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THE RHAPHIDOPHORIDAE (Orthoptera) OF AUSTRALIA

Part 10. A new genus from southeastern Tasmania with New Zealand affinities

By **Aola M. Richards**[1]

Abstract: A new genus, *Tasmanoplectron*, is erected, and the new species, *T. isolatum*, n. sp. is described. Its distribution is restricted to Tasman Island off the southeast coast of Tasmania. The distinctiveness of this genus to the rest of the Australian fauna is stressed, and relationships with New Zealand and subantarctic islands genera are discussed. It is considered an aberrant member of the Macropathinae.

Tasman Island is a small wind-swept island at the tip of Tasman Peninsula in southeastern Tasmania, which is separated from the mainland by a narrow sea channel about 1/3 of a mile wide. On this island a new genus of Rhaphidophoridae, *Tasmanoplectron* n. g., has recently been discovered at night in and near the lighthouse buildings. Its true habitat has not so far been discovered. There are no caves on the island, but beneath the buildings is an area where large rocks lie jumbled one upon another forming artificial cavities. The insects may seek shelter amongst these rocks, and they may also be established in bird burrows.

The discovery of this new genus has increased the number of Tasmanian rhaphidophorid genera to 4. The distribution and possible origins of the other 3 genera, *Micropathus* Richards, *Parvotettix* Richards and *Cavernotettix* Richards, have been discussed elsewhere (Richards 1971), and it has been shown that *Micropathus* is the dominant genus on mainland Tasmania. So far it has not been found on any of the off-shore islands, but it appears to have prevented both *Cavernotettix* and *Tasmanoplectron* from colonizing the mainland.

If my assumption is correct that before the last Pleistocene glaciation an ancestral species of *Micropathus* was widespread throughout Tasmania (Richards 1971), then *Tasmanoplectron* probably was unable to compete with it, and was driven into an isolated corner of the island where it managed to survive at the tip of Tasman Peninsula. Today *M. tasmaniensis* Richards occurs throughout southern Tasmania and particularly along the southeast coast in granite caves on Mt Wellington, Hobart, in mines at Kaoota and Mt Cygnet, and in limestone caves at Hastings and Ida Bay. Tasman Island probably was separated from the mainland at the same time as the rise in sea level created Banks Strait about 10,000 years ago (Jennings 1971). However, it is unlikely that the narrow sea channel would have acted as a permanent barrier against the recolonization of Tasman Peninsula by *T. isolatum* n. sp. Today this rugged section of the mainland is seldom visited, and its fauna is not well known. While no rhaphidophorids have been collected from the peninsula, it is very probable they do occur there and it will be very interesting to discover to which species they belong.

1. School of Zoology, University of New South Wales, Sydney, Australia.

Tasmanoplectron is unique amongst other genera of Australian Rhaphidophoridae, but in spination of the legs and shape of the external genitalia it has strong affinities with at least 9 New Zealand and subantarctic islands genera. As the 2 areas have probably been isolated by sea since the Cretaceous, this suggests that *Tasmanoplectron* and its ancestors are of considerable antiquity. Bigelow (1967) has also pointed to close relationships in ♂ genitalia between certain New Zealand and Tasmanian alpine grasshoppers (Acrididae), and more distant relationships between Tasmanian and southeastern Australian forms. It is significant that 2 of the 3 endemic families of New Zealand Orthoptera are closely related to Tasmanian genera.

Apical spination of the legs has proved to be a remarkably constant generic character amongst New Zealand genera, with the exception of *Talitropsis* Bolivar where variation occurs in apical spination of the fore, middle and hind femora (Richards 1958a). It has also been a constant character amongst Australian genera, except for *Micropathus* where the prolateral apical spine on the hind femur is variable, being absent in *M. tasmaniensis*, frequently present in *M. cavernicola* Richards and *M. fuscus* Richards, and always present in *M. montanus* Richards (Richards 1964b, 1968, 1971). In no other known genera is the remarkable variation in apical spination found in *Tasmanoplectron* known to occur. Most significant is the extreme reduction or absence of the 2 apical spines on the 2nd segment of the hind tarsus. The presence of these spines has been a constant character in all Australian and New Zealand genera examined by me, and they comprise the main distinguishing character listed for the subfamily Macropathinae Karny (Chopard 1949), a group of Rhaphidophoridae with a palaeantarctic distribution comprising New Zealand, southern Australia, South Africa and South America. At the moment *Tasmanoplectron* is to be regarded as an aberrant member of the Macropathinae.

Genus **Tasmanoplectron** new genus

Body thickly clothed with setae. Legs long and slender, thickly clothed with setae. Antennae very long and tapering, almost touching at their bases ; scape about 4 × as large as pedicel ; from segment 4 onwards segments subequal in length, but steadily decreasing in size, all segments thickly clothed with short setae. A single, anterior, median ocellus present. Fastigium rising abruptly, grooved medianly and longitudinally. Maxillary palps with 3rd and 4th segments subequal in length. Fore coxa armed with a retrolateral spine. All femora sulcate ventrally. Not all apical spines constant in number. Fore femur variable in presence or absence of 1 prolateral and 1 retrolateral apical spine above ; fore tibia bears 3 or 4 apical spines, 1 above prolaterally and 1 beneath both prolaterally and retrolaterally, presence of dorsal retrolateral apical spine variable ; fore tarsus unarmed. Middle femur bears 1 prolateral apical spine above, presence of retrolateral spine above variable ; middle tibia bears 4 apical spines, 1 above and 1 beneath both prolaterally and retrolaterally ; middle tarsus unarmed. Hind femur variable in presence or absence of 1 prolateral and 1 retrolateral apical spine above ; hind tibia bears a pair of long apical spurs above, a pair of subapical spines above, a pair of short apical spurs beneath and a pair of subapical spines beneath, 1 from each pair being prolateral and the other retrolateral ; most proximal segment of hind tarsus bears 2 apical spines above, 1 prolateral and 1 retrolateral ; 2nd proximal segment variable, 2 apical spines above may be present or absent, if present extremely reduced in size ; other 2 segments unarmed. Subgenital plate of ♀ strongly keeled and tapering to an acute apex. Subgenital plate of ♂ triangulate and rounded ; styli borne subapically on plate. Distal portion ventral valves of

ovipositor armed with row of spines along median line.

Type-species: *Tasmanoplectron isolatum* n. sp.

Tasmanoplectron isolatum Richards, new species Fig. 1-6.

Color: Basic color light brown with pronotum, mesonotum, metanotum and abdominal terga irregularly mottled with mid brown; fore, middle and hind femora and tibiae light brown banded or mottled with mid brown, all tarsi ochreous; antennae light brown; ovipositor light reddish brown. *Body:* Length 19 to 21 mm in ♂, 18 mm in ♀. Body thickly clothed with setae. Antennae broken. Fastigium longer than high. Ovipositor subequal in length with body; ventral valves very weakly armed distally 0.2 of total length to apex with 11 small teeth forming a saw-toothed edge, and 5 small spines along median line (fig. 1). *Antennae:* As in generic description. Third segment on dorsal aspect 2.4 × as long as pedicel, and on ventral aspect 1.4 × as long. Sexual dimorphism absent. No spines present on flagella of ♂ or ♀. *Legs:* Fore and middle legs subequal in length, with hind leg 1.5 length of fore and middle legs. Sexual dimorphism absent. Hind femora, all tibiae and proximal segment of hind tarsi armed with variable numbers of linear spines (Table 1). No linear spines occur on fore and middle femora or tarsi. All femora, fore tibiae and 2nd segment of hind tarsi armed with variable number of apical spines (Table 2). Length of proximal segment of hind tarsus subequal with other 3 segments together. Ratio of length of legs to length of body: fore leg 2.5: 1; middle leg 2.5: 1; hind leg 3.8: 1.

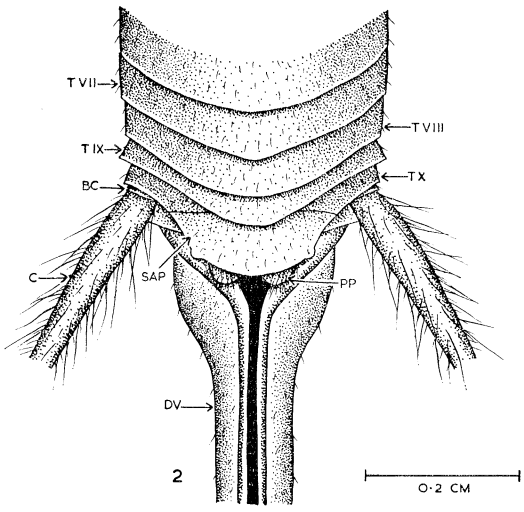
Genitalia. ♀: Suranal plate, fig. 2 (SAP), convex laterally and produced into 2 small nodules, distal margin rounded and thickly clothed with setae; rest of plate sparsely clothed with setae. Subgenital plate, fig. 3 (SGP), mediolaterally sharply indented 0.5 up from distal margin, then tapering to an acute apex; medianly the plate is strongly keeled; whole plate 0.4 as long as wide, glabrous.

♂: Suranal plate, fig. 4 (SPL), convex laterally changing to concave distolaterally, distal margin deeply emarginate and notched medianly, strongly chitinized and serrated, thickly clothed with setae, rest of plate clothed with setae. Whole plate 1.1 longer than wide. Subgenital plate, fig. 5 (H), triangulate, 1.1 wider than long, convex proximolaterally tapering to a rounded apex; whole plate rounded and clothed with setae, more thickly distolaterally and apically. On ventral surface, fig. 4 (H), plate curved over a short distance anteriorly and clothed with setae; pseudosternite and penis located beneath this. Two styli, fig. 4, 5 (S), short, broad, conical, thickly clothed with setae, located close together subapically on subgenital plate, length of styli being 0.2 length of sternite IX (S IX). Parameres, fig. 4, 5, 6 (P), elongate, rounded at apex, 2 × as long as wide, lateral and distal portions thickly clothed with setae. Pseudosternite, fig. 4, 5, 6 (PD), approximatelly 3 × as long as wide, convex proximolaterally changing to truncate distolaterally, distal margin indented medianly forming 2 lobes; plate bears 3 longitudinal strongly chitinized bands, 2 lateral and 1 median. Penis, fig. 6 (PN), 2-lobed, each lobe 3.2 longer than wide. Paraprocts absent.

LOCALITY. TASMANIA: At night in and near No. 2 Residence, No. 3 Residence, Radio Room and Engine Room of lighthouse, Tasman I., at tip of Tasman Peninsula, southeastern Tasmania (type locality), coll. R. Elmore, I.1971.

Types. Holotype ♂ No. F 188, allotype ♀ No. F 190, and 3 paratypes; 1 ♂ No. F 187, 1 ♀ No. F 191 and 1 ♂ nymph F 189 in Tasmanian Museum Collection, Hobart.

Remarks. Tasmanoplectron has no close affinities with any known Australian Rhaphidophoridae, but it shares certain characters with 9 New Zealand and subantarctic islands genera.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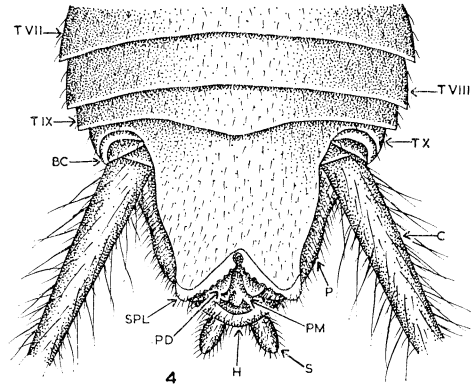
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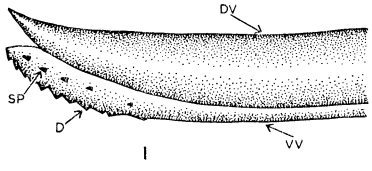
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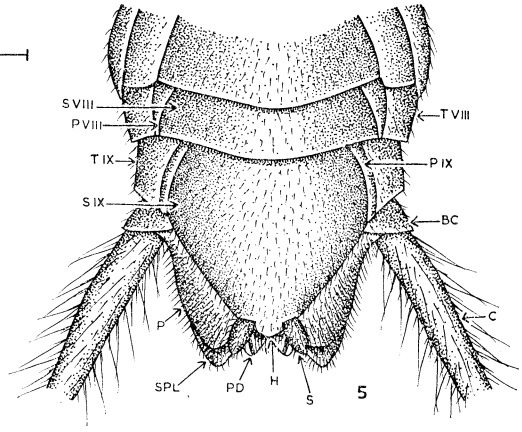
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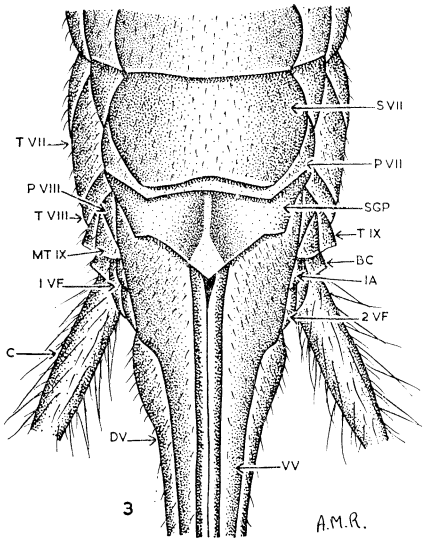
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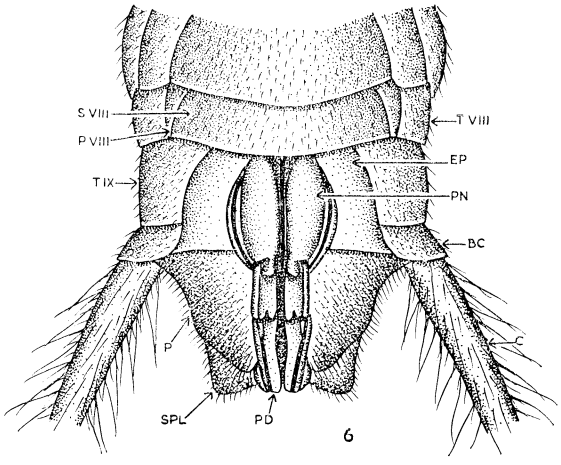
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Table 1. Variability in number of linear spines on the legs of *Tasmanoplectron isolatum* n. sp.

		Mean		Number Specimens		Standard Deviation		Range	
		L	R	L	R	L	R	L	R
Fore Tibia Inf.	Pro.	4.0	3.6	5	5	0	0.8	4	2-4
	Retro.	4.0	3.6	5	5	0	0.8	4	2-4
Mid Tibia Sup.	Pro.	6.2	8.4	5	5	2.2	2.2	3-9	5-12
	Retro.	0.8	1.0	5	5	0.7	0.9	0-2	0-2
Mid Tibia Inf.	Pro.	4.0	3.8	5	5	0	0.4	4	3-4
	Retro.	4.0	4.0	5	5	0	0	4	4
Hind Femur Inf.	Pro.	4.8	4.5	5	4	2.3	1.7	2-7	2-6
	Retro.	1.2	1.0	5	4	1.0	1.0	0-2	0-2
Hind Tibia Sup.	Pro.	56.6	52.5	5	4	3.6	3.6	51-61	47-57
	Retro.	56.0	53.8	5	4	3.8	2.3	49-60	51-56
Hind Tarsus 1 Sup.	Pro.	2.4	3.3	5	4	1.0	1.1	1-4	2-5
	Retro.	3.6	4.0	5	4	1.0	1.4	2-5	2-6

Table 2. Variability in number of apical spines on the legs of *Tasmanoplectron isolatum* n. sp.

		Mean		Number Specimens		Standard Deviation		Range	
		L	R	L	R	L	R	L	R
Fore Femur Sup.	Pro.	0.6	0.6	5	5	0.5	0.5	0-1	0-1
	Retro.	0.6	1.0	5	5	0.5	0	0-1	1
Fore Tibia Sup.	Pro.	1	1	5	5	0	0	1	1
	Retro.	0.8	0.8	5	5	0.4	0.4	0-1	0-1
Mid Femur Sup.	Pro.	1.0	1.0	5	5	0	0	1	1
	Retro.	0.6	0.6	5	5	0.5	0.5	0-1	0-1
Hind Femur Sup.	Pro.	1.0	0.8	5	4	0	0.4	1	0-1
	Retro.	0.4	0.5	5	4	0.5	0.5	0-1	0-1
Hind Tarsus 2 Sup.	Pro.	0.5	0.8	4	4	0.5	0.4	0-1	0-1
	Retro.	0.8	0.5	4	4	0.4	0.5	0-1	0-1

1. Superior linear spines on middle tibia also present in *Gymnoplectron* Hutton, *Paraneonetus* Salmon, *Dendroplectron* Richards, *Novoplectron* Richards, *Turbottoplectron cavernae* (Hutton) and *Pleioplectron diversum* Hutton (Richards 1954, 1958a, 1958b, 1959a, 1959b, 1959c, 1960, 1961a, 1961b, 1961c, 1962, 1964a).
2. Variability in apical spination of all femora also present in *Talitropsis crassicruris* Hutton (Richards 1958a).
3. Strongly chitinized, serrated and emarginate distal margin of ♂ suranal plate also present in *Petrotettix* Richards (Richards, in press).

Fig. 1-6. *Tasmanoplectron isolatum* n. sp.: 1, distal portion of ovipositor showing serrations and spines on ventral valve; 2, ♀ genitalia, dorsal view; 3, ♀ genitalia, ventral view; 4, ♂ genitalia, dorsal view; 5, ♂ genitalia, ventral view; 6, ♂ genitalia, ventral view, subgenital plate removed to expose structures beneath.

4. Serrated edge of ovipositor also present in *Insulanoplectron* Richards (Richards 1970).

Tasmanoplectron also has a number of unique characters.

1. Extreme reduction in size or absence of apical spines on 2nd segment of hind tarsus.
2. Median ridge of spines on distal portion of ventral valves of ovipositor.
3. Very elongated shape of ♂ pseudosternite.
4. Subapical position of styli on ♂ subgenital plate.

Acknowledgments: I am most grateful to Miss Alison Green, Tasmanian Museum, Hobart, for bringing these very interesting specimens to my notice. I should also like to thank Dr W. Bryden, Director of the Tasmanian Museum, for permission to examine this material from the Museum Collections.

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BC. — basal segment of cercus. C. — cercus. D. — serrations. DV. — dorsal valve. EP. — endoparamere. H.—subgenital plate, ♂. IA.—intersegmental apodeme. MT IX—membrane of tergite IX. P. — paramere (ectoparamere). P VII, P VIII, P IX — pleurite VII, VIII, IX. PD. — pseudosternite. PM. — peritrophic membrane. PN. — penis. PP.—paraproct. S.—stylus. S VII, S VIII, S IX — sternite VII, VIII, IX. SAP. — suranal plate, ♀. SGP. — subgenital plate, ♀. SP. — spine. SPL. — suranal plate, ♂. T VII, T VIII, T IX, T X — tergite VII, VIII, IX, X. 1 VF.—1st valvifer. 2 VF.—2nd valvifer. VV —ventral valve.

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L.— left leg. R. — right leg. Sup. — superior. Pro. — prolateral. Retro. — retrolateral.

ADDENDA

Since this paper was submitted for publication, 11 additional specimens, 3 males No. F 196 and 8 females No. F 197, of *I. isolatum* have been collected by J. W. Cook near buildings on Tasman Island in July and August 1971. They are now in the Tasmanian Museum Collection. I am grateful to Mr J. Brent, Department of Shipping and Transport, Lighthouse Service, Hobart, for his assistance in this project.