½ lin. longa, nitida, glumisu ninervis, brevibus, hirsutiusculis. *Flosculi* neutri *obtusi*, subæquales, nitidi, margine tenuissime ciliati, inconspicue nervosi, hermaphrodito subglabro, apice tantum hirsutiusculo duplo breviores. *Flos* fertilis apertus, obtusus, paleis æqualibus. *Squamulæ* 3, obtusissimæ, multinervosæ, superne margine tenuiciliatæ. *Stylus* cito bifidus, stigmatibus recurvatis. *Ovarium* exacte ovale.

This appears to have the largest leaves of any grass known. Purdie says, "This noble and beautiful grass forms quite a feature in the scenery of the highest wooded mountains of the Paramo of Rinz; and the leaves, often attaining a foot in diameter and 15 feet in length, are valuable for making huts."

4. *P. ACUMINATISSIMA*, Munro. *Panicula* thyrsoidea, apice spicata, basi composita' sesquipedali, glumis acuminatissimis, *paleas longe superantibus*, foliis sub 2 ped. longis hirsutis.

*Hab.* in Nova Granada, Tolima, *Goudot!* *Linden (Triana)* 50! v. s.

*Culmus* erectus, simplex, basi foliatus, (panicula inclusa) 6-pedalis. *Folia* longa, 2-pedalia et ultra, 6-12 lin. lata, striata, hirsuta. *Vaginæ* longissimæ, striatæ, hirsutæ. *Panicula* 1½-pedalis, apice fere spicata, medio et basi composita, ramis inferioribus 3-4 poll. longis, adpressis, rhachi angulata, sulcata, pilis longis sparsis hirsuta; pedicellis brevissimis, hirsutis, sæpe glandulosis. *Spicula* (sine glumis) vix lineam longa, ovata, subhirsuta; glumis longissimis, 1-nervis, setis scabris, acuminatissimis, flosculis duplo triplove longioribus. *Flosculi* neutri subæquales, acuminati, inconspicue venosi, nitidi, apice scabriusculi, hermaphroditum glabrum, fere membranaceum plerumque supe-

rantes. *Squamula* 3, basi latæ, apice conico-acuminatæ, fere enervosæ, margine superiore tenui-ciliatæ. *Stylus* basi, brevi spatio, simplex, tunc bifidus.

This fine species is well distinguished by its very long glumes, rivalling in that respect *Chusquea aristata*, Munro, which it resembles in many respects, although of course widely separated from it by the character of its foliage.

5. *P. APERTA*, MUNRO. Panicula pedali et ultra, *aperta, patula*, rhachi *glaberrima*, pedicellis *longis*; spiculis *obtusis*, sub-3-linealibus; foliis  $1\frac{1}{2}$ - $2\frac{1}{2}$  ped. longis, subtus *pubescentibus*.

*Hab.* in Nova Granada, sub nom. "Chusquea de Paramo," *Goudot!* v. s.

*Culmus* erectus, simplex? (folia 2 et panicula tantum visa). *Folia*  $1\frac{1}{2}$ - $2\frac{1}{2}$  ped. longa, 1 poll. lata, supra glabra, subtus pubescentia et glaucescentia, basin versus, miro modo, in petiolum 3-4 poll. longum attenuata, inarticulata. *Vagina* præcipue apicem versus hirsutæ, utroque latere *processu* 2 poll. longo *auriculata*. *Panicula* 16 poll. longa, amplissima, laxa, rhachi glaberrima, radiis primariis subsolitariis, sæpe dichotomis, pedicellis interdum longissimis (1 poll. et ultra). *Spicula* sub 3 lin. longa, subobtusa, glabra, glumis brevibus vel brevissimis, ovatis, obtusis, enerviis, fimbriatis, flosculis neutris plus quam duplo brevioribus. Hi *flosculi* obtusi, inconspicue nervosi, margine vix fimbriati, concolores, hermaphroditum simillimum, subobtusum, glabrum, membranaceum fere æquantem. *Squamula* 3, multinerviæ, membranacæ. *Stylus* cito bifidus in stigmata 2 valde divergentia. *Ovarium* apice brevirostratum.

A very fine grass, unlike any other of the genus, with most remarkably long-petioled leaves, and very curious appendages or auricles to the vagina.

*Fendler*, no. 2501!, from Colonia Tovar, in Venezuela, is probably another species of *Planotia*. I have, however, only seen some leaves of this, which are 6 feet long and 5 inches broad, with unusually long ligules. *Fendler* states that it had never been seen in flower or fruit.

## Section II. BAMBUSEÆ VERÆ (conf. supra, p. 12).

### *Conspectus Generum.*

- Glumæ *nunquam* gemmiparæ. Stamina 6, filamentis basi liberis. Squamulæ 3, normales. Styli 3, fere ad basin discreti. Spiculæ 5-7-floræ, flosculo (*nonnisi penultimo*) bipaleaceo, hermaphrodito 9. *Nastus*.
- Glumæ *plerumque* gemmiparæ. Stamina 6, filamentis basi liberis. Spiculæ plerumque multifloræ, flosculis 1-pluribus bipaleaceis.
- Palea superior lata, bicarinata, *carinis alatis*. Squamulæ 3, normales. Stylus brevis, cito 2-3-4-partitus . . . . . 10. *Guadua*.
- Palea superior plerumque angusta, bicarinata, *carinis non alatis*. Squamulæ plerumque 3, normales, raro 1-2-3 abnormales. Stylus vel subbrevis, cito 3-fidus vel basi subbulbosus profunde 2-3-fidus, vel longus, apice tantum 2-3-fidus . . . . . 11. *Bambusa*.
- Glumæ interdum gemmiparæ. Stamina 6, filamentis *basi monadelphis*. Spiculæ *subovata* vel *oblonga*. Squamulæ abnormales 1-2-3, aut abortu nullæ . . . . . 12. *Gigantochloa*.
- Spiculæ *longæ, cylindrica*, angustæ. Squamulæ *nullæ* . . . . . 13. *Oxytenanthera*.

## IX. NASTUS.

Jussieu, Gen. Plant. 39 (1791); Kunth, Enum. 429; Suppl. tab. 32. fig. 3; Lam. Ill. t. 264. fig. 1 *b, c, d*;  
 Endl. Gen. Plant. no. 908. *Stemmatospermum*, P. de B. Agrost. 144, tab. xxv. fig. 5 (1812). *Chloothamnus*? Büse in Pl. Jungh. i. 387; Miq. Fl. Ind. Bat. iii. 414. *Bambusæ*, sp., Bory.

*Spicula sursum deorsumque imperfecta, brevipedicellata*, compressa, disticha, 5-7-flora, flosculis 4-5 inferioribus unipaleaceis, neutris, glumis similibus sed gradatim increscentibus, *flosculo 1 (penultimo) bipaleaceo*, hermaphrodito; terminali *pedicellato, tabescente, conspicuo*. *Glumæ 2*, breves, coriaceæ, hirsutæ, *nunquam gemmiparæ*. *Palea* inferior costato-nervosa, nervis prominulis, apice brevimucronata, superiorem bicarinatam profunde canaliculatam subæquans. *Stamina 6*, antheris apice bilobis, connectivo non elongato. *Stylus* ad basin usque trifidus, vel potius styli 3, stigmatibus brevibus, interne plumosis. *Squamulæ 3*, ciliatæ, integræ, obtusæ, inæquales, duæ majores. *Caryopsis* glabra, basi indurata, stylorum basibus coronata, ovato-conica.

Gramina in Borbonia, Madagascaria? et Sumatra? indigena, arborea, ramis e nodis fasciculato-verticillatis, apice floriferis. Folia coriacea, angusta, venulis transversis nullis vel inconspicuis. Vaginæ apice *longe fimbriatæ*. Inflorescentia panícula terminalis, bis terve composita.

Limited as above, *Nastus* is certainly a very good genus, and is a very interesting connecting link between the *Triglossæ* and the true Bamboos. I have no doubt concerning the identity of Jussieu's plant; for he states that he made his description of his genus *Nastus* from a specimen of Commerson's, collected in Bourbon, under the name of "Calumet des hauts," and I have, through the kindness of M. Brongniart, seen a specimen, with the same name, in the Paris herbarium, from the herbarium of Du Petit Thouars. Jussieu certainly ascribes "Styli 2 aut stylus profunde 2-fidus," instead of Styli 3 aut stylus profunde 3-fidus; and this error, I presume, induced Palisot de Beauvois to create his genus *Stemmatospermum*. I am not acquainted with *Chloothamnus* of Büse, except from the description of the genus given by Miquel, and, with the sole exception of no mention being made of the terminal barren pedicel, I cannot discover any difference between it and *Nastus*. It is, however, very interesting that a plant which was supposed to be confined to a very considerable elevation (3000-4000 feet above the sea) in Bourbon, should also be found in Sumatra, probably in a similar volcanic district. A note attached to a specimen in the Paris herbarium states that it was found in Madagascar. Raspail, in the Ann. des Sci. Nat. 1st ser. v. 442, and Sprengel also, have given such a comprehensive scope to *Nastus* that it would include nearly all Bamboos, whether with 3 or 6 stamens; hence have arisen the numerous synonyms and much confusion.

*Species vera unica tantum.*

1. *N. BORBONICUS*, Gmel. Syst. edit. 13. ii. 580 (1791). Spiculis pedicellatis 6-7-floris, flosculis 4-5 inferioribus neutris, *penultimo hermaphrodito*, terminali *longe stipitato tabescente hermaphroditum subæquante*; foliis *angustis, acuminatissimis*, margine serrato-ciliatis.—Kunth in Journ. de Physique (1822), 148; Enum. 430; Suppl. 354, tab. xxxii. fig. 3; Nees in Linn. ix. 484; Rupr. l. c. 133, tab. xvii. fig. 42 (optima); Steud. l. c. 332. *N. paniculatus*, Sm. in Rees's Enc. n. 4, et herb. Smith! *Stemmatospermum verticillatum*, P. de B. l. c. 145. *Bambusa alpina*, Bory, It. i. 310, t. 12! (bona). *Chloothamnus chilianthus*? Büse, Pl. Jungh. 387; Miq. l. c. iii. 415; Walp. Ann. vi. 1045. *Bambusa arundinacea*, H. B. Pl. Æq. i. 71, non aliorum.

*Hab.* in ins. Borbonia, "regione Pays Brule," alt. 3000-4000 ped. s. m., *Commerson, Bory, Richard!*; Madagascar? ("Calumet des hauts," no. 101, herbier *Du Petit-Thouars* in herb. Mus. Paris.!) ; Sumatra in prov. Angkolæ sup., 1000-3000 ped., *Junghuhn.* v. s.

*Culmus* arboreus, 50-pedalis, fistulosus, raro ultra  $2\frac{1}{2}$  poll. diametro, ramis (vel ramulis?) 5-12 poll. longis, basi foliatis, apice floriferis, semiverticillatis. *Folia* angusta, lineari-lanceolata, 2-4 poll. longa, 2-3 lin. lata, basi subattenuata, apice longissime acuminata, subtus vix pallidiora, venulis transversis obsolete remotiusculis, margine serrato-ciliata. *Vaginæ* sulcato-striatæ, interstitiis lateralibus hirsutis, ore ciliis longis basi latis fimbriatæ, ligula inconspicua. *Panicula* subsimplex, ramis albido-fuscis, sericeo-tomentosis, spiculis pedicellatis vel fere sessilibus. *Spicula* oblonga, compressa, 5-7-flora, glumis 2, brevibus, muticis, nunquam gemmiparis; flosculis 4-5 inferioribus neutris, unipaleaceis, nervoso-costatis, interstitiis pubescentibus vel hirsutis; penultimo neutris simillimo, bipaleaceo, hermaphrodito, paleis subæqualibus. *Palea* superior angusta, in sulco canaliculato rudimentum pedicellatum recipiens. *Genitalia* et *caryopsis* ut in genere descripto.

Bory, in the Itinerary quoted above, gives a very good drawing and interesting description of this plant. He says it is a most beautiful grass, flowering in September and October, when the stamens are exerted and hanging from the spiculæ. It is quite an alpine plant, and forms a well-marked and remarkable belt all round the island of Bourbon, interrupted only in places where the flow of lava prevents vegetation.

*Species valde incerta et sine dubio anomala, stylo bifido.*

2. *N. BARBATUS*, Trin. in Act. Petrop. l. c. 627, sub nom. *Bambusa barbata*. "Spiculis sessilibus, in fasciculos dense aggregatis, 5-floris, foliis latis, ovato-oblongis, basi subcordatis."—Ruprecht, l. c. 132, tab. xvii. fig. 41; Steud. l. c. 332.

*Hab.* in Brasilia, in collibus sylvaticis Bumadinhæ, *Riedel.* s. v. Ruprecht.

"*Culmus* 20-25-pedalis, ramis paniculatis, ad internodia ramulos 2-3-nos, basi floriferos, medio oligophyllos vel aphyllous, apice spiculas capitatas emittentibus. *Folia* ovato-oblonga, 6-8½ poll. longa, 16-18 lin. lata, basi rotundata, subcordata, longe petiolata, plicata, opaca, nervis secundariis 10-11, venulis transversis infra prominulis remotis. *Vaginæ* infra petiolum 3-linealem dense unilateraliter sericeo-barbatæ, ore fimbriatæ. *Spicula* in fasciculos dense aggregatæ, sessiles, 3-5 lin. longæ, 4-5-floræ, glumis inæqualibus, obtusis (interdum gemmiparis?) *Flosculi* 2-3 inferiores neutri, lævigati, glabri, nervosi, glumis similes. *Palea* inferior (flosculi penultimi hermaphroditi) acuta, superior involuta, pedicello flosculi sterilis longo, firmo. *Squamulæ* æquales, lanceolatæ, nervosæ. *Stylus* superne bifidus. *Caryopsis* hirsuta, attenuata." "Quoad spiculas affinis *N. Borbonico*, quoad habitum autem *Guadua distorta*."—Ruprecht, desc. et icon.

It will be observed from the above description, which is the only acquaintance I have with this plant, that it is widely separated from *Nastus Borbonicus*, especially if the drawing is correct, in the glumes being occasionally gemmiparous. I do not feel certain to what genus it does really belong, and have therefore kept it where Ruprecht placed it.

*NASTUS ARUNDINACEUS*, Sm. l. c. et Raspail, l. c. = *Bambusa arundinacea*, W.

*N. BACCIFERA*, Raspail, l. c. = *Melocanna bambusoides*, Trin.

*N. CAPITATUS*, Kunth, Gram. i. 325, = *Beesha capitata*, Munro.

*N. CHUSQUE*, H., B. et K. Nov. Gen. i. 201, = *Chusquea scandens*, Kth.

*N. GUADUA*, Spr. Syst. ii. 113, = *Guadua angustifolia*, Kth.

N. HUMILIS, Hassk. Cat. Hort. Bot. 19,	nomen tantum.
N. LATIFOLIA, Spreng. <i>l. c.</i>	= <i>Guadua latifolia</i> , Kth.
N. MACROSPERMA, Raspail, <i>l. c.</i>	= <i>Arundinaria macrosperma</i> , Mich.
N. QUILA, Rœm. et Sch. <i>l. c.</i> 1361,	= <i>Chusquea quila</i> , Kth.
N. STRICTUS, Sm. et Raspail, <i>l. c.</i>	= <i>Dendrocalamus strictus</i> , Nees.
N. TESSELLATUS, Nees in Fl. Afr. Aust. 463,	= <i>Arundinaria tessellata</i> , Munro.
N. THOUARSII, Rasp., Spr. <i>l. c.</i>	= <i>Bambusa thouarsii</i> , Künth.
N. TJANKORREH, Rœm. et Sch. <i>l. c.</i> , Hassk. <i>l. c.</i>	= <i>Dinochloa tjankorreh</i> , Büse.
N. VERTICILLATUS, Sm. <i>l. c.</i> excl. syn. Lour.	= <i>Bambusa verticillata</i> , Willd.
N. VIVIPARA, Rasp. <i>l. c.</i> t. 8. fig. 3.	= <i>Bambusa Thouarsii</i> , Kth.

## X. GUADUA.

Kunth, Journ. de Physique, 148 (1822), et Syn. Pl. Æquin. i. 252; Ruprecht, *l. c.* 128. *Guada*, Euseb. Nieremb. lib. 14. cap. 194. *Bambusæ*, sp., Humb. et Bonpl. Pl. Æq. i. 68 (1808); Nees in Agros. Bras. 531, et Linn. ix. 469; Endl. et alior. *Nasti* sp., Sprengel et Raspail.

*Spicula* sursum deorsumque imperfecta, cylindracea, multiflora, flosculis nonnullis inferioribus masculis, vel unipaleaceis neutris, sequentibus paucis vel plurimis bipaleaceis, hermaphroditis, terminali tabescente. Interdum spicula dioica. *Glumæ* 2, breves, interdum gemmiparæ. *Palea* inferior multinervia, plerumque ovata et brevimucronata, margine fimbriata vel glabra; superior lata, plurinervia, marginibus incurvis, bicarinata, carinis plerumque late alatis. *Stamina* 6. *Squamulæ* 3 (in *G. macrostachya* 2 basi coalitæ, sed tertia libera), plerumque obtusæ, basi multinervosæ, superne fimbriatæ. *Stylus* plerumque cito trifidus vel bifidus, portionibus styli raro iterum divisus ut in *G. tagoara* et *G. latifolia* (stigm. 4). *Stigmata* vel brevia vel longa, interdum pulchre plumosa vel pilosa, interdum membranacea expansa marginibus argute denticulatis. *Caryopsis* ovalis vel lineari-oblonga, apice hirsuta vel pubescens, bulbo styli persistente sæpe aucta.

Gramina exclusive Americana Tropica, in Brasilia, Nova Granada, Mexico, Venezuela, Quito, Guiana, et Peru crescentia, culmis arboreis, ramosis, ramis junioribus sæpissime pungentibus et spinosis. *Folia* vel lata vel angusta, plana, petiolata, petiolo glabro vel hirsuto, venulis transversis plerumque obsoletis vel nullis, vaginis ore plerumque ciliatis. *Inflorescentia* variabilis, vel terminalis, panicula nunc subsimplex, paucispiculata, nunc decomposita, ramis divaricatis, vel sæpe in eodem ramo panicula terminalis, adjectis infra folia ad nodos ramulis spicigeris aphyllis. *Interdum* culmi foliiferi e florigeris discreti sunt.

This genus is kept up by most authors; but I am unable, in the absence of perfect fruit, to point out any good distinction, except a well-marked one in geographical distribution, between it and true *Bambusa*. Excepting a doubtful cosmopolitan species, *Bambusa vulgaris*, it may be said that all true *Bambusas* are confined to the East, and all true *Guaduas* to the West. The upper palea in *Guadua* has the keels much more distinctly and broadly winged than in any *Bambusa*. Ruprecht distinguishes *Guadua* as having "Flosculi non exacte distichi;" but in *G. latifolia* and many others the flowers are remarkably distichous. Nees, in Agrost. Bras. p. 532, makes *Guadua* a section of *Bambusa*, applying to it the definition of "Spiculæ teretiusculæ, stylus 2-3-partitus." This would of course include most of the Indian Bamboos. Rœmer et Schultes define the section *Guadua* as having "stylus brevis tripartitus, floribus inferioribus masculis vel neutris;" and this, again, would include *Bambusa tulda* and many other species of *Bambusa*. Kunth, in his 'Notice sur le genre *Bambusa*' (1822), separates *Guadua* from



*Bambusa* in consequence of the former having a trifid style whereas "the only two Bamboos" he was then acquainted with, *Bambusa arundinacea* and *B. stricta*, had bifid styles.

*Conspectus Specierum.*

Sect. I. Rami ramulive floriferi et foliiferi in eodem culmo.

- Panicula in ramulis basi foliatis, semper, nisi raro in *G. latifolia*, terminalis.
- Panicula *composita* ramis divaricatis recurvis . . . . . 1. *G. tagoara*.
- Panicula simplex, spiculis *subracemosis*, 2-4 poll. longis, palea inferiore margine *fimbriata*. Folia lata . . . . . 2. *G. latifolia*.
- Panicula fere simplex, spiculis glabris *glomeratis*, sæpe recurvis, palea inferiore margine *glabra*. Folia lata . . . . . 3. *G. glomerata*.
- Panicula subsimplex, depauperata, racemosa, spiculis 1½-2½ poll. longis, dorso *hirsutis*. Folia *angusta* . . . . . 4. *G. macrostachya*.
- Spiculæ *paucifloræ* in capitulis vel glomerulis distantibus aggregatæ, palea inferiore margine *glabra*. Folia *angusta* . . . . . 5. *G. capitata*.
- Inflorescentia variabilis, vel panicula in ramulis foliiferis terminalis, vel rami spicigeri, aphylli, ad nodos fasciculati.
- Spicula *multiflora*, 15-24 lin. longa. Folia 6-7 poll. longa, petiolo *glabro* . . . . . 6. *G. angustifolia*.
- Spicula 4-8-flora, 9-12 lin. longa. Folia supra *scabro-hispida*, 2-3½ poll. longa, petiolo *hirsuto* . . . . . 7. *G. Trinii*.
- Spicula 2-4-flora, 5-7 lin. longa. Folia *glabra*, 3-4 poll. longa, petiolo *glabro* . . . . . 8. *G. distorta*.
- Spicula 4-8-flora, 6-10 lin. longa. Folia 4-5 poll. longa, utrinque *pubescentia* vel *tomentosa*, petiolo *tomentoso-pubescente* . . . . . 9. *G. virgata*.

Sect. II. Culmi floriferi a foliiferis distincti.

- Spiculæ *magnæ*, 1½-2½ poll. longæ, 8-14-floræ. Folia 8-15 lin. lata, brevissime petiolata . . . . . 10. *G. amplexifolia*.
- Panicula supra decomposita, ramis tandem *pendulis, refractis*, spiculis 9-12 lin. longis. Folia 5-6 lin. lata, 8 poll. longa, petiolo *hirsuto* . . . . . 11. *G. refracta*.
- Panicula supra decomposita, ramis divaricatis, spiculis 6-9 lin. longis. Folia 2½-5 lin. lata, 4-7 poll. longa, petiolo *hirsuto* . . . . . 12. *G. paniculata*.
- Panicula supra decomposita, ramis divaricatis, spiculis 9-10 lin. longis. Folia 4-5 lin. lata, 3-4½ poll. longa, petiolo *hirsutissimo* . . . . . 13. *G. Venezuelae*.

1. *G. TAGOARA*, Kunth, Enum. 434 (1833). Ramulis infra nodos latos strigosis, foliis latissimis (2 poll.), 9-10 poll. longis, vaginis ore fimbriatis; spica composita, ramis divaricato-recurvis; spiculis arcuatis, 12-15 lin. longis, 6-8-floris; palea inferiore margine ciliolata.—Rupr. *l. c.* 131, tab. xvi. fig. 40; Steud. *l. c.* 334. *Bambusa tagoara*, Nees in Agrost. Bras. 532, et Linn. ix. 470; Spix et Mart. Veget. Form. t. i. fig. 9; Roem. et Sch. *l. c.* 1349; Lindl. in Penny Cycl. vol. iii.

*Hab.* in Brasilia: in sylvis alt. 1800 ped. s. m. montis Serra do Mar versus Guarantigueta, prov. St. Pauli ("Tagoara" incolis), *Martius*; Minas Geraes, *Burchell*, no. 2074! (folia tantum); Organ Mts.!, *Wilkes* (folia). v. s.

*Culmus* 20-30-pedalis, spinosus (teste *Burchell*), 4-6 poll. diametro, nunc erectus, nunc curvatus, superne *vage ramosus et ramulosus*, internodiis ½-1½-pedalibus. *Ramuli* laxi, propendentes, læves, infra nodos

latos strigosi, apice spicas compositas, ramis dissitis, elongatis, divaricatis, recurvis ferentes. *Folia* oblongo-lanceolata, acuminata, glabra, e basi rotundata in petiolum brevem canaliculatum attenuata, 9–10 poll. longa, 2–2½ poll. lata. *Vaginæ* basi læves, apice sulcatæ, glabræ, ore truncatæ, fibroso-ciliatæ. *Spica* terminalis, *composita*, inferne foliosa, ramis alternis, *divaricato-recurvis*, scabriusculis; spiculis ad nodos ramulorum sessilibus, ternis, apicem versus solitariis. “*Bractea* aliquot imbricatæ aridæ ad ramorum ortum, et inter eas ramulus sæpe progenitus brevis, recurvus, spiniformis, nudus” (*Nees*). *Spicula* subcylindrica, acuminata, recurva, 12–15 lin. longa, scabriuscula, fusco-viridis, 6–8-flora, flosculis 3–4 perfectis, rhachilla compressa lævi valida. *Glumæ* 2, breves, ovato-acutæ, 3–5-nerviæ. *Flosculi* 2 inferiores, neutri, 1-paleacei, 9-nervi, glabri, margine obsolete ciliati. *Palea* inferior (flosculi fertilis) neutris similis, margine ciliata, 2½ lin. longa.; superior æqualis vel paulo longior latiorque, magis membranacea, obtusa, lateribus acute inflexis bicarinata, carinis alatis, membranaceis, ciliatis. *Rudimentum* flosculi sterilis terminalis pedicellatum. *Squamula* 3, tenuissime membranaceæ, ovatæ, acutæ, lacero-ciliolatæ. *Stylus* ad basin fere bipartitus, cruribus (altero saltem) bifidis; hinc stigmata 3–4, filiformia, pubescentia, vix plumosa. *Ovarium* (immaturum) obconicum, trigonum, styli basi incrassata coronatum, superne pubescens.

This is distinguished from all other species by the width of the leaves far exceeding that of the following species (called *latifolia*), which is certainly closely allied, but has much longer spiculæ. It is one of the numerous plants already referred to at p. 47 as being called Tagoara or Taquarra by the inhabitants of the country in which it grows.

In one of Burchell's specimens the leaves are 2½ inches broad, and about a foot long, with 24–28 secondary nerves, and numerous conspicuous transverse veinlets; and on one of the sides of the vaginæ near the top there is a curious dense bundle of short hairs, and the ciliæ are often more than half an inch long. In Wilkes's specimen the leaves are narrower and the ciliæ have fallen; but there is the same curious alternating bundle of hairs on the vaginæ. These two I suppose to be the same as the plant referred to by Ruprecht in a note at p. 131 of his work referred to above, where he says,—“*Alia prope Rio de Janeiro provenit species [Guadua], ramis spicigeris recurvatis G. tagoaræ proxima, vaginis vero imprimis superne villosis, foliis pedalibus et ultra, 2½ poll. latis, spiculis 6–9 lin. distincta.*” I may therefore be wrong in including Burchell's and Wilkes's plants, as I have done, in *G. tagoara*; but I have not seen any authentic specimens of that plant. Burchell's second specimen is from the rambling upper portion of the culm; the short branches are pendulous, the ciliæ are as long as described above, and the bundle of hairs on the vaginæ is occasionally present and occasionally absent. There are three rather strong recurved spines at each joint of the culm, the internodes of which are scabrous.

2. *G. LATIFOLIA*, Kunth, Syn. i. 254 (1822); Enum. 433; Suppl. 357. Ramulis subrecurvatis pungentibus; foliis 13–15 lin. latis, 5–6 poll. longis; vaginis pilis rigidis sparsim obsitis (*Kunth*), demum glabris, ore ciliis rigidis fimbriatis; panícula sæpe dioica, plerumque subsimplici, ramis adpressis 1–2-spiculatis spiculis; *arcuatis*, 2–4 poll. longis, 8–10-floris; palea inferiore margine *densissime ciliato-pilosa*.—*Nees*, Agrost. Bras. 534, adnot.; Rupr. *l. c.* 128, tab. xvi. fig. 33; Steud. *l. c.* 333; Grisebach, *l. c.* 528. *Bambusa latifolia*, H. et B. Pl. Æquin. i. 68, t. 21!; H., B. et K. Nov. Gen. i. 200; Spix et Martius, *l. c. t. v.* fig. 2; Roem. et Sch. *l. c.* 1348; Lindley, *l. c.* *Nastus latifolia*, Spr. S. V. i. 113. *Bambusa fragilis*, Spruce, MS. in herb. Benth.

*Hab.* in Brasilia: in sylvis umbrosis humidis ad ripam fluvii Cassiquiare (Missionis del alto Orinoco y Rio Negro), *Bonpland*; secus Rio Negro inter Barcellos et San Gabriel, *Spruce*, no. 1954!; Trinidad, *Purdie*; et Venezuela, teste *Grisebach*.

*Culmus* 24-pedalis, apice tantum ramosus et subnutans, nitidus, læte virens, diametro 4 poll., internodiis bipedalibus (*Kunth*), pedalibus (*Spruce*), spathis intus glaberrimis, extus pilis sparsis rigidis obsitis, tardius deciduis tectis; ramulis subrecurvatis, subpungentibus, dense foliosis, "fragilibus." *Folia* lineari-oblonga, acuminata, basi rotundata, in petiolum 3 lin. longum, glabrum, "basi subtumidum attenuata," 5-6 poll. longa, 15 lin. lata (*Kunth*), in ramulis floriferis, a me visis, 4-7 poll. longa et 7-10 lin. lata, margine serrata, utrinque glabra, nervis secundariis sub 20, venulis transversis manifestis, distantibus. *Vaginæ* striato-sulcatæ, pilis rigidis adpressis sparsim obsitæ (*Kunth*), demum glabræ, ore ciliis paucis rigidis fimbriatæ, ligula brevi. *Panicula* fere simplex, interdum dioica, in ramulis foliatis terminalis, 4-6 poll. longa, adjectis (rarissime) ramis obsoletis, spiculis 1-2-3, ad nodos fasciculatis. *Spicula* angusta, cylindrica, subsessilis, 2-4 poll. longa, acuminata, 8-10-flora, floribus inferioribus nonnullis masculis, rhachillæ articulis interdum 4½ lin. longis. *Glumæ* 2, ovatæ, glabræ. *Palea* inferior (flosculi bipaleacei) nervis 17-20 validis striata, apice mucrone cito caduco acuminata, sæpe medio dorso, basin versus, fasciculo pilorum hirsuta, margine pilis ferrugineis dense ciliata; superior brevior, bicarinata, carinis superne præcipue late alatis, inter carinas 4-5-nervia et hirsutiuscula. *Squamulæ* 3, oblongo-ovatæ, margine fimbriatæ, subæquales, membranaceæ, glabræ, apice vix nervosæ, ima basi interdum coalitæ. *Stamina* 6, "antheris purpureis" (*Spruce*). *Stylus* profunde 3-4-partitus, violaceus, basi conicus et pilis subglandulosis hirsutus. *Ovarium* ovato-oblongum, acuminato-rostratum, hinc convexum, inde planum sulco longitudinali.

*Spruce* says that this is very slender and brittle in the flowering portion. I have already, at p. 3, stated how very rarely this plant has been found in flower. *Ruprecht* states that he had seen but a single spicula; and *Nees* states, in *Martius's* 'Flora Brasil,' that there was no specimen in any herbarium he had access to. *Kunth* states that his description and figure were taken from a specimen presented by *Humboldt*, who says that the plant is very abundant on that part of the Orinoco which is below the cataracts. I have quoted Trinidad as a locality on the authority of *Grisebach*. The very long spiculæ appear to keep this distant from all other species. The drawing in the *Plant. Æquin.*, which is not a good one, is more like the following species than any specimen I have seen of *G. latifolia*.

3. *G. GLOMERATA*, *Munro*. Internodiis culmi apice scabris, ramis ramulisque *subrecurvatis*; foliis latis vel interdum angustis, ovato-lanceolatis vel lineari-lanceolatis, 3-5 poll. longis, 5-15 lin. latis, in eodem ramulo; vaginis superne hirsutis vel glabris, membrana cupuliformi terminatis, ore fimbriatis; panicula dioica, brevissima, contracta, rhachi fere nulla, spiculis glomeratis, 1-2 erectis, reliquis refractis pendentibus palea inferiore *margine efimbriata*.

*Hab.* in Brasilia: in vicinibus Barra, Gapo de Rio Negro, *Spruce*, no. 1196! v. s.

*Culmi* —pedales, "2-3 poll. diametro, solidi, arcuati, ramulis intertextis, fruticeta fere impenetrabilia struentes, nodis spinis validis, fasciculatis, decurvis armatis." *Rami* breves, internodiis 2-4 valde inæqualibus, plerumque scabris, ramulos breves, apice floriferos, 1-3 ad nodos ferentes. *Folia* valde inæqualia, eodem ramo lata (15 lin.) vel angusta (5 lin.), subtus discoloria, 3-5 poll. longa, apice attenuata et denique mucronata, e basi subrotunda vel cuneata in petiolum brevem subglabrum attenuata, glabra vel supra uno latere tactu scabra, margine serrata, nervis secundariis 18-20 vix conspicuis, venulis transversis nullis vel obsoletis, suprema spiculas superantia. *Vaginæ* basi læves,

nitidæ, superne sulcato-striatæ et pilis brevibus canescentibus subhirsutæ, demum glabræ, infra petiolum membrana chartacea terminatæ, ore ciliis pallidis fimbriatæ. *Panicula* dioica, rhachi brevissima, fere nulla; spiculis 5-8-10, inæqualibus, glomeratis, 1-2 erectis, reliquis pendentibus, vix e vagina suprema exserta et folio superata. *Spicula* (mascula tantum visa) 1-2 poll. longa, nervoso-costata, 7-10-flora, flosculis 2-3 inferioribus unipaleaceis, neutris, sequentibus 3-4 bipaleaceis, masculis, 2-3 terminalibus gradatim tabescentibus, rhachillæ articulis brevissimis. *Glumæ* 2, breves, mucronatæ. *Flosculi* neutri lati, nervis 16 validis notati, subobtusis, breviter mucronati. *Palea* inferior (flosculi masculi) neutris simillima sed longior, 7-9 lin. longa, mucrone interdum incurvo; superior multo brevior, multinervia, lata, bicarinata, carinis late alatis et superne longe ciliatis. *Stamina* 6, filamentis brevibus. *Squamulæ* 2-3 in flosculis masculis, ovatæ, obtusæ, multinervosæ. *Styli* rudimenta nulla.

Spruce, in his notes, mentions having sent male and female specimens; but all the spiculæ I have examined contain male flowers only. In foliage this approaches very closely to *G. latifolia*; but the spiculæ are very different, and in this latter respect it approaches *G. amplexifolia*, from which, however, it is well distinguished by having very simple instead of compound inflorescence.

4. *G. MACROSTACHYA*, Rupr. *l. c.* 129, tab. xv. fig. 35. Ramulis tenuibus apice floriferis, foliis *angustis*, petiolo vix ullo, 4-8 poll. longis, 3-6 lin. latis, vaginis glabris ore *efimbriatis*, panicula terminali subsimplici, spiculis  $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. longis, palea inferiore sæpe *tota superficie hispida*.—Steud. *l. c.* 333; *G. ? dioica*, Steud. *l. c.* 334.

*Hab.* in Guiana Gallica, *Leprieur!* no. 1019; ad mare, *Sagot!*; in Brasilia, prov. Para, Santarem, *Spruce*, no. 420! (folia). v. s.

*Culmus* 20-30-pedalis, spinosus, ramis lævibus, solidis, duris, e nodis subverticillato-ramulosis, glabris, foliatis, ramulis subpedalibus, apice floriferis. *Folia* angusta, brevissime acuminata, basi attenuata, petiolo vix ullo, 4-8 poll. longa, 3 (raro usque 6) lin. lata, utrinque glabra, subconcoloria, margine setulis minimis scabris obsessa, (in sicco) imprimis inferne convoluta, nervis secundariis 8-10, venulis transversis obsoletis. *Vaginæ* glabræ, ore *efimbriatæ*, ligula brevissima truncata. *Panicula* interdum dioica, ramulis terminalis, depauperata, spiculis subracemose vel fasciculatim aggregatis, sessilibus vel brevissime pedicellatis, rhachi hirsuta vel subglabra. *Spicula*  $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. longa, cylindrica, teres, 2- $2\frac{1}{2}$  lin. lata, rhachillæ articulis 3 lin. longis, attenuata, subrecta, obscure fuscescens, 6-12-flora, flosculis (inferioribus nonnullis incompletis) ovato-oblongis, chartaceis, multinerviis, dorso plus minus setulis diaphanis, sparsis strigoso-hirsutis, nervoso-striatis, hinc inde basi foliolo brevissimo munita, plerumque nuda. *Palea* inferior (flosculi fertilis) incompletis simillima sed major,  $7\frac{1}{2}$  lin. longa, brevissime mucronata; superior brevior, lata, obtusa, carinis alatis, apice ciliata. *Squamulæ* 3 (4 fide Steudel), 2 interdum basi coalitæ inferne multinervosæ, superne longe fimbriatæ enervosæ et hirsutæ. *Stylus* cito 2-3-fidus, stigmatibus pilosis vel expansis et membranaceis. *Stamina* 6. *Ovarium* oblongum, apice attenuatum et pilosum.

This species has narrow leaves, very similar to those of *G. angustifolia*; but the spiculæ (sometimes very hirsute, but always more or less so) distinguish it at once from all other species with large spiculæ. The squamulæ are different from those of all other species. Two are generally, if not always, united at the base, and are deeply bifid to near the middle, many-nerved in the lower portion; the upper half has no trace of a nerve, but is covered over with very small hairs, which are only visible under a high power. None of the spiculæ which I have examined are diceous.

5. G. ? CAPITATA, Munro. "Ramis glabris, usque ad capitulum florum vaginis tectis, foliis sublanceolato-linearibus, undique glabris, 6-10 poll. longis, 4-7 lin. latis, vaginis glabris, utrinque breviauriculatis, oreque brevissime fimbriatis, spiculis in capitulis vel glomerulis distantibus sessilibus aggregatis, palea inferiore angusta, *marginè glabra*."—*Bambusa capitata*, Trin. in Act. Petrop. *l. c.* 626 et icon. 337! non Willd. *Schizostachyum capitatum*, Rupr. *l. c.* 136, tab. xvii. fig. 46.; Steud. *l. c.* 332.

*Hab.* in Brasilia, in ripa flum. Pardo, *Riedel*. s. v. Trinius et Ruprecht.

"*Culmus* 15-20-pedalis, ramis simplicibus strictis, glabris, dense foliosis. *Folia* sublanceolato-lineararia, stricte arrecta, firma, undique glabra, 6-10 poll. longa, 4-7 lin. lata, subtus glaucescentia, nervis secundariis uno latere 5, altero 6. *Vaginæ* glabræ, utrinque auricula brevi auctæ, ore cirrulis brevibus fimbriatæ, ligula brevissima truncata. *Inflorescentia* terminalis, verticillato-capitata, capitulis vel glomerulis 1-2 poll. diametro, e fasciculis nonnullis spicularum paucarum, patentibus et divergentibus. *Spicula* 3-4-flora, rhachillæ articulis brevissimis, glabris, flosculis 3 inferioribus hermaphroditis, obtusiusculis, terminali tabescente. *Glumæ* obtusæ, multinerviæ, sæpe gemmiparæ. *Palea* inferior 5-6 lin. longa, 13-nervia, glabra, superior æquilonga, vel paulo longior, conduplicata, marginibus contiguis dissite bicostata et præterea tenue 9-nervia. *Squamula* 3 vel 2 (teste Trinius), basi nervosæ obtusæ et superne fimbriatæ. *Stamina* 6. *Stylus* puberulus, basi simplex, tunc in stigmata 3 plumosulo-pubescentia divisus. *Caryopsis* sublinearis, fusca, apice puberula, dorso sulco lato et profundo excavata et linea elevata percursa."—*Trinius et Ruprecht*.

In the compound structure of the fascicle of spiculæ, very well and carefully represented by Ruprecht in the drawing quoted above, this species resembles *Schizostachyum*; but the styles and caryopsis are very different, and show that the plant cannot belong to the section of berry-bearing Bamboos. The drawings do not represent the keels of the upper palea as being as broadly winged as is usual in the other species of *Guadua*.

6. G. ANGUSTIFOLIA, Kunth, Syn. i. 253; Enum. 433; Suppl. 357. Ramis ante explicationem pungentibus, recurvatis, demum erectis, foliis *angustis*, 5-8 lin. latis, 6-7 poll. longis, vaginis glabris, plerumque efimbriatis, inflorescentia variabili, panicula interdum in ramulis foliatis terminali, interdum aphylla ad basin ramulorum locata, spiculis 15-24-linealibus, angustis, palea inferiore *glabra* vel raro dense sed brevissime *hirsutiuscula*.—Rupr. *l. c.* 129, tab. xv. fig. 36; Steud. *l. c.* 333. *Bambusa guadua*, H. et B. Pl. Æquin. 168, t. 20! bona; Nov. Gen. et Sp. i. 200; Turpin in Mém. du Mus. v. 486 (1819), t. i. figg. 12 & 13; Rœm. et Sch. *l. c.* 1347; Lindl. in Penny Cyc. (1835). *Nastus guadua*, Spreng. Syst. ii. 113; Raspail, *l. c.* v. 442.

*Hab.* in Nova Granada, in declivitate occidentali Andium a litore ad 2400 ped. s. m. ("Guadua," incolis), *Humboldt, Goudot!*; La Païla, *Holton*, no. 105!; prov. de Bogota! *Triana*, no. 1040! *Lindig*; Ecuador, Quito, *Humboldt*; Peru, Lima! *Wilkes*, var. spiculis dorso brevissime hirsutiusculis. v. s.

*Culmus* arboreus erectus, a basi ad summitatem ramosus, 30-36-pedalis, "diametro 6-pollicari," spathis externe setis rigidis obsitis, intus glabris, tardius deciduis, "Tabasheer fundens," nitidus, ramis teretibus congestis, ante explicationem pungentibus, recurvatis, demum erectis, "internodiis inferioribus pedalis," superioribus tenuibus, 1-3-pollicaribus. *Folia* plerumque angusta, lineari-lanceolata, 6-7 poll. longa, et sub 5 lin. lata, interdum in eodem ramo 9-10 lin. lata, acuminata, basi attenuata in petiolum glabrum, supra et margine scabra, subtus vix pallidiora, pilis longis sparsis

interdum hirsuta, nervis secundariis 14-16 vix elevatis, venulis transversis obsoletis. *Vagina* plerumque glabræ, apice truncatæ, sæpe eimbriatæ; interdum, præcipue in ramulis junioribus, ciliæ paucae pallidæ cito deciduæ adsunt; ligula brevissima, fere nulla. *Inflorescentia* variabilis, interdum panicula depauperata, fere spicata, 2-4-nodosa, spiculis paucis, 1-3, ad nodos sessilibus, in ramulis terminalis, interdum, eodem ramulo, spiculis paucis infra folia fere ad basin ramuli locatis, interdum paniculæ 2-3, terminali similes, aphyllæ, ad nodos ramorum, cum spiculis 1-2 fasciculatis. *Spicula* semper angusta, 1-2 lin. lata, cylindracea, 15-24 lin. longa, subarcuata, 7-8-12-flora, læte stramineo-fuscescens, basi apiceque attenuata, flosculis inferioribus nonnullis masculis, supremis tabescentibus, intermediis hermaphroditis, rhachillæ articulis brevibus, uno latere sulcatis, fere glabris. *Glumæ* breves, carinatæ, glabræ. *Palea* inferior acuta, nitida, sæpe glabra vel brevissime adpresse hirsutiuscula, dorso obsolete nervosa; superior vix brevior, carinis late alatis et superne fimbriatis, 8-10-nervia. *Squamulæ* 3, tenuissime membranaceæ, basi callosæ et multinervosæ, oblongæ, obtusæ (acutæ, fide Kunth). *Stylus* cito bi-trifidus in stigmata 2-3, longa vel brevia (in eadem spicula), pulchre plumosa vel interdum expansa, submembranacea (teste Rupr.). *Ovarium* apice conico hirsutum, stipitatum.

I have fortunately seen several specimens of this plant in flower, and have thus had an opportunity of observing how extremely variable the inflorescence, as described above, is. The bright yellowish-brown-coloured, shining, long, narrow spiculæ afford very good marks for distinguishing this species at sight from all others. Kunth's mistake in assigning a diameter of 16 inches to the culm has been copied by nearly all other writers on Bamboos. Humboldt says this is found abundantly in the mountains of Quindiu, forming forests several leagues in extent, growing in hot valleys and at moderate elevations.

7. G. TRINII, Rupr. *l. c.* 130, tab. xv. fig. 38. Ramis *tuberculato-asperis*, foliis angustis, 3-3½ poll. longis, supra scabro-hispidis, *petiolo hirsuto*, *vaginis puberulis*, ore herbaceo-setulosis, panicula vel brevi subsimplici, vel longa et decomposita, spiculis ¾-1 poll. longis, 4-6-floris, palea inferiore *marginè glabra*.—Steud. *l. c.* 333. *Bambusa Trinii*, Nees in Linn. ix. 469.

*Hab.* in Brasilia, Sellow! v. s.

*Culmus* —pedalis, ramis tuberculato-asperis, lanuginoso-canis, ad originem spinis recurvatis sæpe oppositis. *Folia* anguste lanceolata, acuminata, basi cuneata in petiolum brevem *hirsutum*, glauca, 2½-3½ poll. longa, 2-3 lin. lata, margine scabra, supra scabro-hispida, subtus nisi ad petiolum et nervum medium fere glabra, nervis secundariis utrinque 3, venulis transversis nullis. *Vagina* puberulæ, ore setulosæ. *Inflorescentia* maxime irregularis—nunc panicula brevis, 4-5-stachya, in ramis spicigeris lateralibus, aphyllis cum foliosis *ramosissimis* mixtis, nunc ramorum validorum terminalis spicam exhibet prælongam, racemoso-decompositam, interrupte glomerulifloram, aphyllam. *Spicula* subsolitaria, ¾-1 poll. longæ, lanceolatæ, acuminatæ, nitidæ, virides vel stramineæ, 4-6-8-floræ, rhachillæ articulis 1½ lin. longis, flosculis demum squarroso-patentibus, 1-2 inferioribus et 1-3 superioribus sterilibus, intermediis perfectis. *Glumæ* acuminatæ, 7-9-nerves, mucrone brevi terminatæ. *Palea* inferior 7-13-nervis, margine glabra, superiorem ovalem, apice obtuso denticulato, carinis alatis, inferne lævibus apice scabriusculis, æquans. *Squamulæ* 3, obtusæ, plicatæ, basi nervulosæ, inconspicue fimbriatæ, tertia angustior. *Stylus* basi bulbosus, cito trifidus in stigmata 3 plumosa.

The inflorescence of this species is remarkably variable; in the compound state it has

an appearance very similar to some forms of *Bambusa tulda*, Roxb. There are frequently some barren abortive spiculæ at the base of the perfect ones.

8. *G. DISTORTA*, Rupr. *l. c.* 131, tab. xvi. fig. 39. “*Ramis lævibus*, foliis lanceolatis, 3–4 poll. longis, 5–6 lin. latis, *glabris lævibusque*, vaginis glabris, ore nudis vel brevissime fimbriatis, panícula fere simplici, spiculis 5–7 lin. longis, paucifloris, palea inferiore *marginè glabra*.”—Steud. *l. c.* 333. *Bambusa distorta*, N. ab E. in Linn. ix. 470.

*Hab.* in Brasilia, *Sellow.* s. v. Ruprecht et Nees.

“*Culmus* (ramus crassior) opacus, striatus, lævis, ramis spicigeris recurvatis. *Folia* lanceolata, 3–4 poll. longa, 5–6 lin. lata, basi rotundata, petiolata, glabra, lævia, margine scabra, nervis secundariis 5–6, venulis transversis obsoletis, remotiusculis. *Vaginæ* glabræ, ore nudæ vel brevissime setulosæ. *Spicæ* e nodis glabris ramorum, fasciculatæ, divaricatæ, aphyllæ, ramulis oligo (2–4)-phyllis, apice brevispicatis, intermixtis spiculis glomeratis pluribus, tereti-oblongis, demum complanatis. *Spicula* 5–7 lin. longa, pauciflora, glabra, flosculis 1–2–3 perfectis, terminali masculo vel neutro longe pedunculato. *Palea* inferior (flosculi fertilis) nervosa, mucronulata, margine glabra, superiorem late carinatam glabram subæquante. *Squamulæ* 3, breves, glabræ. *Stylus* cito trifidus. *Ovarium* apice pilosum. Valde affinis *G. Tagaoræ*, differt imprimis foliorum magnitudine et spiculis.”—*Nees et Ruprecht.*

Judging from Ruprecht's drawing, this appears to me to be very closely allied to some states of *G. Trinii*.

9. *G. VIRGATA*, Rupr. *l. c.* 130, tab. xv. fig. 37. “*Ramis glabris lævigatis*, foliis lanceolatis, 4–5 poll. longis, 6–7 lin. latis, supra *scabro-pubescentibus*, vaginis superne breve tomentosis, panícula spiciformi, interrupta, virgata, spiculis sessilibus, palea inferiore *marginè ciliata*.”—Steud. *l. c.* 333. *Bambusa virgata*, Trin. in Act. Petrop. *l. c.* 624, icon. 338!

*Hab.* in Brasilia, in sylvis montium St. Geraldii, prov. Minarum, *Riedel.* s. v. Trinius et Ruprecht.

“*Culmus* 25-pedalis, diametro 2–3-pollicari, ramis glabris, lævigatis, laxis, ramulis fasciculatis inæqualibus, inferioribus mere et fere a basi floriferis, terminalibus foliiferis ex ipso apice floriferis, omnibus virgatis. *Folia* lanceolato-lineararia, apice acuminata, basi in petiolum fere bilinealem tomentoso-pubescentem attenuata, 4–5 poll. longa, 5–7 lin. lata, supra scabra et pubescentia, subtus molle piloso-tomentosa et canescentia. *Vaginæ* superne brevitomentosæ, margine ciliatæ, utrinque productæ in auriculam brevem chartaceam, e marginibus emittentem cirrulos plures 1–2-lineales. *Panicula* spiciformis, angusta, interrupta, virgata, læte viridis, rhachi tereti, glabra, per internodia, ad summum pollicaria, emittens spiculas sessiles aut 3–4 aut solitarias. *Spicula* subcylindrica, attenuato-acutissima, nitida, 4–8-flora, 6–10 lin. longa, læte straminea, recta, rhachillæ articulis turbinatis, brevibus, flosculis inferioribus sterilibus, sequentibus masculis (an semper?), penultimo hermaphrodito. *Glumæ* 2, interdum gemmiparæ, oblongo-ovata, inferior bicarinata, superior vix longior, mucronulata, 7-nervis. *Palea* inferior 9–15–17-nervis, nervis pertenuibus, apicem versus magis conspicuis, ovata, apice mucronata, margine ciliata; superior (hermaphroditi) inferiorem æquans, lateribus inflexis, bicarinatis, carinis alatis. *Squamulæ* 3, inæquales, tertia angustior, brevior et glabrior. *Stamina* 6. *Ovarium* cum stylis indscriptum.”—*Trinius et Ruprecht.*

I imagine that only undeveloped spiculæ in an immature state have been seen and described by both the authors above quoted.

10. *G. AMPLEXIFOLIA*, Presl in Rel. Hænk. i. 256 (1830). Ramis *infra nodos scabriusculis*, ramulis foliiferis erectis, vel abortivis spinosis refractis, foliis 8–15 lin. latis, 4–12 poll. longis, vaginis superne *hirsutis* vel *glabris*, *auriculato-fimbriatis*, panicula (in culmo florifero tantum) elongata, decomposita, basi aphylla, spiculis ad nodos ramulorum paniculæ fasciculatis, longis, erectis, palea inferiore *marginè glabra*.—Kunth, Syn. 434; Rupr. *l. c.* 128, tab. xiv.; Steud. *l. c.* 333. *Bambusa amplexifolia*, Rœm. et Sch. *l. c.* 1348.

*Hab.* in Mexico, *Presl*; Santa Cruz, *Seemann*, no. 425!; Panama, Isthmus, Chagres, *Fendler*, no. 381!; Nova Granada, Carthagena, *Sutton Hayes*, no. 622!; Venezuela, prope Guigui, alt. 2000 ped. s. m., *Fendler*, 1629! v. s.

*Culmus* —pedalis, basi diametro 2 poll., spathis magnis, pruinoso-glaucis, apiculo triangulari 10 poll. longo, 8 poll. lato, utrinque hirsuto, ramis foliiferis dichotomis, teretibus, striatis, læviusculis, *infra nodos scabriusculis*, interdum abortivis, spiniformibus, refractis. *Folia* membranacea, oblongo-lanceolata, sensim in acumina elongata, e basi ovata, brevissime petiolata, interdum amplexantia, *marginè scabro-serrata*, subconcoloria, utrinque glabra, sed supra interdum tactu scabra, nervis secundariis 14–18, venulis transversis nunc obsoletis, nunc plus minus conspicuis. *Vagine* superne striatæ, glabræ vel pubescentes, *marginè ciliatæ*, ore plerumque auriculato-fimbriatæ, auricula lineari sat longa, *marginè superiore longe setosa*, sæpe cito decidua. *Inflorescentia* paniculata, composita, aphylla, rhachi semitereti, striata, hirsuta, ramo inferiore 10 poll., reliquis 1–3 poll. longis, internodiis  $1\frac{1}{2}$ –3 poll. longis, spiculis, ad nodos ramulorum fasciculatis, ternis quaternisve. *Spicula* cylindræa, basi apiceque attenuata, arcuata,  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longa, 8–14-flora, flosculis 1–3 inferioribus et 2–3 superioribus unipaleaceis neutris, rhachillæ articulis brevibus, sulcatis. *Glumæ* 2, rotundatæ, mucronulatæ, multinerves, glaberrimæ. *Palea* inferior (flosculi fertilis) neutris similis sed longior, 7 lin. longa, ovata, dorso nervoso-costata, *marginè membranacea*, glabra, brevissime mucronata, multi (20 et ultra)-nervis; superior  $\frac{1}{3}$  vel  $\frac{1}{4}$  vel vix brevior, ovato-rotundata, dorso hirsutula, marginibus inflexa, flexuris sat late carinatis et alatis, alis apicem versus ciliatis, multinervibus. *Squamula* 3, longæ, basi callosæ et multinervosæ, apice acuminatæ et fimbriatæ. *Stylus* basi simplex, tunc divisus in stigmata 3, vel tenuissima vel expansa et membranacea, pulcherrime plumosa. *Ovarium* stipitatum, apice conico hirsutum. *Caryopsis* lineari-oblonga, *infra apicem constrictum*.

The only specimens which I have seen in flower are those collected by Sutton Hayes, and these had no leaves attached. The remaining numbers which I have quoted are in leaf only, but they all agree remarkably well with Presl's very good description. The leaves in this species are much thinner than in *G. latifolia* and *G. glomerata*; and the inflorescence is very different from that of any of the species distinguished by having broad leaves and large spiculæ. The spiculæ are very similar to those of *G. glomerata*. Sutton Hayes says the plant is called "Cañabrava," and is very common in low wet land near Carthagena, and that it was also common on the Isthmus, but that he had never seen it in flower there.

11. *G. REFRACTA*, Munro. Culmo florifero aphylo, paniculæ ramis cito *refractis*, fere simplicibus, spiculis subcompressis, 9–12 lin. longis, palea inferiore nervosa, dorso plerumque *glabra*, *marginè vix ciliata*, foliis 4–9 poll. longis, 4–7 lin. latis, basi inæquilateris, petiolis *hirsutis*, vaginis sæpe pubescentibus, *marginè inconspicue ciliatis*.

*Hab.* in Brasilia tropica, prov. Goyaz, *Burchell*, no. 7642! *Gardner*, no. 4063! v. s.



*Culmi* solidi, ramosi, 20–30-pedales, uncinati, juniores pubescentes. Foliiferi internodiis superne strigoso-hispidis, fere teretibus, sed uno latere linea longitudinali plus minus conspicue hirsuta impressis, superioribus vix  $1\frac{1}{2}$  poll. longis, ramulis gracilibus,  $1-1\frac{1}{2}$ -pedalibus et ultra, ad nodos fasciculatis. *Folia* angusta, lineari-lanceolata, 4–9 poll. longa, 4–7 lin. lata, basi inæqualia, subrotundata vel cuneata, petiolata, petiolo brevi complanato utrinque vel subtus tantum pilis longis hirsuto, apice acuta, margine scabra, supra tactu scabra et interdum hirsutiuscula, subtus plerumque pilis longis vel brevibus hirsuta, vel juniora dense pubescentia, nervis secundariis conspicuis, uno latere 5–6, altero 4–5, venulis transversis nullis. *Vaginæ* inferiores hirsutæ, superiores plerumque superne pubescentes, in culmis junioribus hirsutissimæ, margine vix ciliatæ, ore ciliis paucis cito deciduis fimbriatæ, in junioribus biauriculatis, auriculis linearibus apice longe fimbriatis, ligula inconspicua. *Culmo* florifero aphylo; *panicula* gracilis, internodiis superioribus 4–5 poll. longis, superne strigoso-hispidis, ramis plerumque solitariis, cito refractis, fere simplicibus, adjectis ramis 1–2 abortivis spiniformibus, rhachi strigoso-hispida, ad nodos spiculas pallidas 2–3 aut plures divaricatas gerentibus. *Spicula* 6–10-flora, basi valde attenuata, flosculis 1–2 inferioribus et 2–4 supremis incompletis, reliquis bipaleaceis, hermaphroditis, rhachillæ articulis brevibus, compressis, vix hirsutis, glumis 1–2 inferioribus gemmiparis. *Palea* inferior nervosa, nervis utrinque 3–5 validis cum totidem intermediis tenuioribus, dorso vel glabra vel inconspicue hirsuta, apice rotundata et mucronata; superior brevior, margine fimbriata, inter carinas brevissime alatas 3-nervosa. *Squamulæ* 3, oblongo-lanceolatæ, 2 latiores. *Stylus* basi subbulbosus, attenuatus, superne in stigmata 3 longa divisus. *Ovarium* subobovatum, apice hirsutum, in stylum attenuatum.

The structure of the spicula in this species is very similar to that of *G. Venezuelæ*; but the branches of the panicle, bent back nearly to the main axis, give the plant a very peculiar and distinctive appearance. In Gardner's specimen the panicle is not expanded, and the branches are still covered with their enveloping sheaths; but I have little doubt of its identity. Some of Burchell's specimens, carefully marked, however, with the same number, are extremely hairy, and the cilia are placed at the end of a long linear auricle instead of simply at the mouth of the vaginæ; but after a careful examination I see no reason to doubt the correctness of Burchell's identification.

12. *G. PANICULATA*, Munro. Culmo florifero aphylo, paniculæ ramis divaricatis, valde inæqualibus, compositis et decompositis, latere uno planis et pilis canescentibus hirsutis, spiculis cylindricis, angustis, 6–9 lin. longis, palea inferiore nervosa, dorso subglabra, margine fimbriata, foliis 4–7 poll. longis,  $2\frac{1}{2}$ –5 lin. latis, petiolis hirsutis, vaginis plerumque glabris, margine non ciliatis.

*Hab.* in Brasilia tropica, prov. Goyaz ad flum. Tocantins, in sylvis, Burchell, no. 8852!; prov. Pernambuco, Rio Preto, in sylvis ("Taboca" incolis), Gardner, no. 2981! v. s.

*Culmus* 20–30-pedalis, diametro  $1\frac{1}{2}$  poll., foliiferi internodiis superioribus  $1-1\frac{1}{2}$  poll. longis, subglabris vel pubescentibus, ramulis  $\frac{1}{2}$ –1-pedalibus, paucis ad nodos fasciculatis. *Folia* lineari-lanceolata, 4–6–7 poll. longa, 2–5 lin. lata, basi attenuata in petiolum brevem præcipue subtus pilosum, apice interdum nigrescente attenuato-acuminatissima, supra scabra et interdum pilis brevissimis hirsutiuscula, subtus vel glabra vel, præcipue basin versus ad costam, brevissime pilosa, nervis secundariis utrinque 4–5, margine subscabra. *Vaginæ* plerumque glabræ, margine non ciliatæ, ore ciliis paucis scabris fimbriatæ, eligulatæ. *Inflorescentia*, in culmo aphylo, expansa, paniculata, ramosissima, 10-pedalis, ramis 2–3 valde inæqualibus, divaricatis, adscendentibus, per intervalla 2–4-pollicaria ad nodos locatis. Hi rami, 6–9 poll. longi, plus minus compositi, ramulos vel spiculas paucas glomeratas ad

nodos ferunt. *Spicula* angusta, cylindrica, sæpe curvata, 5-8 lin. longa, pauciflora, flosculis 1-2 inferioribus et 1-2 superioribus incompletis, reliquis hermaphroditis, glumis glabris, coloratis, interdum gemmiparis. *Palea* inferior nervis validis 6-10 cum totidem intermediis tenuioribus, dorso subglabra, margine fimbriata; superiore margine ciliata et brevia lata, sæpe conspiciue *brevior*. *Squamula*, *stylus* et *ovarium* veluti in *G. refracta*.

In many respects this approaches *G. refracta*; but the spiculæ are more deeply coloured, shorter, narrower, and with fewer flowers; and the panicle, of which there is an excellent specimen in Burchell's collection, is much more compound, with the divergent branches inclining upwards. The leaves are occasionally nearly as long as in *G. refracta*, but they are much more attenuated at the points, and generally very much narrower.

13. *G. VENEZUELÆ*, Munro. Culmo florifero aphylo, paniculæ ramis divaricatis, decompositis, latere uno planis hirsutis, spiculis compressis, 9-12 lin. longis, palea inferiore *nervoso-costata*, dorso *hirsuta*, foliis plerumque 3-4½ poll. longis, 4-5 lin. latis, petiolis hirsutissimis, vaginis glabris vel superne hirsutis, uno margine *longe* ciliatis.

*Hab.* in Venezuela, *Dr. Krueger!* v. s.

*Culmus* fistulosus, viridis, striatus, foliiferi internodiis superioribus sub 3-pollicaribus, uno latere planis, canaliculatis, hirsutis, nodis undique strigoso-hispidis, ramulis paucis brevibus ad nodos fasciculatis. *Folia* lanceolata 1½-4½ poll. longa, 4-5-2 lin. lata, acuta, basi subrotundata, vix attenuata in petiolum brevem complanatum, utrinque (sed subtus præcipue) pilis longis hirsutissimum, supra scabra, subtus pilis brevibus hirsuta vel demum glabrescentia, nervis secundariis utroque latere 3-4 conspiciuis, margine brevissime serrata. *Vaginae* inferiores hirsutæ, superiores vel glabræ vel superne hirsutæ, uno margine longe ciliatæ, oreque ciliis longis paucis sat rigidis caducis fimbriatæ, vix ligulatæ.

*Culmi* floriferi paniculæ ramus unus longus tantum adest, adjectis plurimis brevissimis simplicibus ad nodum strigoso-hirsutum fasciculatis. *Ramus* subsesquipedalis, internodiis 2-3 poll. longis; rhachi strigoso-hispida, ramulos 2-3 valde inæquales ad nodos strigosos gerens. *Spicula* pallidæ, 2-3, glomeratæ, 5-6-8 floræ, basi valde attenuatæ, 9-12 lin. longæ, rhachillæ articulis brevibus, hirsutis, flosculis 2-3 terminalibus incompletis, glumis interdum gemmiparis. *Palea* inferior extus hirsuta, nervoso-costata, apice mucronata; superior obtusa, carinata, inter carinas alatas et longe ciliatas 3-4-nervia, inferiorem æquans vel superans. *Squamula*, *stylus* et *ovarium* veluti in *G. refracta* et *G. paniculata*.

The specimens which I have seen of this are very imperfect; but I think it is readily distinguishable from *G. refracta* by its much smaller leaves and the long fringe on one side of the vagina. The single branch of the panicle which I have seen is also very much more compound, and the spiculæ more hirsute, than in either of the two preceding species.

All these last three species are certainly very closely allied, especially in the structure of the spiculæ, although they are remarkably different in general appearance. They have all the same obovate form of ovary that is found in *Bambusa tulda* and allied species; and the keels of the upper palea are very much less winged than in any of the ten other species of *Guadua*. Consequently there remains but little except their geographical distribution and their peculiar hairy petioles to separate them from the genus *Bambusa*, in

which genus I should have been inclined to include them had they been dwellers in the East instead of the West.

GUADUA PARVIFLORA, Presl in Reliq. Hænk. = *Arthrostylidium maculatum*, Rupr.

## XI. BAMBUSA.

Schreber, Gen. Plan. no. 607 (1789); Roxburgh (1795). *Arundarbor*, Casp. Bauhin (1671); Rumph. Herb. Amboin. iv. 5 (1750). *Arundo*, sp., Linn. et Lour. *Bambos*, Retz. Obs. v. 24 (1789); Pers. Syn. (1805).

*Spicula* multiflora vel raro pauciflora, *sursum deorsumque imperfecta*, vel cylindrica, elongata, rhachilla plus minus conspicua, vel ovata aut oblonga, rhachilla abscondita, interdum fere obsoleta, plerumque sessilis, raro glumis distantibus, quasi pedicellata. *Glumæ* duæ aut numero indefinitæ, inferiores plerumque gemmiparæ et breves, superiores paleis inferioribus flosculorum similes et pro flosculis habendæ, sæpe plurinerves. *Palea* inferior plurinervis, mutica aut mucronata, plerumque glabra, coriaceo-chartacea; superior membranacea, angustior, vel subæquilonga vel longior, bicarinata carinis *non alatis* sed sæpe conspicue fimbriatis. *Squamulæ* typice 3, plerumque obtusæ, ciliatæ, membranacæ, raro abortu 1-2 deficientes. *Stamina* 6, *basi libera*, antheris vel obtusis vel *apiculatis* vel apice *penicillatis*. *Stylus* in sectione prima brevis, cito et sæpe fere *ad basin 3-fidus*, in secunda ad basin *subbulbosus*, non tam profunde 2-3-fidus, in tertia longus, basi simplex, *superne tantum* in stigmata 2-3 secedens. *Stigmata* vel brevia plumosa, vel longa et pilosa. *Ovarium* vel obovatum, apice hirsutum, vel lineari-oblongum, vel rostratum. *Caryopsis* oblonga vel lineari-oblonga, obtusa aut acuta, sulco longitudinali conspicue notata, palea superiore plerumque arcte inclusa. Gramina arborescentia, vel pauca suffruticosa, interdum scandentia. Species unica (*B. vulgaris*) cosmopolitana, reliquæ omnes orbis antiqui orientalis incolæ. *Culmus* sæpe altissimus, usque ad 120-pedalis, e nodis ramos sæpe ramosissimos emittens, interdum spinosus, ramis junioribus sæpe pungentibus. *Folia* varia, angusta vel lata, venulis transversis vel nullis vel conspicuis, vaginis plerumque ore fimbriatis. *Inflorescentia* vel "scapus radicalis," vel panicula, in culmo inferne foliis denudato, interdum ramosissima et quam maxime decomposita, ramis simpliciter vel composite spicatis, sæpe laxiusculis, adjectis interdum ramulis foliiferis quorum folia minora sunt reliquis, spiculis sæpissime semi-verticillato-spicatis. In *B. nana* et paucis aliis, panicula sæpe in ramulis (basi foliatis) terminalis, fere simplex et interdum valde depauperata.

I have already, at p. 76, mentioned how very little *Bambusa* differs as a genus from *Guadua*. I have not included any species in *Bambusa* in which the filaments are monadelphous, but have placed them in one or other of the two following genera. It appears to me that the united filamental tube of these two genera indicates an interesting transition between the true Bamboos and the berry-bearing ones, in which the peculiar envelope enclosing the real fruit, which I have already referred to at page 4, may possibly prove to be an interior staminodium, or series of stamens of which the tube only is perfected. This envelope, in its youngest state, is very soft and impressive; for I have often observed it bear the impression of the vascular bundles of the true filaments.

### *Conspectus Specierum.*

Sect. I. Stylus brevis, cito fere ad basin 3-fidus, vel (in *B. balcooa*) ad vel paulo infra medium 3-fidus, stigmatibus plerumque brevibus, plumosis.

Culmus *inermis*. Ovarium *obovatum*. Spicula *cylindrica, elongata*.

Folia plerumque *angusta* et subtus discoloria, *venulis transversis nullis*.

- Culmus *suffruticosus*. Panicula sæpe *depauperata* et *basi foliosa*, spiculis interdum solitariis, palea *superiore carinis glaberrima* . . . . . 1. *B. nana*.
- Culmus *arboreus, elatus, cavus*. Panicula *decomposita, vasta, basi nuda, rhachi tereti nitida*, spiculis coriaceis, *nitidis, plurimis fertilibus, laxè* verticillatis, 1-3 poll. longis, antheris *obtusis* . . . . . 2. *B. tulda*.
- Culmus *vix arboreus, gracilis, subsolidus*. Panicula ut in *B. tulda*, sed minor, spiculis *plurimis sterilibus, dense* verticillatis, 10-14 lin. longis, antheris *apiculatis* . . . . . 3. *B. mutans*.
- Culmus *subscandens*. Folia *longe petiolata, vaginis ore nudis*. Panicula *composita, basi foliata* (an semper?), spiculis coriaceis, nitidis, palea inferiore *longe acuminata* . . . . . 4. *B. affinis*.
- Culmus *vix arboreus*. Panicula *composita, rhachi nitida, glabra, dura, ramis subsimplicibus*, spiculis *membranaceis, subcompressis, 12-14* lin. longis, palea inferiore apice *subobtusè mucronata* . . . . . 5. *B. tuldoidea*.
- Culmus *suffruticosus?* Panicula *decomposita, rhachi molli, striata, submedullacea, ramis angulatis*, spiculis *membranaceis, pallidis, 6-12* lin. longis . . . . . 6. *B. angulata*.
- Folia *lata, venulis transversis conspicuis*.
- Folia *basi attenuata, 1½-1¾* poll. lata, ligula *brevi*. Panicula *composita, rhachi cava, fistulosa*, spiculis fertilibus *1½-2* poll. longis, antheris apice *penicillatis* . . . . . 7. *B. teres*.
- Folia *basi rotundata, 2½-3½* poll. lata, ligula *elongata*. Panicula *decomposita, spiculis (plurimis sterilibus) 10-12* lin. longis, pallidis, antheris apice *penicillatis* . . . . . 8. *B. Falconeri*.
- Culmus *inermis. Ovarium subobovatum*. Spicula *brevis, pauciflora*.
- Folia *basi rotundata, 2-3* poll. longa, vaginis utrinque *auriculatis*. Panicula *vix composita, rhachi dura, subsolida, spicula 6* lin. longa, flosculis *2-3* perfectis, his palea superiore inferiorem obtusam sæpe superante . . . . . 9. *B. breviflora*.
- Culmus *inermis. Ovarium rostratum*. Stylus fere ad rostrum *3-fidus, stigmatibus subtenuibus*. Spicula vel *elongata vel brevis, flosculis hermaphroditis plerumque, nisi forsàn in B. balcooa, paucis*.
- Culmus *arboreus, fistulosus*. Folia *4-8* poll. longa, *5-7* lin. lata, *subtus hirsuta*. Spicula *cylindrica, pallida, fertilis 12-14* lin. longa, flosculis *3-4 hermaphroditis, antheris seta apiculatis* . . . . . 10. *B. pallida*.
- Culmus *fistulosus, vix arboreus*. Folia *4-6-8* poll. longa, *9-12-18* lin. lata, *utrinque glabra*. Spicula *cylindrica, 7-9* lin. longa, flosculis *2-3 hermaphroditis, antheris obtusis. Ovarii rostro glabro* . . . . . 11. *B. Khasiana*.
- Culmus *elatus, arboreus*. Folia *tenuia, 4-6* poll. longa, *5-7* lin. lata, *subtus hirsuta*. Spicula *cylindrica, sub 6* lin. longa, flosculis *2-3 perfectis, terminali tabescente longe pedicellato, palea superiore carinis subglabra. Ovarii rostro hirsuto* . . . . . 12. *B. polymorpha*.
- Culmus *subscandens*. Folia *magna, 12-18* poll. longa, *2-2¾* poll. lata, valde *discoloria*. Spicula *cylindrica, 6* lin. longa, flosculo *non-nisi penultimo hermaphrodito, terminali pedicellato, palea superiore carinis glabra* . . . . . 13. *B. Griffithiana*.
- Culmus *arboreus, fistulosus*. Folia *subpedalia, 1-2* poll. lata. Spicula *ovata vel oblonga, mollis, flosculis 4-6 hermaphroditis, palea superiore carinis longe ciliata. Stylus ad vel paullo infra medium 3-fidus* . . . . . 14. *B. balcooa*.

- Culmus spinosus. Ovarium rostratum. Caryopsis basi styli trifidi coronata, subtricornuta.
- Culmus *suffruticosus*, nanus. Folia *parva*, vix 2 poll. longa. Spicula 8-12-flora, rhachilla valde conspicua, *flexuosa*, paleis *hiantibus*, inferiore *rostrato-acuminata* . . . . . 15. *B. flexuosa*.
- Culmus *elongatus*, vix *arboreus*. Folia 3-6 poll. longa. Spicula sub 8-flora, rhachilla tandem *conspicua*, paleis imbricatis, inferiore mucronato-acuta . . . . . 16. *B. Blumeana*.
- Sect. II. Stylus basi subbulbosus, profunde (sed non ad basin) 2-3-fidus, stigmatibus longis, tenuibus. Ovarium infra apicem constrictum. Caryopsis conico-rostrato-acuta. Palea superior in flosculis perfectis inferiorem plerumque superans.
- Culmus *spinosus*. Paniculæ rhachis teres, *glaberrima*, *nitida*, *dura*, glomerulis plerumque *paucispiculatis*. Spicula 8-12 lin. longa, 6-12-flora, flosculis fertilibus 3-7 . . . . . 17. *B. arundinacea*.
- Culmus *spinosus*. Paniculæ rhachis teres, *striata*, vix *nitida*, *dura*, spiculis plerumque *dense glomerato-verticillatis*. Spicula coriacea, sæpe monoica, 5-6 lin. longa, 4-6-flora, flosculis fertilibus 2-3 . . . . . 18. *B. spinosa*.
- Culmus *inermis*? Paniculæ rhachis *glauco-viridis*, *angulata*, *submollis*. Spicula *submembranacea*, 7-9 lin. longa, 5-8-flora, flosculis fertilibus 3-5 . . . . . 19. *B. orientalis*.
- Sect. III. Stylus longus, basi simplex, hirsutus, superne tantum (vel, in *B. Oldhami*, ad medium) 2-3-fidus. Culmus inermis.
- Culmus *arboreus*. Spicula *oblonga*, *subcompressa*, evoluta *quasi bifida*. Palea inferior *basi subattenuata*, superne margine *fimbriata*. Antheræ *pilis brevibus* apiculatæ. Squamulæ 3 . . . . . 20. *B. vulgaris*.
- Culmus *subarboreus*. Panicula *composita*. Spicula ovata vel ovato-lanceolata, 7-8 lin. longa, flosculis 7-11, palea inferiore basi *latissima*. Squamulæ 3 . . . . . 21. *B. Beecheyana*.
- Culmus eximie *fistulosus*, *cavus*, *suffruticosus*? Panicula *subsimplex*. Spicula *ovato-lanceolata*, 12-13 lin. longa, flosculis 8-13, palea inferiore basi *latissima*. Squamulæ 2-3. Stylus sæpe ad medium 3-fidus . . . . . 22. *B. Oldhami*.
- Culmus *arboreus*, maximus. Spicula *ovata*, *brevissima*, 3-4 lin. longa. Palea inferior spinoso-acuta, margine *longe fimbriata*. Squamulæ 1-2-3 . . . . . 23. *B. Brandisii*.
1. *B. NANA*, Roxb. Hort. Beng. 25 (1814); Fl. Ind. ii. 199. Panicula interdum depauperata, in ramulis sæpe efoliatis paucispiculata, ramulis foliiferis adjectis, interdum subsimplici et etiam monostachya, ramulis foliiferis terminali, raro composita, spiculis cylindricis, perfectis 1-1½ poll. longis, palea superiore *margine glaberrima*, staminibus 6, quorum 3 interdum (lusu) obsoletis, foliis plerumque parvis, 1-3-pollicaribus, interdum majoribus, 3-5 poll. longis, subtus *cæsio-glaucis*, vaginis ore subauriculato-fimbriatis.—*B. nana*, hb. Ham. in Wall. Cat. 5036! *B. glauca*, Loddig. Cat. et Lindl. in Penny Cyc. (1835); Ræm. et Sch. l. c. vii. 1355; Blume. *B. floribunda*, Zoll., Steud. in Zoll. Cat. 57; Syn. 330; Miquel, Ann. Mus. Bot. Lug.-Bat. ii. 285, teste Kurz in herb. ex hort. Bogor. *B. cæsia*, Sieb. et Zucc. fide spec. in herb. Kew ex herb. Zucc. *B. glaucescens*, Sieb. Cat. et Hort. *B. sterilis*, Kurz in Hort.

Bogor. fide Miq. *l. c.* (var. foliis supremis valde deminutis ramulisque pluribus efoliatis). *Iscurochloa floribunda*, Büse, in Pl. Jungh. 390; Miq. Fl. Ind. Bat. iii. 422. *Arundinaria glaucescens*, P. de B. Agros. 144, et supra, p. 22, cum syn. omnibus. Ludit glumis et etiam paleis inferioribus flosculorum inferiorum in folia conversis, stylo 2-4-fido, staminibus 3, vel etiam 6, obsoletis, filamentis basi squamulæformibus.

*Hab.* in China ("Keu-fa" incolis), *Roxburgh*; in Japonia, *Buenger*; ins. Nippon in sylvis montanis prope Susokatogi, *Pierrot*. Cult. in hortis Ind. or. Dacca et Calcutta, *Hamilton*! *Roxburgh*, *Hooker*!; in hort. Ceylon, status abnormalis, staminibus 3-6 plus minus obsoletis, sub nom. "Chinese Bamboo," *Thwaites*!; in hort. Java, *Blume*, *Kurz*!; in hortis Europæ plurimis. ("Tsiutsik" vel "Tsiuts Take," Jap.) v. v. et s.

*Culmus* suffruticosus, inermis, fistulosus, 6-8-pedalis, diametro  $1\frac{1}{2}$ -lineali; spathis (in culmis junioribus)  $1\frac{1}{2}$  poll. longis, glaberrimis, striatis, intus nitidis, apiculo lanceolato basi biauriculato semipollicari. *Rami* simplices vel compositi, ad nodos inferiores numerosissimi, ad superiores 2-4-8 semiverticillati, internodiis superne glabris vel scabriusculis vel pruinoso-glaucis. *Folia* plerumque parva, lanceolata,  $1-2\frac{1}{2}$  poll. longa, 2-5 lin. lata, interdum majora, 3-5 poll. longa, apice acutissima, basi subcordato-rotundata, petiolo glabro flavescente, subtus pulchre *cæsio-glauca*, pilis brevissimis pubescentia vel demum glabrescentia, nervis secundariis subconspicuis, utroque latere 3-5. *Vagine* glabræ, striatæ, ore biappendiculatæ, fimbriatæ vel demum nudæ. *Inflorescentia* nunc panicula depauperata, spiculis in spica remotiflora dissite sparsis, ramo, foliis cito delapsis, basi nudo *terminali*; nunc spicula solitaria paucæve, ramulis dense foliiferis terminales; raro (in spec. e Ceylon) panicula composita (an culmo terminalis?), subaphylla, internodiis 4-6 poll. longis, spiculis in glomerulis per ramos breves, simplices vel compositos, semiverticillatos dissite sparsis, paucis, inæqualibus. *Spicula* primum cylindrica, demum subcompressa, 7-11-flora, glabra, rhachillæ articulis conspicuis, elongatis, sulcatis, superne tantum hirsutis, glumis sæpe gemmiparis et interdum, in spiculis solitariis, apice in laminam foliaceam expansis, flosculis 1-2 inferioribus et 2-3 superioribus incompletis (vel masculis vel femineis), intermediis 3-6 hermaphroditis. *Palea* inferior 14-18-nervis, vix acuta, glaberrima, superiorem multinervosam, *carinis glabram*, apice tantum subhirsutam involvens et superans. *Squamulæ* typice 3, lanceolatæ, elongatæ, basi interdum callosæ et inconspicue nervosæ. *Stamina* typice 6, antherarum connectivis nunc obtusis nunc seta apiculatis. *Stylus* cito 3-fidus, stigmatibus pulchre plumosis. *Ovarium* stipitatum, obovatum, superne hirsutum.

In statu luso e Ceylon, a Thwaites mihi misso, stamina 1-3 tantum perfecta, tria plus minus obsoleta; hæc nunc squamularum formam arrogant, nunc ad rudimenta brevissima, squamulis normalibus adherentia, redacta. Stylus sæpe abnormalis, nunc indivisus, nunc bifidus, cruribus 1-2 iterum divisus, et hinc stigmatibus 4, nunc trifidus. In flosculis nonnullis 2-3 ovaria adsunt.

Whilst these pages were passing through the press, I received some flowering specimens of this plant from Mr. Thwaites, which have enabled me to ascertain that the opinions which I have long entertained, as stated above at p. 22, regarding the identity of *B. nana* and *Arundinaria glaucescens*, are correct. Some of Mr. Thwaites's specimens are evidently in the same condition as those seen and figured by Ruprecht in fig. 3. tab. i. of his memoir on Bambusæ, the three abortive stamens apparently being figured as 3 ovaries. The rudiments of these stamens are certainly sometimes extremely minute, although occasionally they are nearly half as long as, and very similar to, the squamulæ. In all the flowers which I have examined, I have been able, after careful maceration, to discover the vascular bundles of the filaments. Thwaites says, in a note attached to the specimen,

“Flowers usually imperfect; I can see no ripe seeds forming.” In all the other specimens which I have seen from Buitenzorg and Kew (where the plants flowered in October 1862), the 6 stamina are quite perfect, and the spicula is regular in all respects. It is very closely allied to *B. tulda*. I have observed in the living plants that the terminal leaf of the branch is not as glaucous as the remainder of the leaves on the same branch.

2. *B. TULDA*, Roxb. Hort. Beng. 25 (1814); Fl. Ind. ii. 193, Icon. 1403! et herb. Roxb.!

Culmo inermi, fistuloso, *excelso*, florifero basi aphylo, sed ramulis ultimis floriferis sæpe basi foliatis; panícula ampla, decomposita, rhachi nitida *glaberrima*, ramis simplicibus vel compositis, divaricatis; spiculis in verticillis simplicibus vel compositis per ramulos ultimos sparsis, interdum solitariis, lanceolatis, *plurimis fertilibus*, 1–3 poll. longis, multifloris, *nitidis*, articulis rhachillæ conspicuæ longis, apice *fimbriatis*; palea inferiore acuta, margine superne sæpe brevifimbriata, superiore carinis *longe ciliata*; antheris *obtusis*, ovario *obovato*, apice *hirsuto*; foliis lineari-lanceolatis, 4–12 poll. longis, 6–12 lin. latis, subtus plerumque *hirsutis*, *petiolo supra hirsuto*.—*B. trigyna*, Roxb. MS. herb. Mus. Brit.! *B. macala*, hb. Ham.

*Hab.* in Ind. or. Bengal (“Tulda Bans” incolis), *Roxburgh!* 5030 c.! *Wallich, Griffith!*; Birgung, 880 bis! (folia tantum); Takurgung, 880! *hb. Hamilton, Wall. Cat.* 5026 A; Assam? Sechsagur, 944! *Masters*; Tenasserim, Martaban, Meaong! Trogl! 5027! *Wallich*; var. ramulis floriferis basi foliatis (“Jowa Bans”), Bengal, Serampore! Hort. Bot. Cat. ! *Griffith, herb. Roxb.!* in *Wall. Cat.* 5030 B! *et in herb. Mus. Brit.!*; Cachar (“Dullooh”)! *Hooker.* v. s.

*Culmus* arboreus, elatus, gregarius, inermis, fistulosus (parietibus tenuibus), “diebus 30 altitudinem 20–70-pedalem, cum diametro 2–4-pollicari, attingens” (Roxb.), spathis coriaceis cito deciduis, ramis numerosissimis, ultimis bifariis. *Folia* lineari-lanceolata, acuta, basi rotundata vel cordata vel raro attenuata, petiolo brevi, plano, supra hirsuto, 4–6–12 poll. longa, 8–12 lin. lata, supra tactu scabra, subtus pallidiora et plerumque hirsuta, raro glabra, nervis secundariis utrinque 5–6, inconspicuis. *Vaginæ* superne, interdum pilis longis, hirsutæ, margine uno ciliatæ, utroque latere auriculatis, auriculis interdum elongatis et longe ciliatis, ligula brevi. *Panicula* vasta, decomposita, oblonga, undulata, ramis ramulisque numerosis supra decompositis, ramulis ultimis, ad nodos, spiculas vel solitarias vel 2–3-nas vel laxè glomeratas gerentibus, foliis non raro inflorescentiam intrantibus, axillis interdum spiculam elongatam 3-pollicarem ferentibus. *Spicula* nitida, plerumque fertilis, cylindrica, lanceolata, 9–36 lin. longa, 7–10–12-flora, rhachillæ conspicuæ articulis longis, compressis, apice tantum hirsutis, glumis inferioribus gemmiparis. *Palea* inferior lævissima, nitida, acuminata, basi submembranacea et plicata, interdum 12 lin. longa, multinervis, margine interdum brevissime fimbriata; superior subbrevior vel fere æquilonga, inter carinas longe ciliatas 3–5-nervis, apice pilis penicillata. *Squamulæ* longe vel longissime fimbriatæ, basi sæpe coloratæ et conspicue nervosæ, duæ obtusæ, tertia lanceolata. *Antheræ* “rubro-purpureæ,” muticæ vel brevissime obtusi-apiculatæ. *Stylus* cito divisus in stigmata 3 plumosa. *Ovarium* obovatum, apice hirsutum, stipitatum. *Caryopsis* oblonga vel ovalis, apice obtuso hirsuta.

This species, unless the following, *P. nutans*, should prove to be a mountain form of it, appears to be principally confined to the plains of Bengal and the nearly adjoining provinces; but I am unable to distinguish specifically the specimens collected by Wallich in 1827 in the teak-forests of Martaban, and contained in his herbarium No. 5027. The section, however, of the stem which is attached to these specimens is much more solid

than is usual in *B. tulda*. Arnott, in his MS. notes on Hamilton's grasses, says that 880 hb. Ham., Wall. 5026 A, is "*Beesha Rheedei*;" but that is certainly not the case in the specimens of that number in Wallich's herbarium in the possession of the Linnean Society. Some of the specimens of this species from Calcutta are marked "*B. stricta*," and some "*B. latifolia*."

3. *B. NUTANS*, Wallich, MS. in herb. 5031! Culmo inermi, *subsolido, gracili, vix* arboreo, florifero, interdum aphylo, interdum ramis foliiferis floriferisque ex eodem nodo erumpentibus; panicula nutante, composita, rhachi *nitida, glaberrima*, ramis plerumque *brevibus, erectis, sæpe a basi dense spicatis*; spiculis *dimorphis*, in verticillis *approximatis* dense glomeratis, *plurimis sterilibus*, gemmiparis, sub 10 lin. longis, acutis, rhachillæ articulis brevibus, subhirsutis, *paucis fertilibus*,  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longis, rhachillæ articulis longis, subglabris; palea inferiore (spiculæ fertilis) longe acuminata, sæpe 1 poll. longa, antherarum connectivo elongato; foliis plerumque 4–7 poll. longis, discoloribus, subtus pilosis et sæpe canescentibus, vaginis plerumque *glabris, margine efimbriatis*.

*Hab.* in Ind. or. Nepal, Nag-Arjoon, *Wallich, Cat.* 5031! Silhet ("Peechle Bans"), *Da Costa in Wall. Cat.* 5030 A! spiculis fertilibus evolutis; Khasia, no. 316 in *Kew Mus.*! *Griffith*, spiculis fere omnibus sterilibus, foliis subtus canescentibus; Assam, Seesagar ("Bidhooli Bans"), no. 945! ("Mukial Bans") no. 946! *Masters* (folia tantum); Sikkim? Pemionchi! alt. 5000–7000 ped. s. m. ("Mahlo" incolis), *Thomson* (folia), var. foliis latioribus et culmo fistuloso. v. s.

*Culmus* vix arboreus, foliiferus, subsolidus, in spec. a me visis gracilis,  $1\frac{1}{2}$  lin. diametro, internodiis 4 poll. longis, ramis sæpe simplicibus, semiverticillatis, adjectis interdum, in spec. e Khasia, ramis floriferis aphyllis. *Folia* vix petiolata, lineari-lanceolata, apice attenuato-acuta, basi rotundata vel cuneata, 4–7 vel raro 9 poll. longa, 6–9 (raro 12–15) lin. lata, supra subfusca, uno latere marginibusque tactu scabra, subtus pallida vel canescentia, pilosa vel raro glabra, nervis secundariis utroque latere 4–6–9. *Vaginæ* plerumque glabræ, dorso carinatæ, margine *nunquam ciliatæ*, collo *biariculatæ*, auriculis interdum *elongatis*, ciliis non raro 9 lin. longis, fimbriatis, ligula subelongata, obtusa, dorso hirsuta. *Panicula*, in culmo florifero, vix expansa (pars superior 10-pedalis, internodiis 5–6 poll. longis, adest), ramis validis, suberectis, plerumque brevibus et simplicibus, sæpe ex *ima basi* floriferis, verticillis densis, approximatis, spiculis *plerisque gemmiparis, sterilibus*, acutissimis, 10–12 lin. longis, rhachillæ conditæ articulis subhirsutis, apice fimbriatis, flosculis sæpe bipaleaceis sed imperfectis. *Spicula fertilis*  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longa, nitida, 7–9-flora, flosculis hermaphroditis 3–5, rhachillæ conspicuæ articulis longis, glabris vel apice fimbriatis, palea inferiore *longissime acuminata*, interdum 1 poll. longa, margine subglabra, intus hirsutiuscula, superiorem carinis ciliatam superante. *Squamulæ* obtusæ, latæ, longe ciliatæ, multinerves, subæquales. *Stamina* 6 vel rarissime 7!, connectivo elongato. *Ovarium* obovatum, stipitatum. *Caryopsis* oblonga, apice obtuso hirsuta.

This may possibly be a mountain form of *B. tulda*; but it appears to me to be a much smaller plant, with a slender and nearly solid stem. The ligula is more extended, the leaves generally whiter below, and the vaginæ are never fringed on the margin; the paucity of fertile spiculæ is also remarkable. Griffith's herbarium contains a large number of specimens; but I have scarcely been able to find a dozen perfect spiculæ amongst them. Wall. Cat. 5030 A exhibits a very perfect developed state; 5030 B & C are ordinary forms of *B. tulda*. Thomson says that bows are made in Sikkim from the



“Mah-lo” bamboo. Some specimens, under the same native name, collected by Hooker in Sikkin, appear to me to be quite distinct; and I think there is considerable doubt about the identity of Thomson's specimens, which are in leaf only.

4. *B. AFFINIS*, Munro. Culmo florifero *foliato*? diffuso, *scandente*, paniculæ *coloratæ* ramis elongatis, erectis, ad nodos paucis, spiculis *coriaceis*, *coloratis*, palea inferiore *longe acuminata*, foliis *petiolatis*, fere setaceo-acuminatis, vaginis ore *efimbriatis*, conspicue ligulatis.

*Hab.* in Ind. or. Burmah; Yoongalum (“Theeshe” incolis), no. 18, *Brandis!* v. s.

“*Culmus* diffusus, *scandens*, diametro vix bipollicari,” ramulis foliiferis 1-1½-pedalibus, semper in speciminibus visis apice floriferis. *Folia* lanceolata, 4-8 poll. longa, 10-12 lin. lata, demum refracta, basi rotundata, conspicue *petiolata*, apice fere *setaceo-acuminata*, margine brevissime serrata, utrinque *glabra*, subtus pallidiora, nervis secundariis utroque latere 8-10 vel interdum 5 (teste Brandis). *Vaginæ* striatæ, glaberrimæ, infra petiolum membrana integra coriacea terminatæ, ore *non-fimbriatæ*, ligula *producta*, obtusissima. *Panicula* in culmo foliifero terminalis, an semper?, internodiis glaberrimis, 4-7 poll. longis, ramulis ad internodia 2-3, sæpe pedalibus et ultra, spiculas paucas, coriaceas, nitidas, subpollicares, semiverticillatas, per intervalla 2-4 poll. distantes, gerentibus. Interdum spica, fere simplex, in ramulis foliiferis terminalis. *Spicula coriacea*, 6-10-flora, *nitidissima*, læte fusca, rhachillæ articulis striatis, subbrevibus, apice brevissime fimbriatis. *Palea* inferior plus quam 20-nervis, basi plicata, apice *longe acuminata*; superior multo angustior, inter carinas ciliatas 7-nervis, et extus carinas utrinque 4-nervis. *Squamulæ* 3, fere crassæ, basi nervosæ et subplicatæ, duæ majores basi interdum coalitæ. *Ovarium* subobovatum, apice obtuso subhirsutum et attenuatum in stylum, cito in stigmata 3 divisum.

This, again, approaches very closely to *B. tulda*; but the scandent habit would appear to keep it distinct, as well as the long petioles, and vaginæ without any traces of a fringe, but with a ligule of some length. The specimens are not sufficiently perfect to show whether the leaf-bearing and flowering culms are ever distinct; but that is not likely to be the case in a climbing plant.

5. *B. TULDROIDES*, Munro. Culmo inermi, vix arboreo, fistuloso; paniculæ ramis inferioribus subsimplicibus, semiverticillatis, paucis, superioribus alternis, foliis superne inflorescentiam intransibus, rhachi nitida, glabra, dura, tereti; spiculis pallidis, *non nitidis*, *membranaceis*, cylindrico-compressis, subuncialibus, rhachilla tandem visibili, in glomerulis, plus minus distantibus, vix dense aggregatis, palea inferiore apice *subobtusata*, *subito mucronata*; foliis *angustis*, subtus pallidis et hirsutis, vaginis glabris.—*B. Blumeana*? Hook. et Arn. Bot. Beechey's Voyage, 254, ad not., non Rœm. et Sch. *B. tulda*, Benth. Fl. Hongk. 434, non Roxb.

*Hab.* in China, Canton, *Millett!*; Hongkong, 3657! 7486! *Hance*; Formosa, 652! *Oldham.* v. s.

*Culmus* subarboreus?, inermis, subsolidus vel fistulosus. (Ramuli foliiferi, internodiis sulcato-striatis, duo tantum adsunt) hæc folia 5-7 poll. longa, 5-8 lin. lata, lanceolata, basi rotundata, petiolata, margine (præcipue basin versus) longe serrata, supra glabra vel margine tactu scabra, subtus hirsuta, nervis secundariis utrinque 6-8, subconspicuis. *Vaginæ* glabræ, pulchre striatæ, auriculis ciliis paucis caduceis fimbriatis biauriculatæ. *Folia* floralia similia, sed minora, basi attenuata, nervis secundariis paucioribus, auriculis vaginæ obsoletis. *Panicula* diametro inferne 3 lin., rhachi glabra,

ramis simplicibus vel compositis, valde inæqualibus, ad nodos inferiores 5-6, ad superiores 1-3, sub semiverticillatis, *internodiis* infimis *apice scabriusculis*, glomerulis plerumque paucispiculatis, raro subdensifloris, approximatis vel distantibus. *Spicula* pallida, *membranacea*, non nitida, interdum tortuosa, rhachillæ (tandem conspicuæ) articulis inferioribus brevibus, apice tantum hirsutis, 12-14 lin. longa, 4-8-flora, flosculo infimo masculo, 2-5 sequentibus fertilibus, 1-2 supremis tabescentibus. *Palea* inferior nervosa, glabra, obtusa, brevimucronata; superior vix vel multo brevior, acuminata, apice fasciculo pilorum terminata, carinis *superne tantum* breviciliatis. *Squamulæ* obovatæ, obtusissimæ, longe et tenuissime fimbriatæ. *Antheræ* obtusæ. *Stylus* cito 3-fidus in stigmata 3 sublonga et tenuia. *Ovarium* stipitatum, fere obovatum, apice hirsutum, in stylum rostratum. *Caryopsis* 2½ lin. longa, obtusa, fere glabra.

In the structure of the spicula this is very close to *B. tulda*; but the plant appears to be smaller, and to have a generally different appearance. Moreover Mr. Hance, who has had an opportunity of observing the plant when growing, is decidedly of opinion that it is distinct. The perfect spicules are much smaller than in *B. tulda*, and have not the usual shining appearance; the lower palea is blunter and has fewer nerves; the vaginæ are more glabrous and more deeply striated; and I have never observed the lowest branches near the main axis to be scabrous in *tulda*, as they often are in this species.

6. *B. ANGULATA*, Munro. Culmo inermi, *herbaceo*?, fistuloso, paniculæ rhachi *mollis*, *submedullosa*, sulcato-striata, internodiis apice subhirsutis, ramis ramulisque *angulatis*, uno latere sæpe hirsutis, verticillis sæpe compositis, distantibus, spiculis 6-12 lin. longis, membranaceis, *pallidis*, foliis angustis, subconcoloribus, subtus hirsutis, vaginis superne hirsutis, oreque ciliatis.

*Hab.* in China, Formosa, no. 650! *Oldham.* v. s.

*Culmus* suffruticosus? vel herbaceus? (ramuli foliiferi 3-4, disjuncti, *internodiis inferioribus hirsutis* tantum adsunt). *Folia* 3-7 poll. longa, 6-8 lin. lata, apice setaceo-acuminata, basi rotundata vel cuneata, vix petiolata, supra uno latere marginibusque aspera, subtus vix pallidiora, hirsuta, nervis secundariis utroque latere 5-6. *Vaginæ* superne hirsutæ vel tandem glabrescentes, margine uno fimbriatæ, collo auriculatæ. *Panicula* aphylla (pars superior 5-pedalis adest), internodiis inferioribus 5-6 poll. longis, apice hirsutis, rhachi sulcato-striata, *mollis*, fere medullacea, viridi-glaucæ, ramis inferioribus sæpe compositis, superioribus simplicibus, ramulisque angulatis, striatis, mollibus, *uno latere sulcatis* et sæpe *hirsutis*, glomerulis plerumque distantibus, sæpe compositis. *Spicula* pallida, 6-10-12 lin. longa, basi attenuata, 5-6-flora, flosculis 1-3 fertilibus, palea inferiore brevimucronata, superiore sub lente hirsutiuscula, carinis fimbriata. *Antheræ* obtusæ. *Stylus* cito 3-fidus. *Squamulæ* ovatæ, apice fimbriatæ, subæquales, tertia minor. *Ovarium* stipitatum, tandem subobovatum, apice vix hirsutum.

In spiculis perpaucis, forsan morboris, palea superior *intus hirsuta*, *dorso rugosa*, squamulæ *carnosæ* et fusco-hirsutæ, cum ovario *rostrato* apice *glabro*, occurrunt.

This species, of which I have seen but one specimen, collected by the late Mr. Richard Oldham, in 1864, appears to be more herbaceous than any other *Bambusa*. The green, striated, almost *pithy* panicle, with angled branches, distinguishes it from all other allied species. *B. orientalis* of Nees approaches it in having a soft and striated panicle, but has a very different style and fruit.

7. *B. TERES*, hb. Ham. 881, Wall. Cat. 5026B. Culmo ignoto, paniculæ rhachi *eximie fistulosa, cava, striata, non dura*, ramis *angulatis*, spiculis in semiverticillis *paucis*, fertilibus  $1\frac{1}{2}$ –2 poll. longis, palea inferiore *longe acuminata*, antheris apice *penicillatis*; foliis  $1\frac{1}{2}$ – $1\frac{3}{4}$  poll. *latis*, 12–14 poll. longis, basi *attenuatis*, venulis *transversis crebris*, sæpe *conspicuis*, ligula *brevi*.

*Hab.* in Ind. or. Bengal, Gongachora, 881! *Hamilton, Griffith!* (folia tantum); Assam! *Jenkins* (flores sine foliis). v. s.

*Culmus* ——. *Folia* lanceolata, 12–14 poll. longa,  $1\frac{1}{2}$ – $1\frac{3}{4}$  poll. lata, basi inæqualia, attenuata, vix petiolata, apice rostrato-acuminata, margine brevissime serrata, supra glabra, sed uno latere tactu scabra; subtus pilis brevibus hirsuta, tandem glabrescentia, nervo centrali valido, secundariis utrinque 11–16 subconspicuis, venulis transversis sat crebris (inferne præcipue) conspicuis. *Vagina* pilis paucis, superne hirsutæ vel glabræ, infra petiolum membrana coriacea terminatæ, ore *nudæ, ligula brevi*. *Panicula* composita vel decomposita (nodi 3–4 tantum adsunt), rhachi 3– $3\frac{1}{2}$  lin. diametro, *eximie cava*, parietibus tenuissimis, striata, non dura, ramis *angulatis*, 1–2 longis, reliquis brevibus, vix compositis, erectis, ad nodos semiverticillatis, bracteis longis membranaceis stipatis. *Spiculæ* in glomerulis, basi bracteatis, paucæ, plerumque 1 fertilis et 1–2 steriles. Fertilis fere 2 poll. longa, non nitida, 7–8-flora, flosculis 6 sæpe fertilibus, rhachillæ articulis obcuneatis, apice fimbriatis. *Palea* inferior in flosculis infimis interdum apice subfoliacea, nervosa, plerumque longe acuminata, 10 lin. longa, margine fere glabra; superior inter carinas superne, nisi ipso apice, ciliatas 5–6-nervis, apice pilis penicillata. *Antheræ* apice penicillatæ. *Squamulæ* longe fimbriatæ, 10–14-nerves, subobovatæ. *Ovarium* apice hirsutissimum, subobovatum et rostratum, in stylum profunde 3-fidum.

I have only seen some portions of a panicle of this plant, and therefore have had but slight materials to describe a species from. However, the very hollow panicle, with large spiculæ, and much acuminated lower palea, combined with the broad leaves and their conspicuous transverse veinlets, serve to distinguish this from *B. tulda* and all its allies. The following species, *B. Falconeri*, has also broad leaves; but they are rounded at the base, and the ligules are much elongated, in addition to other (less conspicuous) points of difference. *B. Oldhami* has a panicle very similar to that of this species.

8. *B. FALCONERI*, Munro. Culmo vix elato?, fistuloso; panicula decomposita, rhachi fistulosa, pallida, viridi, non nitida nec dura, ramis semiteretibus, sæpe a basi densifloris, ramulorum internodiis apice hirsutis, spiculis plurimis sterilibus, in verticillis approximatis, vix dense aggregatis, fertilibus 10–12 lin. longis, palea inferiore acuminata, antheris apice penicillatis; foliis 12–17 poll. longis, usque  $3\frac{3}{4}$  poll. latis, basi rotundatis, venulis *transversis crebris*, sat *conspicuis*, ligula valde *elongata*.—*B. fistulosa*? Royle, MS. ad herb. 373!

*Hab.* in Ind. or. Himalaya, Gurhwal, Dehra Dhoon! alt. 2000–3000 ped. s. m., *Falconer* (florifer); Okeemath? (“Chye” incolis), 4000 ped. s. m., *Strachey et Winterbottom!* (folia tantum, dubia); Himalaya (“Kag”), *Royle*. v. s.

*Culmus fistulosus*, an subarboreus?, internodiis apice farinoso-hirsutis. *Folia* (quodam modo dubia) ovato-lanceolata, basi æqualia, subrotundata, apice attenuato-acuminatissima, margine scabra, 12–18 poll. longa, medio 3– $3\frac{3}{4}$  poll. lata, supra glabra, subtus punctis minutissimis scabriuscula, inferne interdum pilis brevibus subhirsuta, nervis secundariis utrinque 12–16, venulis *transversis* sat *conspicuis*. *Vaginæ* primum hirsutæ, tandem pilorum residuis scabræ, ore efimbriatæ, ligula conspicua,

*elongata*. *Panicula* decomposita (pars superior 3-pedalis adest), internodiis 5-8 poll. longis, rhachi pallide virente, striata, non dura, ramulis ad nodos subdense verticillatis, 1-2 sesquipedalibus, reliquis brevibus, internodiis subangulatis, plerisque apice subviscido-hirsutis, spiculis pallidis, plurimis sterilibus, gemmiparis, in verticillis sæpe compositis vix dense aggregatis. *Spicula* fertilis 10-12 lin. longa, sub 10-flora, flosculis 4-5 supremis gradatim tabescentibus, rhachillæ articulis cuneatis, apice pilis longis ciliatis. *Palea* inferior nervosa, margine vix fimbriata, acuminata; superior angustior et brevior, inter carinas longe ciliatas 5-7-nervis. *Squamule* 3, tenues, subæquales, duæ interdum obliquæ, obtusæ, vix nervosæ, longe fimbriatæ. *Antheræ* pilis 1-2 vel plurimis penicillatæ. *Ovarium* subobovatum, apice pilis longis hirsutum, in stylum cito trifidum vix rostratum.

As regards inflorescence, this species is to be distinguished from *B. teres* by having a much less hollow panicle, very much smaller, more densely crowded, and paler-coloured spiculæ, with the lower palea much less acuminated. The panicle, in general appearance, bears a considerable resemblance to that of *B. nutans*. I do not feel quite certain about the foliage. The flowering specimens were collected by Falconer in the Dehra Dhoon in September 1840, and the leaves in October 1839; and it is, therefore, just possible that they may have belonged to different species. The specimens collected in the interior of Gurhwal by Strachey are a little doubtful. They are evidently taken from young, almost undeveloped shoots; and the ligules are rather shorter than in Falconer's specimens, and the leaves have fewer secondary nerves; but in other respects they agree very well.

9. *B. BREVIFLORA*, Munro. Culmo inermi, arborescente?, *subsolido*, ramis *inferioribus* sæpe *basi foliatis*, *apice floriferis*, superioribus foliiferis tantum; *panicula* in ramo terminali, *subspicata*, verticillis paucispiculatis, spiculis *brevibus*, vix 6 lin. longis, *lividis*, paucifloris, flosculis 2-3 perfectis, his palea *superiore inferiorem obtusam*, brevissime mucronatam *superante*, ovario subobovato; foliis parvis, subtus hirsutis, vaginis ore utrinque ciliato-auriculatis.

*Hab.* in China, Formosa, Tamsuy, 651! *Oldham*; Lintao! *Dr. Cantor in herb. Benth.* (quoad flores, folia aliena sunt—*B. Cantori*). v. s.

*Culmus* arborescens?, *subsolidus*, durus, nitidus, internodiis 5-6 poll. longis (in spec. viso 3-pedali), ramis ad nodos fasciculatis, inferioribus inferne nodosis, teretibus, simplicibus vel compositis, apice floriferis, sæpe basi foliatis, foliis cito caducis, superioribus foliiferis tantum, adjecto hinc et inde ramulo florifero, basi nudo. *Folia* lanceolata, 1½-4 poll. longa, 6-8 lin. lata, basi rotundata, petiolo brevi, compresso, apice setaceo-acuminata, margine aspera, vix serrata, subglabra, subtus hirsuta; nervis secundariis utrinque 4-5, vix a tertiariis discernendis. *Vaginæ* sulcatæ, glabræ, utrinque auriculatæ, auriculis ciliis, interdum 8 lin. longis fimbriatæ. *Panicula* in ramis vel ramulis terminalis, verticillato-spicata, verticillis subæquidistantibus, paucispiculatis, simplicibus. *Spicula* subcylindrica, acuta, sub 6 lin. longa, rhachillæ articulis brevissimis, livida, nitida, 5-7-flora, flosculis 3-4 terminalibus gradatim tabescentibus, internodiis 2-3 perfectis, his palea inferiore nervosa, glabra, obtusa, sed brevissime mucronata, a palea superiore (submembranacea, inter carinas superne tenuiter fimbriatas 5-7-nervi) superata. *Squamule* longe fimbriatæ, inconspicue nervosæ. *Antherarum* connectivo obtuso-elongato. *Stylus* cito 3-fidus in stigmata sublonga. *Ovarium* stipitatum, obovatum, apice hirsutum.

The nearly simply spicate and fascicled panicles and very small darkish-coloured spiculæ distinguish this from all the species of *Bambusa* which have an obovate ovary.

The leaves attached to Dr. Cantor's specimen are deeply tessellated on both sides, and appear to belong to a very different plant. The flowers are, I feel persuaded, identical with the plant above described.

10. *B. PALLIDA*, Munro. Culmo inermi, fistuloso, florifero basi efoliato, foliis reliquis minoribus, raro inflorescentiam intrantibus; panicula glaberrima, ramis semi-verticillatis, patulis; spiculis *pallidis*, *biformibus*, cylindricis, in glomerulis, per ramos ramulosque dissitis, aggregatis, spiculis perfectis *subuncialibus*, flosculis 3-4 hermaproditis, supremis hirsutiusculis, rhachilla vix unquam visibili, palea inferiore superiore subduplo longiore, stylo cito 3-fido, ovario *lineari-oblongo*, *apice attenuato*, foliis angustis, basi attenuatis, subtus pilis longis hirsutis.

*Hab.* in Ind. or. Bengalia orient. Pundua! et Silhet! cult. (floriger!), Cachar ("Burwal" et "Bakhal" incolis) (folia tantum), Khasia, Joowyc, alt. 3500 ped. s. m., no. 602! et 607! *Kew Mus.* ("Usken" incolis) (folia tantum), *Hooker et Thomson.* v. s.

*Culmus* 50-pedalis, erectus, fistulosus, cavus, glaber, inermis, diametro 2-2½ poll., internodiis superioribus 4-7 poll. longis, spathis 3-4 poll. longis, pilis fuscis, basi bulbosis hirsutis, apiculo 4-7-unciali, e basi amplissima, culmis junioribus foliacea, eximie auriculata, attenuato. *Folia* lineari-lanceolata, 4-8 poll. longa, 5-7 (raro 14) lin. lata, membranacea, basi subcuneata, vix petiolata, supra glabra, sed uno margine tactu scabra, subtus sæpe pallidiora, pilis sublongis hirsuta, nervis secundariis utroque latere sub 4-6 raro 8, margine serrata. *Vagina* glabræ, sulcato-striatæ, lateribus productæ et interdum conspicue auriculatæ, auriculis ciliis perpaucis, subrigidis, cito caducis fimbriatis, ligula brevissima. *Panicula* ramosa, rhachi fistulosa, glaberrima, ramis inæqualibus, simplicibus vel compositis, spiculis plurimis sterilibus, cum paucis (1-4) fertilibus ad nodos ramorum ramulorumque semiverticillatis, verticillis rarissime proliferis. *Spicula* pallida, sterilis 3-5 lin., fertilis 12-14 lin. longa, 7-10-flora; flosculo infimo (fertilis) masculo, sequentibus 3-4 perfectis, terminalibus 3-5 gradatim tabescentibus et sæpe dorso, basin versus, hirsutis; rhachillæ articulis inferioribus brevissimis, apice incrassatis et fimbriatis. *Palea* inferior dorso glabra, intus pubescens, multi (20)-nervis, mucronata, superiorem attenuatam, carinis breviciliatam longe superans. *Antherarum* connectivum *seta* sublonga *apiculatum*, interdum nudum. *Squamule* oblongæ, membranacæ, basi 2-3-nerves, apice longe fimbriatæ. *Stylus* cito 3-fidus in stigmata 3 brevia, pulchre plumosa. *Ovarium* (immaturum) apice attenuatum, nullo modo obovatum. *Caryopsis* ignota.

This bears a considerable resemblance to *B. tulda*, from which, however, the attenuated ovary at once distinguishes it. Very few of the spiculæ (sometimes only 2-3 on a branch) appear to be perfect; the sterile spiculæ are numerous and very much smaller.

11. *B. KHASIANA*, Munro. Culmo fistuloso, vix duro, inermi; ramulis paniculæ floriferis inferioribus verticillatis, superioribus alternis, basi vel nudis vel foliiferis, spiculis tandem complanatis, sub 9 lin. longis, in glomerulis sæpe distantibus, densifloris vel paucifloris, aggregatis, palea inferiore superiore vel breviora vel æquilongâ, stylo 3-fido, ovario *rostrato*, *rostro glabro*; foliis lanceolatis, *acumine hirsutissimo* terminatis, vaginis primum ore fimbriatis.

*Hab.* in India or. Khasia 2000 to 4000 p. s. m., Churra, no. 1097!; Jasper Hill, Mahadeb, no. 496! ("Tumar" vel "Tomar" incolis), *Hooker.* v. s.

*Culmus* fistulosus, glaber, suffruticosus?, spathis subsemipedalibus, basi barba fulva cinctis, dorso pilis nigris, bulbosis hirsutis, margine longe ciliatis, apiculo triangulari, basi fimbriato, brevissimo, 3-5 lin. longo terminatis. *Rami* foliiferi geniculati, pauci (5-8), basi bracteati, verticillati, apice folia pauca (3-5) gerentes. *Folia* plerumque 4-6 poll. longa, et 9-12 lin. lata, in ramulis floriferis 8 poll. longa, et 18 lin. lata, lanceolata, basi rotundato-attenuata in petiolum sublongum, *acumine*, præcipue in foliis junioribus, *hirsutissimo* terminata, utrinque glabra, nervis secundariis plurimis, ægre a tertiariis discernendis, membranacea, pallida. *Vaginæ* glabræ, breviter subauriculatæ, ore ciliis paucis, *fuscis, plicatis*, cito deciduis fimbriatæ, ligula demum elongata. *Paniculæ* ramis inferioribus verticillatis, simplicibus, valde inæqualibus, superioribus alternis, sæpe gracilibus, loriformibus, basi plerumque nudis, interdum paucifoliatis, spiculis glomerato-verticillatis, verticillis 6-1 poll. et minus distantibus. *Spicula* fertilis 7-9 lin. longa, primum cylindrica, demum complanata, glabra, 5-6-flora, rhachillæ articulis striatis, apice fimbriatis, flosculo inferiore bipaleaceo, masculo vel neutro, 2-3 sequentibus subpatulis, fertilibus, 1-2 superioribus tabescentibus, gluma inferiore gemmipara, superiore 5-7-nervi, margine subfimbriata. *Palea* inferior (fertilis) acuminata, multinervosa, glabra; superior vel longior vel subæquilonga, carinis breviciliata. *Squamulæ* variabiles, ratione spiculæ magnæ, ovales, toto margine fimbriatæ, obtusæ, in flosculis 2 inferioribus paucinerves, nervis coloratis valde conspicuis, in tertio fertili multinervosæ, nervis minus conspicuis. *Antherarum* connectivum obtusum. *Stylus* cito 3-fidus, stigmatibus sublongis, tenuibus. *Ovarium* (immaturum) lineari-oblongum, rostratum, rostro glabro, styli 3-fidi residuis coronatum.

This is a well-marked species, readily distinguished from all others of the genus by the peculiar long beard at the base of the spathes, combined with the long hairy point to the leaves. The specimens I have seen do not enable me to state whether the leaf-bearing and flowering culms are generally distinct. The plant appears to be confined principally to the lower and warmer slopes of the Khasia mountains.

12. *B. POLYMORPHA*, Munro. Culmo excelso, inermi, fistuloso, duro, internodiis apice pilis adpressis albidis, hirsutis, florifero basi aphylo; panicula supra decomposita, ramis ramulisque polymorphis, nunc brevibus vel brevissimis, verticillis spicularum, paucifloris, approximatis, nunc 2-3-pedalibus, verticillis densifloris, 4-6 poll. distantibus, spiculis interdum monoicis vel dioicis, 3-6 lin. longis, palea inferiore obtusa, mucronata, superiore *carinis glabra*, antheris sæpissime seta apiculatis, ovario subrostrato, rostro *hirsuto*; foliis angustis, utrinque *hirsutiusculis*, vaginis eximie auriculatis.

*Hab.* in Ind. or. Martaban, Pegu! ("Kijathounwa" incolis), no. 1, *Brandis*; Rangoon, *M'Clelland*. v. s. "*Culmus* arboreus, 60-80-pedalis, rectus, apice leniter curvatus, inferne nudus, superne ramis semi-verticillatis comosus, diametro maxima 6-pollicari, parietibus tenuibus, annulis horizontalibus, internodiis 1-2 ped. longis" (*Brandis*); spathis crassis, coriaceis, intus nitidis, pilis paucis sparsis, extus pilis canescentibus adpressis, medio affixis, glaucescentibus, "fauce lacero-dentatis, ciliatis, apiculo cucullato, mucronato, laxè adpresso." *Folia* tenuia, lineari-lanceolata, basi inæqualia, subattenuata, apice setaceo-acuminata, margine aspera, vix serrata, 5-6½ poll. longa, 4-7 lin. lata, supra, punctulis minutissimis tota superficie scabriuscula, pilis paucis sparsis, utroque margine et medio aspera, subtus pilis crebris hirsuta, nervis secundariis utroque latere 6-8, subconspicuis. (*Folia* pauca, raro inflorescentiam intrantia, minora, vix 3 lin. lata, 2½-4 poll. longa.) *Vaginæ* carinatæ, compressæ, striatæ, inter strias hirsutæ, margine uno fimbriatæ, apice abrupte terminatæ, lateribus auriculatæ, auriculis sæpe elongatis, ciliis longis fimbriatis, ligula vix ulla. *Panicula* supra decomposita, inter-

nodiis (visis) 4-6 poll. longis, apice *pilis adpressis hirsutiusculis*, ramis sæpe numerosis semiverticillatis, nunc brevibus et tenuibus, 2-7 poll. longis, verticillis subapproximatis, paucifloris, nunc, adjectis ramis 2-3, valde elongatis, verticillis densifloris, simplicibus vel compositis, 4-6 poll. distantibus. *Spicula* cylindrica, nitida, 3-6 lin. longa, interdum monoica et forsitan dioica, mascula sæpe violaceo colorata, fertilis pallida, 6 lin. longa, sub 6-flora, flosculis 1-2 inferioribus neutris, 1-paleaccis, 2-3 fertilibus, terminali tabescente sublongipedicellato, rhachillæ articulis reliquis brevibus. *Spiculæ* interdum viviparæ, elongatæ, paleis inferioribus apice foliaceis. *Palea* inferior (flosculi fertilis) nervosa, *obtusa*, brevissime mucronata, glabra; superior æqualis vel longior, obtusissima, carinis *glaberrima*. *Squamulæ* obovatæ vel ovatæ, toto margine fimbriatæ, basi venosæ, tertia minor. *Antheræ* interdum seta apiculatæ, interdum, præcipue in spiculis masculis, nudæ. *Stylus* in stigmata longa, pilosa, fere ad rostrum 3-fidus. *Ovarium* apice hirsutum, subito rostratum, rostro hirsuto, raro fere obsoleto.

The individual spicula of this species is certainly very like that of *B. breviflora*, but is at once distinguished by the comparatively long-stalked terminal flower. In size, foliage, and general inflorescence, the two plants are widely different. Dr. Brandis says that this species is common throughout Pegu on hills, and is associated with Teak.

13. *B. GRIFFITHIANA*, Munro. Culmo gracili, subscandente, fistuloso, cavo, florifero (an semper?), foliifero; panicula vel ramosa ramis alternis, vel fere spicata, spiculis 6-7 lin. longis, in glomerulis parvis distantibus aggregatis, flosculo non nisi *penultimo hermaphrodito, terminali* tabescente, *longe stipitato*; foliis *magnis*, subtus *discoloribus*, venulis *transversis crebris*, vaginis collo auriculato fimbriatis.—*Bambusa*, sp., Griff. Journ. p. 90.

*Hab.* in Ind. or. Burmah, Mogoung! *Griffith.* v. s.

*Culmus* gracilis, fistulosus, cavus, non durus, subscandens, foliifer sæpe apice florifer. *Folia* magna, 1-1½ ped. longa, 2-2¾ poll. lata, valde discoloria, supra (an siccando tantum?) fusca, subtus pallidiora, apice acuta, basi vix rotundata, inæquilatera, in petiolum brevem, crassum, rugosum attenuata, utrinque marginibusque subglabra, nervo centrali valido, secundariis tota lamina 30, subconspicuis, *venulis transversis crebris*, subtus plus minus elevatis. *Vaginæ* dorso obtuse carinatæ, glabræ, utrinque auriculam magnam, reversam, margine ciliis validis numerosis fimbriatam gerentes, ligula elongata, obtusa, ciliata. *Panicula* terminalis, vel ramosa, ramis paucis alternis, vel simplex, usque 6-7 ped. longa, verticillato-spicata, glomerulis parvis distantibus. *Spicula* cylindrica, sessilis, 6-7 lin. longa, 5-flora, flosculis 3 inferioribus *unipaleaceis, neutris*, gradatim incrementibus, *penultimo hermaphrodito*, terminali tabescente longe pedicellato, rhachilla brevissima, nunquam visibili. *Palea* inferior (fertilis) membranacea, glabra, brevissime mucronata, multinervis, basi involuta; superior subæquilonga, tenuimembranacea, hyalina, inter *carinas obtusas, glabras* sulcata, pedicellum flosculi imperfecti arcte involvens. *Squamulæ* 3, longe fimbriatæ, nervosæ, hyalinæ, 2 obtusæ longiores, tertia sublanceolata. *Antheræ* obtusæ. *Stylus* fere ad basin in stigmata pulchre plumosa 3-fidus. *Ovarium* (immaturum) rostratum, *rostro glabro*.

In habit of growth, foliage, long spike-like hollow panicle, and structure of the spicula, with only one perfect flower, this is widely separated from all other species of *Bambusa*. In the composition of the spicula it is very closely allied to the genus *Nastus*. *B. Khasiana* approaches it in some respects, but has always more flowers in the spicula, and the leaves are very different. It appears to have been found once only by Griffith

in his journey from Hookoom Valley to Ava, associated with numerous tropical plants on the banks of the river Mogoung, in the extreme north of Burmah.

14. *B. BALCOOA*, Roxb. Hort. Beng. 25 (1814); Fl. Ind. ii. 196, icon. 1402! Culmo excelso, fistuloso, panicula "*scapiformi*, radicali, spicis verticillatis" (Roxb.), ramis interdum elongatis, internodiis ramorum *uno latere sulcatis et hirsutis*, spiculis glomeratis, *ovatis, mollibus*, 6–8-floris, flosculis 4–6 hermaphroditis, palea inferiore *marginè fimbriata*, superiore et *carinis et marginè ciliata*, stylo hirsuto, *ad* vel paulo *infra medium* 3-fido; foliis sæpe pedalibus, vaginis *hirsutis*.—Cat. of B. G. Calc. 79. *B. capensis*, Rupr. l. c. 144, t. xii. f. 54; Steud. l. c. 330. *B. vulgaris*? Nees Fl. Afr. Aust. 462, non alior. *B. vasaria*, herb. Hamilton, no. 883, in Wall. Cat. 5025! an etiam *Arundarbor vasaria*, Rumph. Amb. iv. 8. *Arundo bambos*, herb. Smith! e Thouin, no. 230! non Linn.

*Hab.* in Ind. or. Bengalia ("Balkoo Bans" incolis), *Roxburgh*; Birgunge, no. 883! *Hamilton*; Purnea Kishengunge! Megna, 202!, Cachar! ("Betwah"), *Hooker et Thomson*; Boglepore, 44! *Pinwell*; Assam, Seesagur ("Burra Balooka"), 947! *Masters*!; cult. C. B. S. *Ecklon, Mund*!, no. 1045–3, *Burchell*!; Paris, *Thouin*; in hb. Smith! Crystal Palace! v. s.

*Culmus* arboreus, excelsus, 50–70-pedalis, cavus, inermis. *Folia* lanceolata, basi subcordata vel attenuata, petiolata, petiolo supra subhirsuto et sæpe transverse ruguloso, margine hispida et interdum basin versus longe ciliata, utrinque viridia vel raro glaucescentia, 6–12 poll. longa, 1–2 poll. lata, supra tactu scabra, subtus pilis brevibus, demum deciduis hirsuta, nervis secundariis utroque latere 7–11, venulis transversis distantibus, plus minus conspicuis. *Folia* inflorescentiam intrantia multo minora sunt. *Vagina* striatæ, setis diaphanis, dein deciduis hirsutæ, apice truncatæ, ore plerumque nudæ vel pilis paucis ciliatæ, ligula producta, obtusa, ciliata vel glabra. *Inflorescentia* "*scapus radicalis, spicis verticillatis, verticillis interdum proliferis*" (teste *Roxburgh*); interdum panicula composita, internodiis subteretibus, apice hirsutiusculis, ramis ad nodos paucis, 2–3, simplicibus vel raro compositis, 6–18 poll. longis, internodiis uno latere sulcatis et hirsutis, spiculis plerumque subdense glomeratis in verticillos, vel approximatos, vel 1–2½ poll. a seipsis invicem remotos; interdum (*e. g.* in spec. e C. B. S. in herb. Hook.) panicula inferne ramosa, ramis inferioribus et spicigeris et foliiferis ad eundem nodum, superne subverticillato-spicata, verticillis densis, globosis, ramulos 1–2 breves interdum emittentibus. (Hæc forma *B. capensis*, Rupr. est.) *Spicula* 4–6 lin. longa, ovata, mollis, violacea (in icon. *Roxb.*), 6–8-flora, flosculo infimo et supremo sterilibus, reliquis 4–6 hermaphroditis, rhachilla abscondita. *Palea* inferior nervosa, membranacea, ovata, mucronata, margine superne fimbriata, (lævis, *Roxburgh*), pallide straminea vel demum fuscescens, inflata; superior vix brevior sed angustior, inter carinas nervis 4 *anastomosantibus* percursa, *carinis et marginè* hispidociliata. *Squamulæ* 3, variables, plerumque ovals, membranacæ, longe ciliatæ, inæquales, duæ obtusissimæ, tertia longior, sublanceolata. *Anthera* seta cito caduca apiculatæ. *Stylus* hirsutus, *ad* vel paulo *infra medium* in stigmata 3 sublonga, flexuosa, hirsuta divisus. *Ovarium* (immaturum) rostro hirsuto, in stylum attenuatum.

In numerous respects, especially in the form of the spicula, this species very closely approaches *B. Beecheyana* and *B. Oldhami*; but the much thicker and more deeply trifid styles have induced me to place it in the first section of the genus. *Roxburgh*, whose drawing represents apparently a young undeveloped flowering culm, states that he never saw this species but once in flower: and flowering specimens must still be very rare; for I have never seen anything like a perfect one; and most of those which I have quoted



are in leaf only. Dr. Hooker's specimen from Kishengunge is the only one that gives any information as to the structure of the panicle. Dr. Hamilton's, which is the only other Indian one I have seen in flower, contains merely a single detached branch of a panicle. Mund's, from the Cape, is evidently in an abnormal leaf-bearing condition; and the only remaining flowering specimen, namely that from Burchell, contains two or three detached branches of a panicle. Roxburgh states that the bamboo-workers of Bengal consider this to be the very best Bamboo for building houses, scaffolding, &c., but that in order to render it durable, it requires long immersion in water.

15. *B. FLEXUOSA*, Munro. Culmo florifero basi aphylo, spinoso, 6-12-pedali; panicula decomposita, ramulis tenuibus, ad nodos spiculas paucas, latas, compressas, multifloras gerentibus, rhachilla spiculæ conspicua, valde *flexuosa*, glumis linearibus, acutis, paleis *hiantibus*, ovario rostrato; foliis lanceolatis, brevibus.—“*Humilis spinosa*,” Osbeck in “*Resa*,” 204 (1757).

*Hab.* in China, circa Cantonem, no. 10,000, *Hance*!; Quantung, *Sir G. Staunton*! in *herb. Mus. Brit.* (folia tantum). v. s.

*Culmus* suffruticosus, “6-12-pedalis,” spinosus, viridis, diametro  $1\frac{1}{2}$  lin., internodiis glabris, striatis, 2-3 poll. longis, ramis 1-3, cum spinis 1-2 (in inferioribus) ad nodos locatis. *Folia* parva, lanceolata, maxima (in speciminibus visis) 2 poll. longa, 5-6 lin. lata, basi rotundata, petiolata, apice mucronato-acuta, margine, præcipue in foliis junioribus, longe ciliata, utrinque glabra, nervis secundariis inconspicuis, utroque latere 3-4. *Vagina* glabræ vel hirsutæ, striatæ, margine læves, infra petiolum membrana sæpe tenuiter ciliata terminatæ, ore ciliis tenuissimis cito caducis fimbriatæ, ligula subelongata, sæpe longe ciliata. Culmi floriferi dispositio ramorum ut in foliifero, ramulis simplicibus vel compositis, foliis hinc et inde sparsis, cito deciduis, spiculis in ramulis approximatis, inferioribus geminis vel ternis, superioribus alternis, 10-14 lin. longis, eximie compressis, sessilibus vel interdum pedicellatis. *Spicula* 8-12-flora, flosculo inferiore interdum et superioribus 2-3 masculis vel neutris, reliquis intermediis perfectis, hermaphroditis, distichis, divaricatis, *paleis hiantibus*, articulis rhachillæ apertæ, conspicuæ, flexuosæ longis, hirsutis, compressis; glumis linearibus, acutis, sæpe distantibus. *Palea* inferior rostrato-acuminata, glaberrima, nervis inconspicuis 7-9-11, in flosculis inferioribus longe, in superioribus paulo, superiorem subcymbiformem, dorso canaliculatam, carinis plus minus ciliatam superans. *Squamulæ* 3 subæquales, apice rotundato-obtusissimæ, longe fimbriatæ, nervosæ, nervis, sæpe curvatis, squamulæ marginem percurrentibus. *Stamina* 6, filamenta basi expansa, antheris obtusis. *Stylus* basi subbulbosus, primum indivisus, sed cito in stigmata 3 pulcherrime penicillata, *inferne nuda*, fere ad bulbum 3-partitus. *Caryopsis* lineari-oblonga, vix 2 lin. longa, apice glabra et basibus styli trifidi tricornuta.

This has a different look from all other *Bambusæ*. The perfect spicula has the rhachis as much exposed as it often is in *Brachypodium*, to which it bears some resemblance. The gaping paleæ also give the plant a very peculiar appearance. Osbeck, in speaking of this plant, collected during his travels in China in 1751, says that it is generally 6 feet, but occasionally 12 feet, high, and that it is said to flower once in sixty years.

16. *B. BLUMEANA*, Schultes, *Syst.* vii. 2. 1343 (1830). Culmo elongato, spinoso, panicula “laterali” (Schult.), decomposita, patula, ramis plerumque solitariis, inferioribus 15 poll. longis; spiculis vix compressis, verticillato-glomeratis, rhachillæ

tandem conspicuæ articulis *hirsutis*, flosculis imbricatis, palea inferiore mucronato-acuta, stylo profunde 3-fido, caryopsi subtricornuta; foliis 3-6 poll. longis, utrinque glabris.—Kunth, Enum. 431. *B. spinosa*, Blume in litt. ad Nees ab Esenbeck, in Bot. Zeit. 1825, p. 580, non Roxb. *B. agrestis*? Poir. Enc. viii. 704 (1808); Sch. l. c. 1344; Rupr. l. c. 149; Kunth, l. c. 432; Steud. l. c. 330. *Arundo agrestis*? Lour. Fl. Coch. i. 72; forsā *Arundarbor spinosa*, s. *Bulu Baduri*, *Teba Teba*, Rumph. Amb. iv. 14, t. 3. *B. teba*, Miq. Fl. Ind. Bat. iii. 418. *Schizostachyum durie*, Rupr. l. c. 136; Steud. l. c. 332, sed vix Miq. l. c. 425. *Ischurochloa spinosa*? Büse in Pl. Jungh. 390, Miq. l. c. 422 (syn. plur. exc.), Walp. Ann. vii. 1045.

*Hab.* in Java, *Rumph.*, *Junghuhn*, (“Tring ori,” “Tring ampel” et “Giping” incolis) no. 313! *Horsfield*, (“Hauer Tjutjuk” vel “Bambu Durie”) *Blume*; ins. Soembawa, no. 3417, *Zollinger* (teste Miquel); Amboina? Coram? Manipa? *Rumph.*; Cochīn China? *Loureiro*. Vidi spec. plur. in herb. *Horsfield*.

*Culmus* erectus, elongatus, spinosus, “spinis ternis recurvis, crassitie 1-2 poll., haud scandens,” internodiis superioribus cinerascēti-flavicantibus, *glabris*, *teretibus*, inconspicue striatis, 1½-2-4 poll. longis. *Rami* ramulosi, ad nodos pauci, basi incrassati, geniculati, ramulis numerosis, gracilibus, aliquid deflexis, internodiis ramulorum sæpe apice *scabris*. *Folia* tenuia, lineari-lanceolata, cuspidata, basi interdum rotundata, plerumque abrupte attenuata in petiolum glabrum, 3-6 poll. longa, vel raro minora 9-30 lin. longa, 3-7-9 lin. lata, margine serrata vel etiam fimbriata, utrinque glabra, subtu glaucescentia, ⅓ laminæ nitida, nervis secundariis utroque latere 5-7. *Vaginæ* striatæ, margine uno ciliatæ, in siccis pallide fuscescentes, primum pilis sparsis, adpressis hirsutæ, demum glabriusculæ, ore utrinque ciliis paucis (sæpe cito deciduis) fimbriatæ, ad apicem infra petiolum fovea parva sub lente ciliolata, ligula truncata, brevi, pilis sublongis, demum deciduis ciliata. *Panicula* (lateralis, testibus *Blume* et *Schultes*), ut videtur, ampla, gracillima, ramosa, apice nutans et simpliciter verticillato-spicata (pars superior 3-pedalis adest), internodiis inferioribus 3-4½ poll. longis, ramis plerumque solitariis, alternis, raro (in spec. uno) ternis, inferioribus 15 poll., sequentibus 10-8-7 poll. longis, gracilibus, suberectis, divaricatis, supremis interdum 2-2½ poll. longis, erectis, densifloris, fere spicatis, verticillis approximatis, imbricatis. *Spiculæ* per ramos, ad intervalla regulariter et gradatim e basi decrescentia, glomerato-verticillatæ, patulæ, plurimæ breves, steriles, subulatæ, paucæ fertiles, subpollicares. *Spicula* fertilis subcompressa, pallida, rhachillæ tandem conspicuæ articulis 1½ lin. longis, hirsutis, 8-10-flora, flosculis 3-5 intermediis perfectis, 1-2 infimis et 2-3 supremis bipaleaceis sed sterilibus. *Palea* inferior (fertilis) 4 lin. longa, inferne lævis, superne costato-nervosa, apice subulato-acuminata; superior vix brevior, carinis et sæpe margine basin versus ciliata. *Squamulæ* 3, obovatæ, longissime ciliatæ, subæquales, interdum basi callosæ et nervosæ. *Antheræ* obtusæ. *Stylus* brevis, cito in stigmata 3, pulcherrime plumosa, fere ad basin divisus. *Ovarium* subtriquetrum, apice, vix hirsuto, residuis stylorum tricorutum.

Having seen several excellent specimens of this plant in *Horsfield's* Herbarium, I have been able to add some particulars to the description of the species given by *Schultes*, who states that all the spiculæ he saw were sterile. I can see nothing to justify the panicle being called lateral; on the contrary, it appears to me to be decidedly terminal and unusually elegant and slender. *Blume* states that this plant is spinous; and there are some traces of spines in the specimens which I have seen; but there is nothing to indicate that it is as spinous as *B. agrestis* of *Poir.* and *Arundarbor spinosa* of *Rumph.* are described to be. *B. agrestis* is also described by *Loureiro* as having a bifid, not trifid style. I have therefore included these two species as probable synonyms only. Had I been fully persuaded of their identity, the earlier name of *B. agrestis*, *Poir.*, ought to have been adopted for the

species. One of Horsfield's specimens is marked "Tring ampel;" it has certainly no thorns, but I am not able to distinguish it in any other respect from the remaining specimens. Miquel, at p. 418 of the "Flora Indiæ Batavæ," states that "Ampel" is the native name of his *B. fera* (*Arundarbor fera species prima* of Rumph). The style, deeply trifid to near the base, the very hirsute joints of the rhachilla, and the somewhat 3-horned fruit separate this species from *B. spinosa*, Roxb., and its allies *B. arundinacea* and *B. orientalis*.

17. *B. ARUNDINACEA*, Retz. Obs. v. 24. (1789) sub *Bambos*. Culmo spinoso, florifero basi aphylo, foliis sæpe inflorescentiam superne intransibus, panícula ramosissima, ramis compositis et decompositis, interdum filiformibus, rhachi plerumque *glaberrima, nitida*, spiculis *rarissime* agglomerato-verticillatis, plerumque geminis vel ternis vel etiam supremis *solitariis*, interdum *pedicellatis*, 8-12 lin. longis, 6-12-floris, raro monoicis, rhachilla subhirsuta, plus minus *visibili*, palea inferiore *acuminata*, dorso glabra, margine nunc superne nunc inferne *tenuiter ciliata* vel omnino glabra, superiore, in flosculis perfectis, *inferiorem superante*, carinis plerumque longe ciliata, stylo basi subbulboso, cito in stigmata 2-3 profunde diviso, foliis plerumque 3-6 poll. longis, majoribus interdum pedalis, basi cuneatis vel rotundatis, vaginis ore fimbriatis vel tandem nudis.—Willd. Sp. Pl. ii. 245 (1797); Roxb. Corom. Pl. i. 56, t. 79, Hort. Beng. 25 (1814), Fl. Ind. ii. 191; Poir. Enc. viii. 701; Spreng. l. c. ii. 112; Link. Hort. Berol. i. 249; Rœm. et Sch. l. c. 1340; Kunth, Enum. 431, non Nees in Linn. ix. 475; Dalzell et Gibson, Bomb. Fl. 299. *B. spinosa*, Nees, l. c. 474, et Rupr. l. c. 142, tab. xii., xiii. fig. 52; Steud. l. c. 329, sed non Roxb. *B. arundo*, hb. Klein. Nees, l. c. 471; Rupr. l. c. 143, t. xiii. fig. 53; Steud. l. c. 329; Benth. in Fl. Hongk. 434 (var. foliis floralibus basi rotundatis, vaginis ore, ciliis caducis, nudis). *B. orientalis*, Nees in Wight, 206 B! = 1800! *B. Neesiana*, Arn. MS. *Arundo bambos*, Linn. Sp. Pl. ed. i. 81 (1753), teste herb. Linn.! *Bambos arundinacea*, Pers. Syn. i. 393. *Nastus arundinaceus*, Sm. in Rees's Encyc. no. 1; Rasp. l. c. v. 442; *Ily*, Rheede, Hort. Mal. i. 25, t. xvi. (Auctores pristini plures species *Bambusæ* sub *Arundine Bambos* confudisse videntur, quapropter synonyma, a Linnæo celebri citata, hic omitta).

*Hab.* in Indiæ or. peninsula, *Kœnig!* in herb. Mus. Brit., hb. Heyne, in Wall. herb. 5023 A; "Tanshaur, July 1798, Bambus arundo," in Wall. herb. 5023 B! = *Wight*, 205! 1801! ("Bambos arundo," Retz. 440, in Wight, 204! 1799!); Quilon, *Wight*, 1343! (var. fol. floralibus basi cordatis); Courtallum, *Wight*, 1344! 3346!; Nundidroog, herb. *Rottler!*; Madras, *Wight!* Dr. *Shuter!*; Poona-malee, *G. Thomson*, 110! 161! (var. spiculis elongatis et foliis majoribus); Bombay ("Maudgay" incolis), *Dalzell*; Kala Nuddie, *Ritchie*, 822! (folia tantum). In Bengalia, teste *Roxburgh*; China, Hong Kong, cult., *Hance!* (dubia). In hort. Kew! cult. v. s. et v.

*Culmi* 20-50?-pedales, "diametro 3-poll.," per 10-20 pedes stricti, tunc ad alterum latus flexi, anguste fistulosi, sæpe pallide straminei, teretes, duri, glabri, ramosissimi, spinosi, spinis sæpe aduncis "spathis 12-15 poll. longis, ore setigeris, apiculo acuminato, 3-5-pollicari, extus puberulis, intus argenteo nitidis" (*Dalzell*). *Folia*, in specimenibus a me visis, 3-8 poll. longa, 4-12 lin. lata, "12-15 poll. longa,  $\frac{3}{4}$ -2 poll. lata" (*Dalzell*), interdum 2-4 poll. lata (*Roxb.*), lanceolata, apice acuminata, basi attenuata vel subcordata, læviuscula vel supra marginibusque brevissime serrulatis tactu scabra,

subconcoloria, nervis secundariis subinconspicuis, 5-6 utroque latere. *Vagina* primum hirsutæ, demum glabrescentes, ore ciliis paucis, vix cito deciduis fimbriatæ. *Panicula* ingens, ramis numerosissimis, semiverticillatis, simplicibus compositisve, sæpe longis, decurvis aut pendulis, spinosis, spiculis rarissime dense glomeratis, sæpissime agglomerato-ternis quaternisve, superioribus sæpe alternis, solitariis et glumis distantibus quasi pedunculatis, internodiis, sæpe ipso apice, brevissime hirsutis. Interdum panicula ampla, foliosa, ramulis ultimis fere filiformibus, pendulis, foliis, reliquis minoribus, 5-10, basi cuneatis vel rotundatis (in eodem ramo) terminatis. *Spicula* plerumque nitida, lanceolata, 8-12 lin. longa, 6-12-flora, flosculis fertilibus 3-7, 1-2 vel pluribus inferioribus gemmiparis, sequentibus perfectis, his, palea superiore inferiorem superante, terminalibus 1-3 gradatim tabescentibus. *Palea* inferior basi lævis, superne nervosa, acuminata vel mucronata, interdum margine basin versus, interdum superne tenuiter fimbriata, sæpe omnino glabra; superior sæpe longior, carinis longe ciliata, sub lente valida hispidiuscula. *Squamula* 3, inæquales et dissimiles, duæ latiores, obtusæ, tertia lanceolata, angustior, omnes ciliatæ. *Stamina* 6, connectivo vel obtuso vel appendiculato. *Stylus* basi conico-bulbosus, infra medium 2-3-, plerumque 3-fidus in stigmata 3 pulchre plumosa. *Caryopsis* lineari-oblonga, apice styli residuo hirto coronata, "magnitudine et forma avenæ."

The hard, polished, yellowish, smooth, spinous branches of the panicle best distinguish this from *B. orientalis*. I presume that this is the species referred to above, at p. 4, as having, in 1864, furnished, during one of its periodical flowerings, food to upwards of 50,000 persons in Canara. I believe there is no doubt that this Bamboo, which Mr. Stewart says is called "Bidunguloo" in Canara, dies after perfecting its seed; but in proof of how rapidly the young plants may reoccupy the ground, I would mention that I have a plant growing in my greenhouse raised from a seed sent home by Mr. Dalzell in 1864, on which there are now 22 culms. With the exception of Wight, no. 3346, and G. Thomson, 110 and 161, nearly all the dried specimens which I have seen of this species have been collected, probably for convenience' sake, from plants bearing leaves at the end of the flowering branches, and consequently in an abnormal condition. Hence has probably arisen much of the confusion in the nomenclature of the plant indicated by the numerous synonyms quoted above.

18. *B. SPINOSA*, Roxb. Hort. Beng. 25 (1814); Fl. Ind. ii. 198, icon. 1964, non Nees in Linn. ix. 474. Culmo spinosissimo, florifero plerumque omnino efoliato; panicula ingente, ramosissima, spinosa, spiculis fere semper sessilibus, sæpe *curvatis*, acutis, sub 4-6-floris, 5-6 lin. longis, *coriaceis*, interdum monoicis, rhachilla *raro visibili*, per ramulos ultimos, sæpe *tenuis*, plerumque dense *glomerato-verticillatis*, glomerulis subæquidistantibus, palea inferiore sæpissime margine *plus minus fimbriata*, in flosculis perfectis, superiorem carinis ciliatam non æquante, stylo basi conico-bulboso, cito, fere ad basin, plerumque trifido, raro forsan bifido, foliis raro ultra 6 poll. longis, subtus interdum pilosis, vaginis ore ciliatis.—Hamilton in Linn. Trans. xiii. 480, teste herb. Ham. in Wall. no. 5024; Spreng. l. c. ii. 112. *Arundo indica arborea*, Burmann, Thes. Zeyl. 35. *B. arundinacea*, Thw. En. Pl. Zeyl. 375, non Retz. "*Arundo bambos*," herb. Roxb. non Linn.

*Hab.* in India or. Bengal, Calcutta ("Behor Bans"), Roxburgh! Hamilton! Thomson!; Gongachora! et Goraghat! Hamilton in Wall. Cat. 5024! A, B; Assam ("Koto Bans"), Jenkins! (var. spiculis longi-

oribus); Dacca! cult. Cachar! ("Kinkoit"), *Hooker* (folia tantum); Tenasserim, Moulmeyn, 5028! *Wallich*; Mergui, *Griffith*, 327! *Helper*, 267!; Pegu ("Yakatwa"), 8! *Brandis* (folia tantum), *M' Cleland*! v. s.

*Culmi* "subarborei" (*Roxb.*), dense cæspitosi, "30-50-pedales" (*Roxb.*), "100-pedales" (*Brandis*), superne incurvi, spinosissimi, ramis inferne semiverticillatis, superne alternatim distichis, vix fistulosi, duri, virido-flavi, striati. *Folia* lineari-lanceolata, 3-6 (raro 7 poll.) longa, basi plerumque attenuata in petiolum brevissimum, basi *subtumidum*, supra subglabra, subtus pallidiora et sæpe hirsuta, nervis secundariis utroque latere 4-6, plerumque inconspicuis. *Vaginæ* primum dense hirsutæ, deinde subglabræ, ore ciliis paucis caducis fimbriatæ. Internodiis culmi floriferi aphylli eis foliiferi longioribus et magis fistulosis (teste *Roxb.*). *Panicula* ingens, ramosissima, ramulis ultimis plerumque tenuibus, spiculis per intervalla, sæpe brevissima, dense glomerato-verticillatis. Interdum spiculæ in glomerulis, diametro 1-pollicaribus, ad basin ramulorum aggregatæ. *Spiculæ* acutæ, sæpe curvatæ, *breves*, 5-6 vel raro 8 lin. longæ, 4-6-floræ, flosculis 2-3 perfectis, sæpe monoicæ et forsitan dioicæ. *Palea* inferior margine vel glabra vel fimbriata, mucronata, acuta, in spiculis masculis superiore, carinis superne ciliata, longior, in hermaphroditis brevior. *Antherarum* connectivum elongatum. *Squamulæ* 3, fimbriatæ, vix nervosæ, duæ subobtusæ, tertia lanceolata. *Stylus* plerumque cito 3-fidus, basi conico-bulbosus. *Ovarium* (immaturum) lineari-oblongum, "clavatum" (*Roxb.*). *Caryopsis* matura nunquam a me visa.

This species is best to be distinguished from *B. arundinacea* by having a paler-coloured and more striated panicle, smaller and more coriaceous spiculæ, with fewer flowers, generally smaller leaves, which are often hairy on the underside, and with the petiole sometimes remarkably swollen at the base. In some of the Tenasserim specimens the spiculæ are remarkably small; but they do not appear to differ in any other respect. Unfortunately most of the specimens I have seen are imperfect; some contain only male spiculæ, and the flowering specimens generally are unaccompanied by leaves, and *vice versa*. Roxburgh states that "it is a middling-sized subarboreous species;" but a few lines below he says, "the height is from 30 to 50 feet;" and Dr. Brandis says it spreads all over the lower part of Pegu, in the plains and along the principal streams, and attains a height of 100 feet. Thwaites mentions that the seed of this species is eaten in Ceylon; and it was probably this species which is referred to in p. 4 as having flowered so providentially in India in 1866. The magistrate states "it was the wild thorny species only which had flowered."

19. *B. ORIENTALIS*, Nees in herb. Wight. 206 A, et in Linn. ix. 472 (partim). *Culmo* *incerte* spinoso, florifero, in speciminibus visis efoliato, *glauco-viridi*, *angulato* et *sulcato*, *minusque duro*, internodiis sæpe hirsutis; *panicula* decomposita; spiculis membranaceis, irregulariter paniculato-agglomeratis, interdum circa nodos dense verticillatis, nonnullis, glumis distantibus, distincte pedunculatis, 7-9 lin. longis, 5-8-floris; *palea* inferiore margine vel fimbriata vel nuda, superiorem vix subæquante, stylo basi conico-bulboso, non longe supra basin 2-3-fido; foliis (in spec. visis) 2-3½ poll. longis, petiolis plerumque hirsutis, vaginis primum hirsutis, ore longe ciliatis.—Rupr. *l. c.* 142, t. xiii. fig. 51. *B. arundinacea*, Nees in Linn. *l. c.* 475, teste Wight, hb. prop. 207! = 1802!, et Rupr. *l. c.* 141, t. xiii. fig. 50, sed non Retz. et aliorum.

*Hab.* in peninsula Indiæ orientalis, no. 206 A! = 1800!; Quilon, no. 3417! *Wight*! In planitie ad

montes Neilgherries, *Schmid.*; var. "spiculis, in glomerulis, æquo spatio distantibus spurie verticillatis," Negapatam, no. 103 != 207 != 1802! *Wight.* v. s.

*Culmus* (quoad altitudinem mihi ignotus) forsan suffruticosus, fistulosus, non solidus, glauco-viridis, internodiis ramorum sæpissime apice hirsutis, inferioribus (præcipue in culmis floriferis) tota longitudine hirsutis et sæpe uno latere sulcatis. *Folia* lineari-lanceolata, 2-3½ poll. longa, 4-5 lin. lata, apice acuta, basi subtruncata vel rotundata, attenuata in petiolum utrinque hirsutum, margine brevissime serrata, supra pilis sublongis, basi subbulbosis, sparsis, subtus pilis brevissimis hirsutiuscula, nervis secundariis utroque latere 5. *Vagina* superne hirsutæ, discolores, apice ciliis albis tenuibus fimbriatæ. *Panicula* decomposita, internodiis inferioribus 4-5 poll. longis, sæpissime hirsutis, angulatis, striatis, uno latere interdum profunde sulcatis, ramis paucis, simplicibus vel compositis, valde inæqualibus, 6-40-pollicaribus, ad nodos semiverticillatis, spiculis per ramos ramulosque irregulariter paniculato-agglomeratis, nonnullis distincte pedicellatis et solitariis, approximatis, erectis. Interdum, panicula nondum evoluta (*Wight*, 1802), spiculis circa nodos ramorum ramulorumque dense glomeratis, glomerulis subæquidistantibus. *Spicula* pallida, 7-9 lin. longa, 7-9-flora, flosculis 3-5 perfectis, reliquis incompletis, glumis vel bracteis 2 vel pluribus, gemmam spiculæ imperfectæ foventibus, interdum, in spiculis solitariis, longe distantibus. *Palea* inferior basi lævis, superne leviter nervosa, margine nunc glabra nunc ciliata; superior, in flosculis perfectis, carinis longe ciliata, ultra inferiorem plus minus prominens. *Squamula* fimbriatæ, nervosæ, inæquales, duæ obtusæ, tertia sublongior, lanceolata. *Stamina* 3 connectivo obtuso vel breviter appendiculato. *Stylus* basi conico-bulbosus, fere ad bulbum plerumque 3-fidus, interdum 2-fidus. *Caryopsis* lineari-oblonga, styli bulbo hirsuto persistente conico coronata.

I have been a little doubtful of the propriety of retaining the specific name of "*orientalis*" for this plant, as there is a specimen in herb. *Wight.*, no. 206 B (1800), which is marked by Nees himself "*Bambusa orientalis*, mihi," and is certainly not the plant described above, but, I believe, *B. arundinacea*, Retz. However, the remainder of *Wight*, 1800, and also his 1802, are certainly the plant described and figured as *B. orientalis* by Ruprecht, and very probably that described by Nees also; and there may, therefore, have been some mistake in the labelling. In the structure of the spicula this species approaches very closely to *B. arundinacea*; but after an examination of the numerous excellent specimens collected by *Wight* in Western India at Quilon in 1835, I have no doubt that the species is a good one. I should imagine that the plant is of much dwarfer habit than any other species of the section, and is probably only about 8-9 feet high. The panicle is fistulous and soft, and almost herbaceous in appearance, and the lower portion is angled and unusually hirsute. I do not perceive any traces of thorns, and I observe that in the "*Linnæa*," p. 472, Nees does not describe the culm as spinous. Ruprecht, however, says the branches are shortly spinous. This may possibly, from its probable height, be *B. arundo* of Dalzell and Gibson in the 'Flora of W. India,' described at p. 299 as having "culms 8-9 feet high, and spicula 6-8-flowered," "Chiwaree" of Mahableswhar. They state that the culms of this species are thorny, and that walking-sticks are made of them.

20. *B. VULGARIS*, Wendl. Collect. Pl. ii. 26, t. xlvii. mala (1810). Culmo arboreo, inermi, panicula perfecta supra decomposita, ramis *striatis* vel *teretibus* et *nitidis*, ad nodos spiculas *oblongas*, *compressas*, solitarias vel paucas vel plurimas gerentibus; palea inferiore basi *subattenuata*, superne *nervosa* et margine *fimbriata*, superiore

carinis (ciliis sæpe coloratis) fimbriata; stylo *elongato*, *hirsuto*, basi simplici, *superne tantum* 2-3-fido; antheris pilis apiculatis; foliis lineari- vel oblongo-lanceolatis, plerumque utrinque glabris, venulis *transversis* conspicuis.—Roth, Nov. Plant. et Sp. 198 (1821), excl. syn. Rœm. et Sch. *l. c.* 1337 (1830); Rupr. *l. c.* 137, t. xi. fig. 47; Steud. *l. c.* 329; Griseb. *l. c.* 528; Miq. *l. c.* 417; Dalzell & Gibson *l. c.* 299. *B. Thouarsii*, Kth. "Notice sur le genre Bambusa," in Journ. de Physique, 148 (1822); Syn. Pl. Æquin. i. 252; Rev. Gram. i. 323, t. 73, 74; Enum. 431; Suppl. 356; Rupr. *l. c.* 138, t. xi. f. 40 (var. fol. lineari-lanceol. spiculis solitariis subobtusis); Steud. *l. c.* 329; Desf. Cat. 22 (1829); Rœm. et Sch. *l. c.* 1347; Nees in Linn. *l. c.* 466; Thw. Enum. *l. c.* 375, non Hassk. Pl. Jav. rar. 41. *B. surinamensis*, Rupr. *l. c.* 139, t. xi. fig. 49 (var. fol. ovato-lanc. utrinque virid. spiculis minoribus, 5-6 lin. long.); Steud. *l. c.* 329. *B. Sieberi*, Griseb. *l. c.* 528 (var. ramis nitidis vix striatis). *B. humilis*, Reich. MS. (teste Rupr.), non fide Steud. in Nomenc. *B. arundinacea*, Moon, Cat. 26 (teste Thw.), Ait. Hort. Kew. ed. 2da, ii. 316 (excl. syn. Roxb.); Link? Hort. Berol. i. 249; Sieb. Fl. Mart. no. 43; Descourt, Fl. des Antilles, iv. 281, t. 293? non Retz. *B. auriculata*, Kurz in Cat. Bot. Gar. Calc. 79, teste spec. viv. in hort. Kew. *Nastus Thouarsii*, Rasp. *l. c.* 442, et forsan *N. viviparus*, *l. c.* 458, t. viii. f. 3. *Nastus?* P. de B. *l. c.* t. xxv. fig. 3. *Arundo*, Hort. Cliff. 25!

*Hab.* in India utraque, forsan semper culta, nunquam certe indigena. Ind. or. Silhet ("Zice Bass" incolis), *Da Silva*, *Wall. Cat.* 5034!, Chittagong!, Khaji-ke-hath!, Cachar!, *Hooker et Thomson*; Bombay ("Kulluk"), *Dalzell*; Ceylon, *Colonel Walker!*; "Oonagass," alt. 1000-2000 ped. s. m., *Thwaites*, no. 3252!, (var. foliis angustis, palea inferiore acuminatissima); Java ("Tring Pitting?"), *Horsfield*; Mauritius, *Wallich in herb. Mus. Brit.!*; Borbonia et ins. St. Helena, teste *Ruprecht*; Madagascar, haud indigena, *Du Petit Thouars*; Ind. occ. Jamaica, *Dr. Distin!*, *Dr. Prior!*, *M'Nab!*; Trinidad, *Purdie!* (var. verticillis densiss.); St. Kitts, *Crueger!*; St. Domingo, *Jaeger*; Bermuda, *Munro!*; Surinam, *Weigelt!*, Guiana Gallica, *Rotheray*, no. 22!; Peru, *Matthews*; Mexico, Brazil, fide *Grisebach*. In hortis Europæ plurimis. v. s. et v.

*Culmus* inermis, arboreus, fistulosus, 20-30-50-pedalis, ramosissimus, diametro 4 poll. et ultra, internodiis inferioribus 1-1½ ped. longis; spathis 6 poll. longis, intus glabris nitidis, extus pilis adpressis fuscis hirsutis, margine superne fusco-ciliatis, apiculo triangulari, 2 poll. longo, 2¼ poll. lato, basi biauriculato, utrinque hirsutissimo. *Rami* plerumque elongati, sæpe virides, opaci, striati vel teretes et nitidi, ramulorum internodiis plerumque apice hirsutis. *Folia membranacea*, lineari- vel oblongo-lanceolata, subulato-acuminata, basi interdum rotundata, interdum *inæquilatera*, cuneata, in petiolum brevem, supra scabrum vel hirsutum attenuata, nunc 1 ped. longa et 2 poll. lata, plerumque 6-10 poll. longa, 8-15 lin. lata (floralia in spec. e Ceylon 1¼-5 poll. longa, 3-5 lin. lata), margine scabra, supra glabra sed ad nervos margini adjacentes spinulis scaberrima, subtus interdum scabriuscula vel raro in junioribus inferne hirsuta, utrinque viridia vel subtus glaucescentia, nervis secundariis utroque latere 6-8, conspicuis, venulis transversis crebris, distantibus, sæpe opacis. *Vagina* nervoso-striatæ, ore plerumque efimbriatæ, sæpe pallidæ, primum supra medium pilis crebris brevibus vel in junioribus setulis fuscis hispida, demum glabræ, margine "tenuiter ciliatæ" vel nudæ, sæpe utroque latere in auriculam oblongam obtusam productæ, ligula truncata, brevi, fusco-virente, breviter ciliata. *Inflorescentia* variabilis, "scapus, vel panicula radicalis aphylla vel ramulo folioso intermixta, vel lateralis e nodis inferioribus, vel apicalis in ramulis, spiculis numerosis vel solitariis" (teste *Schultes*), in spec. a me visis, panicula plerumque aphylla, foliis raro inflorescentiam intrantibus, composita vel decomposita, internodiis glabris, nitidis, ramis ramulisque ultimis ad nodos

spiculas paucas (3-6, rarius 1-2) vel interdum plurimas densissime semiverticillato-capitatas gerentibus; ramulorum internodiis plerumque apices versus pubescentibus vel hirsutis, nunc teretibus, duris, nunc striatis vel angulatis, minus duris. *Spicula* oblongo-lanceolata, compressa, disticha, ei *Bromi* similis, 4-9-12-flora, 5-10 lin. longa, primum arcte imbricata, demum laxiuscula, rhachillæ articulis inferioribus brevissimis, conditis, superioribus elongatis, flosculo infimo unipalaceo, neutro, margine tenuiter ciliato, reliquis, præter terminalem imperfectum, bipalaceis et ut videtur hermaproditis. *Palea* inferior cuspidato-acuminata, basi subattenuata, chartacea, 11-19-nervia, nervis superne sæpe prominentibus, margine, supra medium, pilis densis patentibus fimbriata; superior brevior, vel æquilonga, vel etiam longior angustior, obtusiuscula, carinis pilis *sat longis*, crebris, albidis vel *coloratis* ciliata. *Squamulæ* tenuiter membranaceæ, diaphanæ, apice pilis longis ciliatæ, inæquales, duæ obovato-oblongæ, tertia longior et multo angustior. *Antheræ* apice pilis brevibus penicillatæ. *Stylus* gracilis, filiformis, ima basi quidquam incrassatus, undique hirsutus, superne tantum 2-3-fidus, stigmatibus filiformibus, sæpe cito dilabentibus, ut stylus inde simplex esse videatur. *Ovarium* (immaturum) oblongum, apice pilosum.

The numerous specimens which I have seen of this plant have enabled me to ascertain that the large number of synonyms quoted above all belong to one species, which, indeed, considering its wide range, appears to vary less than many other species. The most remarkable varieties occur in plants cultivated in the gardens of Europe, two of which (one from the garden at Paris, and one from that of Göttingen) are figured under the name of *B. Thouarsii* by Kunth in plates 73 and 74 of his magnificent work on Gramineæ. The native country of this species is still doubtful: it is certainly naturalized in many places; but there is no reliable information as to its being actually indigenous anywhere, either in the East or the West. It is, when in flower, readily distinguished from all other species in being the only one with oblong compressed spiculæ, the lower paleæ of which are not considerably enlarged at the base, combined with a long slender style divided into stigmas at the extreme end, and stamens free at their base. A magnificent specimen of this plant is growing in the Palm-house at Kew.

21. *B. BEECHEYANA*, Munro. Culmo inermi, subarboreo; panicula *composita*, rhachi striata, ramis longis simplicibus, internodiis superioribus plerumque hirsutis, floriferis sæpe apice foliiferis; spiculis *ovatis*, plurifloris, in glomerulis subæquidistantibus paucis, vel solitariis *bractea elongata* suffultis; palea inferiore basi *latissima*, dorso glabra vel raro *subhirsuta*; stylo gracili, filiformi, superne 2-3-fido; foliis basi eximie cordatis et petiolatis, venulis transversis obsoletis vel nullis.—*B. verticillata*? Hook. et Arn. Bot. Beechey's Voyage, 254, non Willd.

*Hab.* in China, *Beechey*! *Sir G. Staunton in herb. Mus. Brit.*!; Quantung, Ookaisa, in sylvis, *Dr. Tate*! (var. palea inferiore dorso pubescente). v. s.

*Culmus* "20-pedalis," fistulosus, inermis. *Folia* (floralia tantum adsunt) lanceolata, apice setaceo-acuminata, basi *eximie cordata*, brevipetiolata, petiolo interdum *supra hirsuto*, margine serrata, 3-5 poll. longa, 6-12 lin. lata, supra glabra sed uno margine tactu scabra, subtus glabra vel hirsutiuscula, nervis secundariis vix conspicuis, utroque latere 6, venulis transversis obsoletis. *Vaginæ* sulcato-striatæ, glabræ, ore plerumque nudæ. *Panicula* (nodi 4 tantum adsunt) *composita*, *elongata*, rhachi fistulosa, *striata*, *vix dura*, ramis basi *bracteatis*, interdum sesquipedalibus, ad nodos paucis, subflexuosis (internodiis superioribus compressis, hirsutis), nunc aphyllis nunc foliosis, spiculis, in glomerulis subæquidistantibus, approximatis, vel etiam imbricatis, paucis, interdum solitariis *bractea* 1-2 poll. longa velatis. *Spicula ovata* vel *ovato-oblonga*, acuta vel obtusa, 7-11-flora, plerumque



6–8 lin. longa, interdum minor, rhachillæ *articulis inferioribus brevissimis*, superioribus *conspicuis*, hirsutis, flosculis 1–2 infimis et 2–3 terminalibus incompletis, reliquis bipaleaceis perfectis. *Palea* inferior 18–20-nervia, basi latissima, orbiculato-ovata, mucronata, dorso glaberrima vel raro pubescens, toto margine brevissime fimbriata; superior minor, angustior, obtusiuscula, pubescens vel hirsuta, inter carinas ciliatas binervia. *Squamulæ* 3, latæ, ovatæ, obtusæ, longe fimbriatæ, nervosæ. *Antherarum* connectivum mucrone hirsuto apiculatum. *Stylus* longus, gracilis, filiformis, hirsutus, apice 2–3-fidus. *Ovarium* (immaturum) basi attenuatum, apice rostratum.

22. B. OLDHAMI, Munro. Culmo inermi, *suffruticoso*, fistuloso; panicula terminali, fere *simplici*, interdum subspicæformi, rhachi angulata, striata, tactu scabrula, ramis brevissimis, spiculis *ovato-lanceolatis*, 12–13 lin. longis, flosculis 5–8 hermaphroditis; palea inferiore basi lata, glabra, margine tenuiter fimbriata; squamulis plerumque 2, raro 3; stylo hirsuto, interdum ad medium 3-fido; foliis (immaturis) parvis, lanceolatis, basi rotundatis, venulis transversis nullis.

*Hab.* in China, Formosa, Tamsuy, *Oldham*, no. 648! v. s.

*Culmus* 5–6-pedalis?, suffruticosus, fere herbaceus, pallide virens, eximie fistulosus, striatus, internodiis inferioribus 7–8 poll. longis, spathis vix 3 poll. longis, striatis, fere glabris, apiculo sub 3 lin. longo, adpresso vel refracto, ramis 1–3 ad nodos, basi bracteatis, adpressis, erectis, superioribus interdum *apice floriferis*. *Folia* (nondum evoluta) lanceolata, apice acuminatissima, basi rotundata et brevissime petiolata, sub 2 poll. longa et 6 lin. lata, supra glabra, subtus hirsuta vel demum glabrescentia, margine scabra, nervis secundariis utrinque 5–6. *Vaginæ* striatæ, superne hirsutæ et subasperæ, lateribus truncatæ et fimbriatæ, ligula inconspicua. *Panicula* in culmo *terminalis*, internodiis paucis, 3–4 poll. longis, striatis, uno latere subsulcatis, ramis, basi bracteis hirsutis velatis, brevibus vel brevissimis, internodiis paniculæ semper brevioribus, spiculas 1–4 gerentibus. Interdum rami superiores, apice, spiculas solitarias, reliquis minores, bractea suffultas, subspicatas ferunt. *Spicula* ovato-lanceolata, 8–13-flora, rhachillæ nunquam visibilis *articulis inferioribus brevissimis*, fere glabris, apice concavis, superioribus paulo longioribus, flosculis interdum omnibus bipaleaceis et (nisi 2–3 terminalibus) perfectis. *Palea* inferior *orbiculato-ovata*, mucronata, basi *lata*, 30 et ultra nervis venulisque transversis percursa, glabra, membranacea, margine vix conspicue fimbriata; superior *hirsuta* vel *pubescens*, paulo brevior, multo angustior, obtusa, inter carinas superne longe ciliatas 4–7-nervia. *Squamulæ* plerumque 2, *hyalinæ*, tenuimembranaceæ, *lanceolatae*, *acutæ*, fimbriatæ, basi nervosæ, *longæ*, tertia (intermedia) plerumque (an semper?) obsoleta. *Stamina* 6, filamentis latis, connectivo antherarum mucrone longo, hirsuto, apiculato. *Stylus* basi simplex, hirsutus, interdum (non semper) ad *medium* 3-fidus, stigmatibus pulchre plumosis. *Ovarium* stipitatum, apice hirsutum, in stylum rostrato-attenuatum.

The panicle of this species bears a considerable resemblance to Roxburgh's drawing of that of *B. balcooa*, and also to the portions which I have seen of the panicle of *B. teres*. The style is also occasionally, but not always, deeply trifid; and I ought, perhaps, to have placed this species in the first section of the genus and next to *B. balcooa*. Several florets in the two spiculæ which I have examined are evidently in an abnormal state, and in some the long points of the anthers are prolonged into style-like appendages of considerable length.

23. B. BRANDISII, Munro. Culmo *excelso*, usque ad 120-pedali; panicula maxima, ramosissima, ramis superioribus floriferis  $1\frac{1}{2}$ –2 ped. longis, gracilibus, decurvis, pendulis, spiculis in verticillis globosis, æquidistantibus, approximatis, densissime

glomeratis, spicula ovata, *brevissima*, *pauciflora*; palea inferiore apice *spinoso-acuta*, margine fimbriata, superiore apice *bifida*; squamulis plerumque 1-2, rarissime 3; stylo longo, filiformi, hirsuto, *tandem* superne 2-3-fido; foliis latis et longis.

*Hab.* in Ind. or. Tenasserim, Martaban, Pegu, usque ad 4000 ped. s. m., præcipue in saxis calcareis ("Kyello-wa" et "Mytsangue" incolis), *Brandis*, no. 2! v. s.

"*Culmus* 120-pedalis, circumferentia maxima 27-pollicari, striatus, inferne subnudus, prope terram ramis fasciculatis, superne foliiferis semiverticillatis, comosis, nodis inferioribus radicum annulos emittentibus, internodiis 2-2½ ped. longis, spathis 17 poll. longis" (*Brandis*), intus glabris, extus fuscis, superne pilis fuscis asperis, apiculo spatham longitudine superante, lanceolato-acuminato, intus basin versus pilis densis, fuscis hirsutissimo. "*Folia* magna, 10 poll. longa, 3 poll. lata, nervis secundariis 24" (*Brandis*); (in spec. a me visis) *folia* pedalia, 1½ poll. lata, lanceolata, apice acuminata, basi rotundata, utrinque glabra sed supra uno latere tactu scabra, venulis transversis obsolete vel nullis. *Vagina* glabræ, ore nudæ, lateribus in auriculam obtusam rotundatam productæ. *Panicula* maxima, ramosissima, internodiis superioribus 3 poll. longis, pallidis, teretibus, nitidis, spiculis numerosissimis, in semiverticillis globosis, sæpe 9 lin. diametro, secus ramulos subæquidistantibus, sed superne approximatis, ramulorum internodiis apices versus incrassatis, uno latere sulcatis et hirsutis. *Spicula* 3-4 lin. longa, *ovata*, 4-5-flora, flosculis 2-3 perfectis, rhachilla inconspicua. *Palea* inferior basi *lata*, apice *spinoso-acuta*, glabra vel superne scabrula, 16-20-nervia, toto margine fimbriata; superior paulo brevior, *marginis* et *carinis* fimbriata, apice bimucronata, inter carinas 2-3-nervia. *Squamule* variabiles, raro et tantum in flosculo infimo 3, plerumque 2 vel 1, lanceolatæ, fimbriatæ, vix nervosæ, hyalinæ. *Stamina* 6, basi libera, antheris apice penicillatis vel nudis. *Stylus* longus, basi incrassatus, hirsutus, *tandem* superne 2-3-fidus? (tametsi partitiones nunquam vidi). *Caryopsis* obtusa, styli residuo rostrata, hirsuta, 1½ lin. longa, *inferne* sulco longitudinali notata.

I have some doubt about the leaves of this plant, as two very different sorts of leaves are enclosed in the same envelopes with Dr. Brandis's excellent flowering specimens, and neither quite agree with the description given by him. I have consequently taken my description from some to which a label marked "Kyello-wa" is attached. The other leaves are remarkably unequal at the base, which would probably have been mentioned by Dr. Brandis. These latter are very thin, 14-15 inches long, and 2½ inches broad. The necklace-like flowering branches of this magnificent species are extremely striking. In many respects, especially in outward form, it approaches very closely to *Dendrocalamus flagelliferus*.

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BAMBUSÆ *cognitæ steriles (foliiferæ tantum), igiturque, quoad genus, dubiæ.*

\* Venuli *transversi creberrimi* conspicui, hinc folia *tessellata*.

24. B. TESSELLATA, Munro. Foliis 1-1½ ped. longis, 2-3¼ poll. latis, *eximie tessellatis*, an *B. reticulatæ* forma major?, Rupr. l. c. 148.

*Hab.* in China. Vidi folia segregata Theam in transitu e China involventia.

*Folia* membranacea, oblongo-lanceolata, *utrinque*, venulis transversis creberrimis elevatis, *eximie tessellata*, interstitiis quadratis, apice acuminata, basi inæquilatera et attenuata in petiolum brevem, supra canaliculatum, margine inferiore lævi, superiore aspero, utrinque glabra, nisi *linea tomentosa* secus costam mediam, ad latus magis evolutum, nervis secundariis utrinque 13-14, tertiariis 9-11.

I have seen only the dried leaves of this species when sewn together and in the state so largely used by the Chinese in packing their tea. I now believe that *B. reticulata*, var. *macrophylla*, of Rupr. should be referred to this species instead of to *Phyllostachys bambusoides*, as it has been at p. 36 above.

25. *B. CANTORI*, Munro. Foliis chartaceis, 5–8 poll. longis, 1 poll. latis, utrinque tessellatis, vaginæ ciliis longissimis.

*Hab.* in China, Lintao! *Dr. Cantor* quoad folia, flores alieni (*B. brevifloræ*). v. s.

*Folia* chartacea, oblongo-lanceolata, apice spinoso-acuminata, basi vix attenuata in petiolum brevissimum, margine serrata, utrinque *glabra*, nervis secundariis utrinque 7–9, vix conspicuis, venulis *transversis creberrimis*, vix elevatis. *Vaginæ* dorso nitidæ, lateribus subhirsutæ, margine ciliatæ, ore ciliis validis longis fimbriatæ, ligula *brevi* truncata.

I have already, at p. 96, referred to the flowers which are attached to these leaves in herb. Bentham, and which I have been unable to distinguish from *B. breviflora*.

26. *B. FORTUNEI*, Van Houtte Fl. de Serres, vol. xv. (1863), t. 1535. Foliis membranaceis, *angustis*, plerumque  $3\frac{1}{2}$ –5 poll. longis et 4–6 lin. latis, interdum 8 poll. longis et 9–10 lin. latis, utrinque pubescentibus et tessellatis, venulis transversis sæpe *hyalinis*.—*B. picta*, Sieb. & Zucc. MS. fide herb. Zucc. sed non Lind. in Penny Cyc. (1835). *B. variegata*, Sieb. MS., Miquel in. Ann. l. c. 285.

*Hab.* in Japonia, *Kämpfer*, herb. fol. 78!, *Bürger*, in herb. Mus. Brit.!, “Yokohama, “in sylvis pone Kanagawa, spontanea,” *R. Oldham*, no. 192!; ins. Kiusiu (“Noma Saki” incolis), *Pierrot*. In hortis Europæ sæpissime cult. v. v. et s.

*Culmus* suffruticosus, nanus, tenuis, ramosus, teretiuseculus, fistulosus, internodiis brevissimis. *Folia* lineari-lanceolata, subito acuminata, basi subrotundata, brevissime petiolata, petiolo hirsuto, margine serrata et sæpe ciliis longis fimbriata, supra pubescentia vel demum *glabra*, subtus pubescentia, vel in speciminibus spontaneis hirsuta, “tota longitudine, albido (in sicco flavido) lato-striato pulchre variegata,” majora 8 poll., sed plurima breviora, 3–5–6 poll. longa, nervis secundariis utrinque 3–4 parum conspicuis, venulis transversis sat crebris, plerumque hyalinis, *interstitiis oblongis*. *Vaginæ* sulcato-striatæ, primum pubescentes, cito glabrescentes, margine ciliatæ, apice truncatæ, lateribus ciliis paucis fimbriatæ, ligula *brevissima*, *ciliata*.

This pretty grass appears to be quite hardy in England, and will doubtless soon become one of the most popular and commonest of variegated plants in all gardens.

\*\* Venuli transversi *minus* conspicui, vel *obsoleti*, vel *nulli*.

(Ordo incipiens a foliis latissimis gradatim ad folia parva angustissima.)

27. *B. WIGHTII*, Munro. Foliis amplis,  $2\frac{1}{2}$ –4 poll. latis, 12–20 poll. longis, utrinque glabris, venulis transversis *obsoletis*, ligula *membranacea*, primum *longissima*.

*Hab.* in Ind. or. Courtallum, no. 1009!, Malabar, 117! 1346! *Wight*. v. s.

*Folia* oblonga vel oblongo-lanceolata, apice scabro-acuminatissima, basi rotundata, attenuata in petiolum 5–9 lin. longum, supra sulcatum, dorso longitudinaliter rugosum, basi valde incrassatum, ibidemque

transversim rugosum, margine lævia, utrinque *glaberrima*, supra tactu scabriuscula, nervis secundariis vix conspicuis, tota lamina 26–30. *Vaginæ* glabræ, striatæ, lævissimæ, fovea apicali emarginata, *glaberrima*, utrinque productæ, ligula sæpe 1 poll. et ultra longa, membranacea (interdum major pars superior caduca).

Wight's herbarium contains but portions of three branches of this splendid Bamboo, which, however, have the appearance of belonging to a very lofty tree.

28. *B. BITUNG*, Rœm. et Sch. *l. c.* 1354. "Foliis amplis, ovato-lanceolatis, 2–3 $\frac{1}{4}$  poll. latis, 12–18 poll. longis, subtus margineque *scaberrimis*, petiolo *hispido*."—Kunth, En. 433; Lind. Penny Cyc. (1835), non Hassk. Pl. Jav. rar. p. 42, teste Miq. Fl. Ind. Bat. iii. 417. *Schizostachyum bitung*, Steud. *l. c.* 332. *Bambusacea*, no. 12, Pl. Jungh. p. 393; Miq. *l. c.* 419.

*Hab.* in Java ("Bambu Bitung" incolis), ad montem Salak, *Blume*. s. v. Schultes.

'Specimen visum summitas, ut videtur, culmi, foliorum vaginis tecta, crassitie digiti, stricta. *Folia* pergamena, longe acuminata, basi breviter attenuata, supra tactu scabrida, et medio, præsertim basin versus, scaberrima, subtus glaucescentia, undique, præter nervum medium, prominentiis minutis et setulis scabra; nervis secundariis tota lamina 28, prominulis, margine denticulis scaberrima facillimeque vulnerantia, petiolo brevi, crasso, supra planiusculo et spinuloso, scaberrimo, dorso carinato et dense setoso-hispido, 3 lin. longo. *Vaginæ* crasse coriaceæ, *margine glabræ*, nervis numerosis validis striatæ, basi glabræ, sed tactu scabriusculæ, supra medium setis albidis, adpressis, haud longis, numerosis scabræ, apice iterum glabræ, *ore nudæ*, apice, ad dorsum, fovea lata, margine calloso cinctæ, ligula *brevi truncata*, extus *scabra*, margine *ciliata*."—*Schultes*.

Ruprecht and Miquel are both of opinion that this species is scarcely to be distinguished from the succeeding one, *B. apus*, and that both of them are very closely allied to *Schizostachyum Blumei*. I think it is very probable that it will prove to be the same as *Dendrocalamus flagelliferus* described in the following pages.

29. *B. APUS*, Rœm. et Sch. *l. c.* 1353. Foliis amplis, lanceolatis, 1 $\frac{1}{3}$ –2 poll. latis, 10–15 poll. longis, supra glabris, subtus scabriusculis, *petiolo glabro*.—Kunth, En. 433, Lind. *l. c.* *Schizostachyum apus*, Steud. *l. c.* 332.

*Hab.* in Java ("Bambu apus" incolis), ad montem Salak, *Blume*; "Tring apus," *Horsfield*. v. s.

*Culmus*, sec. *Blume*, crassitie cruris. "Folia chartaceo-pergamena, elongato-lanceolata, longe acuteque acuminata, basi paulo tantum in petiolum angustata, supra glabriuscula, præter nervos, margini alteri adjacentes, qui spinulis minutis scaberrimi, subtus glaucescenti-viridia, attactu scabra et in foliis junioribus setulis minimis subhirsuta, nervis secundariis sub 24, minus prominentibus quam in *B. bitung*, venulis transversis crebris, parum, magis tamen quam in *B. bitung*, conspicuis, margine scaberrima, petiolo 5–6 lin. longo, subtrigono, supra quidquam convexo, dorso carinato, *glabro*, basi dilatato et ad margines callosos ibidem transversim rugoso. *Vaginæ* ut in *B. bitung*, tamen margine *breviter ciliata* vel demum glabræ et utrinque, ligulam versus, auricula parva, rotundata auctæ, ligula integerrima vel demum emarginata, nervosa, glabriuscula, margine tenuissime ciliata vel demum glabra."—*Schultes*.

This is certainly very close to the preceding; and the only real points of distinction seem to be the narrower leaves and glabrous petiole. There is a specimen marked

“*apus*” and “*Gigantochloa apus*” in herb. Kurz., which is, I think, distinct from the preceding, as the leaves are uneven at the base, and are much more hirsute below; the membrane below the petiole is also conspicuously fringed. I think it is very probable that Blume's *B. apus* will prove to be the same as *Oxytenanthera nigro-ciliata*, Munro.

30. *B. CORNUTA*, Munro. Foliis membranaceis, ovatis vel ovato-lanceolatis,  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. latis, 6–9 poll. longis, utrinque glabris, margine vix asperis, petiolo glabro, vaginis glabris, lateribus, appendice *elongata*, *corniformi*, apice ciliata auriculatis, ligula brevissima.

*Hab.* in Java (“Tring Embon” incolis), *Horsfield*, no. 193! v. s.

*Ramuli* 2 cum foliis 8 tantum adsunt. *Folia* ovato-lanceolata, basin versus latissima, inæquilatera, fere e basi rotundata in apicem setaceo-acuminatum attenuata, petiolata, petiolo glabro complanato 3-lineali, utrinque glabra, margine lævia vel asperiuscula, inferiora (rami) 10 lin. lata et  $2\frac{1}{2}$  poll. longa, superiora  $2\frac{1}{2}$  poll. lata et 9 poll. longa, nervis secundariis conspicuis, utroque latere 9–13, venulis transversis crebris, distantibus, subtus conspicuis. *Vaginæ* glabræ, ore nudæ, inferne nitidæ, superne sulcato-striatæ, margine glabræ, truncatæ, latere uno vel utroque appendice corniformi, obtusa, 3 lin. longa, glabra, apice ciliis paucis longis fimbriata auriculatæ.

Two or three species of Bamboos have the curious horn-like appendages to the vaginæ described above; but in this species they are larger than in any of the others. The same native name (“Embon”) is applied in herb. Horsfield to *Melocanna Zollingeri*, to which, however, the above-described leaves certainly do not belong.

31. *B. RITCHEYI*, Munro. Foliis lineari-vel oblongo-lanceolatis,  $1\frac{1}{2}$ –2 poll. latis, 10–15 poll. longis, utrinque glabris, margine serratis, petiolo vix ullo, vaginis primum hirsutis, ore plerumque *nudis*, ligula *elongata*.

*Hab.* in Ind. or. Bombay, Kala Nuddi (“Choomaree” incolis), *Ritchie*, no. 820! v. s.

*Culmus* “inermis, 10–15-pedalis,” internodiis, præcipue apices versus, dense sericeo tomentosus. *Folia* anguste lanceolata, apice attenuato-acuminatissima, basi leniter cuneata, sed vix petiolata, utrinque glabra, sed supra tactu asperiuscula, margine scabro-serrata, nervis secundariis utrinque sub 12, conspicuis, venulis transversis elevatis, distantibus. *Folia* novella angustiora, vix 9 lin. lata. *Vaginæ* primum pilis adpressis hirsutæ, demum glabrescentes, per totam longitudinem striatæ, margine glabræ, ore nudæ vel fibris 1–2 ciliatæ, fovea membranacea, conspicua, emarginata terminatæ, lateribus productæ, ligula valde elongata, truncata, dentata.

Ritchie states that this was found in a rivulet below the fall on the Kala Nuddi, and that baskets are made of it.

32. *B. MASTERSII*, Munro. *Culmo scandente*, foliis oblongo-lanceolatis, plerumque  $1\frac{1}{2}$  poll. latis, 10–12–13 poll. longis, utrinque, nisi ad costam basin versus, glabris, subtus glaucescentibus, margine serratis, petiolo brevissimo, sæpe hirto, vaginis præcipue *lateribus hirsutis*, margine *ciliatis*, ore ciliis *numerosis*, *longis*, subplicatis *fimbriatis*, ligula *brevissima*.

*Hab.* in Ind. or. Assam, Dibrooghur (“Bentibans” incolis), *Masters*, no. 1123! v. s.

“*Culmus* diffuse scandens, calamo similis” (*Masters*) (ramulorum apices tantum adsunt). *Folia* apice rostrato-acuminata, basi flavescens attenuata in petiolum, ut videtur, glandulosum, utrinque, ple-

rumque scabro-hirsutum, ima basi incrassatum, supra glabra sed punctulis minutis asperiuscula. subtus pallidiora et basin versus, ad costam, pilis sat longis hirsuta, vel tandem glabra, margine serrato-aspera, nervis secundariis utrinque 10-12, ægre a tertiariis discernendis, venulis transversis fere obsoletis. *Vaginæ* striatæ, inter strias pilis adpressis, primum hirsutæ, demum glabrescentes, margine ciliatæ, interdum biauriculatæ, ciliis longis, plicatis, numerosis fimbriatæ, ligula obsoleta.

33. B. M'CLELLANDI, Munro. Culmo scandente, *aspero*, foliis oblongo-lanceolatis, 12-18 lin. latis, 5-10 poll. longis, utrinque glabris, membranaceis, margine *via asperis*, vaginis glabris, ore *nudis*, ligula brevissima, truncata, dorso hirsuta.

*Hab.* in Ind. or. Pegu, Rangoon, Phoungce Valley! *M'Clelland.* v. s.

*Culmus* gracilis, *scandens*, internodiis superne *pilis asperis*, 7 poll. longis, ramis ad nodos 3, deflexis, polyphyllis. *Folia* tenuia, concoloria, apice setaceo-acuminata, basi inæqualia, vix attenuata in petiolum brevissimum, subrugosum, *utrinque glabra*, sed supra, medio et ad alterum marginem, setulis minutis tactu aspera, nervis secundariis utroque latere 9-12, inconspicuis, venulis transversis obsoletis. *Vaginæ* striatæ, utroque latere in auriculam obtusam, brevem productæ.

Judging from its general appearance, I think it is very probable that this may prove, when its flowers are discovered, to be a species of *Cephalostachyum*.

34. B. MARGINATA, Munro. Culmo scandente, nigrescente, *glabro*, foliis oblongo-lanceolatis, majoribus 12-14 lin. latis, 6½ poll. longis, supra subtusque glabris, superne *pilis* sat longis, *densis*, subsericeis *utrinque marginatis, petiolatis*, vaginis glabris, ore *nudis*, apice *truncato subhirsutis*.

*Hab.* in Ind. or. Tenasserim? Daunat faucibus, alt. 5000 ped. s. m. ("Wamé" incolis), *Brandis*, no. 17! v. s.

"*Culmus* alte scandens, nigrescens," fistulosus, internodiis glabris, "ramis subsolitariis, ramosis" (*Brandis*), (in specimine a me viso) fasciculatis, deflexis, basi bracteatis, geniculatis et tortuosis, apicè oligophyllis, internodiis inferioribus ramorum apicè hirsutis. *Folia* setaceo-acuminata, basi rotundata, petiolo 1-3 lin. longo, glabro vel supra scabro, margine lævia, nisi apicem versus, ubi pulchre fimbriata, majora ut supra, minora vix 3 poll. longa, 5-6 lin. lata, nervis secundariis utrinque 4-7, centrali subtus rufescente, venulis transversis paucis, vix conspicuis. *Vaginæ* sulcato-striatæ, dorso carinatæ, margine, nisi ipso apice, glabræ, membrana, infra petiolum, hirsuta et brevissime ciliata terminatæ, ligula *brevi*, truncata, dorso hirsuta.

The smooth stems and curious fringe on the upper portions of the margins of the leaves distinguish this from the preceding species. Dr. Brandis says that "it is a real climber, intertwining the stems and branches of the oaks and chestnuts."

35. B. HELFERI, Munro. Culmo scandente, *pilis et punctulis aspero*, foliis sublanceolatis, majoribus 12-14 lin. latis, 5 poll. longis, *margine uno serratis*, altero lævibus, utrinque glabris, vaginis margine *ciliatis* vel raro glabris, ore *fimbriatis*.

*Hab.* in Ind. or. Tenasserim, *Helper*, no. 411! v. s.

*Culmus* fistulosus, internodiis 4 poll. longis, 2 lin. diametro, asperrimis, ramis brevibus, ad nodos incrassatos, membrana rugosissima circumvolutos, fasciculatis. *Folia* pergamena (siccando fere crispata), subinæquilatera, apice setaceo-acuminata, basi cuneata, vix petiolata, supra, medio et alterum marginem versus, setulis minutis aspera, nervis secundariis utrinque 6-7, ad imam basin continuis, venulis

transversis distantibus, paucis, vix conspicuis. *Vaginæ* superne sulcato-striatæ, apice truncato brevissime ciliatæ, oreque ciliis sublongis *fimbriatæ*, ligula brevi interdum ciliata.

This has a much more scabrous stem than *B. M. Clellandi*, and is, moreover, distinguished from both the preceding species by the fringe at the sides of the *vaginæ*. The ligula has also occasionally a long fringe.

36. *B. HORSFIELDII*, Munro. Culmo subscandente, vel vagante?, superne filiformi, punctulis minutis aspero, foliis lineari-lanceolatis, maximis 9–10 lin. latis, 6 poll. longis, petiolatis, utroque margine asperis, supra glabris, sed hinc et inde tactu asperis, subtus pilis brevibus hirsutis, vaginis hirsutis vel glabris, utroque latere, in auriculam corniformem, obtusam, apice ciliatam productis.

*Hab.* in Java, *Horsfield.* v. s.

*Culmus* tenuis, fistulosus, internodiis superioribus 3–4 poll. longis, asperis, tenuissimis, ramis ad nodos 2–4–5, divaricatis. *Folia* tenuia, majora ut supra, minora vix 1½ poll. longa, et 3 lin. lata, petiolo undique hirsuto, apice setaceo-acuminata, basi subflavescente cuneata, supra, medio et marginem alterum versus, scabra, nervis secundariis utrinque 5–6, venulis transversis obsoletis. *Vaginæ* sulcato-striatæ, inferiores hirsutæ, superiores margine interdum subviscido-hirsutæ, apice truncatæ, biauriculatæ, ligula brevi.

This has neither name nor number in Horsfield's collection, but appears to be a distinct species. The curious auricles of the *vaginæ* are similar in form to those which occur in *B. cornuta*, which, however, appears to be a tall arboreous species, whereas this is a slender creeper or twiner.

37. *B. LUÇONLÆ*, Munro. Culmo subscandente, superne *filiformi, asperrimo*, foliis lineari-lanceolatis, *angustis*, 4–5 lin. latis, 3–4 poll. longis, breviter petiolatis, margine membranaceo pallido cinctis, utrinque, nisi interdum basin versus, glabris, punctulis minutis elevatis vix asperis, vaginis subglabris, ore ciliis paucis, tenuibus, cito caducis fimbriatis, ligula *brevissima*.

*Hab.* in ins. Philipp. Luçon, montibus mahaihai!, *Wilkes.* v. s.

*Culmus* vagans vel scandens (pars superior 3½-pedalis adest), internodiis inferioribus 4 poll. longis, asperiusculis, *superioribus* 1½ poll. longis, *asperrimis*, ramis ad nodos 4–5, brevissimis. *Folia* mucronato-acuta, basi rotundata, *albo marginata*, nervis secundariis utrinque 3–4, venulis transversis obsoletis. *Vaginæ* striatæ, inter strias paucas pubescentes vel demum glabræ, apice truncatæ.

Blanco has given short descriptions of several species of Bamboo from the Philippine Islands, but this does not agree with any of them.

38. *B. AUREA*, Sieb. MS. apud Miquel, *Ann. l. c.* ii. 285. “Culmo suffruticoso, foliis lanceolatis, 4–6 lin. latis, 2–3 poll. longis, margine obsolete scaberrimis, cæterum utrinque glaberrimis, vaginis glabris, vix striatulis, ore semper glabris, ligula brevi, abbreviato-semirotundata, glabra, fuscula.”

*Hab.* in Japonia, *Siebold*, spec. cult. vid. Miquel; v. cult. in hort. Kew! an eadem?

“*Rami* tenues, teretiusculi, longi, graciles, virides, ramulis ad nodos tumidos gracilibus, ½–¾-pedalibus, 6–8,

simplicibus vel parce ramosis, flaccidis, unilateraliter fasciculatis. *Folia* breviter sed distincte petiolata, e basi acutiuscula lanceolata, acuta, membranacea, tenera, læte viridia, subtus pallidiora, nervis secundariis utrinque 3-4, ægre a tertiariis discernendis, venulis transversis obsolete. An ob colorem foliorum emortuorum flavescentium 'aurea' dicta?—*Miquel*.

The plant which I have seen cultivated at Kew under the name of *B. aurea* appears to be a species of *Arundinaria* or *Thamnocalamus*. It agrees with the above description, except that the vaginæ are more distinctly striated, the transverse veinlets rather more conspicuous, and the ligule is rather elongated.

39. *B. REGIA*, Thomson, MS. in Brandis herb. (nomen tantum). Culmo *arboreo*, elato, foliis angustis, fere linearibus, vix 3 lin. latis, 2-3½ poll. longis, supra glabris, sed uno latere tactu asperis, subtus concoloribus, hirsutiusculis vel glabris, vaginis striatis, inter strias hirsutis, vel demum glabris, margine superne ciliatis, ore nudis.—Cat. Bot. Gard. Calc. 79. *B. siamensis*, Kurz, teste Kurz in herb.

*Hab.* in Ind. or. Tenasserim, ad Salueen fluv. ("Tiwa" incolis), *Brandis*, no. 12!; Siam! *Kurz*. v. s.

"Culmus 40-pedalis, strictus, inferne nudus, apice ramorum verticillos gerens, circumferentia 4-10 poll., internodiis nitidis, 1-13 poll. longis, annulis horizontalibus, spathis deciduis, internodia æquantibus, apiculo adpresso, lanceolato." (*Brandis*). In speciminibus a me visis *spathæ* 11 poll. longæ, basi 8 poll. latæ, vix coriaceæ, intus inferne glabræ, extus pilis brevibus, adpressis, nitidis hirsutæ, apiculo 4-5 poll. longo, utrinque hirsuto, internodiis culmi superioribus sub 4 poll. longis, flavidis, nitidis, solidis, ramulis simplicibus vel compositis et divaricatis, ad nodos paucis vel numerosis. *Folia* apice mucronato-acuta, basi rotundata vel cuneata, petiolata, margine serrata, nervis secundariis utrinque 3-4, inconspicuis, venulis transversis nullis. *Vaginæ* apice truncatæ, ligula brevissima, truncata.

Brandis says that "this is a most elegant Bamboo, on account of the regularity of the nodes," and that it is brought to Moulmelyn in great quantities, and used as handles for umbrellas. The young plant cultivated at Kew, and received, I believe, from Calcutta as *B. regia*, appears to be distinct from this species. In the Kew plant the leaves are 6 inches long and 10 lines broad, with 6 secondary nerves on each side, and the petiole inconspicuously hairy above, whereas it is quite glabrous in the Tenasserim specimens.

40. *B. PYGMÆA*, Miquel, *l. c.* 286. "Culmo suffruticoso, *semipedali*, solido, subtereti, ramoso, foliis dense distichis, e basi rotundata in petiolum vix ullum constrictis, lanceolatis, acutis, 5-4 lin. latis, 1-1½ poll. longis, marginibus subciliolato-scabris, subtus pubescentibus, subglaucino-pallidis, nervis lateralibus utrinque 3-4."

*Hab.* in Japonia ("Gin-Meitsik" incolis), *Siebold*. Colitur in horto Bogoriensi. s. v. Miquel.

"Statura pygmæa insignis, cæterum *B. aureæ* et *B. puberulæ* [*Phyllostachys nigra*, Munro] quodammodo accedens."—*Miquel*.

41. *B. AUREO-STRIATA*, Regel, *Gartenflora*, 1865, 362, t. 490. figg. 3, 4. "Caule humili (1-2-pedali), tenui, glaberrimo, nodis biannulatis, sæpe ramulos 3 breves gerentibus, ramis basi bracteis glabris vel villosis ciliatis vestitis, foliis lanceolatis vel ovato-



lanceolatis, acuminatis, basi in petiolum attenuatis, margine scabris, vaginis *glabris*, ligulis *exsertis*, truncatis, *denticulatis*, *pilosulis*."—*Regel*.

*Habitatio* ignota.

This is very probably a species of *Phyllostachys*.

42. *B. ARGENTEO-STRIATA*, *Regel*, *l. c.* fig. 5. "Caule glabro, 4–5-pedali, crassitie pennæ cygneæ; ramulis ad nodos biannulatos confertissimis; foliis lineari-lanceolatis, glabris, acuminatis, basi rotundatis, brevissime petiolatis, margine scabris, vaginis brevissime puberulis, ore in ligulam brevissimam, longe ciliatam excurrente."—*Regel*.

*Hab.* ignota.

In the drawing this bears a resemblance to *B. Fortunei*.

I have not yet observed either of the two preceding species in cultivation in England; and neither the descriptions nor the coloured figures enable me to identify either of them with any previously known species.

In addition to several of the preceding species, described from specimens collected by Dr. Brandis, and in describing which I have derived much assistance from that gentleman's careful notes made on the living plants, I have seen some specimens of his no. 6, "Wathaboot," and no 14, "Theiwa" of the Burmese; but in neither case are they sufficient to enable me to describe the plant satisfactorily; and, unfortunately, in these two instances Dr. Brandis's notes do not contain much information, nor do they quite agree with the specimens. Some of Dr. Brandis's plants belong to other genera than *Bambusa*, and will be found described in the following pages.

Many of the species, from no. 24 to 42, as well as several of the following less-known species, may very probably not belong to *Bambusa*; but, in accordance with the custom and example of most authors, I have placed under the main genus *Bambusa* all those doubtful plants which I had not strong reasons for believing to belong to other genera.

*Bambusæ floriferæ, minus notæ, auctoribus inepte descriptæ.*

(Ordo alphabeticus.)

43. *B. AGRESTIS*, *Poir.* Enc. viii. 704. "Culmo arboreo, durissimo, ramis inferioribus *spinosissimis*, foliis lineari-lanceolatis, parvis, glabris, petiolis longiusculis, tenuibus, panicula terminali, erecta, spiculis congestis, brevibus, paucifloris, stigmatibus 2, caryopsi oblonga."—*R. et Sch.* *l. c.* 1344; *Kunth*, Enum. 432; *Rupr.* *l. c.* 149; *Steud.* *l. c.* 330; *Lindl.* *l. c.* *Arundo agrestis*, *Lour.* Fl. Cochin., 72. *Arundarbor spinosa*, *Rumph.* Amb. iv. 14, t. 3. (teste *Lour.*) an recte?

*Hab.* in Cochin-China et fortasse etiam in China, *Loureiro*.

"*Culmus* lignosus, subterres, *tortuosus*, 30 ped. altus, brachii crassitie, nodis prominentibus, internodiis brevibus, intus parum vacuis, sæpe integre solidis, ramis multis, inferioribus densioribus, arcuatis, intricatis, spinis plurimis, crassis, sparsis, curvis. *Folia* et inflorescentia ut supra." *Squamule* (corollæ, *Lour.*) "minimæ, lanatæ."—*Loureiro*.

I think it is very probable, as stated at p. 102, that this is the same as *B. Blumeana*, Sch., or possibly *B. spinosa*, Roxb. Rumphius describes the leaves of his *Arundarbor spinosa* as having leaves 6–7 inches long and an inch broad, which does not agree with Loureiro's description of "folia lineari-lanceolata parva."

44. *B. DIFFUSA*, Blanco, Fl. Filip. 269. "Culmo plerumque *procumbente*, foliis ensatis, subtus *pilosis*, margine serratis, floribus dense distichis, spicatis, stigmatibus 3, villosis, *semine magno, ciceriformi*, testa 4-lineata."—Steud. *l. c.* 331; Miq. Fl. Ind. Batav. iii. 421.

*Hab.* in ins. Philipp., *Blanco*.

In the size of the fruit this agrees very well with *Schizostachyum acutiflorum*, of which it may be only a variety with leaves hairy below.

45. *B. LINEATA*, Munro. "Internodiis longis, ultra 2 poll. crassis, externe albicantibus, interpositis *striis viridibus* longitudinalibus (in inferioribus viridis color frequentior), articulis inferne copiosioribus, pilis vaginalum prurientibus raris; ramulorum summum aliquando terminatur in spicam longam, ex nodosis verticillis constantem, et compositam ex paleaceis et duris squamis, instar aristæ obtusæ, erectis."—*Leleba lineata*, s. *virgata*, Rumph. *l. c.* iv. 2; Rœm. et Sch. *l. c.* 1346.

*Hab.* in ins. Ternate et Celebe, in Amboina exotica, *Rumph.*

46. *B. LONGINODIS*, Miq. *l. c.* 418. "Culmis majoribus 2 digitos crassis, internodiis  $3\frac{1}{2}$ –4 ped. longis, externe pallide virentibus, rugosisque, nodis inferioribus, ramulos abortivos, breves, firmos, spinas mentientes et vulnerantes emittentibus, foliis illis *B. atræ* similibus, sed glabrius nec hirtis, attamen scabris et rugosis, floribus verticillatis ut in *B. tenui*."—*Arundarbor spiculorum*, s. *Bulutuy*, Rumph. *l. c.* iv. 7.

*Hab.* in Amboina, Manipe, et Java, *Rumph.*

"*Culmi* valde stoloniferi, *crassum* formant *fruticem*, cujus trunci interni, majores, ultra 2 digitos crassi, externi vero vix digiti minoris crassitie, tenuiores et glabriores. Textura adeo dura ut, si majori cultro cædatur, ignis scintillæ exsiliant."

This is included in Loureiro's *Arundo tabacaria* by Poirét, Schultes, and others, but, I think, erroneously; for Loureiro does not mention the spinous lower joints, and says that his plant is slender and scabrous all over.

47. *B. LUMAMPAO*, Blanco, *l. c.* 270. "Culmo *erecto, inermi*, spiculis in spicam compositam, interruptam confertis, fasciculis rotundatis vel elongatis, ultra 50-spiculatis, paleis vix ciliatis, stylo solitario, stigmatibus 2 brevissimis."—Steud. *l. c.* 331; Miq. *l. c.* 421.

*Hab.* in ins. Philipp., *Blanco*.

Sticks from this plant are stated to be commonly sold at Manilla.

48. *B. MITIS*, Poir. Enc. viii. 704. "Culmo *inermi*, omnino æquali, 40-pedali, ramis *inermibus*, numerosis, foliis *majusculis*, lanceolatis, *amplexicaulibus*, panícula simplici, erecta, coarctata, spicis longis, imbricatis, stylo in stigmata 3, longa, villosa trifido."—Rœm. et Sch. *l. c.* 1351; Kunth, *l. c.* 432; Rupr. *l. c.* 150; Steud. *l. c.* 330; Lindl. *l. c.* (1835), non Blanco. *Arundo mitis*, Lour. *l. c.* 73 (excl. syn. Rumph.).

*Hab.* in Cochín-China ("Cay-mo-ho," incolis), culta, vix frequens in arvis et sepibus.—*Loureiro*.

"*Culmus* lignosus, teres, nodis distantioribus vix prominentibus." "In tenuissimas tœnias secta uti solent ad texendos pilcos, cistas et diversa ac pulchra vascula." *Loureiro*.

49. *B. MONOGYNA*, Blan. *l. c.* 268. "Foliis ensiformibus, utrinque rigide et breviter pilosis, margine hamulosis, petiolis pilosis, spiculis dense spicatis, plurifloris, gluma uniflora, corollæ petalis 2 parvis, antheris majusculis, stylo 1, stigmatibus 2."—Steud. *l. c.* 331; Miq. *l. c.* 420.

*Hab.* in ins. Philipp., *Blanco*.

50. *B. MULTIPLEX*, Ræusch; Rœm. et Sch. *l. c.* 1350. "Culmo *inermi*, fistuloso, 12-pedali, pollicem crasso, *multiplfici*, internodiis longissimis, foliis lanceolato-linearibus, 6 poll. longis, *glabris*, *amplexicaulibus*, *fusco-viridibus*, spicis terminalibus, paucis, erectis, longis, interruptim *verticillos* spicularum *subulatarum* circa pedicellum communem, sessilem gerentibus, stigmatibus 3 sessilibus, longis, plumosis, reflexis, caryopsi oblonga."—Kth. *l. c.* 432; Rupr. *l. c.* 150; Lind. *l. c.*; Steud. *l. c.* 330. *Arundo multiplex*, Lour. *l. c.* 73 (exc. syn. Rumph.).

*Hab.* in Cochín-China, locis cultis provinciarum borealium ("Cay-hop" incolis), *Loureiro*. "An una vel altera varietatum *Lelebæ* a Rumphio descriptarum?"—*Schultes*.

In many respects this approaches in description to *B. nutans*, Wall.

51. *B. PUNGENS*, Blan. *l. c.* 270. "Gemmis ramorum acutis, rigidis, foliis anguste ensiformibus, subtus glabris, supra asperrimis, margine minutissime hamulosis, petiolis pilosissimis, staminibus 6, ovario basi pilorum fasciculo obsito, stylo magno, stigmate ramoso vel ad medium bipartito."—Steud. *l. c.* 331; Miq. *l. c.* 421.

*Hab.* in ins. Philipp., *Blanco*.

52. *B. TENUIS*, Munro. "Culmo 15–16-pedali, *duritie arundinis Europeæ*, extus *glabro*, spathis pilis tenuissimis, pruritum excitantibus obsitis, internodiis inferioribus 2 ped., superioribus 3–3½ ped. longis, foliis superioribus 13–14 poll. longis et 4 poll. latis, tenuibus, petiolis pilis pungentibus hirsutis, capitulis verticillatis, per interstitia distinctis."—*Arundarbor tenuis* (*Leleba alba*, Rumph. *l. c.* iv. 1, t. 1); Rœm. et Sch. *l. c.* 1346.

*Hab.* in Macassara circa domus et areas plantata, Ceramæ ore occidentali, *Rumphius*.

"*Culmus* ad nodos inferiores viridis, ad superiores pallide virens et albicans, detruncatus et siccatus album exhibet colorem, tertia ab inferiore parte ramuli multi erecti 7–12 poll. longi, arcte incumbentes, in superioribus internodiis ramuli ac folia sensim sunt majores magisque sese extendunt. *Folia* 4–5 in ramulo, inferiora palmam longa, pollicem lata, superiora ut supra. In adulta longus erigitur culmus

in capitula verticillata per interstitia distinctus; quivis verticillus compositus est ex diversis apicibus et acutis capitulis instar avenæ obtusæ, erectis, in culmi summo semper frequentioribus."—*Rumph.*

Kunth includes this as a synonym of *B. verticillata*, Blume (*Gigantochloa verticillata*, Munro); and Loureiro considers it to be his *Arundo multiplex* (*B. multiplex*, Poir.); but it appears to me to be very doubtful whether it really belongs to either species, being distinguished from the first by its shorter and much softer stem, and from the last by the size of its leaves. *B. Beecheyana* bears a greater resemblance to Rumphius's drawing than *G. verticillata* does.

*Bambusæ minus notæ, steriles, foliiferæ tantum.*

53. *B. AMAHUSSANA*, Lindl. *l. c.* no. 25. "Culmo pollicem crasso, *adeoque duro ac Arundarbor spinosa*, vix recto, internodiis brevibus, spathis pilosis et rugosis, foliis instar *Lelebæ* vel paulo latioribus, exceptis inferioribus quæ minora sunt, tenuia, glabra nec pilosa."—*Leleba amahussana*, Rumph. *l. c.*; Rœm. et Sch. *l. c.* 1346; Rupr. *l. c.* 146.

*Hab.* in Amboina ad pagum Amahussa, Manipa, *Rumphius*.

Rumphius adds that the wood of this is very thick, and that the Chinese use the leaves for packing their rice in.

54. *B. ARISTATA*, Lodd., Lindl. *l. c.* no. 16. "Culmo tenui, glabro, inermi, *nodis* primum *farinosus*, foliis glaberrimis, basi in petiolum brevem attenuatis, vaginis pubescentibus, fimbriatis, ligulis ciliis longis, validis fimbriatis."

*Hab.* in Ind. or., *Lindley*.

55. *B. ATRA*, Lindl. *l. c.* no. 22. "Culmo ex nigro viridi usque ad verticem, internodiis ad summum  $2\frac{1}{2}$  poll. [an pedes?] longis, foliis 13–16 poll. longis,  $2-3\frac{1}{2}$  poll. latis, maxime sinuosis et *nervosis*, superne ex viridi nigricantibus, inferne griseis. Substantia lignosa, non torqueri potest, *Lelebæ albæ* (*B. tenuis*) instar, sed frangitur et facile finditur."—*Leleba nigra*, Rumph. *l. c.*; Rœm. et Sch. *l. c.*; Rupr. *l. c.* 145.

*Hab.* in Amboina, *Rumphius*.

56. *B. BLANCOI*, Steud. *l. c.* 331. "Culmo inermi, foliis ensiformibus, utrinque rigide breviterque pilosis, margine minutissime serratis, petiolis per totam longitudinem pilosis."—Miq. *l. c.* 421. *B. mitis*, Blanco, *l. c.*, non aliorum.

*Hab.* in ins. Philipp., *Blanco*.

57. *B. FERA*, Miq. *l. c.* 418. "Culmis usque 30-pedalibus, superne nutantibus, inermibus; ad nodis sæpe curvatis, internodiis ad nodos brevisulcatis,  $1-1\frac{1}{2}$ -pedalibus, foliis 6–10 poll. longis, digitum latis, glabris, viridibus, subtiliter striatis."—*Arundarbor feræ* species prima s. *Bulu Swangi*, Rumph. *l. c.* iv. 16, tab. iv. (folia tantum depicta); "anne *B. vulgaris*?" (Miq.).

*Hab.* in Amboina, *Rumphius*.

58. *B. LEVIS*, Blanco, *l. c.* 270. "Foliis ensiformibus, supremis magnis, subtus *molliter lanatis*, supra breviter et *rigide pilosis*, margine nervoque medio supra minutissime hamulosis, petiolis totis pilosis."—Steud. *l. c.* 331; Miq. *l. c.* 421.

*Hab.* in ins. Philipp., *Blanco*.

59. *B. LIMA*, Blanco, *l. c.* "Foliis lanceolatis, angustis, *pilis rigidis* utrinque asperis, margine minutissime hamulosis, petiolis *apice pilosis*, cæterum glabris."—Steud. *l. c.*; Miq. *l. c.*

*Hab.* in ins. Philipp., *Blanco*.

60. *B. MAXIMA*, Poir. Enc. viii. 704. "Culmo maximo 80–100-pedali, crassitie cruris, internodiis tripedalibus, valde inanibus (ligno vix  $\frac{1}{2}$ -poll.), externe quidpiam rugosis, stipitibus rectissimis, ad verticem usque simplicissimis, ramulis terminalibus paucissimis, foliis fere ut in *B. aspera* sed paulo minoribus. *Arundarbor aspera*, *farina* et crassitie ligni abunde diversa."—Rumph.; Rœm. et Sch. *l. c.* 1352 (excl. syn. Lour.); Kth. *l. c.* 432; Rupr. *l. c.* 152; Steud. *l. c.* 331. *Arundarbor maxima* seu *Bulu Sammet*, Rumph. *l. c.* iv. 12. = *Bambusa excelsa*, Miq. *l. c.* 418. *Arundo maxima*, Lour. *l. c.* 74, "spinis densissimis horrida," differe videtur.

*Hab.* in Amboina, in summis montibus; Manipa, Kelanga et Cerama; Java, in montibus, *Rumphius*.

This may possibly, as stated at p. 124, be the same as *Gigantochloa verticillata*, Munro.

61. *B. PICTA*, Lindl. *l. c.* no. 24. "Internodiis usque 4 ped. longis, 2 poll. crassis, substantia minorem pennam crassis, siccatis albissimis, foliis angustis, vix hirsutis. Ex hac formantur baculi, 4–4 $\frac{1}{2}$  ped., albi vel variis figuris exusti."—*Leleba picta*, Rumph. *l. c.*; R. et Sch. *l. c.* 1346; Rupr. *l. c.* 146.

*Hab.* in Cerama, Kelanga et Celebe inss., *Rumphius*.

62. *B. PRAVA*, Lindl. *l. c.* no. 23. "Culmis ingentes sylvas formantibus, *Lelebis* reliquis crassioribus, sed tenuioris substantiæ, admodum fragilibus, foliis omnium latissimis, 14–18 poll. longis, ultra palmam latis, sinuosis et nervosis, superne pallide viridibus, inferne griseis, pungentibus, spinulis frequentissimis hirtis, unde vix tractabilia sunt ob prurimum quem excitant."—*Leleba prava*, Rumph. *l. c.*; Rœm. et Sch. *l. c.* 1346; Rupr. *l. c.* 145.

*Hab.* in Amboina, vulgatissima, *Rumphius*.

63. *B. STRIATA*, Loddig., Lindl. *l. c.* no. 19. Culmo inermi, tenui, 20-pedali, nitido flavo, striis viridibus, foliis angustis, in petiolum attenuatis, utrinque glabris, subtus glaucescentibus, vaginis pilis brevissimis paucis subhirsutis.

*Hab.* in China, in Anglia sæpe culta, *Loddiges*.

64. *B. TABACARIA*, Poir. Enc. viii. 705. "Culmo *tenui*, rectissimo, æqualissimo, sub-solido, *aspero*, ramoso, internodiis longissimis, durissimis, tenacissimis, *scabris*. Ex illis lævigatis fiunt fistulæ tabacariæ pulchræ."—Lour.; Rœm. et Sch. *l. c.* 1351;

Kth. *l. c.* 432; Rupr. *l. c.* 151; Steud. *l. c.* 331. *Arundo tabacaria*, Lour. *l. c.* 74 (excl. syn. Rumph.).

*Hab.* in Cochinchina ("Oung-thaong" incolis), Loureiro.

65. B. TEBA, Miq. *l. c.* 418. "Culmo vix alto, ab inferiore parte usque ad summum *spinosis* undique armato *ramis*, crassitie pedis, internodiis  $1\frac{1}{2}$ -pedalibus, extus glabris et politis, substantia omnium crassissima, foliis 6-7 poll. longis, *poll. latis*, subtiliter striatis, tenuibus, *glabris*, superioribus minoribus, 4- $4\frac{1}{2}$  poll. longis."—Rumph. *Arundarbor spinosa*, s. *Bulu Baduri*, *Teba Teba*, Rumph. *l. c.* iv. 14, t. 3; R. et Sch. *l. c.* 1344; Rupr. *l. c.* 149.

*Hab.* in Amboina, Cerama, Manilla, Java, China australi, Rumphius.

"Ex ipsius truncis quam ex omnibus ramis, sæpissime aphyllis, horridæ progerminant spinæ, retrorsum incurvatæ. Rami inferiores sæpe procumbentes, hamis et spinis armati."

I have already stated, at p. 102, that it is possible that this may be the same as *B. Blumenana*; but that certainly does not ever appear to be so "horridly spinous" as this species is described to be.

66. B. TEXTORIA, Blanco, *l. c.* 270. "Culmo erecto, foliis ensiformibus, supra glabris, subtus margineque scaberrimis."—Steud. *l. c.* 331; Miq. *l. c.* 421.

*Hab.* in ins. Philipp., Blanco.

67. B. VASARIA, Munro. "Culmo elegantissimo et politissimo, 36-50-pedali, internodiis 2-3 poll. longis, ultra pedem crassis, viridibus, glabris, ligni substantia vix minorem digitum crassa, surculis omnibus ad ortum vaginis rugosis obductis, atque pilis rarioribus caducis hirtis, foliis inferioribus minimis, 6-7 poll. longis, 1 poll. latis, superioribus 13-14 poll. longis, in surculis 17 poll. longis,  $1\frac{1}{2}$ -2 poll. latis, subtiliter nervosis, tenuibus, margine asperis, in junioribus fruticibus subtus parum lanuginosis, in vetustioribus glabris."—Rumph. *Arundarbor vasaria* s. *Bulu Java*, Rumph. *l. c.* iv. 8; Rœm. et Sch. *l. c.* 1341 (in obs. ad *B. arundinaceam*); Rupr. *l. c.* 142.

*Hab.* in Amboina, Cerama, Molucca, Java, Rumph. ; an Java ("Tring Djawa" ! incolis)? Horsfield. v. s.

I have, at p. 100, quoted this as a probable synonym of *B. balcooa*, but I do not feel certain of its identity. Schultes has quoted it under *B. arundinacea*; and Miquel thinks it may be the same as *B. vulgaris*. Loureiro quotes it as a synonym of his *Arundo bambos*, which, however, he describes as having "folia parva." Some specimens, in leaf only, in Horsfield's herbarium, marked "Tring djawa," agree very well with the preceding description. Miquel, *l. c.* 416, identifies "Djawa" with *B. verticillata*, Blume.

*Bambusæ species auctorum generibus alienis redactæ.*

B. ABYSSINICA, Rich.	= <i>Oxytenanthera abyssinica</i> , Munro.
B. ALPINA, Bory	= <i>Nastus borbonicus</i> , Gmel.
B. AMPLEXIFOLIA, Rœm. et Sch.	= <i>Guadua amplexifolia</i> , Presl.

B. BACCIFERA, Roxb.	= <i>Melocanna bambusoides</i> , Trin.
B. BARBATA, Trin.	= <i>Nastus barbatus</i> , Rupr.
B. BIFOLIA, Sieb.	= <i>Phyllostachys bambusoides</i> , Sieb.
B. CAPITATA, Trin.	= <i>Guadua</i> ? <i>capitata</i> , Munro.
B. CHUSQUE, Poir.	= <i>Chusquea scandens</i> , Kth.
B. DICHOTOMA, Don (nomen tantum)	= <i>Phyllostachys nigra</i> ?, Munro (teste Rupr.).
B. DISTORTA, Nees ab Es.	= <i>Guadua distorta</i> , Rupr.
B. DUMETORUM, Hance	= <i>Schizostachyum dumetorum</i> , Munro.
B. ELEGANTISSIMA, Hassk.	= <i>Beesha elegantissima</i> , Kurz.
B. FAX, Poir.	= <i>Beesha fax</i> , Rœm. et Sch.
B. GLAUCIFOLIA, Ruprecht	= <i>Schizostachyum glaucifolium</i> , Munro.
B. GUADUA, Humb. et Bonp.	= <i>Guadua angustifolia</i> , Kth.
B. KUMASACA, Zoll.	= <i>Phyllostachys kumasaca</i> , Munro.
B. LATIFOLIA, Humb. et Bonp.	= <i>Guadua latifolia</i> , Kth.
B. METAKE, Sieb.	= <i>Arundinaria japonica</i> , Sieb. et Zucc.
B. MITIS, Hort. non Poir.	= <i>A. japonica</i> , Sieb. et Zucc.
B. NIGRA, Loddig.	= <i>Phyllostachys nigra</i> , Munro.
B. NIGRO-CILIATA, Büse	= <i>Oxytenanthera nigro-ciliata</i> , Munro.
B. PANICULATA, Willd. herb.	= <i>Nastus borbonicus</i> , Gmel.
B. PARVIFLORA, Rœm. et Sch.	= <i>Arthrostylidium maculatum</i> , Rupr.
B. PSEUDOARUNDINACEA, Steud.	= <i>Gigantochloa verticillata</i> , Munro.
B. PUBERULA, Miq.	= <i>Phyllostachys nigra</i> , Munro.
B. RETICULATA, Rupr.	= <i>Phyllostachys bambusoides</i> , Sieb.
B. RUSCIFOLIA, Sieb. MS.	= <i>P. kumasaca</i> , Munro.
B. SCANDENS, Blume	= <i>Dinochloa tjankorreh</i> , Büse.
B. SCRIPTORIA, Dennst.	= <i>Beesha Rheedii</i> , Kth.
B. STRICTA, Roxb.	= <i>Dendrocalamus strictus</i> , Nees.
B. TAGOARA, Nees ab Esen.	= <i>Guadua tagoara</i> , Kunth.
B. THOUARSII, Hassk., non Kunth.	= <i>Gigantochloa atter</i> , Kurz.
B. TRINII, Nees	= <i>Guadua Trinii</i> , Rupr.
B. VERTICILLATA, Willd.	= <i>Gigantochloa verticillata</i> , Munro, test. hb. Willd.
B. VIRGATA, Trin.	= <i>Guadua virgata</i> , Rupr.

## XII. GIGANTOCHLOA.

Kurz, MS. (nomen tantum in herb.). *Bambusa*, sp. auct. *Arundarbor* sp., Rumph.

*Spicula* multiflora, sursum deorsumque imperfecta, vel ovata, teres, vel oblonga, compressa, elongata, rhachilla nunquam conspicua, plerumque fere obsoleta. *Glumæ* et *paleæ* ut in *Bambusa*. *Squamule* abnormales, in *G. heterostachya* plerumque 3, in reliquis 1-2, sæpe abortu deficientes. *Stamina* 6, filamentis *monadelphis*, in tubum primum brevem, cito elongatum, paleis vix breviorum connatis, antheris *mucrone hirsuto* apiculatis. *Stylus* filiformis, hirsutus, longus, basi incrassatus, *exsertus*, apice tantum 2-3-fidus. *Stigmata* brevia, revoluta, pilosa. *Ovarium* apice hirsutum vel hirsutissimum, oblongum ?, interdum rostratum. *Caryopsis* ignota.

Gramina arborea in insulis Java et Malacca crescentia. Inflorescentia panicula composita vel decomposita, culmo vel ramis terminalis, ramulis foliiferis intermixtis, spiculis in verticillis nunc plurimis, nunc paucis, vel etiam solitariis, primum bractea longa, apice foliacea, interdum diutius persistente stipatis.

This genus can only be said to differ essentially from *Bambusa* in having the filaments of the stamens united into a delicate monadelphous tube.

*Conspectus Specierum.*

Spiculæ homomorphæ, 3-4 lin. longæ. Panicula supra decomposita. Folia basi attenuata, petiolo glabro. Vaginæ subglabræ . . . . .	1. <i>G. verticillata.</i>
Spiculæ homomorphæ, 4-6 lin. longæ. Panicula bis composita. Folia basi rotundata, petiolo hirsuto. Vaginæ hirsutæ . . . . .	2. <i>G. atter.</i>
Spiculæ dimorphæ, fertiles compressæ, 12-15 lin. longæ . . . . .	3. <i>G. heterostachya.</i>

1. *G. VERTICILLATA*, Munro. Culmo arboreo, excelso, internodiis apice glabris vel scabris, raro primum farina cito decidua tectis, panicula supra decomposita, ramis interdum longissimis, foliis basi attenuatis, plerumque glabris, subtus glaucescentibus, nervis secundariis vix conspicuis, vaginis plerumque glabris.—*G. maxima*, Kurz, in herb. *Bambusa verticillata*, Willd. Spec. ii. 245 (1797) (excl. syn. Lour. et Rumph.), teste hb. Willd. no. 7007!; Rœm. et Sch. l. c. 1346, sub obs. 2 ad spec. e Blume; Hassk. Pl. Jav. rar. 40, non Rupr. nec Nees. *B. pseudoarundinacea*, Steud. l. c. 330. *Bambusacea*, no. 17, Miq. l. c. 420, forsân *Arundarbor maxima*, Rumph. l. c. iv. 12=*B. excelsa*, Miq. l. c. 418.

*Hab.* in Java, hb. Willd. 7007! herb. Mus. Brit. ! a Thunberg ("Tring ater" incolis), Horsfield! no. 647! 3479, Zollinger; Buitenzorg ("Andoong Kekens"), var. *β. minor* (Kurz) (internodiis hirsutioribus, verticillis majoribus, rhachi fistulosa); hort. Bogor. ("Andong Kitzil"! ("Andong Bezaar"!), Kurz. v. s.

*Culmus* elatus, "80-100-pedalis, ad verticem usque simplicissimus, ramulis terminalibus paucissimis" (si *Arundarbor maxima*, Rumph., eadem est). (In speciminibus visis) internodiis floralibus 3-6 poll. longis, plerumque subsolidis, glabris, raro in var. *β striatis* et fistulosis, interdum apice farina albida cito caduca tectis. *Folia* plerumque 7-12 poll. longa,  $\frac{3}{4}$ -1 $\frac{3}{4}$  poll. lata, minora 3-4 poll. longa, 6-8 lin. lata, lanceolata, acuminata, basi attenuata in petiolum glabrum, vix longum, margine argute serrata, supra glabra, sed uno latere scabra, subtus glaucescentia, in junioribus hirsuta, in vetustioribus glabra, sed interdum costam versus pilis paucis stipitatis subhirsuta. *Vaginæ* ore truncatæ, primum scabriusculæ, demum glabræ, margine vel glabræ vel raro (in Zoll. 647) ciliatæ, ore nudæ, ligula abbreviata, truncata, apice ciliata. *Panicula* supra decomposita, ramis plerumque ramulosis, rhachi plerumque glabra, subsolida, ramis vel ramulis ultimis tenuibus, sæpe bipedalibus et ultra, horum internodiis superioribus uno latere sulcatis et hirsutis, spiculis per interstitia  $\frac{1}{2}$ -1-3-pollicaria verticillato-glomeratis, "spiculis nunc paucis 2-4, quin hinc inde solitariis, bracteis longissimis apice foliaceis stipatis, nunc plurimis, 12-30, aggregatis." (Steud.). *Spicula* raro ultra 4 lin. longa, ovata, subacuta, sub-6-flora, flosculis 2-4 perfectis, rhachilla obsoleta, flosculis inferioribus unipaleaceis, brevioribus, margine minute ciliatis, superioribus sensim longioribus, sed angustioribus, longius ciliatis. *Palea* inferior multinervosa, apice breviter mucronato-acuta; superior subbrevior, angustior, inter carinas pilis sat longis ciliata, 3-4-5-nervia, apice interdum bimucronata. *Squamulæ* variabiles, lanceolatæ, apice fimbriatæ, 3 plerumque in flosculo supremo fertili tantum visæ, in flosculis



reliquis 1-2 reperiuntur, hæ semper paleæ inferiori oppositæ. *Stamina* 6, basi monadelphia, antheris mucrone plus minus hirsuto terminatis. *Stylus* brevis, basi incrassatus, superne, ut videtur, bifidus, sed forsân trifidus. *Ovarium* (immaturum) apice hirsutissimum.

This species appears to be a loftier plant than the following, and to have a much more compound inflorescence; and the spicules also are rather shorter; but the leaves appear to me to afford the best marks of distinction. Kurz is probably quite correct in identifying Rumph's *Arundarbor maxima* with this plant; but I have felt bound to adopt Willdenow's specific name as the first published. Willdenow's plant was kindly forwarded by Dr. Garcke for my inspection from Berlin, so that there is no doubt of its identity. Willdenow had only seen one flowering branchlet, sent by Thunberg, and therefore describes it as having "spica terminalis simplex." His locality of India is, of course, wrong—as Thunberg was never in India, ordinarily so called.

2. G. ATTER, Kurz, MS. (nomen tantum) in herb. Culmo erecto, 40-pedali, internodiis 1-1½ ped. longis, ad basin et apicem *albido strigoso tomentosis*, foliis basi rotundatis, vel rarissime subattenuatis, subtus hirsutis, petiolatis, petiolo *hirsuto*, nervis secundariis subtus conspicuis, vaginis pilis sæpe *atris* hirsutis, panicula bis composita, spiculis sub 6 lin. longis.—*Bambusa Thouarsii* β. *atter*, Hassk. Pl. Jav. rar. 41, non Kunth. *B. verticillata*, Miq. l. c. 416, partim, sed non Willd.

*Hab.* in Java, *Horsfield!* Buitenzorg ("B. atter Bezaar") ("B. taman") (var. *rhachi hirsutiss.*), Kurz. v. s. *Culmus* apice ramosus, internodiis glabris, viridibus, apice farinosus, 1½-2 poll. crassis, spathis ovatis, subpedalibus, intus glaberrimis, extus densissime nigro strigosis, apice, lateribus undulato-fimbriatis, apiculo lanceolato, "reflexo," lanceolato-acuminato, 4 poll. longo, utrinque pilis nigris hirsuto. *Folia* lanceolata, apice fere setaceo-acuminata, basi rotundata, petiolo complanato, utrinque scabro-hirsuto, margine argute serrata, 7-13 poll. longa, 9-20 lin. lata, supra scabriuscula, subtus hirsuta et sæpissime scabra, nervis secundariis utrinque 8-10, conspicuis, venulis transversis elevatis. *Vaginæ* sulcato-striatæ, striis pilis vel nigris vel pallidioribus hirsutæ, vel pilorum residuis scabræ, marginibus longe fimbriatæ, fovea infra petiolum margine fimbriata, ore nudæ vel uno latere rarissime fimbriatæ, ligula subelongata, truncata, dorso hirsuta, margine interdum longe fimbriata. *Panicula* bis composita, ramo vel culmo? terminalis "6 ped. longa," Hassk. (pars superior 3 ped. longa adest in hb. *Horsfield*), internodiis (visis) 4-5 poll. longis, teretibus, scabris, apice pruinosis, ad nodos 3 ramos 2-3-nos, inæquales, 5-10 poll. longos, gerentibus, pars superior simplex, nutans, verticillato-spicata, verticillis 3-2-½ poll. distantibus, verticillis rhachi centrali plurispiculatis, in lateralibus 3-5-7 spiculis, internodiis ramulorum striatis, subhirsutis, uno latere sulcatis. *Spicula* ovata, subobtusa, 6 lin. longa, 6-7-flora, flosculis 2-3 superioribus unipaleaceis, 3 sequentibus perfectis, terminali vel ad pedicellum brevem redacto, vel unipaleaceo, palea reliquis simili, paleis inferioribus dorso puberulis, superioribus, apice subobtusis, pilis penicillatis. Reliqua, *Squamulæ*, *Stamina*, *Stylus*, et *Ovarium*, nullo modo a *G. verticillata* discrepant.

Kurz, in his notes, identifies this species with *B. aspera* and *B. bitung*, Roem. et Sch.; but the latter is described as having much longer, and the former much more glabrous leaves.

3. G. HETEROSTACHYA, Munro. Culmo gracili, 30-pedali, internodiis floriferis inferioribus apice scabris, superioribus nitidis, glaberrimis, foliis fere lineari-lanceolatis,

basi rotundatis, utrinque glabris, sed tactu asperiusculis, nervis secundariis inconspicuis, vaginis compressiusculis, glabris, panícula composita, spiculis dimorphis, fertilibus compressis, plurifloris, sæpe 12–15 lin. longis.—*Bambusa diversistachya*, Munro, in herb. T. C. D.

*Hab.* in Malacca, “prope Ayer Punas, circa domum,” *Griffith.* v. s.

*Culmus* arboreus, 30-pedalis, fistulosus (internodiis floriferis tantum visis). *Folia* angusta, setaceo-acuminata, basi rotundata vel attenuata, petiolata, petiolo glabro, margine argute serrata, plerumque 8–11 poll. longa, 9–12 lin. lata, utrinque glabra, nisi interdum pili pauci subtus ad costam sparsi, nervis secundariis utrinque 4–6, ægre a tertiariis discernendis, venulis transversis obsoletis. *Vaginæ* glabræ, utrinque productæ, ore nudæ, ligula elongata, truncata, glabra, interdum longe ciliata. *Panicula* vix decomposita, terminalis, internodiis teretibus 4–6 poll. longis, inferioribus apice scabris, superioribus gradatim glabrescentibus et nitidis, ramis inferioribus ad nodos plerumque 3, interdum plurimis, nunc floriferis tantum, nunc foliiferis superne floriferis, apice nutans et simpliciter verticillato-spicata, ramis approximantibus, brevibus, subdensifloris, spiculis secus ramos fasciculato-verticillatis, vel sæpe solitariis, plurimis cylindricis acutis, angustis, incompletis, vix 9 lin. longis, paucis oblongis, compressis, 12–16 lin. longis, et 4 lin. latis, *bromiformibus*. *Spicula* fertilis 11–13-flora, flosculis omnibus, nisi 2–3 terminalibus tabescentibus et forsitan infimo, bipaleaceis, hermaphroditis, rhachillæ articulis superioribus plus minus conspicuis. *Palea* inferior valde acuminata, margine et dorso glabra, superne immerse nervosa; superior multo angustior, vix brevior, sæpe hirsuta, 6½ lin. longa, carinis inconspicue fimbriata. *Squamulæ* 3, oblongæ, longe fimbriatæ. *Stamina* 6, monadelphæ, antheris mucrone *hirsuto* vel *penicillo pilorum* apiculatis. *Stylus* longus, hirsutus, superne bifidus. *Ovarium* (immaturum) apice hirsutissimum, longe rostratum.

This has a very different appearance from the two preceding species. The perfect spicula has a considerable resemblance to that of *Bambusa vulgaris*.

*Species dubia, folia tantum.*

4. G. APUS, Kurz, MS. in herb. (nomen). *Folia* (2 tantum adsunt) 14 poll. longa, 2½–2¾ poll. lata, basi inæquilatera, attenuata in petiolum supra *scabrum*, subtus *hirsutum*, basi incrassatum, supra glabra, sed medio et ad nervos margini alteri adjacentes scaberrima, subtus scabrula et pilis brevibus hirsuta, margine serrato scaberrima, nervis secundariis tota lamina 26–28, elevatis, conspicuis, venulis transversis inconspicuis. *Vaginæ* sulcatæ, striatæ, margine ciliatæ, superne glabræ, inferne striis pilis albidis adpressis hirsutæ, fovea apice callosa, hirsuta, margine *fimbriata*, ligula truncata, dorso *hispida*, margine tenuissime *ciliata*.—A an *B. apus*? Roem. et Sch. *l. c.* 1350, et ante, p. 112.

*Hab.* in Java, hort. Bogor. (“Talie” incolis), *Kurz.* v. s.

These leaves are different from some marked “Apus” in hb. Horsfield, as already mentioned at p. 113. In many respects they correspond perfectly with Schultes’s description of *B. apus*, differing principally in having hirsute petioles. Hasskarl, in Cat. Hort. Bog. 295, says that “Apus” belongs to the genus *Dendrocalamus*.

XIII. OXYTENANTHERA.

Munro, nov. gen. *Bambusæ*, sect. *Scirpobambos*, Rich. Fl. Abyss. ii. 439.

*Spicula* subcylindrica, sæpe elongata et curvata, plerumque pauciflora, flosculis 1–3 tantum, bipaleaceis,

plerumque nonnisi uno, terminali vel penultimo, fertili, rhachilla obsoleta, paleis imbricatissimis, nunc sursum deorsumque, nunc deorsum tantum imperfecta (flosculo terminali tabescente nullo). *Palea* inferior multinervia, acuminata vel spinoso-mucronata, margine nunc pilis sat longis fimbriata, nunc glabra; superior, flosculi fertiliis supremi, dorso *convexa*, carinis *obsoletis*. *Squamulæ* nullæ. *Stamina* 6, basi *monadelphæ*, antheris mucrone vel seta, sæpe longissima, vel (in *O. Stocksii*) pilis paucis hyalinis apiculatis. *Stylus* gracilis, longus vel longissimus, basi vix incrassatus, apice in stigmata 2-3 interdum longa et plicata divisus. *Caryopsis* angusta, lineari-oblonga, sulco longitudinali notata.

Gramina arborescentia vel scandentia, in Africa tropica, India orientali, Zeylania, Java et insulis adjacentibus crescentia. Folia varia. Inflorescentia vel capitulum, vel panicula decomposita, spiculis in verticillis densis, per ramos dissitis, aggregatis.

The monadelphous stamens often with extremely long points, the absence of squamulæ, the convex, not keeled, upper palea of the fertile flower, and narrow linear oblong fruit are characters which separate this genus from all others.

*Conspectus Specierum.*

- Sect. I. "Scirpobambos." Spiculæ cylindrico-conicæ, 12-20 lin. longæ, in capitulis, sæpe terminalibus, dense aggregatæ . . . . . 1. *O. Abyssinica*.
- Sect. II. Spiculæ in verticillis, secus ramos dissitis, aggregatæ.
- Spicula *cylindrica*, 9-14 lin. longa, flosculo terminali tabescente, *conspicuo*, *exserto*. *Palea* inferior acuminata, margine pilis *nigris* vel *violaceis* ciliata . . . . . 2. *O. nigro-ciliata*.
- Spicula *cylindrica*, *angusta*, sub 9 lin. longa, sæpe *curvata*, flosculo terminali tabescente *nullo*. *Palea* inferior margine pilis *albis* fimbriata . . . . . 3. *O. albo-ciliata*.
- Spicula *subcompressa*, *brevis*, 4-7 lin. longa, sæpius 3-flora, raro 6-flora, flosculis 1-3 bipaleaceis. *Palea* inferior *spinoso-acuta*, margine *brevisime* fimbriata vel omnino *glabra*. Antheræ *longe* mucronatæ . . . . . 4. *O. Thwaitesii*.
- Spicula *teres*, *brevis*, 6 lin. longa, 4-5-flora, flosculis 2 bipaleaceis, terminali vel ad *pedicellum brevissimum* redacto, vel omnino *obsoleto*. *Palea* inferior sæpe spinoso-acuminatissima, *nervoso-striata*, margine *glabra*. Antheræ vel mucrone *brevissimo* vel pilis 1-2 *hyalinis* apiculatæ . . . . . 5. *O. Stocksii*.

1. *O. ABYSSINICA*, Munro. Culmo arboreo, spiculis oblongo-conicis, numerosissimis, in capitulis, terminalibus vel spicatis, conglomerato-aggregatis, monoicis, flosculis 1-2 bipaleaceis, palea inferiore dorso plus minus hirsuta, foliis lanceolatis, vaginis ore fimbriatis.—*Bambusa abyssinica*, Rich. Tent. Fl. Abyss. ii. 439; Steud. l. c. 330; Walp. Ann. vi. 781. *B. Schimperiana*, Steud. in litt. ad. no. 501 un. itin.

*Hab.* in Africa tropica, Abyssinia in ripas fluv. Tacazze ("Arkai" et "Chommel" incolis), *Quartin Dillon*, no. 501! *Schimper* (folia tantum); Gallabat, Matamma, no. 2511! *Schweinfurth*; Angola, Pungo Andongo, 2400-3800 ped. s. m., no. 1134! *Wehwitsch*; Accra! *Vogel* (folia); Nuffe, *Barter*, 805 (folia). v. s.

*Culmus* 25-50-pedalis, lignosus, basi 1½-3 poll. diametro, inermis, *glauco-pruinosis*, ramis verticillatis, spathis 10 poll. longis, intus glabris, extus hirsutis, margine superne fimbriatis, apiculo lineari-lanceolato, 2 poll. longo, utrinque hirsuto. *Folia* lineari- vel oblongo-lanceolata, plerumque 6-7 poll. longa, 6-12 lin. lata (interdum, in eodem ramo, superiora (more insolito) minora, 6 poll. longa, 6-8

lin. lata, venulis transversis inconspicuis, inferiora 10 poll. longa,  $1\frac{3}{4}$  poll. lata, venulis transversis conspicuis), basi subcordata, vel in petiolum hirsutiusculum attenuata, margine serrulato-scaberrima, supra glabra, sed uno latere tactu scabra, subtus pilis brevibus, sæpe vix conspicuis pubescentia, vel glabra, nervis secundariis utrinque 5-10, plus minus conspicuis. *Vaginæ* interdum glabræ, interdum hirsutæ, margine ciliatæ, ore fimbriatæ, ligula brevi, truncata. *Inflorescentia* nunc capitulum densiflorum, in ramis terminale, nunc "capitulis lateralibus superpositis, terminali majore, et quasi spicam vastam, interrupte verticillatam efformantibus." *Spiculæ*, raro fertiles, in capitulis numerosissimæ, acutissimæ, 12-20 lin. longæ, paleis imbricatissimis, flosculis inferioribus 1 paleaceis, glumis similibus, gradatim increscentibus, mucronatis, hirsutis, flosculis (1-2, vel raro 3) superioribus bipaleaceis, vel masculis, vel femineis, vel hermaphroditis. *Palea* inferior (fertilis) 9 lin. longa, acutissima, subspinescens, perfecte convoluta; superior vix brevior, in flosculis bipaleaceis inferioribus 1-2 bicarinata, superne fimbriata, apice hirsuta, bimucronata, in flosculo supremo bipaleaceo, dorso convexa, 10-12-nervia, caryopsin arcte involvens. *Stamina* 6 monadelphia, *antheris* apice mucrone longo hirsuto subulatis. *Stylus* longus, hirtus, basi tandem articulatus, apice in stigmata 3, longa, sæpe plicata, hirtella divisus. *Caryopsis angustissima*, lineari-oblonga, 6 lin. longa, uno latere sulco fusco longitudinali notata.

This fine distinct-looking Bamboo seems to have a wide range in Africa, extending into both tropics. Barter says that it was the only arboreal grass he had seen (in Baikie's Niger Expedition), and that the stems were used to pole canoes, and the smaller ones as shafts for spears. This species has a very different appearance from the remainder of the genus; but the structure of the spiculæ in all the species is very similar.

2. *O. NIGRO-CILIATA*, Munro. Culmo excelso, internodiis floriferis sæpe 9 lin. diametro, glabris, ramis floriferis ad nodos fasciculatis, 3-pedalibus et ultra, spiculis 9-14 lin. longis, angustis, sæpe curvatis, flosculo terminali tabescente conspicuo, exserto, palea inferiore acuminata, apice nervosa, margine pilis sat longis, *nigris* vel *violaceis* fimbriata, foliis basi inæqualibus, subtus pubescentibus vel demum glabris.—*Bambusa nigro-ciliata*, Büse in Pl. Jungh. i. 389; Miq. l. c. 416; Walp. Ann. vi. 1045. *B. bitung*, Hassk. Pl. Jav. rar. 42, sed vix Schult. *B. gracilis*, Wall. MS. in Cat. 5033!

*Hab.* in Ind. or. Tenasserim, *Helfer*, 285! 314!; Martaban, Meaoung! Kogun! in saxis prope mare inter Chappadong et Amherst, *Wallich*, 5033!; Moulmein, *Falconer*, 18! (fol.) 20! (flores), *Lobb*!; Chittagong, *Jones*!; Madras, Canara, Mercara, *Hohenacker*, 527!; ins. Andaman! Sumatra! *Kurz*! Java, *Zollinger*! *Junghuhn*, ("Lengha" incolis) *Horsfield*! v. s.

*Culmus* 30-40-pedalis (*Helfer*), pulchre striatus (*Wallich*), internodia florifera tantum visa. *Folia* 7-10 vel etiam 12-15 poll. longa,  $1\frac{1}{4}$ -2 poll. lata, lanceolata, basi rotundata, inæquilatera, breviter petiolata, apice rostrato-acuminata, supra glabra, sed uno latere scabra, subtus pallidiora, pubescentia, vel demum glabra, nervis secundariis, utrinque 8-10-12, mediocriter conspicuis. *Vaginæ*, infra petiolum, abrupte truncatæ, margine fimbriatæ vel glabræ, dorso superne plerumque glabræ, interdum pilis *albis* vel *nigris* adpressis hirsutæ, ligula subelongata vel brevi. *Panicula* maxima, decomposita, internodiis inferioribus glabris, fistulosis, ramis compositis, longis, ramulis gracilibus, interdum 2-pedalibus, ultimis verticillato-spicatis, apice interdum foliatis, spiculis in verticillis  $\frac{1}{2}$ - $1\frac{1}{2}$ - $2\frac{1}{2}$  poll. distantibus, vel paucis vel numerosis, ramulorum internodiis inferioribus glabris, superioribus vel glabris vel, supremis præcipue, hirsutis. *Spicula* cylindrica, angusta, 5-6-7-flora, flosculis 2-3 inferioribus 1-paleaceis, tunc 1-2-3 bipaleaceis, terminali 1-paleaceo, conspicuo, exserto. *Palea* inferior (fertilis) sæpe dorso pubescens (interdum pili nigri sparsi adsunt), basi membranacea, apice

acuminata, vel raro subobtusa, margine pilis *violaceis* vel *nigris* ciliata; superior subæquilonga, carinis longe fimbriatis, apice vel obtusa vel bimucronata, in flosculo supremo dorso convexa. *Stamina* 6, antheris longe exsertis, flexuosis, mucrone *longo*, *hirsuto* subulatis. *Stylus* longus, apice 3-fidus. *Ovarium* lineari-oblongum, apice hirsutum.

3. *O. ALBO-CILIATA*, Munro. Culmo diffuso, scandente, internodiis floriferis plerumque apice scabris, spiculis sub 9 lin. longis, *anguste cylindricis*, curvatis, flosculo *terminali* tabescente *nullo*, glumis paleisque inferioribus pilis *albis* longis ciliatis, foliis dubiis.

*Hab.* in Ind. or. Pegu ("Wapyoogele" incolis), no. 19! *Brandis*; Moulmein, no. 27! Falconer. v. s.

"*Culmus* subscandens, ramis solitariis, circumferentia maxima  $4\frac{1}{2}$  poll., internodiis bipedalibus, annulis obliquis, spathis hirsutis,  $\frac{1}{3}$  internodii æquantibus, foliis deciduis."—*Brandis*. *Folia* dubia. *Panicula* (an culmo terminalis?) composita (pars superior 9-pedalis in hb. Falconer adest), internodiis sæpe 8 poll. longis, inferioribus apice scabris, superioribus glabris et nitidis, ramis inferioribus ad nodos plurimis, superioribus solitariis binisve, simpliciter verticillato-spicatis, interdum 2 pedes longis, internodiis glabris, verticillis densifloris, subæquidistantibus. *Spicula* pallida, deorsum imperfecta, 3-4-flora, flosculis 1-2 inferioribus 1-paleaceis, sterilibus, tertio masculo, *terminali hermaphrodito*. *Palea* inferior acuta, apice immerso-nervosa, margine pilis *albis patulis* fimbriata; superior subobtusa, margine fimbriata. Reliqua ut in *O. nigro-ciliata*.

In addition to the colour of the fringe on the margin of the lower palea, the spicule of this species is distinguished from that of the preceding by the absence of a terminal imperfect flower. In habit it appears to be a much more slender plant, with a much less compound panicle. There are, unfortunately, no leaves actually attached to any of the flowering specimens; so that I have been unable to describe the foliage with any certainty.

4. *O. THWAITESII*, Munro. Culmo 10-12-pedali, ramulis ad nodos numerosis, inferioribus floriferis basi foliiferis, sæpe 2-3 ped. et ultra longis, spiculis brevibus, 4-6 lin. longis, nunc 5-6-floris, sed sæpius 3-floris, flosculis 1-3 bipaleaceis, palea inferiore margine brevissime fimbriata, vel, in var  $\beta$ , glabra, apice spinoso-acuta, antheris longe mucronatis, foliis lanceolatis, ligula vel brevi vel elongata.—*Dendrocalamus monadelphus*, Thw. in Enum. 376. *Bambusa stricta*, Roxb. Cor. Pl. t. 80! quoad tabulam sed non quoad descriptionem, quæ ad *Dendrocalamum strictum* verum pertinet: "*D. strictus*, var. spiculis glabratis," Nees, MS. in hb. Wight!

Var.  $\beta$ . Spiculis 5-6-floris, palea inferiore margine *glabra*, foliis *pedalibus*,  $1\frac{1}{4}$  poll. latis, ligula elongata.

*Hab.* in Ceylon, prov. centr. alt. 4000-5000 ped. s. m., no. 3359! *Thwaites*; Ind. or. in montibus Nilghiri, mont. Shevagherry, no. 176! = 3430! *Wight*. Var.  $\beta$ , Ceylon! *Thwaites*. v. s.

*Culmus* inermis, viridis, teres, fistulosus, striatus, circiter 1 poll. in diam., ramosus. *Folia* lanceolata, acuminata, basi subcordata, petiolata, parum obliqua, margine uno vel utroque serrata, supra glabra, subtus primum pilis sparsis vix hirsuta, demum glabra, plerumque 2-5 poll. longa, 6-9 lin. lata, nervis secundariis utrinque 6, venulis transversis obsoletis (in var.  $\beta$  folia 12 poll. longa,  $1\frac{1}{2}$  poll. lata, nervis secundariis utrinque 10-12, venulis transversis *conspicuis*). "*Vaginæ* fugaci-albido-pilosæ, apice longe caduco-ciliatæ," ligula nunc brevi, nunc elongata, apice membranacea, obtusa. *Inflorescentia* (an culmo foliifero terminalis?) panicula decomposita, ramis inferioribus sæpe longissimis, valde inæ-

qualibus, floriferis, basi foliiferis, superioribus omnino floriferis, brevioribus, internodiis inferioribus glabris, interdum 8 poll. longis, viridibus, striatis, verticillis sæpissime densifloris, subglobosis, raro ad nodos dense aggregatis, plerumque secus ramulos regulariter spicatis. *Spicula* acuta, lineari-oblonga, plerumque 3-flora, rarius 5-6-flora, flosculis 2 inferioribus unipaleaceis, sequentibus 1-3 bipaleaceis, terminali tabescente nunc conspicuo, nunc obsoleto. *Palea* inferior dorso glabra, 15-20-nervosa, margine vel *brevissime fimbriata*, vel *glabra*, subulato-acuta; superior vix brevior, in flosculo bipaleaceo supremo dorso *convexa*, 9-nervis, margine ciliata, apice subpilosa, in reliquis obtuse-bicarinata. "Antheræ angustæ, subulato-apiculatæ, apiculo *piloso*." *Stylus* apice 3-fidus. *Caryopsis* (matura) 3 lin. longa, lineari-oblonga, apice acuta et glabra.

Roxburgh's drawing in the 'Plants of the Coast of Coromandel' was undoubtedly taken from a plant of this species; but the description, with which the drawing does not agree, was probably written at a later date, and is very nearly in the same words as those used in the 'Flora Indica,' ii. 193, for the real *Dendrocalamus strictus*. I have been unwilling to change Thwaites's specific name for this plant; but as the whole genus have monadelphous stamens, it was no longer a distinctive one, and I have therefore named it after the excellent botanist who first described the plant correctly.

5. O. STOCKSII, Munro. Culmo gracili, internodiis 4-7 poll. longis, glaberrimis, ramis ad nodos paucis, spiculis sub 6 lin. longis, teretibus, acutissimis, glabris, plerumque 4-5-floris, flosculis 2 bipaleaceis, terminali vel lineari brevissimo, vel omnino obsoleto, palea inferiore *membranacea*, margine *glabra*, in flosculis superioribus interdum spinoso-acutissima, antheris vel *brevissime* mucronatis, vel *pilis hyalinis* 1-2 brevibus apiculatis, foliis angustis, subtus *hirsutis*.

*Hab.* in Ind. or. Concan, *Stocks*. v. s.

*Folia* lineari-lanceolata, apice mucronato-acuta, basi cordato-rotundata, vel attenuata in petiolum complanatum, basi incrassatum, brevem, subtus hirsutum, 3-4 poll. longa, 4-6 lin. lata, supra hirsuta vel glabra, subtus hirsuta, nervis secundariis utrinque 4-5, inconspicuis. *Vaginæ* striatæ, plerumque glabræ vel primum pubescentes, ore fimbriatæ. *Inflorescentia*, ut videtur, ei præcedentis similis (ramuli floriferi 3 tantum adsunt), verticillis interdum 1¼ poll. diametro, densissimis, fere echinatis, in ramulis approximatis. *Spicula* 4-5-flora, glabra, flosculis 2 inferioribus unipaleaceis brevibus, dorso nitidis, apice mucronatis, 2 sequentibus bipaleaceis, terminali *brevissimo* vel obsoleto. *Palea* inferior (fertilis) membranacea, per totam longitudinem *striato-nervosa*, apice mucrone sæpe longo spinoso subulata; superne, in flosculo tertio, bicarinata, obtusa, carinis fimbriata, in quarto convexa obtusa. *Stamina* 6, antheris vel *brevissime* mucronatis, vel *fere obtusis*, vel pilis 1-2 hyalinis apiculatis. *Stylus* apice 2-3-fidus. *Ovarium* (immaturum) apice hirsutum.

The leaves of this species are remarkably like those of *Dendrocalamus strictus*. The short points to the anthers and striated membranous lower palea are the chief points of distinction between this and the preceding species.

### Sectio III. BACCIFERÆ (conf. supra, p. 12).

#### *Conspectus Generum.*

Subsectio I. SCHIZOSTACHYOIDEA. Rhachis propria, nisi in Cephalostachyo, bis terve fasciculatim divisa; tandem spicula fertilis, plerumque cylindrica, flosculis (1 vel raro 2) hermaphroditis, supra glumas articulata. Squamulæ 3 vel raro 2 aut nullæ.

- Spiculæ *spicata*, oblongæ vel cylindricæ, flosculis 1-2 *bipaleaceis*, hermaphroditis. Squamulæ 3 vel raro 2. Fructus (in specie unica tantum notus) *magnus, carnosus*, pomiformis, rostratus . . . . . 14. *Melocanna*.
- Spicula cylindrica, paleis imbricatissimis, involventibus, flosculo 1 hermaphrodito, plerumque *unipaleaceo*, rarissime (in specie unica) bipaleaceo. *Squamulæ nullæ*. Fructus (tantum in specie unica notus) oblongus, rugosus, rostro brevi subito cuspidatus . . . . . 15. *Schizostachyum*.
- Spiculæ cylindricæ, in *capitulis* densis, plerumque *terminalibus* congestæ, flosculo 1 hermaphrodito, bipaleaceo. Squamulæ 3. Fructus longe attenuato-rostratus . . . . . 16. *Cephalostachyum*.
- Spiculæ oblongæ, *membranaceæ*, spicatæ, flosculis 1-2 hermaphroditis, bipaleaceis. Squamulæ 3 vel 5. Fructus *globosus* rostro longo subito rostratus. Tab. IV. . . . . 17. *Pseudostachyum*.
- Subsectio II. BAMBUOIDEA. Spicula structura *Bambusæ* similis, flosculis 1-2 vel plurimis fertilibus. Squamulæ 3, vel *plurimæ*, vel *nullæ*. Fructus *bacciformis*, plerumque rostratus.
- Spicula *elongata*, cylindrica, *pluriflora*, flosculis 3-5 fertilibus. Squamulæ 3. Fructus rostratus. Tab. III. . . . . 18. *Teinostachyum*.
- Spicula subcylindrica (fructifera major, conoideo-cylindrica), flosculo 1 bipaleaceo, hermaphrodito. Squamulæ *plurimæ* vel raro (in specie unica) 3. Stamina *plurima* vel 6. Fructus longe rostratus . . . . . 19. *Beesha*.
- Spicula oblonga vel ovata, flosculis 2 vel *plurimæ* perfectis. Squamulæ veræ *nullæ*. Fructus oblongus, plerumque rostratus. Tab. VI. . . . . 20. *Dendrocalamus*.
- Spicula minima, ovata, flosculo *terminali solo* bipaleaceo. Squamulæ *nullæ*. Fructus oblongus, brevissime rostratus. Tab. V. . . . . 21. *Dinochloa*.

## XIV. MELOCANNA.

- Trinius in Sprengel, Neue Entd. ii. 43 (1821). *Beesha*, Kunth, 'Notice sur le genre Bambusa' (1822); Endl. no. 910, sed non Rheede (1685). *Bambusæ* sp., Roxburgh. *Schizostachyi* sp., Steud. et Miquel.
- Spicula* utrinque imperfecta, pauciflora, flosculo plerumque 1, raro 2 hermaphroditis, terminali tabescente, conspicuo, nunc subovata, nunc cylindrica, fertilis basi, supra glumas, articulata. *Glumæ* numero indefinitæ, forsan omnes gemmiparæ. *Palea* inferior flosculi fertilis paucinervia, in speciebus 2 membranacea, in reliquis coriacea, plerumque scabra et sæpe involutissima; superior sæpe longior, in speciebus "*bambusoides*" et "*Kurzii*" membranacea, in reliquis coriacea, involuta, raro carinata, plerumque dorso convexa. *Squamulæ* 3, vel raro 2, plerumque fimbriatæ, sæpe *persistentes*. *Stamina* plerumque 6, raro 5-7, antheris vel obtusis vel mucronatis. *Stylus longus*, apice trifidus. *Ovarium* longe rostratum, rostro sæpe angulato, glabro vel subhirsuto. *Fructus*, in *M. bambusoide*, maximus, pomiformis, carnosus, acuminatus, edulis, in reliquis ignotus.
- Gramina arborea vel fruticosa, in India orientali, et inss. Singapore, Java, et Andaman indigena. Folia plerumque lata, petiolata, venulis transversis nullis vel obsoletis, vaginis ore ciliis longis, interdum deciduis fimbriatis. *Inflorescentia* nunc panicula vasta, supra decomposita, aphylla, spiculis spicatis, imbricatis, bracteis velatis, nunc panicula decomposita, aphylla, spiculis in fasciculis secus ramos elongatos dissitis, nunc panicula fere simplex in ramis basi foliatis terminalis, fasciculis plerumque simplicibus verticillato-spicatis.

I think it is very probable that *Schizostachyum* of Nees, which is principally distinguished by the absence of squamulæ, is merely an incomplete state of this genus; or per-

haps this genus should have been confined to the one typical large-fruited species, and the remainder placed in *Schizostachyum*, with an enlarged character.

*Conspectus Specierum.*

Sect. I. Typica. Culmus arboreus.

Panicula *ampla*, supradecomposita. Paleæ *membranacea*. Squamulæ 2. Fructus *magnus, pomiformis, carnosus* . . . . . 1. *M. bambusoides*.

Sect. II. Dubiæ. Culmus subarboreus vel frutescens. Fructus ignotus.

Panicula decomposita, *aphylla*, ramis valde *elongatis*, sæpe compositis. Spicula plerumque sesquiflora, paleis *coriaceis*. Antheræ obtusæ . . . . . 2. *M. virgata*.

Panicula subsimplex, basi foliata, fasciculato-spicata, fasciculis 3-4. Spicula 3-4-flora, paleis *coriaceis*. Antheræ obtusæ. Folia *angusta, nervis* secundariis *inconspicuis* . . . . . 3. *M. gracilis*.

Panicula ut in *M. gracili*, fasciculis plurimis. Spicula 3-4-flora, paleis *coriaceis*. Antheræ obtusæ. Folia *lato-lanceolata, nervis* secundariis *conspicuis* . . . . . 4. *M. Zollingeri*.

Panicula ut in *M. gracili*. Spicula 3-5-flora, paleis *membranaceis*. Antheræ *longe mucronatæ* . . . . . 5. *M. Kurzii*.

1. *M. BAMBUSOIDES*, Trin. *l. c.* 43. Culmo arboreo, excelso, apice tantum ramoso, panicula supradecomposita, basi aphylla, spiculis 3-4-floris, paleis membranaceis, squamulis 2, ovario apice rostrato, demum carnescente, in fructum *pomiforme*, interdum 5-pollicare, incremente, foliis ovato-lanceolatis, vaginis ore longe fimbriatis.—Spreng. Syst. ii. 113 (excl. syn. Lour.); Rupr. *l. c.* 155; Steud. *l. c.* 331; Miq. *l. c.* 423. *Bambusa baccifera*, Roxb. Hort. Beng. 25 (1814); Corom. Pl. iii. 38, t. 243 (1819); Fl. Ind. ii. 197. *Beesha Rheedei*, Kunth, *l. c.*; Rev. Gram. i. 141; Enum. 434 (excl. syn. nonnull.), non Rupr. *l. c.* ad not. *Beesha baccifera*, Roem. et Sch. *l. c.* 1336. *Nastus baccifera*, Rasp. *l. c.* v. 442.

*Hab.* in Ind. or. Chittagong, spontanea ("Moollī" et "Metunga"), Hooker! Jones!, ("Bish Bans") Roxburgh; Sylhet, Wallich! Cachar ("Moollī") Verner; Tipperah, Campbell; Arracan, Theobald; Akyab, Tickell; cult. hort. bot. Calc., Thomson; Moulemein! Falconer; île Bourbon! Boivin; Mauritius! Ayres (var. ramo florifero basi foliato). v. s.

*Culmus* 50-70-pedalis, basi peripheria 12-13 poll., erectus, apice tantum ramosus, fistulosus, parietibus tenuibus, "tabasheer" fundens. *Folia* ovato-lanceolata, basi attenuata, inæquilatera, petiolata, petiolis flavescens, apice setaceo-acuminata, 6-12 poll. longa, 1-2-4 poll. lata, utrinque glabra, sed supra ad unum latus scabra, subtus pallidiora, nervis secundariis utrinque 8-14, subconspicuis. *Vagina* glabræ vel villosæ (teste Roxb.), ore fimbriatæ, ligula inconspicua. *Panicula* supradecomposita, ramis ramulisque iterum iterumque divisus, ultimis spiculas spicatas, inferiores steriles, supremas tantum fertiles, bracteis involutas gerentibus. *Spicula* fertilis supra glumas articulata, 3-4-flora, flosculis 1-2 inferioribus neutris vel masculis, penultimo hermaphrodito, terminali tabescente, interdum ad pedicellum redacto, interdum paleis duabus prædito. *Palea* inferior (flosculi hermaphroditi) membranacea, 9-nervia, apice acuminata; superior tenuimembranacea, subæquilonga, dorso vix carinata. *Squamula* 2, paleæ inferiori oppositæ, lineari-oblongæ, apice obtusæ, margine fimbriatæ, 3-5-nerviæ, *persistentes*. *Stamina* 5-7, longa, basi libera, antheris, demum *tortis*, subobtusis. *Stylus* longus, attenuatus, apice 2-3-4-fidus, stigmatibus brevibus, pilosis. *Ovarium* longe attenuatum, cito crescit et carnescit. *Fructus* pomiformis, 3-5-pollicaris, *carnosus*, apice curvatus et acuminatus.



The very curious fruit of this species is remarkably well figured by Roxburgh in the 'Plants of the Coast of Coromandel.' The plant appears to have fruited abundantly in Arracan in 1864 and 1865; and Mr. Theobald states that "the true seed inside the fleshy pericarp, about the size and shape of a small betel-nut, is very pleasant eating, and not at all austere, though without much flavour. The natives declare the whole fruit is edible after baking." Some further particulars about the flowering of this plant will be found at p. 3.

2. *M. VIRGATA*, Munro. Culmo subarboreo?, internodiis floriferis interdum 12-15 poll. longis, glabris, vel apice scaberrimis; panicula longissima, *ampla*, *nutante* aphylla, ramis fasciculatis, paucis vel plurimis, virgatis, simplicibus vel compositis; spiculis in fasciculis, interdum proliferis, nunquam densifloris, per ramos dissitis; spicula cylindrica, acuta, pauciflora; flosculo uno fertili; paleis *coriaceis subhirsutis*.—*Bambusa*, sp., Griffith, Journ. p. 89.

*Hab.* in Ind. or. Burmah, Keouksik ad fluv. Mogong, *Griffith*. v. s.

*Panicula* aphylla tantum adest, decomposita, rhachi glabra, ramis inæqualibus, sæpe pedilibus, internodiis teretibus vel uno latere planis, fasciculis, plerumque sessilibus, interdum pedunculatis et compositis, interdum longe distantibus, basi bracteatis. *Spicula* fertilis acuta, angusta, sub 6 lin. longa, plerumque *sesquiflora*, flore inferiore bipaleaceo, fertili, ad basin, flore tabescente, pedicellato, fertili brevior aucto. Flos terminalis interdum major et bipaleaceus, sed semper sterilis. *Palea* inferior dorso sparse hirsuta, coriacea; superior sulcata, apice bimucronata, inferiore longior, carinis non ciliatis. *Squamulae* 3, lanceolatae, inconspicue nervatae, margine tenuiter fimbriatae, interdum basi coalitae, subinæquales. *Stylus* longissimus, stigmatibus 2-3, brevis, plumosus. *Ovarium* (immaturum) basi stipitatum, longe rostratum. Folia desunt.

The structure of the spicula is similar to that of the three following species; but the inflorescence is much more compound than in any of them.

3. *M. GRACILIS*, Kurz, MS. in hb. Culmo suffruticoso, 10-pedali, ramis numerosis, brevibus, fasciculatis, ramo florifero, basi foliato, fasciculos spicularum 3-4, simpliciter spicatos gerente; spicula sub 3-4-flora; foliis angustis, lineari-lanceolatis, nervis secundariis ægre a tertiariis discernendis; vaginis ore ciliis cito deciduis fimbriatis.—Cat. Bot. Gar. Calc. 79. *Bambusa*, Wall. Cat. 5032.

*Hab.* in Singapore, 5032! *Wallich*; Java, hort. Bogor. et Calc. Bot. Gard., *Kurz*. v. s.

- *Culmus* gracilis, internodiis glaberrimis, fistulosus, ramulis foliiferis floriferisque ad eundem nodum semi-verticillatis. *Folia* angusta, 5-6 poll. longa, 6-8 lin. lata, apice setaceo-acuminata, basi rotundata, petiolata, petiolo fusco, margine aspera, utrinque glabra, subtus pallidiora et punctulis minutissimis asperiuscula, raro pilis parvis basin versus, ad costam sparsis, nervis secundariis utrinque 3-4, ægre a tertiariis discernendis, venulis transversis fere obsolete. *Vaginæ* margine primum ciliatae, glabrae, sulcatae, abrupte truncatae, ore ciliis paucis, cito caducis fimbriatae. *Panicula* spicata, brevissima, fasciculis parvis, paucis, (in spec. visis) 3-4. *Spicula* vix 4 lin. longa, nunc 4-flora, flosculis 2 inferioribus et terminali sterilibus, nunc *sesquiflora*, flore terminali tabescente. *Palea* inferior nervosa, coriacea, acuta, superiore bicarinata sulcata brevior. *Stamina* 6, filamentis plerumque brevibus, antheris *fusco obtuse* apiculatis. *Stylus* longissimus, apice breviter 2-3-fidus. *Squamulae* 3, angustae, oblongae, fimbriatae, 3-5-nervosae, subinæquales. *Ovarium* (immaturum) longe rostratum.

This is principally distinguished by its narrow leaves, with very inconspicuous secondary nerves, from *M. Zollingeri*.

4. *M. ZOLLINGERI*, Kurz, MS. in hb. Culmo suffruticoso, internodiis glaberrimis, vel apice scabris, ramis ad nodos fasciculatis, patulis, nunc foliiferis tantum, nunc apice floriferis, fasciculis spicularum spicatis, approximatis, spiculis paucifloris, plerumque 4–6 lin. longis, foliis 6–12 poll. longis,  $\frac{3}{4}$ – $1\frac{3}{4}$  poll. latis, sæpe plicatis, nervis secundariis utrinque 6–10–12, *conspicuis*, vaginis glabris, ore fimbriatis.—*Schizostachyum Zollingeri*, Steud. *l. c.* 332, forsan *S. iruten*, Steud. *l. c.*, var. ramis striatis puberulis. *S. Blumei*, Miq. *l. c.* 424 sed non Nees.

Var.  $\beta$ . *brachyclada*, Kurz, *spiculis* 4–5-floris, flosculis 2 perfectis, spicæ densæ verticillis multifloris, foliis subtus *hirsutis*.

Var.  $\gamma$ . *longispiculata*, Kurz, *spiculis*  $1\frac{1}{2}$  poll. longis.

*Hab.* in Java (“Tring Embon” incolis), *Horsfield*; Buitenzorg (“Bamboe Koeda”), hort. Bogor. (“B. gohlah-ab”), Kurz, 717! 3529 *Zollinger*; var.  $\beta$ , Buitenzorg (“Boeloe Konning”), var.  $\gamma$ , hort. Bogor, Kurz. v. s.

*Culmus* inermis, teres, nodis vel glabris vel raro hirsutis, ramis raro tantum floriferis, plerumque sursum foliiferis et spica terminatis. *Folia* lanceolata, basi attenuata in petiolum subbreve, apice acuminatissima, margine scabra, glaucescentia, utrinque glabra, vel interdum subtus hirsuta, non raro tactu asperiuscula. *Vaginæ* plerumque glabræ, interdum tactu scabræ, margine ciliatæ, raro lateribus biauriculatæ, fovea emarginata, glabra vel fimbriata, ore ciliis sat longis sæpe deciduis pulchre fimbriatæ. “*Panicula* subspicata, terminalis, subcontinuo vel brevi interrupte fasciculis spicarum, nunc pauci- nunc plurispiculatarum obsessa” (*Steud.*), fasciculis inferioribus interdum proliferis, 2–3 poll. longis. *Spicula* fertilis plerumque brevis, 4–8 lin. longa, interdum (in var.  $\gamma$ )  $1\frac{1}{2}$  poll. longa, plerumque 4-flora, flosculis inferioribus 2 sterilibus, tertio bipaleaceo, hermaphrodito, rudimento flosculi quarti plus minus conspicuo; (in var.  $\beta$ ) spicula 5-flora, flosculis 2 intermediis bipaleaceis. *Palea* inferior (fertilis) nervosa, scabra, coriacea, superiore bicarinata brevior, apicem versus tenuiter ciliata. *Squamulæ* 3, oblongæ, fimbriatæ. *Stamina* 6, rarius 3 (teste *Steud.*), antheris obtusis. *Stylus* longus, apice 3-fidus. *Ovarium* (immaturum) longe rostratum, rostro tenui puberulo.

5. *M. ? KURZII*, Munro. Culmo suffruticoso? ramis floriferis basi foliiferis, panicula simplici, verticillato-spicata, verticillis paucifloris, bractea elongata basi stipatis, spicula 3–5-flora, flosculis 2 intermediis bipaleaceis, hermaphroditis, paleis *submembranaceis*, squamulis 2–3, antheris *longe mucronatis*, foliis lanceolatis, vaginis dorso hirsutis, apice auriculato-fimbriatis.—*Bambusa schizostachyoides*, Kurz in hb.

*Hab.* in ins. Andaman, Kurz. v. s.

*Culmus*, ut videtur, suffruticosus, internodiis superioribus brevibus, striatis, fistulosis, ramis ad nodos 1–4, basi foliiferis, apice floriferis. *Folia* lineari- vel oblongo-lanceolata, 5–8 poll. longa, 9–12 lin. lata basi rotundata vel attenuata in petiolum brevem, supra hirsutiusculum, margine asperrima, utrinque glabra, sed supra ad unum latus aspera, nervis secundariis utrinque 6–8, inconspicuis. *Vaginæ* primum pilis fuscis hirsutæ, biauriculatæ, *auriculis fimbriatis*. *Panicula* spicata, fasciculis paucispiculatis, subæquidistantibus. *Spicula* teres, 4–6 lin. longa, dimorpha, nunc 3-flora, angustior, flosculo infimo sterili, 2 sequentibus bipaleaceis, terminali obsoleto, nunc 5-flora, 1–2 terminalibus incompletis, sterilibus, *rhachillæ articulis* 1–2 visibilibus, brevibus, *obovatis*. *Palea* inferior (fertilis) nervosa, dorso glabra, margine breviter fimbriata; superior brevior vel longior, *eximie membranacea*, *bicarinata*, carinis ciliatis. *Squamulæ* nunc 3 inæquales, nunc 1–2 obsoletæ, lanceolatæ, angustæ

fimbriatæ. *Stamina* 6, antheris *mucrone hirsuto* apiculatis. *Stylus* longus, apice trifidus. *Ovarium* (immaturum) *stipitatum*, apice longissime attenuato-rostratum, rostro subhirsuto.

The inflorescence and foliage of this species is very similar to that of the preceding species; but the spicula is different in appearance, although, I think, really similar in structure.

*Species minus nota, valde dubia.*

6. *M. HUMILIS*, Roepert in Trin. Clav. Agr. 105. "Culmo humili, 15–18-pedali, crassitie pollicis—brachii, ad nodos sæpe ramulos foliosos emittente; foliis anguste lanceolatis, 6–12 poll. longis, 1½ poll. latis, viridibus, subtus *lanuginosis*; fructibus *rugosis*, imbricatis, medulla alba sicca repletis" (sec. desc. Rumph.).—Spreng. Syst. ii. 113; Rupr. l. c. 154; Steud. l. c. 331; Miq. l. c. 423. *Beesha?* *humilis*, Kunth, Enum. 434. *B. Fax*, Rœm. et Sch. l. c. 1336 (excl. syn. nonnull.). *Arundarbor cratium*, Rumph, Amb. iv. 5. An *Arundo fax*, Lour. l. c. 74?

*Hab.* ab Amboina ad Javam, *Rumphius*.

*MELOCANNA EXCELSA*, Roep. = *Bambusa maxima*, Poir.

*M. RHEEDII*, Steud. = *Beesha Rheedii*, Rupr.

#### XV. SCHIZOSTACHYUM.

Nees ab Es. in Agrost. Bras. 535 (1829), Rupr. l. c. t. xvii f. 44 (*analysis*).

*Spicula* utrinque vel deorsum tantum imperfecta, cylindrica, angusta, plerumque elongata, fertilis supra glumas articulata, spiculis sterilibus plurimis stipata, plerumque 3–4-flora, flosculo uno tantum fertili. *Glumæ* plurimæ, fere omnes gemmiparæ, a spicula fertili remotæ. *Palea* omnes *imbricatis-simæ*, 2–3 inferiores vacuæ, steriles, suprema vel penultima sola fertilis, genitalia arcte involvens. *Palea* superior (nisi in *S. parvifolio*) deest vel ad rudimentum minutum vel lineare redacta. *Squamulæ nullæ*. *Stamina* 6, antheris obtusis. *Stylus* longus, ovarii rostro inclusus, stigmatibus 3 brevissimis. *Caryopsis* matura (in *S. acutifloro* tantum visa) oblonga, *rugosa*, *obtusa*, rostro brevi subito cuspidata.

Gramina arborea vel suffruticosa, vel subscandentia, in Madagascar, China, Java, Tahiti et aliis insulis Oceani Pacifici crescentia. Folia nunc lata nunc angusta. Inflorescentia variabilis, panicula nunc ampla, decomposita (in *S. acutifloro*), nunc composita, nunc fere simplex, fasciculis interrupte spicatis.

This genus is very closely allied to *Melocanna*; and I have now retained in it only those species in which the squamulæ are deficient and the upper palea generally obsolete or altogether wanting. In one species, however, as stated above, the upper palea is present.

#### *Conspectus Specierum.*

- Panicula subsimplex, fasciculis paucispiculatis, interrupte spicatis. Spicula *elongata*, *cylindrica*, flosculo FERTILI *bipaleaceo*. Vaginæ auriculato-fimbriatæ . . . . . 1. *S. parvifolium*.  
 Panicula, ut in præcedente, fasciculis interdum proliferis. Spicula elongata, cylindrica, flosculo fertili 1-*paleaceo*. Vaginæ ore tenuiter fimbriatæ . . . . . 2. *S. dumetorum*.  
 Panicula composita, ramis *inferioribus elongatis*, verticillato-spicatis. Spicula elongata. *Palea* superior flosculi fertili ad rudimentum lineare redacta. Folia *lata* . . . . . 3. *S. Blumei*.  
 Panicula *decomposita*, verticillato-spicata, ramis floriferis e verticillis erumpentibus. Spiculæ omnes in speciminibus visis *vacuæ*. Folia *lata* . . . . . 4. *S. glaucifolium*.  
 Panicula supradecomposita, ramis iterum ramulosis, *ramulis* ultimis *spiculiferis*. Spicula subbrevis, acuta. Folia *lineari-lanceolata* . . . . . 5. *S. acutiflorum*.

1. *S. PARVIFOLIUM*, Munro. Culmo suffruticoso, ramis foliiferis sæpe apice floriferis, ad nodos sæpe numerosissimis, panícula angusta, fasciculis approximatis, imbricatis, flosculo fertili *bipaleaceo*, foliis parvis, angustis, subtus *hirsutis*, vaginis miro modo utrinque *auriculatis*, auriculis longe fimbriatis.

*Hab.* in Madagascar, Nossi-bé, no. 1978! îles Comores, Mayotta, no. 3030! *Boivin in herb. Mus. Paris*, no. 74! *Gerrard. v. s.*

*Culmus* 8–10-pedalis (*Gerrard*), internodiis inferioribus 9 poll. longis, 3 lin. diam., glabris, apice tenuissimus, filiformis, ramis brevibus. *Folia* lineari-lanceolata, 1–3½ poll. longa, 3–5 lin. lata, basi attenuata, vix petiolata, apice mucronata, supra glabra, vel raro hirsutiuscula, subtus pilis sat longis hirsuta, vel raro glabra, nervis secundariis utrinque 2–3. *Vaginæ* primum hirsutiusculæ, demum glabræ, utroque latere auriculatæ, auriculis linearibus, pedatis, *elongatis*, interdum *apicem versus ramosis*, et ciliis longis subfuscis fimbriatis. *Panicula* subsimplex, fasciculis paucifloris, subspicatis. *Spicula* elongata (nondum evoluta), flosculis omnibus imbricatissimis, 2–3 inferioribus sterilibus, penultimo bipaleaceo, hermaphrodito, terminali tabescente brevissimo, glumis nunc glabris, nunc longe fimbriatis. *Palea* inferior convoluta, 7–9-nervia, acuminata; superior multo brevior, apice *bifida*. Genitalia immatura. *Stamina* 6. *Stylus* apice 3-fidus.

The remarkable auricles of the vaginæ and very small leaves distinguish this from the remainder of the genus. In inflorescence it is very similar to the next species.

2. *S. DUMETORUM*, Munro in Seem. Bot. Her. 424. Culmo 4–6-pedali, panícula ramis terminali, fasciculato-spicata, fasciculis 1–4 poll. distantibus, inferioribus interdum proliferis, spiculis gracilibus, cylindricis, flosculo uno fertili, 1-paleaceo, foliis lanceolatis, supra scabris, subtus *glabris*.—Benth. Fl. Hongk. 435. *Bambusa dumetorum*, Hance in Walp. Ann. iii. 781; Steud. *l. c.* 331.

*Hab.* in China, no. 164! *Fortune*; Hongkong, *Seemann*! 255! *Wilford, Hance. v. s.*

*Culmus* frutescens, 4–6-pedalis, multicaulis, tenuis, inermis, lævis. *Folia* lanceolata, petiolata, apice mucronata, basi rotundata, 3–6 poll. longa, 4–12 lin. lata, nervis secundariis utrinque 4–5. *Vaginæ glabræ*, ore ciliis subrigidis deciduis fimbriatæ. *Panicula*, in ramis fasciculatis 3–6–12 poll. longis, plerumque terminalis, adjecto interdum ad nodum “fasciculo spicularum dense congestarum.” *Spicula* 3–6, fasciculatæ, attenuatæ, divaricatæ, ½–1 poll. longæ, flosculis 3–4 inferioribus sterilibus, imbricatis, gradatim increscentibus, terminali fertili unipaleaceo, genitalia arcte involvente. *Stamina* 6. *Stylus* longus, rostro ovarii (longo, angulato) inclusus, apice in stigmata 3 brevissima divisus. *Ovarium* (immaturum) longissime rostratum.

3. *S. BLUMEI*, Nees ab Esen. in Agrost. Bras. 535. Culmo arborescente, panícula composita, ramis elongatis, approximatis, simplicibus, spiculis in glomerulos secus ramos dissitos congestis, cylindricis, acutissimis, palea superiore subobsoleta, foliis *latis, plicatis*, sublonge petiolatis.—Rœm. et Sch. *l. c.* 1355; Kunth, Enum. 435; Rupr. *l. c.* 133, t. xvi. (xvii. f. 44), analysis optima; Steud. *l. c.* 332; Miq. *l. c.* 424, excl. syn. plur.

*Hab.* in Java, *Blume*. Vidi spec. in hb. Wight sine loco indicato.

*Culmus* arboreus. *Folia* (in spec. visis) floralia, 9–10 poll. longa, 1¼–1¾ poll. lata, lanceolata, basi rotundata, longe petiolata, utrinque scabra, apice rostrato-acuminatissima, margine aspera, nervis secundariis utrinque 9–11, plus minus conspicuis. *Vaginæ* inferne nitidæ, superne sulcato-striatæ, et inter strias sæpe hispido-scabræ, ore ciliis cito caducis fimbriatæ, ligula brevi, truncata, sæpe apice fimbriata. *Panicula* ramulis (basi foliiferis) terminalis, 10–14 poll. longa, ramosa, internodiis

breviter hispidis, ramis 5-2 poll. longis, alternis, solitariis, erectis, capitulis parvis, 3 lin. latis, interrupte verticillatis. *Spicula* cylindrica, acuta, sub 6 lin. longa, flosculo fertili nunc unipaleaceo, nunc bipaleaceo (palea suprema nunquam perfecta, interdum obsoleta), terminali tabescente nunc conspicuo, nunc deficiente. *Palea* inferior 15-17-nervis. *Stamina* 6 obtusa. *Stylus* apice 3-fidus.

The only specimens which I have seen in flower are those contained in Wight's herbarium, without any locality attached; and from these I have made my description. The inflorescence, as described by Schultes, would occasionally appear to be very different from that described, and in some respects rather resembling that of *S. glaucifolium*.

4. *S. GLAUCIFOLIUM*, Munro. "Culmo humili, 9-pedali," panicula decomposita, internodiis superioribus 4-3-2 poll. longis, striatis, asperiusculis, ramulis floriferis brevibus, ad nodos fasciculatis, e capitulo denso,  $1\frac{1}{4}$  poll. diam., ad quemque nodum sessili, erumpentibus, ramis interrupte glomerato-spicatis, spiculis angustis, cylindricis, pallidis, omnibus sterilibus (in spec. viso), foliis latis, basi angustatis, petiolatis. —*Bambusa glaucifolia*, Rupr., *l. c.* 147; Steud. *l. c.* 331. *Bambos arundo*, Solander, Fl. Ins. Ocean. Pacif. 217.

*Hab.* in insulis Oceani Pacifici, Tahiti, Hawaii! *Wilkes* (florif.), no. 130, *Guillemin*, ("Ovhe" incolis) *Bertero*, *Moehroch*; Fiji ("Bitu" incolis), 694! *Seemann*; Samoa, Fiji, *Wilkes*; Nukahiva, *Kyber*. v. s.

*Culmus* ad nodos ramos paucos (1-2) 1-2-pedales emittens, nodis parum tumentibus, glabris. *Folia* ovato-vel lineari-lanceolata, glabra, 8-17 poll. longa,  $1\frac{1}{2}$ -2 poll. lata, longe acuminata, basi inæquilatera, in petiolum 2-3-5 lin. attenuata, glauca, plicata, margine imo lævia, superne tantum hispidula, basin versus macula flavo-aurantiaca insignata, nervis secundariis utrinque 11-14."—*Ruprecht*. Paniculæ pars suprema  $1\frac{1}{2}$ -pedalis adest, efoliata, ramis tenuibus, 1-4 poll. longis, capitula 2-4 ferentibus.

I have seen only one flowering specimen of this plant, which was collected at Tahiti in Wilkes's Expedition. Unfortunately, although the spiculæ are numerous, there is not one which contains the least trace of genitalia. Every spicula is sterile; and I therefore think it is very possible that the specimen I have seen may be a proliferous barren sport. The inflorescence agrees to some extent with one of the states of *S. Blumei* described by Schultes.

5. *S. ACUTIFLORUM*, Munro in hb. T. C. D. Culmo suffruticoso, vel scandente, panicula ampla, decomposita, 4-pedali et forsitan ultra, fistulosa, ramis ramulosis, spiculis brevibus, acutis, secus ramulos dense verticillato-spicatis, fructu oblongo, rugoso, foliis lineari-lanceolatis, vaginis utrinque auriculato-fimbriatis.

*Hab.* in ins. Philippinis, 544! *Cuming*, Luçonia! *Wilkes*. v. s.

*Culmus*, ut videtur, pluripedalis. *Folia* 6-9 poll. longa, 8-10 lin. lata, basi rotundata, vel vix attenuata in petiolum brevissimum, ima basi incrassatum, apice mucronato-acuta, utrinque tactu scabra, subtus interdum pilosa, margine asperrima, nervis secundariis utrinque sub 6, conspicuis. *Vaginæ* superne, margines versus præcipue, strigoso-hirsutæ, utrinque auriculatæ, auriculis latis, reversis, longe fimbriatis, ligulis brevibus, sæpe longe fimbriatis. *Panicula* (pars  $3\frac{1}{2}$ -pedalis adest) vel aphylla vel ramo uno alterove basi foliato, internodiis 5-2 poll. longis, inferioribus subglabris, superioribus scaberrimis, ramis tenuibus, solitariis vel fasciculatis, inferioribus ramulosis, ramulis alternis, subpollicaribus, fasciculis brevibus, dense spicatis, ramis superioribus simplicibus, dense spicatis. *Spicula* acuta,

3-4 lin. longa, cylindrica, plerumque sterilis, rarissime fructifera, 3-flora, flosculis 2 inferioribus sterilibus, acutis, terminali unipaleaceo, genitalia arcte amplectente, rudimento terminali nullo. *Squamulæ* nullæ. *Stamina* 6, antheris breviter mucronatis. *Stylus* longus, gracilis, in stigmata 3, plumosa, revoluta, sublonga divisus. *Ovarium* (immaturum) angustum, rostratum. *Fructus* maturus ovato-oblongus, niger, sub 5 lin. longus, rugosus, apice depressus, rostri residuo subito apiculatus, paleis tribus persistentibus quasi involucreto. Semen, a pericarpio prompte solutum, oblongum, scutello centrali hirsuto.

The above-described very remarkable fruit distinguishes this from all other Bamboos. It is, I believe, the only species of the genus of which the fruit is known, and helps to show how little is known at present of what the really perfect state of the spiculæ of the species of this genus, and several of *Melocanna* also, may prove to be.

SCHIZOSTACHYUM APUS, Steud.	= <i>Bambusa apus</i> , Rœm. et Sch.
S. BITUNG, Steud.	= <i>B. bitung</i> , Rœm. et Sch.
S. CAPITATUM, Rupr.	= <i>Guadua</i> ? <i>capitata</i> , Munro.
S. DURIE, Rupr.	= <i>Bambusa Blumeana</i> , Sch.
S. IRATEN, Steud.	= <i>Melocanna Zollingeri</i> , Kurz.
S. ZOLLINGERI, Steud.	= <i>M. Zollingeri</i> , Kurz.

#### XVI. CEPHALOSTACHYUM.

Munro, nov. genus. *Schizostachyum*, Griffith, Icon. Pl. Asiat. 151; Notulæ, 64.

*Spiculæ* utrinque imperfectæ, in glomerulis plerumque terminalibus, subglobosis subsessilibus, fertiles cylindricæ, teretiusculæ, sub-3-floræ, flosculo inferiore unipaleaceo, penultimo tantum fertili, bipaleaceo, ultimo stiptiformi, tabescente, sæpe minuto. *Glumæ* aristatæ, gemmiparæ. *Palea* inferior (fertilis) subulato-acuta, membranacea, venosa, striata, sæpe venulis transversis anastomosantibus, dorso glabra vel hirsuta; superior plerumque longior, apice mutica, vel biaciculata, dorso profunde sulcata. *Squamulæ* 3, magnæ (nisi forsitan in *C. Chapelieri*), apice fimbriatæ. *Stamina* 6, antheris obtusis. *Stylus* longus, rostro inclusus. *Stigmata* 2, plumosa, ramosa, ratione styli, brevissima. *Fructus* basi attenuatus, longe rostratus.

Gramina fruticosa vel arborescentia in montibus Indiæ orientalis et Birmah crescentia. Folia lanceolata vel ovata, petiolata, plerumque acumine longo sæpe hirsuto terminata. Inflorescentia semper capituliformis, plerumque terminalis, foliis superioribus quasi involucreto, ramulis inferioribus interdum verticillato-spicatis, in *C. pergracili* glomerulis secus ramos graciles dissitis, moniliformibus.

Griffith's drawing contains a very good analysis of the structure of this genus; and the description above given is principally extracted from his notes. In regard to the structure of the inflorescence, he says, "It is not difficult to conceive that the usual form is to have one terminal spicula, which, by the continued development of lateral flower-buds, subsequently assumes the anomalous structure and appearance of *Schizostachyum* described by Nees in Agros. Bras. p. 534."

#### *Conspectus Specierum.*

Capitula terminalia vel in ramulis inferioribus aphyllis subspicato-verticillata. Spicula fertilis 6-7 lin. longa, *vix exserta*, spiculis sterilibus numerosissimis bracteisque scariosis suffulta. Folia lanceolata . . . . . 1. *C. capitatum*.

- Capitulum terminale. Spicula fertilis 12-14 longa, e sterilibus longe *exserta*. Folia lanceolata . . . . . 2. *C. pallidum*.  
 Capitulum terminale, magnum, 2 poll. diam. Spicula fertilis *brevis*, a *sterilibus* plerumque *superata*. Folia lata, ovata . . . . . 3. *C. latifolium*.  
 Capitulum terminale, foliis supremis intus *hirsutis conditum*. Spicula fertilis angusta (vix evoluta). Folia oblongo-lanceolata . . . . . 4. *C. Chapelieri*.  
 Species anomala. Glomeruli densiflori, secus ramos gracillimos, monilis more dissitæ. Spicula fertilis dorso hirsuta, pedicello terminali longo . . . . . 5. *C. pergracile*.

1. *C. CAPITATUM*, Munro. Culmo subarboreo, superne vagante, ramis laxis, glomerulis densifloris, plerumque terminalibus, folio suffultis et longe superatis; in var.  $\beta$ , ramulis inferioribus brevibus, aphyllis, glomerulos 2-3 superpositos ferentibus; spicula fertili *vix exserta*, palea inferiore mucrone brevi vel arista apiculata, rudimento terminali brevissimo, foliis lanceolatis. *Bambusa capitata*, Wall. et Griff. in Wall. Cat. 8913!

*Hab.* in Ind. or. montibus, Khasia, Churra, 4000 ped. s. m., *Wallich!* et *Griffith*, 1078! 1392! (in hb. Griff.), Nunklow ("Sillee et Sullea"), no. 1813!; Sikkim! 4000-6000 ped., Myong Valle ("Pyong"), *Hooker et Thomson*. Var.  $\beta$ , glomerulis basi aphyllis subspicatis, Churra! v. s.

"*Culmus* 12-30-pedalis, basi carpi diam., supra arbores pendens" (*Hooker*), ramis oligophyllis, apice sæpe capituliferis. *Folia* lanceolata, basi subrotundata, petiolata, apice setaceo-acuminata, utrinque glabra, margine aspera,  $2\frac{1}{2}$ -7 poll. longa, sæpe  $1\frac{1}{4}$  poll. lata, nervis secundariis subinconspicuis, venulis transversis sat crebris, subconspicuis. *Vaginæ* glabræ, nitidæ, ore ciliis paucis caducis fimbriatæ, ligula brevissima. *Capitulum* densiflorum, plerumque castaneo coloratum,  $1-1\frac{1}{2}$  poll. diametro, spiculis sterilibus et bracteis longe aristatis, carinis serratis numerosissimis, *spiculis fertilibus paucis*. *Spicula* fertilis 3-flora, flosculo inferiore acuto, secund fertili subæquilongo, palea inferiore brevimucronata, superiore subobtusata, sulco dorsali hirsuto. *Squamulæ* 3, oblongæ, lanceolatae, apice rotundatae et breviter ciliatæ, supra medium 3-5-venosæ. *Stamina* 6. *Stylus* longus, primum rostro inclusus demum exsertus, hirsutus, apice bifidus. *Ovarium* in rostrum longum, glabrum, subangulatum attenuatum. *Fructus* maturus nunquam visus.

In var.  $\beta$ , collected at Churra Poonjee in 1830, some of the branches are very short, without any leaves, and bear 2-3 heads of flowers one above the other. These heads are much smaller than usual, but appear to have more perfect flowers in proportion to their size than the larger terminal head.

2. *C. PALLIDUM*, Munro. Culmo subarboreo, ramis, interdum numerosissimis, ad nodos verticillatis, capitulis pallidis, terminalibus, vix densifloris, spicula fertili sæpe pollicari et ultra, e reliquis sterilibus *longe exserta*, paleis inferioribus *longissime mucronatis*, foliis lanceolatis,  $1\frac{1}{2}$ -5 poll. longis. *Bambusa*, sp., Griff. Jour. 64.

*Hab.* in Ind. or. Mishmee! Birmah, Patkaye! 5000 ped. s. m. ("Betee Bans" incolis), *Griffith*. v. s.

*Culmus* subarboreus vel fruticosus, ramis valde inæqualibus, plurimis apice capituliferis. *Folia* lanceolata, plerumque brevia, 1-5 poll. longa, 5-10 lin. lata, basi rotundata, apice setaceo-acuminatissima (seta, in foliis parvis, longitudine  $\frac{1}{3}$  laminæ æquante), pallida, utrinque glabra, sed supra, alterum marginem versus, scaberrima, marginibus aspera. *Vaginæ* glabræ, ore nudæ, vel interdum ciliis cito caducis fimbriatæ, ligula conspicua. *Capitulum* terminale, pallidum, vix densiflorum. *Spicula* fertili e reliquis *exserta*, 12-14 lin. longa, 3-flora, flosculo inferiore unipaleaceo, multinervi, apice mu-

crone, 3 lin. longo, acuminato, secundo fertili pollicari, palea inferiore nervoso-striata, longe mucronata, superiore longiore, tenuimembranacea, multinervi, nisi sulco hirsuto glaberrima, genitalia involvente. *Squamulae* angustae, lanceolatae, 5 lin. longae, apice brevissime ciliatae. *Ovarium* basi attenuatum, longe rostratum, rostro glabro incluso 12-13 lin. longum. *Stylus* breviter exsertus et cito 2-fidus. *Fructus* non visus.

This may probably be a more perfect state of *C. capitatum*, but it has a different appearance. The heads of flowers are of a much paler colour, and the fertile flower is very much longer. Griffith says that he found it commonly on the summit of the Patkaye range, on his journey from Naga to Hookhoom, and that it descended to a considerable distance on the southern side.

3. *C. LATIFOLIUM*, Munro. Culmo subarboreo?, nodis sæpe hirsutis, capitulo fusco, magno, 2 poll. et ultra diametro, spicula fertili 6-7 lin. longa, non e spiculis sterilibus numerosissimis exserta, foliis ovatis,  $2\frac{3}{4}$  poll. latis, ligula elongata.

*Hab.* in Ind. or. Bootan, no. 4! 2682! Griffith. v. s.

*Folia* latissima ovata, vel ovato-lanceolata, maxima 6-9 poll. longa et fere 3 poll. lata, basi rotundata, apice setaceo-acuminata, petiolata, petiolo utrinque transverse rugoso, flavescente, utrinque glabra, nervis secundariis, interdum utroque latere 18, conspicuis. *Vaginae* superne striatae, medio scabro-hirsutae, fovea apicali magna, emarginata, ligula interdum valde elongata. *Capitulum* densissimum, terminale. *Spicula* fertili 6-7 lin. longa, paleis genitalibusque iis *C. pallidi* similibus, sed fere duplo brevioribus. *Fructus* maturus glaberrimus, basi stipitatus, medio ovoideus, apice rostratus, cum rostro sub 6 lin. longus.

The foliage and ligules, combined with the smaller-sized fertile spiculæ, appear to keep this distinct from the two preceding species.

4. *C. CHAPELIERI*, Munro. Culmo tenui, scandente, nodis rugosissimis, capitulo terminali, foliis supremis intus hirsutis condito, spiculis fertilibus angustis, 5-6 lin. longis (vix maturis?), foliis oblongo-lanceolatis, subtus linea obliqua transversali notatis.

*Hab.* in Madagascar! *Chapelier* in herb. Mus. Paris. v. s.

*Culmus* scandens, internodiis superioribus 2 poll. longis, scabris et scabro-hirsutis, ramis ad nodos bianulatos rugosos paucis, geniculatis, apice floriferis,  $\frac{1}{2}$ -1 ped. longis. *Folia* oblongo-lanceolata, coriacea, basi vix attenuata, nitida, 2-4 $\frac{1}{2}$  poll. longa, 6-9 lin. lata, supra, nisi in foliis supremis involucrentibus, glabra, subtus, more insolito, lineis 1-2 hirsutis obliquis notata, margine serrata, nervis secundariis utroque latere 5-6, cum venulis transversis conspicuis. *Vaginae* striatae, marginibus dense fimbriatae, ore auriculatae, auriculis cito caducis, vix longis, ciliis etiam caducis fimbriatis. *Capitulum* multiflorum, breve, conditum, spiculis fertilibus 6 lin. longis, cum spiculis incompletis, subulatis, hirsutissimis, numerosis mixtis. *Spicula* (vix evoluta), 4-flora, flosculis 2 inferioribus unipaleaccis, 7-11-nerviis, apice in subulam hirsutam attenuatis, tertio fertili, bipaleaceo, terminali brevissimo, rudimentario. *Palea* inferior (fertili) membranacea, brevimucronata, 5-7-nerviis; superior convoluta, membranacea, apice bifida, acuminibus hirsutis, dorso canaliculata. *Stamina* 6, antherarum connectivo subelongato. *Squamulae* fere obsoletae, inconspicuae. *Stylus* basi rostro ovarii inclusus, apice trifidus. *Stigmata* pulchre pinnata. *Ovarium* (immaturum) rostratum.

I have, through the kindness of M. Brongniart, been permitted to examine the specimen of this grass belonging to the Paris Museum, and have no doubt of its belonging



to the genus *Cephalostachyum*; but the specimen is from an immature state of the plant; and I did not consider myself justified in taking more than one spicula for examination. The inflorescence is so thoroughly concealed by the uppermost leaves, that no casual observer would perceive that the plant was in flower.

5. *C. PERGRACILE*, Munro. Culmo arboreo, ramulis floriferis gracillimis, tenuissimis, glomerulis spicularum, per intervalla 1–2 poll. distantibus, secus ramos dissitis, flore hermaphrodito hirsuto, palea superiore apice biaciculata, rudimento terminali longo.

*Hab.* in Ind. or. Tenasserim, Rangoon! *M'Clelland*; Pegu ("Tinwa," "Wablo" Karens), no. 11, *Brandis*.  
v. s.

"*Culmi* erecti, 40-pedales, dense cæspitosi, internodiis 18 poll. longis, circumferentia maxima 10-pollicari, spathis brevibus, 6 poll. longis, extus pilis atris tectis, margine fimbriatis, apiculo triangulari, cuspidato, reflexo, ramis inferne plurimis, sterilibus, rigidis, dense fasciculatis, apice spinescentibus" (*Brandis*). *Folia* lineari-lanceolata, plerumque 10 poll. longa, 9–15 lin. lata, basi attenuata in petiolum subtumidum et longitudinaliter rugosum, margine aspera, utrinque glabra (nisi pili pauci interdum subtus basin versus sparsi), nervis secundariis utroque latere 9. *Vaginæ* glabræ, ore ciliis paucis caducis fimbriatæ, ligula brevissima. *Inflorescentia*, ut videtur, *panicula* ampla, ramis simplicibus, 1–18 poll. longis, ad nodos numerosis, omnibus tenuissimis, filiformibus, glomerulos plerumque distantes ferentibus. Fasciculi spicularum bis terve divisi, in verticillis vel glomerulis dense aggregati. *Glumæ* inferiores gemmparæ; superior oblonga, nervosa, margine longe fimbriata, flosculos basi circumvolvens. *Flosculus* inferior bipaleaceus, paleis hirsutis, inferiore acuta, nervosa, hirsuta, superiore brevior profunde sulcata, apice biaciculata, rudimento terminali longo, filiformi, raro, in flosculum bipaleaceum sed sterilem crescente. *Squamulæ* 3, angustæ, lineari-lanceolatæ, apice ipso sæpe obtusæ, multinervosæ, basi concavæ, margine tenuiter fimbriatæ, persistentes, fructu maturo adhærentes. *Stamina* 6, antheris obtusis. *Stylus* longus, basi rostro ovarii inclusus, apice in stigmata 3, revoluta divisus. *Fructus* maturus oblongus, nitidus, sine rostro 3 lin. longus, rostro glabro 3-lineali, subcompresso, subito mucronatus.

Brandis's herbarium contains numerous excellent specimens of this beautiful Bamboo, the branches of which are quite as slender as ordinary packing-thread, and yet bear numerous verticils, often an inch in diameter, with considerable intervals between them. The fascicles are more compound in this than in any of the other species of the genus, and often as much as in some species of *Melocanna* and *Schizostachyum*. The sterile spiculæ are not numerous.

## XVII. PSEUDOSTACHYUM.

Munro, nov. gen. Tab. IV.

*Spicula* fertilis oblonga, sursum deorsumque imperfecta, intra glumas pedicellata, sub-4-5-flora, flosculo infimo 1-paleaceo, sterili, secundo et interdum tertio perfectis, bipaleaceis; penultimo masculo, bipaleaceo, cum terminali (tabescente, incompleto) cito caducis, pedicello relicto (fig. 2). *Glumæ* omnes gemmparæ, vel pedicellos spicularum sterilium foventes. *Paleæ* glabræ, membranaceæ; inferior (fertilis) 5-nervis, margine fimbriata (fig. 2); superior plerumque longior, vix angustior, bicarinata, carinis superne tantum ciliatis (figg. 2, 4). *Squamulæ* 3, vel 4, vel 5, membranaceæ, obtusæ, apice fimbriatæ, persistentes, fructu maturo adhærentes (figg. 6, 7, 9). *Stamina* 6, antheris apiculo conico terminatis (fig. 3). *Stylus* rostro inclusus, longus (fig. 7), apice bifidus. *Ovarium* (figg. 5, 6) an-

gustum, lineari-oblongum. *Fructus* globosus, apice depressus, rostro contracto subito cuspidatus (figg. 8, 9).

Gramen subarborescens, in India orientali (Assam et Sikkim) indigenum. Folia lanceolata. Inflorescentia panicula supradecomposita, ramulis vel omnino floriferis, vel basi foliiferis apice floriferis, ad nodos fasciculatis, spiculis sæpissime morbosis et monstrosis, in fig. B bene delineatis.

Mr. Fitch's excellent drawing explains the inflorescence of this genus better than I could possibly succeed in doing in the most lengthened description.

*Species unica tantum nota.*

P. POLYMORPHUM, Munro. Culmi internodiis sæpe apice scabris, ramis paniculæ interdum longissimis, pendulis, sæpissime pseudospiculas (spiculas morbosas, steriles, polymorphas) ferentibus, spiculis fertilibus 4-5-floris, glabris, squamulis sæpe 5, foliis lanceolatis.

*Hab.* in India or. Assam, Nigrigam! Kujoodoo! et Tingrei! cum Thea associata, 1081! 1089! 1403! Griffith!; Sikkim, 4000-6000 ped. s. m. Balasur! Darjeeling! ("Mountain Bamboo," "Purphiok," "Partok"), Hooker et Thomson.

*Culmi* internodia sæpe 8 poll. longa, 3 lin. diametro, fistulosa. *Folia* oblongo-lanceolata, apice rostrato-obliquiacuminata, basi inæquilatera, vix attenuata in petiolum brevem, ima basi tumidum, 4-14 poll. longa,  $\frac{3}{4}$ -2 poll. lata, utrinque glaberrima, nervis secundariis utrinque 7-11, subconspicuis. *Vaginæ* striatæ, glabræ, vel primum hirsutæ et fimbriatæ. *Panicula* supradecomposita, ramis ad nodos numerosis, plerumque basi nudis, interdum oligophyllis, fasciculis sæpe iterum iterumque divisus, ad nodos ramulorum ultimorum alternis, spiculis fertilibus pedunculis elongatis sterilium sæpe stipatis. *Spiculæ* sæpissime morbosæ, nunc glabræ, curvatæ, squamis plurimis imbricatis, nunc globosæ, hirsutæ. *Spicula* fertilis et genitalia ut in genere descripta.

Perfect flowers are very rarely found in this species. I had seen numerous specimens collected by Griffith, and Hooker, and Thomson, and never could find a perfect flower; and the flowering branches were always more or less in the form represented at fig. B of Fitch's drawing. Thomson, however, collected some perfect flowers on his journey to Sikkim in 1857; and these are represented at fig. A. I have also seen some perfect fruit collected near Darjeeling in the same year by Mr. Hodgson.

In outward form these fruits are extremely like the seed-pods of *Anagallis* or of *Primula*. The change that takes place between the young ovary shown at fig. 5 and the perfect fruit (fig. 8) is very remarkable.

XVIII. TEINOSTACHYUM.

Munro, nov. gen. Tab. III. *Bambusæ*, sp., Thwaites.

*Spicula* pluriflora, sursum deorsumque imperfecta, cylindrica, attenuata, elongata, 1-2½ poll. longa, rachillæ articulis sæpe longis et conspicuis, flosculis inferioribus 1-2 et superioribus 2-4 unipaleaceis, incompletis, intermediis 3-5 fertilibus. *Glumæ* 2-3, vel numero indefinitæ, plerumque gemmiparæ, semper distantes. *Palea* inferior basi involuta, medio lata, apice attenuata, plurinervis; superior brevior, vel longior, bicarinata, carinis ciliatis. *Squamulæ* 3, basi interdum concavæ; apice unica specie glabræ, unica fimbriatæ. *Stamina* 6, basi libera, antheris obtusis. *Stylus* longissimus, rostro ovarii inclusus (Tab. III. f. 5), deinde exsertus, apice 2-3-fidus. *Stigmata* tenuia, brevia, revoluta, cito caduca. *Ovarium* longissime attenuato-rostratum. *Fructus* bacciformis, rostratus.

Gramina fruticosa, vel subarborea, vel subscandentia, in India orientali (Burmah) et Zeylania indigena. Folia lanceolata, petiolata, venulis transversis nullis, vaginis ore fimbriatis. Inflorescentia spica subsimplex, ramulis nunc foliatis, nunc nudis terminalis, spiculis solitariis vel fasciculatis.

This is distinguished from all other genera of the section by the elongated spicula, with several perfect flowers and long joints of the rhachilla.

*Conspectus Specierum.*

Spicula  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longa, 5–11-flora. Squamulæ apice *glabræ* . . . . 1. *T. Griffithii*.  
 Spicula 12–14 lin. longa, 5–7-flora. Squamulæ apice *fimbriatæ* . . . . 2. *T. attenuatum*.

1. **T. GRIFFITHII**, Munro, Tab. III. Culmo gracili, internodiis apice scabriusculis, ramis fasciculatis, valde inæqualibus, spiculis spicatis, sæpe solitariis binisve, flosculis 3–5 fertilibus, squamulis glabris, vix acutis, foliis plerumque 5–7 poll. longis, vaginis ore longe fimbriatis.

*Hab.* in India or. Burmah prope Wuloboom “in sylvis collinis,” *Griffith.* v. s.

*Culmus* gracilis, apice filiformis (fig. B.), vagans vel subscandens (pars superior 7-pedalis adest), internodiis 5–8 poll. longis, ramis ad nodos fasciculatis, valde inæqualibus, 2–12-pollicaribus, simplicibus vel compositis, floriferis nunc basi nudis, nunc foliatis (fig. A). *Folia* oblongo-lanceolata, plerumque  $\frac{3}{4}$ – $1\frac{1}{2}$  poll. lata, utrinque glabra, nisi interdum subtus basin versus subhirsuta, petiolata, apice attenuata, acumine scabro, nervis secundariis utrinque 5–6, parum conspicuis. *Vaginæ* glabræ. *Panicula* subsimpliciter spicata, ramis vel ramulis terminalis, spiculis vel solitariis vel binis ternisve, nunc imbricatis, nunc distantibus. *Spicula*  $1\frac{1}{2}$ – $2\frac{1}{2}$  poll. longa, apice valde attenuata, 5–11-flora, flosculis 1–2 inferioribus brevibus, difformibus, sterilibus (unus del. in fig. 1), 3–5 sequentibus perfectis fertilibus, 2–4 supremis gradatim tabescentibus, rhachillæ articulis longis, conspicuis, glabris (figg. 1, 2). *Palea* inferior (fig. 1) basi involvens, medio lata, multinervia, apice acuminata, 7 lin. longa, glabra vel interdum margines versus pubescens; superior (figg. 1, 2) longior vel brevior, obtusa, bicarinata, carinis breviter ciliatis. *Squamulæ* (figg. 3, 4) lanceolatæ, glabræ, subæquales, nervosæ, nervis basin concavam versus subincrassatis. *Stamina* 6 (figg. 2, 3), basi libera, antheris obtusis. *Stylus* (figg. 5–6) longus, hirsutus, ovarii rostro glabro inclusus, tandem exsertus, apice 2–3-fidus. *Ovarium* (fig. 6) longe rostratum, apice attenuatum. *Caryopsis* fere matura (fig. 3) glaberrima, basi apiceque attenuata, longissime rostrata, rostro incluso subpollicaris.

2. **T. ATTENUATUM**, Munro. Culmo subarboreo, 12–25-pedali, apice interdum filiformi, internodiis apice hirsutis, ramis fasciculatis, breviusculis, spiculis in fasciculis parvis subspicatis congestis, spicula subpollicari, flosculis 2–4 fertilibus, squamulis apice fimbriatis, foliis 3–6 poll. longis, vaginis ore longe fimbriatis.—*Bambusa attenuata*. Thw. Enum. 375.

*Hab.* in Ceylon, prov. central., alt. 4000–6000 ped. s. m., 3255! *Thwaites*, *T. Thomson*! (var. spiculis plurifloris et culmo apice *filiformi*!). v. s.

*Culmus* mediocris, inermis,  $\frac{1}{2}$ –1 poll. diam., apice filiformis. *Folia* 3–6 poll. longa, 4–9 lin. lata, glabra, lineari-lanceolata, subabrupte acuminata, basi rotundata, petiolata, nervis secundariis utrinque 3–4, inconspicuis. *Vaginæ* sparsim pallide adpresso-pilosæ, margine ciliatæ, ore longe fimbriatæ. *Panicula* subsimplex, spiciformis, internodiis uno latere sulcatis, in ramis florigeris, fasciculatis, breviusculis vel brevissimis, foliatis vel basi nudis, terminalis, spiculis in fasciculos parvos congestis, vel raro superne solitariis. *Spicula* 12–16 lin. longa, angusta, attenuato-cylindrica, glabra, 5–7-flora, flosculo infimo 1 et superioribus 2–3 sterilibus, intermediis hermaphroditis, rhachillæ articulis

glabris, tenuibus, longis. *Palea* inferior 8–12-nervis, glaberrima, acuta, mucronata; superior brevior, bicarinata, carinis superne tantum inconspicue fimbriatis. *Squamulæ* 3, lanceolatæ, apice fimbriatæ, basi angustatæ et concavæ, nervosæ. *Stamina* 6, antheris mucrone brevissimo, obtuso appendiculatis. *Stylus* elongatus, apice in stigmata 3 plumosa divisus. *Fructus* rostratus, utrinque attenuatus, glaber, rostro incluso  $4\frac{1}{2}$  lin. longus. (Diagn. præcipue ex descr. *Thwaites*.)

### XIX. BEESHA.

Rheede, Hort. Mal. v. 119, t. 60! bona (1685), sed non Kunth, 'Journ. de Physique' (1822), quæ est *Melocanna bambusoides*. *Ochlandra*, Thwaites in Enum. Ceylon Plants, 376. *Nasti*, sp., Kunth, Rev. Gram. i. 325, t. 75. *Bambos*, Du Petit Thouars, gen. nov. Madagasc. in Mel. de Bot. (1811), non Retz.

*Spicula* utrinque imperfecta, monoica (an semper?), cylindrica, fructifera plerumque multo major, pluriflora vel pauciflora, flosculis paucis vel plurimis, inferioribus unipaleaceis, neutris, penultimo bipaleaceo, hermaphrodito, rudimento minuto floris superioris tabescentis, hoc interdum obsoleto. *Glumæ* duæ. *Palea* inferior (fertilis) multinervia, membranacea, nunc dorso glabra, nunc setulis nigris obsita; superior plerumque longior, apice obtusa vel bimucronata. *Squamulæ plurimæ*, vel in *B. capitata* 6. *Stamina* 6–9 vel *plurima*. *Stylus* longus, apice in stigmata 3–4–5 divisus. *Fructus* majusculus, ovoideus vel oblongus, longe rostrato-acuminatus.

Gramina arborea vel fruticosa in India orientali (Malabar), Zeylania et Madagascaria indigena. Folia varia, magna vel parva. Inflorescentia plerumque terminalis, nunc laxè verticillato-spicata, nunc spiculis in apice ramulorum capitato-congestis.

Rheede's drawing is, considering its date, a very good one of the Malabar species; but there has been much confusion about his genus. Kunth, who, in 1822, was the first of modern writers who used the word, distinctly states that he applied it to *Bambusa baccifera* of Roxb.; and this mistake has been perpetuated by most authors, who have frequently applied the description of the fruit taken from Rheede's drawing to Roxburgh's plant; and, *vice versâ*, descriptions from Roxburgh's drawing of *B. baccifera*, only found in Eastern Bengal, have been applied to Rheede's plant, only found in Western India.

#### Conspectus Specierum.

Folia <i>angusta</i> . Spicula fertilis <i>major</i> , plerumque in ramulo brevi ad basin rami vel paniculæ locata. Squamulæ <i>plurimæ</i> . Stamina <i>plurima</i> , plus quam 6, antheris sæpe longe mucronatis . . . . .	1. <i>B. Rheedei</i> .
Folia <i>lata</i> . Spicula fertilis in verticillis spicæ cum sterilibus mixta. Squamulæ et stamina <i>plurima</i> . . . . .	2. <i>B. stridula</i> .
Folia <i>angusta</i> . Spiculæ fertiles apice ramorum capitato-congestæ. Squamulæ 3. Stamina 6 . . . . .	3. <i>B. capitata</i> .

1. *B. RHEEDEI*, Kunth, Enum. 434 (excl. syn. omn. nisi Rheede in Hort. Mal.). Culmo arborescente 16-pedali, ramis foliiferis floriferisque ad nodos intermixtis, spiculis dimorphis, fructifera sæpe solitaria, antheris sæpe longe apiculatis, foliis angustis.—*Rupr.*, l. c. 155 ad not. *Beesha*, Rheede, l. c.; Ray, Hist. ii. 1316. *Bambusa scriptoria*, Schleus., fide Dillwyn in index Hort. Malab. *Melocanna humilis*, Roep. in Trin. Clav. Agr. 115, non alior. nec. Trin. aliis locis. *M. Rheedei*, Steud. l. c. 332.

*Hab.* in Ind. or. Malabar; Cochín, no. 115!, 1347!, *Wight, Johnstone!* v. s.

*Culmi* internodia superiora, 4-2½ poll. longa, nitida, glaberrima, ramis simplicibus vel raro compositis, valde inæqualibus. *Folia* lineari-lanceolata, plerumque 4-5 poll. longa, sub 6 lin. lata, basi rotundata et petiolata, apice seta longa, scabra acuminatissima, utrinque glabra, sed supra uno latere marginibusque scabra. *Vaginæ* glabræ, ore ciliatæ, ligula brevissima. *Panicula* apice verticillato-spicata, nunc 1-2 nunc 4-5 poll. longa, rhachi glabra, verticillis sæpe imbricatis, nunc basi nuda nunc foliata, in his spiculæ omnes steriles, tametsi genitalia adsint. *Spiculæ fertiles*, ad eundem nodum culmi, in ramis brevissimis, 1-1½ poll. longis, subsolitariae. *Spicula sterilis* cylindrica, sub 9 lin. longa; *fructifera* conico-ovata, 12-14 lin. longa, 3-4-flora, flosculis 1-2 inferioribus unipaleaceis, sterilibus, supremo vel rarissime 2 hermaphroditis, terminali tabescente nullo. *Paleæ* multinerviæ, glabræ, vel hirsutiusculæ, membranacæ, inferiores subito mucronatæ; superior subobtusa. *Squamulæ* plurimæ, angustæ, apice fimbriatæ. *Stamina* plurima, 15-18, basi libera, antheris vel longe vel breviter apiculatis. *Stylus* longus, apice 3-4-fidus, stigmatibus plumosis. *Fructus* oblongus, apice longissime rostratus, rostro incluso 20 lin. longus.

This has a more delicate habit of growth than the succeeding species, and has very much the appearance in foliage of some of the Arundinarias. The general character of the plant is extremely well represented in Rheede's drawing.

2. B. STRIDULA, Munro. Culmo fruticoso, panicula in ramis foliiferis terminali, laxe spicata, rhachi *hirsuta*, spiculis sterilibus et fructiferis in eodem glomerulo aggregatis, antheris apice mucronulatis, foliis majusculis.—*Ochlandra stridula*, Thw. l. c. 376. *Bambusa stridula*, Moon's Cat. p. 26, teste Thw.

*Hab.* in Ceylon, 1044! *Gardner, Macrae*, 42! *Walker*, 1345! *Wight, Thomson*!; Ratnapoora ("Battagass") 241! *Thwaites*; Ind. or. Bombay, Kala Nuddi, 875! *Ritchie* (folia). v. s.

"*Frutex*, culmis suberectis, confertis, internodiis sæpe scabris." *Folia* late lanceolata, 8-10-12 poll. longa, 1¼-1¾ poll. lata, basi rotundata, vel attenuata in petiolum fuscum, apice setaceo-acuminata, utrinque glabra sed aspera. *Vaginæ* plus minus hirsutæ, vel tandem glabrescentes, margine ciliatæ, ore sæpe biauriculatæ, et ciliis pallidis longis caducis vel persistentibus fimbriatæ, ligula brevi, truncata. *Panicula* terminalis, verticillato-spicata, 1-3-pedalis, spiculis in glomerulos parvos, subdistantes aggregatis. *Spicula* fertilis cylindrica, subpollicaris, acuta, 3-5-flora, flosculis 1-2 inferioribus glumis similibus, sed longioribus, multinerviis, margine fimbriatis, apice mucronatis, penultimo fertili, pedicello rudimentario minimo vel fere obsoleto. *Palea* inferior (fertilis) 12-14 lin. longa, basi eximie membranacea, acuta, glabra, sæpe superne fusca, 30-nervia; superior subæquilonga, obtusa, dorso convexa, fere 18-nervia. *Squamulæ* 6-9 vel forsitan plures, lanceolatæ, 1-5-7-nerviæ. *Stamina numerosa* (7-30), antheris utrinque bifidis, apice mucronulatis. *Stylus* longiusculus, rostro inclusus, in stigmata 4-5 brevissima plumosa divisus. *Fructus* ovoideus, stylo persistente indurato acuminatus, paleis squamulisque stipatus, rostro incluso 1½-2 poll. longus.

Thwaites says this is common in the warm and moister parts of Ceylon, and very abundant in the Saffragan district. The leaves make an excellent thatch.

3. B. CAPITATA, Munro. "Culmo arboreo, 50-pedali," spiculis fertilibus apice ramulorum capitato-congestis, sterilibus multo minoribus in fasciculis interrupte subpaniculato-spicatis, vel in fasciculis brevibus terminalibus, spicula fertili 16 lin. longa, palea superiore apice bifida, foliis lineari-oblongis.—*Nastus capitatus*, Kunth, Gram. i. 325, t. 75! Enum. 430, Suppl. 355; Rupr. l. c. 133, tab. xvi. f. 43; Steud. l. c. 333. *Bambusa capitata*, Willd. hb. 7013, teste Trin.

*Hab.* in Madagascar, *Du Pet. Thouars*; côté est (vulgo "Voulou"!), *Chapelier*!; île Nossi-bé! *Per-ville*, no. 1978!, et Nossi Camba, 1978-2! *Boivin* (hb. Mus. Paris.). v. s.

*Culmus* inermis, 4-5 poll. diam., ramis foliosis. *Folia* oblongo-vel lineari-lanceolata, 3-4½ poll. longa, 6-10 lin. lata, brevipetiolata, basi rotundata et parum obliqua, apice angustato-subulata, utrinque glabra. *Vaginæ* glabræ, sursum obsolete striatæ, ore pilis setosis fimbriatæ. *Spiculæ* fertiles in capitulum solitarium, terminale congestæ. *Spicula* fertilis basi lata, lanceolata, acuminata, straminea, nervoso-striata, setulis nigris obsita, *multiflora*, flosculis inferioribus 5-6 unipaleaceis, sterilibus, gradatim incrementibus, penultimo bipaleaceo, fertili, ad basin pedicello brevi vel longissimo, rudimentario aucto. *Palea* inferior (fertilis) flosculis sterilibus brevior, sed iis similis, ovato-oblonga, apice mucronata; superior longior, 15 lin. longa, dorso sulcata, bisubulata, multinervia, carinis brevissime ciliatis. *Squamulæ* 3, *breves*, nervosæ, oblique acuminatæ. *Stamina* 6, connectivo antherarum interdum elongato. *Stylus* longissimus, pubescens, superne trifidus. *Fructus* tereti-oblongus, sine rostro 7½ lin. longus, parum obliquus et subcurvatus, basi breviter stipitatus, rostro persistente acutato-subulatus.

This differs in some respects from the two preceding species; but I have but little doubt, after the examination which I have, through the kindness of M. Brongniart, been permitted to make of the specimens in the Paris herbarium, that it belongs to the genus *Beesha*, and that it is the species referred to by Flacourt, as already mentioned at p. 8. None of the specimens which I have seen would indicate that the plant ever attained the size mentioned by Kunth.

#### *Species dubia.*

4. *B. ELEGANTISSIMA*, Kurz, MS. in hb. "Caulibus tenuibus, gracillimis, altissimis, ramis terminalibus pendulis culmos truncosque arborum hosce sustinentes velantibus."—*Bambusa elegantissima*, Hassk. Pl. Jav. rar. 42; Miq. *l. c.* iii. 419.

*Hab.* in Java, in sylvis elatis ("Ulul"), *Hasskarl, Kurz*! (tantum spathæ hirsutissimæ). v. spathas.

I do not know what authority Kurz has for placing this plant in the genus *Beesha*.

BEESHA BACCIFERA, Schult.	= <i>Melocanna bambusoides</i> , Trin.
B. FAX, Schult.	= <i>M. humilis</i> , Roep.
B. HUMILIS, Kunth	= <i>M. humilis</i> , Roep.

#### XX. DENDROCALAMUS.

Nees ab Esenb. in Linnæa, ix. 476 (1834). *Bambusæ* sect., Ruprecht, Steudel, et auct. alior.

*Spicula* sursum deorsumque, vel deorsum tantum imperfecta, ovata vel oblonga, aut ovalis, acuta vel obtusa, pauciflora vel pluriflora, rhachilla *abscondita*, flosculis 1-2 inferioribus unipaleaceis, sequentibus 2-3 vel plurimis bipaleaceis hermaphroditis vel fœmineis, terminali tabescente, sæpe obsoleto, vel omnino deficiente. *Glumæ* duæ aut tres, 1 vel 2 sæpe gemmiparæ, suprema carinata et carina ciliata. *Palea* inferior plurinervia, plerumque ventricosa, chartacea vel membranacea, sæpe apice subulato vel spinoso mucronata, saltem in flosculis superioribus, dorso vel glabra, vel hirsuta, vel sericea, margine glabra vel ciliata; superior angustior, obtusa, paucinervia. *Squamulæ* veræ *nullæ*; rarissime, in speciebus 2, pseudosquamulæ fallaces in flosculis nonnullis videntur. *Stamina* 6, basi libera, antheris vel apiculo conico subobtusis, vel mucrone longo hirsuto terminatis. *Stylus* longus, filiformis, basi rostro inclusus, apice vel indivisus?, vel 2-3-fidus. *Ovarium* apice hirsutum, ros-

tratum, rostro nunc caduco, nunc persistente. *Fructus* bacciformis, oblongus, apice hirsutus, plerumque rostratus, rostro interdum deciduo.

Gramina arborescentia vel fruticosa, sæpius inermia, in India occidentali, Malacca, Java, et China crescentia. Folia nunc angusta, nunc lata et latissima. Inflorescentia in omnibus speciebus similis, nempe panicula composita, spiculis secus ramos glomerato-spicatis, glomerulis e verticillis multis in ramulo abbreviato valde approximatis derivandis.

This genus is distinguished from *Bambusa* by its fruit and the absence of true squamulæ. In all other respects it agrees with that genus.

*Conspectus Specierum.*

- Folia plerumque angusta, nunquam lata (in *D. Parishii* ignota). Spicula *brevis*, pauciflora, antheræ *breviter apiculatæ*.
- Palea inferior *spinoso-acuta* vel *pungens*, dorso *adpresse hirsuta*. Paniculæ ramis ultimis validis, glabris . . . . . 1. *D. strictus*.
- Palea inferior mucronata, vix spinosa, dorso *sericeo-hirsutissima* . . . . . 2. *D. sericeus*.
- Palea inferior *fere glabra*, margine *fimbriata, colorata*, mucronata. Paniculæ ramorum internodia apice *prunioso-glauca*. Folia ignota . . . . . 3. *D. Parishii*.
- Palea inferior omnino *glabra, membranacea, acuta*; superior *æquilonga* vel *longior*, sæpe dorso ad basin *fissa*. Paniculæ ramis ultimis *elongatis pendulis* . . . . . 4. *D. membranaceus*.
- Folia lata vel latissima. Spiculæ *breves*, verticillis *parvis*, secus ramos tenues, *pendulos*, elongatos dissitis . . . . . 5. *D. flagellifer*.
- Folia lata vel latissima. Spicula *ovata* vel *oblonga*, plerumque *pluriflora*. Antheræ *longe mucronatæ*.
- Spicula *ovato-acuta*, dorso *pubescenti-hirsuta*, 6–9 lin. longa . . . . . 6. *D. giganteus*.
- Spicula *ovato-acuta*, dorso *levissima*, 4–5 lin. longa . . . . . 7. *D. Hookeri*.
- Spicula *obcuneata*, apice *truncata, obtusa, glabra*, 3–5 lin. longa. Verticilli *densiflori* . . . . . 8. *D. Hamiltonii*.
- Spicula *lato-ovata* vel *oblonga, obtusa*, dorso *pubescens*, 9 lin. longa . . . . . 9. *D. latiflorus*.

1. *D. STRICTUS*, Nees in Linnæa, ix. 476. Culmo subarboreo, alto, paniculæ ramis ultimis validis, internodiis apice, nisi in var.  $\beta$ , glabris, verticillis densifloris, interdum maximis, spiculis pallidis, palea inferiore (saltem in flosculis superioribus) dorso *hirsuto-pubescente*, apice spinoso-acuminata, *pungente*, foliis subtus *pubescentibus*.—Miq. *l. c.* iii. 421. *Bambusa stricta*, Roxb. Corom. Pl. i. 58 (quoad descrip., sed non quoad tab. 80!, quæ est *Oxytenanthera Thwaitesii*, Munro); Hort. Beng. 25; Fl. Ind. ii. 193; Kunth in Jour. de Phys. 1822, 148; Enum. 431; Rœm. et Sch. *l. c.* vii. 1339; Rupr. *l. c.* 146, t. xii. f. 56; Steud. Syn. 330. *B. verticillata*, hb. Rottler, non Willd. *B. glomerata*, Royle hb. *B. hexandra!* et *Arundo hexandra!* Roxb. hb. *B. tanæa*, hb. Ham. in Wall. Cat. 5038 A! *B. pubescens*, Lodd. et Lindl. in Penny Cyc. *Nastus strictus*, Sm. in Rees's Cyc. no. 2 (excl. syn. Lour.); Raspail, *l. c.* v. 442. *Munget*, Pluken. Mantissa, 28, t. 341. fig. 2 (bona) (teste spec. in Plukenet herb. in Mus. Brit.), vol. xcii. fol. 31; Roth. Nov. Pl. sp. 198.

Var.  $\beta$  forsan monstrosa, verticillis proliferis, paleis inferioribus nervosis, hirsutis, paniculæ internodiis hirsutis (hb. Roxburgh in hb. Kew.).

*Hab.* in India orientali, in siccioribus fere ubique, Bengalia, Behar, Dunwah Pass, no. 896, Panchadurma!, *Hooker*; Hurdwar, *Wall. Cat.* 5038 v!; Seharunpoor, *Watson*!; Himalaya, *Griffith*! *Madden*!; Kaleedongee, 311! 372! ("Kussub"), *Royle*; Kalka! *Thomson*; Kumaon, *Strachey*!; Mussooree! Dehra Dhoon (var. *antheris longe mucronatis*), *Falconer*; Chumba, 206!, *Pinwell*; Punjab, *Aitcheson*!; Banda, *Edgeworth*; Nagpore! (Cent. Ind.), Madras, *Dr. Shuter*! 208; 1798! 3345! 3418! 3419!, *Wight*; Vizagapatam, *Russell*; montibus Nilagiri, *Schmidt*, *G. Thomson*! *Wight*!; Bombay, *Dalzell*!; Concan!, *Stocks*; Belgaum ("Chouga"), 821! *Ritchie*; Burmah, *Wall. Cat.* 5037! var. *vaginis viscosis*; Tenasserim, 26! *Falconer*! *M'Clelland*! ("Minwa"), no. 18! *Brandis*; Singapore! *Montgomerie*, var. *verticillis maximis*; Java, *Junghuhn*. v. s.

*Culmus* sæpe inermis, nunc suffruticosus, nunc subarboreus, nunc arboreus elatus, "8-10-pedalis in Behar" (*Hooker*); "in collibus 40-, in vallibus 100-" (*Brandis*); "dense cæspitosus, basi ramis fasciculatis, horizontalibus, rigidis, sæpe spinescenti-ramosis, interdum foliigeris tectus" (*Brandis*); spathis striatis, flavis, intus lævissimis, 8-10 poll. longis, apiculo adpresso, glabro. *Internodia* sæpe pedalia, plerumque glabra, fere solida. *Folia* lanceolata, basi rotundata, vel raro attenuata, brevipetiolata, apice tenuissime acuminata, 1½-10-12 poll. longa, 6-12-18 lin. lata, supra *aspera* et interdum hirsuta, subtus hirsuta vel tandem glabrescentia. *Vaginæ* plerumque hirsutæ, nunc *viscidæ*, nunc glabræ, ore ciliis paucis, cito caducis fimbriatæ, ligula brevi, producta, truncata. *Panicula* ramosa, ramis *teretibus* simplicibus, elongatis, nunquam pendulis, glomerulis spicularum sæpe densissimis, ½-1-2 poll. diam. *Spicula* ovata vel oblonga, 3-9 lin. longa, sæpe acutissima, flosculis 1-2 inferioribus 1-paleaceis, 2-3 superioribus bipaleaceis. *Palea* inferior (fertilis) ventricosa, subcoriacea, dorso hirsuta vel pubescens, apice spinoso-pungente subulata; superior angustior, obtusa, pubescens, inter carinas ciliolatas 2-4-nervia, (in flosculo supremo) dorso convexa, ecarinata. *Stamina* 6 (in flosculis quibusdam, sed raro, 3 rigidiora et mutila), connectivo in conum brevem, rarissime elongatum et mucronatum producto. *Stylus* longus, pilis hirsutus, apice bifidus. *Ovarium* rostratum, apice hirsutum, rostro subpyramidali. *Fructus* bacciformis, 3-4 lin. longus, ovatus, rostratus, rostro persistente, apice infra rostrum subhirsutus.

This very useful and strong Bamboo is generally known to Europeans throughout India as the male Bamboo, and is universally used for spear-staffs. It is extremely variable in the size of its foliage. The plant flowers frequently, if not every year, and does not die down after flowering, as is the case with so many Bamboos.

2. *D. SERICEUS*, Munro. Culmo subarboreo, paniculæ ramis ultimis validis, internodiis glabris, vel apice hirsutiusculis, verticillis vix 1 poll. diam., spiculis 3-5 lin. longis, palea inferiore dorso et margine pilis *subbulbosis*, *densis*, *sericeis barbata*, mucronata sed vix spinosa, foliis lineari- vel oblongo-lanceolatis.

*Hab.* in Ind. or. Bengalia, Behar, monte Parasnath, 4000 ped. s. m., *Thomson*! *Hooker*! (folia tantum). v. s.

*Culmus* ut in *D. stricto*, spathis striatis, margine longe fimbriatis, apices versus pilis bulbosis hirsutis, apiculo brevi, triangulari, acuto. *Folia* 5-15 poll. longa, 6-9 lin. lata, sæpe longe petiolata, utrinque vel subtus tantum hirsuta, cæteroque ut in *D. stricto*. *Vaginæ* striatæ, margine fimbriatæ, lateribus sæpe dense pilis glandulosis hirsutæ, ore sparse et caduce fimbriatæ, ligula dorso hirsuta, plerumque ciliata. *Paniculæ* ramis solidis, glabris, ramulorum internodiis sæpe striatis, non nitidis, et interdum superne hirsutiusculis, verticillis globosis, densifloris. *Spicula* brevis, plerumque 3 lin. longa, nunc obtusa, nunc acuta, 5-flora, structura *D. stricti*. *Palea* inferior (fertilis) apice cucullata et mucronata, vel, in eodem verticillo, obtusa, dorso basi nudo, superne sericeo-tomentosa; superior carina



sericeo-tomentosa, inter carinas binervia. *Antheræ* nodulo obtuso terminatæ. Reliqua ut in *D. stricto*. *Fructus* non visus.

I have never seen this in flower except from Parasnath. Dr. Hooker collected the leaves there in February 1848; and Dr. Thomson found it in flower there in September 1858. It has a very different appearance from any form of *D. strictus*, of which, however, it may prove to be a silky variety, distinguished by its very long curious spreading silky pubescence. I cannot point out any distinction in the structure of the spicula, except that the upper palea of the terminal flower is keeled, and not convex, as it is in *D. strictus*.

3. *D. PARISHII*. Paniculæ internodiis apice *pruinoso-glaucis*, palea inferiore submembranacea, colorata, dorso glabra, margine *fimbriata*, antheris appendiculo obtuso terminatis.

*Hab.* in Ind. or. Punjab, Himalaya!, *Lieut. Parish*. v. flores sine foliis.

Paniculæ (rami 3 tantum adsunt) internodia striata, verticillis densifloris. *Spicula* 5-6-flora, flosculis 2 inferioribus sterilibus, 2-3 sequentibus hermaphroditis, terminali tabescente, vel minimo vel omnino obsoleto. *Palea* inferior (fertilis) multinervia, dorso striata, brevissima, subviolacea, margine fimbriata, intus hirsutiuscula, apice acuta, vix mucronata; superior obtusa, *margine* et *carinis* fimbriata, venulis paucis reticulatis. *Ovarium* (immaturum) hirsutum, rostratum. Reliqua generis.

The anthers of the flowers in this species have the blunt points which are found in the two preceding species. In other respects it resembles *D. Hookeri* and *D. Hamiltonii*.

4. *D. MEMBRANACEUS*, Munro. Paniculæ ramis ultimis tenuibus, sæpe pendulis, verticillis  $\frac{1}{2}$ - $\frac{3}{4}$  poll. diam., spiculis angustis, cylindricis, glabris, palea inferiore *glaberrima*, margine *nuda*, superiore interdum, *dorso* fere ad basin *bifida*, foliis angustis, lineari-lanceolatis.

*Hab.* in Ind. or. Martaban, Troglā, no. 5029!, *Wallich*; Tenasserim! *Brandis*, *Lobb*! (quoad flores; folia dubia). v. s.

*Culmus* arboreus?, ramis superioribus foliiferis tenuibus, basi incrassatis, simplicibus vel compositis. *Folia* 4-5 poll. longa, 4-6 lin. lata, basi rotundata vel attenuata, apice mucronata, supra et margine aspera, subtus hirsuta, petiolata. *Vaginæ* striatæ, fere ad basin solutæ, hirsutæ vel glabrescentes, ore ciliis subsistentibus paucis fimbriatæ, ligula brevissima, obtusa. *Panicula* omnino generis, internodiis glabris, ramis plerumque tenuibus, glabris, verticillis sæpe distantibus, interdum ad nodos glomeratis, densifloris. *Spicula* palida, glaberrima, 3-4 lin. longa, 4-5-flora, flosculis 1-2 inferioribus sterilibus, 2-3 sequentibus bipaleaceis, terminali tabescente brevissimo vel nullo. *Palea* inferior (fertilis) *glaberrima*, ipso apice immerse nervosa, mucronata; superior sæpe longior, obtusa vel acuta, sæpe dorso usque ad basin fissa, inter carinas fimbriatas 3-nervia. *Antheræ* mucrone glabro, *brevi* apiculatæ. *Fructus* maturus ovatus, uno latere compressus, apice ipso tantum hirsutiusculus, rostro brevi persistente subito mucronatus, sine rostro 3 lin. longus.

This is distinguished from all the genus by the perfectly glabrous lower palea, combined with narrow leaves. . . . In Brandis's herb. no. 19, this was unfortunately mixed up with *Oxytenanthera albo-ciliata*, Munro; and I have in consequence not been able to derive any information as to the habits and size of the plants from Dr. Brandis's notes.

The leaves attached to Lobb's specimens are very different from the mature ones attached to Wallich's 5029, but they may possibly be young leaves from a young shoot.

5. *D. FLAGELLIFER*, Munro. Culmo arboreo, paniculæ ramis elongatis, 2–3-pedalibus et ultra, tenuibus, *pendulis*, internodiis uno latere sulcatis et hirsutis, spicula brevi, palea inferiore margine *fimbriata*, mucronata, foliis latis.—*Bambusa flagellifera*, Griffith, MS. in herb.; forsan *B. bitung*, Rœm. et Sch. *l. c.* 1354, et supra, p. 112. *Schizostachyum loriforme*, Munro, in hb. T. C. D.

*Hab.* in Malacca, Griffith. v. s.

*Culmus* elatus, internodiis junioribus apice farinosus, ramus foliifer terminalis (1 tantum adest)  $2\frac{1}{2}$  ped. longus, axillis ramos floriferos nondum evolutos ferentibus. *Folia* majora 10–12 poll. longa, 2–2 $\frac{1}{4}$  poll. lata, supra glabra, nisi medio, præsertim basin versus, ubi denticulis parvis scaberrima, subtus tactu aspera et prominentiis minutis scabriuscula, ad costam pilis longis, interdum basin versus hirsuta, margine serrato-scaberrima, basi attenuata in petiolum sæpe scabro-hirsutum, apice longe acuminata, nervis secundariis utrinque 11–13, conspicuis. *Vagina* striatæ, medio pilis adpressis, albidis hirsutæ, superne glabræ, apice truncatæ, ore nudæ, margine uno fimbriatæ, ligula brevi, conspicua, truncata. *Panicula ampla*, internodiis plerumque apice scaberrimis, ramulis ad nodos numerosis, elongatis, *flagelliformibus*, *pendulis*, *filiformibus* sed validis, verticillis distantibus, vix 5 lin. diametro, internodiis omnibus uno latere *hirsutis*. *Spicula* brevis, ovata, vix 3 lin. longa, 5–7-flora, flosculis 4–5 bipaleaceis, terminali nunc minimo, nunc obsoleto. *Palea* inferior inconspicue 12–18-nervosa, dorso glabra vel raro subscabra, mucronata, margine breviter fimbriata; superior obtusa vel acuta, membranacea, carinis et margine fimbriata, inter carinas 1–2-nervia. *Squamulæ nullæ*. *Stylus* hirsutus, bifidus, interdum profunde. *Stamina* 6, basi libera, antheris seta vel pilis brevibus paucis (2–3) apiculatis. *Fructus* non visus.

This has smaller spiculæ than any species of the genus. It is very similar in many respects to *Bambusa Brandisii*, but has much smaller and less densely flowered verticils, and there are never the least traces of squamulæ. I have but little doubt that *B. bitung* of Schultes will prove to be the same species.

6. *D. GIGANTEUS*, Munro. Culmo excelso, internodiis apice glauco-pruinosis, verticillis approximatis, spiculis ovato-acutis, dorso *hirsutis*, plurifloris, antheris *acuminatis*, foliis interdum *maximis*, ligula *elongata*.—*Bambusa gigantea*, Wallich, Cat. Bot. Gard. Calc. p. 79.

*Hab.* in Pulo Penang, Wallich; Tenasserim (“Waklê” no. 10! “Wayā,”? no. 5), Brandis; cult. in Bot. Gard. Calcutta, Thomson! Anderson!; Hort. Sion! et Kew! v. v. et s.

*Culmus* maximus, interdum 26 poll. circumferentia, spathis variantibus, 9–12 poll. longis, intus glaberrimis, albicantibus, extus striatis, nunc pilis fuscis inferne hirsutis, nunc fere glabris, sed tactu asperis, apiculo lanceolato, sæpe spatham superante, plerumque reflexo, adpresso. *Folia* majora 12–20 poll. longa, usque ad 4 poll. lata, lato-lanceolata, basi rotundata, petiolata, supra glabra, subtus, in junioribus, pubescentia, demum glabrescentia, margine aspero-serrata, et basin versus sæpe longe fimbriata, nervis secundariis utrinque sub 16, venulis transversis crebris, parum conspicuis. *Vagina* sulcato-striatæ, demum glabræ, lateribus productæ, ore fimbriatæ, ligula *elongata*. *Panicula* ampla, ramis simplicibus vel compositis, nunc floriferis tantum, nunc apice foliiferis, sæpe apice *curvatis*, internodiis hirsuto-scabris, apice farinosus, verticillis plerumque approximatis, paucifloris. *Spicula* ovata, acuta, apice pungens, dorso pubescens, pluriflora, 6–9 lin. longa, flosculis 2–3 vel

pluribus unipaleaceis, sequentibus 2-4 bipaleaceis, fœmineis tantum (staminibus plus minus abortivis), penultimis 1-2 hermaphroditis fertilibus difformibus, terminali incompleto conspicuo, sæpe pungenti-acuto. *Palea* inferior, in flosculis fœmineis, dorso convexa, multinervia, mucronata, *adpresse hirsuta*, margine *fimbriata*, in hermaphroditis dorso plana et sulcato-plicata, apice breviter spinoso-acuta; superior dorso *hirsuta*, carinis longe fimbriata, nunc apice acuta, nunc *bicuspidata*. *Squamulæ* nullæ. *Stamina* 6, antheris apice acuminatis. *Stylus* longus, hirsutus, tandem 2-fidus. *Ovarium* hirsutum, longe rostratum. *Fructus* oblongus,  $3\frac{1}{4}$  lin. longus, obtusus (rostro caduco), apice hirsutus, perigynio superne adhærente, tamen *inferne soluto*; hinc scutellum extus visibile est.

This splendid species is growing admirably in the palm-house at Kew. It appears to have flowered at Calcutta in 1861, thirty years after it had been originally introduced; and Dr. Anderson states that the specimen, although weakened, remained alive. It appears to me that the seed in this species is really enveloped in a perigynium, but that in the fertile flower this often becomes detached at the base, and shrinks up, forming a somewhat rugose hirsute crown to the fruit, and thus the scutellum becomes exposed to view; and I believe that the false squamulæ seen in one or two species are only the remains of the lower part of the perigynium.

7. *D. HOOKERI*, Munro. Culmo arboreo, paniculæ internodiis lævibus, glaberrimis, verticillis densifloris, spiculis *ovatis*, *subacutis*, *nitidis*, palea inferiore vix acuta, lævissima, antheris apice *penicillatis*, foliis interdum latissimis.

*Hab.* in Ind. or. in mont. Khasia, Jasper hill! ("Ussey") 2000 ped., Nurtiung! 4000 ped., Nowgong! ("Denga"), Myrung ("Ussey") 5700 ped., Joowye! ("Ukotang"), cult. Bengal. Orient. no. 411! Pundua?, *Hooker et Thomson.* v. s.

*Culmus* 50-pedalis, cæspitosus, apice nutans, viridissimus, plumosus, 5-6 poll. diam., internodiis inferioribus subhirsutis, glaucescens, spathis magnis, basi 16 poll. latis, 10 poll. longis, extus pilis atris hirsutissimis, intus glaberrimis, apiculo lanceolato, 3-7 poll. longo. *Folia* lanceolata, 10-12-14 poll. longa, 2-2½-3 poll. lata, basi rotundata et breviter attenuata in petiolum brevem, latissimum, sæpe supra hirsutum, apice acuminatissima, supra glabra sed tactu aspera, subtus aspera, interdum hirsuta, vel ad costam, basin versus tantum, pilis sublongis hirsuta, margine serrato-aspera, nervis secundariis conspicuis, utroque latere 8-12-16; venulis transversis crebris, subconspicuis. *Vaginæ* inferne pilis adpressis hirsutæ, superne glabrescentes, truncatæ, ore nudæ, ligula conspicua, obtusa vel longe producta. *Panicula* composita, rhachi nitida, *lævissima*, verticillis densis, distantibus, vel raro approximatis, ramorum internodiis (interdum profunde) sulcato-striatis, hirsutis. *Spicula* ovata, vix acuta, lævis, 4½ lin. longa, 4-5-flora, flosculis 3 bipaleaceis, terminali sæpe pedicellato, apice *pilis longis* barbato. *Palea* inferior (fertilis) chartacea, glaberrima, vix acuta, margine quam brevissime fimbriata; superior subacuta, carinis longe fimbriata. *Stamina* 6, antheris apice *penicillatis*. *Squamulæ* veræ nullæ; rarissime 1-2 pseudosquamulæ adsunt. *Stylus* longissimus, apice 2-3-fidus. *Ovarium* hirsutum. *Fructus* maturus non visus.

This is principally to be distinguished from *D. Hamiltonii* by the tapering polished spiculæ and smooth general rhachis.

8. *D. HAMILTONII*, Nees et Arnott, MS. ad Hamilton, Gram. Culmo *præalto*, paniculæ compositæ internodiis sulcato-striatis, aspero-hirsutis, verticillis *densifloris*, spiculis *obcuneatis*, apice obtusis, truncatis, *glabris*, palea inferiore margine fimbriata, an-

theris *mucrone longo hirsuto* appendiculatis.—*Bambusa maxima*, Ham. hb. 882, in Wall. Cat. 5039. *B. monogyna*, Griffith, Icon. cl. fig. 2, Notulæ p. 63, Itin. not. 110.

Var.  $\beta$ . *edulis*, Munro, spiculis plurifloris, pseudosquamulis 2–3, verticillis majoribus, foliis latissimis et tenuioribus.

*Hab.* in Ind. or. Assam, Goalpara, *Hamilton, Jenkins!* 189!, *Masters*, Gowahutty 641! 748! (in hb. Calcutta), Negrigam! Kujoodoo!, Bootan, 143!, Dewangiri, 2! 2680!, Mishmee, Ghloom vicus, 10! 16! 18!, Sikkim, Darjeeling! *Griffith*; Sikkim ad 4000 ped. frequens (“Pao”), Yoksun! 5600 ped., Dubdi! (“Rugvet et Putu”) (folia tantum), Darjeeling!, (var.  $\beta$ ) Sikkim, Ramoon et Rato vallibus! 4000 ped. (“Pao” et “Wah” pulluli juveniles edules), *Hooker et Thomson*. Kew cult. v. s.

*Culmus* 40–60-pedalis, ramis horizontalibus, internodiis brevibus, 4–5 vel 6–7 poll. diam., dense cæspitosus, parietibus crassis. *Folia* valde variabilia, lato-lanceolata, 4–16 poll. longa, 10 lin.–5 poll. lata, basi rotundata, interdum obliqua, supra glabra, subtus pallida vel concoloria, glabra vel hirsutiuscula, nervis secundariis utrinque 6–17, subconspicuis, brevipetiolata. *Vaginæ* superne glabræ, inferne pilis strigosis adpressis hirsutæ, ligula *elongata*. *Panicula* ampla, ramis erectis, sæpe fistulosis, rhachi scabra vel scaberrima, multisulcata, nodis hirsutissimis, glomerulis spicularum sæpe densissimis, raro proliferis, interdum  $1\frac{1}{2}$  poll. diam., plerumque distantibus. *Spicula* fragilis, ovalis, compressa, 3–5 lin. longa, 4–5–6-flora, flosculis 2–4 bipaleaceis, penultimo difformi, fructifero, terminali nunc 1-paleaceo, nunc ad pedicellum redacto. *Palea* inferior latissima, suborbicularis, scarioso-membranacea, interdum emarginata, marginibus fimbriata, multinervia, glabra; superior angustior, paulo brevior, dorso apicem versus sparsim pilosa, membranacea, inter carinas ciliatas 3–5-nervia. *Stamina* 6 vel raro 7, antheris rubro-purpureis (*Thomson*), connectivo in apiculum conico-subulatum, breviter pilosum producto. *Squamulæ* veræ nullæ; in var.  $\beta$  pseudosquamulæ 2–3 interdum adsunt. *Stylus* longissimus, apice trifidus. *Ovarium* ovato-conicum, hispidum. *Fructus* oblongus, apice hirsutus, rostratus, rostro sæpe persistente; interdum, non semper, perigynio inferne soluto, scutellum visibile est. Vide not. ad *D. giganteum*.

Dr. Hooker states that the young shoots of this species are eaten when boiled, and that the plants flower every year. The flowers, in the variety *D. edulis*, exhibit occasionally the most capricious variations: some flowers contain 3 stamens tolerably perfect, the remaining 3 being converted into style-like processes; sometimes there are two distinct styles, and sometimes the style is 4-cleft; occasionally there are 7 stamens.

9. *D. LATIFLORUS*, Munro, Tab. VI. *Culmo fruticoso*, fistuloso, internodiis brevibus, striatis, glabris, paniculæ ramosæ ramis simplicibus, 1–3–4 ad nodos (fig. B),  $1\frac{1}{4}$ – $1\frac{1}{2}$ –pedalibus, internodiis apice incrassatis, uno latere sulcatis et hirsutis, verticillis paucispiculatis, spiculis sub 8-floris, latis, ovatis, *obtusis, pubescentibus*, palea inferiore margine fimbriata, antheris *longe mucronatis*.—*Bambusa verticillata*, Benth. in Fl. Hongkong, 434, non Willd.

*Hab.* in China, Hongkong, *Wright!*, 1050! *Hance*, 740! *Harland*; Formosa, no. 649! *Oldham*. v. s.

*Culmus* 6–7-pedalis et ultra. *Folia* (fig. c) lato-lanceolata, basi rotundata, vix attenuata, brevipetiolata, apice acuminatissima, utrinque glabra, margine aspera, 7–10 poll. longa,  $1\frac{1}{4}$ –3 poll. lata, nervis secundariis utroque latere 9, subconspicuis, ramulis transversis creberrimis, vix conspicuis. *Vaginæ* sulcato-striatæ, glabræ, vel inter strias pilis sublongis hirsutæ, ligula obtusa, truncata, *raro fimbriata*. *Panicula* (pars superior 4-pedalis adest) composita, spiculis in glomerulis, ramis approximatis, 3–6 vel superne solitariis. *Spicula* lato-oblonga (fig. 1), 9 lin. longa et 6–7 lin. lata, compressa, sub-8-flora,

flosculis omnibus, nisi 2 inferioribus sterilibus, bipaleaceis, fosculo terminali tabescente, nullo vel raro obsoleto. *Gluma* superior (fig. 5) enervosa, obtusa, carinata, carina brevissime ciliata. *Palea* inferior (fertilis) (fig. 2) basi lata, sæpe plicata, multinervia, vix acuta, dorso *pubescens*, margine sæpe colorato-fimbriata; superior (figg. 2, 3) multo angustior, hirsuta, carinis fimbriata, apice breviter *bifida*. *Squamulæ* typicæ nullæ; rarissime, in spec. e Formosa, pseudo-squamulæ 1-2 adsunt. *Stamina* 6, e flosculis superioribus exserta, antheris mucrone *hirsuto longo* apiculatis. *Stylus* filiformis, longus, primum simplex, tandem apice bifidus. *Ovarium* (fig. 4) hirsutum, rostratum, stipitatum. *Fructus* maturus non visus.

This very pretty species seems well worthy of cultivation in our European gardens, as it doubtless flowers annually. Until Oldham's specimens were received, all hitherto known in herbariums were single branches of the panicle, and consequently the inflorescence was supposed to be simply spicate. I think it is very probable that this species is one of Rumphius's varieties of *Leleba*.

## XXI. DINOCHLOA.

Büse, Pl. Jungh. 388; Miq. *l. c.* iii. 415. Tab. V.

*Spicula* deorsum imperfecta, parva, ovata, 3-flora, flosculis 2 inferioribus dorso nitidis, subobtusis, supremo perfecto bipaleaceo (figg. 4-5). *Glumæ* 2, obtusæ, glabræ, flosculis inferioribus similes. *Palea* inferior (flosculi fertilis) paucinervia, obtusa, dorso et margine glabra (fig. 5) vel dorso *hirsuta* (fig. 4) (in Cuming. no. 637); superior brevior, ovalis, obtusa, carinis ciliata (fig. 5) vel glabra (fig. 4). *Squamulæ* nullæ. *Stamina* 6, filamentis brevissimis, antheris apice conico-acuminatis (fig. 6). *Stylus* brevis, ovarii rostro inclusus, apice in stigmata 3, brevissima, villosa divisus (fig. 6). *Fructus* (fere maturus) ovalis et breviter rostratus,  $1\frac{1}{2}$  lin. longus (fig. 7), "bacciformis, et, ut videtur, intus carnosus" (*Sch.*).

Gramen alte (usque ad 50 pedes) scandens, in Java et ins. Philippinis et Andaman crescens. Folia lanceolata. Panícula supradecomposita, ramis iterum iterumque ramulosis, spiculis secus ramulos ultimos subverticillato-glomeratis.

This genus has the smallest spiculæ of any Bamboo; but, among the thousands which the specimens contained, very few were perfect.

*Species unica.*

D. TJANKORREH, Büse, Pl. Jungh. *l. c.*; Miq. *l. c.* Tab. V. Panícula maxima, divaricatissima, spiculis minimis, vix 2 lin. longis, secus ramulos subspicato-glomeratis, foliis basi leniter attenuatis, vaginis primum ore fimbriatis, ciliis cito caducis. — *Bambusa scandens*, Blume in litt. ad Nees in Bot. Zeit. 1824, 291. *Nastus tjankorreh*, Rcem. et Sch. *l. c.* 1358; Kunth, *l. c.* 430; Steud. *l. c.* 333. *Schizostachyum parviflorum*, Munro in hb. T.C.D. *Chusquea amplopaniculata*, Steud. *l. c.* 337; Miq. *l. c.* 414.

*Hab.* in ins. Philippinis, no. 637! Cuming; Java, monte Gedee, Blume; monte Salak, 4000 ped. s. m., Kurz! Junghuhn; Hort. Bogor. 798, Zollinger; ins. Andaman! Kurz (folia tantum). v. s.

*Culmus* scandens, internodiis  $\frac{3}{4}$ - $1\frac{1}{2}$  ped. longis, ramis fasciculatis. *Folia* plerumque 2-5 poll. longa et 8-12 lin. lata, in spec. ex Andaman ins. 10 poll. longa,  $2\frac{1}{4}$  poll. lata, lanceolata, setaceo-acuminata, basi attenuata et brevissime petiolata, glabra et lævia, venulis transversis parum conspicuis. *Vaginæ* superiores glabræ, inferiores scabræ, ore fimbriatæ, ciliis cito caducis, ligula truncata, sæpe longa, fimbriata. *Panícula* amplissima, rhachi semitereti, asperrima, ramis interdum 3-pedalibus, in racemos simplices vel ramosos divisus. Reliqua generis.

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[\* attached to some numbers indicates that reference should be made to the "Addenda et Corrigenda."]

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A

B

3

2

4

5

H. Fitch, del. et lith.

J. N. Fitch, imp.

*Arthrostylidium longiflorum*, Munro.



W.H. Fitch, del et hth.

J. N. Fitch, imp.

*Chusquea simpliciflora*, Munro.



W. H. Fitch, del. et lith.

J. N. Fitch, imp.

*Teinostachyum Griffithii*, Munro.

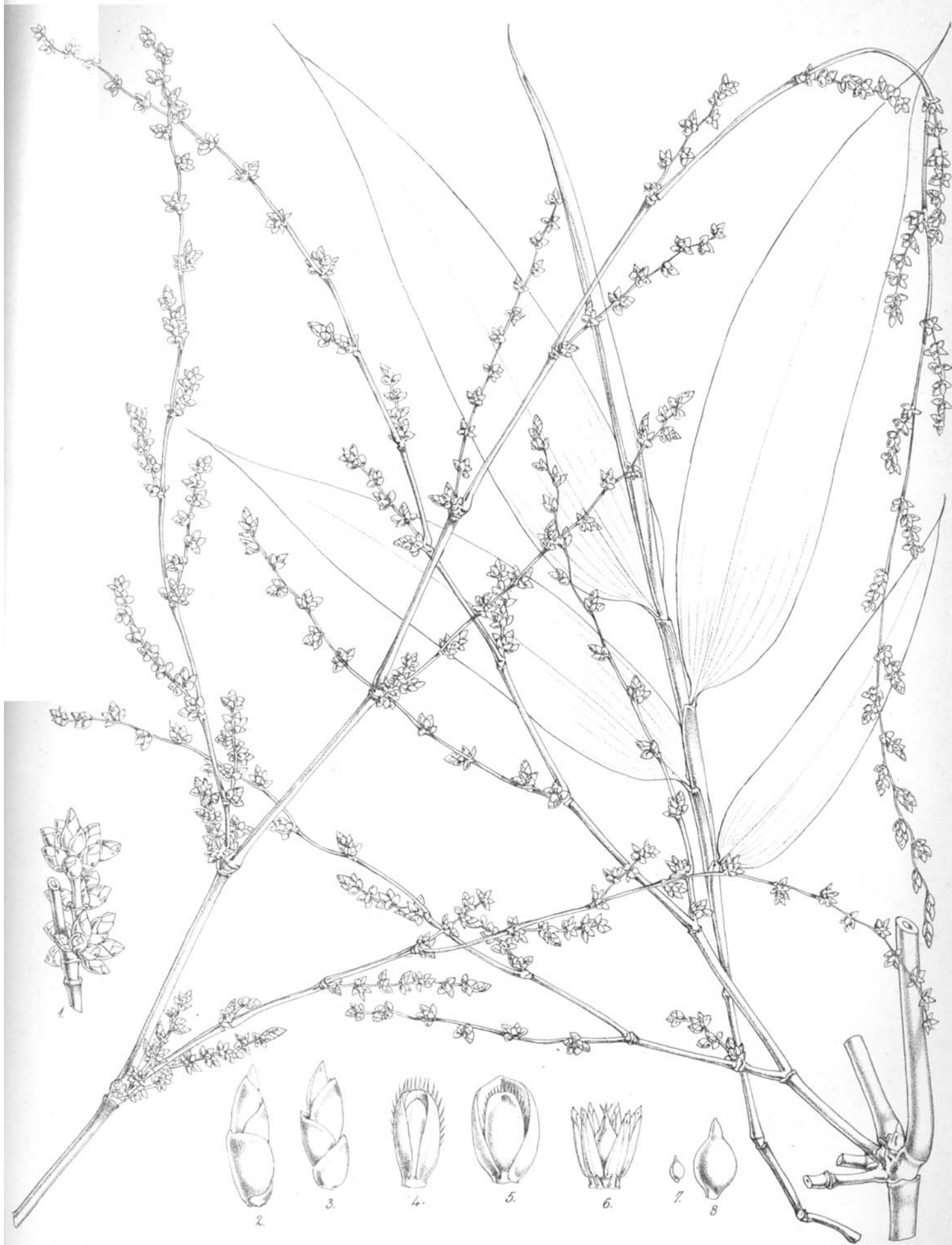


H. Fitch, del. et. lith.

J.N. Fitch, imp.

*Pseudostachyum polymorphum*, Munro.





W. H. Fitch, del. et lith.

J. N. Fitch, imp.

*Dinochloa Tjankorret, Base.*



W. H. Fitch, del. et hth.

J. N. Fitch, imp.

*Dendrocalamus latiflorus*, Munro.

