Vol. XXIV, pp. 103–160. June 16, 1911

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON GENERA OF PANICEAE. IV.*

BY AGNES CHASE.

The work upon the genera of *Paniceae* as originally outlined contemplated a consideration by groups. It was the intention of the writer to prepare as a final paper a synopsis of the entire work, in a sequence representing, so far as possible in a lineal series, the natural relationship of the genera investigated. This synopsis with special reference to American genera together with notes on the North American genera are offered in a preliminary way at this time at the request of Mr. G. V. Nash, of the New York Botanical Garden, who wishes to cite the references in his forthcoming treatment of the tribe *Paniceae* in the North American Flora.

PANICEÆ.

Spikelets ideally 2-flowered, the terminal floret perfect, the lower staminate or neuter (perfect in *Isachne* and *Dissochondrus*), its glume (the sterile lemma) unlike the flowering glume (the fertile lemma) in form and texture and simulating a third empty glume, a membranaceous or hyaline sterile palea (indurated at maturity in *Ixophorus* and in a few species of *Panicum*) present or wanting, the spikelet or at least the fruit (the fertile floret) dorsally compressed (laterally in *Lithachne*); fertile lemma and palea alike in texture, indurated, or at least firmer than the glumes and sterile lemma, firmly clasped together (open at the summit in *Leptocoryphium* and *Hymenachne*) inclosing the free grain (in the cultivated *Pennisetum americanum* the enlarged grain forcing open the lemma and palea), awnless (sometimes mucronate, acuminate-pointed or, in *Coridochloa*, *Alloteropsis*, and species of *Eriochloa*, even short-awned), the nerves obsolete (present in *Reimarochloa* and *Acritochaete*).

*Notes on Genera of Paniceae I appeared in Proc. Biol. Soc. Wash. 19 : 183–192. 1906; same II, op. cit. 21 : 1–10. 1908; same III, op. cit. 21 : 175–188. 1908.

In the following synopsis and diagnoses this ideal spikelet is always in mind, the same name being used for corresponding parts, even when the first glume is wanting as in most species of *Paspalum* or when both glumes are wanting as in *Reimarochloa* and in a few species of *Paspalum*, the scale which appears to be a glume in the latter case, being the sterile lemma.

The type species of each of the genera here recognized, except *Thrasya*, *Odontelytrum* and *Dissochondrus*, and of most of the generic names referred to synonymy, is represented in the National Herbarium by specimens or in a few cases by spikelets contributed from type specimens.

Synoptical Key.

Spikelets all alike (the lower of each pair aborted in *Echinolaena*).
Spikelets neither sunken in the cavities of a spongy rachis, nor surrounded by an indurated leaf-sheath nor involucre-form bracts.
Spikelets not subtended nor surrounded by bristles (sterile branchlets), (axis of branchlet extending beyond the base of the uppermost spikelet as a point or bristle in *Panicum*, subgenus *Paurochaetium*).
Fruit cartilaginous-indurated, not rigid, papillose, usually dark colored, the lemma with more or less prominent, white hyaline margins not inrolled. (Fruit not rigid in *Hymenachne*, *Reimarochloa* and in a few species of other genera, but texture and margin not as above.)
Spikelets awnless.
Fruit open at hyaline summit . . . . . 1. *Leptocoryphium*.
Fruit not open at summit.
Lemma boat-shaped, hyaline margins narrow 2. *Anthaenantia*.
Lemma convex with broad hyaline margin.
Fruit lanceolate-acuminate; second glume and sterile lemma unusually long-silky . . . . . 3. *Valota*.
Fruit elliptic, pubescence short or none.
Inflorescence of slender racemes, digitately or subdigitately arranged . . . . . 4. *Syntherisma*.
Inflorescence a capillary panicle . . . . 5. *Leptoloma*.
Spikelets with slender awns.
Second glume reduced to a minute scale; sterile lemma with a straight awn . . . . . 6. *Chloridion*.
Second glume and sterile lemma with flexuous or tangled awns . . . . . 7. *Acritochaete*.
Fruit indurated, rigid (or if thin, not hyaline-margined).
Alternate spikelets facing in opposite ways, that is the first glume alternately extrorse and introrse; inflorescence a solitary, unilateral raceme, the margins of the concave rachis partially embracing the subsessile spikelets . . . . . 8. *Thrasya*.

Alternate spikelets not facing in opposite ways (or if so the lower of the pair aborted).
Spikelets (or the primary one of a pair) placed with the back of the fruit turned away from the rachis, usually solitary.
First glume as long as the spikelet or nearly so.
Spikelets in pairs, the secondary usually aborted, sometimes wanting, strongly tuberculate-hispid or uncinate at maturity, laterally compressed, in unilateral racemes . . . . . 9. *Echinolaena.*
Spikelets solitary, not tuberculate nor uncinate.
Inflorescence a single spike-like raceme; spikelets swollen on the side toward the axis and fitting into alternate hollows . . . . . 10. *Mesosetum.*
Inflorescence a narrow panicle; spikelets swollen on the side away from the rachis or at least more convex on that side . . . . . 11. *Leucophrys.*
First glume obsolete or not over ¼ the length of the spikelet.
First glume and rachilla joint forming a swollen ring-like callus below the spikelet, the glume reduced to an adnate sheath of the rachilla joint; fruit mucronate or shortly awn-pointed . . 12. *Eriochloa.*
First glume present or wanting but no ring-like callus below the spikelet.
First glume present; racemes racemose along the main axis . . . . . 13. *Brachiaria.*
First glume wanting; racemes digitate or sub-digitate . . . . . 14. *Axonopus.*
Spikelets placed with the back of the fruit turned toward the rachis of the spike-like racemes, or pedicellate in panicles.
Fruit long-acuminate, scarcely indurated, both glumes wanting; spikelets sessile, solitary in spike-like racemes, these reflexed or verticillate at maturity 15. *Reimarochloa.*
Fruit not long-acuminate, indurated (if but slightly indurated, both glumes present and inflorescence paniculate).
First glume typically wanting; spikelets plano-convex, subsessile in spike-like racemes . 16. *Paspalum.*
First glume present; spikelets usually in panicles.
Neither glumes nor lemmas awned.
Spikelet with a single fertile floret.
Second glume and sterile lemma not indurated, like the first glume in texture.
Glumes not equal nor entirely enclosing the rest of the spikelet.

Fruit chartaceous-indurated the palea enclosed (rarely the tip free).
Second glume not inflated-saccate.
Culms not woody nor bamboo like.
Fertile lemma neither with lateral appendages nor excavations at base, the inrolled margins clasping the palea; inflorescence typically paniculate. 17. *Panicum.*
Fertile lemma either with lateral appendages or excavations at base, the margins usually not inrolled; first glume large; blades usually contracted into a petiole-like base . . 18. *Ichnanthus.*
Culms usually woody, bamboo-like; spikelets globose, large, the glumes and sterile lemma papery; fruit bony-indurated, a downy tuft at the apex . . . . . 19. *Lasiacis.*
Second glume inflated-saccate, this and the sterile lemma much exceeding the stipitate fruit . . . . 20. *Sacciolepis.*
Fruit membranaceous, the palea not inclosed above; spikelets lanceolate, subsessile in usually spike-like panicles . . . . . 21. *Hymenachne.*
Glumes equal, enclosing the rest of the dorsally compressed spikelet; margins of the fertile lemma flat . . . 22. *Homolepis.*
Second glume and sterile lemma leathery-indurated; spikelets stipitate . . 23. *Scutachne.*
Spikelets typically with two fertile florets.
Florets alike in form and texture; panicle compound . . . . . 24. *Isachne.*
Florets unlike, the lower lanceolate, exceeding the upper; panicle racemose. 25. *Heteranthoecia.*
Glumes or lemmas or both awned, or if short-pointed only, the summit of fertile palea not enclosed.
Inflorescence of unilateral racemes along a common axis, never digitate; glumes 2-lobed (rarely entire) awned from between the lobes; fruit indurated, the palea enclosed at the summit . . . . . 26. *Oplismenus.*

Inflorescence paniculate or of slender subsimple racemes, these digitate.

Spikelets never silky-pubescent, nor ciliate-margined, often scabrous or hispid.

Spikelets ovate, not having a callus-like base . . . . . 27. *Echinochloa.*

Spikelets lanceolate, with a long callus-like base below the long-awned glumes. 28. *Chaetium.*

Spikelets silky pubescent or with a conspicuously ciliate margin; fruit subindurated.

Second glume and sterile lemma 2-lobed, a slender awn from between the lobes; fruit awnless; first glume remote; inflorescence paniculate . . . 29. *Tricholaena.*

Second glume and sterile lemma not lobed; fruit awned; first glume not remote; inflorescence of digitately arranged, subsimple racemes.

Sterile lemma and glumes papery, not at all indurated; fruit stipitate. 30. *Coridochloa.*

Sterile lemma subindurated similar to the fertile lemma . . . . . 31. *Alloteropsis.*

Spikelets subtended or surrounded by 1 to many bristles or spines (sterile branchlets), these distinct or more or less connate at base, forming a pseudo-involucre.

Spikelets deciduous, bristles persistent.

Spikelet with lower floret as well as the upper perfect and with indurated lemma and palea. . . . . 34. *Dissochondrus.*

Spikelet with upper floret only perfect.

Sterile palea at maturity becoming cartilaginous and winged, much exceeding the spikelet in width; spikelets secund along the branches of a simple panicle, each subtended by a single viscid bristle. 35. *Ixophorus.*

Sterile palea not enlarged at maturity.

Second glume and sterile lemma very broad, many-nerved, the glume saccate, auriculate, the lemma lyre-shaped, indurated on the margins; the spikelet subtended by a single flexuous bristle . 32. *Setariopsis.*

Second glume and sterile lemma not many-nerved, saccate, auriculate nor lyre-shaped; subtending bristles 1 to many . . . . . 33. *Chaetochloa.*

Bristles falling with the spikelets at maturity (in the cultivated *Pennisetum americanum* the globose grain falls from the usually persistent spikelet, with or without the lemma and palea attached).

Articulation below the spikelet-bearing branchlets.
A single bristle produced beyond the solitary spikelets.
First glume present; second glume and sterile lemma acuminate; fruit not acuminate . . 36. *Chamaeraphis.*
First glume usually obsolete, second glume minute, sterile lemma and fruit long-acuminate . 37. *Paratheria.*
Bristles numerous below each spikelet or cluster of spikelets.
Bristles not united at base, usually slender, often plumose . . . . . 38. *Pennisetum.*
Bristles more or less united at base into a bur-like pseudo-involucre . . . . . 39. *Cenchrus.*
Articulation at the junction of the primary branches with the main axis . . . . . 40. *Plagiosetum.*
Spikelets either sunken in the cavities of a corky axis or surrounded by a sheath or by involucre-form bracts.
Spikelets sunken in the cavities of the flattened corky axis, this disarticulating at maturity with the spikelets attached. 41. *Stenotaphrum.*
Spikelets not sunken in a corky axis.
Spikelets in small spikes, these surrounded by rigid sheaths. 42. *Xerochloa.*
Spikelets solitary, subtended by two glume-like bracts, these placed cross-wise to the spikelet* . . . . . 43. *Odontelytrum.*
Spikelets not all alike.
Plants monoecious or polygamous, that is with the different kinds of spikelets on one plant.
Spikelets all perfect, but those of the aerial panicle not perfecting grains; the fruitful spikelets cleistogamous, borne on subterranean branches . . . . . 44. *Amphicarpon.*
Spikelets not all perfect.
Spikelets hermaphrodite and sterile.
Spikes several, crowded on a leaf-like axis . . 45. *Phyllorachis.*
Spike solitary . . . . . 46. *Thuarea.*
Spikelets unisexual.
Inflorescence paniculate; fruit bony-indurated.
Panicles terminal on culms or leafy branches, pistillate spikelets above, staminate spikelets below, in same panicle . . . . . 47. *Olyra.*
Panicles all axillary or axillary and terminal; the terminal when present wholly staminate.
Fruit laterally compressed, conspicuously gibbous on upper dorsum . . . . . 48. *Lithachne.*
Fruit dorsally compressed, lanceolate . 49. *Raddia.*
Inflorescence of spike-like racemes.
Raceme solitary; spikelets geminate, a pistillate and a staminate forming a pair . . . . . 50. *Diandrolyra.*

* Taken from Hackel's description. We have not yet seen the plant.

Racemes 2, digitate, one pistillate, the other staminate, the spikelets solitary . . . . . 51. *Mniochloa.*
Plants dioecious . . . . . 52. *Spinifex.*

1. Genus LEPTOCORYPHIUM Nees.*

Leptocoryphium Nees, Agrost. Bras. 83. 1829. Two species are included, *L. lanatum* Nees, based on *Paspalum lanatum* H. B. K., and *L. molle* Nees, the first named being here taken as the type of the genus.

2. Genus ANTHAENANTIA Beauv.

Anthaenantia Beauv. Ess. Agrost. 48. pl. 10. f. 7. 1812. Based on a single species, *Phalaris villosa* Michx. This name is spelled *Anthenantia* † by Robert Brown (in Flinders, Voy. App. 2: [3]582. 1814) and *Athenantia* † by Kunth (Mem. Mus. Paris 2: 71. 1815).

Aulaxanthus Ell. Bot. S. C. & Ga. 1: 102. 1816. Two species, *A. ciliatus* Ell. and *A. rufus* Ell., the first named of which is here taken as the type, are included. The type of *A. ciliatus*, in Elliott's herbarium, is *Anthaenantia villosa* (Michx.) Benth. Elliott refers "*Phalaris villosa?* Michx." to *A. ciliatus*. With the later fascicles of Elliott's work an illustration of *A. rufus* (pl. 6. f. 1), was given, but since this was not published until 1821 the first species published under the genus is taken as the type.

Aulaxia Nutt. Gen. Pl. 1: 47. 1818. This is based on *Aulaxanthus* Ell., Elliott's description, slightly altered, being used and his species cited. Steudel (Nom. Bot. ed. 2. 1: 171. 1840) spells the name *Aulaxis*.

3. Genus VALOTA Adans.

Valota Adans. Fam. Pl. 2: 495. 1763. This genus is established by a reference to "Sloan. t. 14. f. 2." This figure identifies the genus with *Andropogon insulare* L. (Syst. Nat. ed. 10. 2: 1304. 1759). The type of the latter in the Linnaean Herbarium is from Jamaica, sent by Browne. After his diagnosis Linnaeus cites "Sloan. jam. t. 14. f. 2." Steudel (Nom. Bot. ed. 2. 2: 744. 1841) spells the name *Vallota*.

Acicarpa Raddi, Agrost. Bras. 31. pl. 1. f. 4. 1823. This is based on a single species, *A. sacchariflora* Raddi, the figure and description of which identify it with *Valota insularis*. Raddi also cites "*Sloan.* H. jam. I. p. 43. t. 14. fig. 2)."

Trichachne Nees, Agrost. Bras. 85. 1829. Six species are included in the genus, *T. insularis* Nees which is taken as the type, based on *Andropogon insulare* L., *T. sacchariflora* (Raddi) Nees, which we now know to

* The group containing the first five genera here given was earlier discussed and the fruit of the type species figured (Proc. Biol. Soc. Wash. 19: 183–192. 1906). Only a summary of that discussion is here given, with such additional knowledge as has been gained.

† These misspellings or changes of spelling are here given only because these names have found their way into synonymy, hence must be accounted for.

be synonymous with the first, and four new ones, *T. recalva*, *T. tenuis*, *T. velutina* and *T. ferruginea*.

Since the notes on *Valota* were published* Prof. A. S. Hitchcock has examined the types of *T. tenuis* and *T. recalva* in Nees' herbarium at Munich, and duplicate types of *T. ferruginea* and *T. velutina* in the Trinius Herbarium. *Trichachne recalva* is seen to be allied to *V. Pittieri* (Hack.) Chase, while *T. ferruginea* and *T. velutina* approach *Syntherisma* through *S. adusta*. *Trichachne tenuis* Nees, upon which Kunth based *Panicum tenerrimum* (Rév. Gram. 1:39. 1829) is most nearly allied to *V. insularis*, but has much smaller spikelets with less copious and shorter hairs. None of these species are the one referred to† as represented in American herbaria by Nealley's Texas collections and passing under the name of *Panicum tenerrimum* Kunth. This very distinct species was collected in the summer of 1910 by Prof. A. S. Hitchcock, and is described below:

Valota Hitchcockii sp. nov.

Plants perennial, in dense clumps; culms erect, very slender, 30 to 50 cm. high, sparingly branching from the lower nodes, glabrous, usually very leafy, the lower nodes ascending-villous, the upper glabrous; sheaths about as long as the internodes or overlapping, the lower silky-villous, the middle and upper with a few, scattered, delicate hairs or glabrous or silky-ciliate only; ligule membranaceous, scarcely 0.5 mm. long, continued as a brown scarious margin down the sheath; blades ascending or erect, flat, 2 to 4.5 cm. long, 2 to 2.5 mm. wide, scarcely narrowed to the base, glabrous on the lower surface, minutely puberulent or glabrous on the upper, usually with a few long hairs near the base, and with a thin, white, cartilaginous margin; panicles consisting of few to several ascending racemes rather distant along a slender, glabrous axis, the rachises slender, 3-angled, the spikelets mostly in pairs, one short-pediceled, the other on a pedicel about as long as the lower spikelet, thus forming slender racemes, the spikelets scarcely imbricated; spikelets whitish or purplish, 2.5 to nearly 3 mm. long, 0.7 mm. wide, or with the hairs expanded about 1.2 mm. wide; first glume less than $\frac{1}{3}$ the length of the spikelet, obtuse, glabrous; second glume and sterile lemma equal, strongly 7- to 9-nerved, the internerves and margins densely silky hairy, the hairs at first appressed, at maturity spreading and matted, the spikelets often matted together by the tangled hairs; fruit 2.1 to 2.2 mm. long, 0.6 mm. wide, abruptly short-acuminate, brown, the broad, white, hyaline margins of the lemma nearly covering the palea except at the base.

Type collected June 24, 1910, on dry prairie soil, San Antonio, Texas, by A. S. Hitchcock (no. 5329).

Valota Hitchcockii is most nearly related to *V. saccharata* (Buckl.) Chase, from which it is distinguished by its lower stature, short blades, short racemes of smaller spikelets, the sterile lemma densely hairy on all the internerves, while in *V. saccharata* the middle four internerves are

* Proc. Biol. Soc. Wash., 19:186. 1906.

† Op. cit. p. 188.

glabrous, the hairs of the lateral internerves and margins and of the second glume being also much longer than in *V. Hitchcockii;* the fruit of the latter is much smaller, less acuminate and the lemma more broadly margined than in *V. saccharata.*

This species is known only from Texas. It was also collected by G. C. Nealley, at Sanderson, Pecos County, in September, 1892, and at Del Rio, October, 1892, both collections being distributed as no. 109.

Until the South American species referable to *Valota* are better known the transfer of Nees' species of *Trichachne* to this genus is deferred.

4. Genus SYNTHERISMA Walt.

Sanguinella Gleichen, Mikrosk. Untersuch. 4. pl. 8. 1764. This includes a single species with a phrase name which is not directly associable with a previously published binomial, hence the genus is not technically published. The plate is a crude colored representation of *Syntherisma sanguinalis.*

Digitaria Haller, Stirp. Helv. 2:244. 1768, not Adanson, 1763. Haller includes two species, the first of which is Linnaeus' *Panicum sanguinale,* this name, however, being omitted and Linnaeus' diagnosis used instead as a phrase name.

Syntherisma Walt. Fl. Carol. 76. 1788. Three species are included, the first of which, *S. præcox* Walt., is taken as the type. Though there is no specimen of this now in Walter's herbarium,* there is little doubt that it the same as *Panicum sanguinale* L. as stated by Michaux † and by Elliott. ‡

Gramerium Desv. Opusc. 61. pl. 7. f. 1. 1831. This includes a single species, *G. convolutum* Desv. We have not seen Desvaux's specimen but the description and figure apply well to the South American allies of *Syntherisma adusta* (Nees) Chase, and may possibly refer to a small specimen of that species itself.

Sanguinaria Bubani, Fl. Pyren. 4:256. 1901. Four species are included, the first of which, here taken as the type, is *S. nevenarae* Bub. From the synonyms and illustrations cited this is seen to be *S. sanguinalis.*

5. Genus LEPTOLOMA Chase.

Leptoloma Chase, Proc. Biol. Soc. Wash. 19 : 191. 1906. Based on *Panicum cognatum* Schult., *L. cognatum* (Schult.) Chase.

6. Genus CHLORIDION Stapf.§

Chloridion Stapf in Hook. Icon. Pl. 27 : ² pl. 2640. 1900. A single species, *C. cameroni* Stapf, from "British Central Africa: * * * Namasi,

* For an account of the grasses in Walter's herbarium see Hitchcock, Sixteenth Ann. Rept. Mo. Bot. Gard. 44. 1905.

† Fl. Bor. Amer. 1 : 45. 1803.

‡ Bot. S. C. & Ga. 1 : 131. 1816.

§ It is intended to discuss in detail this and other extra-American genera in a later paper, when the spikelets of the type species will be figured.

Cameron, 15 (coll. of 1899),'' is included in the genus. The type has not been examined but the description and plate identify the species with the following.

Stereochlaena Hack. Proc. Rhodesia Sci. Assoc. 7 : 2 65. 1908. One species, *S. Jeffreyssii* Hack., ''Bulawayo, Maio, 1907, leg. Jeffreys, no. 46, 83.'' Professor Hackel kindly sent spikelets of the type for deposit in the National Herbarium, and stated in a letter that *Stereochlaena* ''is identical with *Chloridion* Stapf, Hook. Ic. 2640 (1900).''

In this genus the fruit is cartilaginous-indurated, brown, papillose, the margins of the lemma white and hyaline, as in the other genera of this group. The inflorescence consists of few to several slender racemes, digitate at the summit of the culm; the short-pediceled, lanceolate, spikelets are in pairs, the first glume is wanting, the second a minute scale; the sterile lemma is attenuate into a slender scabrous awn, 4 or 5 times longer than the body of the spikelet, and encloses a minute cleft palea. Stapf says ''*Chloridion* might be described as a *Digitaria* in which the lower glume is entirely suppressed and the upper reduced to a scale, whilst the lower (barren) valve runs out into a fine bristle-like awn.''

7. Genus ACRITOCHAETE Pilger.

Acritochaete Pilger in Engler, Bot. Jahrb. 32 : 53. 1902. The genus is based on one species, *A. Volkensii* Pilger (op. cit. 54) ''Ost-Afrika, am Kilimandscharo, im Grütelwald oberhalb Marangu verbreitet, 2100 m. s. m. (Volkens n. 1278.)'' A portion of a raceme from the type specimen was kindly sent to the National Herbarium by Dr. Pilger.

This genus like the preceding is very unlike any known American grass. In *Acritochaete* the scarcely indurated fruit is more like that of *Reimarochloa* or *Hymenachne* than like that of the preceding genera in texture, but the broad, white, thin-membranaceous margins of the lemma are like those found in this group. *Chloridion* is evidently related to *Syntherisma*, and *Acritochaete* is more nearly related to *Chloridion* than to any other known genus. The inflorescence consists of a few slender erect, distant racemes; the solitary, short-pediceled, lanceolate spikelets in two rows on one side of the slender raceme; the first glume is reduced to an obscure scale, the second glume and sterile lemma are attenuate into long, slender, more or less twisted and irregularly flexuous awns several times longer than the body of the spikelet, the awns of the several spikelets more or less entangled.

8. Genus THRASYA H. B. K.

Thrasya H. B. K. Nov. Gen. & Sp. 1 : 120. pl. 39. 1816. This is based on a single species, *T. paspaloides* (op. cit. p. 121). ''Crescit in calidis, subinundatis insulae Orinocensis Panumana, inter vicos Atures et San Borja.'' The type has not been examined nor has any specimen of this species. The generic characters here given are based upon a study of specimens of *Panicum thrasyoides* Trin. (*Thrasya hirsuta* Nees) and *P.*

petrosum Trin. and the other two species here listed. Judging from Kunth's description and plate 39, and allowing for evident error in each, *Thrasya paspaloides* is closely related to *P. thrasyoides* Trin. Kunth places his *Thrasya* as the last genus of "Sectio I. Paniceae" (about the equivalent of our subfamily *Panicoideae*) immediately following *Manisuris granularis* (*Hackelochloa*). He diagnoses *Thrasya* as being 2-flowered, having two glumes, "superior profunde bipartita," the halves aristate below the apex, "inferior [gluma] integra mutica." The male floret is said to have but a single palea [both valves of a floret being termed paleae]. From dissections of spikelets of *P. thrasyoides* and from plate 39 the following conclusions are reached: Kunth overlooked the small, hyaline first glume (which in *P. thrasyoides* is more or less buried in the cleft of the sterile lemma and might easily escape notice); his entire, awnless, lower glume is the second glume; his deeply divided upper glume, the sterile lemma, the aristae of the halves being not awns (prolongations of fibrovascular bundles) but stiff, quill-like hairs; the single palea of the male floret is the sterile palea. It is strange that Kunth, failing to note the first glume, did not, nevertheless, count it as obsolete, since failing to do so, and counting the second glume as the first, he describes a spikelet in which the scales are not distichous, for his male floret is immediately above the (supposed) second glume instead of on the opposite side above the first. The margins of the sterile palea (in the allied *P. thrasyoides*) are so narrow and so readily torn from the hyaline middle portion that the fact that they turned toward the supposed second glume might escape observation. Kunth describes this "flos masculus" as "subtrinervia"—being a palea it has no midnerve, where Kunth evidently looked for one. But even if this [supposed] incongruous structure of the spikelet escaped him (if it did escape him) Kunth considered his *Thrasya* a most curious grass. He states that though it resembles *Paspalum platycaule* in habit, the structure of the flowers is so singular as to be widely different from that of all known genera. Nees (Agrost. Bras. 93. 1829) in his diagnosis of *Thrasya* notes a minute, scale-like inferior glume "(a cl. Kunth neglecta.)" The further important character that Kunth neglected, that is the alternately reversed position of the spikelets on the axis, Nees takes note of in his specific description of *Thrasya hirsuta* (based on *Panicum thrasyoides* Trin.), though Trinius failed to do so.

Description.—Inflorescence a single, terminal, more or less arcuate, spike-like raceme; spikelets apparently subsessile and solitary, in a single row on one side of a channeled, more or less winged rachis (the wings partially embracing the row of spikelets), but actually in pairs (the spikelets of each pair back to back) the pedicel of the primary spikelet adnate to the midnerve of the rachis* (the spikelets spreading from the

* To account for the alternation in position of spikelets, this was the interpretation arrived at by the writer from an examination of *P. thrasyoides* and *P. petrosum*, but I should not have ventured to give it at this time had I not found that it is the conclusion of Prof. Hackel (Oesterr. Bot. Zeitschr. 51:368. 1901) in the case of *Panicum campylostachyum*, in which species the paired arrangement is more evident than in *P. thrasyoides* and *P. petrosum*.

rachis at an angle of about 45 degrees), alternate spikelets placed with the back and alternate spikelets placed with the face toward the rachis (that is, the first glume alternately introrse and extrorse), a short callus below the spikelet; first glume minute, often hyaline and nerveless; second glume membranaceous, shorter than the spikelet; sterile lemma subindurated, thinner down the middle and early splitting to the base (the margins of the split rolling inward) or deeply sulcate only, the sterile palea nearly as long as its lemma, the nerves and margins firm, the broad internerve very thin, a staminate flower present or wanting; fruit oblong-elliptic, subacute, the lemma and palea cartilaginous-indurated, papillose, the summit of the lemma often clothed with stiff hairs, the thin margins flat, more or less pubescent. Slender, branching perennials, with narrow leaves, the genus confined to the tropics of the mainland of the western hemisphere.

The strictly racemose inflorescence, the alternation in the position of the spikelets, the subindurated, split or deeply sulcate sterile lemma, and the cartilaginous (not chartaceous) indurated lemma and palea, the thin margins of the lemma flat, taken in combination, are here used to distinguish *Thrasya* from *Panicum* and *Paspalum*. *Thrasya* approaches *Paspalum* through *Thrasya cultrata* and *Panicum campylostachyum* (in which the fruit is not hairy at the summit) on the one side and *Paspalum monostachyum* (H. B. K.) Vasey (in which the slightly indurated sterile lemma is somewhat sulcate and readily splits in dissection, and the firm margins of the papillose fertile lemma are not inrolled), on the other side. In the latter species, however, the paired spikelets are in two rows, and not in the alternately reversed position of those of *Thrasya*. If we conceive of a genus as bounded by an orbiculate line in places farther from, in places nearer to, the center (the species conceived to be the type of the genus) we have *Paspalum monostachyum* close to the line in one circle and *Panicum campylostachyum* and *Thrasya cultrata* close to the line in the adjoining one, the theoretical common ancestor of both long extinct. In such cases of extra-generic affinity it seems to be the nearest approach to a natural arrangement if we place the anomalous species in the genus to the members of which it is on the whole most nearly allied. And *Paspalum monostachyum* finds its nearest allies in *Panicum unispicatum* Scribn. & Merr. and a few other species of the section *Harpostachys* or *Dimorphostachys* of *Paspalum*.

The following species belong to this genus:

Thrasya paspaloides H. B. K. Nov. Gen. & Sp. 1 : 121. pl. 39. 1816. (See above.)

Panicum thrasya Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : [2]228. 1834. Based on *T. paspaloides* H. B. K. Only the Humboldt and Bonpland specimen is mentioned. It is possible that this species has not been collected a second time.

Thrasya thrasyoides (Trin.).

Panicum thrasyoides Trin. Gram. Pan. 126. 1826. "Brasil. (Langsdorff)." The type specimen, in the Trinius Herbarium, is labeled

"Panicum thrasyoides m. ubique in campis siccis, Brasiliae crescens, leg. mense Dec. 1824. cl. Langsdorff."

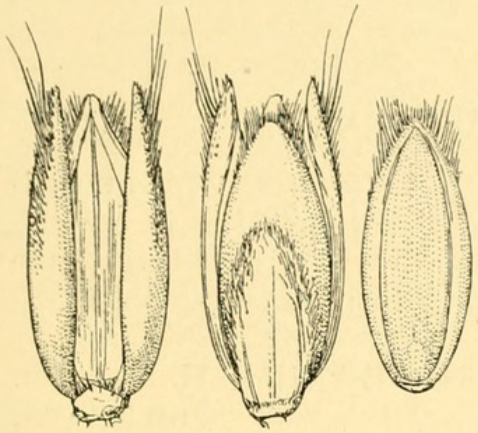

Fig. 1.
Thrasya thrasyoides.
(Two views of spikelet and fruit x 10 diam.)

Thrasya hirsuta Nees, Agrost. Bras. 94. 1829. Based on *P. thrasyoides* Trin. Nees distinguishes between this and *T. paspaloides*, a specimen of the original collection of which he examined in the Willdenow Herbarium. We take it on his authority that the two are distinct. So far as we know they have not been united, but they are closely allied and it seemed possible that Kunth's erroneous description might have led to failure to recognize his species.

Thrasya petrosa (Trin.).

Panicum petrosum Trin. Gram. Icon. 3: pl. 280. 1836. Trinius states that the illustration is "ad specimen Brasilianum." The type specimen, in the Trinius Herbarium, labeled "Panicum petrosum m. Cuyaba febr. 1827," was probably collected by Langsdorff.

Tylothrasya petrosa Doell, in Mart. Fl. Bras. 2 : ²295. pl. 37. 1877. Based on *Panicum petrosum* Trin. Doell bases his genus *Tylothrasya* on this species, the basal callus being the character by which he differentiates it from *Thrasya* H. B. K. *Thrasya thrasyoides*, however, has this callus though it is less pronounced than in *T. petrosa*. Bentham (Linn. Soc. Journ. Bot. 19 : 42. 1881) misspells the specific name "petraeum."

Thrasya cultrata (Trin.) Nees, Agrost. Bras. 94. 1829.

Panicum cultratum Trin. Gram. Pan. 126. 1826. "Brasil (Langsdorff)." The type specimen, in the Trinius Herbarium, is labeled "Panicum cultratum m. In graminosis, m. da Congonhas, Brasil. leg. mense Jan. 1825. cl. de Langsdorff. Thrasya cultrata N. ab Esenb." Above this the name "cultratum" had been written and crossed out, apparently by Trinius himself, and "monostachyum Hb. Kth." added. In his later work, "Panicearum Genera" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ²228. 1834) Trinius gives *P. cultratum* as a synonym of *P. monostachyum*.

Thrasya campylostachya (Hack.).

Panicum campylostachyum Hack. Oesterr. Bot. Zeitschr. 51 : 367. 1901. "Costarica; in savannis ad Cañas Gordas leg. Pittier, nr. 11012 et 11018." The type (no. 11012) is in Hackel's herbarium, a duplicate is in the National Herbarium.

This and the preceding species differ from the first three here listed in the lack of the quill-like hairs on the halves of the split sterile lemma, and also on the summit of the fruit.

There are several South American species, *Panicum Schumannii* Pilger among them, at present insufficiently known to us, which belong in this genus.

9. Genus ECHINOLAENA Desv.

Echinolaena Desv. Journ. de Bot. Paris 1 : 75. 1813. This genus is based on a single species, *E. hirta* Desv. (l. c.) "*Habitat* in America *equinoxiali.*" The type specimen, bearing in Desvaux's handwriting the name and date as published, is in the herbarium of the Muséum d'Histoire Naturelle at Paris.

Echinolaena was recognized as a genus by Kunth (H. B. K. Nov. Gen. & Sp. 1 : 118. 1816, Rév. Gram, 1 : 54. 1829, and Enum. Pl. 1 : 171. 1833), and by Trinius in his earlier work (Gram. Pan. 75. 1826), though later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ^{2}230. 1834) he includes it under his section *Harpostachys* of *Panicum*. Nees (Agrost. Bras. 127. 1829) makes it a section of *Panicum*. Steudel follows Trinius' later disposition of the genus, as does Doell (Mart. Fl. Bras. 2 : ^{2}179. 1877). Bentham (Linn. Soc. Journ. Bot. 19 : 50. 1881) maintains *Echinolaena* as a genus because of its having "the rigid single spike of some Chlorideae," and in the Genera Plantarum (Benth. & Hook. Gen. Pl. 3 : 1107. 1883), also, he gives it generic rank. Hackel (Engler & Prantl, Pflanzenf. 2 : ^{2}35. 1887) reduces it to a section of *Panicum*.

Description.—Inflorescence of one dense and spike-like, or several rather loose racemes; spikelets in pairs, face to face, the primary short-pediceled and perfect the secondary subsessile, abortive (sometimes developed, rarely wanting), the back of the primary spikelet turned toward the axis (that is the back of the fruit turned from the axis), in two rows along one side of a flat rachis and more or less divergent from it; fertile spikelets laterally subcompressed, echinate, at least at maturity; glumes broad, firm, acuminate-pointed, one or both echinate at maturity, the first straight and as long as the spikelet or longer, the second boat-shaped or becoming ventricose; sterile lemma broad, acuminate, enclosing a nearly equal sterile palea and usually a staminate flower; fruit indurated, less so than usual in *Panicum*, plano-convex, elliptical, the margins of the lemma flat or inrolled at the summit only, a minute membranaceous wing or spongy thickening on either side at base. Freely branching, more or less decumbent or creeping herbs, the type species confined to the South American tropics, another of widespread tropical distribution and a third of Madagascar.

The statement made by Bentham (Benth. & Hook. Gen. Pl. 3 : 1107. 1883): "rhachi spicæ rigida ultra spiculas producta," and which appears from the Conspectus (page 1078) to express his chief reason for maintaining *Echinolaena* as a valid genus, is found to be erroneous. The uppermost spikelet in *E. scabra* (*E. hirta*), the one species Bentham admitted to the genus, (as well as in *E. polystachya*) is strictly terminal, the rachis not at all produced beyond its insertion. This uppermost spikelet is solitary and usually erect, and the first glume is long-acuminate

(longer than in the other spikelets) and has much the appearance of a hirsute prolongation of the rachis. The characters to which we here give chief weight as generic are the strictly racemose inflorescence, the paired spikelets face to face (exactly the opposite arrangement to that in *Thrasya*), the lower or secondary spikelet of the pair abortive or usually so, the fertile spikelet with its back to the axis (as in *Brachiaria*), the long first glume, and the fruit less indurated than in *Panicum*.

Raceme solitary, terminal on the culm or branches; second glume boat-shaped only . . . . . *E. inflexa.*
Racemes several, erect, distant along a common axis; second glume becoming ventricose and uncinate-spiny at maturity . . *E. polystachya.*

Echinolaena inflexa (Poir.).

Cenchrus inflexus Poir. Encyc. Suppl. 6 : 50. 1804. "M. Richard l'a recueillie à Cayenne. (*V. s. in. herb.* Jussieu & Lam.)" The type specimen in the herbarium of the Muséum at Paris was examined by Prof. Hitchcock and found to be the same species as the type of *Echinolaena hirta* Desv. in the same herbarium. Trinius (Gen. Pan. 75. 1826) also referred *C. inflexus* Poir. to *E. scabra* H. B. K. Poiret observes that he finds no involucre, that the species may belong to another genus, and that it deserves further study.

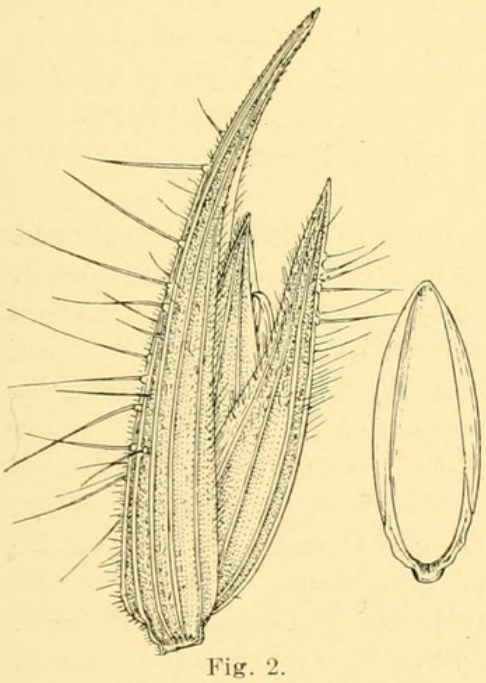

Fig. 2.
Echinolaena inflexa.
(Spikelet and fruit x 6⅔ diam.)

Cenchrus marginalis Rudge, Pl. Guian. 19. pl. 25. 1805. No locality nor specimen is cited. The type has not been examined but the plate and description identify the species.

Echinolaena hirta Desv. Journ. de Bot. Paris 1 : 75. 1813. (See above.)

Echinolaena scabra H. B. K. Nov. Gen. & Sp. 1 : 118. pl. 38. 1816. "Crescit in ripa umbrosa Atabapense juxta vicum San Balthasar et rupem Kemarumo. (Prov. de la Nueva Guayana.)" The type specimen has not been examined but the plate and description identify the species.

Panicum echinolaena Nees, Agrost. Bras. 128. 1829. Nees divides the entire species into three varieties, α, β and γ and cites "*Echinolaena scabra* H. et K." as a synonym without indicating to which variety he considers it synonymous. Since he also cites specimens we can not consider *P. echinolaena* a change of name only. "Var. α et β in Brasilia meridionali. (Sellow.) Vidi in Herb. Reg. Berol.)—Var. γ in campis siccis ad Tanbaté nec non Sabara, provinciarum S. Pauli et Minarum * * * (Martius)." The specimens referred to as α and β have not been examined. The Martius specimen, the type of var. γ, in the Munich

Herbarium, is the villous form represented in the National Herbarium by *Novaes* 1248, Campinas, Brazil.

Echinolaena polystachya H. B. K. Nov. Gen. & Sp. 1 : 119. 1816. "Crescit in ripa fluminis Magdalenæ inter Tenerife et Zambrano." A part of the type, labeled "*Echinolaena polystachya* H. B. K. in ripa fluminis Magdalena, ex herb. Humb. & Bonpl.," was examined in the Berlin Herbarium. As indicated by Nees (Agrost. Bras. 129. 1829) and Trinius (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ²240. 1834) this is the same as *Panicum uncinatum* Raddi.

Panicum uncinatum Raddi, Agrost. Bras. 41. 1823. "In sylvaticis prope *Catumby*, non procul ab Urbe *Rio de Janeiro*." An authentic specimen from Raddi (probably a duplicate type) was examined in the herbarium of the British Museum.

Panicum heteranthum Link, Hort. Berol. 1 : 212. 1827. "Hab. in Brasilia." An authentic specimen from the Berlin Botanical Garden was examined in the Trinius Herbarium. The description also identifies the species.

Panicum glandulosum Nees, Agrost. Bras. 129. 1829. "Habitat in sylvis ad Xipotó et ad Rio Jequetinhonha flumina (Martius)" is the first specimen cited, "in confinibus regni Paraguayani legit Sellovius (Vidi in Herb. Reg. Berol.)" an additional one. The Sellow specimen was examined at the Berlin Herbarium. Nees gives *Echinolaena polystachya* H. B. K. and *Panicum uncinatum* Raddi as synonyms. Trinius (Gram. Pan. 174. 1826) gives "*Panicum glandulosum N. ab Es.* in litt." (as well as *P. uncinatum* and *Echinolaena polystachya*) without description as a synonym of *Panicum nemorosum* Swartz var. β.

Echinolaena Trinii Zoll. & Mor. Syst. Verz. Zoll. 102. 1846. Based on "*Panicum uncinatum* Trin. v. 3. non Brown." The reference to Trinius is probably to the "Panicearum Genera" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ²240. 1834). The name published by Brown is *P. uncinulatum* not *P. uncinatum*.

Panicum echinatum Willd.; Doell in Mart. Fl. Bras. 2 : ²193. 1877. This herbarium name is given as a synonym of *P. uncinatum* Raddi. The specimen, in the Willdenow Herbarium, bears the data "Magdalena, Humboldt," and is doubtless a duplicate of the type of *E. polystachya*.

Immature specimens of this species bear a superficial resemblance to *Ichnanthus nemorosus* (Sw.) Doell, and allied species. Trinius, as seen above, at first included it as an unnamed variety of *Panicum nemorosum*, but later (Gram. Icon. 2: pl. 216. 1829) gives *Panicum uncinatum* as a valid species, explaining that though it resembles *P. nemorosum* it differs in having a subcoriaceous lower floret, and, in the upper racemes, spikelets in which the prickles of the "inferior glume" [the plate shows the second glume is intended] are so dense and long as to produce a resemblance to spikelets of *Lappago* [*Nazia*]. Because of the racemose inflorescence Trinius here and in the Panicearum Genera (Mém. Acad. St. Pétersb.

VI. Sci. Nat. 3 : [2] 240. 1834) places *P. uncinatum* in the section *Brachiaria*.

Kunth (Rév. Gram. 1 : 54. 1829) doubtfully refers to *Echinolaena* his own *E. polystachya*, together with *Panicum nemorosum* Sw., *P. naviculare* Nees (both of which belong in *Ichnanthus*) and *P. brachystachyum* Nees and *P. procurrens* Nees. In his synoptical heading the character "gluma superior echinato-glochidata" would exclude all but *E. polystachya*. In the Enumeratio (Enum. Pl. 1 : 173. 1833) Kunth again doubtfully includes these species and adds *Panicum loliaceum* Bert., probably referable to *Ichnanthus*.

While the uncinate and ventricose second glume of the mature spikelet of this species makes it look very different from spikelets of *E. inflexa*, the paired spikelets, the primary fertile, the secondary abortive or rudimentary, placed face to face, the back of the primary one turned toward the rachis, and the essentially like structure of the spikelet to that of *E. inflexa* show the two species to be congeneric. The second glume becomes indurated and spiny only as the spikelet nears maturity; the immature spikelets resemble those of *E. inflexa*. The sterile spikelet is often reduced to a mere rudiment, is sometimes wanting, and is rarely developed like the primary spikelet. In the fifty specimens of this species in the National Herbarium none are found without some of these sterile spikelets in the racemes.

From the description, *Echinolaena madagascarensis* Baker, a species which we have not seen, appears to belong unmistakably to this genus.

10. Genus MESOSETUM Steud.

Mesosetum Steud. Syn. Pl. Glum. 1 : 118. 1854. This is based on a single species, *M. cayennense* Steud. (l. c.) "*Leprieur* legit in Cayenne." The type specimen, labeled "Mesosetum cayennense Steud. Cayenne. Leprieux, 1825," in the Steudel Herbarium at Paris, is found to be the same species as *Panicum rottboellioides* H. B. K. Steudel earlier (Flora 33 : 228. 1850) mentions the name in a paper on the progress of his work on the "Synopsis plantarum." The generic description as given by Steudel is faulty and misleading. He evidently became confused as to the morphology of the parts of the spikelet. But reading his description with a dissected spikelet of *P. rottboellioides* under the microscope one can see that this is what Steudel is trying to describe. It seems likely from his description of the "flosculus hermaphroditus" that he mistook the sterile lemma with the fertile floret enfolded for the hermaphrodite floret (that is mistaking the fertile lemma for the "second valve" of the floret). Steudel's statement that *M. cayennense* approaches *Panicum mesocomum* Nees is further misleading. For this reason the name *Mesosetum* has been referred to various sections of *Panicum* but never, so far as we can find, to the group containing *Panicum rottboellioides*, until so used by Hitchcock (Contr. Nat. Herb. 12 : 211. 1909). Bentham (Linn. Soc. Journ. Bot. 19 : 42. 1881) says that *Panicum leucophaeum* H. B. K. (which is *Panicum insulare* (L.) Meyer, *Valota insularis* (L.) Chase)

"appears to have been the type of the proposed genera *Acicarpa*, Raddi, *Eriachne*, Philippi, and *Holosetum* and *Mesosetum* Steud." (It is in fact the type of only the first-named of these.) In the Genera Plantarum (Benth. & Hook. Gen. Pl. 3 : 1101. 1883) he says that *Mesosetum* is perhaps (*forte*) referable to the section *Trichachne* of *Panicum*. At the same time Bentham (Linn. Soc. Journ. Bot. 19 : 42. 1881) establishes as a section of *Panicum* his *Diplaria* comprising " *P. rottboellioides*, H. B. K., *P. exaratum* and *P. ferrugineum* Trin., *P. pappophorum*, Nees, and a few others." In the Genera Plantarum (l. c.) this section is described and the same species mentioned as belonging to it. Dalla Torre and Harms (Gen. Siphonog. 14. 1900) also include *Mesosetum*, together with *Alloteropsis* Presl, *Coridochloa* Nees, *Eriachne* Phil., as well as *Acicarpa* Raddi and *Trichachne* Nees which properly belong there, under *Panicum*, section *Trichachne*. Steudel himself failed to see the identity of his *Mesosetum cayennense* with *P. rottboellioides* or its affinity to the other species of this group which he includes under the section *Harpostachys* (Syn. Pl. Glum. 1 : 55. 1854). It was only Prof. Hitchcock's examination of the type specimens of *Mesosetum cayennense* and *P. rottboellioides*, both now in the Herbarium of the Muséum d' Histoire at Paris, that revealed the specific identity of the two. It is unfortunate that Steudel's generic name, with its inadequate description, must stand for this well-marked genus. But if the names of all incorrectly described genera were rejected the nomenclature of the *Gramineae* would undergo many changes, for this family seems particularly to have suffered from the misunderstanding by authors, of the morphology of the parts of its inflorescence. *Anthaenantia*, *Ichnanthus*, *Alloteropsis* and *Pentarrhaphis* are examples of valid genera incorrectly described by the authors who bestowed the names we use for them.

Description.—Inflorescence a single, terminal, erect, spike-like raceme, the spikelets subsessile, solitary, alternate in two rows on one side of a three-angled, rarely winged, tortuous or zigzag rachis, the spikelets with the back of the fruit turned from the median line of the rachis (the first glume towards it), ventricose on the side toward the rachis, and fitting into its concavities, the back of the spikelet flat or nearly so; glumes 3- to 5-nerved (when 5-nerved the lateral pairs of nerves approximate) the lateral nerves often uniting with the midnerve below the acute or acuminate summit, one or both usually clothed on the margin with stiff hairs; sterile lemma like the glumes in texture and the distribution of the pubescence, usually appearing 2-keeled from the strong lateral nerves and firm lateral internerves and thin or hyaline middle internerves and weak midnerve; sterile palea wanting except in the section *Bifaria*; fruit pointed, ventricose on the face (palea side) usually straight on the back, the lemma and palea less indurated than in *Panicum*, the flat margins of the lemma not hyaline. Slender perennials with narrow leaves, the uppermost reduced to a bladeless or nearly bladeless sheath.

This genus, like *Brachiaria*, differs from *Panicum* in the strictly racemose inflorescence and reversed position of the spikelets, and further in the form of the spikelets, swollen or ventricose on the face (or first glume

side) instead of on the back as in *Panicum*, *Paspalum* and, in more or less pronounced form, in all other genera of the *Paniceae*. The fruit differs from that of *Panicum* in having less indurated lemma and palea, the margins of the lemma flat. Doell (in Mart. Fl. Bras. 2 : ²173. 1877) states that in this group of plants the caryopsis has a linear hilum, but the specimens in the National Herbarium are not mature enough to permit of verification of this statement. The genus is confined to the tropics of the western hemisphere, Brazil being the center of distribution, two species occurring in the West Indies.

Besides *Mesosetum* proper the genus contains a well-marked section.

First glume awnless; lower floret neuter . . . . *Mesosetum* proper.
First glume awned; lower floret staminate . . . . Section *Bifaria*.

MESOSETUM proper.

This contains the following species:

Mesosetum rottboellioides (H. B. K.) Hitchc. Contr. Nat. Herb. 12 : 211. 1909. Based on *Panicum rottboellioides* H. B. K.

Panicum rottboellioides H. B. K. Nov. Gen. & Sp. 1 : 96. pl. 32. 1816. "Crescit in humidis ripæ Orinocensis inter Maypures et montem Sipapo."

Mesosetum cayennense Steud. Syn. Pl. Glum. 1 : 118. 1854. (See above.)

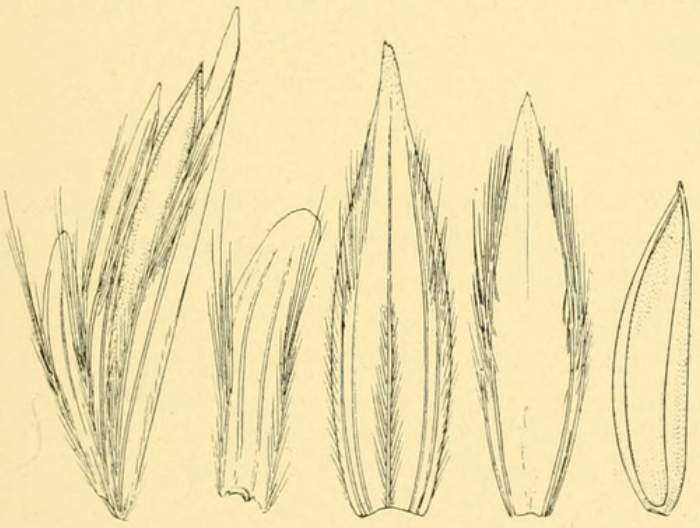

Fig. 3.
Mesosetum rottboellioides.
(Spikelet, first glume, second glume, sterile lemma and fruit x 10 diam.)

Mesosetum Wrightii Hitchc. Contr. Nat. Herb. 12 : 211. 1909. "Wright 3859 no. 559961 in the U. S. National Herbarium."

This species is known only from Cuba.

Mesosetum exaratum (Trin.).

Panicum exaratum Trin. Gram. Pan. 160. 1826. "Brasil. (LANGSDORFF.)" The type specimen, in the Trinius Herbarium, is labeled "Panicum exaratum m. In pratis paludosis S. da Lapa. Brasil. leg. cl. de Langsdorff."

Panicum pappophorum Nees, Agrost. Bras. 104. 1829. "Habitat * * * provinciae Piauhiensis." The type specimen, in the Munich Herbarium, bearing the name and locality as published, was collected by Martius.

Mesosetum loliiforme (Hochst.) Chase, Bot. Gaz. 51 : 302. 1911. Based on *Panicum loliiforme* Hochst.

Panicum loliiforme Hochst. in Steud. Syn. Pl. Glum. 1 : 56. 1854. "Herbr. Dr. Hostmann nr. 1071." The type specimen is in the herbarium at Leipzig.

This is the not uncommon Cuban species which has been usually referred to *P. rottboellioides* in herbaria. It differs from *M. rottboellioides* and *M. Wrightii* in having glumes each bilaterally unsymmetrically developed, the second shorter than the first instead of being the longest scale of the spikelet as in *M. rottboellioides ; M. loliiforme* also differs in being sparingly stoloniferous.

Nees' *P. pappophorum* var. β, his specimen of which, also collected by Martius in Brazil, is now in the Munich Herbarium, is either *M. loliiforme* or a very closely allied species.

Mesosetum chlorostachyum (Doell).

Panicum chlorostachyum Doell in Mart. Fl. Bras. 2^2 : 173. pl. 28. A. 1877. "Habitat in regionibus fluminis Rio Negro (Spruce n. 885, 1310)." Spruce's no. 885 is in the Munich Herbarium.

Mesosetum ferrugineum (Trin.)

Panicum ferrugineum Trin. Gram. Pan. 1826. "Brasil (Langsdorff)." The type specimen, in the Trinius Herbarium, is labeled "Panicum ferrugineum m. In campis glareosis pr. S. Luzia, Brazil. l. *mense* Oct. 1824. cl. Langsdorff."

Panicum eriochryseoides Nees, in Trin. Gram. Pan. 160. 1826. This name is given as a synonym of *P. ferrugineum*. Nees (Agrost. Bras. 103. 1829) publishes this as a new species citing a specimen collected in Brazil by Sellow, "Vidi in Herb. Reg. Berol." What is evidently a duplicate of this is in the Trinius Herbarium. Nees gives "Panicum ferrugineum *Tr. in litt.*" as a synonym of *P. eriochryseoides*.

Mesosetum sclerochloa (Trin.) Hitchc. Contr. Nat. Herb. 12 : 212. 1909. Based on *Panicum sclerochloa* Trin.

Panicum sclerochloa Trin. Gram. Icon. 3 : pl. 283. 1836. The illustration is drawn "ad specimen Brasilianum." The type, in the Trinius Herbarium, is labeled "Panicum sclerochloa m. pr. Cuyaba febr. 1827."

This peculiar species shows an approach to the species of the section *Bifaria* in the thickened midnerve of the first glume, keeled toward the apex and protruding as a short, laterally compressed point from between the lobes of the slightly cleft summit of the glume. The midnerve of the second glume and that of the sterile lemma are similarly keeled.

Besides the species listed above, *Panicum lolium* Nees, the type specimen of which has not been examined, and a few other insufficiently known South American species belong in this genus.

Section Bifaria (Hack.).

Hackel (Oesterr. Bot. Zeitschr. 47 : 75. 1897) establishes *Panicum*, section *Bifaria* with three new Brazilian species, *P. bifarium*, *P. caudiculatum* and *P. elytrochaetum*. Professor Hackel kindly contributed to the National Herbarium a spike from the type specimen of *P. bifarium;* the other two species have not been examined. The spikelets of *P. bifarium* have the structure and reversed position characteristic of *Mesosetum* but differ strikingly in the character of the first glumes. In these the midnerve, which (as in most species of *Mesosetum* proper) is joined by the lateral nerves, is keeled toward the summit of the notched glume and extends into a laterally compressed, sinuous, stout awn, varying from a short point to as long again as the spikelet. The species differs further from those of *Mesosetum* proper in having a staminate flower in the lower floret. Prof. Hackel points out the relationship of his section *Bifaria* to Bentham's section *Diplaria* (*P. rottboellioides*, *P. loliiforme*, etc.), and because of this relationship establishes for his three species a section of *Panicum* instead of a new genus. But unless the boundaries of the genus *Panicum* are extended to the limits to which Trinius (Gram. Pan. 1826) stretched them, including *Paspalum*, *Oplismenus*, *Setaria* and other genera recognized as distinct by even the most conservative students of *Gramineae*, the species here referred to *Mesosetum* with their constant combination of characters and their sharp delimitation from *Panicum* (there being no intergrading species as between *Panicum* and *Paspalum* and between *Panicum* and *Chaetochloa*) can not well find place therein.

The only species of the section *Bifaria* we have seen is here transferred:

Mesosetum bifarium (Hack.).

Panicum bifarium Hack. Oesterr. Bot. Zeitschr. 47 : 76. 1897. "Serra da Baliza ad Cachoeiras da Vargem Grande, 5–I. 1895, Glaziou nr. 22455."

Bifaria bifaria Kuntze, Gen. Pl. 3 : [2]359. 1898. Based on *Panicum bifarium* Hack. Kuntze, apparently without having seen the species, raises Hackel's section, on account of the lobed and awned first glumes, to generic rank in order to be consistent, he having maintained *Oplismenus* and *Chaetium* as distinct genera, he says, because of this characteristic.

11. Genus LEUCOPHRYS Rendle.

Leucophrys Rendle, Cat. Afr. Pl. Welwitsch 2 : [1]193. 1899. This genus is based on a single species, *L. mesocoma* (Nees) Rendle (op. cit. 194) based on *Panicum mesocomum* Nees, an African species. In this genus the spikelets are placed with the back of the fruit turned from the axis, but, not being strictly racemose, this is not readily observed. The rachilla is produced into a short stipe below the first glume which is separated from the second by the slightly prolonged second joint of the rachilla. The nearly glabrous first glume about as long as the spikelet and the densely silky second glume and sterile lemma, as well as the narrow

panicle and the reverse position of the spikelets, suggest an approach to the unique North American *Panicum ciliatissimum* Buckl. The stipitate spikelet of *Leucophrys*, however, with a joint between the glumes, and the different arrangement of the silky pubescence on the second glume and sterile lemma (a dense ring of long hairs across the middle of the spikelet, an arrangement also found in *Panicum nigropedatum*, *P. serratum*, *P. argenteum*, etc., and approached in several species of *Eriochloa*) does not show a close affinity with *P. ciliatissimum*. Species intermediate between them may be found, but without such intermediate species our *P. ciliatissimum* finds a more natural place in *Panicum*. Study of more material may show that *Panicum argenteum* and its allies should be placed in *Leucophrys*.

Rendle (l. c.) places *Leucophrys* immediately before *Tricholaena* to which he compares it. The silky spikelets resemble outwardly those of *Tricholaena* but the indurated fruit and membranaceous, entire and awnless second glume and sterile lemma indicate but remote relationship to that genus. The two, however, probably belong closer together than is indicated by their relative position in the sequence here given, but it must be borne in mind that any lineal arrangement of that which is really irregularly radiate must fail to show all but the closest relationship.

12. Genus ERIOCHLOA H. B. K.

Eriochloa H. B. K. Nov. Gen. & Sp. 1 : 94. pl. 30 and 31. 1816. Two species are included, *E. distachya* H. B. K. (l. c. pl. 30) "Crescit in ripa Orinoci fluminis inter Santa Barbara et Esmeraldam," and *E. polystachya* H. B. K. (l. c. pl. 31.). Since both are illustrated and are equally covered by the generic description the first species is here taken as the type of the genus. A duplicate type of this, "Ex herb. Humboldt," was examined in the Berlin Herbarium.

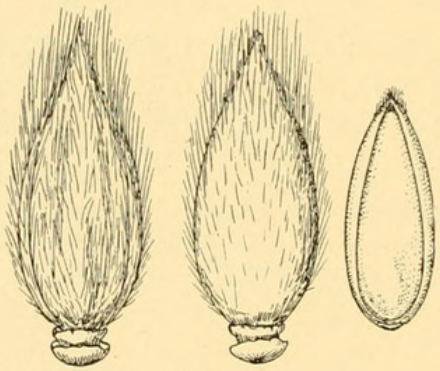

Fig. 4.
Eriochloa distachya.
(Two views of spikelet and fruit x 10 diam.)

Helopus Trin. Fund. Agrost. 103. pl. 4. 1820. A single species, *H. pilosus* Trin. (op. cit. 104) is included. Since the genus only and not the species is described and since no specimen is cited we should consider the species based on *Milium ramosum* Retz., which is cited as a synonym, save for the fact that plate 4 shows an aristate lemma while Retzius (Obs. Bot. 6 : 12. 1791) states that the "valvula exterior" is mucronate only, and that Trinius later (Gram. Pan. 118. 1826) gives *Helopus pilosus* Trin. as a synonym of *Paspalum punctatum* Flügge (*Milium punctatum* L.), while *Milium ramosum* Retz. he gives as a synonym of *Paspalum annulatum* Flügge. In the Trinius Herbarium is a specimen collected by Mikan in Brazil, which is marked in Trinius' hand "Helopus pilosus m. Paspalum punctatum Flügge." Whether or

not this specimen be taken as the type of *H. pilosus* we know that the species *Eriochloa punctata* (L.) Hamilt. (Prod. Pl. Ind. Occ. 5. 1825), based on *Milium punctatum* L., should be taken as the type of the genus *Helopus* Trin.

Trinius places *Eriochloa* H. B. K. immediately after *Helopus* in his systematic arrangement and (page 75) differentiates the two as follows:

> Racemi ad rachin communem. Cor. apice mucronato-aristata . Helopus.
> Racemi subpaniculati. Involucrum stellato-setosum! . . . . . Eriochloa.

Probably Trinius had not at that time seen Kunth's species and was impressed by Kunth's description of an involucre of numerous hairs at the apex of the pedicel and by the ring of spreading hairs shown in plate 30. Later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : [2] 130 and 133. 1834) the species of both *Eriochloa* and *Helopus* are placed in *Paspalum* in the subdivision *Helopus*.

Oedipachne Link, Hort. Berol. 1 : 51. 1827. This includes a single species, *O. punctata* Link (l. c.), based on *Milium punctatum* L. In his additions and emendations (p. 273) Link directs that *Oedipachne* be expunged and *Helopus* Trin. be inserted in its place, and in the second volume (Hort. Berol. 2 : 199. 1833) *Helopus* is given as a genus with *Oedipachne* as a synonym. *Eriochloa* H. B. K. seems to have been overlooked by Link.

Alycia Willd.; Steud. Nom. Bot. ed. 2. 1 : 66. 1840. This herbarium name is listed without description, and two undescribed species, *A. coarctata* Willd. and *A. distachya* Willd., are listed under it. Both names are here referred to *Helopus brachystachys* but on page 747 *A. coarctata* Willd. is referred to *Paspalum polystachyum* Trin. and *A. distachya* to *P. brachystachyum* Trin. *Helopus brachystachys* Trin. (upon which *Paspalum brachystachyum* is based) is *Eriochloa distachya* H. B. K. or a very closed allied species, while *Paspalum polystachyum* Trin. is based on *Eriochloa polystachya* H. B. K., so that whichever species be taken as the type of *Alycia* this name becomes synonymous with *Eriochloa* H. B. K. Willdenow's herbarium name is spelled "Aglycia" by Steudel (op. cit. 37) with the same two species listed under it.

Nees (Agrost. Bras. 16. 1829) recognizes *Helopus* Trin. as a genus, and does not mention *Eriochloa*. Probably since neither of Kunth's species was from Brazil Nees neglected to study the genus.

Doell (Mart. Fl. Bras. 2 : [2] 123. 1877) recognizes *Helopus* Trin. as a genus, and includes *Eriochloa* H. B. K. under it. Bentham (Benth. & Hook. Gen. Pl. 3 : 1099. 1883) recognizes *Eriochloa* H. B. K.

Nash (Bull. Torrey Club 30 : 374. 1903) takes up the name *Monachne* Beauv. for this genus, but we do not find this name tenable. It is based on *M. unilateralis* Beauv., an undescribed species unrecognizable from the figure, which represents a branching paniculate inflorescence, though the spikelets were evidently drawn from some species of *Eriochloa*, and *Saccharum reptans* Lam., which is a species of *Panicum* allied to *P. urvilleanum* Kunth.

Description.—Inflorescence of one to many, usually dense, racemes along a common axis; spikelets solitary, sometimes in pairs, short pediceled or subsessile in two rows on one side of a narrow, usually hairy rachis, the pedicels often clothed with long stiff hairs [the "involucre" of Kunth], the back of the fertile lemma turned from the rachis; spikelets dorsally compressed, more or less pubescent, stipitate by the lengthening of the internode of the rachilla below the second glume into a more or less ring-like, usually dark-colored callus, the first glume reduced to a minute sheath about this internode and adnate to it; second glume and sterile lemma equal or nearly so, acute or acuminate, the lemma usually enclosing a hyaline palea and sometimes a staminate flower; fruit indurated, less so than in *Panicum*, minutely papillose-rugose, the lemma mucronate-pointed or aristate, sometimes pubescent at the apex, the margins slightly inrolled. Perennial herbs with linear leaves and terminal panicles of few to many racemes, confined to the warmer temperate and tropical regions of both hemispheres.

This genus approaches *Leucophrys* and *Brachiaria* through such species as *Panicum nigropedatum* Munro, *P. argenteum* R. Br., and *P. serratum* R. Br. in which the first glume is well developed above the more or less stipitate base.

13. Genus BRACHIARIA (Trin.) Griseb.

Brachiaria Griseb. in Ledeb. Fl. Ross. 4 : 469. 1853. Grisebach here raises "Panicum sect. Brachiaria Trin." (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : [2] 194. 1834) to a genus, including under it a single species *B. eruciformis* (Smith) Griseb. based on *Panicum eruciforme* Smith (Sibth. Fl. Graec. 1 : 44. pl. 59. 1806). "In arvis circa Junonis templum in insula Samo." The plate is a good representation of the species and fully identifies it. The enlarged portion of the raceme (f. A) shows that the spikelets are placed with the first glume toward the axis. This species we here take as the type of the genus. Roemer & Schultes (Syst. Veg. 2 : 426. 1817) misspell the name "*cruciforme*," and in this form also it appears in the Index Kewensis under *Brachiaria*.

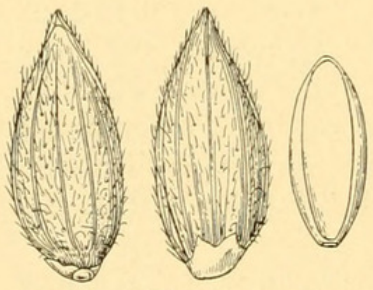

Fig. 5.
Brachiaria eruciformis.
(Two views of spikelet and fruit x 10 diam.)

Grisebach cites not the first work in which Trinius proposes the subgenus *Brachiaria*, but a later work, in which Trinius includes a somewhat different group of species from those included in his first establishment of the section in "De Graminibus paniceis" (pages 51 and 125. 1826). Here (p. 51) the section is diagnosed as follows: Racemes simple, regularly or irregularly alternate; spikelets oblong (rarely lanceolate), either in regular series and imbricated or laxly disposed; lower glume manifest, awnless. Under it are included "Thrasya Kth.? * * *

Urochloa Pal. [de Beauv.] * * * Streptostachys Desv., Echinochloa Pal." In the body of the work (p. 125) the first species included under section *Brachiaria* is *Panicum decumbens* Roem. & Schult. (*Paspalum decumbens* Poir.), the species which later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : [2] 227. 1834) is the first included under section *Harpostachys* of Trinius. This is followed by *Panicum thrasyoides* and *P. cultratum* (species of *Thrasya*), several species of Panicum (in the stricter sense) and of *Echinochloa; P. holosericeum* and *P. argenteum*, in which the spikelets are in the reversed position and which are the first species under section *Brachiaria* as later used by Trinius, are here only the seventeenth and eighteenth species under that section. In the "Panicearum Genera" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : [2] 194. 1834), which Grisebach cites, Trinius makes *Brachiaria* the eighth section of *Panicum*, *Harpostachys*, to which are relegated the species with a single raceme earlier included in *Brachiaria*, being the seventh. The characters now assigned to *Brachiaria* are: Simple, alternate racemes, the partial axes angled (usually 3-angled); sessile or short-pediceled, glabrous, pilose, or lanate, awnless spikelets, imbricated in 2, 3, or 4 series. No species is here mentioned, but under "VIII Brachiaria" (pages 233–247) this purely artificial division contains thirty diverse species referable to *Brachiaria* (as here limited), *Echinolaena*, and the greater number to *Panicum*. Since there is nothing in either work to indicate which species should be considered the type, it seems best to follow Grisebach's choice when he established *Brachiaria* as a genus. His choice, to be sure, was guided by the fact that *Panicum eruciforme* was the only one of the group which occurred in the Russian Empire, but even so, it would be unwise to reject his type and arbitrarily to choose another. *Panicum eruciforme* is included, under the name "*Panicum Isachne* Roth!" by Trinius in the first subdivision of his section *Brachiaria* as limited in the "Panicearum Genera." Later in the "Graminum Supplementa" (op. cit. 4 : [1] 103. 1836) he states that *P. Isachne* should be called *Panicum eruciforme*. Trinius' first three species, *P. holosericeum* R. Br., *P. argenteum* R. Br. and *P. serratum* Spreng., are of that peculiar group of Old World species with reversed spikelets clothed with silvery hairs more or less aggregated across the middle of the second glume and sterile lemma, and having a well-developed first glume, which, together with *Leucophrys*, appear to be a connecting link between *Eriochloa* and *Brachiaria*. In the present state of our knowledge it is difficult to say whether these species fall the more naturally into *Brachiaria* or into *Leucophrys*.

Grisebach does not mention the reversed position of the spikelets in *Brachiaria*, and later (Goett. Abh. 7 : 263. 1857) transfers to this genus *Panicum prostratum* Lam. (*P. reptans* L.), a species in which the spikelets are not in the reversed position. In the "Flora of the West Indies" (page 545. 1864) Grisebach uses "Brachiaria Tr." as a section of *Panicum*, including under it *Panicum paspaloides* Pers. [*P. geminatum* Forsk. is intended] and three species of *Echinochloa*.

Steudel (Syn. Pl. Glum. 1 : 56. 1854) follows Trinius' own later limitation of the subgenus *Brachiaria*.*

Bentham (Benth. & Hook. Gen. Pl. 3 : 1102. 1883) uses the name *Brachiaria* for a section of *Panicum* and in about the sense equivalent to the group *Geminata* (Hitchc. & Chase, Contr. Nat. Herb. 15 : 30. 1910). Hackel (Engler & Prantl. Pflanzenf. 2 : [2] 35. 1887) also uses it as a section of *Panicum* and apparently in the same way, his diagnosis being: Inflorescence as in *Paspalum*, spikelets awnless.

Nash (Britton, Man. 77. 1901) recognizes *Brachiaria* as a genus (giving Ledebour as the author), differentiating it by the racemose inflorescence and awnless spikelets of 3 glumes. Two species, *Panicum digitarioides* (*P. hemitomon* Schult.) and *P. obtusum* H. B. K., in both of which the spikelets are in the position normal for *Panicum* and *Paspalum*, not the reversed position of *Brachiaria eruciformis*, are transferred to it. Later (in Small, Fl. Southeast. U. S. 50 and 80. 1903) Nash adds to his diagnosis of the genus *Brachiaria* "flowering scale with its opening toward the rachis," thus limiting the genus to Grisebach's type species and its allies. *Panicum digitarioides* and *P. obtusum* he here restores to *Panicum*. Hitchcock (Contr. Nat. Herb. 12 : 141. 1908) accepts *Brachiaria* in this emended sense, separating it from *Panicum* chiefly on account of its "having spikelets so placed that the fertile floret stands with its palea toward the axis."

Milium Bubani, Fl. Pyren. 4 : 259. 1901, not L. 1753. This includes a single species, *M. alternans* Bubani, based on *Panicum eruciforme* Smith. No generic description is given but something of the author's concept of the genus is shown by his statement that it is not possible to separate *Panicum beckmanniaeforme* Mikan (*P. geminatum* Forsk.) from *Milium alternans*, indicating that *Milium* is used in the historic sense.

Description.—Inflorescence of several to many dense racemes along a common axis; spikelets solitary, rarely in pairs, subsessile in two rows on one side of a 3-angled, sometimes narrowly winged rachis, the back of the fertile lemma turned from the axis; spikelets dorsally compressed, sometimes turgid; first glume usually less than half the length of the spikelet; second glume and sterile lemma equal or nearly so, 5- to 7-nerved, the lemma enclosing a hyaline palea and sometimes a staminate flower; fruit indurated (in the type species smooth and shining) usually papillose-rugose, the margins of the lemma inrolled, the apex rarely mucronate pointed. Annual or perennial, branching herbs with linear leaves, the culms often decumbent and rooting at the lower nodes, confined to the warmer temperate and tropical regions of both hemispheres.

Brachiaria is here distinguished from allied genera by the strictly racemose inflorescence and reversed position of the spikelets (in which the first glume is present) taken in combination.

*Schlechtendal's stricture (Linnaea 26 : 537. 1853) of Steudel for including under *Panicum* section *Brachiaria* Trin. a different aggregation of species from that included under it by Trinius himself, must have been made in ignorance of Trinius' later paper, for Steudel, not only includes the same species as did Trinius, but gives them in the same order, only interspersing a few of what he considers allied species.

Among North American species of *Panicum* two approach *Brachiaria* or *Leucophrys*, *Panicum texanum* Buckl. and *P. ciliatissimum* Buckl., in which the inflorescence is not strictly racemose, but in the first of which the spikelets toward the ends of the branches are often in the reverse position of those of *Brachiaria*, while in the second all the spikelets are in the reverse position. The rugose apiculate fruit of both also recall the fruit of *Eriochloa* and of one species of *Brachiaria*, *B. meziana* Hitchc., but the spikelets are not in one-sided racemes.

14. Genus AXONOPUS Beauv.

Axonopus Beauv. Ess. Agrost. 12 and 154. 1812. A brief diagnosis is given and the following species cited as belonging to the genus: "*Milium compressum* [*Axonopus compressus* (Swartz) Beauv.], *digitatum* [*Syntherisma digitata* (Swartz) Hitchc.], *cimicinum* [*Panicum cimicinum* (L.) Retz., *Coridochloa cimicina* (L.) Nees], *paniceum* [a species of *Syntherisma*]." There is little in the diagnosis or observations to favor one species more than another as the type, but such as there is favors *M. compressum*, since *Axonopus* is differentiated from *Ceresia* and *Paspalum* on the digitate inflorescence and solitary spikelets. All but the first species named have spikelets in pairs. This species, therefore, we take as the type of *Axonopus*. Beauvois himself expresses doubts as to the validity of his genus. He says that if *Milium* can be separated from *Paspalum* because the axis of the latter is a spike composed of spikelets alternate or geminate, the same character (*motif*) would serve to distinguish *Axonopus* in which the axis is digitate; at least if one does not reunite the three genera, forming of each a division of the same genus; this, he says, would be perhaps the most natural. But, he adds, "C'est aux Botanists à prononcer: il me suffit de leur présenter mes doutes." Next follows a brief, informal description of a plant received from "M. de Lessert," which, it appears to Beauvois, ought to belong to this genus, with the name of *Axonopus aureus*. In the index (page 154) all five species mentioned are listed under *Axonopus*, but all except "*aureus*" are followed by a question mark. But we find that under *Milium* in the index these same species are again queried. It would seem that the query refers to the author's doubts as to the advisability of keeping *Paspalum* and *Axonopus* distinct from *Milium*. The omission of the question mark after "*aureus*" may be a typographical error. However, we hold *Axonopus compressus* and *A. aureus* to be congeneric, but to belong to two rather well-marked sections.

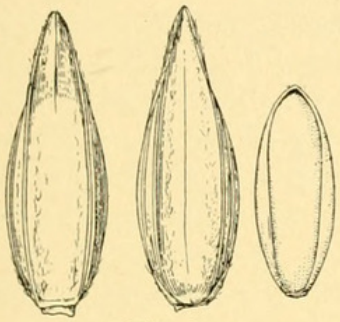

Fig. 6.
Axonopus compressus.
(Two views of spikelet and fruit x 10 diam.)

Cabrera Lag. Gen. & Sp. Nov. 5. 1816. A single species is given under this genus, *C. chrysoblepharis* Lag. "H. in America meridionali, ad Panamaidem et *Aricam* portum, ubi legit. cel. D. Lud. Neé (V. S.)." The type specimen has not been examined but the clear and detailed descrip-

tion identifies the species with that described as *Paspalum immersum* Nees. In this species and its close allies the 3-angled rachis is about 1.5 mm. wide, the margins and midrib bearing stiff golden hairs arising from papillæ, a few hairs also at the side below the spikelet, but not bearing a fascicle of hairs beneath the spikelet as in *Axonopus aureus*. The spikelets in *Cabrera chrysoblepharis* fit into shallow depressions in the rachis, the effect of an excavation being heightened by the surrounding piliferous papillæ. In *A. aureus*, to which Lagasca's species has been referred by many authors, and its close allies, the narrow rachis is ciliate on the margin (not down the center also as in *Cabrera chrysoblepharis*), and below each spikelet, "in the form of an involucre," as Beauvois says, is a fascicle of bright golden hairs exceeding the spikelets which are not set in excavations of the rachis. Nees (Agrost. Bras. 78. 1829) includes *Axonopus aureus* Beauv. (under the name *Paspalus immersus** to which he refers *A. aureus* as a synonym) and allied species under Paspalum "Sectio VI. Axonopodes." Apparently he failed to note that in these species as well as in *Paspalum compressum* and its allies, of which he makes "Sectio I. Digitariae," the solitary spikelets are in the reversed position. Nees refers "Gen. Cabrera Lag." to this section *Axonopodes*. Lagasca's species, *C. chrysoblepharis*, he refers as a synonym to his own *Paspalus exasperatus*."

Anastrophus Schlecht. Bot. Zeitschr. 8 : 681. 1850. The author discusses *Paspalum* section *Digitariae* "(spiculis inversis)" of Nees and proposes a generic name for it. He lists under this genus the names of eight species, three of them unpublished herbarium names. The first of the species (all of which are included in the section *Digitariae* by Nees) is *Paspalum platyculmum* Thou. This species, which we take as the type, was described by Nees (Agrost. Bras. 24. 1829) from a specimen bearing this name in the Willdenow Herbarium. We have not seen the specimen, which was collected in "insula S. Mauritii," but Nees' description shows it to be closely related to *Axonopus compressus*. Schlechtendal does not himself form any binomials under *Anastrophus*. Index Kewensis (1 : 118. 1893) transfers all names, including nomina nuda, mentioned by Schlechtendal in his paper. Schlechtendal does not here make any mention of *Axonopus*, but in a later paper (Linnaea 26 : 532. 1853), discussing *Axonopus* Beauv., he remarks that he has already established *Anastrophus* and has thereby begun the destruction of the genus *Axonopus* of Beauv., and that now *Cabrera* Lag. must be separated from it. [Since Nees did not mention the reversed position of the spikelets in this group, as he did in the group Schlechtendal named *Anastrophus*, neither does Schlechtendal note this character, although when discussing *Anastrophus* he laid great stress upon it.]

Hackel (Engler & Prantl, Pflanzenf. 2 : [2] 35. 1887) makes *Anastrophus* his third section of *Paspalum*, noting that the lower glume and lemma are turned from the axis. Nash (Small, Fl. Southeast. U. S. 79. 1903) recognizes *Anastrophus* as a genus.

* Nees uses throughout the masculine form of this name.

Lappagopsis Steud. Syn. Pl. Glum. 1 : 112. 1854. This genus is proposed with a single species *L. bijuga* Steud. "*Urville* legit in Ins. St. Catharin. et *Claussen* in Brasil." The Claussen specimen referred to is in the Kew Herbarium. It is found to be closely related to *Paspalum dissitiflorum* Trin., which species Nees (Agrost. Bras. 32. 1829) includes in his section "Digitariae (speculis inversis)." Hackel (Engler & Prantl. Pflanzenf. 2 : [2] 35. 1887, where the name is misspelled "*Lappagrostis*") includes it in section *Anastrophus*.

Owing to its insufficient diagnosis and the diverse species assigned to *Anoxopus* by Beauvois this name has been applied to different groups of species by different authors. Roemer & Schultes (Syst. Veg. 2 : 318. 1817) recognize it as a genus including under it the same species as did Beauvois except *A. paniceus* which, they say, is *Paspalum filiforme* [it is a species allied to *Syntherisma filiformis*]. Nees, as we have seen, used it as a section of *Paspalum* for the species allied to *A. aureus*. Hooker (Fl. Brit. Ind. 7 : 64. 1896) says of *Axonopus* "A natural genus, remarkable for the small cleft palea of gl. III [the sterile palea]. It was established by Beauvois on *Panicum cimicinum* Retz, to which other grasses having no affinity with it were added." Hooker does not state why he takes *P. cimicinum* as the basis of *Anoxopus*. It fails to agree with one of the two characters of Beauvois' diagnosis (in that its spikelets are not solitary), and it is only third in the list. Hooker here includes one other species in this genus, *A. semialatus* (based on *Panicum semialatum* R. Br.) Stapf (Dyer, Fl. Cap. 7 : 418. 1898) accepts the genus as emended by Hooker. Hitchcock (Rhodora 8 : 205. 1906; Contr. Nat. Herb. 12 : 141. 1908; Gray, Man. ed. 7. 100. 1908; Contr. Nat. Herb. 12 : 207. 1909.) recognizes *Axonopus* for the congeners of *A. compressus*.

Description.—Inflorescence of 2 to many slender racemes usually aggregated at the summit of the culm; spikelets solitary, sessile and alternate in two rows on one side of a 3-angled rachis, the back of the fertile lemma turned from the axis; spikelets depressed-biconvex, not turgid; first glume wanting; second glume and sterile lemma equal; sterile palea obsolete; fruit indurated, oblong-elliptic, usually obtuse, the margins of the lemma slightly inrolled. Stoloniferous or tufted perennials, with flat, conduplicate or involute, linear leaves; species numerous in South America, a few species extending into subtropical and warm temperate regions of North America and one or two to the warmer parts of the Old World.

The characters to which we here attach chief value as generic are the reversed and solitary spikelets (in which the first glume is wanting) and the racemes aggregated at the summit of the culm.

The genus *Axonopus* as here understood, subdivides into three rather well-marked sections as follows:

Rachis and spikelets glabrous or the latter softly pubescent, neither bearing conspicuous, stiff, spreading hairs . . . . . AXONOPUS proper.

Rachis and sometimes spikelets bearing conspicuous, stiff, spreading hairs.

Spikelets glabrous or minutely pubescent, the hairs of the rachis golden . . . . . Section Cabrera.
Spikelets papillose-pilose, the hairs of these and of the rachis pale . . . . . Section Lappagopsis.

In North America *Axonopus* proper is represented by the following species:

Axonopus compressus (Sw.) Beauv.

Milium compressum Sw. Prod. Veg. Ind. Occ. 24. 1788. "Jamaica; India occidentalis." No specimen of this could be found in the Swartz Herbarium, but the later detailed description of Swartz (Fl. Ind. Occ. 1 : 183. 1797) leaves no room for doubt.

Paspalum platicaulon Poir. Encyc. Suppl. 5 : 34. 1804. "Cette espèce a été recueillie à Porto-Ricco, par le citoyen Ledru. (V. s. in herb. Lam.)." The type has not been examined but the description identifies the species.

Axonopus compressus Beauv. Ess. Agrost. 12. 1812. Based on *Milium compressum* Sw.

Paspalum compressum Rasp. Ann. Sci. Nat. I. 5 : 301. 1825. Based on *Axonopus compressus* Beauv.

Anastrophus platycaulis Schlecht.; Ind. Kew. 1 : 118. 1893. Based on *Paspalum platycaule*.

Closely related to this species is a narrower-leaved form with nearly obtuse spikelets and usually few racemes which may be *Paspalum tristachyon* Lam. (Tabl. Encycl. 1 : 176. 1791. "Ex America merid. Communic. D. Richard"). This name has been referred by Trinius and others to *P. platycaule*, but Lamarck's description "spicis ternis" points to the other form. The type has not been examined.

Axonopus furcatus (Flügge) Hitchc.

Paspalum furcatum Flügge, Gram. Monog. 114. 1810. "Carolina. *Bosc. Walne.*" The type has not been examined, but the description identifies the species.

Paspalum digitaria C. Muell. Bot. Zeit. 19 : 324. 1861. "America septentrionalis, ubi forsan in Texas legit T. Drummond (coll. no. 276)." The type specimen was examined in the Berlin Herbarium.

Axonopus furcatus Hitchc. Rhodora 8 : 205. 1906.

Michaux's name *Digitaria paspalodes* and several names based upon it, *Milium paspalodes* Ell., *Paspalum elliottii* Wats., *Paspalum paspalodes* Scribn., and *Anastrophus paspaloides* Nash, have been misapplied to this species. Michaux's type specimen is *Paspalum distichum* L.*

Axonopus Rosei (Scribn. & Merr.).

Paspalum Rosei Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 24 : 9. f. 2. 1900. "Foothills of the Sierra Madre Mountains, between

* See Hitchcock, Contr. Nat. Herb. 12 : 146. 1908.

Pedro Paulo and San Blascito, 1995 J. N. Rose, August 4, 1897." The type specimen is in the National Herbarium.

Axonopus capillaris (Lam.).

Paspalum capillare Lam. Tabl. Encycl. 1 : 176. 1791. "Ex America merid. Comm. D. Richard."

Paspalum minutum Trin. (Linnaea 10 : 293. 1836), the type of which, collected by Poeppig in Peru, was examined in the Trinius Herbarium, appears to be based on depauperate specimens of *A. capillaris*.

The only North American specimens we have seen of this species are from Costa Rica, *Pittier* 508 and *Jimenez* 146.

Axonopus laxiflorus (Trin.).

Paspalum laxiflorum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 148. 1834. "V. spp. Bras." The type specimen, in the Trinius Herbarium, is labeled "Paspalum laxiflorum m. In saxosis pratisque humidis S. da Lapa. Langsdorff."

This species is represented from North America in the National Herbarium by *Pittier* 214, Alta Verapaz, Guatemala, and *Nelson* 2738, collected between Guichocovi and Lagunas, Oaxaca, Mexico.

Axonopus poiophyllus sp. nov.

Plants perennial, tufted, flattened at the base; culms erect, slender, compressed, 60 to 90 cm. high, simple, glabrous or minutely scrabrous below the appressed-pubescent nodes, the leaves mostly crowded at the base; lower sheaths much overlapping, keeled, villous, the upper pubescent along the margin, otherwise glabrous or minutely pubescent; ligule scarcely 0.5 mm. long, erose-ciliate; blades erect, firm, linear, 8 to 35 cm. long (the uppermost reduced to 0.5 to 2 cm. long), 3 to 5 mm. wide, the apex boat-shaped as in *Poa*, the lower conduplicate at base and slightly narrower than the summit of the sheaths, usually flat above, papillose-villous toward the base on both surfaces, scabrous on the upper surface; inflorescence of about 3 slender, erect racemes, 6 to 12 cm. long, the rachis narrow, flexuous, glabrous or minutely scabrous; spikelets tinged with rose-purple, distant their own length, 3 mm. long, 1 mm. wide, oblong-elliptic, subacute, the second glume and sterile lemma slightly exceeding the fruit, minutely pubescent at the base and along the edges with appressed silky hairs, 4-nerved, the midnerve suppressed or nearly so, especially that of the glume, the lateral nerves near the margins and approximate; fruit pale, very obscurely papillose, the lemma with a minute tuft of erect hairs at the apex.

Type U. S. National Herbarium no. 860024, collected in April, 1904, in the vicinity of Secanquím, Alta Verapaz, Guatemala, by O. F. Cook & C. B. Doyle (no. 58).

This species is related to the group of cespitose South American species to which *A. laxiflorus* also belongs.

Axonopus deludens sp. nov.

Plants perennial; culms geniculate at base, leafy, strongly flattened, rather stout, 1 to 1.5 meters high, sparingly branching, glabrous, the nodes glabrous; sheaths glabrous or minutely pubescent at the summit; ligule about 0.5 mm. long, membranaceous, erose; blades rather thin and lax, linear, 15 to 45 cm. long, 8 to 13 mm. wide, flat, sparsely papillose-scabrous on the upper surface and on the margin, pubescent on the narrow auricles, glabrous beneath, the midnerve prominent; inflorescence of 6 to 15 very slender, erect or rather lax racemes, 10 to 25 cm. long, the lower mostly naked at the base, the rachis narrow, subflexuous, scabrous; spikelets purple tinged, distant about their own length or, toward the base of the raceme, remote, 3 to 3.2 mm. long, 1 to 1.2 mm. wide, obtuse, glabrous, the second glume and sterile lemma covering the fruit but not exceeding it, delicate in texture, 4- or 5-nerved, the midnerve present or suppressed even in adjacent spikelets, the lateral nerves strong; fruit papillose, smooth toward the summit and margins of the lemma, the apex glabrous or with a few obscure hairs.

Type U. S. National Herbarium no. 460803, collected Oct. 20, 1903, Barranca near Guadalajara, Jalisco, Mexico, by C. G. Pringle (no. 8761).

This species is not closely related to any other we have seen. The geniculate lower nodes suggest a stoloniferous habit, but our one specimen does not show stolons. The suppression of the midnerve in the glume or its presence is somewhat confusing, since it gives the impression of spikelets turned different ways, reverse and obverse, but turning back the glume always shows the back of the fertile lemma turned from the axis.

There are some eight or ten South American species, as yet insufficiently known, that belong in *Axonopus* proper. *Paspalum suffultum* Mikan (Trin. in Spreng. Neu. Entd. 2 : 46. 1821) is interesting as a species intermediate between *Axonopus* proper and section *Cabrera*. The axis is not ciliate but the very short pedicels bear at either side a few stiff hairs nearly as long as the spikelets.

Section Cabrera (Lag.).

Axonopus chrysoblepharis (Lag.).

Cabrera chrysoblepharis Lag. Gen. & Sp. Nov. 5. 1816. (See above under *Cabrera*.)

Paspalus immersus Nees, Agrost. Bras. 82. 1829. "Habitat in campis ultra 2000 pedes altis provinciae Minarum generalium passim." The type specimen was examined in the Munich Herbarium. This is, as Nees indicates, the species Kunth called *Paspalum aureum*, but since Kunth based this name on *Axonopus aureus* Beauv., his name is a synonym of that, misapplied to this species.

Panicum immersum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 197. 1834. Based on *Paspalum immersum* Nees.

Panicum chrysoblephare Steud. Syn. Pl. Glum. 1 : 38. 1854. Based on *Cabrera chrysoblepharis* Lag.

Paspalum chrysoblephare Doell in Mart. Fl. Bras. 2^2 : 119. 1877. Based on *Panicum chrysoblephare* Steud.

The North American specimens of this species in the National Herbarium are all from Costa Rica: *Herb. Instit. physico-geogr. nat. costaricensis* no. 4464, collected in "Savanes de Boruca," by *Pittier & Tonduz* and no. 4638, collected between Boruca and Terraba, by *Pittier;* no. 11004 of the same series, collected by *Pittier*, is a mixture of *A. chrysoblepharis* and *A. aureus.*

Axonopus aureus Beauv.

Axonopus aureus Beauv. Ess. Agrost. 12. 1812. Beauvois states that the plant was given him by De Lessert, but does not say whence it came. The specimen could not be found in the Delessert Herbarium. The author's observation "Locustes [spikelets] sont garnies, en-dessous, et en forme d'involucre, de poils court et dorés", points conclusively to one of the species with a cluster of golden hairs subtending the spikelets, these having a narrow rachis, not a broad one in which the spikelets are sunken as in *A. chrysoblepharis.* Following Trinius (Icon. 1: pl. 97. 1828) we take the common species with the smaller and glabrous spikelets to be the true *A. aureus.* The one with larger, pubescent spikelets, *Paspalum canescens* Nees (in Trin. Gram. Pan. 89. 1826, not Roth. 1821, *Panicum chrysodactylon* Trin.), the type of which was examined in the Trinius Herbarium, has not been found in North America and for the present need not be transferred. The species of this group extending into North America is that called *Paspalum aureum* by Trinius.

Paspalum aureum H. B. K. Nov. Gen. & Sp. 1 : 93. 1816. Based on "*Axonopus* [misspelled *Axinopus*] *aureus* Beauv. agrost. p. 12." The species described and illustrated by Kunth (l. c. pl. 27) is *A. chrysoblepharis.*

Digitaria aurea Spreng. Syst. 1 : 272. 1825. Based on "*Paspalum aureum* Humb."

Paspalum exasperatum Nees, Agrost. Bras. 81. 1829. "Habitat ad margines sylvarum prope Ferradas provinciae Bahiensis, in via Felisbertiana, quae descendit e Minis." The type specimen was examined in the Munich Herbarium.

Panicum aureum Trin. Mém. Acad. St. Pétersb. VI. 3^2 : 196. 1834. Based on "*P*[*aspalum*] *aureum* Trin."

In North America this species also is known only from Costa Rica. In the National Herbarium are the following: *Herb. instit. physico-geogr. nat. costaricensis* no. 3305, collected at Pacaca, by *Pittier;* no. 3683, collected at Buenos Aires by *Tonduz;* nos. 11003 and 11004, collected at Cañas Gordas by *Pittier*, the latter having an intermixture of *A. chrysoblepharis.*

Section Lappagopsis (Steud.).

Axonopus dissitiflorus (Trin.).

Paspalum dissitiflorum Trin. Gram. Pan. 92. 1826. "V. spp. Brasil. (Langsdorff.)" The type specimen was examined in the Trinius Herbarium.

Paspalus tener Nees, Agrost. Bras. 32. 1829. This herbarium name is given as a synonym of *P. dissitiflorum* Trin.

This species is represented in the National Herbarium by *Glaziou* 15637, from Brazil.

Axonopus bijugus (Steud.).

Lappagopsis bijuga Steud. Syn. Pl. Glum. 1 : 112. 1854. (See above under *Lappagopsis*.)

This more delicate species with smaller spikelets is represented in the National Herbarium by the following, all from Brazil: *Burchell* 5886, 7703; *Gardner* 2978.

Two species described by Nees, *Paspalum canaliculatum* and *P. fastigiatum*, the types of which, both collected by Martius in Brazil, were examined in the Munich Herbarium, belong in this section but being insufficiently known are not here transferred.

15. Genus REIMAROCHLOA Hitchc.

Reimarochloa Hitchc. Contr. Nat. Herb. 12 : 198. 1909. "For *R[eimaria] acuta* and its allied species the above name is proposed with *Reimaria acuta* Flügge as the type: *Reimarochloa acuta* (Flügge)" Hitchc. Besides the type, two other species are here included in this genus, *Reimarochloa brasiliensis* (Spreng.) Hitchc. and *Reimarochloa oligostachya* (Munro) Hitchc. For the discussion of *Reimaria* Flügge see this name under *Paspalum*.

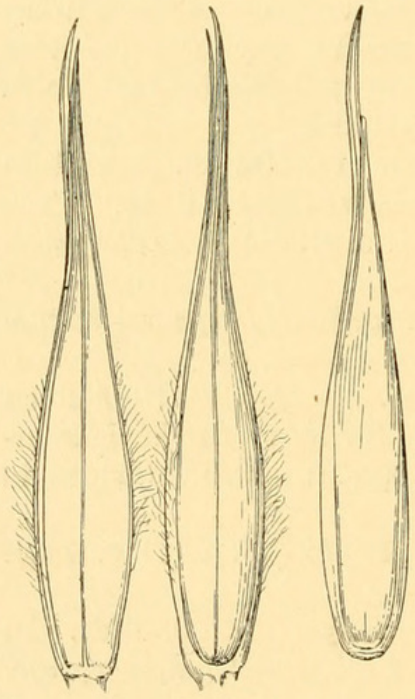

Fig. 7.
Reimarochloa acuta.
(Two views of spikelet and fruit x 10 diam.)

Description.—Inflorescence of few to several slender racemes, approximate at the summit of the culm, spreading or reflexed at maturity; spikelets strongly dorsally compressed, lanceolate, acuminate, solitary, rather distant, subsessile and alternate in two rows along one side of a narrow, flattened rachis, the back of the fertile lemma turned toward it; both glumes wanting (or the second glume sometimes present in the terminal spikelet); sterile lemma about equaling the fruit, sterile palea obsolete; fruit scarcely indurated, the lemma faintly nerved, acuminate, the margins inrolled at the base only, the palea free nearly half its length. Stoloniferous perennials with linear leaves; a small genus of but few species confined to the tropics and subtropics of the western hemisphere.

The scarcely indurated, acuminate fruit, the margins of the lemma inrolled at the base only, the palea free for its upper half, and the absence of the glumes, taken in combination, together with the spreading or

reflexed racemes approximate at the summit of the culm, are here taken as the distinguishing characters of this genus.

Besides the species placed in this genus by Hitchcock (l. c.) a third South American species belongs in the genus, **Reimarochloa aberrans** (Doell), *Reimaria aberrans* Doell (Mart. Fl. Bras. 2^2 : 38. pl. 13. 1877) "Habitat prope Santarem provinciae Paraënsis (R. Spruce n. 851 et 887.)" The type specimen, *Spruce* 851, was examined in the Munich Herbarium. In this species the second glume is occasionally present on racemes with glumeless spikelets.

16. Genus PASPALUM L.

Paspalum L. Syst. Nat. ed. 10. 855. 1759. After a brief diagnosis four species are given, *P. dimidiatum*, *P. virgatum*, *P. paniculatum* and *P. distichum*. All agree with the diagnosis, though the last, with acute fruit, might be excluded from eligibility as type species because the generic diagnosis reads: "*Cor.* Gluma * * * obtusa." None of the species are figured in the same work, none are economic nor indigenous from the standpoint of the author. *Paspalum virgatum* and *P. paniculatum* are here first published, *P. dimidiatum* being the only one previously described. For this reason and also because it is the first species under the genus it is here taken as the type. This is given as follows: "*dimidiatum* A *P*[*aspalum*] spicis subsolitariis, pedunculo communi membranaceo. *Panicum dissectum sp. pl.* 57. *n.* 6." There is nothing to explain why Linnaeus changed the specific name. This is discussed by Hitchcock (Contr. Nat. Herb. 12 : 115–116. 1908) who examined in the Linnaean Herbarium the type specimen, upon the sheet of which Linnaeus wrote both "dimidiatum", which is crossed out, and "dissectum." The plant is also marked "K" which indicates that it was collected by Kalm. In the second edition of the Species Plantarum (page 81. 1762) Linnaeus corrects himself, giving the name *Paspalum dissectum* L. based upon "Panicum dissectum Sp. pl. 1. p. 57." (For a full discussion the reader is referred to Hitchcock's paper.) The specimen belongs to the species long known under the name *Paspalum membranaceum* Walt.

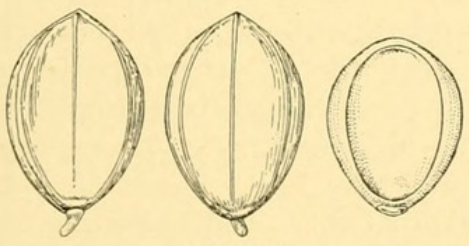

Fig. 8.
Paspalum dissectum.
(Two views of spikelet and fruit x 10 diam.)

The masculine form *Paspalus* was used by Flügge (Gram. Monog. 51–190. 1810) Roemer and Schultes (Syst. Veg. 2 : 290–317. 1817) and by Nees (Agrost. Bras. 18–82. 1829).

Digitaria Heist. in Fabr. Enum. Pl. Hort. Helm. 207. 1759. This name is given as follows: "Digitaria Heist. Dactylis Rai. Gramen dactylon majus panicula longa, spicis pluribus nudis crassis. Sloane." This phrase name in Sloane (Voy. Jam. 1 : 112. pl. 69. f. 2. 1707) refers to the species later published as *Paspalum virgatum* L., Sloane's specimen of which was examined in the herbarium of the British Museum. This phrase

name Linnaeus first cites (as the third synonym) under *Panicum dissectum* (Sp. Pl. 57. 1753), but erroneously, the plate being an illustration of a very different species from the type of *P. dissectum* in the Linnaean Herbarium.* Linnaeus later (Sp. Pl. ed. 2. 81. 1762) cites this phrase name and plate under *Paspalum virgatum* and also (op. cit. 1483), erroneously, under *Andropogon fasciculatum*. According to the American Code of Botanical Nomenclature (Canon 10) the publication of *Digitaria* Heist. as a genus would depend upon the specific description [from Sloane] "associable by citation with a previously published binomial species." While this specific description is cited under *Panicum dissectum* it is erroneously so; the species to which the description (as well as the figure) applies has no "previously published binomial," and therefore in the technical sense is not published.

Sabsab Adans. Fam. 2:31, 599. 1763. No species are given. The technical publication of the name is based upon the citation of "Paspalum. Lin."

Cleachne Roland. in Rottb. Acta Lit. Univ. Hafn. 1:285. 1778. The name "*Cleachne* R." appears to be given as a synonym of *Paspalum*, three unpublished names of the latter being mentioned without description.

Ceresia Pers. Syn. Pl. 1 : 85. 1805. A brief diagnosis is given and a single species *C. elegans* Pers. (l. c.) is cited. This name is based on "Paspalum membranaceum Lam. ill. gen. p. 177. t. 43. f. 2. Hab. in Peru." The generic diagnosis appears to be taken from Lamarck's specific description, but slightly rearranged. Lamarck's specimen has not been examined, but the description and figure indicate one of the species related to *Paspalum stellatum* Humb. & Bonpl. and probably that represented by Gardner's Plants of Brazil no. 4029 and Bang's Plantae Bolivianae no. 1080. Lamarck's name is preoccupied by Walter's use of *P. membranaceum*. Roemer & Schultes (Syst. Veg. 2 : 290. 1817) give *P. elegans*, based on *Ceresia elegans* Pers., as a synonym of *P. membranaceum* Lam., but this binomial also is preoccupied by *P. elegans* Flügge (Gram. Monog. 183. 1810); *P. commersonii* Zucc. (in Roem. Collect. 122. 1809), which appears to refer to this species, is preoccupied by Lamarck's use of the same name. It seems probable that this species has somewhere received a name that will prove tenable, but as yet we have not found it. Trinius and Doell use the name *P. membranaceum* Lam.

Reimaria Flügge. Gram. Monog. 213. 1810. The "character essentialis" given is as follows: "*Calix* uniglumis, unifloris, valvae planiori appressus. *Corolla* plano-convexa, bivalvis," to which is added the observation "Paspalo affinis, at satis superque differt calice constanter uniglumi nec biglumi." It will be seen that the absence of both glumes is the only character given to differentiate this proposed genus from *Paspalum*. Three species are included, *R. candida* Humb. & Bonpl., *R. elegans* and *R. acuta*, all here described for the first time. The first

* For an account of the types of American grasses described by Linnaeus see Hitchcock (Contr. Nat. Herb. 12 : 114–127. 1908).

two are species of *Paspalum* in which both glumes are wanting, the third has characters sufficiently distinct to be referred to a different genus. (See *Reimarochloa* Hitchc., of which *R. acuta* is the type.) Since the three species cited belong to two genera, it is necessary that the name *Reimaria* go with the larger group. (See Hitchcock, Contr. Nat. Herb. 12 : 198. 1909.) Of these two species we take the first as the type species. This was described from a plant collected "Prope Puanbo in America meridionali. *Humboldt* et *Bonpland*." Flügge gives "Humboldt et Bonpland" as the authors of the species. Kunth later (Mem. Mus. Par. 2 : 68. 1815) transferred the specific name to *Paspalum*. A part of the type or a duplicate of it marked "ex Hb. Kunth & Hb. Humb." was examined in the Berlin Herbarium. It is the species distributed as *Paspalum candidum* H. B. K. by John Donnell Smith and by the Herb. Instit. physico-geogr. nat. costaricensis, and represented in the National Herbarium by *John Donnell Smith* 4992, *Tonduz* 8492 and several others collections from Costa Rica and Guatemala. Doell (Mart. Fl. Bras. 2^2 : 39. 1877) proposes a section *Eremachyrion* for the species of *Paspalum* in which both glumes are wanting.

Paspalanthium Desv. Opusc. 59. 1831. This genus, which is differentiated from *Paspalum* by the loose glume and sterile lemma exceeding the fruit and by the membranaceous rachis, includes a single species *P. stoloniferum* Desv., based on *Paspalum stoloniferum* Bosc. (Trans. Linn. Soc. 2 : 83. pl. 16. 1794 "H. in Perua"). The type specimen was examined in the Bosc Herbarium at Padua. It is the species frequently cultivated under this name, with thin, conspicuously rugose sterile lemma.

Moenchia Wender in Steud. Nom. Bot. ed. 2. 2 : 153. 1841, not Roth. 1788. There is no description and a single nomen nudum, *M. speciosa* Wender, is given as a synonym of *Panicum saccharoides* Kunth, upon which is based *Paspalum saccharoides* Nees.

Anachyris Nees, in Hook. Kew Journ. 2 : 103. 1850. A single species, *A. paspaloides* Nees "In Brasilia. *Gardner*, n. 4031 *in herb.* Lindl.," is included. A portion of a raceme from the type specimen was kindly sent by the herbarium at the University of Cambridge for deposit in the National Herbarium. The species is of that small group including *Paspalum malacophyllum* Trin. and *P. elongatum* Griseb., in which both glumes are wanting and in which the very convex fertile lemma is longitudinally grooved. This accounts for the mistake made by Nees in placing the proposed genus in *Oryzeae*. In this group the fruit is rather readily detached from the spikelet leaving the thin sterile lemma attached to the rachis. It must have been such a fruit, mistaken for the entire spikelet, that Nees had before him when he described the genus.

Steudel (Syn. Pl. Glum. 1 : 33. 1854) spells this name *Anachyrium*.

Maizilla Schlecht. Bot. Zeit. 8 : 601, 605. 1850. A single species is given, "*M. stolonifera* Bosc. sub *Paspalo*."

Cymatochloa Schlecht. Bot. Zeit. 12 : 817, 821. 1854. Two species, "*C. fluitans* N[o]b. (*Ceresia fluitans* Ell. * * *)" and "*C. repens*

Nb. (*Paspalum repens* Berg.),'' are included, the first of which is here taken as the type.

Dimorphostachys Fourn. Compt. Rend. Acad. Sci. Paris. 80 : 441. 1875. This genus is proposed because of the presence of the first glume of the spikelet, this glume in the lower of the pair of spikelets being larger than in the upper. The author says the group contains eleven species, but four of which he mentions, *Panicum monostachyum* H. B. K. *Paspalum pilosum* Lam., *Paspalum oajacense* Steud., and *Paspalum pedunculatum* Poir. Fournier does not here actually transfer any species to *Dimorphostachys*. His first named species, which we take as the type, was, together with the others given in his posthumous work (Mex. Pl. 2 : 14–16. 1886*), published under this genus by Hemsley (Biol. Centr. Amer. Bot. 3 : 499. 1885), as *D. monostachya* Fourn., based on *Panicum monostachyum* H. B. K.

The section *Harpostachys* of Panicum established by Trinius (Mém. Acad. Pétersb. VI. Sci. Nat. 3^2 : 227. 1834) for species having a simple, solitary raceme, if typified by the first group of species included in it, *Panicum decumbens* Roem. & Schult. (based on *Paspalum decumbens* Sw., of which *P. pedunculatum* Poir. is a synonym) and *Panicum monostachyum* H. B. K., is synonymous with *Dimorphostachys*. In this section, however, Trinius included a number of remote species, the wholly artificial character on which it is based bringing together, besides the two species of *Paspalum* mentioned above, *Thrasya paspaloides* H. B. K. and congeners; *Panicum repandum* Nees, a species related to *P. obtusum* H. B. K., *Echinolaena hirta*, and *Panicum sclerochloa* Trin. and other species referable to *Mesosetum*.

Wirtgenia Nees; Doell in Mart. Fl. Bras. 2^2 : 40. 1877. ''*Wirtgenia paspaloides* Nees ab Esenb. in herb. Reg. Berolin.'', a herbarium name for the species Nees published as *Anachyris paspaloides*, is here given as a synonym of *Paspalum malacophyllum* Trin.

The relationship of the various species upon which are based the proposed genera here included as synonyms of *Paspalum* together with the history of these groups will be discussed in the projected revision of North American species of Paspalum.

Description.—Inflorescence of 1 to numerous, simple, spike-like racemes, along a common axis; spikelets plano-convex, usually obtuse, subsessile (rarely on pedicels as long as the spikelets) solitary or in pairs, in two rows on one side of a narrow or dilated rachis, the back of the fertile lemma turned toward it;† first glume typically wanting (regularly present in a few species, occasionally present in others; in a few species both glumes wanting); second glume and sterile lemma subequal, the glume rarely shorter; fruit usually obtuse, the lemma and palea chartaceous-indurated (rarely but slightly so), the margins of the lemma inrolled.

*For discussion of date of this work see Hitchcock & Chase, Contr. Nat. Herb. 15 : 49. 1910.

†Owing to a tortion of the short pedicels the crowded, paired spikelets are often turned edgewise to the rachis or even entirely reversed, but in all species examined the spikelet is attached with the back of its fertile lemma toward the rachis.

Mostly perennials, of various habit; a large genus of the tropics and warm temperate regions of both hemispheres, but the species much more numerous in the western hemisphere.

The characters here considered as of chief generic value are the strictly racemose inflorescence, the plano-convex (sometimes slightly concavo-convex) spikelets in which the first glume is wanting, and the obtuse, indurated fruit, the margins of the lemma inrolled, taken in combination. But in this large, on the whole well-marked genus, there are many species which depart more or less from some one or two of these characters.

17. Genus PANICUM L.

Panicum L. Sp. Pl. 55. 1753. This genus is discussed by Hitchcock & Chase (Contr. Nat. Herb. 15 : 11–18. 1910) and the type species shown to be *Panicum miliaceum* L. The generic names included as synonyms under *Panicum*, so far as these are based on North American species, are there accounted for. The genus in relation to the South American and Old World species upon which genera have been proposed will be discussed in a later paper. In the above mentioned work, under the genera excluded from *Panicum* (op. cit. 16), is given *Panicum tuerckheimii* Hack., "an anomalous species with spikelets in which the first glume is wholly wanting, and in which no rudiment of a palea is found in the sterile lemma." This statement is found to be partly erroneous. There is present a small hyaline first glume, so transparent as to be invisible in the dry spikelet, which escaped the notice of Hackel and of ourselves. This species, though unique, we now include in the genus *Panicum*. It will be described and the spikelet figured in a forthcoming paper (by Hitchcock & Chase) on the Mexican and Central American species of *Panicum*, a supplement to the recent revision of the genus.

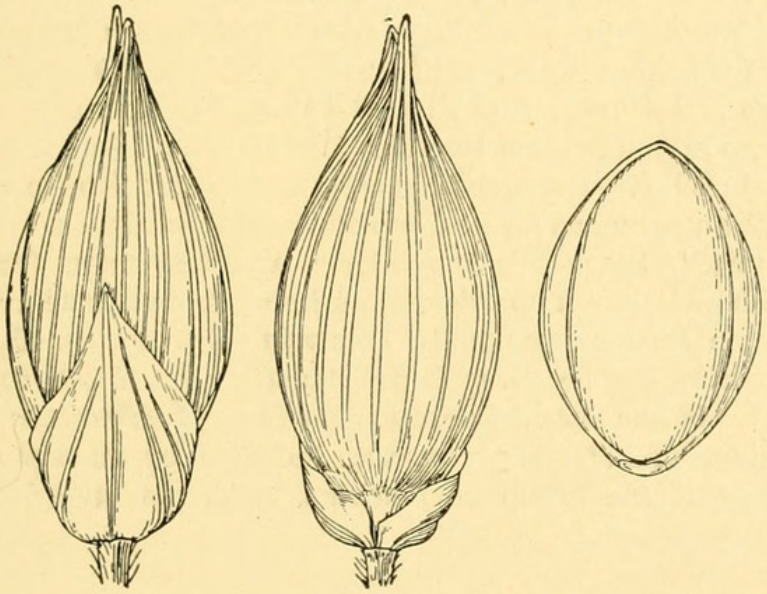

Fig. 9.
Panicum miliaceum.
(Two views of spikelet and fruit x 10 diam.)

Chasea Nieuwl. Amer. Midl. Nat. 2 : 63, 64. 1911. This name is proposed as "nov. nom. *Panicum* of the authors not of Linnaeus or only

in part." The author states that he "restores" the "name *Panicum* to the group of plants to which it was applied as far back as nearly two thousand years ago," overlooking Bubani's restoration of the same name to the same group in 1901 (Fl. Pyren. 4 : 261) and the fact that Adanson, Miller and Moench, applied the name *Panicum* in the same way. As shown in the revision of North American Species of *Panicum* (Hitchcock & Chase, Contr. Nat. Herb. 15 : 13. 1910) "the historic type species of Panicum is *Chaetochloa italica*", and the pre-Linnæan name for the genus containing *Panicum miliaceum* is Milium. Nieuwland, while maintaining *Panicum* for the pre-Linnæan genus of this name, overlooks *Milium* Tourn., the historic name of the genus containing *Panicum miliaceum*, and also the post-Linnæan *Urochloa* Beauv. (Ess. Agrost. 52. pl. 11. f. 1. 1812.) based on *U. panicoides* Beauv., which is the same as *Panicum helopus* Trin., an Old World species of the *Fasciculata* group of *Panicum*; *Thalasium* Spreng. (Syst. Veg. 4 : cur. post. 30. 1827), based on a South American species allied to *Panicum urvilleanum* Kunth; *Steinchisma** Raf. 1827; *Eriolytrum* Desv. in Kunth (Rév. Gram. 2 : 217. 1830), based on a South American specimen of *P. urvilleanum* or an allied species; and *Phanopyrum* Nash. The author (op. cit. 61) states that the "other group [*Panicum* L. excluding *Panicum italicum* and its congeners] has never to my knowledge received a name," and (op. cit. 63) that "This procedure leaves the other genus hitherto called *Panicum* by the authors, without a name, as far as I am able to ascertain, and I propose that of Chasea." Since this is proposed as a new name for "*Panicum* of the authors" and no particular authors are mentioned,† we take it as based upon *Panicum* as used by Beauvois (Ess. Agrost. 45, 169, 170, 171. 1812) who, besides recognizing *Paspalum* L., *Digitaria* Hall., *Cynodon* and *Pennisetum* Pers., segregates *Setaria* and *Echinochloa*, leaving in *Panicum* the remainder of the species included by Linnaeus under that genus, that is the group of *Panicum miliaceum* and its congeners.

18. Genus ICHNANTHUS Beauv.

Ichnanthus Beauv. Ess. Agrost. 56. pl. 12. f. 1. 1812. The genus is based on a single species, *I. panicoides* Beauv. (op. cit. 57), "croît dans l'Amérique méridionale: elle m'a été communiquée par M. Desfontaines." The generic description is erroneous in that Beauvois mistook the appendages at the base of the fruit for an abortive floret placed, he says, contrariwise to the other florets. (It was from this supposed abortive floret that Beauvois derived the name *Ichnanthus*.) We have not seen Beauvois' specimen. The figure, though slightly inaccurate, is a good illustration of the species well described and figured by Kunth (Rév. Gram. 2 : 245. pl. 34. 1830) under the name *Ichnanthus panicoides*.

* This and *Phanopyrum* are discussed in Contr. Nat. Herb. 15 : 18, 118, 327. 1910.

† It might be inferred from the name proposed that Hitchcock and Chase, authors of the North American Species of Panicum, were referred to, but this work is nowhere mentioned by Nieuwland, nor is the source of the proposed name given.

Navicularia Raddi, Agrost. Bras. 38. pl. 1. f. 5. 1823. Three species are included, *N. hirta*, *N. glabra* and *N. lanata* (op. cit. 40. pl. 1. f. 5). The last-named species, "Invenitur in herbidis prope *Rio-Inhumirim*", is here taken as the type since it is the only one of the three figured in the same work and because Raddi, in his generic description, refers to this figure. We have not seen Raddi's specimen, but from the description and figure we judge it to be the same as *Panicum leiocarpum* Spreng. (*Ichnanthus leiocarpus* (Spreng.) Kunth), to which Nees (Agrost. Bras. 147. 1829) refers it, or a closely allied species. Raddi proposes the genus because of the peculiar calyx-like structure which is borne on the hermaphrodite floret.

Fig. 10.
Ichnanthus panicoides.
(Spikelet and fruit x 7½ diam.)

The genus *Ichnanthus* has been recognized by some authors as valid and by others has been included in *Panicum*. Trinius at first (Fund. Agrost. 130. 1820) accepts *Ichnanthus*, even to the "transverse" abortive floret, but later (Gram. Pan. 52, 53. 1826) he includes it in his *Panicum*, section *Jubaria*, with the observation that it is included in *Panicum*, having, like "*Pan. almadense*, *pseudagrostis*, *Hofmanseggii*, *melicarium*", a hermaphrodite floret appendiculate at the base with a double rudiment.

Nees (Agrost. Bras. 149. 1829) includes *Ichnanthus panicoides*, which he here renames *Panicum ichnanthum*, in *Panicum*, section *Virgata*, placing it next after *Panicum leiocarpum* and *P. Hoffmannseggii*, species now recognized as belonging in *Ichnanthus*. Nees describes the perfect floret as being embraced at the base by an ovate, appressed, papery, two-parted lamina.

Kunth (Rév. Gram. 1 : 41. 1829) accepts the genus *Ichnanthus* with the single original species, and describes the fertile lemma as bearing at the base oblique-oblong, obtuse, glabrous scales decurrent on the pedicel. Later (op. cit. 2 : 245. 1830), while still including but the single species, Kunth, in his observations, states that the supposed hypogynous scales of authors are analogous to the lodicules which are ordinarily found only at the base of the interior palet (palea) but are here found also and greatly developed, on the exterior palet (lemma). In a later part of the same work (op. cit. 2 : 508. pl. 168. 1831) he transfers to *Ichnanthus* *Panicum leiocarpum* Spreng., a species in which the appendages are prominent. Still maintaining the genus solely on account of the appendages at the base of the perfect floret, Kunth (Enum. Pl. 1 : 135. 1833) adds *Panicum almadense* Nees to *Ichnanthus*.

Trinius (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 195, 320. 1834) makes *Ichnanthus* (spelling it "*Ichnantus*") a section of *Panicum*, with the synoptical heading "Flosculus * * * hermaphroditus basi faciei utrinque canaliculato-scrobiculatus vel (plerumque) auriculato appendiculatus," thus indicating the group as to-day accepted, including species in which there is a scar or excavation at base as well as those having appendages.

Steudel (Syn. Pl. Glum. 1 : 93. 1854) follows Trinius.

Bentham (Fl. Hongkong. 413. 1861) adopts *Ichnanthus* as a genus in this emended sense, including in it *I. pallens* (Sw.) Munro.

Grisebach (Fl. Brit. W. Ind. 550. 1864) gives it, in the same sense, as a section of *Panicum*.

Doell (Mart. Fl. Bras. 2^2 : 276. 1877) maintains *Ichnanthus* as a genus for the group segregated as *Panicum*, section *Ichnanthus* by Trinius, making under it two divisions "I Valvula inferior ad basin utrinque auriculatus" and "II Valvula inferior ad basin utrinque scrobiculata."

Bentham (Benth. & Hook. Gen. Pl. 3 : 1103. 1883) and Hackel (Engler & Prantl, Pflanzenf. 2^2 : 36. 1887) maintain *Ichnanthus* as a genus for this larger group.

(Schultes, Mant. 2 : 281. 1824, misspells the name "Ischnanthus.")

Description.—Inflorescence paniculate, the spikelets mostly short-pediceled along the usually sub-simple branches; spikelets more or less laterally compressed, the glumes and sterile lemma strongly nerved; first glume usually more than half the length of the spikelet, broad, acute; second glume and sterile lemma subequal, acute, exceeding the fruit, the lemma enclosing a membranaceous palea and rarely a staminate flower; fruit acute or subacute, indurated, the margins of the lemma usually flat, the rachilla produced below the lemma into a usually minute stipe, this bearing on either side membranaceous appendages adnate to the base of the lemma and free above, the appendages sometimes wanting and indicated by minute excavations only. Perennials, usually with lanceolate blades abruptly contracted into a petiole-like base; the genus mostly confined to the tropics of the western hemisphere, one species extending into the Old World.

Ichnanthus is closely allied to *Panicum* and appears to be but a loosely coherent genus, several of the species differing from each other almost as much as some of them differ from species of *Panicum*. A few species, such as *I. lanceolatus* Scribn., in which the appendages are wholly wanting and even the scars obscure (but in which the lemma margins are flat), are nearly as referable to one genus as to the other.

19. Genus LASIACIS (Griseb.) Hitchc.

Lasiacis Hitchc. Contr. Nat. Herb. 15 : 16. 1910. "The type of the genus is *Lasiacis divaricata* (L.) Hitchc., based on *Panicum divaricatum*

L., the type of Grisebach's section." The author raises *Panicum*, section *Lasiacis* Griseb. (Fl. Brit. W. Ind. 551. 1864) to generic rank. The type specimen of *Panicum divaricatum* L. (Syst. Nat. ed. 10. 2 : 871. 1759) was examined in the Linnaean Herbarium. It was collected by Browne in Jamaica.

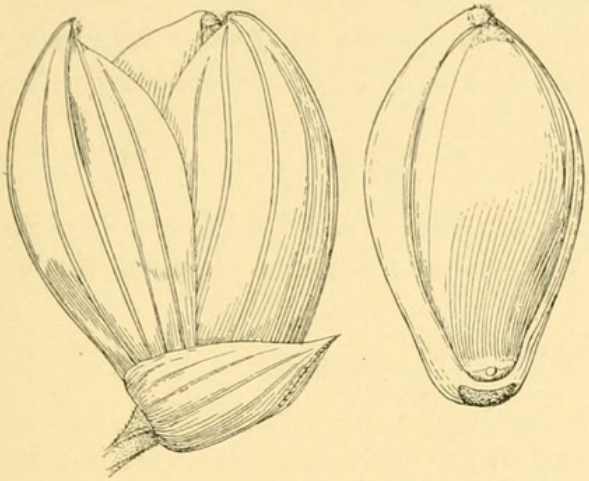

Fig. 11.
Lasiacis divaricata.
(Spikelet and fruit x 10 diam.)

Description. — Inflorescence of open, rarely compact, panicles at the ends of the culm and branches; spikelets subglobose, placed obliquely on their pedicels, the glumes and sterile lemma broad, abruptly apiculate, papery-chartaceous, shining, many nerved, glabrous, or lanose at the apex only, the first glume rarely over ⅓ the length of the spikelet, somewhat inflated-ventricose, the second glume and sterile lemma subequal or the glume slightly shorter, the lemma enclosing a membranaceous palea and sometimes a staminate flower; fruit white, bony-indurated, obovoid, obtuse, both lemma and palea bearing at the apex in a slight crateriform excavation, a tuft of woolly hairs, the palea concave below, gibbous above, the apex often free at maturity. Large perennials, usually with freely branching, woody culms, often forming tall half-shrubs; leaf-blades firm, often narrowed to a petiole-like base; a genus of some fifteen species confined to the tropics and subtropics of the western hemisphere.

This genus is unusually well marked, the spikelets particularly of all the species being strikingly similar.

Besides the species placed in this genus by Hitchcock (Contr. Nat. Herb. 15 : 16. 1910 and Bot. Gaz. 51 : 301, 302. 1911) the following North American species, taken from the manuscript revision of the genus *Lasiacis*, are here transferred :

Lasiacis liebmanniana (Fourn.) Hitchc.
Panicum liebmannianum Fourn. Mex. Pl. 2 : 33. 1886.

Lasiacis oaxacensis (Steud.) Hitchc.
Panicum oaxacense Steud. Syn. Pl. Glum. 1 : 73. 1854.

Lasiacis ruscifolia (H. B. K.) Hitchc.
Panicum ruscifolium H. B. K. Nov. Gen. & Sp. 1 : 110. 1816.

Lasiacis rhizophora (Fourn.) Hitchc.
Panicum rhizophorum Fourn. Mex. Pl. 2 : 31. 1886.

Lasiacis procerrima (Hack.) Hitchc.
Panicum procerrimum Hack. Oesterr. Bot. Zeitschr. 51 : 431. 1901.

20. Genus SACCIOLEPIS Nash.*

Sacciolepis Nash in Britton, Man. 89. 1901. Based on a single species, *S. gibba* (Ell.) Nash, which is the same species as *Holcus striatus* L., the latter name being later transferred to *Sacciolepis* by Nash to replace *S. gibba*.

21. Genus HYMENACHNE Beauv.

Hymenachne Beauv. Ess. Agrost. 48. t. 10. f. 8. 1812. The type species is *Agrostis monostachya* Poir., which is the same as *H. amplexicaulis* (Rudge) Nees.

22. Genus HOMOLEPIS gen. nov.

Inflorescentia paniculata; spiculae majusculae subfusiformes; glumae subaequales vel prima paulum longior, 7–9 nerviae, flosculos (et sterilem et fertilem) occultantes; lemma sterile vix glumis aequilongum, latius fertili idque amplectens et paleam angustam hyalinam includens atque interdum florem cum staminibus; fructus ellipticus acutus laevis nitidus; lemmate paleaque quam in *Panico* minus induratis, lemmatis marginibus planis.

Herbae perennes, stoloniferae, nodis radicantes; culmae floriferae basi plus minusve decumbentes.

Nomen a ὅμοιος *similis*, et λεπίς *squama*.

Inflorescence paniculate; spikelets rather large, subfusiform; first and second glume equal or the first slightly the longer, 7- to 9-nerved, the pair wholly covering the sterile and fertile florets; sterile lemma nearly as long as the glumes, broad, enfolding the fertile lemma, and enclosing a narrow hyaline palea and sometimes a staminate flower; fruit elliptic, pointed, smooth and shining, the lemma and palea less indurated than in *Panicum*, the margins of the lemma flat.

Perennials, sending out long leafy runners, rooting at the nodes, the flowering culms more or less decumbent at base. Confined to the tropics of the western hemisphere. Name from ὅμοιος, alike, and λεπίς, scale.

Type *Panicum aturense* H. B. K.

Homolepis aturensis (H. B. K.)

Panicum aturense H. B. K. Nov. Gen. & Sp. 1 : 103. pl. 33. 1816. "Crescit ad cataractas Aturensis." The type specimen, in the Bonpland Herbarium in the Muséum d'Histoire Naturelle at Paris, consists of a simple flowering culm, decumbent at base. The label bears the name and data as published.

Panicum viridiflorum Nees, Agrost. Bras. 135. 1829. Habitat unknown to Nees. The type specimen in the Berlin Herbarium is labeled "Hb. Nees. Panicum viridiflorum. Panicum aturense Kth.," followed by a diagnosis. Nees distinguishes his plant from *P. aturense* by the 7- to 9-nerved glumes and sterile lemma, these being erroneously described by Kunth as 3-nerved.

* This and the following genus were discussed and the spikelets of the type species figured in Proc. Biol. Soc. Wash. 21 : 1–10. 1908; only a summary is here given.

Panicum blepharophorum Presl, Rel. Haenk. 1:312. 1830. "Hab. in Mexico." The type specimen is in Presl's Herbarium in the Bohemian National Museum at Prague.

Panicum tumescens Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 316. 1834. No locality other than Brazil is given. In the Trinius Herbarium is a specimen collected by Riedel in Bahia, Brazil, in 1831, marked by Trinius "Panicum tumescens m.," which is no doubt the type.

Milium orinoccense Willd.; Steud. Nom. Bot. ed. 2. 2 : 146. 1841. This is given as a synonym of *Panicum aturense* H. B. K.

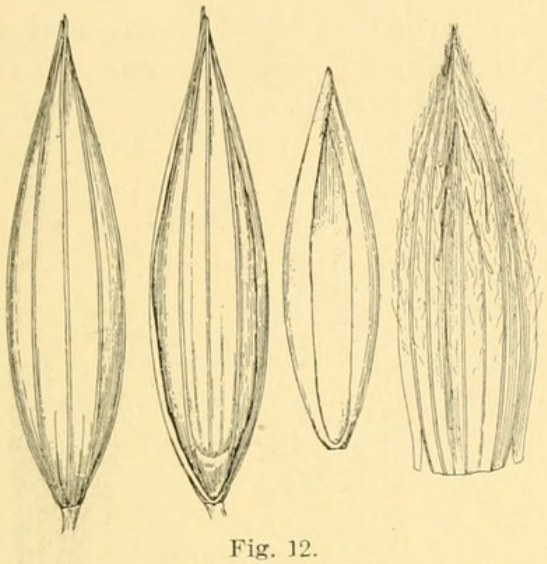

Fig. 12.
Homolepis aturensis.
(Two views of spikelet, fruit and sterile lemma x 6⅔ diam.)

Homolepis isocalycina (Meyer).

Panicum isocalycinum Meyer, Prim. Fl. Esseq. 59. 1818. "In arenosis umbrosis continentis" Essequibo [British Guiana]. A specimen of this sent by Meyer was examined in the Trinius Herbarium.

Panicum Langei Fourn. Mex. Pl. 2 : 23. 1886. "*Teotalcingo* (Liebm. n. 435. junio)." The type specimen is in the herbarium of the Botanical Garden of the University at Copenhagen.

In the National Herbarium there is a specimen of *H. isocalycina* collected by Salzmann in Bahia, Brazil, and distributed without number, as "Panicum zizanioides H. B. K." It is distinguished from *H. aturensis* by the slightly shorter, more turgid spikelets, with a glabrous sterile lemma and more indurated fruit.

Homolepis longispicula (Doell).

Panicum longiflorum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 317. 1834, not Gmel. 1796. No locality other than Brazil is given. In the Trinius Herbarium is a packet of spikelets marked "Panicum longiflorum m. Brasil," and a specimen bearing the same name and also "no. 147. Lect.—?"

Panicum longispiculum Doell in Mart. Fl. Bras. 2^2 : 261. 1877. "Habitat in Brasilia, loco accuratius non adnotato (herb. Acad. Petropolit.)." Doell cites "*Paspalum longiflorum* Trinius in Act. Petrop. 1835. p. 307 non Gmelin Syst. Veg. I. 158." This must be an error for *Panicum* since there is no *Paspalum longiflorum* of Trinius nor of Gmelin. The page reference is also erroneous. Evidently Doell's name is a typonym of *Panicum longiflorum* Trin.

Ichnanthus longiflorus Benth. Journ. Linn. Soc. Bot. 19 : 45. 1881. This is based on "*Panicum longiflorum* Trin".. though from his statement that "in *I. longiflora* (*Panicum longiflorum*, Trin.) they [the auricles] are very

small, but prominent'' it seems probable that Bentham had some other species under this name. The fertile lemmas in the spikelets of this species in the Trinius Herbarium are not at all auricled nor are the spikelets, with their villous-margined second glumes and villous sterile lemmas, suggestive of *Ichnanthus*. Both Trinius and Doell note the affinity of this species to *Panicum aturense*.

Homolepis longispicula differs from both the other species of this genus in having a densely silky-villous margin to the second glume, and a staminate flower in the first floret. The sterile (or staminate) lemma is densely villous, the fruit but little indurated as in *H. aturensis*. The only collection of this of which we know other than that in the Trinius Herbarium is *Glaziou* 22470 from Brazil.

23. Genus SCUTACHNE Hitchc. & Chase gen. nov.

Inflorescentia paniculata; spiculae breviter pedicellatae secus paniculae ramos teneros subsimplices dispositae, fusiformes, acuminatae, basi attenuatae, rachilla cum internodiis elongatis; gluma prima internodio rachillae imo stipitiformi adnata, quam spicula dimidio brevior, membranacea, marginibus basin versus connatis; gluma secunda lemmaque sterile subaequilongae, internodio rachillae manifesto separata, coriacea indurata fusca, 5-nervia; lemma sterile palea et interdum staminibus praeditum; fructus quam gluma secunda lemmateque sterili, vix induratior, circumscriptione ellipticus, lemmate in mucronem pubescentem abrupte angustato, marginibus basin versus leviter involutis, sursum planis pubescentibus, parte paleae summa haud inclusa, margine dense pubescente.

Herbae perennes, tenues, culmis simplicibus, laminis linearibus, planis, et paniculis angustis.

Nomen a σκύτος *corium* vel *pellis*, et ἄχνη *palea*.

Inflorescence paniculate, the spikelets short-pediceled along the slender, simple or nearly simple branches; spikelets fusiform, acuminate, the base attenuate, the internodes of the rachilla elongated, the lowermost forming a stipe, the first glume adnate to it; first glume membranaceous, about half the length of the spikelet, broad, the margins connate below; second glume and sterile lemma subequal, a manifest internode of the rachilla between them, leathery-indurated, brown or brownish, 5-nerved, the lemma enclosing a palea of similar texture, (and in the type species a staminate flower); fruit but slightly more indurated than the second glume and sterile lemma, elliptical in outline, the lemma abruptly acuminate into a slender, densely pubescent tip, the margins slightly inrolled below, membranaceous, flat and pubescent above, the summit of the palea not enclosed, densely pubescent on the margin.

Slender perennials, with simple culms, linear, flat leaves and narrow panicles; known only from Cuba. Name from σκύτος, leather and αχνη, scale.

Type *Panicum durum* Griseb.

Scutachne differs from other genera of this tribe in having a second

glume and sterile lemma leathery-indurated and nearly as firm as the fruit. *Bluffia eckloniana* Nees (which is referable to *Alloteropsis*) and *Alloteropsis semialata* (R. Br.) Hitchc., especially the first, have sterile lemmas subindurated like their fruits but the two glumes are similar. The subindurated, mucronate fruit, the lemma margins membranaceous and flat above, the palea free at the summit, further differentiate *Scutachne* from *Panicum*.

Scutachne dura (Griseb.) Hitchc. & Chase.

Panicum durum Griseb. Mem. Amer. Acad. n. ser. 8 : 533. 1862. This was published in Plantae Wrightianae e Cuba orientali; the only citation given is "(1539)." The type specimen is in the Grisebach Herbarium.

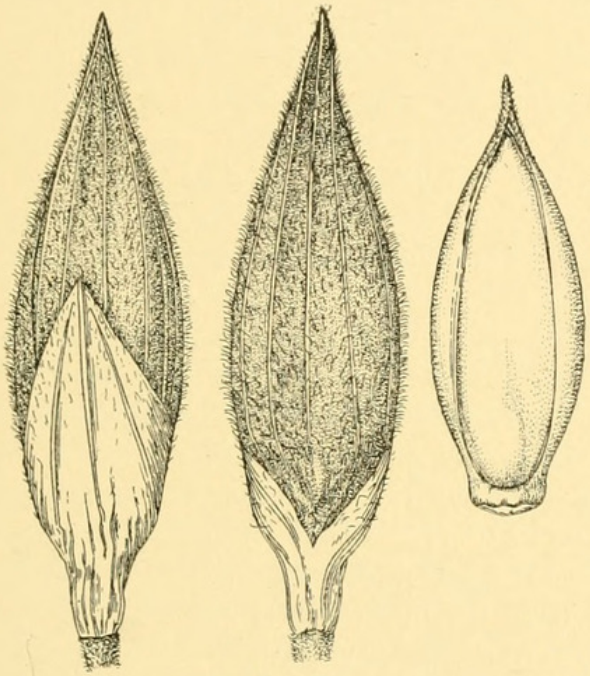

Fig. 13.
Scutachne dura.
(Two views of spikelet and fruit x 10 diam.)

Scutachne amphistemon (Wright) Hitchc. & Chase.

Panicum amphistemon Wright, Anal. Acad. Cienc. Habana 8 : 207. 1871. "Cerra de Mayarí abajo. [3464]." The type specimen, collected by Wright, in the Gray Herbarium, is labeled "Mayarí-abajo, Aug. 2, in small dense tufts."

These two species were placed in the genus *Alloteropsis* Presl by Hitchcock (Contr. Nat. Herb. 12 : 211. 1909) but further study has made this disposition of them appear an unnatural one. *Alloteropsis* is unique among the *Paniceae* in having a minute prolongation of the rachilla beyond the fertile palea. This is not present in all specimens of *A. semialata* examined, though it seems to be constant in *Bluffia eckloniana*, but its usual presence, together with the awn-tipped glumes and lemma, the glumes of like texture, indicate a relationship too remote from the Cuban species to justify retaining them in *Alloteropsis*.

24. Genus ISACHNE R. Br.

Isachne R. Br. Prod. Nov. Holl. 196. 1810. The genus is based on a single species, *I. australis* R. Br. collected by Brown in the vicinity of Port Jackson, Australia. The type has not been examined, but there is no reason to doubt that it is the common species of Australia and New Zealand, known under this name.

Isachne has usually been recognized as a valid genus ever since its pub-

lication. Sprengel (Syst. Veg. 1 : 314. 1825) describes a *Panicum antipodum* to which he refers *Isachne australis* R. Br. In his earlier works Trinius recognizes *Isachne* as a genus, but in his Panicearum Genera (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 195, 328. 1834) he reduces it to a section of *Panicum*, and is followed by Steudel (Syn. Pl. Glum. 1 : 94. 1854).

Nees (Agrost. Bras. 96. 1829) gives "Isachne R. Br." as a synonym under the genus *Panicum*. But it is to be noted that the only species of *Isachne* Nees had in his Agrostologia Brasiliensis was the anomalous *Panicum trachyspermum* Nees, which is an exception to the genus in that the lower floret is unlike the upper. Nees later (Seeman, Bot. Voy. Herald 224. 1857) places this species in *Isachne*.

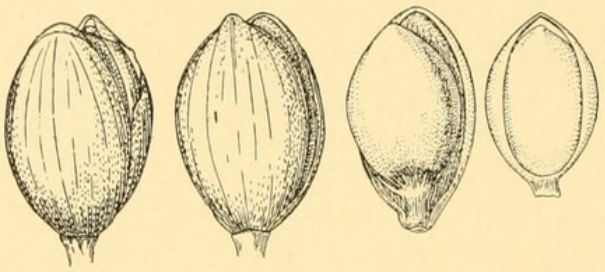

Fig. 14.
Isachne australis.
(Two views of spikelet, florets with glumes removed, and upper fruit x 10 diam.)

Kunth and Bentham give *Isachne* generic rank, as do Doell, Grisebach and Hooker. Bentham (Fl. Austr. 7 : 624. 1878) places the genus (instead of in *Paniceae* as did all other authors) in his tribe "VI *Astreptae*, subtribe *Milieae*," together with *Sporobolus*, *Micraira*, and others, *Paniceae* being his first tribe. This disposition of the genus appears to have been based on what Bentham in the Genera Plantarum (3 : 1077, 1100) calls the subarticulated, persistent glumes, since in his introduction to the *Gramineae* in the "Flora Australiensis" Bentham, emphasizing the importance in classification of the articulation of the spikelet, remarks that this character "settles the position of a few genera, *Polypogon*, *Milium*, *Isachne* etc. which might at first sight appear closely to connect the two great series." Later (Linn. Soc. Journ. Bot. 19 : 92. 1881) he proposes a "Tribe IX Isachnæ" with the statement that this is a modification of the subtribe proposed in the "Flora Australiensis" under the name *Miliæ*. *Milium* and *Sporobolus* are not here included. The tribe is placed between "Agrosteæ" and "Aveneæ" and includes *Prionachne*, *Isachne*, *Zenkeria*, *Cœlachne*, *Airopsis*, *Micraira* and *Eriachne*, all except *Isachne* to-day included in *Aveneæ*. Bentham notes the resemblance of *Isachne* to some species of *Panicum* but adds that the "species of *Isachne* * * constantly differ in the empty glumes persistent below the articulation, and in the two flowers both hermaphrodite or female, though one may be occasionally sterile." Hooker (Fl. Brit. Ind. 7 : 2, 21. 1896) says that the first and second glumes are separately deciduous and that the fourth glume (lemma of upper floret) is articulate on the rachilla. Hackel (Engler & Prantl, Pflanzenf. 2^2 : 35. 1887) in the diagnosis of *Isachne* says, "the fruiting glumes falling out of the persistent empty glumes." The examination of a large number of specimens scarcely verifies these statements. While the articulation below the glumes is not constant as in other genera of *Paniceae*, the spikelets appear to fall entire in at least about half the cases. The glumes appear

to be commonly separately deciduous, as stated by Hooker, the pair of florets joined together, being found persistent in mature panicles after one or both glumes have fallen. A number of specimens show persistent glumes from which the florets have fallen, but these are much fewer than the persistent florets from which the glumes have fallen. Several panicles have been found in which both of these occur, but in the great majority of cases the spikelets are either present entire, or wholly fallen—though the parts may have fallen separately. The second floret articulate on the rachilla, falling separately, appears from the examination of our specimens to occur only very rarely, and then only when the lower floret is staminate, or at least not perfecting a grain. It may here be noted that in *Panicum capillare* and its close allies the fruit frequently falls from the temporarily persistent glumes and sterile lemma, and that occasionally in *P. dichotomum* and its allies the glumes and sterile lemma fall, leaving the fruit for a short time persistent.

Bentham later (Benth. & Hook. Gen. Pl. 3 : 1077. 1883) places *Isachne* in the tribe *Paniceae*, immediately before *Panicum*, and Hackel (Engler & Prantl, Pflanzenf. 2^2 : 33, 35. 1887) also assigns it to this position.

Description.—Inflorescence paniculate; spikelets obovoid to subglobose; glumes membranaceous, subequal, about as long as the fruits or at maturity exceeded by these; lower floret perfect or staminate, its lemma and palea indurated and similar in form and texture to those of the upper floret (scarcely indurated and dissimilar in *I. trachysperma* Nees); both florets (or fruits) plano-convex, obtuse, equal or nearly equal in size (the lower often larger when staminate only), the pair usually remaining attached together by the minute rachilla joint below the upper floret. Perennials with simple or branching culms and flat blades, the species confined to the tropics and warm temperate regions of both hemispheres.

The lower floret often appears to be sterile (not perfecting a grain) in some and fertile in other spikelets on the same panicle. When sterile the floret is often longer and the lemma less convex than when fertile, the spikelets on the same panicle thus having a somewhat diverse appearance.

Several species of *Isachne* bear a superficial though striking resemblance to species of the North American *Panicum*, subgenus *Dichanthelium*.

25. Genus HETERANTHOECIA Stapf.

Heteranthoecia Stapf in Hook. Icon. Pl. 30^2 : pl. 2927. 1911. The genus is based on a single species, *H. isachnoides* Stapf (l. c.) collected in "Tropical Africa: Northern Nigeria; Nupe, in swamps *Barter*, 1348: French Congo; Snussi Country (Chari oriental), at the sources of the Ndelle River, *Chevalier*, 6825." It is not stated from which collection the illustration was made. The genus differs from *Isachne* in having a racemose panicle, the subsessile spikelets in short racemes, these arranged along a common axis, and in having florets with lemmas dissimilar in form and texture, though both fertile. Stapf considers the genus intermediate between *Isachne* and *Coelachne*, the latter an anomalous genus of the Old World at present placed in *Aveneae*.

26. Genus OPLISMENUS Beauv.

Oplismenus Beauv. Fl. d'Oware et Benin. 2 : 14. pl. 58. f. 1. 1809.* Under the genus is described a single species, *O. africanus* (op. cit. 15), of which Beauvois says "J'ai trouvé cette espèce à Chamo, à Koto, à Oware et à Benin." He states that the genus is composed of several species of *Panicum* and notably those of which Persoon has made a division thus characterized: "*Spica composita, spiculis compressis secundis.*" The species included by Persoon (Syn. Pl. 1 : 82. 1805) in this division are *Panicum hirtellum*, *P. setarium*, *P. bromoides*, *P. cespitosum*, *P. loliaceum*, *P. compositum* and *P. elatius*. The type specimen of *O. africanus* has not been examined. The accompanying figure is made from *Zenker & Staudt* 515, collected in Kamerun, Africa, which is included in the region visited by Beauvois. (The generic name is misspelled "Ophismenus" in Poir.; Lam. Encyc. Suppl. 4 : 271. 1816.)

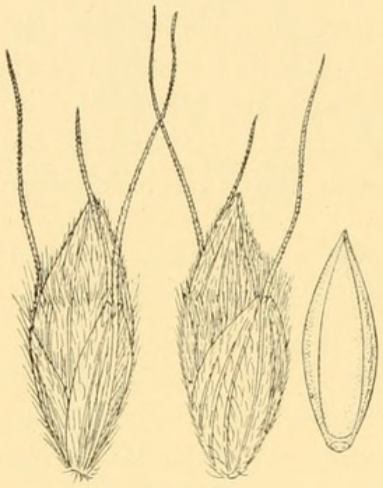

Fig. 15.
Oplismenus africanus.
(Two views of spikelet and fruit x 10 diam.)

Orthopogon R. Br. Prodr. Nov. Holl. 194. 1810. Four species are given under the genus, *O. compositus*, based on "*Panicum compositum* L.," *O. aemulus*, *O. flaccidus*, *O. imbecillis*. None being figured in the same work and all being equally eligible the first is here taken as the type.

Cheeseman (Man. New Zeal. Fl. 849. 1906) refers *Hekaterosachne elatior* Steud. (from New Zealand), the type of the monotypic genus *Hekaterosachne* Steud., to *Oplismenus undulatifolius* Beauv. Dalla Torre and Harms (Gen. Siphonog. 14. 1900) also refer this name to *Oplismenus*. We have not seen Steudel's specimen. His description (Syn. Pl. Glum. 1 : 118. 1854) does not well agree with *Oplismenus*, though it is possible that his description is erroneous.

Hippagrostis (Rumph.) Kuntze, Rev. Gen. Pl. 2 : 776. 1891. Kuntze gives Rumpf as the author of the genus, with the date 1749. *Hippagrostis* Rumph. (Herb. Amb. 6 : 14. pl. 5. f. 3. 1750) is based on a single species, *H. amboinica* Rumph. (l. c.), which the plate shows to be a species of *Oplismenus*, probably *O. burmannii*. Since a binomial species is given under the genus, only the fact that "Botanical nomenclature is treated as beginning with the general application of binomial names of plants (Linnaeus' Species Plantarum, 1753)" † renders *Hippagrostis* invalid for our use. In the Index Universalis (Herb. Amb. Auctuarium, 1755) the name *Hippagrostis amboinica* is given with reference to the 1750 work. Perhaps this might constitute publication.

---

* The title page is dated 1807. The date 1809 is taken on the authority of J. H. Barnhart as stated in a letter from G. V. Nash, to whom we are indebted for a transcript of pages 14 and 15 of the second volume of the Flore d'Oware.

† American Code of Botanical Nomenclature Part 1, principle 2.

Beauvois (Ess. Agrost. 54. 1812) amplifies his earlier generic description and transfers to the genus several species from *Panicum*. He places *Oplismenus* immediately after *Echinochloa*.

Kunth (H. B. K. Nov. Gen. & Sp. 1 : 106. 1816) recognizes *Oplismenus* as a genus, including under it as synonymous *Orthopogon* R. Br. and *Echinochloa* Beauv. The same is done in his later works (Rév. Gram. 1 : 43. 1829; Enum. Pl. 1 : 138. 1833).

Desvaux (Opusc. 81. 1831) follows Kunth, but also includes *Panicum semialatum* in the genus.

Trinius (Fund. Agrost. 181. 1820) recognizes *Orthopogon* R. Br. as a genus, referring *Oplismenus* to it as a synonym.

Raddi (Agrost. Bras. 40. 1823) recognizes *Oplismenus*.

Trinius (Gram. Pan. 51, 153. 1826; Mém. Acad. St. Pétersb. VI. Sci. Nat. 3^2 : 209. 1834) reduces *Orthopogon* to a section of *Panicum*.

Nees (Agrost. Bras. 255. 1829; Fl. Afr. Aust. 60. 1841 * gives *Oplismenus* generic rank.

Steudel (Syn. Pl. Glum. 1 : 44. 1854) follows Trinius in making *Orthopogon* a section of *Panicum* and giving *Oplismenus* as a synonym.

Hasskarl (Cat. Pl. Hort. Bogor. Alt. 16. 1844) and Schlechtendal (Linnaea 31 : 263. 1861) spell the generic name *Hoplismenus*.

Bentham (Fl. Hongkong 409, 411. 1861) includes *Oplismenus* in *Panicum*, but later (Fl. Austr. 7 : 491. 1878) he gives it (with *Orthopogon* as a synonym) generic rank "with the limits originally assigned to it by Beauvois and by Brown," that is excluding *Panicum crusgalli* and allies referred to it by Kunth.

Grisebach (Fl. Brit. W. Ind. 544. 1864) recognizes *Orthopogon* as a genus for the group thus circumscribed, and Doell (Mart. Fl. Bras. 2^2 : 144. 1877) includes *Orthopogon*, in the same sense, as a section of *Panicum*, giving *Oplismenus* as a synonym.

Bentham (Benth. & Hook. Gen. Pl. 3 : 1077, 1104. 1883) gives *Oplismenus* generic rank as does Hackel (Engler & Prantl, Pflanzenf. 2^2 : 33, 36. 1887).

Fournier (Mex. Pl. 2 : 37. 1886) maintains *Oplismenus* as emended by Kunth, that is, including *Echinochloa*.

Dalla Torre and Harms (Gen. Siphonog. 14. 1900) give the name *Paniculum* Ard. as a synonym of *Oplismenus*. The name "PANICULUM *undulatifolium*" occurs in Arduini (Animadv. Bot. Spec. 2 : 14. pl. 4. 1764), but the generic name is an error for *Panicum*. The name printed on the plate is *Panicum undulatifolium*.

Description.—Inflorescence of few to many unilateral racemes, approximate or distant along a common, often flexuous axis, the racemes bearing many crowded or subdistant spikelets, or sometimes very short and bearing a single cluster; spikelets terete or somewhat compressed laterally, subsessile, in pairs or solitary in two rows on one side of a narrow, scabrous or hairy rachis; glumes subequal, emarginate or 2-lobed (rarely entire), awned or mucronate from between the lobes; sterile lemma ex-

* The second edition of this work was published in 1853 with the title "Agrostographia Capensis." The pagination is the same in both.

ceeding the glumes and fruit, notched or entire, mucronate or short-awned, enclosing a hyaline palea; fruit elliptic, acute, the lemma very convex or boat-shaped, the firm margins clasping the lemma, not inrolled. Usually weak, freely branching, creeping or ascending annuals or perennials, with flat, thin, lanceolate blades, the species confined to the tropics and warm temperate regions of both hemispheres.

In this genus the awns are variable in length in the same species.

27. Genus ECHINOCHLOA Beauv.

Echinochloa Beauv. Ess. Agrost. 53. pl. 11. f. 2. 1812. The first of several species of *Panicum* listed under this genus, and in the index (page 161) transferred to it, and the one figured is *E. crusgalli* (L.) Beauv., which is taken as the type. This species is based on *Panicum crusgalli* L. (Sp. Pl. 56. 1753) "*Habitat* in Europæ, Virginiæ *cultis*." The only specimen in the Linnaean Herbarium to which Linnaeus has attached the name is one of the ordinary small form of this species.* This is marked "K" indicating that it was collected by Kalm in America.

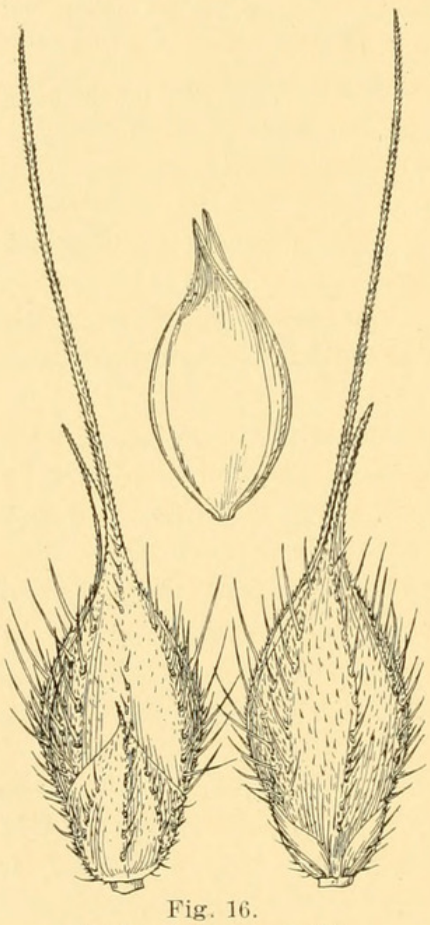

Fig. 16.
Echinochloa crusgalli.
(Two views of spikelet and fruit x 7½ diam.)

Adanson (Fam. Pl. 2 : 496. 1763) proposes a genus *Tema* with the differentiating diagnosis "Corolla obtuse or aristate on the exterior scale of the sterile flower." No binomial is cited. The authority for the genus is given as "H[ort.] M[alab] 12. t. 79" (which would indicate that Adanson adopts the genus from that work), and "Panicum Rumph. 5. t. 76. f. 2." and "Gramen paniceum spica divisa C. B." [Caspar Bauhin] are cited. The last citation refers to *Panicum crusgalli* L. and is also given by Linnaeus under that species (Sp. Pl. 56. 1753). The plant described and figured in Rheede (Hort. Malabar. 12 : pl. 79. 1703) is *Chaetochloa italica* (L.) Scribn. and the name there given it is *Tenna*, of which *Tema* would appear to be an erroneous transcript. The plant illustrated in Rumphius (Herb. Amb. 5 : pl. 76. f. 2. 1747) is *Eleusine indica*. If Adanson meant to unite these species in a single genus, as would appear to be the case, the name *Tema* would go with the first reference, and, since this is not associable with a previously published binomial the genus is not technically published. It is possible that the reference given to Rumphius is an error for plate 75, figure 2, this being an illustration of *Chaetochloa italica*.

* See Hitchcock, Contr. Nat. Herb. 12 : 117. 1908.

Trinius, Nees, and Steudel, of the earlier authors, include *Echinochloa*, usually as a section, in *Panicum*.

Kunth (H. B. K. Nov. Gen. & Sp. 1 : 106. 1816; Rév. Gram. 1 : 43. 1829; Enum. Pl. 1 : 138. 1833) and Desvaux (Opusc. 81. 1831) include it under *Oplismenus*.

Roemer & Schultes (Syst. Veg. 2 : 476. 1817), Schultes (Mant. 2 : 266. 1824), and Link (Hort. Berol. 2 : 208. 1833) give *Echinochloa* generic rank, but the latter adds (op. cit. 209) "Genera Echinochloa et Panicum artificialia sunt, nec natura distincta."

Of the later authors Bentham (Fl. Hongkong 411. 1861; Fl. Austr. 7 : 478. 1878; Benth. & Hook. Gen. Pl. 3 : 1102. 1883), Grisebach (Fl. Brit. W. Ind. 545. 1864), Doell (Mart. Fl. Bras. 2 ^{2} : 139. 1877) and Hackel (Engler & Prantl, Pflanzenf. 2 ^{2} : 35. 1887) include *Echinochloa* in *Panicum*. Fournier (Mex. Pl. 2 : 39. 1886) includes *E. crusgalli* and its close allies in *Oplismenus*, but *Oplismenus holciformis* H. B. K., a long-awned species allied to *E. spectabilis* (Nees) Link, he places in *Berchtoldia* (misspelled "*Berchtholdia*"). In his key to *Paniceae* (op. cit. 3) Fournier distinguishes *Berchtoldia* from *Oplismenus* by the "remote inferior glume." (Both genera are included under "Spiculis involucratis; involucro constante e spiculis abortivis," as opposed to "e chaetocladis" including *Setaria*, *Pennisetum*, etc. What Fournier could have mistaken for an involucre of abortive spikelets is not evident.)

Nash (Britton, Man. 78. 1901; Small, Fl. Southeast. U. S. 84. 1903) and Hitchcock (Gray, Man. ed. 7. 117. 1908) recognize *Echinochloa* as a valid genus.

Description.—Inflorescence paniculate, the usually compact, densely flowered panicle composed of one-sided simple racemes or of subsimple branches; spikelets plano-convex, often spiny-hispid, subsessile, solitary or in irregular clusters on one side of the panicle branches; first glume about half the length of the spikelet, pointed; second glume and sterile lemma equal, pointed, mucronate, or the glume short-awned, the lemma long-awned, in some species conspicuously so, enclosing a membranaceous palea and sometimes a staminate flower; fruit plano-convex, the lemma and palea smooth and shining, acuminate-pointed, the lemma margins inrolled below, flat above, the apex of the palea not enclosed. Coarse, often succulent annuals, with compressed sheaths and linear, flat blades; species of the temperate and tropical regions, two species cosmopolitan.

In this genus the awn of the sterile lemma is exceedingly variable in length, sometimes even in the same plant. *Echinochloa* is distinguished from *Panicum* constantly by the plano-convex, pointed fruit, the lemma margins flat above, the apex of the palea free, and usually by the awned sterile lemma.

A Mexican species described under *Oplismenus* belongs to this genus:

Echinochloa holciformis (H. B. K.).

Oplismenus holciformis H. B. K. Nov. Gen. & Sp. 1 : 107. 1816. "Crescit in humidis montanis prope Cinapecuaro, alt. 970 hexap. (Regno Mexi-

cano.)" A duplicate type, received from Humboldt, was examined in the Willdenow Herbarium. Of the specimens in the National Herbarium *Pringle* 8622 is an excellent match for this. The other specimens mostly have longer awns.

Orthopogon holciformis Spreng. Syst. Veg. 1 : 307. 1825. Based on "*Oplismenus holciformis* Kunth."

Panicum holciforme Steud. Nom. Bot. ed. 2. 2 : 257. 1841. Based on *Oplismenus holciformis* H. B. K.

Berchtoldia holciformis Fourn. Mex. Pl. 1 : 41. 1886. Based on "*Oplismenus holciformis* H. B. K."

28. Genus CHAETIUM Nees.

Chaetium Nees, Agrost. Bras. 269. 1829. This genus is based on a single species, *C. festucoides* Nees (op. cit. 270), "Habitat in graminosis et in cultis ad flumen S. Francesci, ad Joazeiro etc. Provinciarum Pernambucanae et Bahiensis." The type specimen, in the Munich Herbarium, bearing the data as published, was collected by Martius.

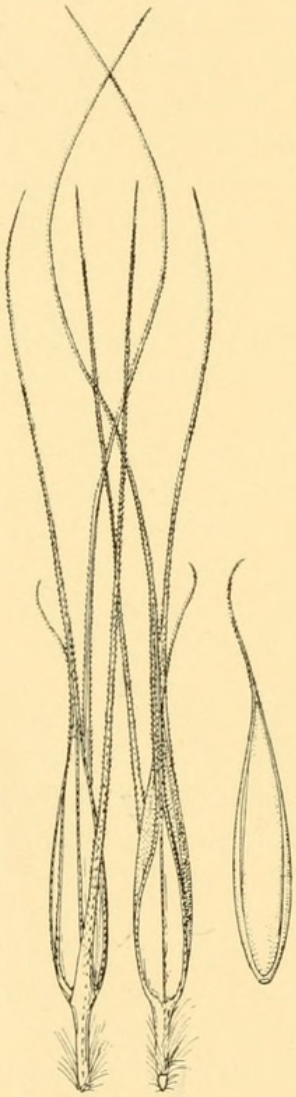

Fig. 17.
Chaetium festucoides.
(Two views of spikelet and fruit x 5 diam.)

Berchtoldia Presl, Rel. Haenk. 1 : 323. pl. 43. 1830. A single species is included in the genus, *B. bromoides* Presl. (op. cit. 324). "Hab. in Mexico." A part of the type specimen was examined in the Trinius Herbarium.

Both Nees and Presl place their proposed genera next after *Oplismenus*.

Kunth (Enum. Pl. 1 : 146. 1833) places *Chaetium festucoides* in *Oplismenus* but to *Berchtoldia* he gives generic rank. After the generic description he adds "(Charact. gen. ex Presl.)" It is probable that Kunth had not seen either species, but that from the plate in Presl's work he recognized *Berchtoldia* as distinct from *Oplismenus*.

Steudel (Syn. Pl. Glum. 1 : 48. 1854) places *Chaetium* in *Panicum*, section *Echinochloa* under the name *P. chaetium*, and gives (op. cit. 117) *Berchtoldia* generic rank, as did Kunth, and doubtless for the same reason.

Doell (Mart. Fl. Bras. 2^2 : 150. 1877) makes *Chaetium* a section of *Panicum* with the single species *P. chaetium* Steud. In the observations (op. cit. 150) he mentions as belonging in this section *Berchtoldia bromoides* Presl, to which he gives the name *Panicum berchtoldium*. Under *P. chaetium* he mentions as an extra-Brazilian specimen *Wright* 735 from eastern Cuba. This number is the type of "*Perotis ? cubana*" Wright, *Chaetium cubanum* (Wright) Hitchc.

Bentham (Linn. Soc. Journ. Bot. 19 : 46. 1881; Benth. & Hook. Gen.

Pl. 3 : 1077, 1104. 1883) recognizes *Chaetium* as a valid genus, as does Hackel (Engler & Prantl, Pflanzenf. 2^2 : 33, 36. 1887) both placing it immediately after *Oplismenus*.

Hemsley (Biol. Cent. Amer. Bot. 3 : 503. 1885) transfers *Berchtoldia bromoides* to *Chaetium* giving Bentham as authority with a reference to the Linnaean Society's Journal mentioned above, but Bentham did not there transfer the species.

Fournier (Mex. Pl. 2 : 40. 1886) gives *Berchtoldia* as a genus, including in it Presl's species, and also two species of *Echinochloa*.

Description.—Inflorescence a dense, narrow panicle; spikelets short-pediceled, dorsally compressed, lanceolate and having a long, slender callus-like base from the elongation of the joint of the rachilla between the glumes, the bearded base of the first glume adnate to it; glumes bearing awns 3 to 4 times the length of the body of the spikelet, the first reduced to the awn or, in *C. bromoides*, the pair broadened and enclosing the rest of the spikelet; sterile lemma bearing a shorter awn or awn-tipped only, the sterile palea obsolete; fruit subindurated, lanceolate, the lemma acuminate into a scabrous awn or point, the thin margins flat, the summit of the palea not enclosed. Perennials with long, narrow leaves; the genus containing but three known species, one of Mexico and Central America, one of Cuba, and one of Brazil.

29. Genus TRICHOLAENA Schrad.

Tricholaena Schrad. in Schult. Mant. 2 : 163. 1824. Three species are included in the genus but the second and third are preceded by a question mark, hence the first, *T. micrantha* Schrad., of which *Saccharum teneriffæ* is given as a synonym, is the type.

Rhynchelytrum Nees in Lindley, Nat. Syst. ed. 2. 446. 1836. The genus is described and a single species, *R. dregeanum*, given. We have not seen the type specimen but the generic description applies to *Tricholaena*. Stapf (Dyer. Fl. Cap. 7 : 444. 1898) refers *R. dregeanum* to *T. rosea* Nees.

Monachyron Parl. in Hook. Niger Fl. 190. 1849. A single species, *M. villosum*, is included. The type specimen has not been examined. Hackel (Engler & Prantl, Pflanzenf. 2^2 : 36. 1887) gives this as a synonym of *Tricholaena*, and Durand and Schinz (Consp. Fl. Afr. 5 : 771. 1895) transfer *M. villosum* to this genus. Making allowance for a misunderstanding of the structure of the spikelet, owing to the remote first glume, the description applies to *Tricholaena*.

The scarcely indurated fruit, scarcely firmer than the usually 2-lobed and awned second glume and sterile lemma, together with the elongation of the rachilla joint between the glumes, serve to distinguish this Old World genus, a single species of which, *T. rosea* Nees, is sparingly escaped from cultivation in the tropics and subtropics of North America.

30. Genus CORIDOCHLOA Nees.

Coridochloa Nees, Edinb. New Phil. Journ. 15 : 381. 1833. This genus is based on a single species, "*Coridochloa* * * * cujus typus est

Panicum cimicinum Retz." Nees states that the genus is allied to *Anthaenantia* Beauv., but is distinguished by the two-flowered spikelets, the fertile floret aristate.

Bentham (Fl. Austr. 7 : 473. 1878) gives "*Coridochloa semialata*, Nees in various catalogues and herbaria" as a synonym of *Panicum semialatum* R. Br., and adds "(the genus not published as generally quoted in Edinb. New Phil. Journ. 1832, July)." It would seem that Bentham must have cited this name and reference from memory. We can not find that Nees himself ever placed *P. semialatum* in *Coridochloa*, nor can we find any reference to the publication of the genus in 1832. It was probably a slip of memory on Bentham's part for 1833. The genus *Coridochloa* is proposed in a footnote with the statement that it will be treated of at another time, hence Bentham may have considered it as insufficiently published. But Nees states that the genus belongs in the tribe *Paniceæ*, names a type species, previously described, and gives the principal distinguishing characters of the spikelet. In Wallich's Catalogue (1849) no. 8749 "Coridochloa fimbriata Nees ab Esenbeck" is listed, "A. Milium cimicinum Hb. Heyn." and "B. Panicum cimicinum Hb. Ham." being given under it. (In a note on page 132 of the Catalogue it is stated that "Mr. Brown * * * has had the goodness * * * to furnish the provisional list of the family" of grasses). In a criticism of Nees, Bentham (Linn. Soc. Journ. Bot. 19 : 18. 1881) again says "Brown's Australian *Panicum semialatum*, for instance, is raised by Nees to the rank of a genus under the name of *Coridochloa* in India, and that of *Bluffia* in South Africa." It may be that Bentham did not know *Panicum cimicinum* Retz., for (op. cit. 42) he says "*P. semialatum* Br. is widely spread over the Old World, for I am unable to distinguish the Asiatic *Coridochloa*, Nees, and the South African *Bluffia*, Nees, from Brown's Australian species."

Hooker (Fl. Brit. Ind. 7 : 64. 1896) places *Panicum cimicinum* and *P. semialatum* under *Axonopus* Beauv. (See discussion under that genus.) Under the second species is given as a synonym "*Coridochloa semi-alata*, *Nees*, in Edinb. New Phil. Journ. XV. (1833) 381." This is an error, Nees makes no mention whatever of *P. semialatum* nor of any species but *P. cimicinum* Retz.

This unique species has been placed in *Milium* (by Linnaeus) in *Panicum* (by Retzius), in *Axonopus* (by Beauvois), in *Urochloa* (by Kunth), and finally in *Coridochloa*, based on it alone, by Nees.

Coridochloa, which is perhaps rather remotely allied to the next genus, is distinguished by the concavo-convex, scarcely indurated, stipitate fruit, the lemma attenuate into an awn about as long as the body of the fruit, the palea sparsely covered with stalked glandular hairs (in appearance like minute fungi), a few of these sometimes scattered on the margin of the lemma; by the papery glumes and sterile lemma, the second glume conspicuously stiff-ciliate along the lateral internerves, and by the digitate inflorescence, the slender racemes naked at the base or for half their length.

31. Genus ALLOTEROPSIS Presl.

Alloteropsis Presl, Rel. Haenk. 1 : 344. pl. 47. 1830. A single species, *A. distachya*, is included in the genus which is erroneously described. Scribner (Mem. Mo. Bot. Gard. 10 : 37. pl. 33. 1899) and Hitchcock (Contr. Nat. Herb. 12 : 210. 1909) explain the error and emend the genus. Presl's type specimen was examined and photographed in the National Museum at Prague by Professor Hitchcock. It is the same species as *Panicum semialatum* R. Br. (Prodr. Nov. Holl. 192. 1810), *Alloteropsis semialata* Hitchc. (l. c.). There are two plants of the same species on the sheet, one with a ticket marked "Peruanæ montanæ" the other with one marked "Regio montana, Luzon." The Peruvian locality is clearly erroneous.

Bluffia Nees, Del. Sem. Hort. Hamb. 8. 1834. The genus is described and a single species, *B. eckloniana* Nees, "ab Ecklono * * * in Africa australi detecti," included under it. By Hackel (Durand & Schinz, Consp. Fl. Afr. 5 : 764. 1895), this species is reduced to a variety of *Panicum semialatum ;* by Hooker (Fl. Brit. Ind. 7 : 64. 1896) it is referred to *Axonopus semialatus* as a synonym, and by Stapf (Dyer, Fl. Cap. 7 : 418. 1898) it is reduced to a variety of that species. To us it appears to be specifically distinct.

Holosetum Steud. Syn. Pl. Glum. 2 : 118. 1854. This is based on a single species, *H. philippicum* Steud. "Herbr. Cuming nr. 1363 et 1414. Ins. Philip." Cuming's no. 1363 was examined in the Kew Herbarium. It proves to be *Alloteropsis semialata.*

This genus of two known Old World species does not appear to be closely allied to any other. The two subindurated, awn-pointed florets to some appear to suggest species of *Arundinella*, under which genus Bentham (Fl. Austr. 7 : 545. 1878) describes a specimen of *Alloteropsis semialata*, as *Arundinella Schultzii* Benth., though he gives *Panicum semialatum* on page 472 of the same work. In both species of this genus, as shown by specimens in the National Herbarium, there is not infrequently found a rudiment, 0.3 mm. or more long, beyond the palea of the fertile floret.

The genus is distinguished by the awn-pointed, similarly subindurated staminate and fertile florets, the margins of the fertile lemma thin, flat, the palea not enclosed at the summit, in combination with the subdigitate inflorescence, the short-pediceled spikelets in clusters along the racemes.

The involucrate genera and the others excluded under the first and second divisions of the key will be considered in a subsequent paper now in preparation.