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A Revision of the Australian Species of *Stipa*

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ROYAL BOTANIC GARDENS, KEW.

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BULLETIN  
OF  
MISCELLANEOUS INFORMATION.

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No. 1]

[1921

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I.—A REVISION OF THE AUSTRALIAN SPECIES  
OF STIPA.

D. K. HUGHES.

A few months ago an inquiry concerning certain Australian species of *Stipa* of the *S. scabra* group was addressed to Kew. This necessitated, in the first place, comparison with the original of *S. scabra*, which was described very briefly by Lindley from a specimen collected by Mitchell (No. 125) on the Bogan River, New South Wales, and now in the Lindley Herbarium in Cambridge. Professor Seward was kind enough to send it to Kew so that a careful collation with the specimens referred by Bentham to *S. scabra* was possible. This resulted in the recognition of Mitchell's type as distinct from much of the material at Kew under that name. Very probably Bentham had never seen it, as he placed it in the group with "Ligules short, ciliate," whilst Mitchell's plant has quite conspicuous ligules over 3 mm. long. Nor do the specimens quoted by Bentham form a homogeneous group. The attempt to place the elements composing it into their proper species showed that most of the species which were drawn upon for comparison consisted of equally incongruous parts, so that nothing but a complete revision of the Australian species of *Stipa* could solve the problem. This Miss Hughes undertook under my supervision, with the result laid down in the present paper.

The admission of 40 species in the place of the 15 species of the Flora Australiensis may seem startling, the more so as only five species distinguished here are based on material unknown to Bentham. In some cases old species have been re-established, in others more recent collections brought out characters which were not so obvious in the older sets; but on the whole the explanation must be sought in the admittedly liberal conception of species characteristic of the author, a conception which in this, as in all pioneer work of that kind, may be looked upon as an almost unavoidable condition for

completion within a practicable time. It is like the bold treatment of the first cast of a monumental work and, rightly and fairly understood, does not detract from the value of the work or the genius of the author. On the other hand, it challenges by its very nature the criticism of the specialist who is called upon to supply the more minute details with a view towards a final recognition of the taxonomic structure of the group. Neither the material available, nor the insight which we possess into the real value of the differences which present themselves in specimens mostly collected in a haphazard way, badly annotated, if at all, and frequently imperfect in some respects, warrants a claim to that finality having been reached. It is evident that nothing but painstaking and comprehensive analysis and the avoidance of unsupported generalisation can lead to the desired goal.

It is hoped that it is in this sense that the Australian botanists, working at the sources of our knowledge of those grasses, will receive this attempt at unravelling the threads of an unusually intricate taxonomic problem.

In explanation of the procedure adopted, I may add that the grouping of the species as it appears in the Key that precedes the Enumeration of the Species was obtained almost entirely from the comparison of external morphological characters such as a careful and catholic analysis revealed. Groups of wider and narrower extent presented themselves, and those which could not be further analysed without drifting away from apparently stable and therefore reliable characters were accepted as species. Some of the wider groups were obvious enough to be recognised at a glance, others less definitely circumscribed, suggested themselves in the first place through their more marked members which were found to form nuclei round which others clustered more or less evidently. Out of this combination of analysis and synthetic perception the Key grew almost automatically. The differentiation thus revealed of the whole plexus of forms under consideration rests, therefore, on a purely empirical basis such as might be expected to reflect natural relationships.

It was not until after the drafting of the Key was completed that I suggested that the result obtained should be tested by reference to the anatomical characters of the leaf-blades, partly to see how they compared with the grouping as it manifested itself through the external characters, and partly to gain additional data which might assist in the recognition of the species. The result of Miss Hughes' work in that direction is embodied in the text figures on pp. 19 and 29. The common experience that the variation of the anatomical structure of the leaf-blade of the grasses does not generally run parallel with the characters from which we infer their phylogenetic relationships, although they add frequently to the distinctiveness of the species, also holds good in the present case. Only one group (*Sclerophyllæ*)

stands out markedly from the rest, and even in that case the concept of the group rests largely on an external character (junciform leaf-blades), of which the anatomical character is but a paraphrase. Apart from this group, the anatomical structure of the leaf-blades varies on the whole within narrow limits, so that it will frequently be found useful as an ancillary character. To introduce these anatomical details into the Key, beyond the most marked instances, would have encumbered it unnecessarily without adding more than can be gleaned from the figures, which are at least as expressive as a description. For the same reason I have advised Miss Hughes to desist from the incorporation of anatomical matter in her descriptions of new species.

The concurrent numbering of the species in the Key and Enumeration and of the figures will materially facilitate reference to the latter.

It was very tempting to extend the study to the problem of the relationship of the Australian *Stipæ* with their congeners in other parts of the world, the more so as the distribution of *Stipa* is very singular, but to do so would have entailed the revision of a larger amount of material and literature than was feasible. It may suffice to state in this place that there is no evident connection with the only undoubtedly indigenous South African species (*S. Dregeana*), and no striking relationship with the American species. On the other hand, the only two annual species are closely linked up with the Mediterranean *S. tortilis*.

O. STAPP.

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#### KEY TO THE GROUPS AND SPECIES.

The numbers of the species in the Key correspond to those of the Enumeration and of the figures. (The letters after the numbers on pp. 19 and 29 should read A instead of a in accordance with the quotations in the text.)

Valvule very small, rarely half as long as the valve, this glabrous or slightly hairy at the base, minutely scaberrulous upwards; leaf-blades flat or involute without a continuous sclerenchymatic hypoderma, girders all percurrent or alternately percurrent and interrupted - -

#### I. *Micropaleatae*.

Valvule as long as the valve or almost so; valve silky hairy mostly all along:

Hyaline margins of the valve produced at the tip into a small lobe on each side of the awn, lobes acute or acuminate, not less than 0.5 mm. long:

Leaf-blades reduced or quite rudimentary; stems hard and woody; spikelets 2·6 mm. long - - -

## II. Aphyllae.

Leaf-blades hard, junciform to subulate or setaceous, with a continuous sclerenchymatic hypoderma on both sides and strong percurrent girders, mesophyll much reduced; plants 60–90 cm. high; glumes 0·9–1·5 cm. long; valve mostly densely hairy, rarely glabrescent or puberulous upwards - - -

## III. Sclerophyllae.

Hyaline margins of the valve not produced into lobes, or, if so, then the lobes quite inconspicuous and obtuse, rarely more distinct (nos. 10 and 16), often only one developed; leaf-blades without a continuous sclerenchymatic hypoderma or only on the lower side, and then mostly very thin; girders alternately percurrent and dorsal or all percurrent :

### \*Perennial :

Bristle of the awn sharply recurved like a scythe or reaping hook; glumes delicate and hyaline at least towards the tips - - -

## IV. Falcatae.

Bristle of the awn slightly curved or straight, often twice geniculate :

Awn plumose either in the upper or lower part; hairs up to 4 mm. long -

## V. Plumosae.

Awn apparently glabrous or pubescent, but not plumose :

Lateral nerves of lower glume continuing nearly the whole of its length and as prominent as the dorsal, giving the spikelets a striate appearance :

Glumes straight or upwards very gently incurved, not bulging below and arching over the floret, which is not or only slightly turgid - -

**VI. Striatae.**

Glumes slightly recurved upwards bulging below and arching over the turgid floret, rather firm, 0.8–1.4 cm. long; awn twice geniculate up to 3.5 cm. long - -

**VII. Turgidulae.**

Lateral nerves of lower glumes very faint or obsolete, usually present only at the base, therefore the glume not striate, delicate -

**VIII. Aphanoneurae.**

**\*\*Annual**, or at least with no trace of a rhizome, sometimes with lateral tufts of leafy shoots at the base, the lowest sheaths of which are blade-bearing; glumes membranous, greenish, somewhat glistening -

**IX. Annuae.**

**I. Micropaleatae.**

Branches of the panicle long-plumose; spikelets 1–1.4 cm. long; leaves and sheaths finely scaberulous or quite smooth, rarely pubescent; girders percurrent - - -

1. *elegantissima*.

Branches of the panicle very shortly hairy; spikelets 9 mm. long; leaves densely pubescent; girders alternately percurrent and interrupted - - -

2. *Tuckeri*.

**II. Aphyllae.**

Only species - - - 3. *Muelleri*.

**III. Sclerophyllae.**

Valve densely hairy all over, lobes ciliate; leaf-blades stiff, junciform or subulate, quite smooth or almost so :

- Hairs of valve whitish, about 2 mm. long; leaf-blades about 60 cm. long, very hard, quite smooth, oval in cross-section and tightly complicate :
- Glumes about 0·9 cm. long, acute, usually yellowish brown; valve 0·7 cm. long - - - 4. *juncifolia*.
- Glumes 1·7–1·8 cm. long, acuminate, white, hyaline; valve 1·2 cm. long - - - 5. *teretifolia*.
- Hairs of valve fulvous, not over 1 mm. long; leaf-blades usually much shorter than in the preceding species, loosely convolute and rather soft, smooth or very finely scaberulous; glumes 1·1–1·3 cm. long - 6. *flavescens*.
- Valve scantily hairy, glabrescent or scaberulous towards the tip, lobes glabrous; glumes 1·3–1·4 cm. long; blades setaceous, flexuous - 7. *oligostachya*.

#### IV. *Falcatae*.

- Glumes 1·6–2 cm. long, finely scabrid all over :
- Base of stem bulbous and woolly; leaf-blades scabrid, flexuose to cirrhiform, with a marked dorsal sclerenchymatic hypoderma; awn up to 10 cm. long - 8. *eripus*.
- Base of stem neither bulbous nor woolly; awn much shorter :
- Leaf-blades smooth or scaberulous; awn up to 7 cm. long - 9. *tenuifolia*.
- Leaf-blades very scabrid; awn 4·5–5 cm. long - - - 10. *leptophylla*.
- Glumes 0·7–1·4 cm. long, smooth; awns 4–9 cm. long :
- \*Ligule not over 1 mm. long, usually represented only by a ciliate rim :
- Plants slender and delicate up to 45 cm. high, the basal sheaths very short, 1–3 (rarely 4) cm. long :
- Glumes 1·1–1·4 cm. long, entire; leaf-blades scabrid or hairy :

- Leaf-blades conspicuously and  
reversedly hairy; basal  
sheaths 2-3 cm. long,  
bright orange-coloured - 11. *trichophylla*.
- Leaf-blades scabrid; basal  
sheaths 1-1.5 cm. long,  
pale - - - 12. *falcata*.
- Glumes 0.7 cm. long, shallowly  
notched at the tip; leaf-  
blades scabrid - - - 13. *arachnopus*.
- Plants usually rather stout and  
well over 60 cm. high, the  
basal sheaths 4-6 cm. long :  
Glumes 0.9-1.5 cm. long;  
valve hairy all along;  
awn about 6 cm. long;  
panicle up to 30 cm.  
long :  
Leaves very hard and  
convolute, glabrous  
or finely scaberulous;  
panicle slender, the  
branches short, 3-6  
flowered - - - 14. *variabilis*.
- Leaves softer than in  
*S. variabilis*, these  
as well as the  
sheaths shortly and  
densely pubescent all  
over; panicle dense,  
contracted, branches  
usually many  
flowered - - - 15. *Drummondii*.
- Glumes 1.5 cm. long;  
valve hairy below,  
scaberulous upwards;  
awn about 9 cm.  
long; panicle rarely  
over 15 cm. long - 16. *incurva*.
- \*Ligule elongated, 3-6 mm. long;  
blades and sheaths glabrous,  
sometimes slightly scabrid :  
Awn about 8 cm. long, the  
column very slender, the  
bristle distinctly flattened;  
culms woody, about 90 cm.  
high - - - - 17. *platychaeta*.



Awn not over 6 cm. long, the column stouter than the bristle, which is not distinctly flattened; culms not more than 45 cm. high :

Culms compressible; blades and sheaths rather soft, slightly scabrid; awn up to 6 cm. long - - - - 18. *scabra*.

Culms wiry; leaf-blades hard, stiff, junciform, quite smooth and glabrous, awn not over 4 cm. long - - - - 19. *pycnostachya*.

### V. Plumosae.

Glumes about 1.5 cm. long; valve 0.6 cm. long; awn 3-4 cm. long :

Glumes pubescent; column of awn plumose on all sides, hairs up to 1 mm. long; bristle scaberulous - - - - 20. *densiflora*.

Glumes glabrous; column and bristle of awn unilaterally plumose, hairs up to 4 mm. long - - - 21. *hemipogon*.

Glumes 1.7-2.4 cm. long; valve 0.8-1 cm. long; awn 7-9 cm. long :

Awn slender, column 1.4-3 cm. long, bristle 3-7 cm. long :

Awn white plumose along the column and base of the bristle, scaberulous towards the tip; hairs of the valve whitish :

Valve scantily hairy all along, the hairs not produced at the tip into a conspicuous tuft :

Column 1.4 cm. long; bristle up to 5.5 cm. long (from W. Australia) - - - 22. *nobilis*.

Column 2 cm. long, bristle 6-7 cm. long (from S. and E. Australia) - - - 23. *mollis*.

Valve densely covered with silky hairs, the uppermost produced into a tuft 2-3 mm. long - - - 24. *stuposa*.

- Awn greyish plumose all along,  
column about 3 cm. long,  
bristle 6 cm. long; hairs of  
valve fulvous - - - 25. *plumigera*.
- Awn rather stout, column 3.5 cm.  
long, bristle about 4.5 cm. long - 26. *semibarbata*.

## VI. *Striatae*.

- Lower glume 2.1-3 cm. long, truncate  
or toothed; awn stout, whitish,  
6-8.5 (rarely 11) cm. long; glumes  
glabrous or rarely pubescent - 27. *pubescens*.
- Lower glume 0.8-1.7 cm. long, acuminate,  
entire; awn 3.5-6.5 cm.  
long, slender, usually turning dark  
in colour :
- Inflorescence very lax; lower glume  
1.4-1.7 cm. long; valve 0.9-1  
cm. long, finally turning very  
dark brown with fulvous  
indumentum - - 28. *rudis*.
- Inflorescence dense, contracted,  
spikelike; glumes 1-1.4 cm.  
long; valve 7-9 mm. long,  
usually pale with white hairs  
(except *S. compacta*) :
- Sheaths densely bearded at the  
mouths with long white silky  
hairs; nodes glabrous; glumes  
tinged with dull violet - 29. *hirsuta*.
- Sheaths shortly pubescent or  
glabrous at the mouths, but  
not bearded; nodes shortly  
and softly pubescent :
- Glumes 1-1.2 cm. long; panicle  
up to 25 cm. long;  
awn 4.5-5.5 cm. long :
- Glumes narrowly contracted;  
valve 0.8 cm. long, slender,  
with whitish indumentum 30. *tenuiglumis*.
- Glumes not contracted; valve  
0.9 cm. long, rather stout,  
with fulvous indumentum  
when mature - - 31. *compacta*.
- Glumes about 1.4 cm. long;  
panicle up to 45 cm. long;  
awn 5.5 cm. long - - 32. *elatior*.

VII. *Turgidulae*.

- Nerves of lower glume running out  
into three sharp teeth about 3 mm.  
long; glumes about 0·8 cm. long - 33. *aristiglumis*.  
Glumes entire, 1–1·4 cm. long :  
Glumes 1·2–1·4 cm. long, acutely  
acuminate; panicle very lax,  
internodes up to 6 cm. long - 34. *fusiformis*.  
Glumes 1 cm. long, acute to sub-  
obtuse; panicle rather dense,  
internodes up to 3 cm. long - 35. *puberula*.

VIII. *Aphanoneuræ*.

- Ligule elongated, glabrous, up to  
6 mm. long; awn 4 cm. long,  
twice geniculate; plant glabrous - 36. *setacea*.  
Ligule short, ciliate :  
Lower glume 1·5 cm. long; valve  
0·8 cm. long; awn 5 cm. long;  
plant shortly pubescent - 37. *aphanoneura*.  
Lower glume 1·1 cm. long; valve  
0·4 cm. long; awn 4 cm. long;  
plant glabrous or scaberulous - 38. *crinita*.

IX. *Annuæ*.

- Leaf-sheaths glabrous; basal leaves  
soft, convolute, 2 mm. wide  
when flattened out - - - 39. *compressa*.  
Leaf-sheaths, at least the lower, villous  
with short coarse whitish and  
brightly glistening hairs; basal  
leaves setaceously convolute,  
rather stiff - - - 40. *lachnocolea*.

## ENUMERATION.

*The specimens to be accepted as "Types" are marked \*.*

1. **S. elegantissima**, Labill. Pl. Nov. Holl. i. 24, t. 29. (Figs. 1 & 1A, pp. 13 & 19.)

W. AUSTRALIA. Shark's Bay, *Gaudichaud*; Murchison River, *Oldfield*; Swan River, *Drummond* 139, 222, 958; Kauring near Greenhills, *G. W. Brown* 532, 537; Lake Cowcowing, *Koch* 1133, p.p.; Dowerin-Merriden, *Stoward* 299; near Coolgardie, *Spencer Moore*; S.W. of Queen Victoria Spring, Elder Exploring Expedition, *Helms*; King George's Sound, *Baxter*; and without precise locality, *Ince*; *Collie*; Isle of Carnac, *Preiss* Herb. No. 1847.

S. AUSTRALIA. Port Augusta, growing among bushes, *T. S. Lea*; Yayinga Mts., Victoria Expedition, Nov. 7th, 1860 (coll ?); "Central Australia," *Capt. Sturt*; *Mitchell* 67.

NEW SOUTH WALES. Wyalong, *Boorman*; Murray River, *Dallachy*; Murrumbidgee, *F. Mueller*.

TASMANIA. *Labillardière*\*.

2. **S. Tuckeri**, *F. Muell.* Fragm. Phytog. Austr. xi. 129. (Figs. 2 & 2A, pp. 13 & 19.)

NEW SOUTH WALES. Mt. Boppy, *Boorman*; Nipigan, *Boorman*; Lachlan and Darling-River, *Tucker*\* (not seen).

3. **S. Muelleri**, *Tate*, Trans. Roy. Soc. S. Austral. vii. (1885) 70. (Fig. 3, p. 13.)

S. AUSTRALIA. Mount Lofty range, *Tate*\*.

4. **S. juncifolia**, *Hughes*, nov. sp. (Figs. 4 & 4A: pp. 13 & 19.) *Perennis*, caespitosa, ad 1 m. alta. *Culmi* erecti, teretes, glabri, laeves, 2-3 nodi, nodis glabris valde exsertis. *Foliorum* vaginae firmas, strictas, laeves, leviter striatas; ligulae elongatae, ovatae, ad 7 mm. longae, glabrae; laminae lineares, convolutae, rigidae, in acumen pungens longe attenuatae, usque 64 cm. longae, glabrae. *Panicula* glabra, e summa vagina exserta, anguste contracta, spiciformis, 16-20 cm. longa; rami pauci, inaequales, pseudovercillati, laeves, 6-10 flori, ad 6 cm. longi; internodia 3-6 cm. longa, laevia; pedicelli 2-6 mm. longi, apice leviter discoidei. *Spiculae* fulvae, 9 mm. longae. *Glumae* subaequales, membranaceae, acutae, glabrae, inferior 3-nervis, superior sub-5-nervis. *Valva* cylindrica, 7 mm. longa, tota hirsuta pilis albis ad 2 mm. longis, 5-nervis, biloba, lobis acutis 1.2-2 mm. longis; callus 1.5 mm. longus, acutus; arista 5 cm. longa, columna robustiuscula 1 cm. longa; valvula valvam subaequans, truncata, dorso hirsuta. *S. flavesces*, Benth. Fl. Austral. vii. 566 p.p. non Labill.

W. AUSTRALIA. Swan River, *Drummond* 4th Coll. 377\*.

There is a great superficial similarity between this plant and *S. flavesces*, Labill., but the differences indicated in the key

appear to justify their being treated as distinct species. The specimens of both species in the Kew Herbarium are over-mature with practically all the florets shed.

5. ***S. teretifolia***, Steud. Syn. Glum. i. 128. *Dichelachne stipoides*, Hook. f. Fl. N. Zeal. i. 294, t. 66; Fl. Tasman. ii. 112. (Figs. 5 & 5A, pp. 13 & 19.)

VICTORIA. Wilson's Promontory, C. Stuart; Point Lonsdale, Tilden 754.

TASMANIA. South Port, C. Stuart; George Town, Gunn 1490; Swanport, Story 18804.

"Forming tussocks growing in shingle at high water mark" (Gunn).

The species was originally described from a plant collected by D'Urville\* at Western Port, Victoria. Although I have not seen it, there is no doubt as to its identity with the specimens quoted.

This plant is also found in New Zealand (see Cheeseman, Fl. N. Zeal. 857), growing abundantly in North Island in rocky or sandy places near the sea from the North Cape to the Bay of Plenty.

6. ***S. flavescens***, Labill. Pl. Nov. Holl. i. 24, tab. 30. (Figs. 6 & 6A, pp. 13 & 19.)

TASMANIA. Labillardière\*.

7. ***S. oligostachya***, Hughes, nov. sp. (Figs. 7 & 7A, pp. 13 & 19.) *Perennis*, caespitosa, ad 65 cm. alta. *Culmi* graciles, erecti, sublaeves, 2-nodi, ad nodos pubescentes, internodiis exsertis. *Foliorum* vaginae arctae, infimae hirsutae, summae glabrae, caeterae pubescentes vel glabrescentes; ligulae breves, dense ciliatae; laminae duriusculae, setaceo-convolutae, saepe recurvae, 12-20 cm. longae, glabrae vel leviter scabriusculae. *Panicula* laxa, pauciflora, valde exserta, 15-20 cm. longa; rami tenues, 2-5-flori, ad 7 cm. longi, minute scaberuli; pedicelli 0.6-1 cm. longi. *Spiculae* fulvae, ad 1.4 cm. longae. *Glumae* membranaceae, acutae vel acuminatae, glabrae; inferior 3-nervis, 1.4 cm. longa; superior 5-nervis, 1.2 cm. longa. *Valva* cylindrica, 9 mm. longa, luteo-hirsuta, superne scaberula, 5-nervis, biloba, lobis acutis 1.2 mm. longis glabris; callus 2 mm. longus, acutus; arista 5 cm. longa, columna bigeniculata subrobusta 2 cm. longa; valvula valvam aequans, dorso sparse pilosa.

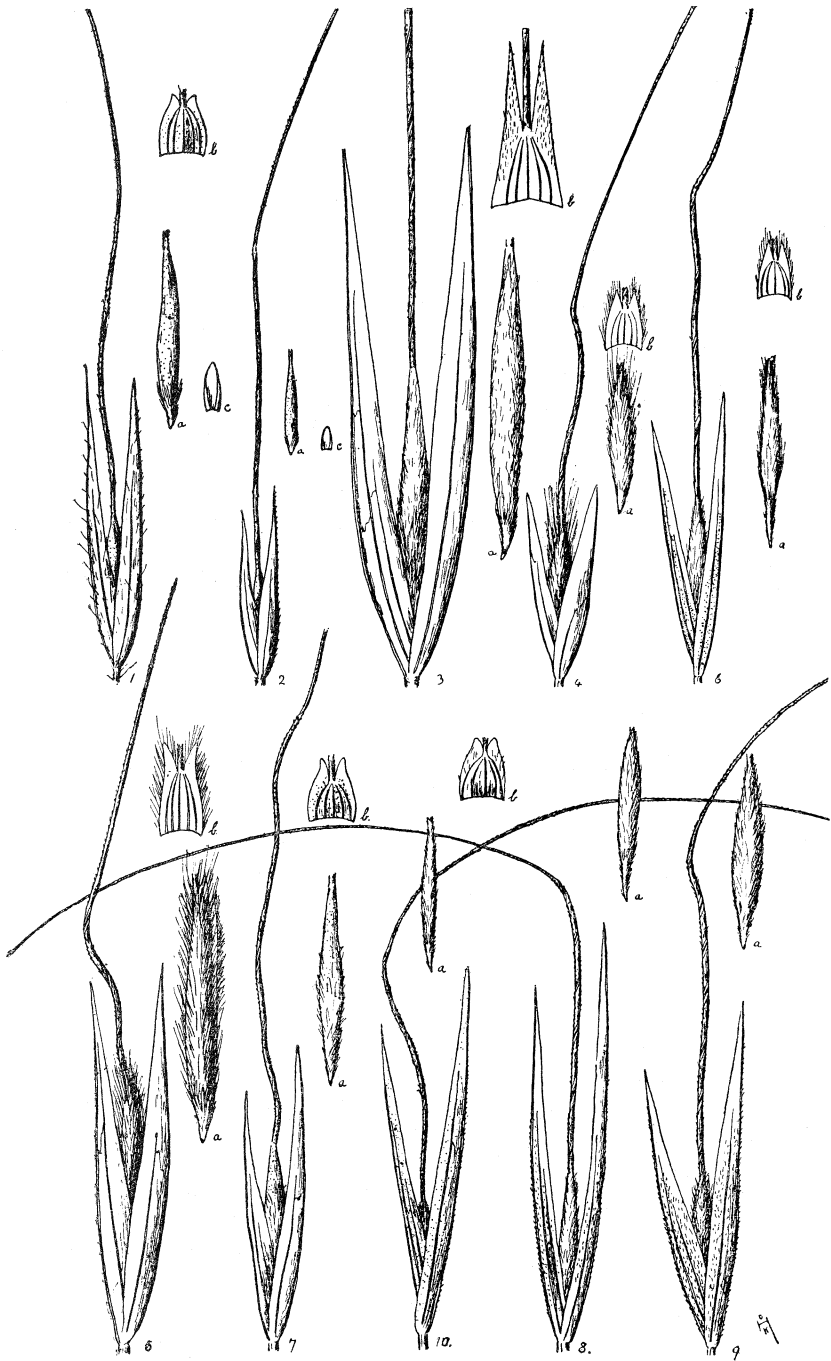
VICTORIA. Wendu Vale, growing in tussocks, Robertson 534\*.

8. ***S. eriopus***, Benth. Fl. Austral. vii. 570. (Figs. 8 & 8A, pp. 13 & 19.)

W. AUSTRALIA. Swan River, Drummond 962\*.

9. ***S. tenuifolia***, Steud. Syn. Glum. i. 128. *S. scabra*, var. *occidentalis*, Benth. Fl. Austral. vii. 571. (Figs. 9 & 9A, pp. 13 & 19.)

S.W. AUSTRALIA. Swan River, Drummond 220, 960, 963; and without precise locality, Drummond 391\*.



Spikelets of species 1—10,  $\times 3$ : a, valve; b, tip of valve  
c, valvule.  $\times 3$ .

There is a specimen in the Kew Herbarium written up "N.W. Coast, N. Holld. Bynoe," in Sir W. Hooker's hand. To this was added "rather Drummond," in pencil by Bentham, who, however, does not quote the locality in the *Flora Australiensis*. The specimen is certainly *S. tenuifolia*, but its origin is entirely doubtful.

10. ***S. leptophylla***, *Hughes*, nov. sp. (Figs. 10 & 10A, pp. 13 & 19.) *Perennis*, caespitosa, 70–90 cm. alta. *Culmi* erecti, teretes, 2-nodi, nodis glabris exsertis. *Foliorum* vaginae arctae, glabrae, laeves, striatae, inferiores cinnamomeo-rufae; ligulae breves vel unilateraliter elongatae, ad 2 mm. longae, ciliatae; laminae filiformes, setaceo-convolutae, usque 25 cm. longae, scabrae. *Panicula* anguste contracta, spiciformis, 20–35 cm. longa; internodia 3–6 cm. longa, laevia; rami pseudo-verticillati, inaequales, leviter scaberuli; pedicelli 2–7 mm. longi, glabri vel leviter scaberuli. *Spiculae* angustatae, vix hiantes, ad 1.8 cm. longae. *Glumae* inaequales, apice hyalinae, acuminatae; inferior 1.8 cm. longa, 3-nervis, dorso scabriuscula; superior 1.5 cm. longa, sub-5-nervis. *Valva* angusta, 6.5 mm. longa, ciliata, pilis albis, 5-nervis, biloba lobis subacutis 1–1.5 mm. longis; callus acutus, 1.2 mm. longus; arista 4.5–5 cm. longa, columna robustiuscula 1–1.1 cm. longa, seta subplana; valvula valvam aequans.

W. AUSTRALIA. Swan River, *Drummond* 381\*.

11. ***S. trichophylla***, *Benth.* Fl. Austral. vii. 570. (Figs. 11 & 11A, pp. 17 & 19.)

W. AUSTRALIA. Kauring on the York-Greenhills Line, *Stoward* 364, 458, 536; and without precise locality, *Drummond* 122\*.

12. ***S. falcata***, *Hughes*, nov. sp. (Figs. 12 & 12A, pp. 17 & 19.) *Perennis*, caespitosa, 30–45 cm. alta. *Culmi* erecti, 2-nodi, nodis glabris exsertis. *Foliorum* vaginae arctae, striatae, glabrae vel inferne subpubescentes, marginibus ciliatae; ligulae breves, dense ciliatae; laminae setaceo-convolutae, rigidulae, 4–8 cm. longae, scabrae. *Panicula* ad 25 cm. longa, 2–3 cm. lata; axis primarius subtriqueter, ut rami glaber; rami erecti vel sursum curvati, tenues, pauciflori, ad 5 cm. longi; pedicelli 0.2–1 cm. longi. *Spiculae* paulo hiantes, angustae. *Glumae* integrae, acuminatae, inaequales, delicatulae, basi violaceae, apice hyalinae; inferior 1.3 cm. longa, 3-nervis; superior 1.1 cm. longa, 5-nervis. *Valva* angusta, 6 mm. longa, parce albo-pilosa, 5-nervis, subintegra; callus acuminatus, 2.2 mm. longus, dense pilosus; arista 5.5–6 cm. longa, columna glabra vel minute scaberula 1.2 cm. longa, seta valde recurva; valvula valvam aequans. *S. setacea*, *Benth.* Fl. Austral. vii. 568 p.p. non R. Br.

W. AUSTRALIA. Blackwood River, *Oldfield* 675.

N.S. WALES. Murrumbidgee, *McArthur* 141\*.

VICTORIA. Mount M'Ivor, *Blandowski*.

13. *S. arachnopus*, *Pilg.* in *Diels* and *Pritz.* *Fragm. Phytog. Austral.* Occ. 70, in *Engl. Jahrb.* xxxv. e descr. *S. setacea*, *Benth.* *Fl. Austral.* vii. 586 p.p. non *R. Br.* (Figs. 13 & 13A, pp. 17 & 19.)

W. AUSTRALIA. Swan River, *Drummond* 136 (or 961?); Coolgardie, near Bullabulling, *Diels* 5954\* (not seen).

14. *S. variabilis*, *Hughes*, nov. sp. (Figs. 14 & 14A, pp. 17 & 19.) *Perennis*, caespitosa, 30–80 cm. alta. *Culmi* erecti, teretes, 1–2-nodi, nodis glabris vel subpubescentibus plerumque exsertis. *Foliorum* vaginae arctae, striatae, glabrae, glabrescentes vel raro pubescentes; ligulae saepe unilateraliter elongatae, ad 2 mm. longae, ciliatae; laminae lineares, convolutae, subflexuosae, in acumen longe attenuatae, 5–15 (raro 25) cm. longae, glabrae; leviter scaberulae vel pubescentes. *Panicula* 15–25 cm. longa, usque 2–3 cm. lata; axis primarius laevis; rami magis minusve erecti, tenues, pauciflori, ad 9 cm. longi, scaberuli; pedicelli saepe curvati vel nutantes, 3–8 mm. longi, scaberuli. *Spiculae* paulo hiantes, 1·2–1·5 cm. longae. *Glumae* subaequales, acuminatae, membranaceae, basi plerumque violaceae, apice hyalinae; inferior sub-3-nervis; superior 5-nervis. *Valva* cylindrica, 6–8 mm. longa, albopilosa, 5-nervis, apice integra vel subintegra; callus acuminatus ad 2 mm. longus; arista 6–7 cm. longa, columna scaberula vel pubescente 11–14 mm. longa, seta valde recurva; valvula valvam aequans. *S. setacea*, *Hook. f.* *Fl. Tasman.* ii. 110, t. 157; *Benth.* *Fl. Austral.* vii. 568 p.p. non *R. Br.*; *S. scabra*, l. c. 571 p.p. non *Lindl.*; *S. pubescens* var. *effusa*, *Benth* l. c. 570.

W. AUSTRALIA. Kauring on the York-Greenhills Line, *Stoward* 361, 459, 466 p.p.; Swan River, *Drummond* 961\*; Ningham Country beyond the Arrowsmith River, *Monger*.

S. AUSTRALIA? "Central Australia," *Sturt* 16, 17.

VICTORIA. Wendu Vale in large patches, *Robertson* 531; Yarra River, *Mueller*; Port Phillip, *MacGillivray* 880; Murray River, *Mueller*.

TASMANIA. Without precise locality, *Gunn* 1487.

The specimens enumerated here comprise a variety of forms, but none of them seem specifically distinct. The glumes vary slightly in length, but all have the same texture and shape. *Robertson* 531, from Victoria, is the only plant with the lower leaf sheaths pubescent, but it agrees in all other particulars. The species seems very closely allied to *S. Drummondii*, *Steud.*, which differs merely in the very much denser panicle with longer and more divided branches, the usually straighter awn and the texture of the blades. In *S. variabilis* the blades are mostly glabrous and exceedingly hard, showing in cross section very prominent nerves with thin weak tissue between them, causing them to split up readily. (Fig. 14A, p. 19.) In *S. Drummondii* the blades are densely pubescent, much softer to cut and only loosely or sometimes hardly convolute, and the tissue between the nerves is thicker with no tendency to splitting. (Fig. 15A, p. 19.)



Further, the column of the awn of this species is usually conspicuously white pubescent.

15. ***S. Drummondii*** Steud. Syn. Glum. i. 128. *S. scabra* var. *auriculata*, Black in Trans. Roy. Soc. S. Austral. xlii. 169 (1918). (Figs. 15 & 15A, pp. 17 & 19.)

W. AUSTRALIA. Swan River, *Drummond*; without precise locality, *Drummond*, 4th coll. 378\*.

S. AUSTRALIA. Laura, Oct. 8th, 1916, *Black*; Moonta, Nov. 24th, 1919, *Black*; Pinnaroo, Oct. 12th, 1918, *Black*; Enfield, Nov. 10th 1919, *Black*; Adelaide, *T. S. Lea*.

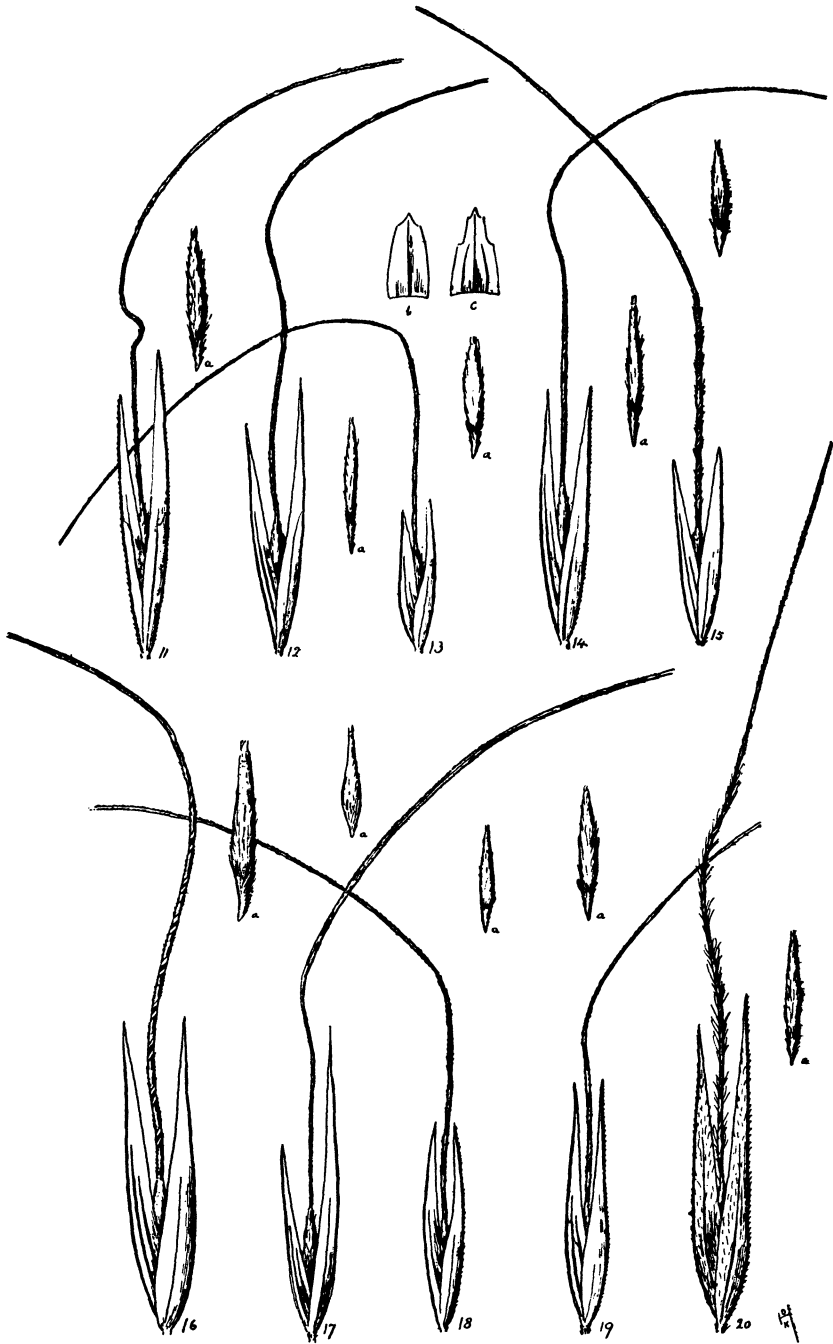
N.S. WALES. Bogan River, collected in the open forest, *Mitchell* 24.

16. ***S. incurva***, *Hughes*, nov. sp. (Figs. 16 & 16A, pp. 17 & 19.) *Perennis*, caespitosa, ad 65 cm. alta. *Culmi* erecti, teretes, 2-nodi, nodis glabris rarius exsertis. *Foliorum* vaginæ firmæ, scabrae vel glabrae, striatae, summae plerumque tumidae, paniculae basin amplexantes; ligulae brevissimae, ciliatae; laminae lineares, convolutae, in acumen pungens attenuatae, ad 20 cm. longae, valde scabrae vel rarius scabriusculae. *Panicula* 10–15, raro 20 cm. longa, usque 1 cm. lata; rami erecti, striati, leviter scaberuli, ad 8 cm. longi; pedicelli 0.5–2 cm. longi, saepe nutantes. *Spiculae* paulo hiantes. *Glumae* integrae, acuminatae, subaequales, usque 1.5 cm. longae, basi violaceae, apice hyalinae; inferior 3-nervis, dorso leviter scaberula; superior 5-nervis, dorso laevis. *Valva* cylindrica, cum callo 7.5 mm. longa, inferne pilosa, superne scaberula, 5-nervis, biloba, lobis minutis obtusis; callus acutus, 2 mm. longus, dense pilosus; arista 9 cm. longa, columna glabra vel sparse pubescens 2 cm. longa, seta valde recurva; valvula valvam aequans. *S. scabra* var. *pubescens*, Benth. Fl. Austral. vii. 571.

W. AUSTRALIA. Swan River, *Drummond* 138, 375\*, 973; *Collie*; York District, Killerberrim, *Leake*; Harvey, *Stoward* 533, 766.

VICTORIA. Nidesdale, *Etheridge*, June, 1865.

17. ***S. platychaeta***, *Hughes*, nov. sp. (Figs. 17 & 17A, pp. 17 & 19.) *Perennis*, haud caespitosa, ad 1 m. alta. *Culmi* erecti vel subgeniculati, teretes, lignosi, glabri, laeves, usque 10-nodi, iterum ramosi vel subfasciculati, internodiis exsertis; ligulae elongatae, ad 5 mm. longae, membranaceae, glabrae; laminae lineares, in acumen longe attenuatae, planae, ad 15 cm. longae, 2–5 mm. latae, utrinque glabrae. *Panicula* glabra, demum exserta, laxa, ad 20 cm. longa; internodia ad 4 cm. longa; rami primo erecti, maturi obliqui, 3–4-flori, ad 5 cm. longi; pedicelli 0.3–1 cm. longi, flexuosi. *Spiculae* parce hiantes. *Glumae* inaequales, delicatulae, basi violaceae, apice hyalinae, acuminatae; inferior 3-nervis, 1.2–1.5 cm. longa; superior 5-nervis, 0.9–1.2 cm. longa. *Valva* fusiformis, cum callo 5 mm. longa, integra, breviter pilosa; callus brevis, ad 0.6 mm. longus; arista usque 8 cm. longa, columna tenui 1 cm. longa, seta valde recurva manifeste compressa; valvula valvam aequans.



Spikelets of species 11—20,  $\times 3$ : *a*, valve,  $\times 3$ ; *b*, tip of lower glume; *c*, tip of upper glume,  $\times 6$ .

W. AUSTRALIA. Lake Cowcowing, *Koch* 1133 p.p.\*; 80 m. N. of Coolgardie, *Menzies*, 1st coll. 1207; and without precise locality, *Ince* p.p.

S. AUSTRALIA. Upper Arkaringa Valley, *Helms*.

N.S. WALES. Murrumbidgee, *Mueller*.

18. *S. scabra*, *Lindl.* in *Mitch. Trop. Austral.* 31. *S. setacea*, *Benth. Fl. Austral.* vii. 568, non R. Br. (Figs. 18 & 18A, pp. 17 & 19.)

W. AUSTRALIA. Fraser's Range, *Dempster*.

S. AUSTRALIA. Elder Exploring Expedition (about 131° 30' E. 27° S.), *Helms*; Mt. Lyndhurst, growing on elevated country, tablelands, &c., *Koch* 371; Gawler River, *Mueller*; and without precise locality, *Sinclair*.

QUEENSLAND. Warwick, *Beckler*.

N.S. WALES. Castlereagh, *Woolls*; Bogan River, *Mitchell* 125\*.

19. *S. pycnostachya*, *Benth. Fl. Austral.* vii. 568. (Figs. 19 & 19A, pp. 17 & 19.)

W. AUSTRALIA. Swan River, *Drummond*; and without precise locality, *Drummond* 121\*.

20. *S. densiflora*, *Hughes*, nov. sp. (Fig. 20, p. 17.) *Basis* incognita. *Cuimus* florifer robustus, nodis parce exsertis brevissime pubescentibus. *Foliorum* vaginæ arctae, striatae, breviter et dense pubescentes, summae tumidae paniculae basin amplectantes; ligulae brevissime sparse ciliatae; laminae laxae convolutae, in acumen attenuatae, superiores usque 13 cm. longae, utrinque breviter pubescentes. *Panicula* densissima, contracta, elliptico-oblonga, usque 20 cm. longa, 4 cm. lata; rami iterum divisi, multiflori. *Spiculae* angustae, subherbaceae. *Glumae* acuminatae, subaequales, usque 1.6 cm. longae, breviter pubescentes, 3-nerves. *Valva* 6 mm. longa, indistincte biloba, sparse albo-pilosa; callus acutus, 3 mm. longus; arista ad 3.8 cm. longa, columna 1.6–1.8 cm. longa breviter plumosa pilis albis ad 1 mm. longis, seta recta scabriuscula; valvula valvam aequans.

CENTRAL VICTORIA. Without precise locality, *Etheridge*\*.

21. *S. hemipogon*, *Benth. Fl. Austral.* vii. 569. *S. semibarbata*, var. F. v. Muell. *Fragm. Phytog. Austral.* viii. 104. (Figs. 21 & 21A, pp. 23 & 29.)

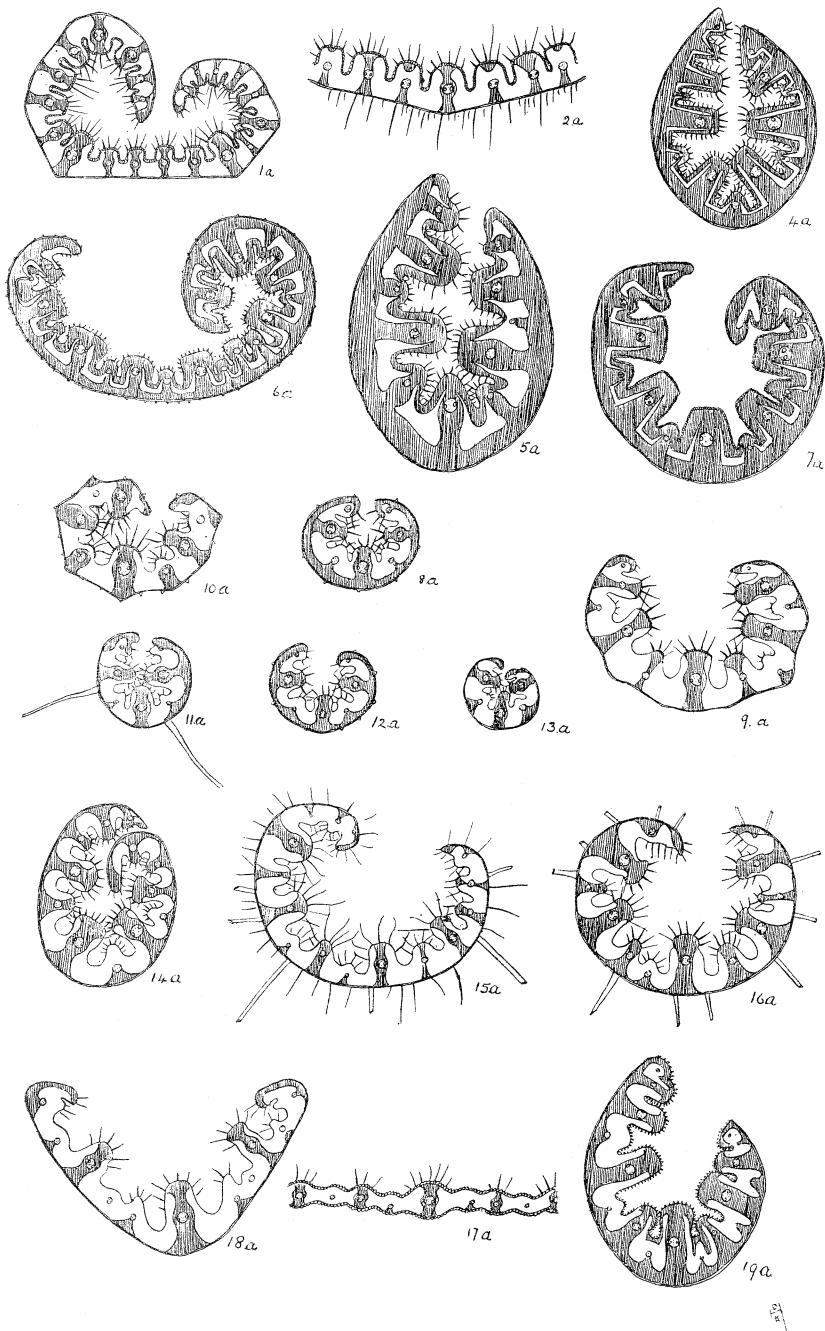
W. AUSTRALIA. Swan River, *Drummond* 231, 376\*; Lake Cowcowing, *Koch* 1132; Sikaltar District, *Spencer Moore*.

S. AUSTRALIA. Garker's Range, *Mueller*.

22. *S. nobilis*, *Pilg.* in *Diels and Pritz. Fragm. Phytog. Austral. Occ.* 70 in *Engl. Jahrb.* xxxv. e descr. *S. semibarbata*, *Benth. Fl. Austral.* vii. 568, p.p. non R. Br. (Figs. 22 & 22A, pp. 23 & 29.)

W. AUSTRALIA. Swan River, *Drummond* 116, 129; Kauring on the York-Greenhills Line, *Stoward* 474; Coolgardie, near Bronti, *Diels*\* (not seen).

23. *S. mollis*, *R. Br. Prod.* 174. *S. semibarbata*, *Hook. f. Fl. Tasman.* ii. 110 p.p. non R. Br.; *Benth. Fl. Austral.* vii.



Leaf sections of species 1--19,  $\times 30$ .

569 p.p. non R. Br. *S. semibarbata*, var. *mollis*, Benth. 1 c. (Figs. 23 & 23A, pp. 23 & 29.)

N.S. WALES. Port Jackson, *Brown* 6205\*; *Sieber*, *Agrostoth.* 60; *Kneucker* 196.

VICTORIA. Wendu Vale, forest land, *Robertson* 529; and without precise locality, *Harvey*.

TASMANIA. Port Dalrymple, *Paterson*; Hobart Town, *Gunn* 1452.

24. *S. stuposa*, *Hughes*, nov. sp. (Figs. 24 & 24A, pp. 23 & 29.) *Perennis*, vix caespitosa, ad 1 m. alta. *Culmi* erecti vel geniculati, teretes, 3-nodi, nodis exsertis molliter pubescentibus. *Foliorum* vaginae leviter striatae, praeter summas patule pubescentes, bases tandem in fibras longissimas tortas dissolutae; ligulae brevissimae, ciliatae; laminae lineares, convolutae, in acumen longe attenuatae, ad 20 cm. longae, patule pubescentes vel scabrae. *Panicula* angusta, contracta, ad 20 cm. longa; axis primarius teres, laevis; rami tenues, scabri, internodia vix excedentes, ad 10 cm. longi; pedicelli scabri, 2-8 mm. longi. *Spiculae* paulo hiantes, pallidae. *Glumae* inaequales vel subaequales, tenuiter acuminatae, membranaceae, apice longe hyalinae, dorso scaberulae; inferior 3-nervis, 1.7 cm. longa; superior 5-nervis, usque 1.5 cm. longa. *Valva* 1 cm. longa, integra, dense et manifeste hirta, pilis apice productis ad 3 mm. longis; callus acuminatus, 3 mm. longus; arista tenuis, non decidua, 5-6.5 cm. longa, columna breviter plumosa torta, 2.5 cm. longa; valvula valvam aequans.

TASMANIA. New Norfolk, *Gunn* 1480, Jan. 5th, 1840\*; Port Arthur and Hobart Town, *Capt. Home*.

25. *S. plumigera*, *Hughes*, nov. sp. (Figs. 25 & 25A, pp. 23 & 29.) *Perennis*, caespitosa, usque 55 cm. alta. *Culmi* erecti, teretes, 2-3-nodi, nodis parce exsertis, molliter pubescentes. *Foliorum* vaginae arctae, leviter striatae, breviter pubescentes, marginibus oreque albo-ciliatae; ligulae non elongatae, dense ciliatae; laminae lineares, laxae vel vix convolutae, ad 35 cm. longae, 2-3 mm. latae, supra breviter et dense pubescentes, infra glabrescentes. *Panicula* densa, contracta, usque 20 cm. longa; axis primarius teres, ut rami tenuiter scaberulus; pedicelli 1-5 mm. longi. *Spiculae* paulo hiantes, pallidae vel basi purpurascentes. *Glumae* inaequales, acuminatae, integrae, apice hyalinae; inferior 2 cm. longa, 3-nervis, dorso scaberula; superior 1.5 cm. longa, dorso laevis. *Valva* cylindrica, 8 mm. longa, hirsuta pilis fulvis; callus acuminatus, 3 mm. longus; arista gracillima, 9 cm. longa, columna et seta griseo-plumosis, pilis 1-1.5 mm. longis; valvula valvam aequans.

S. AUSTRALIA. Elder Exploring Expedition (about 130° 80' E. 28° S.), *Helms*\*.

26. *S. semibarbata*, R. Br. Prod. 174. *S. semibarbata* var. *campylachne*, Benth. Fl. Austral. vii. 569 (Drummond specimen). (Figs. 26 & 26A, pp. 23 & 29.)

W. AUSTRALIA. Swan River, *Drummond*; near Fremantle, among limestone hills, *Oldfield* 1004; "in arenosis silvae prope Pine-Apple, Perth," *Preiss* Herb. no. 1826; Leederville, *Stoward* 935; Gordon River, *Oldfield* 675; Bridgetown to Kojonup and Slab Hut Gulley, *Dorrien-Smith*.

S. AUSTRALIA. Mt. Lofty Range, Belair, *Koch* 937; French Island, *Beveridge*; King George's Sound, *Collie*.

TASMANIA. Penquite, *Gunn* 1480, Dec. 1845; Port Dalrymple, *Brown* 6204\*.

*S. campylachne*, as described by Nees in Pl. Preiss. ii. 99, seems to be a plant with smaller spikelets (13–14 mm.) and shorter valves (6 mm.). I have not seen Preiss's specimen no. 1848 on which the species was primarily based, and am therefore doubtful as to its identity. Nees and Benthams (Fl. Austral. vii. 569) also quote a specimen of Drummond's from the Swan River under *S. campylachne* and *S. semibarbata* var. *campylachne*, respectively. The specimens of this variety as written up by Benthams himself are certainly identical with *S. semibarbata*, R. Br.

27. *S. pubescens*, R. Br. Prod. 174. *S. commutata*, Trin. and Rupr. Gram. Stip. 49. (Figs. 27 & 27A, pp. 23 & 29.)

QUEENSLAND. Brisbane River, *Cunningham*.

N.S. WALES. Port Jackson, *Brown* 6203\*, *Sieber*, *Agrostoth.* 59; Blue Mountains, *Woolls* and *Calvert*; New England, *C. Stuart*; Sydney, *Stephenson* 261.

TASMANIA. New Norfolk, *Gunn* 996 p.p.; Mount Direction, *Gunn*; Latrobe River, *Mueller*; Port Dalrymple, *Paterson*; and without precise locality, *Llotsky*; *Gunn* 588.

*Gunn* 588 and Mount Direction have somewhat more acuminate hyaline tips, but otherwise they agree well with *S. pubescens*, R. Br.

Under *Gunn* 996 there is a specimen dated 15.11.40, which agrees with another also by *Gunn* numbered 1453 and one by *Llotsky*, also from Tasmania, both having much stouter culms and broader leaf-blades than any of the specimens enumerated above. They are not *S. pubinodis*, Trin., and seem not to have been distinguished so far. They may represent a local race.

Variation occurs also in the length of the awns. In the type (*Brown* 6203) they measure 6–7.5 cm. long, while in one of *Llotsky's* specimens (without precise locality) they attain a length of 11 cm. This plant can hardly be called specifically distinct, as intergradations seem to exist between it and the type, so that I can only consider it as another example of a local variety or form.

28. *S. rudis*, *Spreng.* Syst. Cur. Post. 31. (Figs. 28 & 28A, pp. 23 & 29.) Descriptio emendata. *Perennis*, vix caespitosa, ad 1 m. alta. *Culmi* erecti vel geniculati, teretes, 2-nodi, nodis exsertis molliter pubescentibus. *Foliorum* vaginae leviter striatae, breviter pubescentes vel fere glabrae; ligulae brevissimae, glabrae vel minute ciliatae; laminae lineares, convolutae, in acumen longe attenuatae, ad 55 cm. longae, pubescentes vel glabrescentes.

*Panicula angusta*, contracta vel apertiuscula, ad 30 cm. longa; axis primarius teres, laevis; rami tenues, scabri, internodia vix excedentes, ad 9 cm. longi; pedicelli scabri, 2–8 mm. longi. *Spiculae* hiantes. *Glumae* subaequales, acuminatae, integrae vel subdentatae, apice hyalinae, ad 1·7 cm. longae; inferior 3-nervis; superior 5-nervis. *Valva* matura 1 cm. longa, integra, nigra vel fusca, sparse hirsuta pilis fulvis; callus acuminatus, 2 mm. longus; arista tenuis, matura nigrescens, 6·5–7 cm. longa; columna breviter pubescente vel scaberula 2·5–3 cm. longa; valvula valvam aequans. *S. pubescens*, Benth. Fl. Austral. vii. 569 p.p., non R. Br.

W. AUSTRALIA. Fremantle, among limestone hills, *Oldfield*; Leederville (near Perth), *Stoward* 586; Claremont, sandhills near the coast, *Cecil Andrews*, 1st coll., 1206; Swan River, *Collie*.

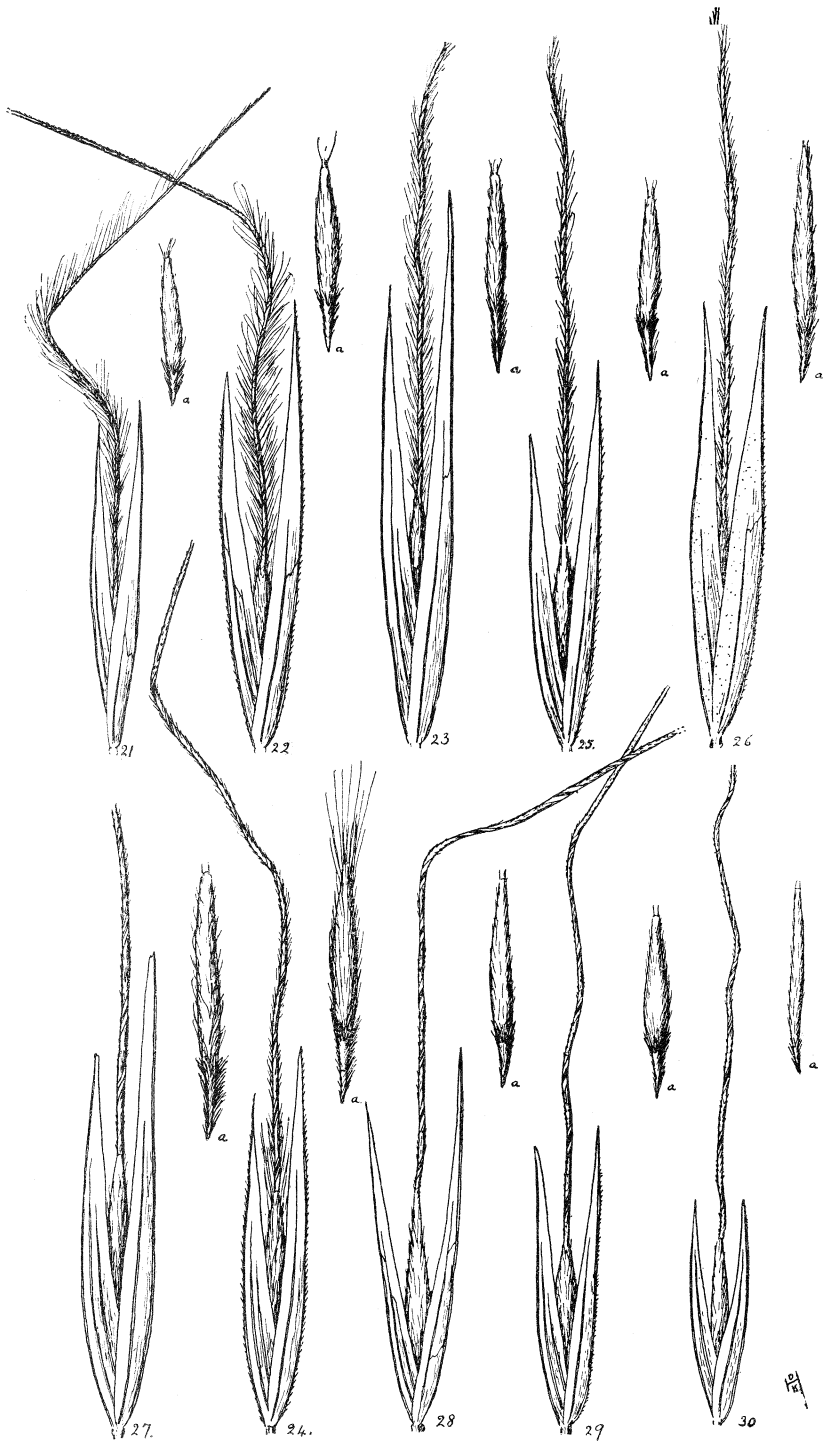
N.S. WALES. *Sieber* 66\*.

VICTORIA. Wendu Vale, *Robertson* 533.

29. *S. hirsuta*, *Hughes*, nov. sp. (Figs. 29 & 29A, pp. 23 & 29.) *Perennis*, caespitosa, ad 60 cm. alta. *Culmi* erecti, teretes vel subcompressi, glabri, 2-nodi, nodis glabris exsertis. *Foliorum* vaginae arctae, striatae, sericeo-pilosae vel superiores glabrae, ore dense barbatae pilis albis ad 4 cm. longis; ligulae brevissimae, ciliatae; laminae lineares, convolutae, in acumen longe attenuatae, subflexuosae, ad 25 cm. longae, striatae, glabrae. *Panicula angusta*, contracta, spiciformis, ad 20 cm. longa; axis primarius teres, laevis; rami tenues, scabri, internodia vix excedentes, ad 10 cm. longi; pedicelli scabri, ad 4 mm. longi. *Spiculae* hiantes, purpurascens. *Glumae* subaequales, acuminatae, integrae, apice hyalinae, usque ad 1·3 cm. longae; inferior 3-nervis, dorso scaberula; superior 5-nervis, nervis manifestis. *Valva* cylindrica, 8 mm. longa, luteo-brunnea, hirsuta pilis albis; callus acuminatus, ad 3 mm. longus; arista nigra, 5 cm. longa, columna breviter pubescente 1·7–2 cm. longa; valvula valvam aequans. *S. scabra*, Lindl. var. *barbata*, Benth. Fl. Austral. vii. 570.

W. AUSTRALIA. Swan River, *Drummond*\*.

30. *S. tenuiglumis*, *Hughes*, nov. sp. (Figs. 30 & 30A, pp. 23 & 29.) *Perennis*, caespitosa, 50–60 cm. alta. *Culmi* erecti, teretes, glabri, laeves, 2-nodi, nodis glabris vix exsertis. *Foliorum* vaginae strictae vel apertiusculae, striatae, glabrae vel marginibus breviter ciliatae, summae interdum tumidae; ligulae brevissimae, sparse ciliatae; laminae lineares, convolutae, in acumen longe attenuatae, subflexuosae, ad 30 cm. longae, striatae, glabrae. *Panicula densa*, contracta, basi vaginata, 10–20 cm. longa, 1–3 cm. lata; axis primarius teres, laevis; rami filiformes, leviter scaberuli, ad 9 cm. longi; pedicelli 1–4 mm. longi. *Spiculae* hiantes, pallidae vel violaceae, striatae. *Glumae* exsiccatae tenues, acuminatae, integrae, subaequales, 1–1·2 cm. longae; inferior 3-nervis; superior 5-nervis. *Valva* pallide brunescens, tenuis, cum callo 8 mm. longa, sparse hirsuta pilis albis; callus acutus, 1 mm. longus; arista gracilis, 4·5 cm. longa, columna parce brevissima pilosula 2·5 cm. longa; valvula



Spikelets of species 21—30: *a*, valve.  $\times 3$ .



valvam aequans. *S. scabra*, Lindl. var. *striata*, Benth. Fl. Austral. vii. 570.

W. AUSTRALIA. Murchison River, Oolingarra, *Oldfield*; Sand near Woodman's Point, *Oldfield*; Swan River, *Drummond* 133\*, 138 p.p.; Buckland Hill, near Perth, limestone hills, *Cecil Andrews*, 1st coll. 1205.

31. *S. compacta*, *Hughes*, nov. sp. (Figs. 31 & 31A, pp. 27 & 29.) *Perennis*, 60–80 cm. alta. *Culmi* erecti vel subgeniculati, teretes, laeves, usque 3-nodi, ad nodos pubescentes, caeterum glabri, internodiis inferioribus exceptis exsertis. *Foliorum* vaginae tandem laxiusculae, glabrae, leviter striatae; ligulae brevissimae, truncatae; laminae lineares, convolutae, in acumen longe attenuatae, 12–20 cm. longae (vel longiores<sup>1</sup>), glabrae. *Panicula* exserta, densa, contracta, spiciformis, 18–30 cm. longa, ad 2 cm. lata; rami internodia vix vel paulo excedentes, usque 7 cm. longi; pedicelli 2–6 mm. longi, ut rami ramulique leviter scaberuli. *Spiculae* ad 1.2 cm. longae. *Glumae* subaequales, subhyalinae, acuminatae, glabrae; inferior 3-nervis; superior 5-nervis, nervis conspicuis. *Valva* fusiformis, 9 mm. longa, luteo-pilosa, 5-nervis, biloba, lobis acutis 1 mm. longis; callus 2.5 mm. longus, acuminatus; arista 5–6 cm. longa, columna bigeniculata 2.5–3 cm. longa; valvula valvam subaequans, dorso pilosa. *S. flavescens* Hook. Fl. Tasman. ii. 110, Benth. Fl. Austral. vii. 566 p.p. non Labill.

TASMANIA. *Gunn* 996 p.p.\*

32. *S. elatior*, *Hughes*, nov. sp. (Figs. 32 & 32A, pp. 27 & 29. *Perennis*, robusta, probabiliter caespitosa, usque ad 1 m. alta. *Culmi* erecti vel geniculati, teretes, 4-nodi, pubescentes, nodis exsertis. *Foliorum* vaginae apertae, striatae, molliter pubescentes, marginibus oreque breviter ciliatae; ligulae non elongatae, brevissime ciliatae; laminae lineares, vix convolutae, in acumen longe attenuatae, subflexuosae, ad 70 cm. longae, 5–7 mm. latae, striatae, utrinque sparse hirsutae vel glabrescentes. *Panicula* anguste contracta, basi vaginata, ad 40 cm. longa, usque 2 cm. lata; axis primarius subteres, glaber; rami filiformes, scaberuli, ad 15 cm. longi; pedicelli scaberuli, 1–4 mm. longi. *Spiculae* hiantes, pallidae. *Glumae* acuminatae, integrae, subaequales vel inaequales, glabrae; inferior 1.4 cm. longa, 3-nervis; superior ad 1.35 cm. longa, 5-nervis, nervis manifestis. *Valva* pallide brunnescens, tenuis, cum callo 7.5 mm. longa, sparse hirsuta pilis albis; callus acutus, 1 mm. longus; arista gracilis, 5.5 cm. longa, columna parce brevissime pilosula 2.5 cm. longa; valvula valvam aequans. *S. scabra*, Lindl. var. *elatior*, Benth. Fl. Austral. vii. 570.

W. AUSTRALIA, Swan River, *Drummond*; and no. 959\*; Harvey, *Stoward* 775; King George's Sound, *Brown* 6203, p.p.

S. AUSTRALIA, Adelaide, *T. S. Lea*.

TASMANIA, Port Dalrymple, *Paterson*.

33. *S. aristiglumis*, *F. Muell.* in Trans. Vict. Inst. 1855, 43. (Figs. 33 & 33A, pp. 27 & 29.)

VICTORIA, Murray River, *Mueller\**.

34. *S. fusiformis*, *Hughes*, nov. sp. (Figs. 34 & 34A, pp. 27 & 29.) *Perennis*, caespitosa, 50–70 cm. alta. *Culmi* erecti vel geniculati, teretes, fere lignosi, glabri, 3-nodi, nodis pubescentibus vel glabrescentibus valde exsertis. *Foliorum* vaginae apertiusculae, striatae, glabrae; ligulae non elongatae, truncatae, fere glabrae; laminae lineares, laxae convolutae, in acumen longe attenuatae, usque ad 15 cm. longae, glabrae. *Panicula* laxa, pauciflora, usque 25 cm. longa; axis primarius gracilis, leviter scaberulus, subtriqueter; rami fasciculati, patentes, ad 8 cm. longi, scaberuli, 4–6-flori; pedicelli 1–2 mm. longi. *Spiculae* subherbaceae. *Glumae* valde acuminatae, valvam amplectantes, subaequales, 1.2–1.4 cm. longae, integrae; inferior 3-nervis; superior 5-nervis. *Valva* cylindrica, turgida, 8 mm. longa, 1–1.5 mm. lata, integra, breviter et dense sericeo-pubescent pilis luteis; callus acutus, 1 mm. longus; arista 3 cm. longa, seta recta; valvula valvam aequans. *S. aristiglumis* Benth. Fl. Austral. vii. 570 non *F. Muell.*

N.S. WALES, Cassilis, *Leichardt*.

VICTORIA. Avoca River, *Mueller*; Murray River, *Mueller* 19277\*.

35. *S. puberula*, *Steud.* Syn. Glum. i. 128. *S. scabra*, Lindl. var. *occidentalis*, Benth. Fl. Austral. vii. 571. (Figs. 35 & 35A, pp. 27 & 29.)

S.W. AUSTRALIA (without precise locality). *Drummond*, 4th coll. 379\*.

36. *S. setacea*, *R. Br.* Prod. 174. (Figs. 36 & 36A, pp. 27 & 29.)

QUEENSLAND. Warwick, *Beckler*.

N.S. WALES. Port Jackson, *R. Brown*, 6202 p.p.\*; New England, *C. Stuart*; Edward's River, *Mueller*; Castlereagh, *Woolfs*.

Cheeseman (Man., N. Zeal. Fl. 858) cites this plant as found in New Zealand, but in his opinion it is probably only naturalised there.

37. *S. aphanoneura*, *Hughes*, nov. sp. (Figs. 37 & 37A, pp. 27 & 29.) *Perennis*, caespitosa, 30–60 cm. alta. *Culmi* erecti vel geniculati, teretes vel subcompressi, pubescentes, 2–4-nodi, nodis dense pubescentibus plerumque exsertis. *Foliorum* vaginae strictae vel apertiusculae, striatae, cinereo-pubescentes; ligulae non elongatae, dense ciliatae, ciliae ad 2.5 mm. longae; laminae lineares, convolutae, in acumen longe attenuatae, 10–20 cm. longae, utrinque tenuiter et densiuscula pubescentes vel glabrescentes. *Panicula* contracta, usque 20 cm. longa, 2–3 cm. lata; axis primarius gracilis, vix scaberulus; rami fasciculati, leviter scaberuli, ad 6 cm. longi; pedicelli 1–3 mm. longi. *Spiculae* angustae, delicatulae, pallidae. *Glumae* inaequales vel subaequales,

acuminatae, membranaceae; inferior sub 3-nervis, nervis lateralibus fere obsoletis, 1·5 cm. longa; superior manifeste 5-nervis, 1·2–1·4 cm. longa. *Valva* cylindrica, 8 mm. longa, pilosula pilis albis, 5-nervis, integra; callus acutus, 2 mm. longus; arista 5–6 cm. longa, columna leviter torta parce brevissime pilosula usque 2 cm. longa, seta recta vel subcurva scaberula; valvula valvam aequans *S. flavescens*, Benth. Fl. Austral, vii. 566 p.p. non Labill.

S. AUSTRALIA. Swanport, *Story*.

VICTORIA. Murray River, *Dallachy*.

TASMANIA. Kent's Group, *Brown* 6202 p.p.\*

38. *S. crinita*, Gaud. in Freyc. Voy. Bot. 407. (Fig. 38, p. 27.)

W. AUSTRALIA. Shark's Bay, *Gaudichaud*\*; and without precise locality, *Caley*.

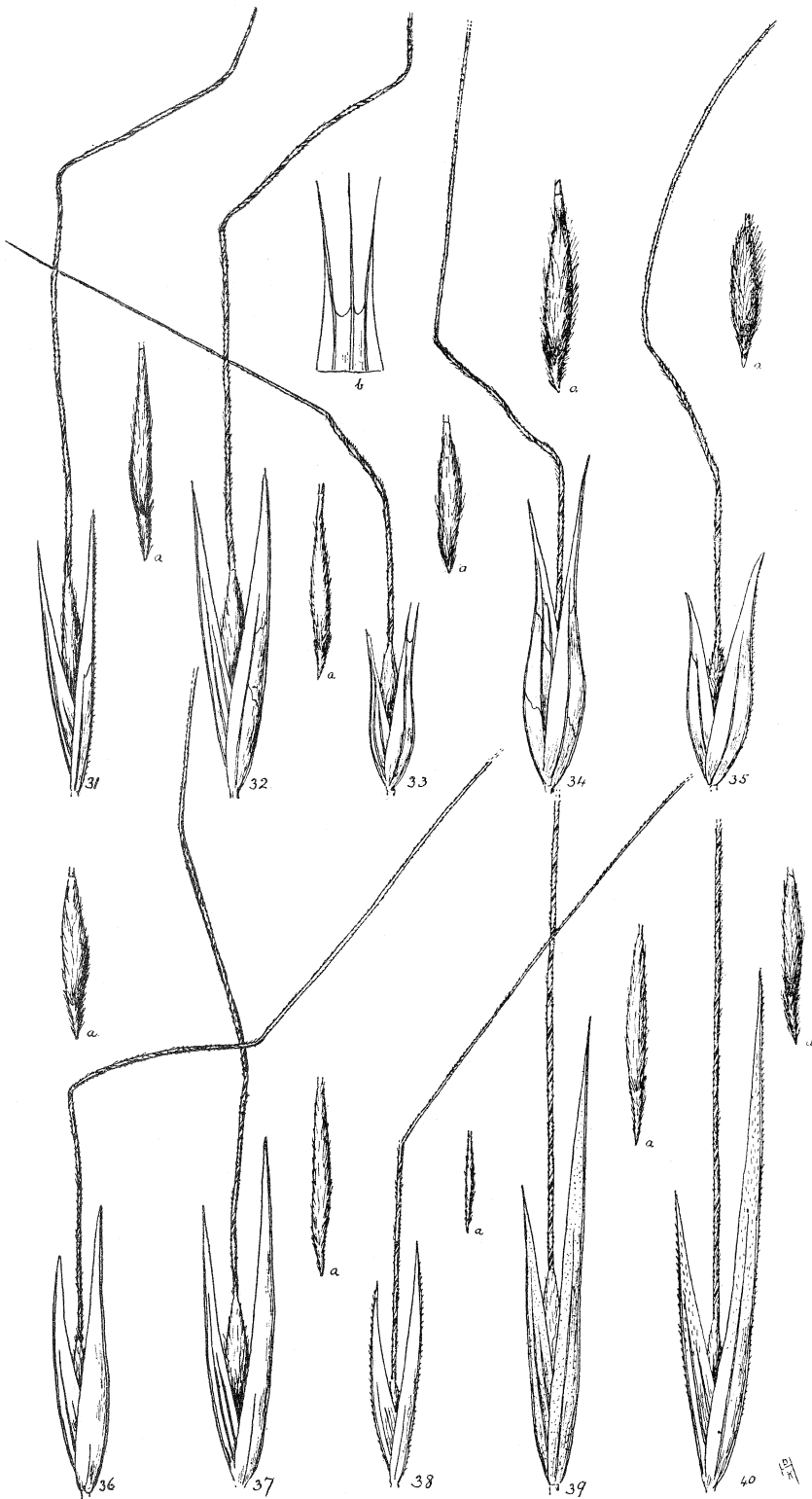
39. *S. compressa*, R. Br. Prod. 174. (Figs. 39 & 39A, pp. 27 & 29.)

W. AUSTRALIA. Swan River, *Drummond*, and no. 134; Claremont, near Perth, in sand, *Cecil Andrews*, 1st coll. 1204; King George's Sound, *Menzies*\*, *Capt. King*; and without precise locality, *Collie*.

40. *S. lachnocolea*, *Hughes*, nov. sp. (Figs. 40 & 40A, pp. 27 & 29.) *Annua*, sed aliquando basi fasciculis foliorum omnium laminigerorum densis adjectis, 20–30 cm. alta. *Culmi* erecti, molliusculi, plerumque robusti, 1-nodi, nodis glabris non exsertis. *Foliorum* vaginae fasciculorum brevissimae, ad 1·5 cm. longae, pallidae, glabrae vel glabrescentes, culmorum inferiores herbaceae, ad 10 cm. longae, tomentosae pilis lucidis hyalinis, superiores striatae, glabrae, scaberulae, paniculae basin amplectantes; ligulae elongatae ad 1 cm. longae, glabrae; laminae fasciculorum setaceo-convolutae, usque 3 cm. longae, glabrae, foliorum culmorum laxae convolutae, in acumen attenuatae, 5–11 cm. longae, leviter scabriusculae. *Panicula* densa, contracta, ad 20 cm. longa, 1–2·5 cm. lata; axis primarius scaber vel scaberulus; rami fasciculati, scaberuli, ad 8 cm. longi; pedicelli 2–8 mm. longi. *Spiculae* nitidae, subhiantes, luteae. *Glumae* valde inaequales, membranaceae, acuminatae, ad apicem scaberulae; inferior 3-nervis, 2·2 cm. longa; superior 5-nervis, 1·4 cm. longa. *Valva* cylindrica, cum callo 7 mm. longa, breviter pubescens pilis luteis, subintegra; arista ad 12 cm. longa, columna valde torta usque 4·5 cm. longa praeter margines spirarum scaberulos laevi, seta subrecta tenuiter scaberula; valvula valvam aequans, dorso pubescens. *S. compressa*, var. *lachnocolea*, Benth. Fl. Austral. vii. 567.

W. AUSTRALIA. Swan River, *Drummond* 132\*; Kauring on the York-Greenhills Line, *Stoward* 466 p.p.

VICTORIA. Melbourne, common, *Adamson* 191.



**Spikelets of species 31—40,  $\times 3$ : a, valve,  $\times 2$ ; b, tip of lower glume  $\times 6$**

## SPECIES DUBIAE VEL EXCLUDENDAE.

**S. acroclitata**, *Reader* in Vict. Nat. xiii. 167. *S. Readeri*, F. Muell. nomen.

VICTORIA. Sandy desert, Lowanshire, 1895, *Reader*.

Placed by the author near *S. compressa*, *S. Drummondii*, *S. pycnostachya* and *S. setacea*.

**S. campylachne**, *Nees* in Lehm. Pl. Preiss, ii. 99.

See note under *S. semibarbata*, R. Br.

**S. eremophila**, *Reader* in Vict. Nat. xvii. 154.

To judge from the description this species must be closely allied to *S. oligostachya* and *S. leptophylla*, both having lobed valves and ciliate ligules.

It seems to differ from *S. oligostachya* in having longer glumes (1.4–1.8 cm. long), a shorter valve (0.7 cm. long), and a longer awn (8–10 cm. long), and from *S. leptophylla* in the reddish-brown indumentum of the valve and in the longer, stouter and twice geniculate awn.

**S. laeviculmis**, *Nees* in Lehm. Pl. Preiss, ii. 99.

Van Diemen's Land?

**S. longearistata**, *Steud.* Syn. Pl. Gram. 127.

"Urville legit ad Port George, N. Holl."

**S. Luehmanii**, *Reader* in Vict. Nat. xvi. 158.

VICTORIA. Sandy Desert, Lowan, 1898, *Reader*.

Placed by the author near *S. semibarbata* and *S. hemipogon*, from both of which it differs in having much smaller (7–8 mm. long) glumes, these truncate and toothed.

**S. micrantha**, *Cav.* Ic. v. 42, t. 467 (1799) non *R. Br.* q.v.

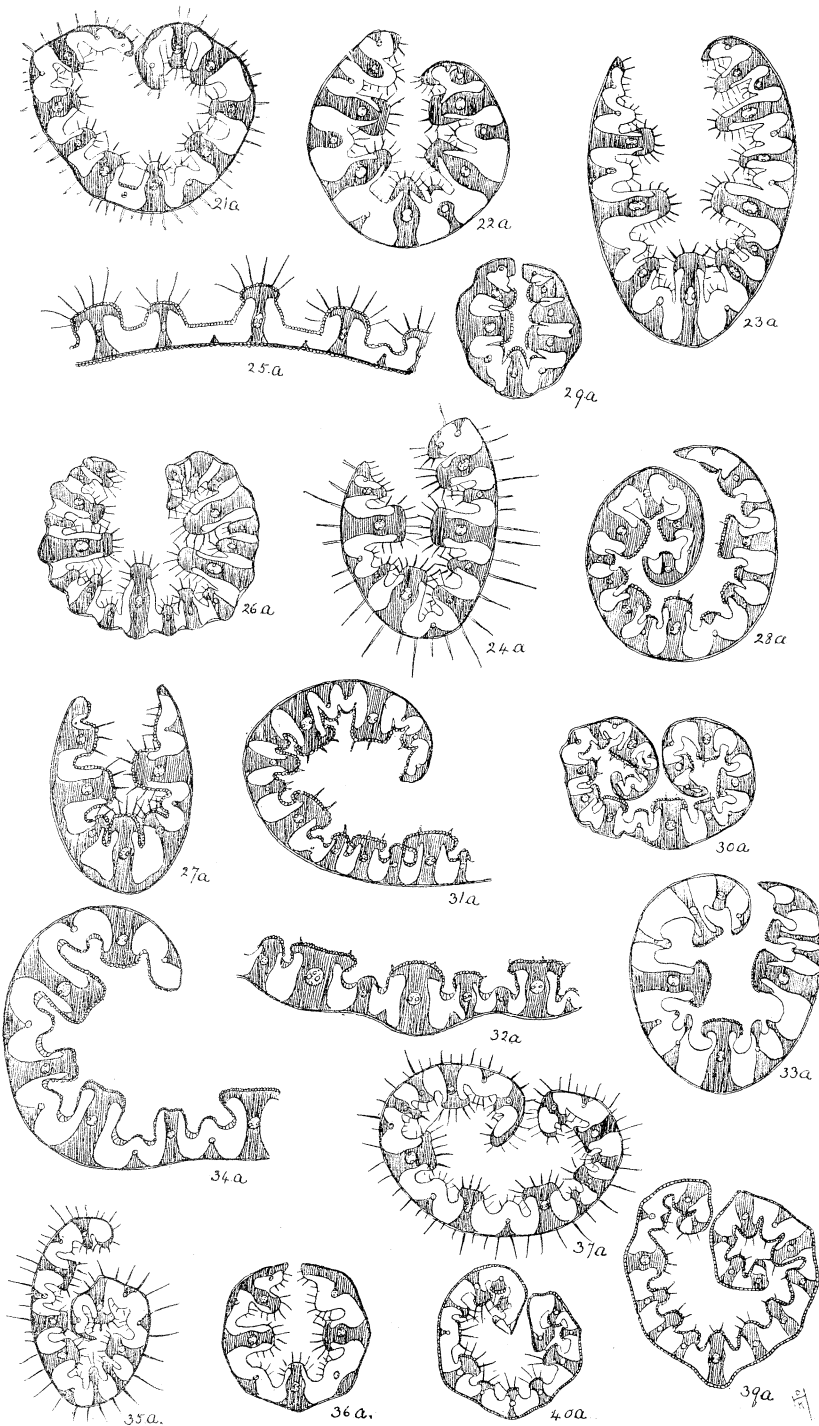
This species is probably identical with *S. ramossissima*, *Trin.* in Mem. Acad. Petersb., Ser. vi. (1831), i. 74, which has as its type *Sieber Agrostoth.* 82, with the valve very scabrid but not hairy and the awn about 1.6 cm. long. It is not a true *Stipa* but a *Dichelachne*, having 2 not 3 lodicules.

**S. micrantha**, *R. Br.* Prod. 175 (1810) non *Cav.*

The type specimen (Brown 6201) differs from *S. micrantha*, *Cav.*, in having the valve distinctly hairy all over and the awn about 4 cm. long. This plant agrees entirely with *Sieber Agrostoth.* 64, described by *Nees* in *Spreng. Syst. Cur. Post.* 30, under the name of *S. verticillata*. This also is a *Dichelachne*.

**S. pubinodis**, *Trin. and Rupr.* Gram. Stip. 50.

To judge from the description, this species must be closely allied to *S. pubescens*, R. Br. There are two specimens from Van Diemen's Land written up "*S. pubinodis*, *Trin.*" by *Munro*. One is *Gunn* 588 and is identical with *S. pubescens*, R. Br., the other collected by *Llotsky*, is the stout form alluded to under *S. pubescens* and does not agree with the description of *S. pubinodis*, *Trin.* and *Rupr.*



Leaf sections of species 21—40,  $\times 30$ .

*S. setacea*, var.? *latifolia*, *Benth.* Fl. Austral. vii. 568.  
*S. scelerata*, *Behr.* Herb. ex *Benth.* l.c.

*S. AUSTRALIA.* Augusta, *Behr*; Crystal Brook, *F. Mueller*;  
 Murray River, *Blandowski*.

I have not seen any of the specimens quoted by *Bentham*, and from his brief description of this variety I am not able to judge their identity.

*S. striata*, *Link* Hort. Berol. 98.

AUSTRALIA ?

## II.—MISCELLANEOUS NOTES.

We note with pleasure in the recently issued list of New Year Honours that His Majesty has been graciously pleased to appoint Dr. E. J. BUTLER, Director of the Imperial Bureau of Mycology, to be a Companion of the Most Eminent Order of the Indian Empire, and Dr. I. B. POLE EVANS, Chief, Division of Botany, Department of Agriculture of the Union of South Africa, to be a Companion of the Most Distinguished Order of St. Michael and St. George.

MR. E. W. DAVY, Agriculturist in the Agricultural Department of Nyasaland (K.B., 1905, 61), has been promoted by the Secretary of State for the Colonies, on the recommendation of Kew, to be Assistant Director of the Department.

MR. A. E. WALTERS, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, a Field Assistant, attached to the Laboratories of the Chemical Research Department, Kenya Colony.

MISS E. M. WAKEFIELD.—At the request of the Secretary of State for the Colonies, Miss Wakefield has been seconded for temporary service in the Imperial Department of Agriculture for the West Indies, to act as Mycologist to the Department. Miss Wakefield left Kew to take up her duties in Barbados in August, 1920. On the completion of her work in the West Indies, she will visit some of the pathological institutions in the United States of America, having been elected to a Travelling Scholarship by the Mary Ewart Trustees, before returning to Kew to resume her duties. During the first two months of Miss Wakefield's absence, Mr. Small, Mycologist in the Department of Agriculture, Uganda, has spent a considerable portion of his leave in carrying on the mycological work in the Herbarium, having been deputed to perform this service by the Secretary of State for the Colonies.