QUEENSLAND HERBARIUM
DEPARTMENT OF PRIMARY INDUSTRIES
BRISBANE

CONTRIBUTIONS

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No. 8 Studies in Cyperaceae.

By S. T. BLAKE

Issued 30th September, 1969

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Issued 9th September, 1969

Contributions from the Queensland Herbarium No. 8

STUDIES IN CYPERACEAE

By S. T. BLAKE

Queensland Herbarium, Brisbane

SUMMARY

New diagnostic characters were found for some genera of the Rhynchosporoideae. *Gahnia* and *Lepidosperma* have ligules to the leaves; *Gahnia* has no midrib to the involute leaves, no prophylls in the inflorescence, and usually a dark brown to black endocarp. *Baumea* differs from *Machaerina* by the unwinged fruit with a rounded to obpyramidal base, a thick hard endocarp and a more or less spongy mesocarp. *Morelotia* differs from all in the exactly distichous caducous lower glumes and elongated uppermost internode of the rhachilla of the spikelet.

Trachystylis differs from *Fimbristylis* in leaf anatomy and structure of the spikelet.

New species are *Gahnia subaequiglumis, Oreobolus acutifolius, Oreobolus oxycarpus, Schoenus pygmaeus* and *Scirpus tasmanicus.*

New combinations are *Baumea articulata* (*Cladium articulatum* R. Br.), *B. aspericaulis* (*Cladium aspericaule* Kükenth.), *B. australis* (*Elynanthus australis* Nees, *Cladium elynanthoides* F. Muell.), *B. complanata* (*Cladium complanatum* Berggr.), *B. disticha* (*Cladium distichum* C. B. Cl.), *B. ensigera* (*Cladium ensigerum* Hance), *B. gunnii* (*Cladium gunnii* Hook. f.), *B. huttonii* (*Cladium huttonii* T. Kirk), *B. milnei* (*Cladium milnei* C. B. Cl.) *B. muelleri* (*Cladium muelleri* C. B. Cl.), *B. nuda* (*Schoenus nudus* Steud.), *B. tenax* (*Lampocarya tenax* Hook. f.), *B. vaginalis* (*Cladium vaginale* Benth.), *Gahnia grandis* (*Scleria grandis* Labill. = *G. psittacorum* Labill.), *Morelotia affinis* (*Lampocarya affinis* Brongn.), *Schoenus ornithopodioides* (*S. ericetorum* R. Br. var. *ornithopodioides* Kükenth.), *Scirpus hookeranus* (*Isolepis hookerana* Boeck. = *S. calocarpus* S. T. Blake), *Scirpus subtilissimus* (*Isolepis subtilissimus* Boeck. = *Scirpus merrillii* (Palla) Kükenth).

Cyperus bifax C. B. Cl. is the correct name for *C. retzii* Nees non Poir.

The following names are correct for the species concerned, with new synonyms in brackets; *Baumea gunnii* (Hook. f.) S. T. Blake (*Cladium brevipaniculatum* (Kükenth.) Kükenth., *Cladium brevipaniculatum* var. *longibracteatum* Kükenth., *Cladium nudum* (Steud.) Boeck. var. *rigidulum* Kükenth.), *Fimbristylis caespitosa* R. Br. (*F. elata* R. Br.), *F. cephalophora* F. Muell. (*F. capitata* auct. non R. Br.), *F. denudata* R. Br. (*F. androgyna* R. Br.), *F. depauperata* R. Br. (*F. parviflora* R. Br., *F. spirostachya* F. Muell. ex Benth.— distinct from *F. dichotoma* (L.) Vahl), *F. furva* R. Br. (*F. capitata* R. Br.), *F. juncea* (Forst. f.) R. & S. (*F. marquesana* Steud., *F. nukahiwensis* Steud., *F. separanda* Steud. ex Jardin, *F. tertia* Steud. ex Jardin), *F. schoenoides* (Retz.) Vahl (*F. longifolia* S. T. Blake), *F. sphaerocephala* Benth. (*F. monandra* F. Muell. non (Roxb.) R. & S., *F. semilevis* F. Muell.

ex C. B. Cl.), *F. tomentosa* Vahl (*F. podocarpa* Nees & Mey., *F. depauperata* R. Br. var. *polyphylla* Domin), *Fuirena arenosa* R. Br. (*Fuirena repanda* S. T. Blake), *Gahnia sieberana* Kunth (*G. arbuscula* Domin, *G. breviaristata* Benl, *G. psittacorum* Labill. var. ? *oxylepis* Benth., *G. radula* (R. Br.) Benth. var. *oreogenes* Domin), *Scirpus antarcticus* L. (*Cyperus modestulus* Steud.—*Isolepis cartilaginea* R. Br. is conspecific), *S. cernuus* Vahl (*S. arenarius* Benth. non Boeck. and consequently *S. psammophilus* S. T. Blake, *Cyperus pumilio* Steud.).

Oreobolus has been found in Tahiti.

INTRODUCTION AND ACKNOWLEDGEMENTS

The present paper is based partly on the results of the study of types in Europe, partly on taxonomic work spread over many years based on material in most Australian herbaria.

Challenged by some recent work, a new study was made on the circumscriptions of *Cladium, Gahnia* and some allied genera and during the course of this several apparently previously overlooked morphological characters were found to provide useful criteria.

Between 1937 and 1961 I published a number of papers in different journals dealing with the Cyperaceae of Australia, New Guinea and neighbouring regions. Since then I have examined in Brisbane a number of types of names published by Rottboell, Vahl and Retzius and during my term as Australian Botanical Liaison Officer at the Herbarium, Royal Botanic Gardens, Kew, England, I was able to examine many more types, especially of R. Brown, C. B. Clarke, Labillardière and Steudel as well as Clarke's extensive MS. As explained elsewhere for grasses (Proc. Roy. Soc. Qd 80: 55–6 (1969)), through the courtesy and assistance of the Directors of the herbaria at the British Museum (Natural History), Edinburgh and Kew, I was able to bring together at Kew and compare Brown's specimens especially of *Cyperus, Fimbristylis* and *Scirpus*. The holotypes of Brown's names are at the British Museum, photographs of many of which are now at Brisbane, but isotypes at Edinburgh and Kew were very helpful in elucidating Brown's concepts of species, especially when used with Brown's extensive MS, a microfilm of which is at Brisbane and some other Australian herbaria. This MS is also very useful in determining more exactly the localities for the specimens. The numbers sometimes quoted for Brown's collections were added by J. J. Bennett and are quoted in square brackets as in the other paper cited.

Besides working in the herbaria mentioned, I studied Cyperaceae in the herbaria at Berlin (B), Copenhagen (C), Florence (FI), Leiden (L), Lund (LD), Munich (M), Paris (P) and Stockholm (S), and thanks to the Directors of these institutions I was able to study selected specimens at Kew. Photographs of many of these were prepared by the staff photographer at Kew.

I am grateful to Dr. Marcel Raymond, Jardin de Botanique de Montréal, for a fine sheet of *Machaerina ekmanii*.

Dr. G. Schultze-Motel searched the Berlin Herbarium for some types.

Present and past directors and many staff members of the herbaria at Adelaide (AD), Brisbane (BRI), Canberra (CANB), Hobart (HO), Melbourne (MEL), Sydney (NSW), Alice Springs (NT), and Perth (PERTH) have been contributors to the results reported in this and previous papers by assistance during my visits to these herbaria, the loan of specimens, the collection of specimens in particular groups or areas, and the sharing of duplicates with the Queensland Herbarium. It is impossible to mention all by name, but because they inspired my interest in the Cyperaceae and Gramineae, I would like to mention the late Mr. C. T. White, then Government Botanist of Queensland, Professor D. A. Herbert, University of Queensland, and Dr. C. E. Hubbard, Royal Botanic Gardens, Kew, then (1930–1) on a year's visit to Queensland and later Keeper at Kew during my visit there in 1964–5.

Attention should be drawn to some apparent inconsistencies in citing localities of specimens collected by F. Mueller. For his own collections Mueller sometimes wrote one locality on the label and cited an apparently different one in his publications while labels to duplicates may not agree with either. In general, the locality referred to on the label is more restricted than the one on duplicates or in publications, but this is not always the case.

One result of the study of Brown's specimens of *Fimbristylis* has been the conclusion that Brown on several occasions described the same species under two or more names, one name being based on well-developed specimens, the other on depauperate individuals, both states possibly collected simultaneously in some cases. Brown had an excellent eye for species, and one hesitates before synonymizing any names based on plants he saw in the living state. But of some tropical Cyperaceae, especially species of *Cyperus* and *Fimbristylis* with usually an umbelliform inflorescence of sometimes many spikelets, individuals may be found with one or two spikelets that look very different from well developed plants. This is especially true of annuals, many individuals of which may sometimes grow together in temporarily wet places; in such cases those of the other edge of the group on ground quickly drying out may be quite small and "depauperate" compared with those in the middle of the group. In the case of perennials, plants may produce fresh shoots out of season following a bush-fire and these shoots may likewise be much smaller with much fewer spikelets than shoots produced at the normal time, whether burnt during the dry season or not; also spikelets in flower only may look different from those in fruit.

In J. Fac. Sci. Univ. Tokyo sect. III, 8: 37–148 (1961) T. Koyama proposed a new classification of the family with many alterations to widely accepted generic limits, some of which are referred to below.

Van der Weken, Bull. Jard. Bot. Etat Brux. 35: 285–352 (1965), described the embryos of a large number of species, and it is clear from this paper that the structure of the embryo is a very useful generic character.

SUBFAM. SCIRPOIDEAE

Cyperus

Cyperus bifax C. B. Clarke, Kew Bull. Add. Ser. 8: 13 (1908). Type: Queensland, Tambo, *Wuth* (K, holo; MEL).

Cyperus retzii Nees in Wight, Contr. Bot. India 82 (1834); S. T. Blake, Univ. Qd Pap. Dept. Biol. 2 (2): 7, 8, plate 5 (1942); non Poir. (1816). Type: India, Madras, *Wight* 1830 (K, BRI, iso).

Cyperus disruptus C. B. Clarke, Kew Bull. Add. Ser. 8: 12 (1908). Syntypes: "Australia, *MacDougal Stuart* (hb. Kew); Darling River, *Dallachy; Mitchell,* n. 24 (hb. Mus. Brit.)". Lectotype: Darling River, *Dallachy* (K, holo; MEL).

Cyperus rotundus L. subsp. *retzii* (Nees) Kükenth. Pflanzenr. 101: 114 (1935). Based on C. *retzii* Nees.

Cyperus rotundus L. subsp. *retzii* (Nees) Kükenth. var. *disruptus* (C. B. Clarke) Kükenth. Pflanzenr. 101: 115 (1935). Based on *C. disruptus.*

When I discussed this species in 1942 (loc. cit.) under the name of *C. retzii* Nees I overlooked the fact that this name is a later homonym of *C. retzii* Poir. in Lamk. Encycl. 7: 255 (1806). Kükenthal cited several names in the synonomy of *C. rotundus* subsp. *retzii.* The earliest of these is *C. rudioi* Boeck. Flora 65: 12 (1882), but the type of this (B, photo K, BRI) is a large specimen of *C. tuberosus* Rottb. from Rio de Janiero (Brazil). *C. victoriensis* C. B. Clarke is specifically distinct as I have already pointed out (Blake, op. cit., 6). *C. bifax* and *C. disruptus* refer to the same species but the types look rather different, that of *C. bifax* being from a plant in flower with yellowish glumes, those of *C. disruptus* showing the tendency to shed spikelets shown by specimens dried in an excessively hot and dry atmosphere.

Cyperus retzii Poir. was a new name for *C. albidus* Retz. Observ. 6: 21 (July–Nov. 1791) non Lamk. Tabl. Encycl. 1: 145 (Mar. 1791). *C. albidus* Retz. was listed by Kükenthal op. cit. 626 (1936) among "Species incertae sedis vel inextricabiles". The type from China (LD) is a tall stem (66 cm) without base of *C. eragrostis* Lamk. The specimen was not seen by Kükenthal or earlier cyperologists and because of the inaccurate description of the fruit by Retzius the application of the name remained uncertain—Kunth even doubted whether the plant belonged in the Cyperaceae.

Fimbristylis

The species originally included in *Fimbristylis* Vahl have many-flowered spikelets with glumes spirally imbricate in more than one series, hermaphrodite flowers, styles more or less enlarged at the base clearly distinct from the ovary and disarticulating from the ripe nut, more or less ciliate or fimbriate like the two or three stigmatic branches, and biconvex or trigonous nuts with the epidermal cells

arranged in regular vertical series; the spikelets are solitary or in a terminal umbel-like inflorescence and the culms are nodeless above the base. (Vahl gave the number of stigmas as two but he included *F. miliacea* which has three stigmas).

Abildgaardia Vahl was originally distinguished from *Fimbristylis* chiefly by the subdistichous glumes and trigonous (supposedly) persistent style-base. It has commonly been treated as a subgenus or section of *Fimbristylis* but Van der Weken (p. 324) found that the embryo of the type species (*F. monostachyos* (Vahl) Haask. = *F. ovata* (Burm. f.) Kern) and the allied *F. oxystachya* F. Muell. differed considerably from the type usually found in *Fimbristylis* and a re-examination of the generic status should be undertaken. Most of the allied species are Australian and are very different from other species referred to *Abildgaardia* (sect. *Fuscae*) which have embryos similar to those of most species of *Fimbristylis* examined.

Bulbostylis C. B. Clarke, nom. conserv. (*Stenophyllus* Raf., *Oncostylis* Mart.) was distinguished by the bulbous base of the style remaining persistent on the nut. It was treated as a section of *Fimbristylis* by Bentham, Fl. Aust. 7: 301, 321 (1878) and as a subgenus by Koyama, pp. 71, 100. According to Van der Weken (p. 366) the embryo is unlike that of *Fimbristylis*. It seems as sharply marked as most genera in the family and its members are usually easily recognized by the needle-like hairs at the orifice of the leaf-sheaths which usually bear well-developed very fine leaves.

Actinoschoenus Benth. was proposed for species referred to *Arthrostylis* R. Br. by Kunth, Enum. Pl. 2: 283 (1837), Steud. Synops. Pl. Glum. 2: 138 (1855) and Boeckeler, Linnaea 37: 323 (1873), none of whom saw material of the type species; when Boeckeler later saw specimens he described them as a new species of *Fimbristylis*. *Arthrostylis* had already been referred to *Fimbristylis* without comment by F. Mueller, Fragm. 9: 9 (1875). *Actinoschoenus* was treated as a subgenus of *Arthrostylis* by Kükenthal, Repert. Sp. Nov. 53: 195, 196, 197 (1944); Koyama (p. 76) treated the two names as synonymous with the remark that "The Indo-African species somewhat differ from typical *Arthrostylis* in having always 3 stamens (up to 6 in Australian one), so that they were once treated as of a separate genus, *Actinoschoenus*"—a statement that does not accord with the references cited nor with the plants themselves. *Actinoschoenus* was referred to *Fimbristylis* by C. B. Clarke in Hook. f. Fl. Brit. Ind. 6: 651 (1893) and Kern, Blumea 8: 160 (1955), but it differs from this in the anatomy of the stem (Chermezon, Archives Bot. 1: 241–8 (1927)), in the embryo (Van der Weken, p. 328) and in the spikelets having only one or very few flowers. *Arthrostylis* also has 1-flowered spikelets but it differs from both in the embryo (Van der Weken, p. 328), in the numerous small bracts forming a 3–4-seriate involucre to the inflorescence and in the remarkable densely hairy style and thick woolly stigmas.

Trachystylis S. T. Blake was referred to *Fimbristylis* by Kern and Koyama but differs in several characters discussed below under *Cladium*. Koyama had previously referred the type species to *Machaerina*.

Fimbristylis caespitosa R. Br. Prodr. 228 (1810). Type: Australia, Carpentaria, *R. Brown* [5955] (BM, holo; K, BRI).

F. elata R. Br. Prodr. 227 (1810), *syn. nov.* Type: Australia, Carpentaria, *R. Brown* [5954] (BM, holo; fragment BRI).

F. brachylaena F. Muell. Fragm. 1: 199 (1859). Type: Northern Territory, Arnhem Land, *F. Mueller* (MEL, holo; BRI, K).

Iriha caespitosa (R. Br.) O. Kuntze, Rev. Gen. Pl. 2: 753 (1891). Based on *F. caespitosa.*

Iriha elata (R. Br.) O. Kuntze, loc. cit. Based on *F. elata.*

The type of *F. caespitosa* consists of small densely tufted, densely leafy plants 14–24 cm high, some plants relatively young, others with old burnt-off parts. The type of *F. elata* consists of plants about 40–50 cm high with few leaves, loose compound "umbels" partly divided to the third degree, with some of the spikelets tending to become attenuate upwards with the upper flowers female only.

Specimens marked *Fimbristylis caespitosa β* by Brown are new season's growth following fire, about 30 cm high with few leaves as in *F. elata,* and intermediate between this and *F. caespitosa.* The type of *F. brachylaena* has young spikelets but otherwise it is intermediate between *F. caespitosa β* and *F. elata;* for the locality Mueller wrote "Arnhem Land" on the label and "Dépôt Creek, Victoria River" in the protologue. Other collections lead to the conclusion that all belong to a single species.

F. caespitosa is a densely tufted perennial with very few to numerous leaves in the tufts up to about 10 cm long but usually short; innermost "cauline" leaf with an oblique membranous orifice, usually muticous but sometimes with a blade like the basal leaves; inflorescence umbel-like, simple or compound, sometimes divided to the third degree, rarely reduced to one or two occasionally geminate spikelets, the rays slender, the bracts and bracteoles glume-like; spikelets pale brown, ovoid to cylindric-oblong, terete, 4–7 mm long, 2–3 mm wide; glumes densely and tightly imbricate, glabrous, elliptic-oblong or somewhat obovate, obtuse, muticous, about 2 mm long, sides about hyaline; style slender flattened, ± ciliate throughout with 2 stigmatic branches; nut shining black, only (0·4–0·45) × (0·25–0·35) mm, obovoid to elliptic-obovoid, somewhat attenuate at the base, apiculate, very turgidly biconvex, 2-ribbed, indistinctly longitudinally striate, prominently transversely striate, with the transversely oblong epidermal cells in about seven vertical series on each face.

The minute, shining black, transversely striate nut is quite distinctive. F. Mueller, Fragm. 9: 9 (1875) referred his specimens (*F. brachylaena*) to *F. denudata* R. Br. but this has narrower spikelets with narrower, often auriculate glumes and larger, pale brown nuts with much smaller and very faintly outlined epidermal cells in about 20 vertical series.

F. cephalophora F. Muell. Fragm. 1: 196 (1859). Type: Northern Territory, Upper Victoria River, *F. Mueller* (MEL, holo; K, BRI).

Bentham, Fl. Aust. 7: 320 (1878), treated this as identical with *F. capitata* R. Br. and his description was based on the type and a second collection of Mueller's from the Victoria River of *F. cephalophora*. *F. capitata* was based on small young plants of *F. furva* (see below under the latter name). *F. cephalophora* is very different in being a perennial with tufted wiry culms, a short erect bract, a quasi-lateral dense head of spikelets sometimes with a second pedunculate one, muticous ± emarginate glumes, a nearly glabrous style, and a broadly obovoid rather than subglobular nut very broadly subpyramidal at the apex.

The species is widely distributed from the Kimberley Division of Western Australia to northern Queensland, at least often associated with limestone.

In the protologue Mueller gave as the locality "Ad ripam udam rivi Dépôt Creek, fluvii Victoriae". Of the two sheets at Melbourne both dated Nov. 1855 one has merely Victoria River, the other has "Rivulets of the Victoria River near Steep Head". I suspect all to refer to the same locality, about 15° 37′ S, 130° 23′ E, not the Depot Creek, Upper Victoria River, of January and April 1856, about 17° S, 130° 23′ E. Two sheets at Kew, labelled Victoria River and Upper Victoria River would be duplicates of those at Melbourne, "Upper Victoria River" probably referring to Depot Creek.

Fimbristylis denudata R. Br. Prodr. 227 (1810). Type: Northern Australia, North Coast, *R. Brown* [5948] (BM, holo—fragment and photo BRI; E, MEL).

Fimbristylis androgyna R. Br. Prodr. 226 (1810), *syn. nov.* Type: Australia, Carpentaria, *R. Brown* (BM, holo—fragment and photo BRI; E, K).

Iriha denudata (R. Br.) O. Kuntze, Rev. Gen. Pl. 2: 753 (1891) (*"denutata"*). Based on *F. denudata.*

Iriha androgyna (R. Br.) O. Kuntze, loc. cit. Based on *F. androgyna.*

F. androgyna was based on plants ± 16–25 cm high with culms bearing almost constantly a single spikelet; one tuft at Edinburgh has culms with two spikelets. The upper glumes are smaller than the lower, subtending female not hermaphrodite flowers, agreeing with Brown's description. The type collection of *F. denudata* has mostly 4–6 spikelets rarely 2 or 1. The spikelets are less narrowed upwards than some of those on the type of *F. androgyna* but their upper flowers also seem to be at least mostly female only. *Blake* 12557 from Wyaaba Creek, 16° 45′ S, 142° E, with 1–6 spikelets some of which are very mature, provides connecting links between all states. The species is widely distributed in the northern part of the Northern Territory and the part of Queensland adjacent to the Gulf of Carpentaria. It forms perennial, dense, nearly leafless tufts of slender

compressed culms with almost glume-like bracts to the usually simple umbel often reduced to a solitary spikelet but with up to six rays, one or two of which may be again divided, with narrow spikelets at least often merely female in the upper part usually about 8–10 mm long and 1·5–2 mm wide, with narrow glumes often expanded and ± auriculate at the base, slender 2-branched styles ciliate in the upper half, and small obovate biconvex tuberculate nuts not more than ¼ as long as the glume with obscure minute transversely oblong epidermal cells in about 20 vertical rows on each face.

Fimbristylis depauperata R. Br. Prodr. 227 (1810); Benth. Fl. Aust. 7: 311 (1878); Domin, Biblioth. Bot. heft 85: 455 (1915). Type: Australia, North Coast, *R. Brown* [5947] (BM, photo BRI).

F. parviflora R. Br. Prodr. 227 (1810), *syn. nov.* Type: Northern Territory [Dudley Island, at entrance to Caledon Bay], *R. Brown* [5951] (BM, holo—photo, BRI; E, K, MEL, BRI).

F. spirostachya F. Muell. ex Benth. Fl. Aust. 7: 311 (1878), *syn. nov.* Type: Northern Territory, Upper Victoria River, *F. Mueller* (MEL, K).

F. diphylla (Retz.) Vahl var. *depauperata* (R. Br.) C. B. Cl. in Hook. f. Fl. Brit. Ind. 6: 637 (1893). Based on *F. depauperata.*

F. diphylla (Retz.) Vahl var. *spirostachya* (F. Muell. ex Benth.) C. B. Cl. in Hook. f. Fl. Brit. Ind. 6: 637 (1893) (*"spirostachys"*). Based on *F. spirostachya.*

Iriha depauperata (R. Br.) O. Kuntze, Rev. Gen. Pl. 2: 753 (1891). Based on *F. depauperata.*

Iriha spirostachya (F. Muell. ex Benth.) O. Kuntze, loc. cit. Based on *F. spirostachya.*

F. dichotoma (L.) Vahl forma *depauperata* (R. Br.) Ohwi, J. Jap. Bot. 14: 577 (1938). Based on *F. depauperata.*

The type collection of *F. depauperata* appears to be represented by a single sheet (BM) with a number of plants about 5–18 cm high with inflorescences of 1–5 spikelets. The plants vary from solitary culms to tufts with six culms and some apparent tufts on the sheet are bundles of solitary culms held together by the soil at their roots; some have the lower bract much elongated relative to the rays. Brown's label has merely "North Coast" for the locality.

The type collection of *F. parviflora* consists of tufted plants, some with many culms, and in all the bracts are conspicuously elongated. The culms are about 12–30 cm high. Brown's label on the holotype has the locality and date "Island v 1/ Feby 10—1803." One Kew sheet has a Brown label with the locality "North Coast". Different as these sheets may appear at first sight, I have no

doubt that they represent the same species. I also have little doubt that all the material was collected together and that Brown afterwards segregated the "depauperate" plants. Bentham, op. cit. 310 and Domin op. cit. were therefore wrong in referring *F. parviflora* to *F. dichotoma* (correctly *F. bisumbellata* (Forsk.) Bubani).

F. depauperata is a widely spread locally abundant annual species in northern Australia chiefly on sand or very sandy soils. It is very variable in size, width of culm and leaf, degree of branching of inflorescence, length of bracts, and number and size of spikelets. Even so, Brown's specimens have unusually small spikelets. In Univ. Qd Pap. Dept. Biol. 1 (13): 2–3 (1940) and J. Arnold Arb. 35: 212–4 (1954), I gave some of the characters that distinguish it from *F. dichotoma* (L.) Vahl (*F. diphylla* (Retz.) Vahl), and in the second paper misidentified it with *F. annua* (All.) R. & S. I certainly did not propose to treat *F. annua* as a variety of *F. dichotoma* as stated by Koyama, J. Fac. Sci. Univ. Tokyo sect. III, 8: 112 (1961). I have not seen the type of *F. annua* (*Scirpus annuus* All.), but I have seen (C, photo BRI) a specimen from the type locality sent to Vahl by Bellardi in the year before Allioni's work was published.

F. dichotoma is normally a long lived perennial with several hard cataphylls and almost distichous leaves especially evident on innovation shoots; *F. depauperata* is consistently an annual with no cataphylls and few ± 3-ranked leaves and further differs (as previously noted, loc. cit.) in having glumes often minutely ciliolate on the upper edge, the cells composing them less distinctly oblong in shape (up to about one and a-half times as long as wide instead of twice as long as wide), relatively shorter and broader styles and, as a rule, softer hairy leaves and bracts and more or less hairy culms and rays. Hairy states of *F. dichotoma* have a harsher indumentum.

F. annua is likewise an annual with few non-distichous leaves but it resembles *F. dichotoma* in having 3–5-nerved glabrous glumes with elongated cells and a slender style longer than the nut; the glumes are somewhat smaller than those of either *F. dichotoma* or *F. depauperata*. It does not look like juvenile *F. dichotoma* (which may flower in its first year) and may very well be a distinct species.

F. depauperata is much closer to *F. tomentosa* Vahl, differing chiefly in the shorter gynophore 0·1–0·3 (not 0·3–0·5) mm long with an appressed not a more or less saucer-like rim, transversely elongated epidermal cells of the nut in fewer (9–12) vertical series, style mostly shorter than the nut (excluding the gynophore), and perhaps in having fewer leaves.

Fimbristylis furva R. Br. Prodr. 228 (1810). Type: Queensland, Booby Island and Endeavour River, *Banks & Solander* (BM, holo—fragment and photo BRI; MEL, BRI).

Fimbristylis capitata R. Br. Prodr. 228 (1810), *syn. nov.* Types: Queensland, Endeavour River, Bustard Bay, *Banks & Solander* (BM, lectotype—fragment and photo BRI) and Endeavour River and Booby Island, *Banks & Solander* (BM, paratype—photo BRI).

Iriha furva (R. Br.) O. Kuntze, Rev. Gen. Pl. 2: 753 (1891). Based on *F. furva.*

Iriha capitata (R. Br.) O. Kuntze, loc. cit. Based on *F. capitata.*

The type sheet of *F. capitata* carries the two collections cited above. The first cited agrees with Brown's description of the capitate inflorescence "umbella congesta subcapitata simplici et semicomposita, spiculis . . . subsessilibus"; the three plants are small with tufted culms about 5–9 cm high with immature spikelets. The two tufts below are of older plants, with culms up to 18 cm high, the smaller culms resembling those on the upper plants, some of the taller ones with looser inflorescences like some of those on the sheet of *F. furva* which have culms about 8–27 cm high some with relatively loose inflorescences. Brown correctly described the style of *F. furva* as ciliate with a bearded base while that of *F. capitata* was said to be naked, but this is not quite correct; the style of *F. capitata* is shortly hairy including the base.

There is some variation in hairiness of style on plants resembling the type of *F. furva*; sometimes the lower part of the style above the base is glabrous, sometimes the hairs are short and the hairs on the base are sometimes short especially in the flowering stage.

Bentham's account of *F. capitata* was based on specimens of *F. cephalophora.*

Fimbristylis juncea (Forst. f.) R. & S. Syst. Veg. 2: 102 (1817). Based on *Scirpus junceus.*

Scirpus junceus Forst. f. Florul. Ins. Austr. Prodr. 6 (1786). Type: Society Islands, *J. R. & G. Forster* (BM).

Fimbristylis marguesana Steud. Syn. Pl. Glum. 2: 107 (1855), *syn. nov.* Type: Nukahiwa (Nukuhiva I. of the Marquesas), *Jardin* (P).

F. nukahiwensis Steud. Syn. Pl. Glum. 2: 117 (1855), *syn. nov.* Type: Nukahiwa [*Jardin* 30] (P).

F. separanda Steud. ex Jardin, Mém. Soc. Sci. Nat. Cherb. 5: 36–7 of reprint (1857), *syn. nov.* Type: Nukuhiva, *Jardin* (P).

F. tertia Steud. ex Jardin, loc. cit., 37, *syn. nov.* Type: Nukuhiva, *Jardin* 30 (P).

Iriha juncea (Forst. f.) O. Kuntze, Rev. Gen. Pl. 2: 753 (1891). Based on *Scirpus junceus.*

I have not seen the journal in which Jardin published, but at Kew there is a separate of the paper "Flore de l'Archipel de Marquises" with separate pagination. Jardin mentioned that his Cyperaceae and Gramineae had been determined by Steudel but that Steudel had died recently before he had time to give descriptions in a supplement to his Synopsis Plantarum Glumacearum. On pp. 36–7 of the separate, Jardin wrote (translation mine):

"Among the specimens of *Fimbristylis* that I collected at the Marquesas, Steudel has recognized four new species which he designated under the names *F. nukahivensis, separanda, tertia* and *marquesana.* The first species, a foot or more in height, has the spikelets in irregular umbels and reddish leaves of 1 to 2 inches, scarious on the margins and terminated by a scarious point; the second species, smaller, has the spikelets most often solitary, larger than those of *F. nukahivensis*; the third species, 6 to 8 inches high, has solitary spikelets with a bract-like leaf 2–3 times longer than the spikelets and linear leaves as long as the flowering stems; the fourth species, like the two preceding ones, has solitary spikelets with a linear bract, but it is easily distinguished at first glance by its much smaller habit and strongly striate stem. All these species grow in damp places; the natives call them *haiki* and use them to cover the part of the ground of their houses included between two coco-nut trees and destined to serve them as bed."

According to Index Kewensis, *F. separanda* and *F. tertia* are nomina nuda, but these names are validly published in the passage just cited. The difference in spelling of the epithets of the other two names by Steudel and Jardin may be noted. However Steudel wrote *marquesana* on the label to his specimen and the published spelling may be "an unintentional orthographic error".

Of the material at Paris there is a sheet ex hb. Richard in hb. Drake labelled by Steudel "Fimbristylis nukahiwensis" that agrees with Steudel's description except that a few stems have four spikelets. There are two sheets labelled *F. tertia.* One of these, ex hb. Jardin "ipse legi" with the label in Jardin's writing (?) and a hb. Paris label, agrees with Jardin's account of *F. tertia* and was annotated by C. B. Clarke (Aug. 1888) "Fimbristylis (diphylla, Vahl). The nut is too young to make out the characteristic vertical rows of cells, but this slender one-spicula form is frequent in India". The other sheet is from hb. Steudel labelled by Steudel: Fimbristylis tertia Steud./Jardin Collectio nr 30/ Nuca . . . Ins. 16 c/ and determined by Clarke without comment as *F. diphylla*; there are two tufts, the right hand one agreeing with Jardin's account of *F. separanda,* the other agreeing better with Jardin's account of *F. tertia,* but having shorter bracts. Another sheet from hb. Steudel labelled *Fimbristylis marquesana* and agreeing with Steudel's description of this carries three tufts of decidedly smaller plants with rather definitely pubescent glumes.

Of the specimens from hb. Steudel those of *F. tertia* and *F. nukahiwensis* are marked "Jardin 30" but there is no number to *F. marguesana* and no numbers to the specimens from hb. Jardin.

The epithets of *F. separanda* and *F. tertia* may point to a provisional opinion and it seems likely that Steudel first separated these from *F. nukahiwensis* because of their solitary spikelets. In his Synopsis he placed *F. nukahiwensis* in a group with umbellate inflorescence but in the description of the species he stated it had often one or two spikelets.

Forest Brown, Fl. SE. Polynesia (1931) treated the four as distinct species citing Jardin's descriptions in translation and citing specimens of his own for three of them but only Steudel for *F. marquesana.*

Drake del Castillo, Fl. Polynés. Franç. 242 (1893) referred *F. separanda* to *F. nukahiwensis* kept distinct from *F. juncea* but he referred *F. marquesana* and *F. tertia* to *F. polytrichoides* (Retz.) Vahl which he treated as a variety of *F. juncea.*

I have also seen some specimens collected by Brown & Brown (716 and 769), Hinds, and Langsdorff (all K) from the Marquesas. All appear to represent one species of which at least the lower glumes in young spikelets are more or less pubescent with the indumentum later wearing away and the upper glumes sometimes perhaps glabrous from the first. Langsdorff's specimens from Nucahiva, four tufts with 1–3 spikelets, display most of the variation shown by Jardin's material except for extreme *F. marquesana.* The Forsters' specimen has solitary spikelets with glumes up to 3 mm long, some of them ciliolate and at least some of the upper ones ± pubescent below the tip; the nut is about 1·3 × 0·95 mm with epidermal cells in about 17 not quite regular rows. Langsdorff's plants are more slender, but the glumes and nuts agree very well. The specimens of Hinds and Brown & Brown 769 are very like the Forsters' specimen in appearance but these and the other specimens have slightly smaller glumes 2·3–2·7 mm long; the glumes are also frequently glabrous.

There is a sheet at Paris determined *Fimbristylis separanda* Steud. by C. B. Clarke which has a printed label reading: Baie de Sampoong—Sumatra, détroit de la Sonde/Voyage de l'Astrolabe et de la Zelée 1838–1840/ *M. Hombron.* 1841. A note by Kern reads: "These are the only specimens of this sp. I have seen. Probably mislabelled! Is Sampoong = Lampong?"

To me these specimens could be part of the type collection of *F. nukahiwensis.*

Fimbristylis schoenoides (Retz.) Vahl, Enum. 2: 286 (1805). Based on *Scirpus schoenoides.*

Scirpus schoenoides Retz. Obs. 5: 14 (1789). Type: [India, *Koenig in*] *hb. Retz.* (LD).

Iriha schoenoides (Retz.) O. Kuntze, Rev. Gen. Pl. 2: 752 (1891). (*"schoenodes"*). Based on *Fimbristylis schoenoides.*

Fimbristylis longifolia S. T. Blake, Univ. Qd Pap. Dept. Biol. 1, No. 13: 9 (1940), *syn. nov.* Type: Queensland, Townsville, *Blake* 13333 (BRI, holo).

The name *Fimbristylis schoenoides* has been misapplied to the species correctly known as *F. tristachya* R. Br. discussed by Kern, Blumea 8: 131–2 (1955) (cf. S. T. Blake, Proc. Roy. Soc. Qd 58: 45 (1947)). To the synonyms given by Kern should be added *F. subbulbosa* Benth. Fl. Aust. 7: 305 (1878) (non Boeck. Flora 41: 598 (1858)) based on specimens collected by Dallachy at Rockingham Bay, Queensland (K, holo; MEL) and *F. macrostachya* Boeck. Linnaea 38: 386 (1874) based on *Schultz* 664 from Port Darwin, Northern Territory (B, holo, now

lost; MEL) (cf. Blake, loc. cit.). Kuntze, loc. cit., referred *F. squarrulosa* F. Muell. to this species, but Mueller's name was based on *Abildgaardia schoenoides* R. Br. which is very different.

Fimbristylis sphaerocephala Benth. Fl. Aust. 7: 306 (1878); non (Boeck.) Hauman & Vanderveken (1917). Syntypes: Western Australia, Camden Harbour, *Martin* (K, MEL), Sunday I., *Cunningham* 354/1819 (K) and Northern Territory, Upper Victoria River, *Mueller* (K, lectotype; MEL, BRI).

F. monandra F. Muell. Fragm. 1: 195 (1859), non (Roxb.) Schult. (1824), *syn. nov.* Type: Northern Territory, Upper Victoria River, *F. Mueller* (MEL, holo; K, BRI).

F. semilevis F. Muell. ex C. B. Cl. Kew Bull. Add. Ser. 8: 24 (1908), *syn. nov.* Type: [Northern Territory, Depot Creek (Upper Victoria River), *F. Mueller*] (G).

Iriha muelleriana O. Kuntze, Rev. Gen. Pl. 2: 753 (1891). Based on *F. monandra* F. Muell.

Iriha sphaerocephala (Benth.) O. Kuntze, loc. cit. Based on *F. sphaerocephala.*

Of the syntypes of *F. sphaerocephala,* Martin's and Cunningham's specimens are very young. Mueller's specimens have a few well-formed nuts.

In the protologue of *F. semilevis* Clarke cited "AUSTRALIA. *Oldfield* (hb. Boissier)". The type sheet has a printed label reading "Nova Hollandia *Oldfried*/1866"; another (blue) label has in Oldfield's writing: Fimbristylis/ semilevis/F. Muell./N. Australia. Clarke determined the specimen in July 1888 as *Fimbristylis semilevis,* but he misinterpreted the label. The specimen was evidently sent to Boissier by Oldfield (wrongly spelt "Oldfried" on the printed label) who must have had it from Mueller. This sheet, a sheet at Kew labelled "Fimbristylis semi/levis ferd Mueller/Upper Victoria/River/ferd Mueller", and one at Melbourne labelled "Fimbristylis semilevis sp. nova" with the locality "Depot Creek" all in Mueller's writing must all be part of the same collection. The material at Brisbane came from Melbourne. Bentham and Clarke determined the Kew sheet as *F. monandra* F. Muell. and it seems that Mueller wrote up the specimens as *F. semilevis* but changed the name to *F. monandra* in the protologue.

Fimbristylis tomentosa Vahl, Enum. 2: 290 (1805) (*"tomentosum"*). Type: (Burma, Ava), *Floer* [?] *in hb. Vahl* (C, photo BRI).

F. podocarpa Nees & Mey. ex Nees in Wight, Contr. Bot. Ind. 98 (1834); Kern, Blumea 8: 139 (1955) *cum syn., syn. nov.* Lectotype (C. B. Clarke): North West India, *Royle* (K).

F. diphylla (Retz.) Vahl var. *tomentosa* (Vahl) Benth. Fl. Hongkong. 392 (1861). Based on *F. tomentosa.*

F. depauperata R. Br. var. *polyphylla* Domin, Biblioth. Bot. heft 85: 456 (1915), *e descr., syn. nov.* Type: Queensland, near Townsville, *Domin* (PR), not seen.

F. annua (All.) R. & S. var. *diphylla* (Retz.) Kükenth. forma *tomentosa* (Vahl) Kükenth. Repert. Sp. Nov. 23: 196 (1926). Based implicitly on *F. tomentosa.*

F. dichotoma (L.) Vahl forma *tomentosa* (Vahl) Ohwi, J. Jap. Bot. 14: 577 (1938). Based on *F. tomentosa.*

F. dichotoma (L.) Vahl ssp. *podocarpa* (Nees & Mey, ex Nees) Koyama, Micronesia 1: 87 (1964). Based on *F. podocarpa.*

For the interpretation of *F. depauperata* var. *polyphylla* I have relied on specimens from near the type locality that agree with the original description.

It has frequently been assumed that the name *F. tomentosa* was based on a hairy state of *F. dichotoma.* Koyama, J. Fac. Sci. Univ. Tokyo sect. III, 8: 111 (1961), stated that "The name, *F. tomentosa,* was given to a form with densely hairy leaf sheaths" and treated *F. dichotoma* forma *tomentosa* (Vahl) Ohwi as a synonym of *F. dichotoma* forma *floribunda* (Miq.) Ohwi said to be distinguished by slightly smaller clustered spikelets, but the spikelets of the type (and other specimens seen) of *F. tomentosa* are solitary on the rays and not smaller than those on the type of *Scirpus diphyllus* Retz. (LD) which according to C. E. C. Fischer in Kew Bull. 1935: 149 (1935) is "identical" with the two syntypes of *S. dichotomus* (*F. dichotoma*). Koyama's statement that *F. podocarpa* differs from *F. dichotoma* only in the less elongated, less conspicuous epidermal cells of the nut ignores the unusually large receptacle, the ± elliptic rather than obovate nut, the less elongated cells of the glumes, the spiral leaves and the annual habit. As a synonym of *F. dichotoma* ssp. *podocarpa,* Koyama cited *F. dichotoma* var. *pallidisquama* Ohwi, J. Jap. Bot. 18: 135 (1942) which I have not seen.

Fuirena

Fuirena arenosa R. Br. Prodr. 220 (1810). Type: Queensland [Lookout Point, approx. 14° 50′ S., 145° 5′ E.], *Banks & Solander* (BM, photo BRI).

Fuirena repanda S. T. Blake, Proc. Roy. Soc. Qd 52: 59 (1941); *syn. nov.* Type: Queensland, Croydon, *Blake* 12467 (BRI, holo; K).

Brown's name was treated as a synonym of *F. glomerata* Lamk. (*F. ciliaris* (L.) Roxb.) by Bentham, Fl. Austr. 7: 338 (1878) and Domin, Biblioth. Bot. heft 85: 467 (1915). *F. arenosa* differs from *F. ciliaris* in the shorter leaves shorter than the bracts, relatively few larger spikelets, and the pentagonal wavy-margined lamina of the "petals" which is thickened, bilobed and awned near the apex.

Scirpus

Koyama, J. Fac. Sci. Univ. Tokyo sect. III, 7: 271–366 (1958), adopted a very broad concept of this genus including within it *Blysmus, Eriophorum, Fuirena* and *Hemicarpha,* groups commonly accepted as distinct genera. I agree with Kern (Advanc. Sci. 19: 144 (1962)) that this is quite unacceptable and that a far more natural classification would result from accepting as genera these and some other taxa more commonly included under *Scirpus.* Van der Weken's studies on the embryos would support this in principle but his finding that *S. prolifer* Rottb. has an embryo similar to that of *S. nodosus* Rottb. and *S. holoschoenus* L. and different from that of *S. inundatus* (R. Br.) Spreng. suggests that much more work must be done before a satisfactory regrouping can be achieved. So it is with some reluctance that I propose two new combinations under *Scirpus* and a new species when all three may have to be treated as species of *Isolepis.* This taxon, whatever its limits may be, is not a natural group when defined merely by the absence of hypogynous bristles as in the original description. Koyama stressed the quasilateral inflorescence of one to several capitate spikelets, but he misunderstood the group. On p. 283 he mentioned *Isolepis* as one of four sections belonging to "Group I. ISOLEPIS" characterized by "a single culm-like bract and *S. mucronatus*-like achenes" but only one of the species referred to *Isolepis* by R. Brown in the protologue has rugose nuts like those of *S. mucronatus* and this species (*S. supinus* L.) was referred by Koyama to sect. *Actaeogeton.* On p. 286 he stated that in sect. *Isolepis* the culms were "surrounded at the base with bladeless sheaths" yet in a later paper (op. cit. 8: 55 (1961)) he stated that "the subgenus *Isolepis* has unifacial blades" (subgenus apparently corresponding to Group I of the earlier paper). In fact, leaf-blades are well-developed in many species of sect. *Isolepis* as defined by Koyama, but they are bifacial, not unifacial.

I discussed *S. supinus* and some allies in Vict. Nat. 63: 116–20 (1946) and Proc. Roy. Soc. Qd 62: 83–8 (1952). In the latter paper I used the name *S. lateriflorus* Gmel. (with *S. erectus* Poir. and *Isolepis uninodis* Delile among its synonyms) for a taxon widely spread in Africa, Asia and Australia distinguished from *S. supinus* by characters of its vegetative parts, inflorescence, glumes and nuts, one of which is the regular development of solitary flowers in the basal leaf-sheaths with elongated styles and stigmatic branches. Kern, Reinwardtia 4: 93 (1956) and Blumea Suppl. 4: 163–5 (1958) stated that *S. erectus* (*I. uninodis*) is a distinct African species differing from *S. lateriflorus* especially in the larger glumes, more distinctly bristly connective of the anthers, bifid style and larger biconvex nuts; he found no basal flowers (1958, p. 164). I would now agree that *S. erectus* is distinct but it also has basal flowers. Besides the piece of the type of *S. erectus* (P) mentioned in the second paper, I have now seen thirteen sheets (K) from Egypt (type locality of *I. uninodis*) and Mauritius (type locality of *S. erectus*); plants on at least ten of these have basal flowers and two of the other sheets are unsatisfactory.

Koyama (p. 284) listed *S. erectus* and *S. supinus* among the species of sect. *Actaeogeton* ser. *Actaeogeton* and on p. 302 made the combination *S. supinus* L. var. *lateriflorus* (Gmel.) Koyama. On the next page he figured (fig. 6) a glume

and a nut of *"Scirpus supinus* L. var. *supinus* (A, B) and its var. *lateriflorus* T. Koyama (C, D). All × 14. (Ic. orig.)." A, B do not truly represent the European plant which has a definitely obovate much more closely and prominently rugose nut and several-nerved glumes, nor are they in accord with the characters of this given by Koyama at the bottom of the page; if the dimensions of the nut of C, D are correctly given in the text (I find the width to be up to 1·1 mm) then the magnification of these figures must be × 20.

In Canad. J. Bot. 40: 921 (1962) Koyama made the statement: "S. T. Blake (1952) indicated the presence of cauline sheaths as one of the important characters of *S. lateriflorus.* According to him, *S. lateriflorus* differs specifically from *S. supinus* in that the culms have a few articulations above the base." This is incorrect; in my key (pp. 86–7) one of the several characters distinguishing *S. lateriflorus* from *S. supinus* and *S. juncoides* Roxb. is "Culms with a node well above the base." Koyama went on to say that "culms are articulated above the base and bear a few cauline sheaths apparently in accordance with the ecological conditions." Wherever they grow, plants of *S. lateriflorus* always have culms with one (and only one) node above the base sometimes hidden by a basal sheath especialy on stunted culms; there are no nodes above the bases of culms of *S. supinus.*

Scirpus antarcticus L. Mant. 2: 181 (1771); C. B. Clarke, Fl. Cap. 7: 223 (1898), Proc. Linn. Soc. (London) 30: 314 (1894). Type: Cape of Good Hope, *Burmann* (LINN).

Isolepis cartilaginea R. Br. Prodr. 222 (1802). Types: var. *α* — Western Australia, King George Sound, *R. Brown* [5979] (BM; photo, fragment, BRI; K); var. *β* — Tasmania, Kent's Group, Bass Strait, *R. Brown* [5980] (BM; photo, fragment, BRI; K).

Scirpus cartilagineus (R. Br.) Spreng. Syst. Veg. 1: 208 (1825). Based on *Isolepis cartilaginea.*

Scirpus bergianus Spreng. Syst. Veg. 1: 212 (1825). Type: Cape of Good Hope, *Bergius* (B, now lost, not seen).

Isolepis bergiana (Spreng.) Schultes in R. & S. Syst. Veg. 3, Mant: 532 (1827). Based on *Scirpus bergianus.*

Isolepis antarctica (L.) R. & S. Syst. Veg. 2: 112 (1817). Based on *Scirpus antarcticus.*

Isolepis seslerioides Kunth, Enum. 2: 195 (1837) (*"sesslerioides"*). Type: Cape of Good Hope (B, now destroyed, not seen; K, iso).

Isolepis notata Nees, Pl. Preiss. 2: 74 (1846). Syntypes: Western Australia, Princess Royal Harbour, *Preiss* 1751 and Albany, *Preiss* 1752 (both MEL, iso).

Isolepis cartilaginea R. Br. var. *pauciflora* Nees, Pl. Preiss. 2: 74 (1846). Type: Western Australia, Rottnest I., *Preiss* 1740 (MEL, iso).

Isolepis cartilaginea R. Br. var. *elatior* Nees, Pl. Preiss. 2: 74 (1846). Type: Western Australia, near Perth, *Preiss* 1743 (MEL, iso).

Isolepis cartilaginea R. Br. var. *elatior* (forma) *minor* Nees, Pl. Preiss. 2: 74 (1846). Type: Western Australia, side of Mt. Melville, Plantagenet, *Preiss* 1750 (MEL, iso).

Cyperus modestulus Steud. Syn. Pl. Glum. 2: 16 (1854), *syn. nov.* Type: W. Australia, King George Sound, *D'Urville* (P; photo BRI, K).

Isolepis semipedunculata Boeck, Flora 41: 418 (1858). Type: "In insula Diemen leg. J. D. Hooker" (see below).

Other synonyms based on African specimens are given by Clarke, Fl. capensis loc. cit.

The type of *S. antarcticus* is an unusually tall specimen 24 cm high with more than a dozen spikelets. According to C. B. Clarke (MS in hb. Kew and cf. Proc. Linn. Soc., loc. cit.) the type of *Isolepis seslerioides* was identically this and that of *S. bergianus* was little different. The types of *I. cartilaginea* are by comparison very small plants with very few spikelets. Brown applied the name to two collections which he distinguished in his Prodromus as var. α and var. β. The former has culms up to 10 cm high with up to 5 spikelets the latter is smaller with culms not exceeding 3 cm with 1–3 spikelets.

I. semipedunculata was described from specimens said to have been collected by J. D. Hooker but almost certainly collected by Gunn and sent to Boeckeler by Hooker and now lost. There are three collections in hb. Hook. under nos. 582 and 421? and either another sheet of 582 or an unnumbered collection, and of these part of 421? agrees with the description well enough except that the flowers have 2 stamens and not 1. The epithet *"semipedunculata"* must refer to the second spikelet if present but the "peduncle" is the lower part of the rhachilla from which the glumes have fallen.

Levyns, J. S. Afr. Bot. 10: 28 (1944) wanted to distinguish *S. cartilagineus* from *S. antarcticus* on the grounds that it was consistently smaller (10 cm high or less instead of about 20 cm) with firm instead of rather loose leaf sheaths, spikelets few and rarely more than 8 instead of usually over 50, and somewhat larger fruit usually with raised points or faint transverse lines instead of always smooth.

V. J. Cook, Trans. & Proc. Roy. Soc. New Zeal. 81: 161 (1953), referred to Levyns's paper and used the name *Scirpus cartilagineus* for the New Zealand forms which he stated were identical with the smaller South African forms "except for slight differences in the markings of the nut". Edgar, New Zeal. J. Bot. 4: 198–9 (1966) accepted Cook's opinion, stating that "the larger *S. antarcticus* does not occur in New Zealand".

There is however a continuous range between the extremes. The 50 spikelets is a mistake—they are rarely if ever as many as 20 and the nature of the surface of the fruit is partly (at any rate) due to the stage of maturity.

I agree with Clarke that all the forms are conspecific.

Scirpus aucklandicus (Hook. f.) Boeck. Linnaea 36: 491 (1870); S. T. Blake, Proc. Roy. Soc. Qd 58: 39 (1947). Based on *Isolepis aucklandica.*

Isolepis aucklandica Hook. f. Fl. Antarct. 1: 88, t. 50 (1844). Syntypes: "Lord Auckland's Group and Campbell's Island", *J. D. Hooker* (K; fragment of former BRI).

Isolepis subcucullata Berggr. Minnesk. Fisiogr. Sällsk. Lund 8: 22, t. 5, f. 16–20 (1877). Type: New Zealand, South I., Waimakariri R., *Berggren* (K, iso; fragment BRI).

Isolepis cartilaginea R. Br. var. *rigida* Berggr. Minnesk. Fisiogr. Sällsk. Lund 8: 23 (1877). Type: New Zealand, South Island, Arthur's Pass, *Berggren* (K, iso; fragment BRI).

Scirpus aucklandicus (Hook. f.) Boeck. var. *subcucullatus* (Berggr.) C. B. Clarke ex Cheesem. Man. New Zeal. Fl. 773 (1906). Based on *Isolepis subcucullata.*

Distribution.—South-eastern Australia: New South Wales, Victoria and Tasmania (Blake, loc. cit.); New Zealand: North I., South I., Stewart I., (Cheeseman, loc. cit.), Auckland I., Campbell I., Antipodes I. (Cheeseman, loc. cit.), Macquarie I. (Cheeseman, loc. cit.). Also far to the westward on Amsterdam I., Southern Ocean, *G. de l'Isle,* Jan. 1875.

De l'Isle's collection was cited by Hemsley, Bot. Challenger Expedn. 2: 266 (1884).

In the key on p. 41 of my paper cited above there are some errors in dimensions which should be corrected as follows:

In the paragraph leading to *S. gunnii* and *S. aucklandicus,* the length of anthers should be 0·7–1·1 (not 0·7–1) mm and the dimensions of the nut should be: about 1–1·5 mm long and about 0·6–0·9 mm wide (not about 1·5 mm long and about 0·8–0·9 mm wide).

In the paragraph leading to *S. aucklandicus,* the length of glumes should be 1·2–1·9 (not 1·6–2·2) mm.

Scirpus cernuus Vahl, Enum. 2: 245 (1805). Type: Portugal, *Rathke* (C).

Isolepis riparia R. Br. Prodr. 222 (1810). Type: New South Wales, Williams River, *R. Brown* [5982] (BM, holo, fragment and photo BRI; E, K, fragment BRI).

Isolepis cernuua (Vahl) R. & S. Syst. Veg. 2: 106 (1817). Based on *Scirpus cernuus.*

Scirpus riparius (R. Br.) Spreng. Syst. Veg. 1: 208 (1825), non Pers. (1805) nec Presl (1830). Based on *Isolepis riparia.*

Isolepis punctulata Steud. Syn. Pl. Glum. 2: 92 (1855). Type: [New Holland] *Lhotsky* 23 (P; photo K, BRI).

Isolepis striatella Steud. Syn. Pl. Glum. 2: 92 (1855). Type: [New South Wales, near Sydney] *Sieber Agrostotheca* 20 (P; photo K, BRI).

Cyperus pumilio Steud. Syn. Pl. Glum. 2: 16 (1855), non Nees ex Steud. *in syn.* Type: Chile, Arigue, *Lechler* 700 (K, iso; fragment BRI).

Scirpus arenarius Benth. Fl. Austr. 7: 325 (1878), non Boeck. (1870), *syn. nov.* Syntypes: Western Australia, *Drummond* 360 (K; E, iso) and Victoria, Wilson's Promontory, *F. Mueller* (K, MEL, BRI).

Scirpus psammophilus S. T. Blake, Proc. Roy. Soc. Qd 51: 178 (1940), *syn. nov.* Based on *S. arenarius* Benth. lectotypified by *Drummond* 360.

The type of *S. cernuus* is a short tuft of many stems each with leaves reduced to sheaths and a solitary spikelet with at best half developed fruit. The culms are 0·3–0·35 mm thick, densely crowded on a definite "rhizome"; the glumes are 1·4–1·6 mm long, very broadly rounded, appressed or slightly spreading at the tip with the keel percurrent and sometimes slightly excurrent; there are 3 or 2 stamens with shortly apiculate anthers 0·3–0·35 mm long and the style below the 3 stigmas is rather less than 0·25 mm long.

There is a wide variation in size, development of rhizome, spacing and thickness of culms and development of leaf blade, and the resultant differences in appearance have led to the publication of a large number of names of which only a small proportion is listed and discussed here.

Bentham described *S. arenarius* as having two stigmas and the figure in C. B. Clarke, Illustr. Cyp. t. 47 figs. 1–2 from Drummond's specimen (K) likewise shows two stigmas. The other syntype, Wilson's Promontory, *F. Mueller* has 3 stigmas and when I wrote the protologue to *S. psammophilus* I assumed that Bentham's description and Clarke's illustration were correct and that Drummond's plant differed from Mueller's. However Drummond's specimens at Kew and Edinburgh have 3 stigmas. Drummond's specimen at Kew is mounted on the same sheet as Mueller's and Clarke has noted on it "style 3-fid in at least three cases" and in his MS "stylus certissime 3-fid". In the latter there is a sketch on which the figure in the Illustrations was based showing three stigmas—one stigma was omitted when the block was prepared. There is a well developed rhizome about 1 mm thick with well spaced stout culms 0·6–0·7 mm thick near the spikelet, flattened in drying to about 1 mm wide lower down. Similar but somewhat less robust forms have been found on coastal sand in SE. Queensland and they are perhaps the most divergent from the general run of the species. The type of *I. punctulata* is about as coarse but the rhizome is shorter with short internodes.

Scirpus hookeranus (Boeck.) S. T. Blake, comb. nov.; non *S. hookeri* Kunth (1837). Based on *Isolepis hookerana.*

Isolepis hookerana Boeck. Flora 41: 418 (1858) (*"Hookeriana"*), non *I. hookeri* Nees ex Boeck. (1870). Type: "In terra Van Dieman leg. J. D. Hooker" (see over).

Isolepis multicaulis Schlechtendahl, Linnaea 20: 562 (1847) non *Scirpus multicaulis* Sm. (1800) nec Gmel. (1805) nec F. Muell. ex C. B. Cl. (1908). Type: South Australia, Barossa Range, *Behr.*

Scirpus calocarpus S. T. Blake, Proc. Roy. Soc. Qd 51: 179 (1940), *syn. nov.* Type: New South Wales, Australian Capital Territory, near Tharwa, *Blake* 7544A (BRI, holo; K).

DISTRIBUTION.—Widely spread in temperate Australia (Blake, loc. cit.).

Boeckeler's citation of J. D. Hooker as collector must be a mistake and it is reasonably certain as in other cases, Hooker sent a specimen to Boeckeler. Boeckeler's description agrees well enough with *Gunn* 421? in hb. Hook. but with none of J. D. Hooker's own collections. Since Boeckeler's type seems to have been lost, *Gunn* 421? (K) is here chosen as lectotype; there is an apparent duplicate in hb. Sydney. Gunn also numbered some specimens of *S. antarcticus* L. as 421? while his 421 is a mixture of *S. antarcticus* and *S. cernuus* Vahl.

Isolepis hookerana var. *elatior* Boeck. loc. cit. must be *S. cernuus.*

Scirpus subtilissimus (Boeck.) S. T. Blake, comb. nov. Based on *Isolepis subtilissima.*

Isolepis subtilissima Boeck. Flora 41: 416 (1858). Type: "Terra Van Diemen—J. D. Hooker" which must be Tasmania, *Gunn* (K, iso).

Schoenoplectus merrillii Palla in Kneucker, Cyperaceae (excl. Carices) et Juncaceae exsiccatae 8, nr 223 (1911) et in Allgem. Bot. Zeitschr. 17, Beil. 3 (1911), *syn nov.* Type: Philippines, Negros, Coulon Volcano, *Merrill in Kneucker, Cyperaceae* . . . 223 (BRI, iso).

Scirpus merrillii (Palla) Kükenth. ex Merr. Enum. Philipp. Fl. Pl. 1: 117 (1925); S. T. Blake, Proc. Roy. Soc. Qd 58: 38 (1947), J. Arnold Arbor. 35: 206 (1954). Based on *Schoenoplectus merrillii.*

DISTRIBUTION.—Philippines, New Guinea, SE. Queensland to Tasmania and New Zealand.

Boeckeler's type (B) has apparently been lost. He cited J. D. Hooker as though he were the collector but there are no Hooker specimens in hb. Hook. (K) and it is reasonably certain that the specimens were communicated to Boeckeler by Hooker and were collected by Gunn. There are two Gunn numbers in Hb. Hook., 1421 and 1428, the former with at best immature fruit but with some culms exceeding 3 inches as described, the latter with shorter culms in good fruit. Boeckeler may well have had representatives of both collections so that the material at Kew can be treated as isosyntypes; his description will apply to no other species. *Gunn* 1428 is figured in Hook. f. Fl. Tasm. 2: t. 145, plant at left, as *Isolepis riparia.*

The affinities and distribution were discussed by me in 1947, loc. cit.

Scirpus tasmanicus S. T. Blake; species nova sectionis *Isolepidis,* affinis *S. gunnii* Boeck., *S. montivago* S. T. Blake et *S. habro* Edgar sed nuce angustiore vix vel haud obovata utrinque conspicue ± abrupteque attenuata ab omnibus differt. Typus: Tasmaniae "between the Arthur River and Circular Head", *F. Mueller* (BRI.080376, holo; MEL, K, HO).

Perennis, glabra laevisque; rhizoma filiforme repens ramosum 0·25–0·5 mm diam.; culmi laxe caespitosi, basi ± ramosi, filiformes, debiles, subtrigoni, vix striati, plerumque 4–8 usque ad 10 cm longi 0·2–0·4 mm lati. Folia caulina 1–ca 4, supremum longissimum, culmum superans ad 15 cm attingens, inferiora gradatim breviora, herbacea, tenuiter striata, subcarinata, plana vel fere plana, raro ± involuta, obtusa, 0·2–0·4 mm lata. Bracteae 1–2, inferior longissima foliis simillima erecta plerumque 4–8 cm longa, superior si evoluta angustior ± setacea raro 1 cm superans. Spiculae capitatae plerumque 2–3, rarius 1 rarissime 4, quasilaterales, pallidae, oblongae vel anguste ovoideae, obtusae vel subacutae, 2–4 mm longae, 1·75–2 mm latae, interdum proliferae. Glumae laxe imbricatae, incurvae, oblongo-obovatae vel ovatae vel oblongo-ovatae, subacutae, acuminatae, dorso convexae, obscure carinatae, sub-3-nerves, lateribus crassiusculae pallidae, ± rubro-punctatae, cellulae conspicuae subquadratae, marginibus anguste hyalinae, 1·7–2 mm longae. Stamina 1–2; antherae lineares subobtusae 0·5 mm longae. Stylus tenuiusculus, ± 0·5–0·7 mm longus, ramis 3 ± 1·25 mm longis. Nux pallida, nitida, anguste ovoideo-ellipsoidea, stipitata, longiuscule acuminato-apiculata, subaequaliter subobtuse trigona, tricostata costis angustis acutis lateribus convexis minute reticulata, sublaevis, (1–1·1) × (0·45–0·5) mm, apiculo ad 0·2 mm longo incluso. Fig. 2, H–K.

TASMANIA.—Fern-tree gullies between the Arthur River and Circular Head, Feb. 1875, *F. Mueller;* Waratah, Dec. 1924, *A. H. S. Lucas.*

In its leafy habit this resembles *S. subtilissimus* (Boeck.) S. T. Blake but the spikelets are more numerous with much larger and less keeled glumes; the glumes are more like those of *S. gunnii* Boeck. and *S. montivagus* S. T. Blake but these are coarser plants that tend to be more densely tufted without conspicuous creeping rhizomes while the ± oblong or elliptic abruptly "stipitate" and conspicuously apiculate nut is different in form from any other species seen of the section.

SUBFAM. RHYNCHOSPOROIDEAE

Under the general title "Vorarbeiten zu einer Monographie der Rhynchosporoideae" G. Kükenthal published revisions of the twenty-two genera he recognized in this group between 1938 and 1952. A considerable amount of "re-modelling" of genera occurs in this series, but it must be remembered that though Kükenthal had been working on the family for a very long time and his ideas must have been crystallizing over a period of many years, a large part of the work including much of the actual writing of the papers was done during years

of war and post-war often under difficult conditions when he was handicapped by lack of material in some groups and his advancing age (the first paper appeared in his seventy-fifth year).

The taxon which he and others treated as a subfamily has been treated as a tribe by some while Kern (Advanc. Sci. 19: 144 (1962)) appeared unwilling to accord it even this status. The rank of subfamily is used in this paper to avoid misunderstandings that would arise if tribe Rhynchosporeae were used, because most of the genera discussed below do not belong to the tribe Rhynchosporeae as circumscribed by Kükenthal.

The limits of the genera that have been arranged here have been drawn in many ways. This is well shown by the synonymy associated with species referred to *Gahnia* and *Cladium*. Partly as the result of papers by Koyama and Kern cited below, particularly on *Cladium* and *Machaerina,* I was led to study these in more detail and the examination of the structure of the fruits, the distribution of prophylls in the inflorescence, and the distribution of ligules to the leaves have suggested a more rigid circumscription of genera.

Baumea, Cladium and Machaerina

The type of *Cladium* is *C. jamaicense* Crantz from Jamaica which has often been considered conspecific with *C. mariscus* (L.) Pohl from Europe. Kükenthal's concept of the limits of the genus in his revision in Repert. Sp. Nov. 51: 1–17, 139–193 (1942) was very like that of C. B. Clarke in Kew Bull. Add. Ser. 8: 124–5 (1908) and Bentham, Fl. Aust. 7: 400 (1878) and in Benth. & Hook. Gen. Pl. 3: 1065–6 (1883).

This concept includes *Machaerina* Vahl based on *Schoenus restioides* Sw. from the West Indies; *Baumea* Gaud. based on *B. glomerata* Gaud. from the Moluccas and *B. mariscoides* from the Marianas; *Vincentia* Gaud. based on *V. angustifolia* Gaud. from Hawaii; and *Chapelliera* Nees based on *Scirpus iridifolius* Poir. from Madagascar and Mauritius.

Other species have been described under or referred to each of these genera both before and since the publications of Bentham and Clarke. On the other hand, F. Mueller, Fragm. 9: 12–16 (1875) included *Gahnia* under *Cladium;* later (e.g. Second Census Aust. Pl. 216 (1889)) he used the name *Gahnia* for the concept because, although *Cladium* was published earlier than *Gahnia,* a name of a species first appeared under *Gahnia.* This was explained in Descr. Notes Papuan Pl. 2: 69 (1890), though in fact *Cladium jamaicense* Crantz (1766) was published earlier than *Gahnia procera* J. R. & G. Forst. (1776).

Bentham treated *Vincentia* and *Baumea* as sections; he identified *Chapelliera* with *Baumea* as others have done and stated that *Machaerina* scarcely differed from *Vincentia* except in having hypogynous bristles. Clarke accepted *Machaerina, Vincentia* and *Baumea* as subgenera. Kükenthal accepted three subgenera, *Vincentia* being included under *Machaerina.* He described three sections of *Baumea,* sect. *Ancipita* (= sect. *Baumea*) for species with much flattened ensiform

leaves and sharply 2-edged biconvex culms, one of them being the type of *Chapelliera*; sect. *Juncea* for species with terete culms and leaves though the latter are often much reduced and then not always terete; and sect. *Obtusangula* for the others. Following Bentham and Clarke he used the epithet *Eu-Cladium* (*Eucladium*) for *Cladium* subgen. (or sect.) *Cladium*.

Bentham described the fruit of sect. *Cladium* as distinctly drupaceous with a more or less spongy exocarp that became brittle when dry and a hard endocarp, while that of sect. *Baumea* ("where observed") was subdrupaceous with a thick pericarp and a less distinct endocarp that in sect. *Cladium*. Kükenthal referred to the drupaceous nut of subgen. *Cladium* having a thick pericarp truncate at the base set on a truncate scutelliform disk; this taxon also differs from the others in its spiral, dorsiventral leaves and corymbose partial panicles. The fruits of *Machaerina* and *Vincentia* have usually been described as having a 3-winged stipe and a triquetrous style-base.

Koyama, Bot. Mag. Tokyo 69: 59–67 (1956) restricted *Cladium* to subgen. *Cladium*; in this he followed Boeckeler and others but he referred all other species to *Machaerina*. *Cladium* was said to have 3-ranked dorsiventral scabrous-margined leaves, corymbose partial panicles, pollen grains with a terminal pore and six lateral ones, and a somewhat drupe-like achene with a corky smooth almost inconspicuous style-base while *Machaerina* had distichous, unifacial, terete or laterally compressed leaves with smooth or nearly smooth margins, sometimes wanting, "slender or conical compound panicle", polyporate pollen, and a hard 3-angled nut with a distinct usually hispid or scabrous not corky beak. He made 71 new combinations as a result. Apparently he did not examine the type species of *Machaerina,* but based his concept of the genus on three species from Japan and the Bonin Islands which in J. Fac. Sci. Univ. Tokyo sect. III, 8: 122–3 (1961) he referred to sect. *Baumea,* identifying *M. boninsimae* (Nakai) Koyama with *M. glomerata* (Gaud.) Koyama, (the type of *Baumea*), *M. brevistigma* (Nakai ex Tuyama) Koyama (of which he had not seen fruits) with *M. rubiginosa* (Spreng.) Koyama, and treating the third, *M. nipponensis* (Ohwi) Ohwi & Koyama as a variety of the latter.

Kern, Acta Bot. Neerl. 8: 263–8 (1959) accepted Koyama's opinion in principle. He commented on "some regrettable inaccuracies in Koyama's extensive list of transfers to *Machaerina*". Others are discussed below.

Kern pointed out that the hollow culms of *Cladium* differed from the pithy or septate culms of *Machaerina* and stated that *Machaerina* differed further in having distichous, not spiral glumes although he described the topmost glume in *M. gunnii* as sometimes transverse to the lower ones, and figured such a case.

My examination of fresh and dried specimens suggest that there is considerable variation between and even within species but that at least in many species the glumes are clearly spiral and exactly distichous glumes are at best rare. I have found no appreciable differences between the glumes of *Machaerina* and *Baumea* but there is a big difference in the fruit.

Machaerina restioides as well as *M. ekmanii* and *M. cubensis* from the same region has nuts with a very thin and fragile pericarp not exceeding 0·02 mm in thickness with epicarp, mesocarp and endocarp scarcely distinguishable at a magnification of 40× (Fig. 1, F); the nuts of *Vincentia angustifolia* and *Cladium sinclairii* (subgen. *Vincentia* sensu C. B. Clarke) have a similar structure (Fig. 1, E, G). The species of subgen. *Baumea* and subgen. *Cladium* have fruits with a thick pericarp with a thick very hard bony endocarp, a spongy or crustaceous usually thick mesocarp and a thin membranous epicarp in all resembling the fruits of *Lepidosperma* more closely than those of *Machaerina* (Fig. 1, A–D). I fully agree with Koyama and Kern that *Cladium* should be restricted to *Cladium mariscus* (L.) Pohl and its close allies which include *C. jamaicense* and the Australian and New Caledonian *C. procerum* S. T. Blake. But the difference in the structure of the fruit together with the other differences given by Kükenthal suggest that *Machaerina* should be restricted to subgen. *Machaerina* sensu Kükenthal and that *Baumea* be treated as a distinct genus.

In general, the leaves of *Machaerina* are strongly laterally flattened and 2-edged with less flattened culms; those in some species of *Baumea* are similar but there is an intergrading series to terete or quadrangular culms and leaves.

I agree with Kern in treating *Cladium undulatum* Thw. and *Tricostularia fimbristyloides* (F. Muell.) Benth. as *Tricostularia undulata* (Thw.) Kern, op. cit. 267, but cannot agree with his disposition of *Trachystylis* S. T. Blake.

Koyama transferred *Cladium stradbrokense* Domin to *Machaerina* as *M. stradbrokensis*. Kükenthal, Bot. Jahrb. 75: 495–6 (1952) identified Domin's specimens with *Trachystylis foliosa* S. T. Blake and (p. 496) made the combination *Trachystylis stradbrokensis* (Domin) Kükenth. Kükenthal placed *Trachystylis* near *Rhynchospora* though in the protologue (Proc. Roy. Soc. Qd 48: 89–90 (1937) I had considered it closer to *Arthrostylis* and *Actinoschoenus*. Kern, op. cit. 267, transferred the species to *Fimbristylis* as *F. stradbrokensis* (Domin) Kern. He attached little importance to the 1–2-flowered spikelets with several empty glumes at the base, characters traditionally used in the circumscription of tribe Rhynchosporeae (subfam. Rhynchosporoideae sensu Kükenthal) but which is by no means absolute as he pointed out. He stated that the floral characters of *Trachystylis* are those of *Fimbristylis* and its anthelate inflorescence and leaves with thickened margins and cellulose-reticulate upper side are also characteristic of this genus. But the 1–2-flowered spikelet with the internode of the rhachilla elongated between the flowers when two are present, the peculiar indumentum of the style, and the surface of the nut with its fine reticulum of tiny cells not in vertical series are characters foreign to *Fimbristylis*. A disarticulating style enlarged at the base is found in unrelated genera to be discussed elsewhere, the foliage resembles that of some species of *Schoenus* as closely as it does that of *Fimbristylis* and according to Dr. Metcalfe (*in litt.*) the leaf anatomy is quite different from that of *Fimbristylis* being much more like that of *Schoenus*.

Kern's transfer of *Gahnia gahniaeformis* and *G. affinis* to *Machaerina* is discussed under *Morelotia*.

The characters of the genera discussed may be compared and contrasted by the following key:

Leaves with a ligule but without a distinct midrib, involute when dry, spirally arranged; no prophylls in the inflorescence; spikelets 1-flowered, or 2-flowered with the upper flower alone fertile; glumes definitely spiral, 1-nerved, the flowering glumes usually shorter than those immediately below, usually blunt, concave and appressed to the nut; fruit with a hard pericarp; mesocarp firm, often ± oily; endocarp dark brown to black with the internal surface transversely striate and in several spp. transversely annular-sulcate; style-base inconspicuous. Stem terete, solid or hollow, few to many-noded *Gahnia*

Leaves without a ligule (except in *Lepidosperma*), not involute, either (1) spiral, bifacial, with a midrib, and tending to recurve when dry or (2) distichous, unifacial, laterally compressed to tetragonous or terete, or ± reduced to the sheaths; prophylls throughout the inflorescence from the base of the partial panicles from the main axis to the pedicel; spikelets 1–6-flowered, sometimes ripening 2 or more fruits, sometimes only the lower or middle flower(s) fertile; glumes distichous to spiral, the flowering glumes not shorter than the empty ones below; fruit with a thin or thick pericarp, the ± spongy or crustaceous mesocarp not oily and the endocarp (if well differentiated) frequently white or nearly so, not transversely sulcate inside; style-base much thickened, very conspicuous in flower, persistent and fused to the top of the fruit and then sometimes inconspicuous, often ± hairy. Stems various, sometimes much compressed, often nodeless above the base:

Leaves spiral, bifacial, with midrib and scabrous margins revolute when dry; stems ± trigonous; perianth 0; endocarp black or nearly so:

Glumes clearly distichous, the lower ones caducous; uppermost internode of rhachilla elongated and curved; nut finally black, held by the persistent stamens clasped by the inrolled margin of the persistent flowering glumes, without a disk; style-base not readily distinguishable externally; mesocarp crustaceous; culms few-noded, solid; inflorescence of 2–4-nate, erect, narrow partial panicles *Morelotia*

Glumes spiral, persistent; all internodes of rhachilla short; fruit shed with persistent upper glumes, finally brown or reddish brown, seated on a truncate scutelliform white disk and with a conspicuous pale corky style-base; mesocarp spongy; endocarp relatively thick; culms several-noded, hollow, sometimes branched; inflorescence of solitary or binate ± decompound corymbose partial panicles *Cladium*

Leaves distichous, unifacial, ± strongly laterally compressed to 4-angled or terete ± resembling the pithy or septate culms which are often nodeless above the base; all internodes of rhachilla short; glumes obscurely distichous to clearly spiral, at least the lower ones persisting until long after the fruit is shed; partial panicles not corymbose; endocarp white or inconspicuous:

Mature fruit with a readily distinguishable hard bony endocarp, and a ± spongy thick or thin mesocarp, unwinged, sessile and rounded or ± obpyramidal at the base; spikelets usually maturing one nut; perianth of thick broad often acuminate scales or 0; culms and leaves sometimes angular or terete (see also p. 26):

Perianth scales at length broad and thick, sometimes with setaceous tip; spikelets usually with 2 or more flowers with the uppermost fertile; all leaves basal, (except in 2 species), the sheaths tending to split into fibres; leaves and lower bracts with a small membranous ligule *Lepidosperma*

Perianth 0; lowest flower fertile if more than 1 or sometimes an upper one if 3 or more; culms 0–many-noded; basal sheaths usually not splitting, leaves and bracts without ligules *Baumea*

Mature fruit with a very thin brittle pericarp and a ± 3-winged usually long stipe; style-base also ± 3-winged, or at least sharply 3-angled, decurrent over shoulders of nut; spikelets commonly maturing 2–4 nuts; leaves strongly laterally compressed and, like the bracts, without ligules; perianth bristle-like or 0 *Machaerina*

As defined here *Baumea* is a genus of about thirty species ranging from Madagascar and the Mascarene Islands through India to Japan, Malesia, Australia, New Zealand and Melanesia to Hawaii with the main concentration of species in Australia from which *Machaerina* as defined here is possibly absent.

Both the original species and a few others are remarkable for their many-noded culms of which the upper leaves are well-developed and long and the lower ones gradually reduced to short bladeless sheaths; usually there are no radical leaves. Most other species have nodeless or 1- rarely 2-noded culms with basal leaves. Of the species with terete culms and leaves referred by Kükenthal to sect. *Juncea, Cladium capillaceum* is better treated as belonging in *Tetraria* (S. T. Blake, Trans. Roy. Soc. S. Aust. 67: 54 (1943)). The others have 1-flowered spikelets sometimes with a second imperfect flower in *B. juncea.*

Kükenthal treated *Cladium gunnii* as a synonym of *C. tenax* but, as I stated previously (op. cit., 59), these names refer to different species. His account was based on *C. tenax* and he described *C. brevipaniculatum* (firstly as *C. gunnii* var. *brevipaniculatum*) from specimens of *C. gunnii.* He recognized *C. nudum* (Steud.) Boeck. as distinct, relying on the more slender canaliculate culms and smaller punctate nuts as distinguishing characters but unfortunately added a var. *rigidulum* based on specimens of *C. gunnii* with some culms more or less canaliculate partly at least as the result of shrinkage. The culms in all are commonly nodeless beneath the inflorescence, rarely 1-noded. The innermost sheath is closed, usually shorter than the one immediately outside which usually bears a long terete blade; sometimes the innermost also has a long blade and rarely both are without blades. The nut is ovate or elliptic in outline, divisible externally into three parts: an obpyramidal base (stipe); an ellipsoid or broadly ellipsoid terete body containing the endocarp with an annular thickening above the stipe and occupying about $\frac{2}{3}$ the total length, narrowed to the blunt apex which is in part the fused style-base. The species may be distinguished as follows:

Panicle occupying $\frac{2}{5}$–$\frac{3}{5}$ (or sometimes as little as $\frac{1}{4}$?) the total length of the culm; mature nut straw-coloured with black apex and base, the apex (with style-base) from $\frac{1}{3}$ to nearly $\frac{1}{2}$ as long as the ellipsoid body which is about $1\frac{1}{4}$–$1\frac{1}{2}$ times as long as wide; entire nut (2·5–3) × (1·1–1·25) mm *B. tenax*

Panicle occupying $\frac{1}{10}$–$\frac{1}{3}$ the total length of the culm, rarely up to $\frac{2}{5}$ or more and then usually with the bottom node a long way below the others; mature nut reddish brown to blackish with dark tip, the apex (with style-base) sometimes less than $\frac{1}{3}$ as long as the broadly ellipsoid to subglobose body 1–$1\frac{1}{3}$ times as long as wide:

Nut smooth at maturity, ± rugulose before, but not punctulate, (2·5–3·4) × (1·3–1·85) mm; apex about $\frac{1}{3}$–$\frac{1}{2}$ as long as the body which is 1–$1\frac{1}{4}$ times as long as wide; culms commonly terete *B. gunnii*

Nut raised-punctulate at maturity, (1·75–2·1) × (1·05–1·25) mm; apex with style-base $\frac{1}{5}$–$\frac{3}{10}$ as long as the body which is 1–$1\frac{1}{3}$ as long as wide; culms commonly sulcate, very slender *B. nuda*

Baumea tenax (Hook. f.) S. T. Blake, comb. nov. Based on *Lampocarya tenax.*

Lampocarya tenax Hook. f. Fl. Nov. Zel. 1: 277 (1853). Type: New Zealand, North Island, Opurago and Tolaga, *Banks & Solander.*

Schoenus tenax Banks & Solander ex Hook. f. loc. cit., *pro syn.*

Cladium tenax (Hook. f.) Druce, Rep. Bot. Exch. Cl. Brit. Isles 1916: 615 (1917). Based on *Lampocarya tenax.*

Machaerina tenax (Hook. f.) Koyama, Bot. Mag. Tokyo 69: 66 (1956). Based on *Lampocarya tenax.*

DISTRIBUTION.—New Zealand.

Baumea gunnii (Hook. f.) S. T. Blake, comb. nov. Based on *Cladium gunnii.*

Cladium gunnii Hook. f. Fl. Tasm. 2: 95, t. 148 B (1860). Type: Tasmania, Formosa, *Gunn* (K).

Cladium laxiflorum Hook. f. Fl. Tasm. 2: 95, t. 148 A (1860). Type: Tasmania, New Norfolk, *Oldfield* (K).

Gahnia sulcata F. Muell. First Gen. Rep. 20 (1853), *nomen nudum.*

Gahnia gunnii (Hook. f.) F. Muell. Key Syst. Vict. Pl. 1: 455 (1888); Benl, Flora 131: 375, fig. 5 (1937). Based on *Cladium gunnii.*

Cladium gunnii Hook. f. var. *brevipaniculatum* Kükenth. Bot. Jahrb. 69: 260 (1938), *syn. nov.* Syntypes: North-east New Guinea, Mt. Sarawaket, *Clemens* 5548, 6084 (B).

Cladium brevipaniculatum (Kükenth.) Kükenth. Repert. Sp. Nov. 51: 176 (1942). Based on *Cladium gunnii* var. *brevipaniculatum.*

Cladium brevipaniculatum (Kükenth.) Kükenth. var. *longibracteatum* Kükenth. Repert. Sp. Nov. 51: 177 (1942), *syn. nov.* Type: Victoria, Tooradin, *Meebold* 7243 (B).

Cladium nudum (Steud.) Boeck. var. *rigidulum* Kükenth. Repert. Sp. Nov. 51: 180 (1942), *syn. nov.* Type: Queensland, between Elimbah ("Klimbah") and Beerburrum, *Blake* 4805 (B, holo; BRI).

Machaerina brevipaniculata (Kükenth.) Koyama, Bot. Mag. Tokyo 69: 62 (1956). Based on *"Cladium brevipaniculatum".*

Machaerina gunnii (Hook. f.) Kern. Acta Bot. Neerl. 8: 266 (1959). Based on *Cladium gunnii.*

DISTRIBUTION.—New Guinea, south-east Queensland, New South Wales, Victoria, South Australia, Tasmania.

Baumea nuda (Steud.) S. T. Blake, comb. nov. Based on *Schoenus nudus.*

Schoenus nudus Steud. Syn. Pl. Glum. 2: 165 (1855). Type: New South Wales, [Port Jackson], *Sieber, Agrost. no.* 19 (P, holo; MEL).

Cladium nudum (Steud.) Boeck. Linnaea 38: 236 (1874). Based on *Schoenus nudus.*

Machaerina nuda (Steud.) Kern, Acta Bot. Neerl. 8: 266 (1959). Based on *Schoenus nudus.*

DISTRIBUTION.—South-eastern Queensland, eastern New South Wales.

Koyama, p. 65, identified *Schoenus nudus* with *S. punctatus* R. Br. and made the combination *Machaerina punctata* (R. Br.) Koyama. Pfeiffer, Repert. Sp. Nov. 23: 350 (1927) made the same error in identification when he made the combination *Cladium punctatum* (R. Br.) Pfeiff., the consequences of which I discussed in Trans. Roy. Soc. S. Aust. 67: 59 (1943). As also pointed out by Kern, op. cit. 264, *S. punctatus* R. Br. certainly belongs in *Schoenus.*

Other species to be referred to *Baumea* include *B. acuta* (Labill.) Palla, *B. arthrophylla* Boeck., *B. crassa* Thw., *B. deplanchei* Boeck., *B. flexuosa* Boeck., *B. glomerata* Gaud., *B. juncea* (R. Br.) Palla, *B. laxa* (Nees) Boeck., *B. mariscoides* Gaud., *B. preissii* Nees, *B. riparia* (Nees) Boeck., *B. rubiginosa* (Spreng.) Boeck., *B. teretifolia* (R. Br.) Palla and those for which new combinations are made below. In most cases references are restricted to the basionym, Kükenthal's monograph where other synonymy can be found, and Koyama's papers.

Baumea articulata (R. Br.) S. T. Blake, comb. nov.

Cladium articulatum R. Br. Prodr. 237 (1810); Kükenth., 164.

Machaerina articulata (R. Br.) Koyama, 62.

Baumea aspericaulis (Kükenth.) S. T. Blake, comb. nov.

Cladium aspericaule Kükenth. Repert. Sp. Nov. 51: 151 (1942).

Machaerina aspericaulis (Kükenth.) Koyama, 62.

Baumea australis (Nees) S. T. Blake, comb. nov.

Elynanthus australis Nees, Ann. Nat. Hist. ser. I, 6: 48 (1841).

Cladium elynanthoides F. Muell. Fragm. 9: 31 (1875) in nota; Kükenth., 177; *nom. illegit.*

Gahnia elynanthoides (F. Muell.) F. Muell. Sec. Census Aust. Pl. 216 (1889); *nom. illegit.*

Mariscus australis (Nees) O. Kuntze, Rev. Gen. Pl. 2: 755 (1891).

Cladium australe (Nees) H. Pfeiff. Repert. Sp. Nov. 23: 350 (1927), non (A. Rich.) Druce (1917).

Machaerina elynanthoides Koyama, Bot. Mag. Tokyo 69: 63 (1956), non *M. australis* (A. Rich.) Koyama, op. cit. 63.

Cladium elynanthoides is an illegitimate name, a name superfluous when published because at that time the epithet *australis* was available. *Gahnia elynanthoides* is illegitimate for the same reason. *Machaerina elynanthoides* Koyama must be treated as a new name not as a new combination (ICBN Art. 72, note). *Cladium australe* (Nees) H. Pfeiff. is antedated by *Cladium australe* (A. Rich.) Druce, based on *Vauthiera australis* A. Rich. on which Koyama based *Machaerina australis* (A. Rich.) Koyama. This species has broad thick (though small) hypogynous scales and leaves with ligules, characters not found in species of *Cladium* sens. lat. and I agree with J. D. Hooker, Kükenthal and Kern that the species belongs in *Lepidosperma* (*L. australe* (A. Rich.) Hook. f.).

Baumea complanata (Berggr.) S. T. Blake, comb. nov.

Cladium complanatum Berggr. Minnesk. Fisiogr. Sällsk. Lund 8: 23, t. 6, fig. 1–5 (1877); Kükenth., 151.

Baumea complanata Boeck. ex Kükenth. Repert. Sp. Nov. 51: 151 (1942) *pro syn.*

Machaerina complanata (Berggr.) Koyama, 63.

Baumea disticha (C. B. Cl.) S. T. Blake, comb. nov.

Cladium distichum C. B. Cl. Philipp. J. Sci., Bot. 2: 102 (1907); Kükenth., 164.

Machaerina disticha (C. B. Cl.) Koyama, 63.

According to Kern, op. cit. 266, *C. philippinense* Merr. (1910) and *C. micranthes* C. B. Cl. (1908) are conspecific with *C. distichum*. The type of this name seems to be an abnormal individual.

Baumea ensigera (Hance) S. T. Blake, comb. nov.

Cladium ensigerum Hance, J. Bot. 23: 80 (1885); Kükenth., 153.

Machaerina ensigera (Hance) Koyama, 63.

Baumea huttonii (T. Kirk) S. T. Blake, comb. nov.

Cladium huttonii T. Kirk, Trans. New Zeal. Inst. 9: 551 (1877); Kükenth., 170.

Machaerina huttonii (T. Kirk) Koyama, 64.

Baumea milnei (C. B. Cl.) S. T. Blake, comb. nov.

Cladium milnei C. B. Cl. Kew Bull. Add. Ser. 8: 46 (1908); Kükenth., 153.

Machaerina milnei (C. B. Cl.) Koyama, 64.

Baumea muelleri (C. B. Cl.) S. T. Blake, comb. nov.

Cladium muelleri C. B. Cl. Kew Bull. Add. Ser. 8: 47 (1908); Kükenth., 174.

Machaerina muelleri (C. B. Cl.) Koyama, 64.

Baumea tetragona (Labill.) S. T. Blake, comb. nov.

Lepidosperma tetragonum Labill. Nov. Holl. Pl. Spec. 1: 17, t. 17 (1804).

Cladium teretifolium R. Br. var. *tetraquetrum* (Hook. f.) Domin; Kükenth., 169.

Machaerina tetragona (Labill.) Koyama, 66, as "(R. Br.) T. Koyama".

Baumea vaginalis (Benth.) S. T. Blake, comb. nov.

Cladium vaginale Benth. Fl. Aust. 7: 408 (1878); Kükenth., 177.

Machaerina vaginalis (Benth.) Koyama, 66.

Gahnia

Gahnia has been monographed twice in recent years, firstly by Benl in Bot. Archiv 40: 151–257 (1940) and shortly after by Kükenthal in Repert. Sp. Nov. 52: 52–111 (1943) in his series of revisions of genera of the Rhynchosporoideae. Differences between the two revisions were discussed by Benl in Bot. Jahrb. 75: 82–89 (1950).

One of the peculiarities of many species of *Gahnia* is that the stamens become greatly elongated after flowering and remain attached to the ripe nut as well as to the spikelets so that even though the nut falls from the glumes it remains hanging from the inflorescence. Benl, Flora 131: 369–386 (1937) described four distinct ways in which the stamens behave after flowering; each species behaved in one way only and Benl based his key to the species on this behaviour. Kükenthal treated the main groups in the key as named sections.

Immature nuts are pallid and often dull but the mature nuts are usually brilliantly red or blackish red with blackish tips or entirely shining black. In many species the pericarp is extremely hard and thick (often much thicker at the top). The conspicuous bony endocarp is at least usually dark brown to black and in some species is marked internally by a number of transverse annular furrows, the tightly fitting seed having corresponding ridges and furrows (Fig. 2, E).

According to Kükenthal the culms are 1–3-noded except for *G. polyphylla* and always solid, but other species have up to 12-noded culms and in some species the internodes are hollow as I pointed out in Proc. Roy. Soc. Qd 68: 39 (1957). Ligules are well developed on the basal and cauline leaves and at least the lower bracts of all species examined, usually as a conspicuous rigid dark-coloured often ± ciliolate membrane (Fig. 2, G) but as a densely long-ciliate quite short membrane in *G. lanigera* and its allies; previously they were reported in the protologue of *G. graminifolia* Rodway, by Kükenthal for this species, and in the

protologue of *G. lanaiensis* O. & I. Degener & Kern. So far as I have seen living plants, their leaves are flat and paler on the upper side; in the dried state they are often so tightly involute as to appear terete with a single channel on the upper side.

Another hitherto unreported but notable feature in the genus is a complete absence from the inflorescence of the 2-keeled, frequently tubular prophylls commonly found close to the base of all ramifications of inflorescences of other genera of the family.

All bracts have a prominent sheath which is closed and tubular for a conspicuous distance above the base, those in the upper part of the inflorescence becoming shorter and shorter until the blade is finally reduced to a very short setaceous point; bracteoles differ from the latter only in size.

The lower glumes scarcely differ from the bracteoles except that the margins are not connate—i.e. glumes are modified sheaths. I have therefore taken the spikelet to be that part of the partial inflorescence above the last bracteole with the basal part of the sheath closed. This unit is ± definitely pedicellate above the bracteole with all glumes closely approximate (Fig. 2, A, B).

The large Australian species of *Gahnia* are not readily represented by orthodox herbarium specimens and the fact that Bentham and others tended to treat most or all of them as forms of *G. psittacorum* is readily understandable. Some of them commonly form stout caudices as much as 2·5–3·5 cm diam. and up to 1 m high, or sprawling over the substrate for 1–2 m before ascending, bearing a dense crown of recurving leaves from which arise the flowering culms commonly 1·5–2 m but up to 4 m high, with 6–12 nodes below the inflorescence which occupies about $\frac{1}{3}$–$\frac{1}{2}$ the total length of the culm with up to about 30 fascicles of partial panicles.

In the species forming sect. *Conflexae* Kükenth. (= sect. *Gahnia*) and including *G. grandis* (*G. psittacorum*) the filaments are greatly elongated after flowering and become tangled with those of adjacent flowers (Flechtmechanismus of Benl) while the other species discussed here belong to sect. *Agglutinatae* (with Klebmechanismus) in which the filaments of the upper flower and those of the lower flower become stuck together in their upper part.

Benl and Kükenthal recognized five Australian species in the group discussed here, two of them described by Benl. They differed in the nomenclature of these species, their synonymy, and the treatment of infraspecific taxa. Sixteen names have now been applied to them excluding those resulting from generic transfers or changes of rank. My results based on several re-appraisals of both revisions against continuing accessions as well as living plants are set out below.

I cannot find reliable discriminating characters for *G. breviaristata* Benl but have had to describe another species as new. No infraspecific taxa are recognized and there is some rearrangement in synonymy.

KEY TO SPECIES

Spikelets with (8–) 10–17 glumes, several lower ones conspicuously shorter so that the spikelet is clavate or pyriform after flowering:

Stamens at length up to 2 cm long, intertwined in their upper part ("Flechtmechanismus"); partial panicles about 4–6-nate *G. grandis*

Stamens at length not exceeding 8 mm long, those of the two flowers in each spikelet becoming stuck together in their upper part ("Klebmechanismus") so that the ripe fruit is anchored by the persistent stamens of the lower flower; partial panicles 2–3-nate:

Spikelets 8–13 mm long; glumes up to 5 mm long; small hypogynous bristles sometimes present; nut about 5 mm long *G. erythrocarpa*

Spikelets 4–5 mm long; longer glumes about 2·5–3·25 mm long; no hypogynous bristles; nut about 2·5–2·75 mm long *G. clarkei*

Spikelets with about 6–10 glumes, the lower ones more than half as long as the spikelet or only 1–2 much shorter; spikelets oblong to elliptic in outline. (Stamens with "Klebmechanismus".)

Culms hollow, about 6–10-noded; inflorescence about 15–30-noded; partial panicles divided to about the 4th (or 5th) degree; glumes 6–10, all or most of them smooth on the sides or weakly punctate-scabrous, the innermost very obtuse, these and the lowermost much shorter than the middle ones; mature nut obscurely 3–4-angled *G. sieberana*

Culms solid, 2–4-noded; inflorescence about 10–12-noded; partial panicles not divided beyond the second degree; glumes 6, not very unequal, ± coarsely and densely papillose-scabrous, the innermost one ± acute; nut obviously 3 (or 4)-angled *G. subaequiglumis*

Gahnia clarkei Benl, Flora 131: 382, 381 fig. 10 (1937), germanice, Repert. Sp. Nov. 44: 196, t. 247 (1938), latine, Bot. Archiv 40: 220 (1940); Kükenth. Repert. Sp. Nov. 52: 78 (1943). Type: New South Wales, Sutherland, *Meebold* 2650 (M, fragment BRI).

G. psittacorum Labill. var. *microcarpa* C.B. Cl. ex Benl, Repert. Sp. Nov. 44: 197 (1938) pro syn.

DISTRIBUTION.—Western New Guinea (fide Benl), SE. Queensland, eastern New South Wales, Victoria, south-eastern South Australia.

Gahnia erythrocarpa R. Br. Prodr. 239 (1810); Benl, Flora 131: 381, 382 (1937), Bot. Archiv 40: 217, (218) fig. 20 (1940); Kükenth. Repert. Sp. Nov. 52: 78 (1943). Type: New South Wales, Port Jackson, *R. Brown* [6058 p.p.].

G. urvilleana Kunth, Enum. Pl. 2: 332 (1837). Type: Port Jackson, *d'Urville* (FI, iso?).

G. goniocarpa Steud. Syn. Pl. Glum. 2: 164 (1855) (*"gonyocarpa"*). Type: Near Port Jackson, *d'Urville* (not seen).

G. psittacorum Labill. var. *erythrocarpa* (R. Br.) Domin, Biblioth. Bot. Heft 85: 482 (1915). Based on *G. erythrocarpa*.

G. psittacorum Labill. var. *microcarpa* Domin, loc. cit., *pro syn.*

Cladium erythrocarpum (R. Br.) F. Muell. Key Syst. Vict. Pl. 1: 455 (1888), *pro syn.*

DISTRIBUTION.—New South Wales (Central Coast).

R. Brown's MS description applies to the species as understood by Benl and Kükenthal but he appears to have placed specimens of *G. clarkei* and *G. sieberana* under this species. Domin did likewise, treating the taxon as a variety of *G. psittacorum*. The occasional presence of hypogynous bristles is nearly unique in the genus.

Gahnia grandis (Labill.) S. T. Blake, comb. nov. Based on *Scleria grandis.*

Scleria grandis Labill. Rel. Voy. Recherche La Pérouse 146 (1800), non Core (1945). Type: As for *G. psittacorum.*

Gahnia psittacorum Labill. Nov. Holl. Pl. Spec. 1: 89, t. 115 (1804); R. Br. Prodr. 238 (1810); Benth. Fl. Aust. 7: 418 (1878); Domin, Biblioth. Bot. Heft 85: 481 (1915); Benl, Flora 131: 380 (1937), Bot. Archiv 40: 200, (204) fig. 15 (1940); Kükenth. Repert. Sp. Nov. 52: 65 (1943). Type: Tasmania, [Storm Bay], *Labillardière* (FI, holo, photo BRI, K).

G. leucocarpa R. Br. Prodr. 239 (1810). Type: Tasmania, [King I.], *Brown* [6057] (K, iso; fragment BRI).

G. leucosperma R. Br. ex Nees, Linnaea 9: 301 (1834), *nomen.* Type: As for *G. leucocarpa.*

(*G. psilocaulon* Hook. f. ex Boeck. Linnaea 38: 345 (1874). Type: Tasmania, *Gunn* 982 (K, iso).)

Cladium psittacorum (Labill.) F. Muell. Fragm. 9: 13 (1875). Based on *G. psittacorum.*

Mariscus psittacorum (Labill.) O. Kuntze, Rev. Gen. Pl. 2: 755 (1891). Based on *Gahnia psittacorum.*

Gahnia psittacorum Labill. forma *leucosperma* Benl, Bot. Archiv 40: 202, (205) fig. 16 (1940). Type: [Tasmania, King I.], *R. Brown* [6057] (BM, holo, not seen; K, iso).

G. psittacorum Labill. forma *psilocaulon* Benl, Bot. Archiv 40: 202 (1940). Type: "*G. psilocaulon* Hook. Mss., secundum exemplar authent., K".

G. psittacorum Labill. var. *psilocaulon* (Benl) Kükenth. Repert. Sp. Nov. 52: 67 (1943). Based on *G. psittacorum* forma *psilocaulon.*

DISTRIBUTION.—New South Wales, Victoria and Tasmania, including islands of Bass Strait. Benl (1940, p. 202) cited specimens from Queensland and the Northern Territory. The last, "Melville Island: Cape van Diemen", is surely a mistake. Cape van Diemen is probably Labillardière's Cape van Diemen which is part of southern Tasmania. The specimens cited from Queensland on the authority of F. M. Bailey belong to other species: Dallachy's to *G. sieberana* and Mueller's to *G. sieberana* or possibly *G. clarkei.*

Scleria grandis was cursorily described in a work in which Labillardière described and figured several new species in great detail. Labillardière did state that the plant was a new species that he named *Scleria grandis* and his remarks concerning its height sometimes as much as 4 m tall, its leaves as cutting as a piece of glass and its oval reddish "seeds" containing a small oily kernel of which the parrots were very fond in spite of the great hardness of the pericarp are sufficient to validate the name and the reference to the parrots links the name to the protologue of *Gahnia psittacorum.* I have to thank Mr. L. A. S. Johnson of the National Herbarium of New South Wales for drawing my attention to Labillardière's earlier name which is not listed in Index Kewensis and renders illegitimate *Scleria grandis* Core, J. Wash. Acad. Sci. 35: 322 (1945).

G. leucocarpa was based on specimens with immature fruits. Brown originally wrote *leucosperma* on his label and this was taken up firstly by Nees loc. cit. and then by Benl as the basis of his *G. psittacorum* forma *leucosperma.* Benl apparently did not realize that Brown altered his manuscript epithet when he published *G. leucocarpa* or he would not have cited *G. leucocarpa* as a possible synonym of *G. psittacorum* forma *psilocaulon.* This trinomial was based on a specimen said to be labelled by Hooker *"Gahnia psilocaulon"* and a duplicate sent to Boeckeler led Boeckeler to publish as a new species *"Gahnia psilocaulon* Hook.". But both Boeckeler and Benl misread Hooker's label—the epithet is *psittacorum* not *psilocaulon.* If *"Gahnia psilocaulon"* has any nomenclatural standing, it should be attributed to Boeckler, but it is surely an "unintentional orthographic error". Benl also cited *G. sieberana* Kunth as a doubtful synonym of *G. psittacorum* forma *psilocaulon* though he (correctly) identified the type number with *G. tetragonocarpa.* Benl doubtfully referred *Gahnia psittacorum* var.? *oxylepis* (without the ?) to forma *leucosperma.* Kükenthal treated both forms as varieties taking up *G. psittacorum* var. *oxylepis* for forma *leucosperma.* But the name *G. psittacorum* var. *oxylepis* refers to other species and is discussed below under *G. sieberana.*

The variation within *G. psittacorum* is such that the recognition of infraspecific taxa appears to be unjustified.

Gahnia sieberana Kunth, Enum. Pl. 2: 332 (1837); Kükenth. Repert. Sp. Nov. 52: 80 (1943) (both as *"Sieberiana"*). Type: [New South Wales, near Port Jackson] *Sieber* 536 (L, iso).

G. tetragonocarpa Boeck. Linnaea 38: 347 (1874); Benth. Fl. Aust. 7: 418 (1878); C. B. Cl. Ill. Cyperac. t. 97, figs. 7–10 (1909); Benl, Bot. Archiv 40: 221, (224) fig. 21 (1940), Bot. Jahrb. 75: 86 (1950). Type?: Victoria, Muddy Creek, *F. Mueller* (BRI, K, MEL).

G. psittacorum Labill. var. ? *oxylepis* Benth. Fl. Aust. 7: 419 (1878), *syn. nov.* Types: 3 or 4 syntypes; lectotype by exclusion: "Queensland, Rockingham Bay, *Dallachy*" (MEL, K).

Cladium tetragonocarpum (Boeck.) F. Muell. Syst. Census Aust. Pl. 129 (1882). Based on *Gahnia tetragonocarpa.*

Mariscus tetragonocarpus (Boeck.) O. Kuntze, Rev. Gen. Pl. 2: 755 (1891). Based on *Gahnia tetragonocarpa.*

Gahnia arbuscula Domin, Biblioth. Bot. heft 85: 482 (1915). Type: Queensland, *Pandanus* swamp on mountains behind Yarrabah, *Domin* (PR, not seen).

G. breviaristata Benl, Repert. Sp. Nov. 44: 199, t. 249 (1938), Bot. Archiv 40: 230, (229) fig. 23 (1940); Kükenth. Repert. Sp. Nov. 52: 82 (1943), *syn. nov.* Type: Queensland, Kamerunga, *Cowley* 33D (M, holo; BRI).

G. radula (R. Br.) Benth. var. *oreogenes* Domin, Biblioth. Bot. heft 85: 481 (1915), *syn. nov.* Type: Queensland, Mt. Bellenden Ker, ± 1000 m, *Domin* (PR, not seen).

G. sieberana Kunth var. *arbuscula* (Domin) Kükenth. Repert. Sp. Nov. 52: 81 (1943). Based on *G. arbuscula.*

DISTRIBUTION.—New Guinea and eastern Australia to Tasmania and South Australia.

G. sieberana is found in a variety of habitats and varies considerably in stature, size of inflorescence, length of partial panicles and form of the nut. Benl treated the name as a doubtful synonym of *G. psittacorum* forma *psilocaulon* but cited the type number under *G. tetragonocarpa* (the name he used for the species) and later (1950) defended his use against Kükenthal's use of *G. sieberana* on the grounds that Kunth's description was defective and he had placed the species among "species dubiae" while Boeckeler's description was quite clear. But Kunth's doubt was whether the species he was describing might belong to *G. leucosperma* Nees or *G. leucocarpa* R. Br., and if these two were different; Kunth certainly did not see any of Brown's specimens. I am not sure what is the basis of Boeckeler's description of *G. tetragonocarpa.* Boeckeler himself said that the specimen was mixed with another species from southern Australia collected (or communicated) by F. Mueller. Bentham took up Boeckeler's name but cited only two collections both from Victoria—Muddy Creek, *F. Mueller* and Mt. William Creek, *Sullivan.*

Mueller had labelled his collection from Muddy Creek *Psittacoschoenus erythrocarpus* and it must be the collection referred to by Boeckeler under *G. erythrocarpa* to which also Boeckeler referred *G. sieberana* including the citation of the type number. Boeckeler's description seems to have been based on Mueller's collection rather than Sieber's though the two collections certainly are conspecific. It does not refer to true *G. erythrocarpa* R. Br. which was described as *G. urvilleana* Kunth on p. 342-3 from the type collection of the latter. The description of *G. tetragonocarpa* was based on part of a very large panicle with the lower panicle branches (peduncles of partial panicles) 10 inches long, secondary partial panicles 4–5 inches long, globose ovate spikelets with subequal glumes and still pallid ellipsoid tetragonous nuts. Such large lower partial panicles are found in several collections of *G. sieberana* from south-eastern Australia and it is at least probable, since Boeckeler has cited no other collection of Mueller's, that the type of *G. tetragonocarpa* was part of the collection from Muddy Creek, and Boeckeler was mistaken in thinking that it was extraneous. Neither Benl nor Kükenthal reported any Mueller specimen from Berlin where Boeckeler's type should have been.

Benl (1940) described and figured (fig. 21) a deformation of the fruit that he believed to be restricted to and always present on specimens of *G. sieberana* (as *G. tetragonocarpa*). However this deformation is present on the type of *G. psittacorum* and at least on an isotype (K) of *G. leucocarpa* R. Br. (= *G. psittacorum*).

R. Brown apparently referred specimens of this and *G. clarkei* to *G. erythrocarpa.*

Gahnia arbuscula was described from imperfect material consisting of the lower part of a culm (? caudex) 10–13 cm in circumference including leaf sheaths, and part of an inflorescence. I have not seen the type but Benl identified it with *G. tetragonocarpa* (i.e. *G. sieberana*) though it had unusually narrow fruits and none of the deformed nuts the presence of which was for him a diagnostic character. He referred to a specimen of *G. tetragonocarpa* from Mt. Lindsay, *C. T. White,* which had some equally narrow nuts, normal nuts and deformed nuts. Kükenthal treated it as a variety of *G. sieberana. Blake* 9646 from a swamp with *Pandanus* at Yarrabah must surely be conspecific with Domin's plant, though growing at a lower elevation, and the abundant conspicuously narrow fruits are shorter than described by Domin, 2·5 × (1–1·1) not (3·5–3·75) × (1·05–1·20) mm.

Benl did not give a full description of *G. breviaristata* nor did he compare it with *G. sieberana,* but the important diagnostic characters for him seemed to be the smaller spikelets, more sharply trigonus nut and the absence of deformed fruits. The lastmentioned "character" is untrustworthy and the sharper angles of the nut are best seen before full maturity.

G. psittacorum var.? *oxylepis* was founded on five collections from four localities. Dallachy's specimens from "Rockingham Bay" (Coast Range, according to Dallachy's own labels in Melbourne) are of two collections one just coming

into flower and another only a little more advanced. I have not traced Mueller's specimen from Moreton Bay, but it must be of *G. sieberana* or *G. clarkei;* Stuart's specimen from Timbarra, New England, in full fruit (MEL) is also *G. sieberana* though the Kew sheet was referred to *G. radula* (R. Br.) Benth. by Clarke and Domin (Domin, loc. cit.).

G. radula var. *oreogenes* described from immature material, must be *G. sieberana.* We have no specimens of *Gahnia* from just this locality, but others from the top of the same mountain (1560 m) and from neighbouring localities at about the same altitude certainly belong to *S. sieberana.*

Gahnia subaequiglumis S. T. Blake; species nova in sect. *Agglutinatis* Kükenth. inserenda affinis *G. sieberanae* Kunth sed culmis paucinodibus solidis, inflorescentia minus composita, glumis punctato-scabris subsimilibus, nuce majore acuta conspicue 3 (–4)-angulata differt. Typus: New South Wales, Coree Flats, *M. Gray* 5002 (BRI.078805, holo; CANB, NSW).

Plantae caespites magnos densos usque ad 50 cm latos formant. Culmi basi multifoliati, erecti, ± 60–160 cm alti, 3–4 mm crassi, teretes, solidi, 2–4-nodes, minute ± dense papillosi. Folia culmo longiora; vaginae ± laeves, eae foliorum basalium valde dilatatae, apertae ± nigrobrunneo-marginatae; ligulae firme membranaceae, minute ciliolatae, 0·9–1 mm longae; laminae involutae specie teretes canaliculatae sensim in apicem longum filiformem curvum flexuosumve attenuatae basi (si explanatae) ± 0·7–0·9 mm latae, facie inferiore sursum scaberrimae deorsum papillosae vel ± laeves, facie superiore in nervis creberrimis dense minuteque hispidulae, marginibus scabrae. Inflorescentia composita densa erecta foliosa 24–65 cm longa, 4–5 cm lata, circa $\frac{2}{5}$–$\frac{3}{5}$ culmi occupans, e fasciculis 10–12 panicularum partialium approximatis saepius imbricatis inferioribus ± remotis constructa. Bracteae foliaceae circa 4 inferiores inflorescentiam superantes vel longe superantes ceterae sensim breviores angustioresque summae setaceae inconspicuae; vaginae inferne clausae praecipue superiores punctato-scabrae, ± (superiores fere omnino) nigro-brunneae. Paniculae partiales binae vel ternae vel imae singulae, ± erectae, anguste pyramidales vel oblongae semel vel bis divisae, pendunculis vaginam bracteae saepius subaequantibus; bracteolae bracteis summis similes spiculis haud longioribus. Spiculae saepius singulae et binae, ± imbricatae, ± oblongae vel subellipsoideae, sub fructu 4–4·5 mm longae, 2·5–3 mm latae, nigro-brunneae vel nigrae, 2-florae floris inferioris pistillo nullo vel valde reducto. Glumae 6, multo minus inaequales quam in speciebus plurimis, papilloso-scabrae, ovatae, inferiores acute acuminatae, summa nuci appressa circa $\frac{4}{5}$ longitudinis glumae penultimae, acutae vel fere acutae minute ciliolatae. Stamina in flore inferiore 3–4 in flore superiore saepissime 3 raro 4, eorum filamenta post anthesin persistentia vix elongata parte superiore inter se agglutinata et nucem retinentia. Nux lucida rubra apice (stylobasi) nigrescens, ambitu elliptica, apice acute conica, basi rotundo-obtusa, conspicue 3 (raro 4)-angulata lateribus leviter convexa vel prope basin concava, minute reticulata cellulis extimis circa isodiametricis, 3·9–4·4 mm longa, 1·7–2 mm lata, pro more duplo longior quam lata; endocarpium transverse annulato-sulcatum, sulcis 4–6. Fig. 2, A–G.

QUEENSLAND.—MORETON DISTRICT: Mt. Maroon, head of steep gorge in rock crevices ± 900 m, very rare, 3 Sept. 1939, *Blake* 14111.

NEW SOUTH WALES.—CENTRAL COAST: National Park, 18 miles SW of Sydney, *Lucas in* NSW. 30080. SOUTHERN TABLELANDS: Coree Flats behind Mt. Coree, swampy area, 1 Feb. 1961, *M. Gray* 5002; Coree Flats, 35° 18′ S, 148° 49′ E, damp sandy soil on edge of swamp, ± 1140 m, 1 Feb. 1961, *Darbyshire* 146; Mt. Bimberi, small swamp halfway down mountain, some *Sphagnum, Oreobolus* etc., 17 Mar., 1960, *M. Gray* 4837, 4856.

VICTORIA.—Upper Delegate River at Bidwell Bridge, Orbost-Bendoc Road, edge of *Sphagnum* bog, ± 900 m, 28 Mar. 1964, *I. G. Stone.*

Morelotia

Kükenthal (p. 87) pointed out that *Gahnia gahniaeformis* (Gaud.) Heller (*Morelotia gahniaeformis* Gaud.) as he circumscribed it (including *Lampocarya affinis* Brongn.) differed from other species in having revolute leaves and "almost" distichous glumes of which the upper ones are longer than the lower ones; he and Benl (1937, p. 376) described the reduced topmost glume and Benl noticed that the lower glumes were deciduous (Fig. 6). Kern, Acta Bot. Neerl. 11: 216–224 (1962) agreed with St. John, Webbia 13: 331–342 (1958) that *Lampocarya affinis* from New Zealand was distinct from *Morelotia gahniaeformis* from the Hawaiian Islands. He felt that the two species were "misplaced" in *Gahnia* because of the trigonous stems, revolute leaves, distichous glumes, presence of an imperfect second flower and greatly thickened style-base "and that by their removal the circumscription of this genus will become more satisfactory". He transferred them to *Machaerina.*

These species are further distinguished from *Gahnia* by the absence of any trace of a ligule, the presence of prophylls at the base of all ramifications of the inflorescence (Benl, in 1940, actually mentioned these as narrow thinly membranous scale-leaves without recognizing their significance), elongated uppermost internode of the rhachilla curved under the nut with the flowering glume decurrent along it, and the decidedly hispidulous stigmas. But the trigonous stems, dorsiventral revolute leaves, distichous deciduous glumes and elongated curved internode of the rhachilla are equally foreign to *Machaerina* and it seems necessary to recognize *Morelotia* Gaud. as a distinct genus and the following transfer must be made.

Morelotia affinis (Brongn.) S. T. Blake, comb. nov.

Lampocarya affinis Brongn. in Dup. Voy. Bot. 2: 166, t. 29 (1829). Type: New Zealand, *d'Urville* (P), not seen, figured by Brongniart, loc. cit.

Morelotia gahniaeformis Gaud. var. *minor* A. Rich. Fl. Nuov. Zél. 115 (1832). Type: New Zealand, Bay of Islands, *d'Urville & Lesson* (P) (not seen).

Gahnia affinis (Brongn.) Steud. Syn. Pl. Glum. 2: 164 (1855); St. John, Webbia 13: 338 (1958). Based on *Lampocarya affinis.*

Schoenus arenarius Banks & Sol. ex Hook. f. Fl. Nov. Zel. 1: 277 (1853) *pro syn.*

Gahnia arenaria Hook. f. Handb. N. Zeal. Fl. 306 (1867). Based on *Lampocarya affinis.*

Mariscus affinis (Brongn.) O. Kuntze, Rev. Gen. Pl. 2: 755 (1891). Based on *Lampocarya affinis.*

Machaerina affinis (Brongn.) Kern, Acta Bot. Neerl. 11: 223 (1962). Based on *Lampocarya affinis.*

Kern, op. cit. p. 223 suggested that *Gahnia hystrix* J. M. Black and *Gahnia filum* (Labill.) F. Muell. were also misplaced in *Gahnia,* but the structure of the spikelet, absence of prophylls in the inflorescence and involute leaves with well developed ligules all agree with characters of *Gahnia.* The glumes are definitely spiral in *G. hystrix.*

Oreobolus

Oreobolus furcatus H. Mann vel sp. aff.

TAHITI.—Orohena, at and above 2200 m, about Jan. 1953, *M. Jay in hb. H. S. McKee* 3124 (BRI).

This discovery of *Oreobolus* on Tahiti makes an important extension to the known range of the genus, elsewhere known from Malesia, south-eastern Australia, New Zealand, Antarctic Islands, Andes of South America extending north to Central America, and Hawaii. The specimen from Tahiti looks very like specimens of the Hawaiian *O. furcatus,* but the single piece is sterile. According to the collector it was locally abundant but not seen elsewhere in the mountains of Tahiti.

Four species are known from Australia which will be fully discussed elsewhere; two new species are described below.

Oreobolus acutifolius S. T. Blake; species nova affinis *O. pumilioni* R. Br., a quo differt foliorum fere distichorum laminis angustioribus saepissime sensim acutis supra aeque tenuiter reticulatis enervibus et nuce latiore late obtusa subtruncata. Typus: Tasmania, Lake Dobson, *Blake* 18321 (BRI.080386, holo; isotypi distribuendi).

Herba perennis caespites parvos densos pulvinatos virides agens. Culmi iteratim ramosi internodiis brevibus vaginis foliorum dense obtecti, floriferi ± 1–2 cm alti sub inflorescentia enodes. Folia fere disticha; vaginae crebre imbricatae, pallide brunneae raro e purpureo variegatae, ciliolatae, rugulosae, 5–sub–7-nerves, apice sub lamina rotundatae vel brevissime auriculatae; laminae fere rectae,

suberectae, parte superiore planae vel fere planae in apicem acutum vel angustissime obtusum sensim angustatae, basin versus concavo-convexae, incrassatae, facie inferiore punctulatae vix rugulosae prope basin 3-nerves, facie superiore tenuiter reticulatae haud rugulosae 1-nerves, circa 1·2–2·5 cm longae, 0·5–0·7 mm latae, marginibus pro majore parte distincte scabrae. Inflorescentia 1-nodis; pedunculi laeves, primo brevissimi tandem foliis superantes. Spiculae 1–2, rhachilla brevissime producta. Glumae 3, inferior laminigera, tertia circa 3 mm longa, anguste obtusa et ± emarginata ejus carina breviter excurrente. Tepala lanceolata acute acuminata, ciliolata, 1-nervia, 1–1·25 mm longa 0·25–0·35 mm lata, prope basin imbricata. Nux ellipsoidea subpyriformis, apice late obtussissima subtruncataque sinuose 3-cristata cristis hispidula, basi breviter subconstricta, 1·2–1·5 mm longa 0·8–0·95 mm lata, tepala conspicue superans. Fig. 2, O.

Known from three collections from Tasmania this species resembles *O. oxycarpus* more than *O. pumilio,* but it differs from both in the hardly rugulose mostly decidedly acute leaf-blades and the very broad subtruncate top of the nut. It has some resemblance also to *O. strictus* Berggr. from New Zealand and *O. obtusangulus* Gaud. from Chile, but these have non-rugulose sheaths and more prominently nerved blades; in addition *O. strictus* has blunter blades, broader tepals and glabrous nuts while *O. obtusangulus* has clearly spiral, distinctly shining leaves with blades 3-ribbed beneath.

Oreobolus oxycarpus S. T. Blake; species nova ab congeneribus nuce supra semen longe acuta et tepalis fere duplo longiore distinguenda. Typus: New South Wales, prope Mt. Franklin, *Blake* 13898 (BRI.080379, holo; NSW, . . .).

Herba perennis caespites densos pulvinatos squarrosos virides 2·5–7 cm altos latosque agens. Culmi iteratim ramosi internodiis brevibus vaginis foliorum valde imbricatis dense obtecti, floriferi 1–5 cm alti sub inflorescentia enodes. Folia haud disticha; vaginae haud lucidae, pallidae vel pallide brunneae interdum ex purpureo tinctae vel marginatae, conspicue rugulosae, marginibus ciliatae, 5–7-nerves; laminae admodum patulae, rectae vel saepius recurvae rarius flexuosae, anguste obtusae, concavo-convexae vel fere planae, 3-nerves sed nervis facie superiore saepe haud visibiles, marginibus ab apice usque ultra medium et prope basin scabrae, 1·5–3 cm longae, 0·5–0·8 mm latae. Inflorescentia 1–2-nodes e spiculis 2–4, 3–8 mm longis constructa; pedunculi bini raro in inflorescentiis 1-nodibus terni, 4–20 mm longi, ± compressi, marginibus ± scabri. Glumae 3, florifera anguste ovata ciliolata 2·5–4 mm longa. Rhachilla saepe ± producta. Tepala anguste lanceolatae acutae, obscure 1-nerves, marginibus supra medium scaberulae vel omnino laeves, prope basin anguste imbricatae, 1–1·3 mm longae, 0·15–0·25 mm latae. Nux anguste fusiformis vel anguste ovoideo-ellipsoideus, gradatim acutus, leviter 3-sulcatus (praecipue supra medium), glabra, lucida, pallide brunnea, laevis sed tenuiter reticulata, 1·8–2·3 mm longa, 0·75–0·8 mm lata. Fig. 2, P.

This species has been frequently collected on the Southern Tablelands of New South Wales, in Victoria and in Tasmania.

O. oxycarpus is readily distinguished from all other species by the acutely conical apex of the ovary and nut. It is also the only species with the nut nearly twice as long as the tepals. Before maturity the apex shrinks on drying becoming sharply and more or less irregularly 3-angled, with the sides sunk between the angles, and externally resembling an enlarged style-base rather than the upper part of the ovary wall.

Schoenus

Schoenus ornithopodioides (Kükenth.) S. T. Blake, comb. nov.

Schoenus ericetorum R. Br. var. *ornithopodioides* Kükenth. Repert. Sp. Nov. 44: 179 (1938). Type: Queensland, Stradbroke I., *Blake* 7111 (B, holo; BRI).

Herba perennis caespitosa fere aphylla. Culmi saepe curvati circa 15–30 cm alti, sursum 0·3–0·5 mm crassi. Folia ad vaginas ore oblique sectas minute ciliolatas brevissime laminatas vel inferiores elaminatas redacta; lamina ± subulata 2–4 mm longa. Inflorescentia 1–5-spiculata quasi lateralis. Bractea directionem culmi continuans saepissime 5–10 mm longa. Spiculae sessiles et ± pedunculatae, anguste ovoideae saepe curvulae, 1–2-florae, 3·5–4 mm longae, 1·4–1·5 mm latae. Glumae 4–5, atrosanguineae, omnes vel inferiores marginibus barbellatae. Perianthium 0. Stamina 3; antherae haud visae. Nux ex brunneo et ochraceo variegata, basi breviter stipitiformis, insuper subglobosa apice rotundata vel subabrupte rotundata, leviter asymmetrica, subtrigona obscure 3-costata, haud rugosa, cellulis extimis minutis isodiametricis tenuiter punctulata, circa 1·3–1·4 mm longa (stipite 0·2 mm longo incluso), 0·95–1·05 mm lata.

DISTRIBUTION.—Queensland: Wide Bay and Moreton Districts, on wallum sands.

The type collection has 1-flowered spikelets as described by Kükenthal; 2-flowered spikelets are found in some other collections.

Kükenthal had only one sheet of *S. ornithopodioides* and he treated this and *S. imberbis* R. Br. as varieties of *S. ericetorum*. *S. ornithopodioides* differs from both the others in the more slender stems, fewer smaller spikelets and smaller nut abruptly constricted to the stipe-like base, ± evenly rounded at the top, (instead of obovate or somewhat pyriform, depressed on top) and not at all rugose. It further differs from *S. ericetorum* in the minutely ciliate, not densely bearded orifice of the leaf sheath, fewer (4–5 not 7–10) glumes less densely bearded on the margins, and from *S. imberbis* in the ciliate margins of the glumes.

Schoenus pygmaeus S. T. Blake; species nova affinis *S. philippinensi* Kükenth., *S. calyptrato* Kükenth. & Blake et *S. maschalino* R. & S., sed spicula turgida, glumis mere 3 pro majore parte haud carinatis nuce suboblonga ab omnibus differt. Typus: Tasmania, Lake Dobson, *Blake* 18318 (BRI.080387, holo; HO).

Herba humillima caespites latos brevissimos pulviniformes formans. Rhizoma repens circa 0·4 mm crassum. Culmi 1–7 mm alti foliorum vaginis obtecti, foliis pluribus circumdati. Folia: vaginae glabrae inflatae saltem dorso purpureae; laminae apicem obtusum versus angustatae, facie superiore canaliculatae subtus convexae, uninerves, striatae, marginibus apicem versus scabrae, 4–12 mm longae, 0·3–0·4 mm latae. Spicula solitaria terminalis erecta, quam bractea unica longior breviorve, angustissime ovata, turgida, 4–5 mm longa, 1–1·1 mm lata. Rhachilla brevis supra florem haud elongata. Glumae 3, glabrae, laeves, 1-nerves nervo tenuissimo solum prope apicem carinatae, ima ovata acuta dimidiam spiculam subaequans vel minime superans, ceterae subaequales anguste ovatae vel late lanceolatae, apicem versus angustissime obtusum acutatae, 4 mm longae, secunda florigera, tertia vacua. Setae hypogynae 6, filiformes, antrorsim scabrae, nucem parum superantes. Stamina 3; antherae . . . Stylus 1·5–1·6 mm longus. Nux sessilis, glabra, nitens, oblongo-ovoidea 3-costata costis tenuissimis, propter cellulas extimas breviter verticaliter oblongas tenuiter obscureque reticulata, stylobasi brevi conico 0·2 mm longo fere aequilato coronata, hoc excluso 1·1–1·3 mm longa, 0·7–0·8 mm lata. Fig. 2, L–N.

TASMANIA.—Lake Dobson, ± swampy ground ± 900 m, 16 Jan. 1949, *Blake* 18318.

This was found growing in association with and resembling *Oreobolus oxycarpus* S. T. Blake, just as the type of *Schoenus calyptratus* Kükenthal & Blake grew with and resembled *Oreobolus distichus*. Besides its small size and solitary spikelet it is noteworthy because of the few glumes and the short nearly straight rhachilla.

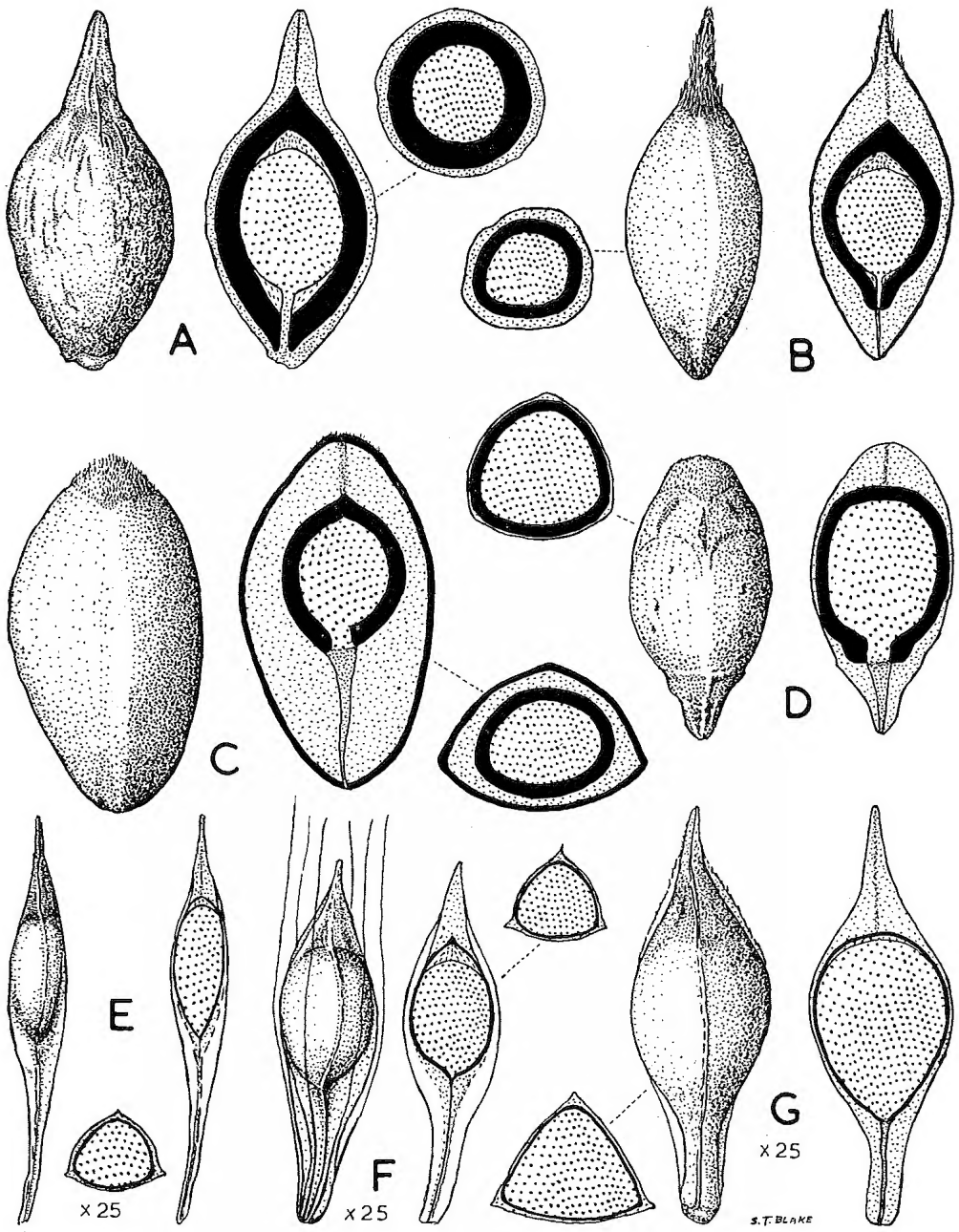

FIG. 1. Fruits (filaments removed) in abaxial view, vertical section and transverse section of:

A. *Cladium jamaicense* (Porto Rico, *F. L. Stevens*).

B. *Baumea glomerata* (Ceram, *Buwalda* 6018).

C. *Baumea rubiginosa* (Queensland, *Blake* 13163).

D. *Baumea gunnii* (New South Wales, *McBarron* 2899).

E. *Machaerina angustifolia* (Hawaii, *Degener & Nitta* 3912).

F. *Machaerina restioides* (Porto Rico, *Sintensis* 1382).

G. *Machaerina sinclairii* (New Zealand, *V. J. Cook*).

Exocarp and endocarp shown in solid black, mesocarp in fine stipple, seed in coarser stipple but embryo not distinguished; × 15 except where marked × 25.

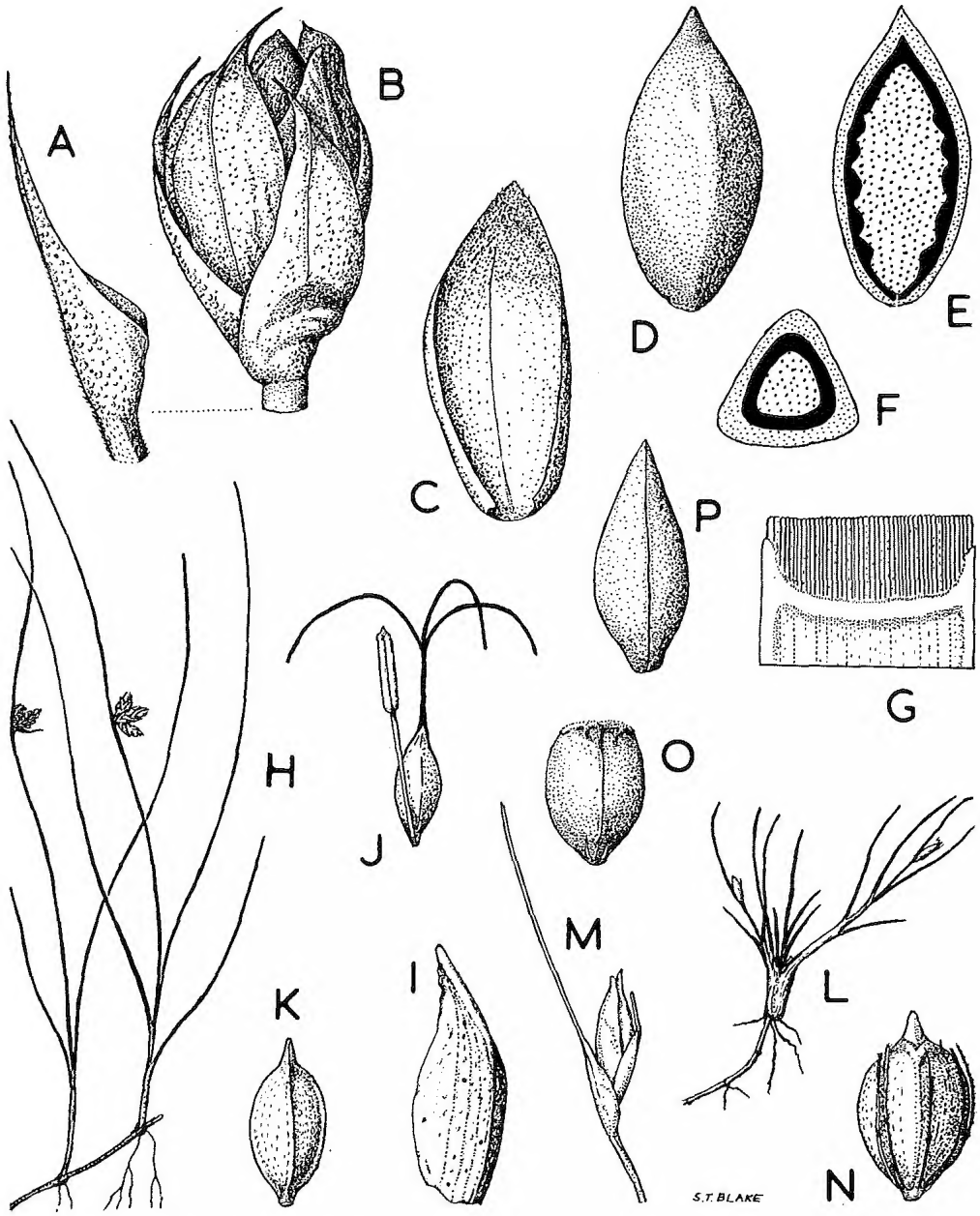

FIG. 2. A–G, *Gahnia subaequiglumis:* A, bracteole; B, spikelet; C, topmost glume; D, fruit, abaxial view; E, fruit, vertical section; F, fruit, transverse section; G, ligule; A–F × 10, G × 3.

H–K, *Scirpus tasmanicus:* H, part of plant, natural size; I, glume; J, flower; K, nut; I–K × 20.

L–N, *Schoenus pygmaeus:* L, part of plant, natural size; M, inflorescence × 5; N, nut × 20.

O, *Oreobolus acutifolius:* nut × 15.

P, *Oreobolus oxycarpus:* nut × 15.

All from types.

INDEX OF NAMES

Names accepted as correct are in roman type; synonyms are in italics. Infrageneric and infraspecific epithets are listed irrespective of rank under the related generic names and names of species.

S. G. REID, Government Printer, Brisbane