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STYLONISCIDAE (ISOPODA, ONISCOIDEA) FROM TASMANIA AND NEW ZEALAND

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(With five plates)

ABSTRACT

An earlier discussion of genus *Styloniscus* is revised. Tasmanian forms previously identified as *St. thomsoni*, *St. phormianus* and *Notoniscus australis* are recognized as new species and information on the above-named New Zealand species is given. One other new species of *Styloniscus* from Tasmania is described. Variation among New Zealand examples of *St. otakensis* is discussed and a typical form of this species is determined. The occurrence of *St. nichollsi* in caves is recorded. Supplementary type specimens are selected for *Notoniscus tasmanicus*.

MATERIAL AND METHODS

Where no acknowledgement to a collector is given in the text, the material described was collected by the author. Specimens have been preserved in 80% alcohol. Objects examined microscopically have been mounted in 'Euparal' mountant.

Length of an animal is measured from anterior border of cephalon to posterior border of telson; breadth is measured across 4th segment of pereion.

Descriptions of new species

The descriptions of certain structures of *Styloniscus maculosus*, as given by Green (1961, pp. 277-80), apply equally well to the corresponding parts of the three new species of *Styloniscus* described in the present paper. Such accounts have not been repeated here. The structures of *St. sylvestris*, *St. hirsutus* and *St. planus*, n.sp., for which the corresponding descriptions of *St. maculosus* apply, are as follows:

- lines and lobes of cephalon,
- left and right mandibles,
- 1st and 2nd maxillae,
- 1st-3rd pereopods of male and female (except that hyaline scales absent from 3rd pereopod of male in *St. sylvestris*),
- male organ,
- protopodite and muscles of 1st pleopod of male,
- exopodite of 2nd pleopod of male,
- 1st pleopod of female.

GENUS *STYLONISCUS* Dana

Styloniscus Dana, 1852, p. 302.

For synonymy and generic diagnosis, see Vandel (1952, p. 14), followed by Green (1961, p. 267).

Revision of previous notes

In an earlier study of *Styloniscus* (Green, 1961, p. 267) two new Tasmanian species, *St. maculosus* and *St.*

squarrosus, were distinguished from established species by means of two keys. These did not take into account further work on *Styloniscus* by Barnard (1958, p. 71) and Andersson (1960, p. 544).

In the first key (p. 270), the name '*mauritiensis*', standing for *St. mauritiensis* (Barnard, 1936), in fact represented *St. vandeli* Barnard, 1958, while *St. mauritiensis* and *St. albidus* Vandel, 1952 (the latter raised to specific rank by Barnard), were omitted from the key. *St. maculosus* and *St. squarrosus* are distinct from *St. mauritiensis* and *St. albidus* because of differences in the arrangement of the ocelli.

With regard to the second key (p. 271), some of the characters obtained from descriptions by Verhoeff (1939, 1951) have been discredited by Andersson. Of the six species erected by Verhoeff (1939), only *St. pallidus* and *St. simrothi* remain well established. *St. nordenskiöldi* and *St. iheringi* have been suppressed in synonymy by Andersson, a procedure supported by Vandel (1963, p. 67). The position of *St. araucanicus* and *St. schwabei* is less clear. Andersson believed these two forms to be conspecific, but not identifiable with *St. magellanicus* Dana, 1853, while Vandel (1963, p. 67) considered that they may be synonymous with *St. magellanicus*. Because of their uncertain identity, *St. araucanicus* and *St. schwabei* have been omitted from further discussion in the present paper. The two Tasmanian species established in 1961 remain distinct from *St. pallidus* and *St. simrothi*, on the form of the 7th pereopod and 1st pleopod of the male in the case of *St. maculosus*, and on the nature of the dorsal surface of the body in the case of *St. squarrosus*.

Finally it should be noted that *St. australis* (Dollfus, 1890), which was doubtfully included in *Styloniscus*, has been redescribed by Barnard (1965, p. 203) and placed definitely in this genus.

New species

Also in the previous study of *Styloniscus*, examples of two other Tasmanian forms were identified (on comparison with published descriptions) as belonging to *St. thomsoni* (Chilton, 1885) and *St. phormianus* (Chilton, 1901), both species established on material from New Zealand. Since then it has been possible to collect samples of these latter two species in New Zealand and to compare them directly with Tasmanian material. As a result the Tasmanian forms have been separated as new species; *St. thomsoni* Green becomes *St. sylvestris*, n.sp., and *St. phormianus* Green becomes *St. hirsutus*, n.sp. A third new species, *St. planus*, n.sp., has been found in Tasmania.

TABLE 1. DIFFERENCES BETWEEN SPECIES OF *STYLONISCUS*

+ signifies presence of a character,
— signifies its absence.

Species	Long setae on cephalon and pereion	Setae on flagelliform process of endopodite of 1st ♂ pleopod	Incurved sternal border on ischion of 7th ♂ pereopod	Setose tubercle on propodos of 7th ♂ pereopod
<i>phormianus</i>	+	—	—	—
<i>hirsutus</i>	+	—	—	—
<i>thomsoni</i>	—	+	—	+
<i>sylvestris</i>	—	+	—	—
<i>maculosus</i>	—	+	+	—
<i>magellanicus</i>	—	—	+	+
<i>planus</i>	—	—	+	+
<i>pallidus</i>	—	—	—	+
<i>simrothi</i>	—	—	—	+
<i>nichollsi</i>	—	—	—	+

St. sylvestris, *St. hirsutus* and *St. planus* share the following characters:

dorsal surface of cephalon and pereion smooth;
ocelli of eye separated and arranged in a triangle.

Thus they are distinct from the established species listed below, each of which possesses one, or both, of the contrasting characters:

dorsal surface of cephalon and pereion tuberculate, granulate or strongly spinescent;

ocelli of eye contiguous and/or arranged in a line.

St. australis (Dollfus, 1890); *St. otakensis* (Chilton, 1901); *St. verrucosus* (Budde-Lund, 1906); *St. spinosus* (Patience, 1907); *St. tabulae*, *St. hottentoti*, *St. natalensis*, *St. ventosus*, *St. capensis*, *St. moruliceps*, *St. austro-africanus*, *St. georgensis*, *St. horae*, *St. cestus*, *St. swelledami*, *St. riversdalei*, all (Barnard, 1932); *St. mauritiensis* (Barnard, 1936); *St. albidus* Vandel, 1952; *St. vandeli* Barnard, 1958; *St. squarrosus* Green, 1961; *St. murrayi*, *St. monocellatus*, both (Dollfus, 1890); *St. kermadecensis* (Chilton, 1911); *St. commensalis* (Chilton, 1910).

The position of *St. jeanneli* (Paulian de Félice, 1940) in this grouping is uncertain, as the dorsal surface in this species is uneven, sometimes covered with small tubercles. However non-tuberculate specimens of *St. jeanneli* would still be distinct from the three new Tasmanian species on the shape of the endopodite of the 2nd male pleopod.

This leaves the following species to be considered: *St. magellanicus* Dana, 1853; *St. thomsoni* (Chilton, 1885); *St. phormianus* (Chilton, 1901); *St. pallidus*, *St. simrothi*, both (Verhoeff, 1939); *St. nichollsi* Vandel, 1952; *St. maculosus* Green, 1961. Differences between these and the new species are shown in Table 1. Further discussion of taxonomic differences follows the description of each new species.

Key to species of *Styloniscus* represented in Tasmania

1. Dorsal surface of cephalon and pereion with transverse rows of conspicuous, rounded tubercles — *squarrosus*. Dorsal surface of cephalon and pereion smooth, or slightly uneven, but not conspicuously tuberculate — 2.
2. Cephalon and pereion with numerous long setae which project laterally beyond outline of body — *hirsutus*. Cephalon and pereion with few or no long setae — 3.
3. Second article of endopodite of 2nd male pleopod with inner side curved in abruptly at about one-quarter of its length from apex, so that its apical part is asymmetrical, continuous with outer half of endopodite — *nichollsi*. Second article of endopodite of 2nd male pleopod with apical part almost symmetrically aligned with remainder of endopodite — 4.
4. Propodos of 7th male pereopod with a setose tubercle on posterior surface; endopodite of 1st male pleopod without setae — *planus*. Propodos of 7th male pereopod without such a tubercle; endopodite of 1st male pleopod bearing setae — 5.
5. Ischion of 7th male pereopod with sternal border straight; flagelliform process of endopodite of 1st male pleopod with setae restricted to a tuft at apex — *sylvestris*. Ischion of 7th male pereopod with sternal border incurved; flagelliform process of endopodite of 1st male pleopod with distal quarter setose and 3 setose pencils at apex — *maculosus*.

STYLONISCUS THOMSONI (Chilton) (Figs 1-4)

Philougria thomsoni Chilton, 1885, p. 576.

Philygria thomsoni Chilton, 1886, p. 159.

Trichoniscus thomsoni Chilton, 1901, p. 118.

Trichoniscus (Megatriconiscus) thomsoni Jackson, 1938, p. 176.

Patagoniscus thomsoni Verhoeff, 1939, p. 304.

Styloniscus thomsoni Vandel, 1952, p. 36.

Seventh pereopod. One character shown by the author's specimens of *St. thomsoni* is not mentioned in previous descriptions. The ischion of the 7th pereopod in the male has its sternal border straight, as in the female, but there is sexual differentiation of the propodos. A rounded, setose tubercle is present on the posterior surface of the propodos in the male; no such tubercle occurs in the female.

Habitat

Specimens examined in detail were collected from debris in mixed podocarp-hardwood forest (at sea level) at Papatowai, South Otago, N.Z., on 10.VIII.1966; 6 males and 8 females.

Other specimens were found in southern beech forest near Lake Monowai, Fiordland, and in predominantly beech forest near Tuatapere, Southland. All localities are in the South Island of New Zealand.

STYLONISCUS SYLVESTRIS, n.sp.
(Figs 5-9)

Styloniscus thomsoni Green, 1961, p. 271.

— *non* (Chilton, 1885).

Location of type specimens

Holotype male and allotype female in the Australian Museum, Sydney.

Paratype male and female in the Western Australian Museum, Perth.

Paratype male and female in the Tasmanian Museum, Hobart.

The description given by Green (1961, p. 271) is too brief to serve for a new species. A more detailed account is presented here.

Male

Size. Largest specimen: length 6.0 mm., breadth 2.7 mm.

Colour. Background coloration of live animal is variegated; predominant colours are light brown with dark brown, or orange-brown with dark brown, or reddish with dark areas almost black. Unpigmented patches present, but not especially conspicuous.

Cephalon. Surface of vertex smooth; scale-setae like those on pereion. Eyes (fig. 5) each composed of 3 ocelli, separated from one another and arranged in a triangle. Distances between ocelli not quite equal; posterior two ocelli closer to each other than either is to anterior ocellus. Lower two ocelli set on a slight swelling at side of cephalon.

Second antenna. Length of peduncle 1.85 mm., length of flagellum 0.68 mm. Fifth article of peduncle has tubercles arranged in two rows, 3 in dorsal and 2 or 3 in ventral row; each tubercle bears a group of long scales. Flagellum has 6 articles. (In smaller specimens flagellum has 5 or 4 articles).

Maxilliped. Endopodite (excluding ischion, which is distinct) divided on inner side into 4 lobes. A faint, oblique suture line extends across ventral surface from notch between 2nd and 3rd lobes. In other respects, maxilliped is as described for *St. maculosus* (Green, 1961, p. 278).

Pereion. Posterior angles of 1st and 2nd epimera bluntly rounded, those of 3rd epimera right-angled and rounded. Fourth to 7th epimera produced backwards and progressively more acute. Dorsal surface of pereion smooth. Scale-setae each with scale part long and narrow, spiniform. Tergites covered with pointed, simple scales.

Seventh pereopod. Ischion (fig. 6) has sternal border straight; lower part of ischion not prolonged distally

below meros. An acute, triangular lobe projects from upper surface of ischion. No setose tubercle on propodos.

Pleon. Abruptly narrower than pereion. Third to 5th pleura small, acute. Telson trapezoidal with posterior border straight; two scale-setae, each with scale part broad, subtriangular and sharply pointed at apex, project beyond posterior border. Dorsal surface of pleon smooth.

First pleopod (fig. 7). Exopodite subtriangular with outer border not indented. Endopodite subcylindrical, tapering, with a terminal flagelliform process. At apex of latter (fig. 8) is a short, dense tuft of setae, flanked on either side by a small, pointed extension of process itself. Combined outline of these apical structures is bluntly rounded. No other setae on flagelliform process, apart from apical tuft.

Second pleopod (fig. 9). Length of articles of endopodite: 1st 0.28 mm., 2nd 1.16 mm. Second article styliform, tapering to an acute apical part, scarcely bent outwards. An oblique groove of varying width, with strongly chitinized walls, extends down dorsal surface of article. In middle part of its length, outer wall of groove bears stiff setae. On ventral surface, at two-fifths of length of article from apex, an oblique ridge of chitin projects outwards. Beyond this ridge article tapers more markedly, then widens again slightly before terminating in a sharp point. Between oblique ridge and apex, article is ornamented with longitudinal ridges of chitin.

Fifth pleopod. Groove for endopodite of 2nd pleopod extends through most of length of exopodite; region occupied by groove more darkly pigmented than remainder.

Uropod. Length of articles: protopodite 0.43 mm., exopodite 0.93 mm., endopodite 0.55 mm.

Female

Size. Largest specimen: length 6.7 mm., breadth 3.1 mm.

Female differs from male in the following structures:

Second antenna. Flagellum may have 7 articles.

First and 2nd pereopods, 1st pleopod. (As described for *St. maculosus*).

Seventh pereopod. No prominent lobe on ischion. (An earlier claim (Green, 1961, p. 271) that 7th pereopod is without sexual differentiation is corrected).

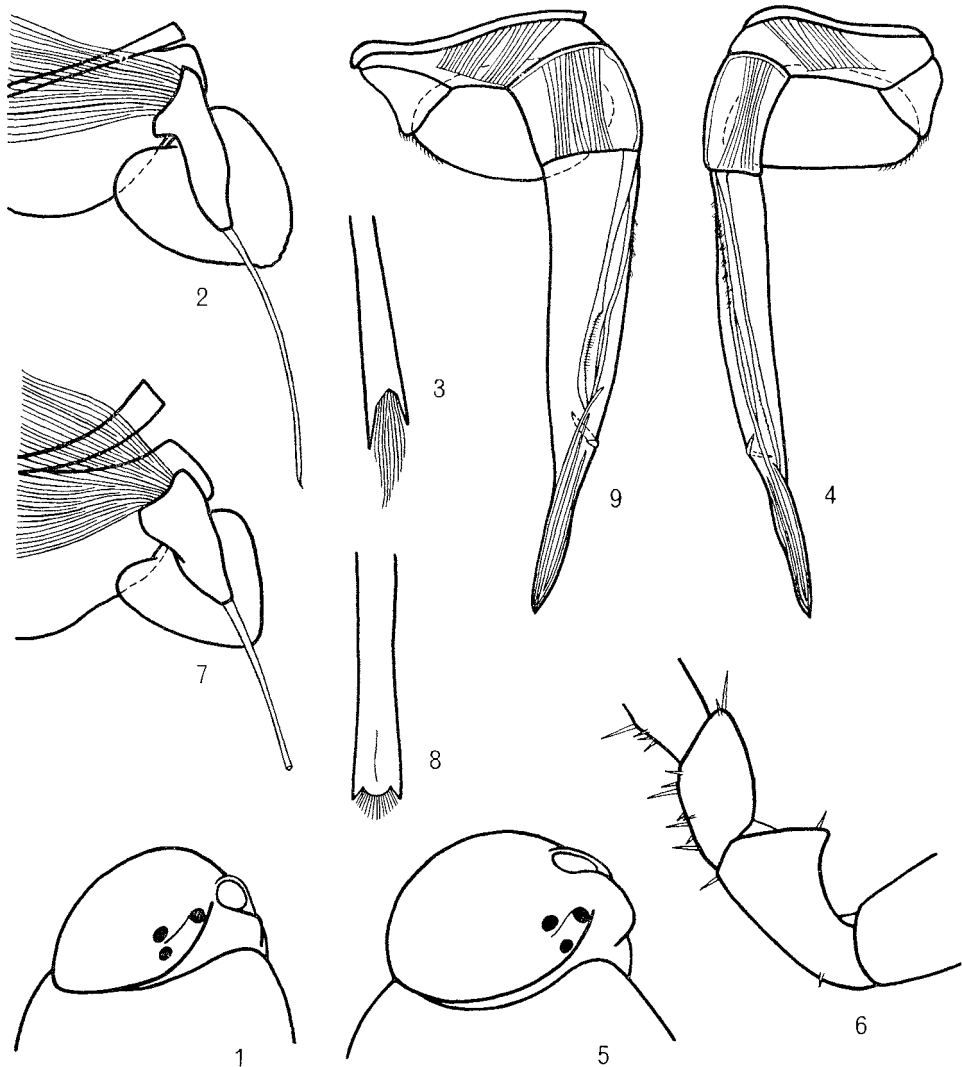
Second pleopod. Endopodite conical and elongated, its distal two-thirds bearing comb-setae. Length of exopodite approximately two-thirds that of endopodite; length (along inner border): exopodite 0.44 mm., endopodite 0.63 mm.

Fifth pleopod. Exopodite without groove or its associated band of darker pigment.

Habitat

Type locality. Description is based on specimens found in debris and under decaying wood in forest, dominated by eucalypts but with the inclusion of some myrtle (southern beech), on Mt Wellington, Tasmania.

Type specimens have been selected from a collection of 26 males and 34 females, obtained on 26.VI.1957, from debris beside Shoobridge Track (altitude 580 m.). Paratype slides have been prepared from this and the



Figs 1-4.—*Styloniscus thomsoni* (Chilton).

Fig. 1.—Right side of cephalon, dorso-lateral view, showing three ocelli and antennary tubercle (antennae removed).

Fig. 2.—Distal part of left 1st pleopod of male, dorsal view.

Fig. 3.—Apex of endopodite of left 1st pleopod of male, ventral view.

Fig. 4.—Right 2nd pleopod of male, dorsal view.

Figs 5-9.—*Styloniscus sylvestris*, n.sp.

Fig. 5.—Right side of cephalon, dorso-lateral view, showing three ocelli and antennary tubercle (antennae removed).

Fig. 6.—Meros and ischion of right 7th pereiopod of male, anterior view.

Fig. 7.—Distal part of left 1st pleopod of male, dorsal view.

Fig. 8.—Apex of endopodite of right 1st pleopod of male, ventral view.

Fig. 9.—Left 2nd pleopod of male, dorsal view.

following earlier collections: beside Shoobridge Track, on 6.III.1957, 8 males and 11 females; near the Pinnacle Road (altitude 820 m.), on 15.V.1956, 2 males and 9 females, and on 22.X.1956, 3 males and 9 females. Collectors on 15.V.1956 were Professor V. V. Hickman, Dr J. L. Hickman and the author.

Other specimens have been collected higher on Mt Wellington at an altitude of 1,130 m.

Other localities. Specimens were found under decaying wood and in forest debris near Collinsvale, at Tarraleah, in Mt Field National Park and in the Florentine Valley.

Remarks

On the basis of a comparison with published descriptions, the Tasmanian isopods now named as *St. sylvestris* were previously (Green, 1961) identified as *St. thomsoni* (Chilton). The subsequent examination of specimens of *St. thomsoni* from New Zealand has shown that this identification was not justified, although the two species are similar.

A detailed comparison has been made between type material of *St. sylvestris* from Mt Wellington, Tasmania, and examples of *St. thomsoni* collected at Papatowai, New Zealand. Differences listed in Table 2 are those which best serve to distinguish the species from each other.

With examples of the two species placed side by side, other relative differences are apparent. The antennary

tubercles of *St. sylvestris* are more prominent than those of *St. thomsoni*. In both species the three ocelli of the eye are arranged in a triangle and widely separated, with unequal distances between them; however in *St. sylvestris* (fig. 5) the forward displacement of the anterior ocellus from the posterior two ocelli is less than it is in *St. thomsoni* (fig. 1). The articles of the endopodite of the 2nd male pleopod in *St. sylvestris* (fig. 9) are broader in proportion to their length than is the case in *St. thomsoni* (fig. 4); however details in the structure of these endopodites are similar in the two species.

In spite of the differences which occur, morphological similarities between *St. thomsoni* and *St. sylvestris* are striking and seem to indicate that these two species are more closely related to one another than each is to sympatric species of *Styloniscus* found in New Zealand and Tasmania respectively.

TABLE 2.

<i>St. thomsoni</i> (Chilton)	<i>St. sylvestris</i> , n.sp.
Pereion broad, so that length of animal is not more than twice its greatest breadth. Largest specimens: male: length 5.0 mm., breadth 2.6 mm. female: length 8.3 mm., breadth 4.3 mm.	Pereion narrower, so that length of animal is more than twice its greatest breadth. Largest specimens: male: length 6.0 mm., breadth 2.7 mm. *female: length 6.7 mm., breadth 3.1 mm.
Seventh pereopod of male without a prominent lobe on ischion, but with a setose tubercle on posterior surface of propodos.	Seventh pereopod of male with a triangular lobe on upper surface of ischion (fig. 6), but without a setose tubercle on propodos.
Flagelliform process of endopodite of 1st male pleopod with long apical setae, which together form a diamond-shaped, pointed mass (fig. 3).	Flagelliform process of endopodite of 1st male pleopod with short apical setae, which together form a crescent-shaped, bluntly rounded mass (fig. 8).

* Measurements of a female specimen given in 1961 (p. 272) have not been confirmed in the present study of *St. sylvestris*.

STYLONISCUS PHORMIANUS (Chilton)
(Figs 10-13)

Philougria rosea Chilton, 1883, p. 73 (in part)
—non Koch, 1835-44.

Philygria rosea Thomson and Chilton, 1886, p. 157
(in part).

Trichoniscus phormianus Chilton, 1901, p. 115.

Patagoniscus phormianus Verhoeff, 1939, p. 303.

Styloniscus phormianus Vandel, 1952, p. 47.

Supplement to Chilton's (1901) description

The following information is based on the author's specimens from Dunedin, N.Z.

Size. Largest male specimen: length 3.3 mm., breadth 1.6 mm. Largest female specimen: length 4.9 mm., breadth 2.3 mm.

Second antenna. Number of articles in flagellum is 4 in most males, 5 or 4 in most females, 3 in very small specimens.

Seventh pereopod. No sexual differentiation.

Second male pleopod (fig. 12). Endopodite composed of two articles, not three as stated by Chilton (p. 117). Length of articles: 1st 0.16 mm., 2nd 0.48 mm.

Fifth male pleopod. Groove for endopodite of 2nd pleopod occupies about two-thirds length of exopodite.

Second female pleopod (fig. 13). Endopodite is more elongated than was figured by Chilton (pl. 12, fig. 1 plp. 2 ♀). Length of exopodite less than half that of endopodite; length (along inner border): exopodite 0.29 mm., endopodite 0.64 mm.

Habitat

Specimens studied in detail were obtained from debris in a mixed forest in the Town Belt, Dunedin, N.Z. (South Island; altitude 90 m.), on 30.VII.1964, 39 males and 94 females. Further collections from this locality were made on 12.IV.1965, 24.III.1966 and 12.XII.1966.

Other specimens of comparable size were found in forest debris: in the South Island at Papatowai, South

Otago, and near Tuatapere, Southland; on Stewart Island at Acker's Point and in Baker Park, both near Oban.

Larger specimens, one male and one female, were collected by Professor B. J. Marples, on I.III.1964, in forest near Otautau, Southland.

Large form of St. phormianus

Specimens from Otautau, N.Z.

Size. Male: length 5.8 mm., breadth 2.5 mm. Female: length 7.0 mm., breadth 3.6 mm.

These two large examples of *Styloniscus* have been assigned to *St. phormianus* as they show most of the characters of this species, including the presence of long setae on the cephalon and pereion and the form of the 1st and 2nd pleopods of the male. They differ from specimens found in Dunedin as follows:

Dorsal surface of cephalon and pereion with scattered, low tubercles. Flagellum of 2nd antenna of male with 6 articles (2nd antennae of female have been lost).

Chilton (1901, p. 115) described *Tr. phormianus* as having the dorsal surface 'smooth or with a few small granulations and irregularities'. Examples of *St. phormianus* from the North Island of N.Z., described by Vandel (1952, p. 50), had smooth integuments. Among the author's collections of *St. phormianus*, the dorsal surface of the cephalon and pereion is smooth in the specimens from Dunedin and Papatowai, almost smooth in those from Tuatapere and slightly tuberculate in those from Stewart Island. Thus the presence of scattered, low tubercles on the cephalon and pereion of the large animals from Otautau is a feature shared with some members of the smaller form of the species.

Chilton (1886, p. 160) referred to an unusually large specimen of *Philygria rosea* found at Kinloch (Central Otago). Presumably this represented another example of the large form of *St. phormianus*.

STYLONISCUS HIRSUTUS, n.sp.

(Figs 14-20)

Styloniscus phormianus Green, 1961, p. 273.

—non (Chilton, 1901).

Location of type specimens

Holotype male and allotype female in the Australian Museum, Sydney.

Paratype male and female in the Western Australian Museum, Perth.

Paratype male and female in the Tasmanian Museum, Hobart.

The description given by Green (1961, p. 273), based on specimens from Collinsvale, Tasmania, is too brief to serve for a new species. A more detailed account, presented here, is based on a larger collection from Mt Wellington.

Male

Size. Largest specimen: length 2.0 mm., breadth 0.8 mm.

Colour. Dorsal surface of live animal purplish-brown, mottled with unpigmented patches.

Cephalon. Surface of vertex smooth, bearing scattered, long setae. Each eye composed of 3 ocelli, separated from one another and arranged in a triangle.

Ocelli set in two or three spots of black pigment; in former case, one black area surrounds the two posterior ocelli.

Second antenna (fig. 14). Length of peduncle 0.53 mm., length of flagellum 0.14 mm. On outer surface of 5th article of peduncle are 6 long spines (4 dorsal, 2 ventral), not raised on tubercles. Flagellum has 3 articles.

Maxilliped. As described for *St. maculosus* (Green, 1961, p. 278).

Pereion. Posterior angles of 1st-3rd epimera bluntly rounded, those of 4th epimera right-angled and rounded; 5th-7th epimera produced backwards and progressively more acute. Dorsal surface of pereion smooth, bearing many scattered, long setae; in dorsal view of animal these setae project beyond outline of body (fig. 15). Tergites covered with pointed, simple scales.

Seventh pereopod. No sexual differentiation. Ischion with sternal border straight; no setose tubercle on propodos.

Pleon. Abruptly narrower than pereion. Third to 5th pleura small, acute. Telson trapezoidal with posterior angles rounded. Dorsal surface of pleon smooth, without long setae except for two which project beyond posterior border of telson.

First pleopod (fig. 17). Exopodite subtriangular, with outer border moderately indented, apex rounded and crenate. Endopodite subcylindrical, tapering; its terminal flagelliform process ends in a simple point, without setae.

Second pleopod (figs 18, 19). Length of articles of endopodite: 1st 0.10 mm., 2nd 0.27 mm. Second article styliform, almost uniform in width until near apex; apical point blunt and bent outwards. On dorsal surface an oblique groove, with strongly chitinized walls, extends throughout length of article; near base of article its inner wall is corrugated. Middle third of groove ornamented with many small, backwardly-directed bars of chitin.

Fifth pleopod. Exopodite not pigmented. Groove for endopodite of 2nd pleopod occupies about half length of exopodite.

Uropod. Length of articles: protopodite 0.11 mm., exopodite 0.17 mm., endopodite 0.14 mm.

Female

Size. Largest specimen: length 2.3 mm., breadth 1.0 mm.

Female differs from male in the following structures:

First to 3rd pereopods, 1st pleopod. (As described for *St. maculosus*).

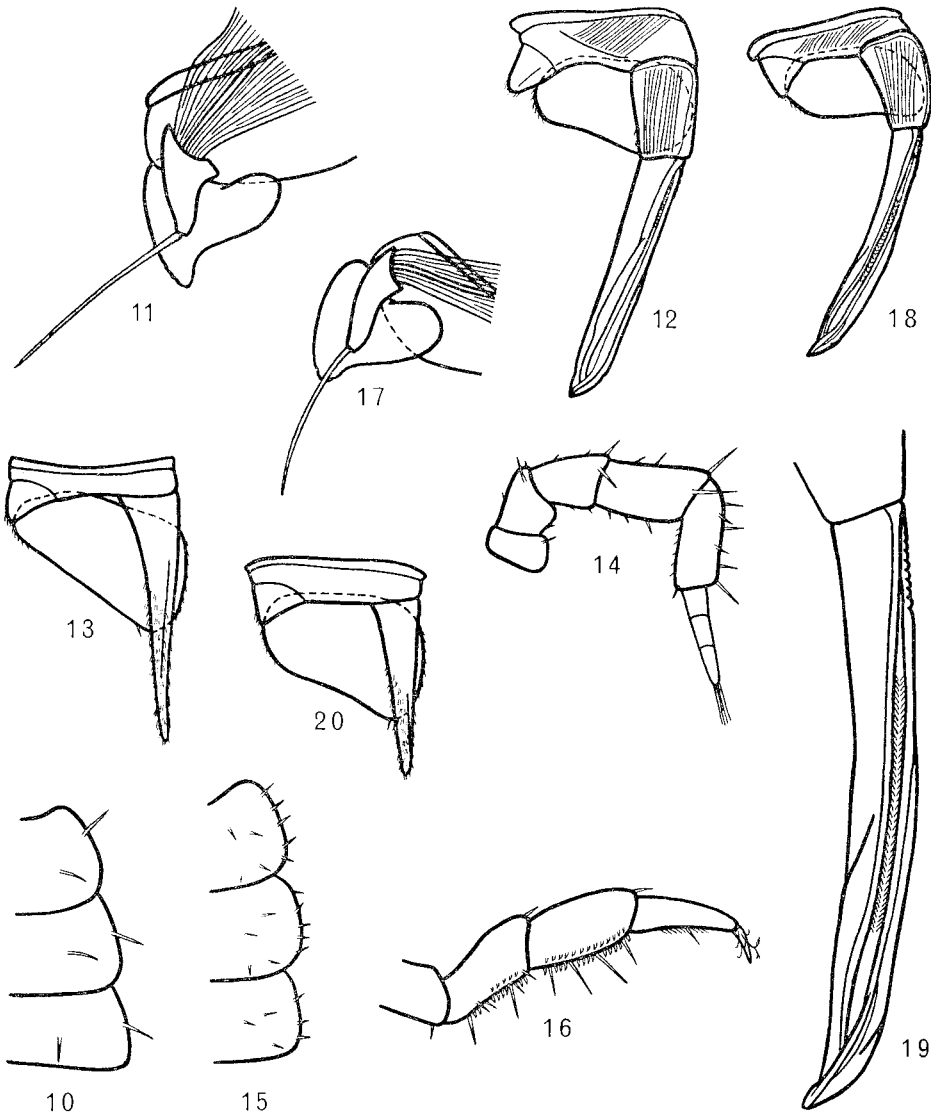
Second pleopod (fig. 20). Endopodite conical and elongated, its distal two-thirds bearing comb-setae. Length of exopodite approximately three-fifths that of endopodite; length (along inner border): exopodite 0.13 mm., endopodite 0.20 mm.

Fifth pleopod. Exopodite without groove.

Habitat

Type locality. Description is based on specimens obtained from debris in forest, dominated by eucalypts but with the inclusion of some myrtle (southern beech), on Mt Wellington, Tasmania.

Type specimens have been selected from examples



Figs 10-13.—*Styloniscus phormianus* (Chilton).

- Fig. 10.—Right 1st-3rd epimera, dorsal view, showing setae.
 Fig. 11.—Distal part of right 1st pleopod of male, dorsal view.
 Fig. 12.—Left 2nd pleopod of male, dorsal view.
 Fig. 13.—Left 2nd pleopod of female, dorsal view.

Figs 14-20.—*Styloniscus hirsutus*, n.sp.

- Fig. 14.—Left 2nd antenna, ventral view.
 Fig. 15.—Right 1st-3rd epimera, dorsal view, showing setae.
 Fig. 16.—Distal part of left 1st pereopod of male, anterior view, showing hyaline scales on meros and carpos.
 Fig. 17.—Distal part of right 1st pleopod of male, dorsal view.
 Fig. 18.—Left 2nd pleopod of male, dorsal view.
 Fig. 19.—Second article of endopodite of left 2nd pleopod of male, dorsal view.
 Fig. 20.—Left 2nd pleopod of female, dorsal view.

found beside Shoobridge Track (altitude 580 m.), on 26.VI.1957, 2 males and 18 females (3 ovigerous), and on 24.X.1963, 8 males and 2 females. Paratype slides have

been prepared from these collections and from one made by Professor V. V. Hickman at Fern Tree (altitude 430 m.), on 28.IX.1957, 7 males and 4 females.

Other localities. Specimens of comparable size were found in debris in a myrtle (southern beech) forest near Collinsvale.

Larger specimens were obtained from debris in a forest of eucalypts and tree ferns at Tarraleah (altitude 610 m.), on 7.X.1957, 15 males and 19 females; collectors were Professor V. V. Hickman, Dr J. L. Hickman and the author.

Large form of St. hirsutus

Specimens from Tarraleah, Tasmania.

Size. Largest male: length 4.8 mm., breadth 2.4 mm. Largest female: length 7.2 mm., breadth 3.6 mm.

These large specimens, which previously (Green, 1961, p. 274) were assigned to *St. phormianus*, have been re-examined and their general agreement with the smaller isopods from Mt Wellington and Collinsvale has been confirmed. In particular, both forms possess many long setae on cephalon and pereion and their 2nd male pleopods are the same. Thus the larger isopods from Tarraleah are now assigned to *St. hirsutus*.

Apart from size, specimens from Tarraleah differ from those found on Mt Wellington as follows:

Flagellum of 2nd antenna with 5-7 articles. No brushes of hyaline scales on 1st-3rd pereopods of some males. Exopodite of 1st male pleopod with outer border more deeply indented. Some specimens are more extensively pigmented, thus pigment present in exopodite of 5th pleopod.

Remarks

On the basis of a comparison with published descriptions, the Tasmanian isopods now named as *St.*

hirsutus previously (Green, 1961) were identified as *St. phormianus* (Chilton). Following the examination of specimens of *St. phormianus* from New Zealand, this identification has been reconsidered. A detailed comparison has been made between type material of *St. hirsutus* from Mt Wellington, Tasmania, and examples of *St. phormianus* collected in Dunedin, New Zealand. Differences are listed in Table 3.

When specimens from New Zealand and Tasmania are placed side by side, it is evident that two groups are represented. However the differences between them are not great and most of these are relative rather than absolute. Also the large isopods from Tarraleah, Tasmania, tend towards *St. phormianus* in some of the features which differ between the smaller forms of the two groups (e.g. hyaline scales of 1st-3rd pereopods of male, exopodite of 1st male pleopod). However, irrespective of their size, the New Zealand and Tasmanian isopods can be distinguished from each other by the relative length and number of setae on cephalon and pereion and by small but constant differences in the 2nd male pleopod.

There is no doubt that the setose styloniscids found in Tasmania are distinct from *St. phormianus* found in New Zealand. However it is not easy to judge, on present knowledge, whether the first group should be separated at the specific level or regarded as a subspecies of *St. phormianus*. A final assessment would depend on whether or not intermediate forms occur elsewhere. On the evidence of the material now in hand the Tasmanian isopods are ranked as a new species, *St. hirsutus*, closely related to *St. phormianus*.

TABLE 3.

<i>St. phormianus</i> (Chilton)	<i>St. hirsutus</i> , n.sp.
Locality: Dunedin, N.Z.	Locality: Mt Wellington, Tasmania.
Largest specimens: male: length 3.3 mm., breadth 1.6 mm. female: length 4.9 mm., breadth 2.3 mm.	Largest specimens: male: length 2.0 mm., breadth 0.8 mm. female: length 2.3 mm., breadth 1.0 mm.
Setae on cephalon and pereion longer and less numerous (fig. 10).	Setae on cephalon and pereion shorter and more numerous (fig. 15).
Flagellum of 2nd antenna with 3-5 articles.	Flagellum of 2nd antenna with 3 articles.
No brushes of hyaline scales on meros and carpos of 1st-3rd pereopods of male.	Brushes of hyaline scales on under surface of meros and carpos of 1st-3rd pereopods of male (fig. 16).
Exopodite of 1st male pleopod with outer border deeply indented, apex almost acute (fig. 11).	Exopodite of 1st male pleopod with outer border less deeply indented, apex less sharply rounded (fig. 17).
Second article of endopodite of 2nd male pleopod: with apical point broader, scarcely demarcated from rest of article; groove with thicker walls, a few chitinous bars near base of groove (fig. 12).	Second article of endopodite of 2nd male pleopod: with apical point narrower, more distinct from rest of article; groove with thinner walls, many chitinous bars throughout middle third of groove (figs 18, 19).

STYLONISCUS PLANUS, n.sp.
(Figs 21-28)

Location of type specimens

Holotype male and allotype female in the Australian Museum, Sydney.

Paratype male and female in the Western Australian Museum, Perth.

Paratype male and female in the Tasmanian Museum, Hobart.

Male

Size. Largest specimen: length 8.2 mm., breadth 4.1 mm.

Colour. Dorsal surface of live animal dark purplish-brown, mottled with unpigmented patches. Large patches, one at base of each of 1st-6th epimera, together form a row on each side. Exopodites of pleopods pigmented. In some specimens, dark brown colour is partly replaced by orange-brown, especially on epimera.

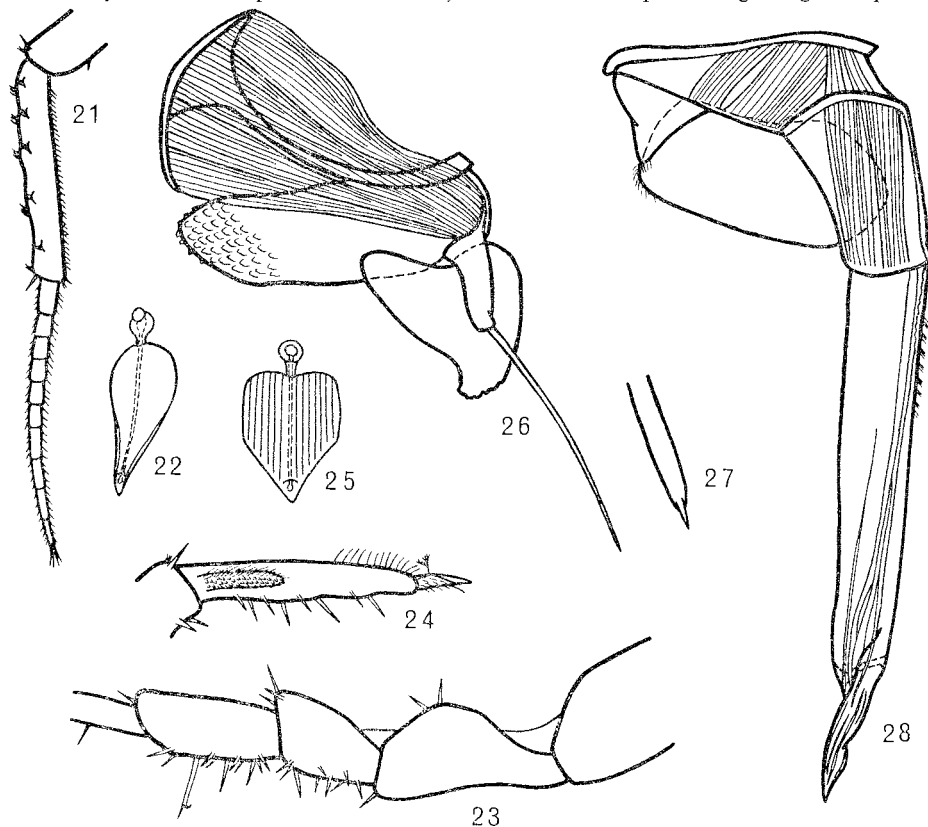
Cephalon. Surface of vertex smooth; scale-setae like those on pereion. Eyes each composed of 3 ocelli,

separated from one another and arranged in a triangle; the two lateral ocelli set on a slight swelling at side of cephalon.

Second antenna (fig. 21). Length of peduncle 2.76 mm., length of flagellum 1.09 mm. On outer surface of 5th article of peduncle are two rows of tubercles, 4 or 5 in each row; each tubercle bears a group of hyaline scales. Flagellum has 10 articles. In smaller specimens (body length less than 7 mm.), number of articles in flagellum ranges from 9 to 6.

Maxilliped. Ischion distinct. Remainder of endopodite divided on inner side into 4 lobes, with divisions between proximal three lobes extended as 2 faint, oblique suture lines across ventral surface. Lobes bear setae of different thicknesses; comb-setae present on inner border, below lobed part. On outer border are 3 long setae and a pencil of setae. Endite subcylindrical and setose, terminating in a conical, setose process, below which are 3 spines.

Pereion. Posterior angles of 1st epimera rounded, those of 2nd epimera right-angled. Epimera of 3rd-7th



Figs 21-28.—*Styloniscus planus*, n.sp.

Fig. 21.—Fifth article of peduncle and flagellum of right 2nd antenna, ventral view.

Fig. 22.—Scale-seta on 1st tergite of pereion, dorsal view.

Fig. 23.—Carpos, meros and ischion of right 7th pereopod of male, anterior view.

Fig. 24.—Propodos and dactylos of right 7th pereopod of male, posterior view.

Fig. 25.—Scale-seta on posterior border of telson, dorsal view.

Fig. 26.—Left 1st pleopod of male, dorsal view.

Fig. 27.—Apex of endopodite of left 1st pleopod of male, dorsal view.

Fig. 28.—Left 2nd pleopod of male, dorsal view.

segments produced backwards and progressively more acute. Second to 7th epimera delimited by faint coxal suture lines, more noticeable on 5th-7th than on 2nd-4th segments. Dorsal surface of pereion smooth. Scale-setae on pereion (fig. 22) each have scale part triangular, sharply pointed at apex, not striated. Tergites covered with simple, non-striated scales.

Seventh pereopod. Ischion (fig. 23) has sternal border shallowly incurved; lower part of ischion prolonged distally below meros. On posterior surface of propodos (fig. 24) is an elongated tubercle, covered partly by setae and partly by scales.

Pleon. Abruptly narrower than pereion. Third to 5th pleura small, acute. Telson trapezoidal with posterior border straight; two large scale-setae (fig. 25), each with broad, subtriangular, striated scale part, project beyond posterior border. Dorsal surface of pleon smooth.

First pleopod (fig. 26). Exopodite subtriangular with apex sharply rounded and crenate; outer border deeply indented near apex. Endopodite subcylindrical, terminating in a long, flagelliform process which bears no setae; at its end, process narrows abruptly to form a distinct apical point (fig. 27).

Second pleopod (fig. 28). Length of articles of endopodite: 1st 0.42 mm., 2nd 1.35 mm. Second article styliform, with apex acute. At about one-quarter of its length from apex, an oblique band of chitin crosses ventral surface of article; length from band to apex (along inner border) 0.36 mm. Breadth of 2nd article decreases only slightly in proximal three-quarters; at level of chitinous band there is sudden decrease in breadth due to incurvature of both sides. On dorsal surface, an oblique groove extends for full length of article, twisting onto outer side in distal quarter; near base of article inner wall of groove is corrugated. Setae present on inner surface of 2nd article, near its base. Dorsal surface of apical region of article ornamented with longitudinal ridges of chitin.

Fifth pleopod. Groove for endopodite of 2nd pleopod extends through most of length of exopodite; region occupied by groove more darkly pigmented than remainder.

Uropod. Length of articles: protopodite 0.60 mm., exopodite 1.40 mm., endopodite 0.86 mm.

Female

Size. Largest specimen: length 9.5 mm., breadth 4.6 mm.

Female differs from male in the following structures:

First to 3rd pereopods, 1st pleopod. (As described for *St. maculosus*).

Seventh pereopod. Ischion has sternal border straight; distal border of lower part of ischion slopes back towards basis. No tubercle on propodos.

Second pleopod. Endopodite styliform, its distal two-thirds bearing comb-setae. Length of exopodite about two-thirds that of endopodite; length (along inner border): exopodite 0.63 mm., endopodite 0.97 mm.

Fifth pleopod. Exopodite without groove or its associated band of darker pigment.

Habitat

Type locality. Description is based on specimens found on austral-montane moorland (altitude 1,070 m.), on Wombat Moor, Mt Field National Park, Tasmania. Collections made were as follows: under pieces of earth on the exposed floor of an empty pond, on 16.XII.1960, one male and two females, collected by Dr J. L. Hickman; under stones on damp ground, near patches of surface water, on 6.III.1962, 8 males and 9 females; under stones on damp ground, near a small temporary stream, on 10.X.1963, 3 males and 9 females.

Remarks

As indicated in Table 1, *St. planus* has most in common with *St. magellanicus* Dana. A comparison of the characters of *St. planus* with accounts of *St. magellanicus* given by Dana (1853, p. 736), Vandel (1952, p. 18; 1963, p. 67) and Andersson (1960, p. 548) has revealed few significant differences between the two. The differences are listed in Table 4. Of these distinctions, the most importance is attached to the last; such subdivision of the second article of the endopodite of the 2nd male pleopod has been used by Andersson (1960, p. 547) in separating material of *St. magellanicus*, *St. pallidus* and *St. simrothi*.

Consideration was given to establishing the new Tasmanian form as a subspecies of *St. magellanicus*, as the two forms appear to be closely related. However, in view of past experience in equating Tasmanian and New Zealand species on the evidence of published descriptions, only to find it necessary to create new species after a comparison of actual material, it seemed wiser to give specific rank to *St. planus* also. Certainly it is simpler to synonymize two species, if a closer relationship is shown to exist, than it is to subdivide one species which later proves to be heterogeneous.

TABLE 4.

<i>St. magellanicus</i> Dana	<i>St. planus</i> , n.sp.
Spiniform scale-setae present on vertex; scale-setae of pereion with apices blunt; no striated scale-setae described from telson.	No spiniform scale-setae found on vertex; scale-setae of pereion with apices acute (fig. 22); striated scale-setae present on telson (fig. 25).
Outer lobe of 1st maxilla with 9 teeth and 2 other processes.	Outer lobe of 1st maxilla with 11 teeth and 2 other processes.
Second article of endopodite of 2nd male pleopod crossed by a chitinous band at about half length of article from apex.	Second article of endopodite of 2nd male pleopod crossed by a chitinous band at about one-quarter length of article from apex (fig. 28).

STYLONISCUS OTAKENSIS (Chilton)
(Figs 29-34)

Philougria rosea Chilton, 1883, p. 73 (in part)
— non Koch, 1835-44.

Philygria rosea Thomson and Chilton, 1886, p. 157
(in part).

Trichoniscus otakensis Chilton, 1901, p. 117.

Styloniscus otakensis Vandel, 1952, p. 42.

Descriptions by Chilton and Vandel

In his account of *Trichoniscus otakensis*, Chilton 1901, p. 117) did not describe or figure those appendages which are sexually differentiated. Instead he claimed that none of the legs of the male is specially modified and that the legs and pleopods (including those pleopods modified in the male) closely resemble those of *Tr. phormianus*. Chilton did not specify a type locality for *Tr. otakensis* but stated that this species is 'widely distributed throughout the South Island, N.Z., in damp situations'.

Vandel's (1952, p. 42) account of *Styloniscus otakensis* was based on two specimens, male and female,

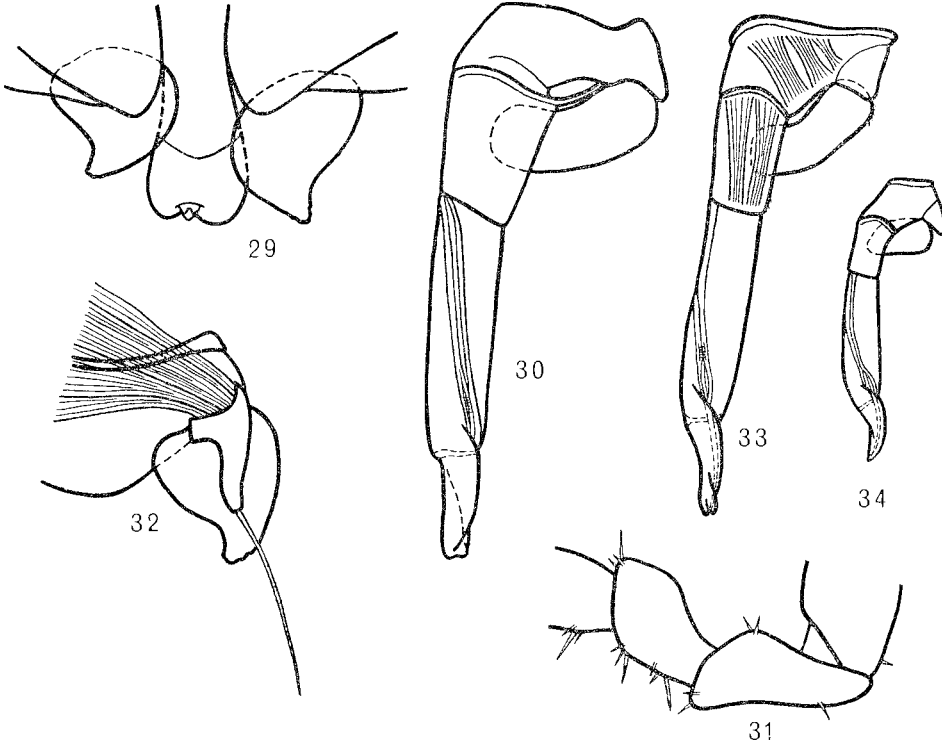
from Omaio (Bay of Plenty), on the east coast of the North Island of New Zealand. Vandel contradicted Chilton's claim that the pleopods of *St. otakensis* closely resemble those of *St. phormianus*. He presented for *St. otakensis* descriptions and figures of structures not dealt with by Chilton.

Variation in Styloniscus otakensis

Examples of a species of *Styloniscus* collected in the Town Belt, Dunedin, N.Z. (South Island) have been identified as *St. otakensis*. These specimens agree with the descriptions given by Chilton (1901) and Vandel (1952) in most characters. However they differ from Vandel's example from Omaio in some features of the 1st and 2nd pleopods of the male, these appendages being closer in appearance to the corresponding pleopods of *St. phormianus*.

Slides of *Trichoniscus otakensis* from Chilton's collection, now lodged in the Canterbury Museum, Christchurch, N.Z., have therefore been examined. Details of these slides are as follows:

Dunedin, N.Z. (no date); 2 slides: male pereiopods; male pleopods.



Figs 29-34.—*Styloniscus otakensis* (Chilton).

Fig. 29.—Male organ and 1st pleopods of male (endopodites missing), overlapped by parts of 7th sternite, ventral view (Chilton's slide, Dunedin).

Fig. 30.—Right 2nd pleopod of male, dorsal view (Chilton's slide, Dunedin).

Fig. 31.—Meros and ischion of right 7th pereiopod of male, anterior view (Dunedin).

Fig. 32.—Distal part of left 1st pleopod of male, dorsal view (Dunedin).

Fig. 33.—Right 2nd pleopod of male, dorsal view (Dunedin).

Fig. 34.—Right 2nd pleopod of male, dorsal view (Auckland).

Flagstaff Hill, 30.XI.1887; 3 slides: female pereopods; pleon of female; young specimen from brood sac.

Mihiwaka, 26.V.1890; 2 slides: appendages of female; whole mount.

(Flagstaff Hill and Mihiwaka are near Dunedin).

On the slide of male pleopods, from Dunedin, the endopodites of the 1st pleopods are missing and some details of the 2nd pleopods are obscured by dark staining; otherwise there is close agreement between the 1st and 2nd male pleopods on Chilton's slide (figs 29, 30) and those of the author's specimens from Dunedin (figs 32, 33).

Differences between examples of *St. otakensis* from Dunedin and Omaio are given in Table 5.

Strouhal (1961, p. 201), describing his new subspecies, *St. otakensis fernandezianus* from Juan Fernandez, noted differences in the 1st and 2nd male pleopods which are related to the size of the animal. In the exopodite of the 1st pleopod, the outer border is more deeply indented in juvenile males (2.3 - 3.0 mm. long) than it is in adult males (3.8 - 4.4 mm. long). In the second article of the endopodite of the 2nd pleopod, the narrower apical part is shorter, relative to the wider basal part, in juvenile males than it is in adult males.

Although it is doubtful whether Strouhal's subspecies, *fernandezianus*, should be attributed to *St. otakensis*, as was pointed out by Vandel (1963, p. 72), the possibility that a similar variation with age may occur in New Zealand examples of *St. otakensis* should be considered. However the evidence available at present does not support such an explanation for the differences listed in Table 5. The animals compared are of similar size; Vandel's male specimen from Omaio was 3 mm. long, the largest males in the author's collection from Dunedin are 2.8 mm. long. Also there is agreement in the characters of the 1st and 2nd male pleopods of specimens from Dunedin obtained in different seasons (30.VII.1964 and 12.XII.1966).

There is, however, further evidence for variation among examples of *St. otakensis* from different localities. Two males and five females collected from manuka litter near Auckland, N.Z. (North Island) in 1965, by Mr E. Scott, have been assigned to *St. otakensis*. These specimens agree with Chilton's (1901) and Vandel's (1952) descriptions in most characters of the species. The larger of the two males (2.0 mm. long) has been dissected. Its 1st pleopod agrees with that of *St. otakensis* from Dunedin. In the endopodite of the 2nd pleopod, length of 2nd article is almost four times length of 1st article; lengths: 1st 0.067 mm., 2nd 0.25 mm. Also the apical part of the 2nd article is subacute, though not as finely tapered as that of the specimen from Omaio. Thus the 2nd pleopod of a male specimen from Auckland (fig. 34), although basically similar to that of males from Dunedin, shows differences which tend towards those exhibited by the male specimen from Omaio (see Table 5).

Typical form of Styloniscus otakensis

Evidently there exists in New Zealand a kind of *Styloniscus* which possesses most of the characters attributed to *St. otakensis*, e.g. spinose tubercles on cephalon, pereon and pleon, but which shows geo-

graphical variation in features of the 1st and 2nd pleopods of the male. The material available at present is quite inadequate as a basis for any decision on the relationships of these variants to each other. However, in any future study of variation in *St. otakensis* the form from the South Island, studied by Chilton, should be regarded as the typical form of the species against which all deviations are compared.

Supplement to Chilton's (1901) description

In the following account, descriptions of the 1st male pleopod (exopodite), 2nd and 5th male pleopods are based on Chilton's slide from Dunedin, with which the author's specimens agree. The remainder is based on the author's specimens from Dunedin. (No appendage on Chilton's slide of male pereopods is recognizable as a 7th leg; i.e. none has the characteristic fringe of long scales on upper surface of propodos. Also no 2nd female pleopod is mounted separately on Chilton's slides).

Size. Largest male specimen: length 2.8 mm., breadth 1.0 mm. Largest female specimen: length 4.2 mm., breadth 1.8 mm.

Seventh male pereopod. Ischion (fig. 31) with sternal border shallowly incurved; lower part of ischion prolonged distally below meros. Propodos has a scale-covered tubercle on posterior surface.

First male pleopod (figs 29, 32). Exopodite subtriangular with apex sharply rounded and crenate, outer border deeply indented near apex. Endopodite subcylindrical, terminating in a long, flagelliform process, apex of which is simply pointed and apparently without setae.

Second male pleopod (figs 30, 33). Exopodite subrectangular, much shorter than 1st article of endopodite. Length of exopodite: Chilton's slide 0.09 mm.; author's slide 0.065 mm. Endopodite with 2nd article about three times as long as 1st article. Length of articles: Chilton's slide, 1st 0.18 mm., 2nd 0.55 mm.; author's slide, 1st 0.14 mm., 2nd 0.43 mm. Second article styliform, decreasing in width only slightly for almost three-quarters of its length, then width decreases abruptly to form a narrower, apical part. Length of apical part: Chilton's slide 0.15 mm.; author's slide 0.125 mm. At level of change in width is a band of chitin across ventral surface. On dorsal surface an oblique groove extends down full length of 2nd article; near middle of groove are a few fine bars of chitin. In apical part, groove is overlapped by an outwardly-directed fold. Apex of endopodite blunt and bilobed.

Fifth male pleopod. Groove for endopodite of 2nd pleopod occupies most of length of exopodite.

Second female pleopod. Endopodite styliform, its distal two-thirds with comb-setae. Length of exopodite less than half that of endopodite; length (along inner border): exopodite 0.20 mm., endopodite 0.46 mm.

Habitat

Specimens were obtained from debris in a mixed forest in the Town Belt, Dunedin, N.Z. (altitude 90 m.). Collections were made on 30.VII.1964, 6 males and 21 females, and on 12.XII.1966, 9 males and 34 females.

Female specimens were found in forest debris at Papatowai, South Otago, and near Tuatapere, Southland, (both in the South Island).

TABLE 5. *ST. OTAKENSIS* (Chilton)

	Dunedin (South Island)	Omaio (North Island)
1st pleopod of male	Exopodite with outer border indented.	Exopodite with outer border not indented.
	Flagelliform process of endopodite simply pointed at apex, apparently without setae.	Flagelliform process of endopodite with a pencil of setae at apex.
2nd pleopod of male	Length of 2nd article of endopodite three times length of 1st article.	Length of 2nd article of endopodite seven times length of 1st article.
	Second article of endopodite with its apex blunt and bilobed.	Second article of endopodite with its apex sharply pointed.

STYLONISCUS NICHOLLSI Vandel

Styloniscus nichollsi Vandel, 1952, p. 30.

Seventh pereopod. Vandel (1952, p. 35) stated that the 7th pereopod in *St. nichollsi* is without sexual differentiation. When the species was recorded again (Green, 1961, p. 275), no cause for amendment was observed. However, a re-examination of specimens collected near Shoobridge Track on Mt Wellington, Tasmania, on 26.VI.1957, has shown that sexual differentiation is present. The 7th pereopod of the male has an oval tubercle, covered partly by setae and partly by scales, situated on the posterior surface of the propodos; no such tubercle is present in the female. There is no differentiation of the ischion of the 7th pereopod; in both sexes its sternal border is straight.

Presence in caves

Examples of *St. nichollsi* have been found in caves at Hastings, in the south, and at Mole Creek and Loongana in the north-west of Tasmania. These isopods usually were associated with dead wood or with debris near

underground streams. Information on collections is given in Table 6.

A comparison of specimens obtained from King George V Cave, Hastings, with the epigeal specimens of *St. nichollsi* found on Mt Wellington has shown that the isopods in these two samples are alike morphologically.

Pigmentation. All of the specimens examined have been stored in 80% alcohol, but the initial method of preservation was not uniform. In the isopods found in caves at Hastings and Mole Creek the body pigment is normal in distribution, but is a lighter brown in colour than that of the epigeal examples from Mt Wellington; the dark brown coloration of the latter is matched only by the specimen from Loongana. The eyes of the cave-dwellers are normal, each being composed of three black ocelli.

There is no previous record of Styloniscidae from caves in Tasmania. However a comparable situation exists in New Zealand where May (1963, p. 185) has recorded the presence in caves of *St. phormianus* (Chilton), another species which normally lives above ground.

TABLE 6. *ST. NICHOLLSI* IN CAVES

Locality	Cave	Specimens	Date	Collectors
Hastings	King George V Cave	5 ♂, 6 ♀	21.IV.1968	Mr & Mrs A. Goede
"	"	2 ♂, 2 ♀	23.VI.1968	"
Mole Creek	Georgie's Hall	1 ♂, 1 ♀	6.III.1967	Mr R. J. Cockerill
"	"	2 ♀	27.I.1968	"
"	Scott's Cave	2 ♂, 2 ♀	6.IV.1968	Mr & Mrs A. Goede
"	"	1 ♂	10.VI.1968	Mr R. J. Cockerill
"	Baldock's Cave	3 ♀	7.IV.1968	Mr & Mrs A. Goede
"	Herbert's Pot	1 ♀	6.VII.1968	Mr A. Goede
"	Mersey Hill Cave	2 ♀	7.VII.1968	"
Loongana	Old Tourist Cave	1 ♂	22.II.1969	Mr & Mrs A. Goede

GENUS *NOTONISCUS* Chilton*Notoniscus* Chilton, 1915, p. 418.*Notoniscus* Chilton, *nom emend.* Green, 1961, p. 284.

For synonymy and generic diagnosis, see Green (1961, p. 284).

Genus *Notoniscus* contains the following species:*N. helmsii* (Chilton, 1901); *N. australis* (Chilton, 1909); *N. tasmanicus* (Chilton, 1915); *N. fernandezi*, *N. secundus*, *N. tertius*, all Strouhal, 1961; *N. chiltoni*, n.sp.Key to species of *Notoniscus* represented in TasmaniaTubercles on pereion forming 4 rows in male, 5 rows in female; 3rd pleura small compared with 4th and 5th pleura ————— *chiltoni*.
Tubercles on pereion forming 6 rows in both sexes; 3rd pleura as large as 4th and 5th pleura — *tasmanicus*.*NOTONISCUS AUSTRALIS* (Chilton)

(Figs 35, 36)

Haplophthalmus australis Chilton, 1909, p. 662.*Notoniscus australis* Chilton, 1915, p. 421.*Chilton's material*Chilton's collection of *Notoniscus australis*, lodged in the Canterbury Museum, Christchurch, N.Z., comprises female specimens obtained on Campbell Island, south of New Zealand, in November, 1907. The following material has been examined by the author:

Two specimens in spirit, designated as type specimens.

Three slides, labelled 'co-type', bearing one stained specimen and separate appendages.

One dried specimen, mounted on a slide.

(Further information is given in Table 7).

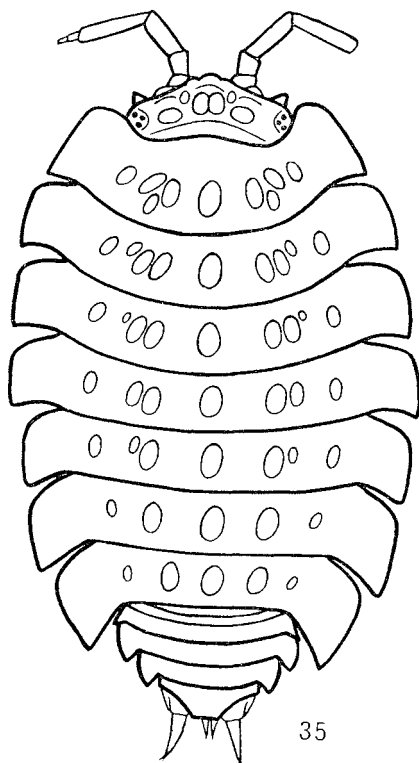
NOTONISCUS CHILTONI, n.sp.

(Fig. 37)

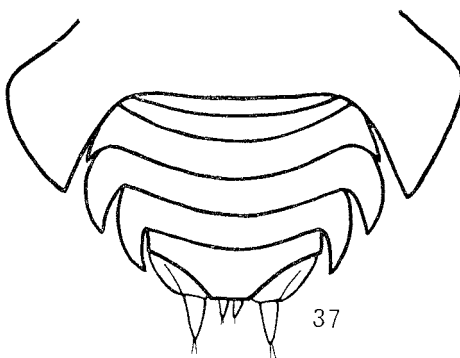
Notoniscus australis Green, 1961, p. 287.—— *non* (Chilton, 1909).*Location of type specimens*

Holotype male and allotype female in the Australian Museum, Sydney.

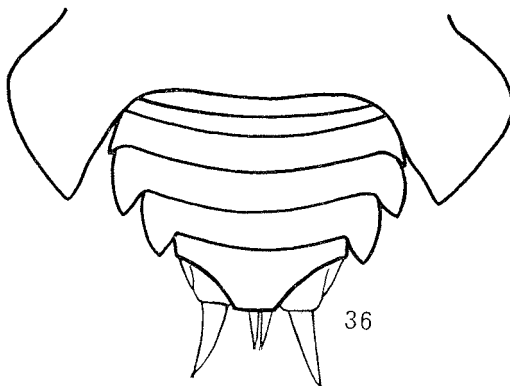
Paratype male and female in the Western Australian Museum, Perth.



35



37



36

Figs 35-36.—*Notoniscus australis* (Chilton).

Fig. 35.—Female specimen, dorsal view (small, scattered tubercles of pereion omitted; 2nd antennae incomplete). Length of specimen: 4.5 mm.

Fig. 36.—Seventh segment of pereion (tubercles omitted), pleon and uropods, dorsal view.

Fig. 37.—*Notoniscus chiltoni*, n.sp.

Fig. 37.—Seventh segment of pereion (tubercles omitted), pleon and uropods, dorsal view.

Paratype male and female in the Tasmanian Museum, Hobart.

Description

The account given by Green, 1961, pp. 287-9, figs 52-56.

Type locality

In debris in a myrtle (southern beech) forest near Collinsvale, Tasmania (altitude 730 m.). Type material was collected on 12.VI.1957 and 19.VI.1957.

Remarks

A form of *Notoniscus* found near Collinsvale, Tasmania, was identified as *N. australis* (Chilton) following a comparison with Chilton's (1909, 1915) descriptions of his specimens from Campbell Island.

A subsequent opportunity to examine the type material of *N. australis*, lodged in the Canterbury Museum, Christchurch, N.Z., has shown that the Tasmanian form is distinct from Chilton's species.

The Tasmanian specimens previously named as *N. australis* differ from all other established species of *Notoniscus* (and of the allied genus, *Paranotniscus* Barnard) in the pattern of tubercles on the pereion, while additional differences, concerning the ornamentation of the pleon or the shape of the pleura, occur in some cases (see Barnard, 1932, p. 202; Chilton, 1915, p. 418; Green, 1961, p. 286; Strouhal, 1961, p. 205). Thus this Tasmanian form represents a new species for which the name of *Notoniscus chiltoni*, in honour of the late Professor C. Chilton, is proposed.

Differences between Chilton's female type material of *N. australis* from Campbell Island and female type specimens of *N. chiltoni* from Collinsvale, Tasmania, are given in Table 7. (Males of *N. australis* have not been recorded). Although the basic pattern of ornamentation in female specimens of *N. australis* and *N. chiltoni* is the same (i.e. 5 longitudinal rows of tubercles on pereion), there are differences in the details of this pattern and these are supported by differences in the pleura and uropods.

TABLE 7.

<i>N. australis</i> (Chilton)	<i>N. chiltoni</i> , n.sp.
Large tubercles on each segment of pereion together form 5 longitudinal rows; on 1st-5th segments the intermediate (2nd and 4th) positions are each occupied by 2 or 3 tubercles set close together, instead of by a single tubercle as occurs elsewhere in the rows (fig. 35); small tubercles scattered on dorsal surface between the 5 rows.	Large tubercles on each segment of pereion together form 5 longitudinal rows; all of these tubercles occur singly; no small tubercles on dorsal surface between the 5 rows (Green, 1961, fig. 56). (Male of <i>N. chiltoni</i> has 4 rows of tubercles on pereion).
Fourth and 5th pleura of pleon ovoid, with both lateral borders convex (fig. 36).	Fourth and 5th pleura of pleon semi-crescentic, with outer border convex, inner border slightly concave (fig. 37).
Uropod with rami longer than propodite; length of articles: propodite 0.42 mm., exopodite 0.59 mm., endopodite 0.62 mm.	Uropod with rami shorter than propodite; length of articles: propodite 0.27 mm., exopodite 0.21 mm., endopodite 0.25 mm.

NOTONISCUS TASMANICUS (Chilton)

Haplophthalmus tasmanicus Chilton, 1915, p. 424.

Chiltonia tasmanica Arcangeli, 1923, p. 314.

Chiltonella tasmanica Vandel, 1952, p. 96.

Notoniscus tasmanicus Green, 1961, p. 289.

Holotype

Chilton's (1915, p. 424) description of *Haplophthalmus tasmanicus* was based on a single specimen, collected at 'Fern Tree Gully, Hobart, Tasmania'. Presumably the locality referred to is Fern Tree on the lower slopes of Mt Wellington (altitude 430 m.). This holotype is lodged in the Canterbury Museum, Christchurch, N.Z., and has been examined by the author.

Supplementary type specimens

Additional reference specimens of *Notoniscus tasmanicus* have been selected from a collection made on 12.VI.1957 and 19.VI.1957, from debris in a myrtle (southern beech) forest near Collinsvale, Tasmania (altitude 730 m.), about 12 Km. north-west of Fern Tree.

One male and one female specimen have been lodged in each of the following institutions:

The Australian Museum, Sydney.

The Western Australian Museum, Perth.

The Tasmanian Museum, Hobart.

These examples have been designated as plesiotypes, being part of a collection on which a subsequent description (Green, 1961, p. 289) was based.

CONCLUSION

The Tasmanian species, *Styloniscus sylvestris*, *St. hirsutus*, *Notoniscus chiltoni* and *N. tasmanicus* all inhabit litter on the ground in damp forests. *St. nicholli* is also present in such forests, but it has been found in other situations as well, e.g. this is the only species of Stytoniscidae yet recorded from caves in Tasmania. The author's specimens of *St. thomsoni*, *St. phormianus* and *St. otakensis*, collected in New Zealand, came from the same kind of habitat, i.e. damp forest litter, as did *St. sylvestris* and *St. hirsutus* in Tasmania.

St. planus has been found only on austral-montane moorland, at an altitude of 1,070 m., in Mt Field National Park, Tasmania. *St. sylvestris* occurs at comparable altitudes, at 1,130 m. on Mt Wellington and at 1,030 m. near Lake Dobson in Mt Field National Park, but it has been collected there from litter under trees and shrubs, not from treeless moorland. The more exposed habitat of *St. planus*, compared with that of other styloniscids in Tasmania, is of interest in view of the far southern distribution of its counterpart, *St. magellanicus*. The latter is a native of southern Chile, Patagonia and Tierra del Fuego; it has also been recorded, by Chilton (1909, p. 661), from the Auckland Islands and Campbell Island, south of New Zealand.

With the establishment of new species for the Tasmanian forms previously placed in *St. thomsoni*, *St. phormianus* and *N. australis*, no species of Styloniscidae is now thought to be common to Tasmania and New Zealand. The earlier assignment of specimens of *N. chiltoni* to *N. australis* was a simple case of mistaken identity; however closer relationships seem to exist between members of the other pairs.

St. thomsoni and *St. sylvestris* undoubtedly should be ranked as distinct species, yet they are more like each other than either is to any sympatric species (e.g. there are similar features in their 1st and 2nd male pleopods). *St. phormianus* and *St. hirsutus* are even more alike; both have long setae on the cephalon and pereion, and a 2nd male pleopod with the endopodite almost uniform in width, also both species include an atypical, larger form. *St. magellanicus* and *St. planus* seem to represent another pair of closely-related species. A wider knowledge of the variation and distribution of these isopods is needed before their true relationships can be determined.

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