

COMMONWEALTH OF AUSTRALIA

Copyright Regulations 1969

WARNING

This material has been reproduced and communicated to you by or on behalf of
The University of Adelaide pursuant to Part VB of the Copyright Act 1968 (the Act).

The material in this communication may be subject to copyright under the Act.
Any further reproduction or communication of this material by you may be the
subject of copyright protection under the Act.

Do not remove this notice.

External Copyright permission (if applicable)

Distribution.—From Rottneet I., W.A., around southern Australia to Peterborough, Vic., and on the north coast (at least) of Tasmania. This species is found mainly on coasts of moderate wave action, or in bays; when growing on very exposed reefs or in deeper rock pools stunted or juvenile plants only may be found.

J. Agardh distinguished *S. heteromorphum* and his later-described *S. halitrichum* almost entirely on the basal parts, which he considered to be simply pinnate, with oblong and obtuse lobes in the former, and bipinnatifid with sublanceolate and acuminate lobes in the latter. He recognized only minor differences in the receptacles and vesicles.

In Herbarium Agardh, Lund, under *S. heteromorphum* are three sheets of Gunn's specimens from Tasmania, together with one other sheet. No plants have basal and upper parts actually attached, and J. Agardh's figure of basal parts is taken from one of two specimens on sheet 2627. The most suitable specimen to select as type, however, is No. 2626, where upper and lower parts are on one sheet.

Under *S. halitrichum* in Herbarium Agardh is only one specimen with basal and upper parts (No. 2635), which J. Agardh figured, and this is taken as the type. Areschoug's specimens comprise only upper parts and might belong to other species. The specimen shown in Plate 2, Figure 2, is identical with, but better developed than, the type of *S. halitrichum*.

There appear to be no real differences between *S. heteromorphum* and *S. halitrichum*. The form of the basal parts depends largely on the age of the plant and probably also on the habitat. Young basal parts are less divided and have rounded lobes; as the plant develops these become more branched and often bipinnate, with subacute apices. Considerable variation may be found on one specimen. The upper parts are similar in both cases, and also very similar to those in *S. sonderi* and *S. decipiens*.

S. australe Kützing (1861, Plate 43) was described from Herbarium Sonder (now in Melbourne National Herbarium), but this specimen could not be located. J. Agardh and Grunow doubtfully placed it under *S. halitrichum*, but as the figure shows only upper parts the name is best rejected as a nomen dubium.

Sargassum sonderi (J. Agardh) J. Agardh, Acta Univ. Lund. 9: 59 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 44, pl. 14, figs. 1-2 (1889); De Toni, Sylloge Algarum 3: 10 (1895)

Fig. 1d; Plate 3, Figs. 1 and 2

Cystophora sonderi J. Agardh, Sp. Gen. Ordines Algarum 1: 247 (1848); Harvey, Phycol. Aust. 5: pl. 243 (?) (no basal parts) (1860).

S. linearifolium sens. J. Agardh, Acta Univ. Lund. 9: 57 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 45, pl. 14, fig. 3 (1889); Grunow, Verh. zool.-bot. Ges. Wien 65: 333 (1915); Lucas, Seaweeds S. Aust. pt. 1: 63 (1936).

Not *S. flaccidum* Sonder in Lehmann, Pl. Preissianae 2: 164 (1846); Linnæa 25: 668 (1852); Linnæa 26: 511 (1853); which are largely *S. decipiens* (see below), except for the type of *S. sonderi*. Grunow's (1915, p. 332) description probably applies to *S. decipiens*.

Holdfast discoid, producing 1 to several stout, compressed stems to 10 cm (or more) high and 2-5 mm across, bare below except for prominent branch scars. Upper part of stem bearing several much divided main branches; axes of main branches angular but not flattened, bearing below pinnate linear laterals to 5-6 cm long, with segments 1-3 cm long and 2-4 (-5) mm broad. When mature, main branches developing further, bearing above crowded, much divided, filiform ramuli, with spherical, petiolate vesicles 1-2 (-3) mm diameter, with or without a slender apical mucro. Receptacles on upper ramuli, racemose, shortly lanceolate, terete, and smooth, 1-2 mm long and about $\frac{1}{2}$ mm broad (possibly larger when fully mature).

Type locality.—Western Australia (Preiss), probably near Fremantle.

Type.—Herbarium Agardh, Lund, No. 2043.

Distribution.—From south-west Western Australia (Fremantle?) along southern Australia to Wilson's Promontory, Vic., and in Tasmania. On Kangaroo I. plants with mature upper parts are only found in the drift, while those in rock pools on reefs consist only of the immature basal parts. It appears to be mainly a sublittoral species of rough to moderately exposed coasts.

J. Agardh's original description (1848, p. 247) mentions specimens of Preiss from Western Australia and of Areschoug from Port Phillip. The latter specimen is not in Herbarium Agardh, and the Preiss specimen (No. 2043) is selected as the type. It consists of three pieces, two of upper parts and one lower part of a plant, which agree well with J. Agardh's concept and that expressed above. However, under *S. sonderi* J. Agardh placed some specimens of *S. decipiens*.

S. sonderi is based on one of Sonder's specimens from Preiss which he had named *S. flaccidum*. All the Preiss material in Lund (excluding No. 2043) and in Melbourne National Herbarium, however, is *S. decipiens*, so that J. Agardh apparently had the only distinct specimen in this collection for his type of *S. sonderi*.

J. Agardh's concept and specimens of *S. linearifolium* are also *S. sonderi*, though mainly only the juvenile or basal state. This is further discussed under *S. linearifolium*.

The upper mature parts of *S. sonderi* are very similar to those of *S. decipiens*, and these species are virtually indistinguishable without the lower parts. The receptacles of *S. sonderi* may be smaller, and there appear to be many fewer cryptostomata (often none) than in *S. decipiens*, but these are variable factors.

Harvey's specimens (No. 15 Algae Aus. Exsicc.) and his figure (1863, Plate 243) show only the upper fertile parts, and cannot be identified with certainty. They might equally well be *S. decipiens*.

Grunow's description (1915, p. 332) seems to apply to *S. decipiens*; what his var. ? *immixta* from Rockingham, Qld., is must remain doubtful, but it is probably not a form of *S. sonderi* or *S. decipiens*.

Sargassum decipiens (R. Brown in Turner) J. Agardh, Acta Univ. Lund. 9: 63 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 51 (1889); De Toni, Sylloge Algarum 3: 15 (1895); Grunow, Verh. zool.-bot. Ges. Wien 66: 335 (1915). All these references apply in part only.

Fig. 1e, f; Plate 4, Fig. 1

Fucus decipiens R. Brown in Turner, Fuci Plant. Gen. Bot. 3: pl. 166a, c, d (not b) (1811).

S. muriculatum J. Agardh, Acta Univ. Lund. 9: 58 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 44, pl. 14, fig. 2 (1889); De Toni, Sylloge Algarum 3: 10 (1895); Grunow, Verh. zool.-bot. Ges. Wien 66: 333 (1915); Womersley, Trans. Roy. Soc. S. Aust. 72: 155 (1948).

S. sonderi Grunow, Verh. zool.-bot. Ges. Wien 66: 332 (probably) (1915).

The following references apply in part (see discussion below):

Cystoseira decipiens (R. Br.) C. Agardh, Sp. Algarum 1: 76 (1821); Syst. Algarum 290 (1824).

Cystophora decipiens (R. Br.) J. Agardh, Sp. Gen. Ordines Algarum 249 (1848).

Blossevillea decipiens (R. Br.) Kützing, Sp. Algarum 630 (1849).

Sargassum flaccidum Sonder, Pl. Preissianae 2: 164 (1846).

Cystophyllum flaccidum Sonder, Linnaea 25: 668 (1852); 26: 511 (1853).

Holdfast discoid, producing 1 to a few stout, strongly compressed stems, to several centimetres in length and 3-6 mm broad, with prominent branch scars. Upper part of stem with several main branches to 40 cm long, bearing simple or branched laterals on all sides below, and much divided above; lower laterals flattened to almost terete, 1-4 cm long and $\frac{1}{2}$ -2 mm broad, simple or once or twice divided, densely clustered and often with prominent cryptostomata; upper parts much divided into filiform, terete ramuli 1-3 cm long with numerous cryptostomata. Vesicles developing in adult plants in late winter, 1-2 (-3) mm in diameter, spherical to slightly ovoid, petiolate, and with a small mucro. Receptacles racemose, petiolate, ovate to lanceolate, smooth to somewhat verrucose.

Type locality.—Port Dalrymple (Tamar estuary), Tas.

Type.—British Museum (N.H.).

Distribution.—From Western Australia (Cottesloe?) around southern Australia to Peterborough, Vic., and in Tasmania. Common on reefs at an upper sublittoral level or in rock pools in South Australia, on rough and moderately exposed coasts.

The seasonal development of *S. decipiens* has been discussed previously (Womersley 1948, p. 155, as *S. muriculatum*). During summer, the plants are short (to 10-12 cm high) and appear stunted, the branch axes being very densely covered with terete or slightly compressed laterals. Further growth commences in March or early April, and during winter the fertile fronds develop, bearing vesicles and receptacles in late winter and reaching a height of 40 cm. In November or early December the fertile fronds disintegrate, leaving only the old branch axes, which may persist for a few months.

The type of *Fucus decipiens* is in the British Museum (N.H.). Brown placed two specimens, actually different species, on the one sheet. The one on the left Turner described and figured as adult *F. decipiens*, and as he clearly based his concept of the species on this specimen, it must be taken as the type. The right-hand specimen ("b" in Turner's plate) he regarded as a juvenile plant, with much broader basal leaves than the adult. J. Agardh, however, retained the name *decipiens* for the "juvenile" plant, referring the adult specimen to *S. turneri* (a variety of *S. trichophyllum*). Much confusion has arisen from this error, as J. Agardh has been followed by most subsequent authors. All J. Agardh's specimens under *S. decipiens* in Lund, and his descriptions of this species, are, or apply to, *S. varians* Sonder, while he redescribed the summer state of *S. decipiens* as *S. muriculatum*.

Sargassum howeanum Lucas, Proc. Linn. Soc. N.S.W. 60: 207, pl. 6, fig. 2 (1935)

Holdfast discoid. Stem short (about 1 cm long), terete and nodulose, producing 1 to several main branches up to 40 cm long. No distinct basal laterals developed. Main branches with angular axes, much divided into crowded, filiform, pinnate ramuli on all sides, bearing spherical, petiolate, mutic vesicles 1-3 (-4) mm in diameter. Receptacles "fusiform, 2-3 mm long, stipitate, smooth, simple or branched" (after Lucas).

Type locality.—Lord Howe I.

Type.—Lucas Herbarium, C.S.I.R.O., Canberra. Isotype in Adelaide University Herbarium.

Distribution.—Lord Howe I., where it is common on the lagoon floor (Lucas).

Lucas compared this species to *S. sonderi*; it is, however, closer to *S. decipiens*, differing from the latter in having a terete stem, in the apparent absence of any distinct lower laterals, and in the mutic vesicles.

Sargassum varians Sonder, Bot. Z. 3: 51 (1845); Pl. Preissianae 2: 163 (1846); Linnaea 25: 671 (1852); 26: 512 (1853); J. Agardh, Sp. Gen. Ordines Algarum 1: 287 (1848); Acta Univ. Lund. 9: 64 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 49, pl. 16, figs. 1-8 (1889); De Toni, Sylloge Algarum 3: 14 (1895); Grunow, Verh. zool.-bot. Ges. Wien 65: 335 (1915); Kützing, Sp. Algarum 617 (1849); Tab. Phycol. 11: pl. 36 (1861); Lucas, Seaweeds S. Aust. pt. 1: 64 (1936)

Fig. 1*g, h*; Plate 4, Fig. 2

S. decipiens sens. J. Agardh, Acta Univ. Lund. 9: 63 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 51, pl. 15, fig. 3 (1889); Grunow, Verh. zool.-bot. Ges. Wien 65: 335 (1915).

Holdfast discoid, with (usually) a single compressed stem to 6 cm high and 2-4 mm broad, with prominent lateral, alternate branch scars. Upper part of stem with 1 to several main branches up to 40 cm in length. Axes of main branches strongly compressed below, producing simple linear

laterals which soon develop into reflexed pinnate laterals, arising from near the edge of the branch axis; pinnate laterals 3-8 cm long, segments 2-4 mm broad, with rounded or acute apices and usually with cryptostomata. Lower laterals changing suddenly or gradually to the upper, filiform, pinnate ramuli, bearing petiolate, spherical vesicles 2-6 mm in diameter, mutic or with a small and slender to longer and compressed mucro (to 2 cm long and 2 mm broad). Receptacles crowded, each in the axil of a simple or furcate ramulus, ovate to lanceolate, smooth, terete, from sessile to shortly petiolate, 1-3 mm long and $\frac{1}{2}$ -1 mm broad. Dioecious, the female receptacles being somewhat shorter and in denser clusters than the male.

Type locality.—Western Australia (Preiss) — probably near Fremantle.

Type.—Melbourne National Herbarium (see Plate 4, Fig. 2).

Distribution.—From Cottesloe, W.A., to Wilson's Promontory, Vic., and in Tasmania (north coast and probably elsewhere). Often common in the drift from deep water on rough to moderately exposed coasts, occasionally found in rock pools.

The distinctive features of *S. varians* are the large vesicles (found also in *S. verruculosum*), the flat lower branch axes producing retrofract pinnate laterals, and the compressed stem. The latter feature in particular distinguishes it from *S. verruculosum*.

J. Agardh's concept of *S. decipiens* applies to *S. varians* Sonder, as discussed under the former species.

In a few specimens from Yallingup and Point D'Entrecasteaux, W.A., the main branches of young plants were unusually well developed, reaching 20 cm in length yet with simple linear laterals to 5 cm long and 2-3 mm wide. This gave the main branches a simply pinnate appearance; later, however, branching occurred, and vesicles arose in the axils of the laterals.

Sargassum verruculosum (Mertens) C. Agardh, Sp. Algarum 1: 26 (1821); Syst. Algarum 302 (1824); J. Agardh, Acta Univ. Lund. 9: 61 (1872); K. Svenska VetenskAkad. Handl. 23 (3): 53, pl. 18, figs. 1-6 (1889); De Toni, Sylloge Algarum 3: 16 (1895); Grunow, Verh. zool.-bot. Ges. Wien 65: 336 (1915); Kützing, Sp. Algarum 617 (1849); Tab. Phycol. 11: pl. 34, fig. 2 (1861); Lucas, Seaweeds S. Aust. pt. 1: 64 (1936); May, Proc. Linn. Soc. N.S.W. 64: 202 (1939)

Figs. 1*i*, *j*; Plate 5, Figs. 1 and 2

Fucus verruculosus Mertens, Mém. Mus. Hist. Nat. Paris 5: 186, pl. 15 (1819).

Cystophora verruculosa (Mert.) J. Agardh, Sp. Gen. Ordines Algarum 1: 248 (1848); Sonder, Linnaea 26: 511 (1853).

Sargassum raoulii Hooker and Harvey, Lond. J. Bot. 4: 523 (1845); Harvey in Hooker, Bot. Antarct. Voyage 2 (2): 212 (1855); Phycol. Aust. 2: pl. 110 (1859); in Hooker, Bot. Antarct. Voyage 3 (2): 282 (1860); Kützing, Sp. Algarum 616 (1849).

Sargassum capillaceum Hooker and Harvey, Lond. J. Bot. 6: 414 (1847); Kützing, Sp. Algarum 617 (1849).

Sargassum adenophyllum Harvey in Hooker, Bot. Antarct. Voyage 2 (2): 212 (1855).

Sargassum trichophyllum J. Agardh, K. Svenska VetenskAkad. Handl. 23 (3): 52, pl. 17, figs. 10-12 (1889); De Toni, Sylloge Algarum 3: 16 (1895); Grunow, Verh. zool.-bot. Ges. Wien 65: 336 (1915); Lucas, Seaweeds S. Aust. pt. 1: 64 (1936).

Holdfast discoid. Stem terete, but with prominent branch scars, producing from near the apex 1 to several long, usually slender and much divided main branches, primarily distichous but sometimes tending to appear almost radial. Branch axes compressed below, with irregularly pinnate laterals up to 4-5 cm long, and segments 1-3 mm broad; cryptostomata usually present; bases of laterals usually retrofract. Lower laterals frequently lost in old plants, leaving a bare flexuous axis to the main branches. Upper ramuli filiform, dense, from rigidly dichotomous to laxly pinnate-dichotomous in older plants, with or without prominent cryptostomata, bearing numerous large, prominent vesicles of varying sizes up to 1 cm diameter, mutic or with a slender, usually short mucro (but up to 1 cm long, bearing cryptostomata when long). Receptacles borne on upper ramuli, 3-5 mm long and about 1 mm broad, lanceolate and slightly torulose, subsessile to petiolate, occasionally branched or with short sterile projections from the receptacle.

Type locality.—Western Australia.

Type.—Paris Museum.

Distribution.—From Western Australia (probably the south-west) around southern Australia to Maroubra Bay, N.S.W., and around Tasmania; New Zealand. Mainly on rough coasts but extending to relatively calm habitats, where the largest plants occur. Mature plants are usually found in drift from the sublittoral, while forms on reefs or in deeper pools comprise the juvenile or basal parts only.

S. verruculosum is a very variable species, distinguished by the terete (though with prominent branch scars) stem, the very large abundant vesicles, and the flattened lower axes of the main branches, together with the lower retrofract laterals and flexuose appearance of the old branch axes.

The general form of the plant, its size, abundance and prominence of cryptostomata, and abundance of vesicles are all variable factors, mainly due to habitat and age. Plants from reef pools are generally small and relatively stout, with prominent cryptostomata, often without vesicles, and may consist only of the branches and lower laterals (Plate 5, Fig. 1). Deeper-water plants (and ones during winter) are larger, more branched with finer ramuli, with few cryptostomata and large and abundant vesicles. These latter plants correspond to Hooker and Harvey's *S. capillaceum*.

S. trichophyllum has usually been separated from *S. verruculosum*, but the distinction cannot be maintained. J. Agardh recognized two varieties of *S. trichophyllum* — var. *turneri*, which was based on Turner's

S. decipiens, though his figures may be of *S. verruculosum*; and var. *corymbosum*, the type of which (Herb. Agardh No. 2767) is certainly only a form of *S. verruculosum*.

SPECIES EXCLUDED FROM PHYLLOTRICHIA

Sargassum linearifolium (Turner) C. Agardh, Sp. Algarum 1: 24 (1821); Syst. Algarum 303 (1824); Kützing, Sp. Algarum 612 (1849); Tab. Phycol. 11: pl. 18 (1861)

Fucus linearifolius Turner, Fuci Plant. Gen. Bot. 2: 106 pl. 111 (1809).

This species has generally been included in *Phyllotrichia*. Turner gave the locality of the type specimen (in Kew Herbarium) as "western coast of New Holland", but on the type sheet is "South Sea. Menzies 1788". The type sheet consists of three specimens, the centre one being figured by Turner. They represent only the upper branches of plants, without basal parts. The main branches bear 2 rows of tufted leaves and receptacles; the leaves are linear, up to 4 cm long, and only $\frac{1}{2}$ -1 mm wide, with a prominent midrib and scattered, sparse cryptostomata. The receptacles are densely clustered in the leaf axils, simple or furcate (usually once furcate, sometimes twice), terete, and smooth except for the swollen conceptacles. Vesicles are absent.

Plants which are almost certainly identical with the type material occur on parts of the South Australian coast. These show distinct basal leaves, broader (to 4-5 mm) and longer than the upper ones, and often branched. During summer (December to March) only the basal parts are present, with leaves normally branched two to four times. Preliminary observations indicate that the basal leaves are lost before the upper fertile fronds (which have only simple leaves) develop during winter. The receptacles in fully developed plants are densely clustered and up to four or five times dichotomous, while vesicles may develop on old fronds. The two rows of "leaf tufts" in the type are more marked than in most specimens.

Although the branched basal leaves in the young or summer state of *S. linearifolium* point to affinity with *Phyllotrichia*, the always simple and flattened upper leaves, the branched receptacles, and the general aspect of the plant are distinctly those of *Arthrophyucus*. While further study is needed, it seems best to class *S. linearifolium* as a species of *Arthrophyucus* which is unusual in having branched basal leaves during summer.

Almost every specimen J. Agardh referred to *S. linearifolium* (in Herbarium Agardh) belongs to *S. sonderi*, being mostly the basal parts of this species. The only true *S. linearifolium* in Herbarium Agardh is a fragment of Menzies' original collection. J. Agardh's figures (1889, Plate 14, Figs. 3-7) also clearly refer to *S. sonderi*. C. Agardh's descriptions (1821, p. 24; 1824, p. 303) probably apply to the type; J. Agardh's (1848, p. 296) where he placed it in *Arthrophyucus* does in part, but his

1872 (p. 57) and 1889 (p. 45) descriptions are incorrect. Kützing's description and figures are probably based on Turner's and are reliable, but May's (1939, p. 202) description is incorrect.

S. linearifolium probably occurs generally along southern Australia, from the south-west to New South Wales. It is common in reef pools on parts of the South Australian coast.

ACKNOWLEDGMENTS

Acknowledgment is made to the directors of the Herbarium, Royal Botanic Gardens, Kew; the British Museum (Natural History), London; the Botanical Museum, Lund; and the Laboratoire de Cryptogamie, Muséum d'Histoire Naturelle, Paris, for facilities and permission to examine algal types, and also to the directors of the various Australian herbaria (listed in the Introduction) for the loan of specimens of *Sargassum*.

REFERENCES

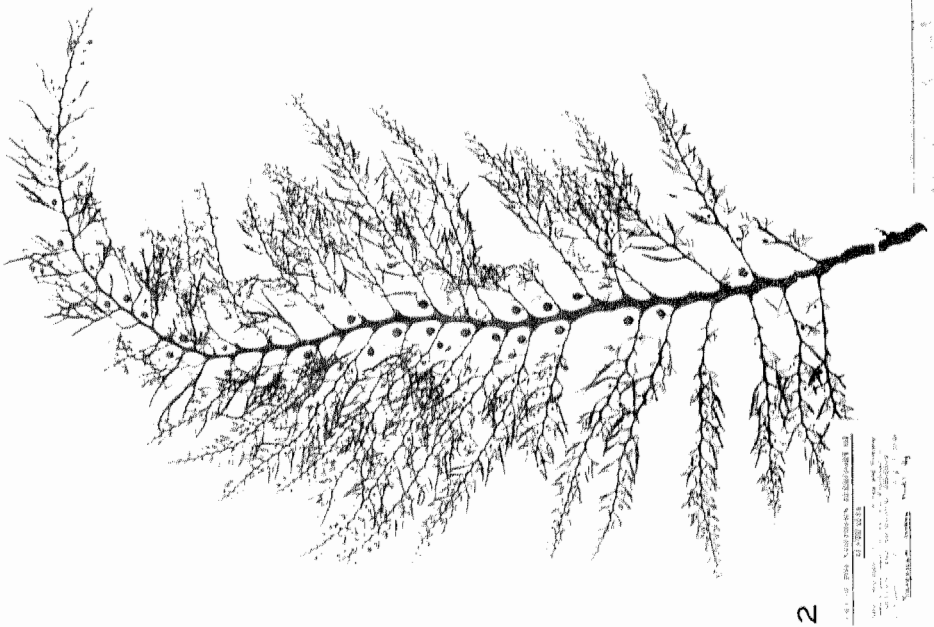
- AGARDII, C. A. (1821).—"Species Algarum." Vol. 1. (Lund.)
AGARDII, C. A. (1824).—"Systema Algarum." (Lund.)
AGARDII, J. G. (1848).—"Species Genera et Ordines Algarum." Vol. 1. (Lund.)
AGARDII, J. G. (1872).—Till algernes systematik. Nya bidrag. III. *Acta Univ. Lund.* 9: 51-71.
AGARDII, J. G. (1889).—Species Sargassorum australiae. *K. Svenska VetenskAkad. Handl.* 23 (3): 1-133, pl. 1-31.
DE TONI, G. B. (1895).—"Sylloge Algarum." Vol. 3, Fucoidae.
GRUNOW, A. (1915).—Additamenta ad cognitionem Sargassorum. *Verh. zool.-bot. Ges. Wien* 65: 329-448.
GRUNOW, A. (1916).—Additamenta ad cognitionem Sargassorum. *Verh. zool.-bot. Ges. Wien* 66: 1-48, 136-85.
HARVEY, W. H. (1855).—"Algae" in J. D. Hooker: "The Botany of the Antarctic Voyage. Vol. 2. Flora Novae Zelandiae." Part 2: 211-66.
HARVEY, W. H. (1859).—"Phycologia Australica." 2: pl. 61-120.
HARVEY, W. H. (1860a).—"Phycologia Australica." 3: pl. 121-80.
HARVEY, W. H. (1860b).—"Algae" in J. D. Hooker: "The Botany of the Antarctic Voyage." Vol. III. Flora Tasmaniae, Pt. 2, 282-343.
HARVEY, W. H. (1863).—"Phycologia Australica." 5: pl. 241-300.
HOOKER, J. D., and HARVEY, W. H. (1845).—Algae Novae Zelandiae. *Lond. J. Bot.* 4: 521-51.
HOOKER, J. D., and HARVEY, W. H. (1847).—Algae Tasmaniae. *Lond. J. Bot.* 6: 397-417.
KUTZING, F. T. (1843).—"Phycologia Generalis." (Leipzig.)
KUTZING, F. T. (1849).—"Species Algarum." (Leipzig.)
KUTZING, F. T. (1860).—"Tabulae Phycologicae." Vol. 10.
KUTZING, F. T. (1861).—"Tabulae Phycologicae." Vol. 11.
LUCAS, A. H. S. (1935).—The marine algae of Lord Howe Island. *Proc. Linn. Soc. N.S.W.* 60: 194-232.
LUCAS, A. H. S. (1936).—"The Seaweeds of South Australia." Part 1. (Adelaide.)
MAY, VALERIE (1939).—A key to the marine algae of New South Wales. Part 2. Melanophyceae (Phacophyceae). *Proc. Linn. Soc. N.S.W.* 64: 191-215.
MAY, VALERIE (1953).—Some marine algae from New Caledonia collected by Mrs. R. Catala. *Contrib. N.S.W. Nat. Herb.* 2: 38-66.

- MERTENS, J. C. (1819).—Mémoire sur plusieurs espèces de *Fucus*, nouvelles ou peu connues, observées dans la collection du Muséum. *Mém. Mus. Hist. Nat. Paris.* 5: 172-90, pl. 13-15.
- REINBOLD, T. (1913).—"Sargassum" in W. v. Bosse: Liste des Algues du Siboga. I. Myxophyceae, Chlorophyceae, Phaeophyceae. *Monogr. Siboga Exped.* 59a: 150-74.
- SETCHELL, W. A. (1931).—Hong Kong seaweeds. II. *Hongkong Nat.* 2: 237-53.
- SETCHELL, W. A. (1933).—Hong Kong seaweeds. III. Sargassaceae. *Hongkong Nat. Suppl. No. 2:* 33-49, pl. 3-20.
- SETCHELL, W. A. (1935).—Hong Kong seaweeds. IV. Sargassaceae. *Hongkong Nat. Suppl. No. 4:* 1-24, pl. 1-17.
- SETCHELL, W. A. (1936).—Hong Kong seaweeds. V. Sargassaceae. *Hongkong Nat. Suppl. No. 5:* 1-20, pl. 1-8.
- SONDER, O. W. (1845).—Nova algarum genera et species quas in itinere ad oras occidentales Novae Hollandiae collegit L. Preiss. *Bot. Z.* 3: 49-57.
- SONDER, O. W. (1846).—"Algae" in Lehmann, "Plantae Preissianae". 2: 148-95.
- SONDER, O. W. (1852).—Plantae Muellerianae. Algae. *Linnaea* 25: 657-709.
- SONDER, O. W. (1853).—Algae annis 1852 et 1853 collectae. *Linnaea* 26: 506-28.
- SONDER, O. W. (1871).—"Die Algen des tropischen Australiens."
- TURNER, D. (1808-1819).—"Fuci Sive Plantarum Fucorum Generi a Botanicis Ascriptarum Icones Descriptiones et Historia." (London.) 1808, 1: pl. 1-71. 1809, 2: pl. 72-134. 1811, 3: pl. 135-96. 1819, 4: pl. 197-258.
- WOMERSLEY, H. B. S. (1948).—The marine algae of Kangaroo Island. II. The Pennington Bay region. *Trans. Roy. Soc. S. Aust.* 72: 143-66, pl. 10-15.

WOMERSLEY

PLATE 1

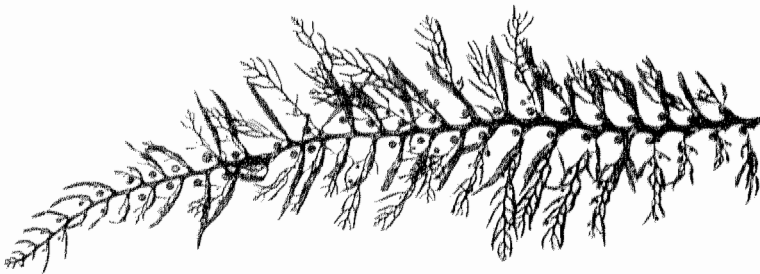
AUSTRALIAN SPECIES OF PHYLLOTRICHIA



2

U.S. DEPT. OF AGRICULTURE
 BUREAU OF PLANT INDUSTRY
 WASHINGTON, D. C.
 1955

Fig. 2.—*S. peronii*: a mature fertile branch.



1

U.S. DEPT. OF AGRICULTURE
 BUREAU OF PLANT INDUSTRY
 WASHINGTON, D. C.
 1955

Fig. 1.—*S. peronii*: a young plant.

AUSTRALIAN SPECIES OF PHYLLOTRICHIA



Fig. 2.—*S. heteromorphum*: a mature plant on the left, with a young rock pool form on the right.

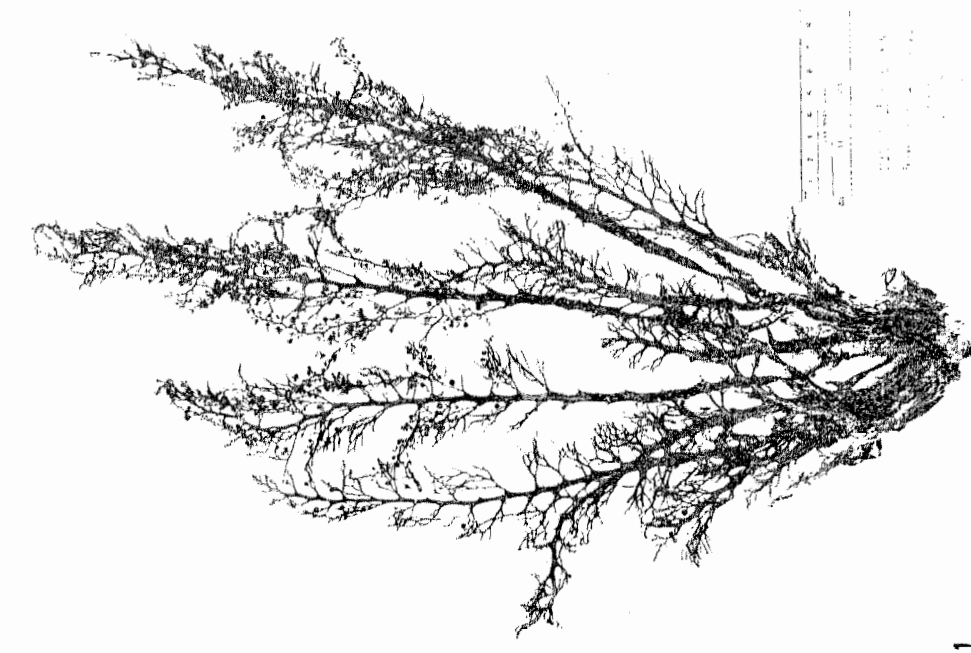


Fig. 1.—*S. decurrens*: a mature fertile plant.

WOMERSLEY

PLATE 3

AUSTRALIAN SPECIES OF PHYLLOTRICHIA



Fig. 2.—*S. sonderi*: a mature plant.

2

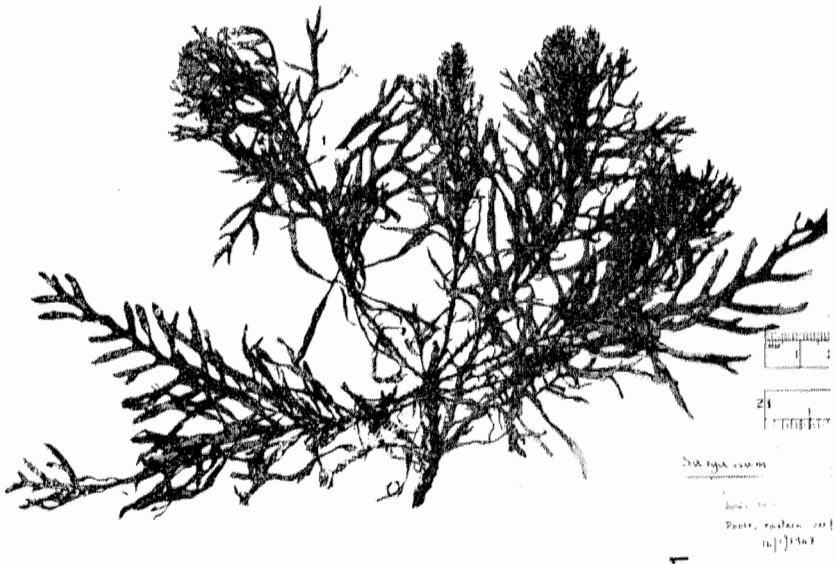


Fig. 1.—*S. sonderi*: a juvenile plant with well-developed main branches only.

1

AUSTRALIAN SPECIES OF PHYLLOTRICHIA



Fig. 2.—*S. varians*: the type sheet of Sonder.



Fig. 1.—*S. decipiens*: a mature, fertile, vesiculate plant.

WOMERSLEY

PLATE 5

AUSTRALIAN SPECIES OF PHYLLOTRICHIA

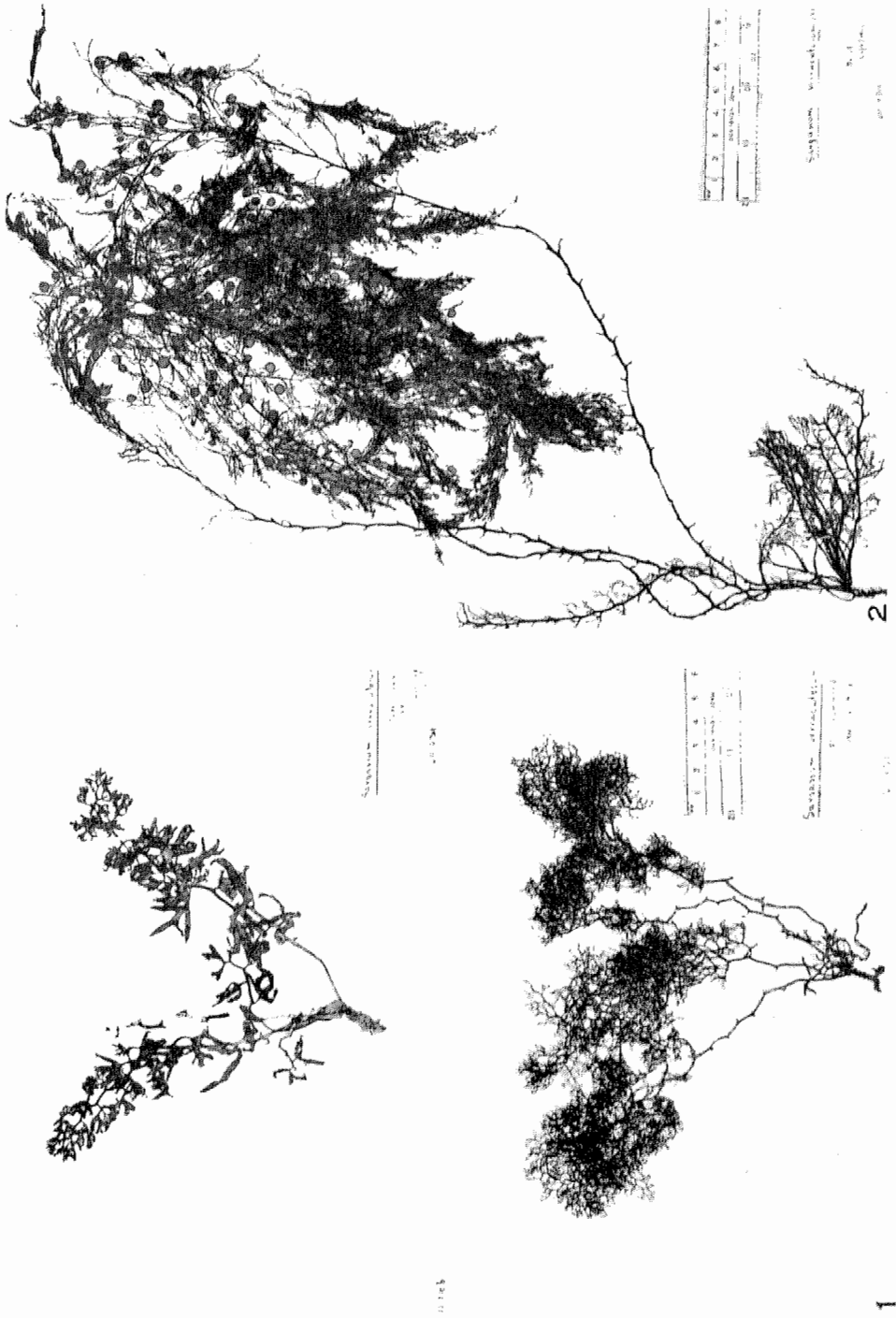


Fig. 1.—*S. verruculosum*: two juvenile forms with lower parts only.

Fig. 2.—*S. verruculosum*: a mature, vesiculate plant.