

THE GRYLLACRIDÆ AND STENOPELMATIDÆ OF AUSTRALIA AND POLYNESIA.

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The GRYLLACRIDÆ and STENOPELMATIDÆ form the two last families in Brunner van Wattenroyls' system of the Locustodea. They resemble each other considerably in general appearance, and approximately in habit; but while the former possess depressed tarsi without pulvilli, or sole pads, and lateral expansions to all the joints, the latter have compressed tarsi with usually distinct pulvilli and the first and second joints simple. The two families may be thus diagnosed:—

GRYLLACRIDÆ.—Tarsi depressed, first and second joints with lateral lobes separated by a furrow. Fore tibiæ without foramina and above without apical spines. Hind tibiæ above with single apical spines, below with two on each margin.

STENOPELMATIDÆ.—Tarsi compressed, first and second joints without lateral appendages, mostly provided with pulvilli. Fore tibiæ often with foramina, above with apical spines on each margin. Hind tibiæ above with single, below with two apical spines on both margins.

Although both resemble the Gryllodea, or Crickets, considerably, and have been classed with them by older authors, including Stål, their relationship with them is quite remote, and the four-jointed tarsi, the structure of the wings and the ovipositor relegate them to the Locustodea, notwithstanding their cricket-like habits and appearance. Brunner says:—"The first Gryllid undoubtedly descended from some Locustid, but the Stenopelmatids did not descend from that Gryllid, but were—if one may so express oneself—a second departure of the Locustids in the direction of the crickets."

In Brunner's monograph are 11 genera of Gryllacridæ and 36 of Stenopelmatidæ described as known, the former consisting of 132 species (*Gryllacris* alone of 95), and the latter of 91, whose general distribution will be apparent at a glance at the following table.

	Gryll.	Stenop.	Gryll. in 2 continents.
Europe	0	4	—
Asia and Malayan Archipelago...	65	14	3
Africa, with Madagascar, &c. ...	19	22	1
North and Central America ...	5	29	—
South America and W. India ...	10	7	—
Australia and Tasmania ...	21	4	1
Polynesia, incl. N. Guinea, N. Caledonia, Fiji, New Zealand, &c. ...	15	11	4
Habitat unknown... ..	2	—	—
	137 sp.	91 sp.	9 sp.

In this paper three new genera of Gryllacridæ and two of Stenopelmatidæ are added. Described as new of the former are 18 species and of the latter three, thus raising the totals of the Gryllacridæ to 155 species in 14 genera, and the others to 94 species in 39 genera, and for Australia and Polynesia alone to 39 species of Gryllacrids in 10 genera, and 18 species of Stenopelmatids in 11 genera.

In glancing at the above table it will be noticed that Europe is the only continent from which the Gryllacrids are wholly absent, while in Asia and the adjoining Austral-Polynesian regions they attain their greatest development (119 sp.), the tropical and temperate zones forming their exclusive habitat. The Stenopelmatids show a different distribution. Being found in all continents, of which Europe contains the fewest, they reach their greatest development in the widely-separated African and North American regions, the intermediate Asiatic-Australasian region only furnishing a moderate variety, notwithstanding its immense extent. Strange to say, South America and the West Indian Island furnish the minimum of both families, notwithstanding most favourable climatic conditions, and for which the want of sufficient exploration can scarcely afford an adequate explanation.

The individuals of both families are nowhere numerous or even common. Their habits are extremely retired, and little known in detail. Many species are undoubtedly nocturnal, notably those of almost uniformly dingy or dark colouring; while the tiger-like banding of black and yellow of many Australian species appears to denote diurnal activity among grass. Some species of the Stenopelmatids never see the light of day, exclusively inhabiting dark caves. All cave-inhabiting Orthoptera belong to that family.

Most of those Australian Gryllacridæ which have been observed by me live by day in hollows under logs of wood, stones, vegetable rubbish, in disused outhouses, &c.; many inhabit hollow spaces under bark on the trunks and thicker branches of Eucal-

ypts, their lair having two openings usually. While at rest in these, their head is near and toward one of the openings; the long, highly flexible antennæ being stretched behind towards the other, so as to receive timely warning of the approach of an enemy or prey from that direction. When disturbed they prove very nimble and swift runners, but do not as a rule take to-wing in daylight or in wet weather, but do so at night, or even in cloudy afternoons before sunset. If handled incautiously they are able to inflict severe bites, drawing blood readily, their mandibles being very strong, sometimes of enormous size, and the largest in general among insects. Being carnivorous, they are highly beneficial in assisting to keep down other species that would be highly injurious to agriculture if increasing without check.

I. GRYLLACRIDÆ.

The GRYLLACRIDÆ are distinguished from all other Locustids (1) by the delicate, mantis-like structure of their wings, which are richly provided with veins and veinlets, but without tympanal organs; (2) the long, articulately-inserted, movable spines on the under side of the fore and middle tibiæ; and (3) the lobe-like lateral expansion of the tarsal joints. The last abdominal segment of the male is also very abnormal, the eighth being usually enlarged, still more so the ninth, becoming cucullate and enclosing the anal organs. Brunner has figured eight different types, without, I think, exhausting them. These, however, are scarcely generally useful for more than specific distinction when both sexes are known, and assist in no wise the mating of individuals, because no corresponding structure or proportionate character exists in females.

Presence or absence of wings forms a good character to separate the family into three groups, as the organs of flight are either perfect, more or less rudimentary or wholly absent. When rudimentary, it is easy, as pointed out by Brunner long ago, to distinguish adults from nymphs by observing whether the anterior or costal margin is directed upwards or downwards, the latter infallibly denoting the adult, the former the nymph-stage. The size, shape, and venation of the wing-lobes form good specific or even generic characters.

The anterior (perfect) organs of flight, known as elytra or tegmina, are so richly and variably supplied with veins and veinlets, that their venation is useless for the object of diagnosis, while the form of the apex can only be employed in closely-related species.

The posterior or real wings, however, afford good characters for distinction by the various colouring of veins and membrane.

These are either uni-colourous or of different tints, the veins and veinlets being either lighter or darker than the membrane, or *vice versa*, or the former lined on either side more or less by lighter or darker borders.

The chest or pectus is of very uniform structure, and only in the genus *Epacra* are there any prominent lobe-like expansions

The ovipositor is more or less straight in the adult, of considerable length usually, and stout at the base, where the lower valves are sharply turned up and quite enclosed by the upper ones. The apex is smooth and shining, neither acute nor serrated. In the nymph-stage it is shorter than in the adult, and often (if not always?) shortly incurved from near the base and carried over the back. Its length, curvature, &c., afford good characters.

Size and proportions of the various species appear to be fairly constant, also the colouring, which cannot be neglected in determination.

The most prominent characters are, however, found in the number, size, and arrangement of the spines of the legs, especially of the under side of the hind femora and the upper side of the hind tibiæ, also the relation they exhibit in number and size to each other. The femoral spines are in four to five pairs in the majority of the Australian species examined by me, but are wanting wholly or partially in rare cases, or increase to nine. Those of the hind tibiæ are quite as variable. Even this character, however, cannot be wholly relied upon, as the numbers not only vary within the species, but actual disparity in the same individual may occur, obsolete spines being indicated by wider intervals or minute tubercles, and increase of numbers by intercalated spinelets separated by narrower interspaces. But the greatest uniformity prevails in regard to the movable spines of the fore and middle tibiæ, at least in those examined by me. Here the number is five on each margin, the only exception observed being a female of *Eonius tigrinus* with four pairs. The same remark applies to the spines of the under side of the hind tibiæ, the usual number being three. The subjoined table of the variations of the spines of hind femora and hind tibiæ will show the extent of the observed variability, rarely obscured by other characters, and also serve as a ready means of identification.

TABLE showing Variability of Spines of Hind Legs in the Species and Sexes of AUSTRALIAN GRYLLACRIDS and STENOPELMATIDS.

		Hind femora below.				Hind tibiae above.				
		Right Side.		Left Side.		Right Side.		Left Side.		
		intus	extus	intus	extus	intus	extus	intus	extus	
A. GRYLLACRIDÆ.										
Gryllacris magnifica	...	Fem.	9	4	8	4	5	4	5	4
atrogeniculata	{	Male	4	3	4	3	5	6	5	6
		Fem.	5	4	5	4	3	4	3	4
marmoriceps	{	M.	3	4	4	3	3	3	3	3
		F.	4	3	3	3	3	3	3	3
var. nigrifrons	{	F.	1	3	4	5	3	3	3	3
		M.	5	3	5	3	0	0	0	0
		F.	5	4	5	2				
		(nymph)	5	3	5	4	0	0	0	0
	"	5	2	4	3					
ferrotestacea	{	F.	4	3	4	4	5	4	5	4
		F.	3	4	4	4	3	4	5	4
lutescens	{	M.	5	4	5	4	6	4	4	4
		F.	4	4	4	4	4	4	5	4
		"	4	4	4	4	5	4	4	3
		"	4	3	4	3	4	4	6	4
	"	4	4	4	3	4	4	4	4	
straminea	...	—	2	6	4	7	6	6	6	6
subdebilis	...	—	4	7	4	2	5	7	6	5
incerta	...	F.	9	4	11	5	6	6	6	6
paulula	...	—	4	5	3	5	4	4	4	4
Molineusiana	...	—	8	8	9	8	7	6	7	6
Paragryllacris infuscata	{	M.	5	4	5	4	5	4	5	4
		F.	5	4	5	4	7	5	7	5
latelineolata	{	F.	5	4	5	3	3	4	2	4
		"	6	4	5	3	4	4	5	5
		M.	5	3	5	3	4	4	3	3
pallidolinea	{	F.	4	4	4	4	4	2	4	4
		"	5	3	5	4	4	4	4	4
		M.	5	3	4	3	5	4	6	4
var. minor	{	F.	4	3	0	0	4	3	3	3
		"	4	3	3	3	4	3	—	—
		insignis	...	M.	4	4	6	4	4	4	4
deserta	...	M.	2	3	3	3	3	5	5	5
Eonius tigrinus	...	F.	3	2	2	3	4	4	4	4
	...	"	2	2	2	2	4	4	4	4
atrofrons	...	F.	6	5	5	4	6	3	6	3
fumatus	...	F.	2	3	3	3	6	4	5	4
Apteronomus Bordaënsis	...	M.	5	2	5	4	6	5	5	5
	...	"	5	3	5	2	5	4	5	5
var. ?	...	"	0	0	0	0	5	4	5	4
Ametrosomus Helmsi	{	F.	6	5	7	8	9	7	10	6
		"	3	3	4	5	9	5	10	5
B. STENOPELMATIDÆ.										
Penthoplophora Driffeldi	...	F.	10	2	9	1	10	8	10	7
Pachypodagrus crassi-	{	M.	12	6	13	5	6	6	6	6
		"	12	5	12	4	6	5	6	5
		F.	12	6	12	7	9	8	6	6
pes	...	F.	12	6	12	7	9	8	6	6
Magareyi	...	F.	6	0	6	0	6	6	6	6

The following list of genera indicates their general distribution, and the systematic place of the new ones :—

- GRYLLACRIS, *Serv.*, all regions.
 DIBELONA, *Br.*, South America.
 HYPERBÆNUS, *Br.*, South America.
 PARAGRYLLACRIS, *Br.*, Australia.
 NEANIUS, *Br.*, Australia.
 EONIUS, *gen. nov.*, Australia.
 EREMUS, *Br.*, Old World.
 EPACRA, *Br.*, Australia.
 APOTRECHUS, *Br.*, Australia.
 APTERONOMUS, *gen. nov.*, Australia.
 AMETRUS, *Br.*, Australia.
 AMETROSOMUS, *gen. nov.*, Australia.
 SCHIZODACTYLUS, *Brullé*, Asia.
 COMICUS, *Br.*, Africa.

The principal work upon which this paper is based is Brunner's Monograph of the two families, Vienna, 1888, and his descriptions of the species not actually known to me are herein reproduced. The abbreviation "*Br.*" signifies that author's name.

GRYLLACRIS, *Serville*

Head short, globose. Occiput covered by pronotum. Vertex declined, fastigium usually wider than first antennal joint, margins obtuse, acute or keeled, and contiguous in a straight line with the frontal. Antennæ very long, usually about three times the body; joints numerous, first joint large, more or less gibbous. Eyes pear-shaped, rather prominent. Usually three ocelliform spots. Face broad, transverse or elongate. Cheeks rounded, and quite smooth. Mandibles strong. Pronotum short, truncate before and behind, disk uneven, more or less coloured; deflexed lobes roundly inserted and low, inferior margin straight. Elytra and wings *perfectly explicate*, former ample, more or less hyaline, many-veined, transverse veinlets very distinct, more or less brownish, alike in both sexes. Hind wings cycloidal, hyaline and diversely coloured, veins and veinlets often bordered brownish. Pectus narrow, *meso- and meta-notum obscurely triangular*. Fore coxæ armed with a spine. Fore and middle femora compressed, sulcate below, unarmed. Hind femora compressed, dilated cricket-like, sulcate below, the margins more or less spined. Fore and middle tibiæ terete above, with 4-5 articulately inserted spines on each margin below. Hind tibiæ *flattened above, with (mostly) five spines on either side, also three short apical spurs*. Three first tarsal joints *broadly lobed laterally, lobes of fourth joint much longer*, claws small. Abdomen obese, seventh and eighth segments of male more or less inflated, arched, latter often much

elongated, ninth segment narrow at apex, furcately deflexed, wholly enclosing the anus. Cerci elongate, pilose. Subgenital lamina of male *transverse with articulately inserted styles*. Ovipositor incurved, elongate, rarely straight, apex obtuse or obliquely truncate, superior valves enclosing the inferior at the base.

GRYLLACRIS CYANEA, Br. (Mon., 82).

"Head *brownish-blue*, *labrum black*, face with three citron-yellow ocelliform spots. Antennæ, first two joints brownish, remainder pale. Pronotum laterally with reddish ferruginous callosities, deflexed lobes bordered black. Elytra *testaceous*, transverse veinlets *broadly bordered with brown*. Wings smoky, veinlets bordered brown. Fore and middle legs *blackish blue*. Hind femora with upper longitudinal half ferruginous, lower blackish-blue, below with five internal and eight external spines. Hind tibiæ chestnut-brown. Ovipositor very straight and slender, brown, apex obtuse. Subgenital lamina triangularly emarginate.

				Female.
Length of body ...	...	...	...	27 mm.
Length of pronotum ...	...	...	...	5 "
Length of elytra...	...	...	...	21 "
Length of hind femora ...	...	...	...	16 "
Length of ovipositor ...	...	...	...	23 "

Habitat.—North Australia."

GRYLLACRIS MAGNIFICA, Br. (ibid, 83).

Size large. Head, pronotum, and legs brownish-black, or in reflected light dark-blue. Antennæ lighter or duller brown, or the basal half blackish. Face with impressed dots. Ocelliform spot rather small, triangular, oval, or orbicular, pale to bright yellow. Labrum and mandibles ferruginous to reddish. Pronotum with deep transverse furrows near fore and hind margins, a conspicuous rounded ridge preceding the latter; medial line narrow, impressed; lateral lobes somewhat higher behind, subangular, inferior margin rounded. Elytra testaceous, hyaline (white and opaque with spirit specimens); veins testaceous to brownish; transverse veinlets from deep brownish black to light brown. Wings pale smoky, or concolorous with elytra, veinlets narrowly bordered with brown, and forming very regular concentric lines. Hind femora below with eight to nine internal and four external pale spines with black tips. Hind tibiæ above with five internal and four external spinelets. Abdomen above with all the segments banded brownish or black at the base. Ovipositor nearly straight, very long, apex conical. Subgenital lamina of female triangular, apex rounded.

				Female.
Length of body	...	...	...	24-29 mm.
Length of pronotum	...	...	...	5 "
Length of elytra	...	...	...	45-52 "
Length of hind femora	...	...	...	13-16.5 "
Length of ovipositor	...	...	...	35-43 "

Habitat.—Port Adelaide, Lyndoch, &c., South Australia; Broken Hill, Central Australia (Coll. S.A. Mus.).

Brunner's description of this magnificent species is unmistakably applicable to the four specimens in the Adelaide Museum, but as they vary in size and colour, it has been slightly departed from. The insects live solitarily under logs, &c., when the ground is dry, or under the loosely-adhering dry bark of Eucalypts, usually about the thicker branches. They appear to be much rarer now than they were some thirty years ago.

Gryllacris atrogeniculata, spec. nov.

Size moderate. Head from front view broadly *oval*, testaceous, occiput and fastigium deep lustrous brownish black. Fastigium *rather more than twice the width of first antennal joint*. Ocelli-form spot scarcely distinct. Face, clypeus, labrum, base and first two joints of antennæ, and the palpi testaceous, borders of frontal fastigium, and a spot under each eye, deep brown. Pronotum with disk rotundately depressed or rounded, fore and hind-margin raised, convex; interruptedly impressed medial line broadly bordered with deep brown, the colour extending to scutellum. Elytra of male *exceeding abdomen by about half their length*, of the female *scarcely reaching base of ovipositor*, testaceous, veins and veinlets brown, apex subacute. Legs of body-colour, except *apex of femora* and *base of tibiæ*, which are *deep black*. Hind femora incrassated at the base only (female) or to the middle (male), below with four to five internal and three to four external spines. Hind tibiæ above with three to five internal and four to six external spines. Abdomen of male with eighth segment produced, ninth segment cucullate, sulcate, pilose. Subgenital lamina of male with the medial lobe *much extended, quadrate, apical angles produced laterally*, lateral lobes not extended, angular. Styles slender, pilose. Ovipositor stout, straight, apex incurved, obliquely acuminate from below, acute, finely serrated above.

		Male.	Female.
Length of body	...	25 mm.	32 mm.
Length of pronotum	...	4.5 "	6 "
Length of elytra	...	38 "	28 "
Length of hind femora	...	12 "	15 "
Length of ovipositor	...	—	12.5 "

Habitat.—Leigh's-Creek (*Poole*), The Peake, Central Australia (*Driffield*), (Coll. S.A. Mus.).

The species resembles Brunner's *G. nigrogeniculata* (male, Manilla) in general aspect, but the elytra are twice as long, the fastigium much wider, the spines of the hind femora much less in number, &c., hence I have considered the creation of a new species justifiable.

GRYLLACRIS MARMORICEPS, *spec. nov.*

Size moderate to large. Head oblong from front view, vertex much raised above pronotum. Face pale, with fine impressed dots; apex of labrum (male) or clypeus (female) brown, marginal ridges of cheeks dark brown, also the mandibles. Fastigium of vertex twice as wide (male) or wider (female) than first antennal joint, much depressed and flattened, marbled *paler and darker testaceous and traversed by black sinuous lines*. Lower ocelliform spot conspicuous, small, oval, acuminate above, pale-yellow; upper pair subtrigonal, dull, all bordered blackish, this colour extending to apex of fastigium, and continues in three sinuous black lines to posterior margin of occiput, two being lateral and one central, the former joined obliquely at two-thirds of their course (from front) to the middle one by emitting on either side a fine but often interrupted line, the central line being continued *from* the junction to the hindmargin; a depressed, pale, pyriform spot at the base of either of the antennæ borders and defines the frontal fastigium. Disk of pronotum straight, flattened, with a short black medial streak in front and a depressed line behind; fore margin convex, hindmargin nearly straight; deflexed lobes longer than high, nearly quadrangular, angles rounded, callosities promiscuous. Elytra more than one and a half times the length of body, veins slightly darker than body-colour. Wings rather longer than elytra, very pellucid, veins and veinlets not bordered darkly. Hind femora (male) with three or four external, and two internal spinelets (female with three). Hind tibiæ above with three or four very minute spinelets on either margin. Abdomen with ninth segment cucullate, *external margin densely but minutely spined, centrally with two very much longer spines*, remote from each other and the lateral ones. Ovipositor nearly straight, gradually tapering, apex dark, rugose, acuminate.

	Male.	Female.
Length of body...	34 5 mm.	37 mm.
Length of pronotum ...	6.5 "	7.5 "
Length of elytra ...	50 "	50 "
Length of hind femora...	17 "	18.5 "
Length of ovipositer ...	— "	39 "

Habitat.—Morgan, on the Lower Murray River, South Australia (*Evans*) (Coll. SA. Museum).

VAR. NIGRIFONS.

Size smaller than the typical form, which it resembles in aspect and in the markings of the head, but differing by a broad deep black band across the face, almost obliterating all other markings, except the small, nearly circular ocelliform spot. The size is very variable, also the number of spinelets of the hind femora, which vary from 3-5 external and 1-4 internal ones, the hind tibiae exhibit three on each upper margin with all the specimens before me. The antennae are about four times the length of the body.

	M.	M. (nymph)	F.	F.	F. (nymph)
Length of body	23 mm.	20 mm.	30 mm.	21 mm.	30 mm.
Length of pronotum...	4 "	4 "	5 "	5.5 "	6 "
Length of elytra	39 "	9.5 "	34 "	35 "	13 "
Length of hind femora	15 "	12 "	15 "	16.5 "	15 "
Length of ovipositor...	—	—	29 "	35 "	18 "

Habitat.—Ardrossan, Yorke's Pen. (M. & F., *Cadd*); vicinity of Adelaide (M. nymph, F. and F. nymph), South Australia (various contributions) (Coll. S.A. Museum).

The species with its variety is one of the best characterised among those examined on account of the constant markings of the head. Should the variety be deemed to deserve raising into higher rank, its varietal name might become the specific.

GRYLLACRIS LONGICORNIS, *spec. nov.*

Size large. Rusty testaceous, concolorous. Head from front view oblong-oval. Face rugose, with impressed dots, shining. Labrum (adults) oval-elongate. Clypeus subhexagonal, lateral sides shortest; above the latter *a short, conspicuous ridge* on each side, parallel, *directed towards the space between the eyes and antennae*. Antennae very long and slender, exceeding four times the length of body; first joint slender. Fastigium of vertex rounded, shiningly smooth, about four times the width of first antennal joint, apex slightly emarginate, apical and lateral margins *bordered narrowly with a pale line revolving upon itself, pale medial line continued to hind margin*. Space between these marginal lines, occiput and sides of head *minutely and irregularly marbled by fine pale lines*, area between them darker than the body-colour. Eyes elongate, black. Pronotum unmarked, anterior and posterior margins straight; lobes much longer than high, inferior margin straight, parallel; humeral sinus very small. Elytra and wings concolorous, pellucid; veins and veinlets of body-colour. Wings with transverse veinlets, bordered very narrowly with dark testaceous. Fore and middle legs long and slender; hind legs much incrassated at base; hind femora below

with two to four external and four to five internal spinelets, being variable on the left and right of the same individual. Hind tibiae above *scarcely flattened and unarmed*, or the spinelets almost imperceptible with a lens. Ovipositor very slender, nearly straight, gradually pointed, shorter in the nymph than the adult, and, being shortly recurved, is carried over the body. One adult female and two female nymphs.

	Female—Adult.	Nymphs.
Length of body ...	35 mm.	28 mm.
Length of pronotum ...	8 "	7 "
Length of elytra ...	46 "	9.5-10 "
Length of hind femora ...	16 "	15 "
Length of ovipositor ...	27 "	12-15 "

Habitat.—Palmerston, Northern Territory of South Australia (presented by the Hon. S. J. Magarey, M.B.) (Coll. S.A. Museum).

GRYLLACRIS FERROTESTACEA, *spec. nov.*

Size rather large. Ferruginous testaceous, concolorous. Head from front view oval. Face rugose; labrum *subcircular, raised basal part small*. Clypeus transverse, *anterior and posterior margins straight*. Mandibles and eyes black. Ocelliform spot of body-colour, elongate, acute above. Fastigium of vertex highly arched, twice as wide as first antennal joint, apex more or less emarginate, unmarked. Antennae about two and a half times as long as the body, and of the colour of the latter entirely. Pronotum with the disk somewhat saddle-shaped, flattened, and with a depressed medial line; fore and hind margins convex, former sometimes with a short black line, latter with a black band; lobes *slightly longer than high*, margins straight, angles rounded. Elytra and wings long, concolorous; veins ferruginous, veinlets paler, membrane pellucid. Hind femora stout, below with four spinelets on each margin usually. Hind tibiae above with four external and five internal spinelets. Ovipositor very slender, considerably incurved, *finely hirsute*; apex gradually acuminate, not acute; inferior keels *short, enclosing a small circular depressed area*.

	Female.
Length of body ...	27-34 mm.
Length of pronotum ...	5 "
Length of elytra ...	50 "
Length of hind femora ...	15-17 "
Length of ovipositor ...	44-45 "

Habitat.—Northern Territory of South Australia (presented by Dr. S. J. Magarey) (Coll. S.A. Museum).

This species resembles *G. lutescens* in general aspect, but the colour and various other distinctions render it advisable to separate the two for the present, until the discovery of the other sex will decide the question.

GRYLLACRIS LUTESCENS, *spec. nov.*

Size large. Pale dirty yellow. Eyes, *fore and hindmargins of pronotum*, bases of abdominal segments, banded black or blackish. Head oval, wider than the pronotum, face slightly rugose with irregular impressed dots, ridges not conspicuous. Labrum almost *circular*, the *middle of base suborbicularly raised* with a medial depressed line continued over the clypeus, which is transverse, posterior margin curved. Frontal fastigium short, inferior limit undefined. Ocelliform spot oblong, acute above, *ivory white*. Space between the antennæ mostly *blackish*, and *enclosing the three pale spots*. Fastigium of vertex short, about one and a-half times the width of first antennal joint, with conspicuous lateral keels, unmarked. Antennæ very slender, pale, about four times the length of body. Eyes black. Pronotum with *fore margin straight*, more or less marked with black, hindmargin *rounded*, produced, *bordered broadly with black*; lobes slightly higher in front, margins straight, angles rounded. Elytra and wings testaceous, pellucid. Transverse veinlets of the latter pale, very slightly bordered dusky. Hind femora below with four spinelets on each margin usually. Hind tibiae above with five to six external and four internal spinelets. Abdomen of male with ninth segment cucullate (Brunner's type "D"), internal margin *not dentate*, but *centrally with two long spines*. Subgenital lamina of male *deeply trilobate*, each lobe again *emarginate*. Ovipositor sword-shaped, slender, apex conical. Subgenital lamina of female oboval, keels widely separating, extending to the apex. One male, four females.

	Male.	Female.
Length of body ...	30 mm.	28-37 mm.
Length of pronotum ...	5 "	5-5.5 "
Length of elytra ...	47 "	36-40 "
Length of hind femora	15 "	15-17 "
Length of ovopositor...	— "	33-40 "

Habitat.—Innaminka, Central Australia, &c. (Coll. S.A. Museum).

GRYLLACRIS DIMIDIATA, *Br. (Mon. 87).*

"Size large. Colour brownish testaceous. Face black. Femora all black below. Knees testaceous, also all the tibiae.

			Female.
Length of body ...	...	...	30 mm.
Length of pronotum ...	...	...	8 "
Length of elytra ...	...	...	39 "
Length of hind femora ...	...	...	20 "
Length of ovipositor ...	...	...	25 "

Habitat.—New Britain."

GRYLLACRIS EXCELSA, *Brunner* (Mon. 107, fig. 41, D.).

"Size large. Colour testaceous. Head brownish. Labrum testaceous. Antennæ brown. Femora below and at apex brownish.

		Male.	Female.
Length of body	... ..	48 mm.	42 mm.
Length of pronotum	... ..	11 "	11 "
Length of elytra	... ..	38 "	35 "
Length of hind femora	... ..	26 "	23 "
Length of ovipositor	... ..	—	26 "

Habitat.—Duke of York Island."

GRYLLACRIS APPENDICULATA, *Br.* (ibid 108, fig. 41, H.).

"Size small. Brownish ferruginous, with piceous marks. Occiput and pronotum with brownish lines, latter also with two lateral brown lines, but without the medial line. Wings hyaline, transverse veinlets bordered brownish.

		Male.	Female.
Length of body	... ..	28 mm.	32 mm.
Length of pronotum	... ..	7 "	7.8 "
Length of elytra	... ..	27 "	31 "
Length of hind femora	... ..	18 "	19 "
Length of ovipositor	... ..	—	20 "

Habitat.—New Britain."

GRYLLACRIS AURANTIACA, *Br.* (ibid 112).

"Size small. Ferruginous. Fastigium of vertex depressed, margins keeled. Wings deeply orange at the base, fore part without brown marks, the brownish bands distinctly circumscribed. Abdomen of male with ninth segment rounded. Ovipositor falcate. Subgenital lamina of female flat.

		Male.	Female.
Length of body	... ..	28 mm.	27–31 mm.
Length of pronotum	... ..	6.5 "	7–7.8 "
Length of elytra	... ..	27 "	27–29 "
Length of hind femora	... ..	16 "	16–18 "
Length of ovipositor	... ..	—	1–17 "

Habitat.—New Britain, Amboyna."

GRYLLACRIS DUBIA, *Le Guillon* (ibid 111).

"Deeply ferruginous. Wing concolorous, pale, hyaline, veins and veinlets pale. Hind femora below with ten very minute spinelets on each margin. Fore tibiæ above brownish, streaked with blackish, also hind femora.

				Female.
Length of body ...	...	...	...	22 mm.
Length of pronotum ...	...	...	...	5.6 "
Length of elytra ...	...	...	...	20 "
Length of hind femora ...	...	...	...	14.8 "
Length of ovipositor ...	...	...	...	16 "

Habitat.—Fiji Islands."

GRYLLACRIS OCEANICA, *Le Guillon* (Br. Mon., 112).

"Pale reddish-yellow, medial ocelliform spot small, labrum brownish-yellow, mandibles brownish-red, palpi testaceous, elytra subpellucid, all the tibiae brownish in the middle. Abdomen brownish above." Length of body of male, 19 mm. (Original description, 1841).

Habitat.—Hamoia (most probably SAMOA) Island."

GRYLLACRIS STRAMINEA, *Br.* (ibid, 115).

Size moderate. Straw-coloured. Head oblong from front view, depressed. Face brownish-ferruginous, mandibles much darker; medial line raised, uncoloured; ocelliform spot large, angularly oval, yellowish-white, extending almost to the apex of frontal fastigium. Eyes black, elongate-oval. Fastigium of vertex scarcely as wide as the first antennal joint; apex prominent, ferruginous, slightly sulcate. Antennae wholly pale, concolorous with body; about five times the length of the latter; first joint longer than the eyes. Pronotum with the disk very uneven, medially depressed, foremargin rotundately produced, hindmargin almost straight, shortly emarginate; lobes with the inferior margin semicircular, deeply sulcate. Elytra and wings very pale and pellucid, veins and veinlets concolorous with membrane, in length slightly exceeding the ovipositor, apex of former acuminate. Legs rather short. First spine of fore and middle tibiae longest, the others gradually shorter. Hind femora below, with two to four internal and six to seven external spinelets, mostly very small. Hind tibiae above, with six spinelets on each margin. Ovipositor curved downward at the base, then almost straight; apex incurved, gradually acuminate, shining. One female.

		Male (<i>Brunner</i>).	Female.
Length of body ...	...	24 mm.	22 mm.
Length of pronotum ...	...	4.5 "	4 "
Length of elytra...	...	36 "	36 "
Length of hind femora ...	...	14 "	14 "
Length of ovipositor ...	...	—	19 "

Habitat.—South Australia (Adelaide, *Brunner*) (Coll. S.A. Museum).

In so assigning the female in the South Australian Museum, from which the above description has been mainly drawn up, it must be remarked that, though slightly shorter in the body, it agrees very well with the principal characters, the differences being sexual and individual.

GRYLLACRIS LIGATA, *Br.* (Mon., 115).

"Size large. Pale testaceous. Head pale, face with a broad, deeply black transverse band; also the pronotum. Ovipositor narrow, acuminate, incurved.

		Male.	Female.
Length of body	... ..	45 mm.	47 mm.
Length of pronotum	... ..	8 "	10 "
Length of elytra	... ..	43 "	48 "
Length of hind femora	... ..	18 "	22 "
Length of ovipositor	... ..	—	33 "

Habitat.—New Britain, and New Hanover Islands."

GRYLLACRIS DEBILIS, *Br.* (ibid, 116).

"Size small. Pale ferruginous. Fastigium of vertex rounded, one and a half times the width of first antennal joint. Ocelliform spot scarcely distinct. Elytra obtuse, subpellucid. Wings cycloidal, hyaline. Femora at apex and base of tibiæ reddish. Hind femora below, with four internal and five external spines. Ovipositor slender, scarcely incurved, and scarcely exceeding the hind femora, acuminate. Subgenital lamina of female obtusely triangular.

				Female.
Length of body	... ..	... ..	... ..	21 mm.
Length of pronotum	... ..	... ..	... ..	4 "
Length of elytra	... ..	... ..	... ..	18 "
Length of hind femora	... ..	... ..	... ..	10.5 "
Length of ovipositor	... ..	... ..	... ..	12.5 "

Habitat.—North Australia."

GRYLLACRIS SUBDEBILIS, *spec. nov.*

Size small. Uniformly testaceous. Head from front view sub-orbicular, depressed. Face with indistinct *pale medial line*, *ocelliform spots none*. *Eyes and mandibles black*. Fastigium of vertex twice as wide as first antennal joint; lateral ridges near apex narrowly brownish; also a small spot on each side of superior external angle of clypeus. Antennæ about twice the length of body, and of the same color. Pronotum with disk sub-triangular, medially depressed; fore and hindmargins raised, former convex, latter concave; lobes deeply sulcate, inferior margin slightly rounded, angles subrotundate. Elytra scarcely

exceeding the ovipositor, concolorous. Wings shorter, similar to elytra. Legs long, pale. Hind femora below with four external and seven internal spinelets (on the right, while there are only two on the left). Hind tibiae above with five to seven external and five to six internal spinelets. Ovipositor *short, much incurved, acuminate*, and with a *fuscous line on each side*.

	Female.			
Length of body...	16 mm.
Length of pronotum	4 "
Length of elytra	21 "
Length of hind femora...	12.5 "
Length of ovipositor	7.5 "

Habitat.—Northern Territory of South Australia (Coll. S.A. Museum). (Presented by Hon. S. J. Magarey, M.B.).

This species appears to be allied to *G. debilis*, Br., but differs from it and all others examined in the structure of the pronotum, elytra, and ovipositor, the latter especially being remarkably short.

GRYLLACRIS FERRUGINEA, *Brunner* (Mon., 117).

"Size small. Deeply ferruginous. Resembling *G. debilis*. Pronotum deeply sulcate. Elytra deeply ferruginous. Hind femora below with 10 spinelets on each margin.

	Male.		Female.	
Length of body	10 mm.	21	mm.
Length of pronotum	...	5.6 "	5.6	"
Length of elytra	...	19 "	19	"
Length of hind femora...	...	13 "	13	"
Length of ovipositor	...	—	14	"

Habitat.—Fiji Islands."

GRYLLACRIS EXIGUA, *Br.* (ibid, 117).

"Size very small. Testaceous. Fastigium of vertex scarcely wider than first antennal joint, obtuse. Antennae very long. Elytra ferruginous, less than one and a half times the length of the hind femora. Latter below almost smooth. Described from a specimen without body.

Length of pronotum	...	...	...	3.5 mm.
Length of elytra	...	...	...	10 "
Length of hind femora	...	...	...	8.5 "

Habitat.—New Caledonia."

GRYLLACRIS HYALINA, *Br.* (ibid, 117).

"Size moderate. Straw-coloured. Fastigium much wider than first antennal joint. Ocelliform spot citron-coloured, elliptical. Elytra acuminate, straw-coloured, subpellucid, two and a

half times longer than hind femora. Wings obtuse, triangular, subhyaline. Hind femora with eight internal and five external spinelets. Ovipositor almost straight, acuminate. Subgenital lamina of female triangular, with incurved sides, apex truncate.

				Female.
Length of body ...	...	...	...	18 mm.
Length of pronotum ...	...	...	...	4 "
Length of elytra ...	...	...	...	25 "
Length of hind femora ...	...	...	...	10 "
Length of ovipositor ...	...	...	...	14 "

Habitat.—Australia."

GRYLLACRIS GEMINA, *Br.* (Mon., 17).

"Resembles the preceding, but differs by the fastigium being scarcely wider than the first antennal joint; elytra nearly three times the length of the hind femora, latter dotted with black, all the tibiae at the base indistinctly blood-red, and the subgenital lamina of the female very little emarginate.

				Female.
Length of body...	...	...	...	18 mm.
Length of pronotum ...	...	...	...	4 "
Length of elytra ...	...	...	...	32 "
Length of hind femora...	...	...	...	11.5 "
Length of ovipositor ...	...	...	...	14 "

Habitat.—North Australia."

GRYLLACRIS MAJOR, *Br.* (ibid, 118).

"Size moderate. Straw-coloured. Fastigium scarcely wider than first antennal joint, flattened. Ocelliform spot large, citron-coloured. Elytra very large, acuminate, about three times larger than hind femora. Latter with seven to eight long spinelets on each margin. Tibiae blood-red about the base. Ovipositor distinctly incurved. Subgenital lamina of female obtusely triangular.

				Female.
Length of body ...	...	...	...	21 mm.
Length of pronotum ...	...	...	...	5 "
Length of elytra...	...	...	...	41 "
Length of hind femora ...	...	...	...	13 "
Length of ovipositor ...	...	...	...	21 "

Habitat.—Sydney, N. S. Wales."

GRYLLACRIS ADVENTA, *Br.* (ibid, 118).

"Resembles the last. Fastigium with subcarinate margins narrower than first antennal joint. Hind femora below with

four to five spinelets on each margin. Ovipositor nearly straight, apex suddenly incurved, acuminate. Subgenital lamina of female narrow in the middle, apex truncate, quadrangulately emarginate.

	Female.			
Length of body	23 mm.
Length of pronotum	4.5 "
Length of elytra	34 "
Length of hind femora	12 "
Length of ovipositor	17 "

Habitat.—Queensland."

GRYLLACRIS INCERTA, *spec. nov.*

Size rather large. Pale testaceous. Head from front view subglobose, much wider than pronotum. Face pale, nearly smooth, shining. *Clypeus shortly subtriangular, emarginate.* Labrum short, broader than long, base narrow, with a ridge fitting into the emargination of the clypeus. Mandibles deep black. Ocelliform spot inconspicuous, orbicular. Fastigium of vertex tumid, termination indistinct, about three times as wide as first antennal joint; subtriangular space between apex and spot whitish, with reddish borders. Pronotum very round, foremargin straight, hindmargin *slightly emarginate*; lobes *higher than long*, margins nearly straight, angles rounded. Elytra broad, twice as long nearly as the body; veins and veinlets of body colour. Wings as long as elytra, pellucid, veinlets pale. Hind femora below with four to five external and ten to eleven internal spinelets. Hind tibiae above, with six spinelets on each margin. Ovipositor slightly acuminate, somewhat dilated towards the apex, but not acute, and unarmed. Subgenital lamina of female broad, deeply and widely emarginate.

	Female.			
Length of body	32.5 mm.
Length of pronotum	5 "
Length of elytra	54 "
Length of hind femora	17 "
Length of ovipositor	32 "

Habitat.—Leigh-Creek, South Australia (*A. A. Poole*, in Coll. S.A. Museum).

There being only a specimen of the female in the collection, the claim to specific rank is perhaps uncertain; but the form of the clypeus, labrum, pronotal lobes, and subgenital lamina distinguish it from all the others. The ova removed from it are oblong-cylindrical, pale testaceous, measure 4.5–5 mm. in length and 1.25 mm. in transverse diameter, and under a Coddington lens, exhibit close, regular, and oblique lines in transverse sets.

GRYLLACRIS PAULULA, *spec. nov.*

Size small. Testaceous. Head oval from front view. Face with upper part blackish-brown variegated, *the lower border extending from below the eye in a semicircular curve to or partly over the clypeus*, with undefined, though distinct, outline; remainder of latter and the labrum pale; mandibles ferruginous, palpi pale. Ocelliform spot oval, acute above, pale yellow. Eyes elliptical, wider above. Fastigium of vertex one and a half times the width of first antennal joint, apex conical, disk in front *rather deeply depressed, bordered by high narrow keels*; exteriorly with a whitish oval spot on each side behind the antennæ, dark-brown (also occiput), and with a fine pale, indistinct medial line. Pronotum saddle-shaped, front straight, with a narrow triangular black spot in the middle; hindmargin straight, slightly raised, with a blackish-brown band extending beyond the humeral sinus; lobes rather high, subangular, margins almost straight. Elytra with apex rounded, veins ferruginous. Wings paler, veins and veinlets scarcely darker than membrane, pellucid. Legs rather long, fore and middle tibiæ, also all knees, pale blackish-brown. Hind femora stout, below with three to four internal and five external spinelets, the emargination between the last spine and the knee being short and deep. Hind tibiæ pale, with four spinelets on each margin. Abdomen, with base of all segments, *banded blackish-brown, dorsally and laterally*. Ovipositor slightly incurved, apex acuminate, subacute, smooth. Subgenital lamina of female semicircular, with two strong keels below. Two females.

				Female.
Length of body	...	...	...	23--25 mm.
Length of pronotum	...	...	...	3-- 4 "
Length of elytra	...	...	...	25--27.5 "
Length of hind femora	...	...	...	11--13 "
Length of ovipositor	...	...	...	30--34 "

Habitat.—S. Australia; Western Plains (A. J. Percy), Monarto (Tepper) (Coll. S.A. Museum).

Allied in size to *G. subdebilis*, and in wing structure to *G. atrogeniculata*, but differing from either by the marking of the face, form of fastigium, the banding of the abdomen, &c.

GRYLLACRIS MOLINEUSIANA, *spec. nov.*

Size small. Pale testaceous. Head from front view subcuneiform, almost flat above. Face blackish-brown, apex of fastigia, disk of clypeus and labrum dark-reddish, margins darker, medial line obsolete, ocelliform spot large, broadly oval, bright yellow, lateral spots on external sides of fastigium also bright yellow. Eyes greyish-brown. Fastigium of vertex about

one half wider than first antennal joint, same as body-colour. Antennæ not much exceeding the elytra in length. Pronotum with disk almost evenly rounded, slightly constricted behind, medial impressed line ending at posterior furrow, foremargin slightly rounded, hindmargin produced, rounded. Elytra and wings ample, veins mostly pale reddish-brown, membrane of body-colour, pellucid, apex bluntly acuminate. Fore and middle tibiæ, also all the tarsi, crimson. Hind femora below with eight external and eight to nine internal spinelets. Hind tibiæ above with seven internal and six external spinelets. Abdomen above the last segment *pitchy and deep black*, eighth segment enlarged, ninth segment with *apex wasp-like acuminate*. Subgenital lamina of male *very short, medial lobe spine-like, lateral lobes almost obsolete*. Styles longer than cerci, both pilose.

	Male.			
Length of body	18 mm.
Length of pronotum	3.5 "
Length of elytra	33 "
Length of hind femora...	12 "

Habitat.—Wirrabara Forest Reserve, South Australia (Coll S.A. Museum).

The specimen described was captured and presented by A. Molineux, Esq., F.L.S., the active Secretary of the Bureau of Agriculture, and is dedicated to him as a slight acknowledgment of his unobtrusive and disinterested zeal in promoting natural history for many years. The species is distinct from all others by the intense dark colour of the terminal abdominal segments, the ninth approaching Brunner's type "A," but the subgenital lamina presents quite a different aspect. The external darkly! tipped spines of the hind femora are much larger than the internal, the more or less red-coloured ones of the hind tibiæ are almost equal in size.

PARAGRYLLACRIS, *Gerstaecker* (Brunner, Mon., 369, fig. 44).

Habits of *Gryllacris*, but differing in the form of the subgenital lamina of the male, the latter possessing no *articulately* inserted styles, and the hind femora (in the typical form) being armed with five to seven minute spinelets.

Fastigium of vertex usually twice as wide as the first antennal joint. Elytra ample, obtusely acuminate, never obtuse, veins and veinlets more or less infusate. Wings subhyaline, never striped. Hind femora below with rather stout spines, often distant or absent. Fore and middle tibiæ below with five pairs of spines. Hind tibiæ above with five spines usually on each side. Abdomen of male with the eighth dorsal segment normal, the ninth more or less hood-like, the hindmargin truncate or

allous-appendiculate. Subgenital lamina of male broad, transverse, medially lobed, laterally with style-like appendages. Ovipositor always nearly straight, very long and slender. Subgenital lamina of female very transverse.

Species all Australian.

I have retained Brunner's genus, and included some new species that appeared to conform to the characters, but doubt whether it can be maintained as more than a subgenus to *Gryllacris*, because the main distinctions appertain to the male sex alone, which is very inconvenient, it not always being possible either to have *both* sexes handy, or to mate individuals correctly, when not caught *in coitu*. Concerning the number of spinelets of the hind femora, it has been shown already that they are too variable even individually to serve as a reliable guide. It is therefore quite possible that some of my species under this genus may have to be transferred to *Gryllacris* upon better acquaintance, and *vice versa*.

PARAGRYLLACRIS COMBUSTA, *Gerstaecker* (Br. Mon., 370, fig. 44a).

"Testaceous, shining. Pronotum marked with black. Face deep black, concolorous, or with a yellowish spot. Occiput testaceous, marked brownish. Medial vitta large, trifoliate. Veinlets of elytra paler than membrane.

	Male.	Female.
Length of body ...	32 mm.	37 mm.
Length of pronotum ...	7.5 "	8 "
Length of elytra ...	37 "	38 "
Length of hind femora...	18 "	18 "
Length of ovipositor ...	— "	23-26 "

Habitat.—Sydney, N.S. Wales; Rockhampton, Queensland; Lord Howe's Island."

PARAGRYLLACRIS INFUSCATA, *Br.* (Mon. 371).

Testaceous. Head deep black (or partly dark brown), except hind margin of cheeks, ocelliform spot, clypeus, labrum and palpi, which are testaceous. Fastigium of vertex one and a-half times to twice as wide as first antennal joint, depressed, margins keeled. Antennæ first and second joints pale, remainder black (or brown). Pronotum testaceous (or brownish), hindmargin black, anterior angles acute (or rounded?). Elytra and wings ample, hyaline, veins and veinlets brownish. Femora all brownish at the apex. Hind femora with four to five spinelets on each margin. Fore tibiæ blackish, except at apex (or only about the knees), spines testaceous. Hind tibiæ above with (four to seven) black (or black tipped) spinelets. Ovipositor not (or not much) longer than hind femora, gradually incurved, acuminate. Sub-

genital lamina of female short, transverse, margins rounded (subsemicircular). Keels wide apart. Subgenital lamina of male hooded (cucullate) in the form of Brunner's type "C." Cerci small, visible from the side above the lateral lobes.

	Male (m.).	Female (m.).	Female (Br.).
Length of body ...	33 mm.	38 mm.	35 mm.
Length of pronotum ...	6.5 "	6.5 "	6 "
Length of elytra ...	38 "	40 "	47 "
Length of hind femora ...	16 "	15 "	16 "
Length of ovipositor ...	—	33 "	15 " (?)

Habitat.—South Australia: Blakiston (*T. D. Smeaton*), Adelaide (*Selway*), (Coll. S.A. Museum), (Adelaide, *Brunner*).

There is some doubt whether I have correctly assigned my specimens to Brunner's species, but it is the only one which they at all approach in general aspect, and I deem it inadvisable to constitute a new one for their reception.

PARAGRYLLACRIS CALLOSA, *Br.* (ibid, 371, fig. 44 B).

"Testaceous chestnut. Occiput brown. Fastigium of vertex one and a-half times wider than first antennal joint, flattened. Face and antennæ testaceous. Pronotum concolorous. Elytra acuminate, of smoky colour, also the wings; veins and veinlets brownish, latter 'perfect.' Hind femora below unarmed, or with two to three spinelets. Abdominal segments bordered brownish. Eighth abdominal segment of male not produced, ninth segment horizontally produced, triangularly emarginate, on both sides with a very prominent callous tubercle. Ovipositor very long and straight.

	Male.	Female.	Female.
Length of body ...	28 mm.	28 mm.	38 mm.
Length of pronotum ...	6 "	6 "	8.5 "
Length of elytra ...	38 "	28 "	55 "
Length of hind femora...	16 "	16 "	20 "
Length of ovipositor ...	—	37 "	36 "

Habitat.—Port Denison, Sydney, N.S. Wales; Melbourne, Victoria."

PARAGRYLLACRIS LATELINEOLATA, *Br.* (Mon., 128, fig. 44 C).

Variety (?). Pale yellow. Fastigium of vertex flat, one and a-half times to twice as wide as first antennal joint, margins acute. Face and clypeus rough with impressed dots, testaceous (to dark brownish). Labrum and mandibles reddish ferruginous. Antennæ ferruginous (or first two joints pale). Pronotum with anterior angles produced, somewhat acute, fore and hind margins striped brownish. Elytra subhyaline, veins ferruginous, transverse veinlets bordered darkly very narrowly. Hind femora

below with three to four spinelets on each margin. Knees all brownish. Eighth abdominal segment of male very parabolically produced, ninth segment orange-coloured, much elongated, cucullate, truncate. Subgenital lamina of male transverse, middle lobe short, emarginate, lateral lobes almost as long, styliform, terete. Ovipositor very narrow, slightly incurved; seventh ventral segment of female trapezoidal. Subgenital lamina of female ample, rotundate margin obtuse.

	Male (Br.).	Female (Br.).	Female (m.).	Female (m.).
Length of body ...	33 mm.	36-40 mm.	33.5 mm.	32 mm.
Length of pronotum	6.5 "	7- 8.5 "	6.5 "	6.5 "
Length of elytra ...	38 "	40-46 "	36 "	38 "
Length of hind femora	17 "	20-22 "	13 "	15 "
Length of ovipositor	—	40 "	43 "	42 "

Habitat.—South Australia: Vicinity of Adelaide (Coll. S.A. Museum). Melbourne (*Brunner*).

The two specimens in the South Australian Museum are doubtfully included in this species as a variety. The bracketted parts of the above description denote the differences. Some ova were obtained from one specimen. They are brown, elongate-elliptical, 4.5 mm. long by 1.3 mm. wide, and ornamented by regularly arranged microscopical impressions.

PARAGRYLLACRIS PALLIDOLINEA, *spec. nov.*

Size moderate or large. Brownish testaceous. Head globose from front view; occiput high. Face, clypeus and cheeks rugose, pale, almost whitish testaceous. Labrum ferruginous. Ocelliform spot pyriform. Frontal fastigium deeply sulcate laterally, apex separated from fastigium of vertex by a straight line. Fastigium of vertex about twice as wide as first antennal joint, much rounded, prominent, shining, with a *pale, somewhat sinuous, medial line, indistinct, pale, cerebriform reticulations all over it and extending to occiput*; posterior margin of the latter pale. Pronotum stout; fore and hind margins more or less broadly blackish, an acute prolongation of the anterior blackish band accompanying the impressed medial to about the middle; fore and hind margins nearly straight; lobes much longer than high, margins nearly straight, angles rounded. Dorsal abdominal segments with obscure posterior margins. Elytra ample, veins and veinlets brown, membrane much paler. Wings slightly exceeding elytra, veins ferruginous, transverse veinlets rather irregular, pale, often with a very narrow dark medial line and bordered narrowly with brownish on each side; membrane similar to elytra. Legs of body-colour, knees more or less dark. Hind femora stout, base very much incrassated, with a deep medial longitudinal furrow, below with three to four (male) or five

(female) external and five (male) or four (female) internal spinelets. Hind tibiae above with three to four spinelets on each margin in both sexes. Ninth abdominal segment of male hooded (type "C" of Brunner). Subgenital lamina of male with *four lobes of subequal length and width*.

	Male.	Female.
Length of body ...	31 mm.	38 mm.
Length of pronotum ...	5.5 "	6.5 "
Length of elytra ...	36 "	40 "
Length of hind femora ...	15 "	18-29 "
Length of ovipositor ...	—	35-40 "

Habitat.—Vicinity of Adelaide, South Australia; three specimens.

Variety.—MINOR. Resembling the above, but smaller.

	Male.	Female.
Length of body ...	27 mm.	28-30 mm.
Length of pronotum ...	5.5 "	6.5 "
Length of elytra ...	35 "	38 "
Length of hind femora...	15 "	17-18 "
Length of ovipositor ...	—	38 "

Habitat.—Neighbourhood of Adelaide; three specimens. (Collection S. A. Museum).

PARAGRYLLACRIS EXSERTA, Br. (Mon., 372).

"Differs from *P. latelineolata* in smaller size, brownish colour, and the transverse veinlets of the wings being narrowly circumscribed with brownish. Hind femora below with four internal and five external spinelets. Abdomen of male with the *last dorsal segment less produced*. Subgenital lamina with the medial lobe longer, *lateral lobes narrow, exsertedly produced*.

	Male.
Length of body...	28 mm.
Length of pronotum ...	5.8 "
Length of elytra ...	38 "
Length of hind femora...	15 "

Habitat.—Queensland."

PARAGRYLLACRIS LOBATA, Br. (ibid).

"Testaceous chestnut colour. Face brownish, very rugose with impressed dots. Ocelliform spot orbicular, citron yellow. Labrum and mandibles ferruginous. Elytra and wings smoke-coloured, transverse veinlets very narrowly bordered with brownish. Hind femora below, with six internal and three to four external spinelets. Abdomen of male with last segment moderately produced, chestnut-coloured, ninth segment ending in two very short spines.

				Male.
Length of body	...	...	30	--43 mm.
Length of pronotum	...	...	6.5	-- 8 "
Length of elytra	...	...	42	--44 "
Length of hind femora	...	...	19	--20 "

Habitat.—Rockhampton, Queensland."

PARAGRYLLACRIS MODESTA, *Br.* (ibid).

"Size small, deep brownish-testaceous. Fastigium of vertex scarcely wider than the first antennal joint, angles keeled. Face smooth. Pronotum with anterior angles obtuse. Elytra and wings smoky, veins and veinlets brown. Hind femora below with six internal and four external spinelets. Abdomen with last segments scarcely produced, ninth ending in two spines. Subgenital lamina with middle lobe tridentate, lateral lobes very narrow, longer than the middle.

				Male.
Length of body ..	...	...	24	mm.
Length of pronotum	...	...	5	"
Length of elytra	...	...	34	"
Length of hind femora	...	...	14.5	"

Habitat.—Port Adelaide, South Australia."

PARAGRYLLACRIS INSIGNIS, *spec. nov.*

Size small. Pale testaceous. Head oval from front view, slightly depressed, *all parts*, except the eyes, of *body colour*. Fastigium of vertex tumid in front, about twice as wide as first antennal joint. Antennæ about three times the length of body. Pronotum somewhat saddle-shaped, disk broad, flat, behind slightly depressed medially, constricted only near foremargin; lobes subquadrangular, angles rounded, margins straight, callosities scarcely developed; hind margin with a dusky border. Elytra broad, acuminate, veins pale ferruginous. Wings somewhat shorter, veins pale, membrane of both elytra and wings very pale and pellucid. Fore and middle tibiæ with second spine longest, concolorous. Hind femora below with four external, and five to six internal blackish-tipped spinelets. Hind tibiæ above with four external and three to four internal spinelets. Abdomen of male with *ninth segment enlarged, tumid* (resembling Brunner's type "A," but the subgenital lamina in the form of type "C"). Subgenital lamina of male with *medial lobe deeply emarginate, lateral lobes styliform*.

				Male.
Length of body	...	...	24	mm.
Length of pronotum	...	...	3.5	"
Length of elytrya	...	...	40	"
Length of hind femora	...	...	12	"

Habitat.—Western Plains, South Australia (A. J. Percy) (in Coll. S.A. Museum).

The species differs from others chiefly, by the want of colour marks, and the peculiar structure of the last abdominal segment, besides size and other details.

PARAGRYLLACRIS DESERTA, *spec. nov.*

Resembling *P. latelineolata*, Br. Size small. Pale testaceous. Fastigium of vertex *slightly carinate in front*, more than twice as wide than the first antennal joint; margins acute, subcarinate. Face and clypeus very rugose from impressed dots, testaceous. Medial ocelliform spot oval, citron coloured, laterally above two small ones testaceous. Labrum testaceous, above with a piceous triangular spot. Mandibles piceous to black. Antennæ pale ferruginous testaceous. Pronotum with the disk marked by a short black wedge-shaped streak in front and behind, bordered broadly piceous; lobes with anterior angles rounded. Elytra subhyaline, veins pale ferruginous. Wings similar, veins very narrowly bordered brownish. Hind femora below with *three spinelets* on each margin, knees brownish. Hind tibiæ above with five spinelets on each margin. Tibiæ of all the legs more or less blackish near the middle, apices indistinctly dark coloured. Abdomen with eighth and ninth segments *pilose*, otherwise resembling *P. latelineolata*. The subgenital lamina of the male also resemble those of that species, but the lateral lobes are *distinctly and unequally divided at the apex*, forming a shorter, broader, medial lobelet, and slender, styliform, lateral lobes.

	Male.			
Length of body	28 mm.
Length of pronotum	3.5 "
Length of elytra	32 "
Length of hind femora	9.5 "

Habitat.—Cootanoorina, interior of South Australia, where it was captured by Mr. R. Helms in June, 1891 (Coll. S.A. Mus.).

NEANIUS, *Brunner* (Mon., 373, fig. 45).

Body subapterous. Head large, as wide as pronotum. Vertex rounded, fastigium about twice as wide as first antennal joint. Pronotum smooth, shining, anterior angles rounded, hindmargin subemarginate. Elytra and wings rudimentary. Hind femora below with numerous spines. Fore tibiæ below with four spinelets on each side. Abdomen with ninth segment of male hood-like. Subgenital lamina of same transverse, middle lobe narrowly produced, lateral styles free. Ovipositor slender, slightly incurved. Species Australian and Asiatic.

NEANIUS LOBATUS, *Br.* (ibid).

"Testaceous. Face pale. Elytra with lobes rather broad, reaching to the hindmargin of the metanotum. Subgenital lamina of male broad, middle lobe narrow, dilated and bilobed at the apex.

				Male.
Length of body	...	...	...	17 mm.
Length of pronotum	...	...	...	5 "
Length of elytra	...	...	...	3.6 "
Length of hind femora	...	...	...	12 "

Habitat.—New Guinea."

The only other species known, *N. squamosus*, inhabits Ceylon.

EONIUS, *gen. nov.*

Subapterous. Head much wider than pronotum, occiput elevated, vertex rounded. Fastigium broad, apical part keeled. Antennæ twice longer (more or less) than the body. Pronotum smooth, shining; anterior angles rounded; hindmargin slightly concave. Elytra and wings very rudimentary. Fore and middle tibiæ below with three pairs of large spinelets, and one or two pairs of smaller apical spinelets. Hind femora below spinulose. Hind tibiæ above flat, and usually armed with four spinelets. Ovipositor slender straight, apex straight above, acuminate from below, acute.

The genus appears to be allied partly to *Neanius*, and partly to *Apotrechus*, but differs from the former in the very large head, broad fastigium, and long straight ovipositor, and from the latter in having rudimentary elytra, the pronotum wider behind, the hind tibiæ flat above, and the ovipositor being longer than the body. Its place in the system is indicated by the following synopsis:—

5. Elytra rudimentary, lobelike. Fore tibiæ with four pairs of spines.
6. Size small. Occiput slightly elevated. Lobes angular. Antennæ long. Hind femora with numerous spines. Hind tibiæ with four spines on each margin. Ovipositor shorter than the body *Neanius*.
- 6.6. Size large. Occiput much elevated. Lobes rounded. Antennæ short. Hind femora with two to three spines on each side. Hind tibiæ with four spines usually on each side. Ovipositor as long or longer than body. *Eonius*.

EONIUS TIGRINUS, *spec. nov.*

Size large. Yellow to testaceous, banded with black. Head oval from front view. Face black or piceous, almost smooth,

shining, with numerous fine oblique and irregularly transverse lines visible only with a lens. Frontal fastigium hexagonal, bounded below by an elbowed (paler or darker) impression and a straight line. Ocelliform spot round or oval, whitish. Clypeus subtransverse, lower part brownish. Labrum large, almost round, brownish. Fastigium of vertex about twice the width, or more, of first antennal joint, depressed, carinate in front, elevated and rounded above, deep castaneous with indistinct, pale, medial line. Antennæ less than twice the length of body, very slender, pale. Pronotum convex in front, concave behind, fore and hind margins black, lobes callous, almost as high as long, angles much rounded, inferior margin straight. Elytra and wings quite rudimentary. Hind femora with two to three spinelets on each margin below. Hind tibiæ above with *four spinelets on each margin*. Legs and tarsi of body-colour. Abdominal segments posteriorly bordered with deep brown or blackish. Cerci of female short. Ovipositor long, shining, yellow, apex black. Subgenital lamina transverse, very short, entire. One adult and one female nymph.

	Female—Adult.		Nymph.	
Length of body	41 mm.	27	mm.
Length of pronotum	6.5 “	5	“
Length of elytra...	...	2 “	1.5	“
Length of hind femora	15 “	15	“
Length of ovipositor	45 “	20	“

Habitat.—Mannanarie, Northern District of South Australia. (*Driffeld*, in collection of S.A. Museum).

The adult specimen was reported to have been captured in an uninhabited hut; the nymph is a spirit specimen, dried and much distorted, from an unrecorded locality, but most probably from the Far North of this province. The eggs taken from the specimen are elongate elliptical, nearly white, and 5 mm. long. About 22 were secured.

EONIUS ATRIFRONS, *spec. nov.*

Size moderate. Testaceous. Head oblong-oval from front view, of body-colour except a *patch of deep shining black, round, outline undefined*, occupying the greater part of the face, including the bases of the antennæ, apex of fastigium and upper part of clypeus. Ocelliform spot small, oval. Pronotum with fore and hind margins black. Abdominal segments broadly black behind. Legs short, pale, concolorous. Hind femora below with five to six internal and four to five external spinelets. Hind tibiæ above with *six internal and three internal spinelets*.

					Female.
Length of body...	...	...	...	24	mm.
Length of pronotum	...	...	...	6	"
Length of elytra	...	...	...	2.5	"
Length of hind femora	...	...	...	14	"
Length of ovipositor	...	...	...	15	"

Habitat.—Leigh Creek, Far North of South Australia (Coll. S.A. Museum.)

EONIUS FUMATUS, spec. nov.

Size moderate, Smoky-brown, indistinctly banded. Head small. Vertex low, *dark brownish*. Face, bases of antennæ, and legs pale. Ocelliform spot obsolete. Pronotum with hind margin only blackish. Legs slender. Fore tibiæ below with five spines on each side. Hind femora below with three slender spinelets on each side. Hind tibiæ flat above, with six external and four internal spinelets. Ovipositor moderately incurved, apex acute. Subgenital lamina of female broad, semi-circular, entire, with a narrow, deep black band near its posterior margin.

					Female.
Length of body ...	...	...	...	23	mm.
Length of pronotum	...	...	...	5	"
Length of elytra ...	...	...	...	3	"
Length of hind femora	...	...	...	14	"
Length of ovipositor	...	...	...	32	"

Habitat.—Kingston, South-Eastern part of South Australia (*D. Redman*, in collection of S. A. Museum).

EREMUS, Brunner (Mon., 374, fig. 46).

"Size mostly small. Wingless. Head large, usually as wide as the pronotum. Fastigium of vertex wider than the first antennal joint. Hind femora spined below, rarely unarmed. Fore tibiæ below armed with four rather large spines. Abdomen of male with ninth segment produced or hood-like. Subgenital lamina of male broad, with free styles. Ovipositor variable in length, acuminate or obtuse.

Habitat.—Asia, Africa, and Australia ; 12 species known."

EREMUS SPINULOSUS, Br. (ibid, 377).

"Size large. Pale testaceous, ferruginous above. Head very large, shiningly ferruginous, occiput pale or infusate. Pronotum unmarked. Hind femora below with very small crowded spinelets on both sides.

	Male.	Female.
Length of body ...	36 mm.	39 mm.
Length of pronotum ...	7.5 "	7.7 "
Length of hind femora ...	17 "	18.5 "
Length of ovipositor ...	—	18.5 "

Habitat.—Fiji Islands "

EREMUS MUELLERI, *Br.* (Man., 378).

"Size small. Testaceous, head brownish. Pronotum with the lobes scarcely deflected, angles obtuse. Hind femora below with four external and three internal (smaller) spinelets. Hind tibiae above with five very small spinelets on both margins.

				Female.
Length of body...	...	...	...	14 mm.
Length of pronotum	...	...	...	3.8 "
Length of hind femora...	...	...	...	9 "
Length of ovipositor	...	...	...	8 "

Habitat.—Queensland."

EPACRA, *Brunner* (Mon., 381, fig. 48).

"Habit of *Gryllacris*. Head elongate from front view. Fastigium of vertex rather narrower than first antennal joint. Eyes large, reniform. Antennae very long. Elytra and wings very large, straw-coloured, as well as the veins, hyaline. Pronotum truncate in front and behind, with deep sulci; meso- and meta-notum acute or lobed. Hind femora slender, armed below with more or less stout spines. Hind tibiae above with seven spinelets on each margin. Ovipositor long, scarcely incurved. Limited to Australia."

EPACRA AENEA, *Br.* (ibid, 382).

"Straw-coloured ferruginous, face brassy black. Fastigium with raised, keel-like margins, Antennae, knees, clypeus, and palpi ferruginous. Meso- and meta-sternal lobes triangular, acuminate. Hind femora below with four strong black spines towards the apex, and four small ones towards the base internally, and six strong spines externally.

		Male.	Female.
Length of body	...	29 mm.	29 mm.
Length of pronotum	...	6 "	6 "
Length of elytra	...	44 "	48 "
Length of hind femora	...	16 "	18 "
Length of ovipositor	...	— "	21 "

Habitat.—Rockhampton, Cape York, Queensland."

EPACRA MODESTA, *Br.* (ibid).

"Face brownish, labrum straw-coloured. Pronotum not striped. Meso- and meta-sternal lobes acute, rotundate. Tibiae brownish at the base. Hind femora below with very small spinelets (four to five on external margin). Ovipositor nearly straight, apex acuminate.

					Female.
Length of body ...	...	...	...	32	mm.
Length of pronotum ...	...	...	...	5.8	"
Length of elytra ...	...	...	...	44	"
Length of hind femora...	...	...	...	14	"
Length of ovipositor ...	...	...	...	19	"

Habitat.—Cape York, Queensland."

APOTRECHUS, *Brunner* (Mon., 383, fig. 49).

"Size large. Wingless. Head much wider than pronotum; occiput rounded, elevated. Fastigium very broad. Eyes small. Pronotum wider in front than behind, anterior angles produced. Hind femora slender, scarcely armed below. Fore and middle tibiae below with three to four spines. Hind tibiae terete, smooth, or nearly so. Abdomen of male with ninth dorsal segment produced, hood-like. Subgenital lamina of male transverse, without styles. Ovipositor short, stout, incurved. *Gryllacris*, Erichson, Gerstaecker."

APOTRECHUS AMBULANS, *Erichson* (ibid).

"Size moderate. Testaceous. Disk of pronotum and succeeding segments dark reddish-brown, excepting the hind margin. Head testaceous above, a large part of face brownish, ocelliform spots pale yellow, medial one nearly round. Thoracic segments with a continuous yellow medial line. Hind femora below with two to three short spines on each side. Hind tibiae wholly unarmed, terete. Ovipositor stout, *longer than hind femora*, slightly incurved, obtusely acuminate.

		Male.	Female.
Length of body ...	...	22 mm.	29 mm.
Length of ovipositor ...	...	—	17 "

Habitat.—Tasmania."

APOTRECHUS UNICOLOR, *Br.* (ibid, 140).

"Size small. Testaceously ferruginous. Face brownish, rough, with horizontal folds, ocelliform spots absent. Pronotum ferruginous, disk uneven. Hind femora below with two spines towards apex. Hind tibiae flat below. Ovipositor very short, scarcely extending beyond the cerci, acuminate.

		Male.	Female.
Length of body ...	...	35 mm.	42 mm.
Length of pronotum ...	...	7 "	8 "
Length of hind femora ...	...	14 "	17.5 "
Length of ovipositor ...	...	—	5 "

Habitat.—Port Denison, N.S. Wales."

APTERONOMUS, *gen. nov.*

Size small. Wingless, or wings scale-like. Head moderately large, not much wider than pronotum; occiput rounded. Fastigium nearly twice as wide as first antennal joint, vertex depressed, carinate. Pronotum equally as wide in front as behind, lobes rounded. Eyes small, elliptical. Hind femora with very small spinelets. Fore tibiae below with five spines on each side. Hind tibiae flattened, spinelets very minute. Abdomen of male with ninth dorsal segment rather short; supra-anal and subgenital laminae prominent, latter narrow, acutely triangular, deeply cleft. Styles distinct.

The following synopsis will indicate the place in the system occupied by this genus:—

4.4. Body wingless, or lobes quite rudimentary. Head broader than pronotum. Occiput elevated.

5. Size large. Head much wider than pronotum. Fastigium very broad, subrotundate. Fore tibiae below with three to four spines on each side. Abdomen of male with ninth dorsal segment produced, hood-like. *Apotrechus*.

5.5. Size small. Head not much wider than pronotum. Fastigium rather narrow, depressed in front, keeled. Fore tibiae below with five pairs of spines. Abdomen of male with ninth dorsal segment short, not hood-like. *Apteronomus*.

APTERONOMUS BORDAENSIS, *spec. nov.*

Testaceously-brown, banded indistinctly darker. Head pale, face almost concolorous. Ocelliform spot pale testaceous, partly bordered with brown, with two pale spots below apex of fastigium. Clypeus trapezoidal, quadrangular, narrower below, as wide above as high. Labrum elongate-oval, ferruginous. Fastigium of vertex narrow, widely separated from the antennae, margins angular, parallel, scarcely keeled, without lateral pale marks, apex semicircular, dark-brown. Antennae concolorous, three times the length of body. Pronotum rounded above, shiningly smooth, fore margin convex and raised, hind margin concave; lobes nearly as high as long, angles much rounded, margins narrowly incurved. Hind femora below with five internal and two to four external minute spinelets. Hind tibiae flattened above, with five internal and four to five external spinelets. All the legs (also the antennae) closely covered with short tomentum. Subgenital lamina of male narrowly triangular, deeply cleft, lateral lobes none.

				Male.
Length of body	...	...	...	14-16 mm.
Length of pronotum...	...	...	...	2.5- 3 "
Length of hind femora	...	...	...	15 "

Habitat.—Western extremity of Kangaroo Island, near Cape Borda, where two males were captured by myself at the end of February, 1886, and were found under the loosely adhering bark of the trunk of Eucalypts in moist situations. A third specimen resembling the above two in most characters, but exhibits minute scale-like wing-lobes, is for the present included. Its face is marked with a broad blackish-brown band, and the hind femora are wholly unarmed. Collection of S. A. Museum.

AMETRUS, *Brunner* (Mon., 384, fig. 50).

"Head with occiput elevated. Fastigium of vertex three times wider than first antennal joint. Antennæ short, slender. Face broad, rounded, Pronotum short, anterior angles obtuse, hindmargin obtusely and triangularly emarginate, transverse furrows deeply impressed. Elytra and wings rudimentary, lobe-like and lateral. Fore coxæ much compressed, spined. Hind femora below with internal margin wholly and external partly spined. Fore and middle tibiæ below with two spines on each side. Hind tibiæ long, very thick, terete, above with six spines on each side, those on the inner side being the longer ones. Tarsi very short. Abdomen of male with ninth dorsal segment hood-like, short, inferior margin triangularly emarginate. Cerci very short. Subgenital lamina quadrate, medial lobe obtuse, produced, lateral lobes acuminate, styles none.

AMETRUS TIBIALIS, *Br.* (ibid).

"Size moderate. Uniformly ferruginous.

				Male.
Length of body...	...	...	...	29 mm.
Length of pronotum	...	...	...	5.2 "
Length of elytra	...	...	...	3 "
Length of hind femora...	...	...	...	14.7 "
Length of hind tibiæ	...	...	...	16 "

Habitat.—Melbourne, Victoria."

AMETROSOMUS, *gen. nov.*

Head with occiput elevated, maxillary palpi very long, filiform. Antennæ about three times the length of the body. Fastigium of vertex scarcely twice as wide as first antennal joint, apex depressed, margins keeled. Eyes large, reniform. Pronotum short, anterior margin raised, disk with a distinct suborbicular callosity on each side, angles much rounded, hindmargin almost

flat, broadly and triangularly emarginate; posterior lateral callosities large, oval; lobes high, inferior margin subemarginate, posterior angles truncate. Elytra and wings lobelike, very narrow. Anterior coxæ subquadrangular, unarmed. Fore and middle legs much compressed, with five spines on each margin. Hind femora below with three to six internal and three to eight external minute spinelets (being different on the right and left side of the same specimen). Hind tibiæ slender, flattened above, with nine to ten internal and five to seven external, very minute spinelets. Ovipositor very short, much incurved, apex obtuse, rounded. Subgenital lamina of female broadly transverse, very short, entire, posterior margin subsemicircular.

The insect has the aspect of *Ametrus*, Br., but is quite different in many points, as shown by the following synopsis, which, at the same time, indicates the place of the genus in the system. The numbers refer to those in Brunner's Monograph, 1888.

3.3. Hind tibiæ spined. Tarsi very short. Elytra and wings lobelike.

4. Hind tibiæ much incrassated. Fastigium of vertex broad. Antennæ short. Fore and middle tibiæ below with two-three spines on each side. *Ametrus*.

4.4. Hind tibiæ slender. Fastigium narrow. Antennæ long. Fore and middle tibiæ with five spinelets on each side. *Ametresomus*.

AMETROSOMUS HELMSI, *spec. nov.*

Size moderate. Colour brownish, with dark brown bands. Face pale. Ocelliform spot circular, cream-coloured. Clypeus subsemicircular. Legs slender, pale. Two specimens.

				Female.
Length of body	...	...	...	27 mm.
Length of pronotum	...	...	...	5 "
Length of elytra	...	...	...	2 "
Length of hind femora	...	...	...	14-16 "
Length of ovipositor	...	...	...	3.5 "

Habitat.—Blyth Hills and Barrow Range, Central Australia, captured by Mr. R. Helms (Coll. S.A. Mus.).

B. STENOPELMATIDÆ.

The STENOPELMATIDÆ differ from all other Locustodea in the form of the tarsi, these being *compressed* instead of depressed, and the first and second joints do not possess any lateral lobes, so greatly developed in the Gryllacrids. Another character serves to separate them into two main groups, viz., the presence or absence of pulvilli (cushions) on the underside of the tarsi, the an-

terior and posterior one possessing one, and the metatarsus two. Intimately connected with this character is another observable in the structure of the base of the hind femora. In all those species which are furnished with pulvilli the hind femora are jointed to the coxæ by an intruding angle plainly visible from the *outside*, but in those without pulvilli the base of the femora is rounded and the angle only seen from the inside.

A second most important distinction consists in the presence or absence of foramina, or auditory organs, of the fore tibiæ, which, when present, are always open on both sides, except in one of the new genera, where they are quite rudimentary.

The form, arrangement, and number of the spines of the legs provide also excellent characteristics within certain limits, but being variable, sometimes not only in the various individuals but even on the right and left sides of the same insect, cannot be considered as of decisive value alone.

The genital characters are very peculiar, and sometimes of extravagant forms, baffling adequate description in words.

The ovipositor is usually of the normal structure among the members of the tribe, and affords good specific distinctions in some cases.

The fastigium of the vertex is also very useful in diagnosing. It merges either gradually into the face without distinct demarcation, or is set off more or less distinctly. Its width and markings are also important as specific distinctions.

The antennæ and mouth parts are unsuited for systematic use, notwithstanding their great, and sometimes enormous, development; being mostly of a very uniform or variable type.

The form, etc., of the clypeus and labrum, appear to deserve considerable attention.

The pectus or chest is either very narrow or very broad and flat (in rare cases), but offers little or nothing feasible to base good distinctions upon.

Organs of flight are mostly absent, but when present they resemble those of crickets to a great extent in their structure.

The presence of auditory organs in part of the family naturally suggests the possession of corresponding organs for producing sounds. These are, apparently, to be sought for in the roughened surfaces of some of the basal segments of the abdomen. Several varieties of structure have been observed.

The habits of these insects, being extremely retired and wholly nocturnal, are little known. All of the cave-inhabiting Orthoptera belong to this family, and in some cases it has been observed that the eyes have become atrophied or wholly obsolete. Other species live in burrows under stones, logs of wood, or under loose bark and in hollows of trees. On account of their formid-

able mandibles they can inflict painful bites, and are not pleasant to encounter incautiously. Their food consisting mainly, if not entirely, of self-caught insects, they must be regarded as being more or less beneficial to man, and not hurtful.

Owing to the paucity of material, most probably due to the rarity of representatives of the family, I shall content myself for the present by offering only a synoptical key, collated principally from that of Brunner van Wattenwyl in his monograph of 1888, and descriptions of three new species belonging to two new genera.

SYNOPSIS OF AUSTRALIAN AND POLYNESIAN STENOPELMATIDÆ.

1. Tarsi with pulvilli, metatarsus with two. Angle of insertion of hind femora visible laterally from outside. SECTION A.

2. Anterior margin of pronotum straight or rounded, without submarginal furrow. Fastigium of vertex separate from frontal, more or less produced between the antennæ. Anterior coxæ armed with a spine. Middle tibiæ below spinulose.

3. Fore tibiæ with foramina on both sides, or rarely on the internal margin. (One Madagascar genus, *Hypocophus*, only).

ANASTOSTOMATÆ.

4. Hind tibiæ flattened above, with three to four spines (dilated at the base) on each side. Fore tibiæ smooth above. Wingless. DEINACRIDA, *White* (*Br. Mon.*, 268, fig. 5).

a. Pronotum shining. Hind femora always with some apical spines on each margin. Middle tibiæ above unarmed, excepting the apical spines. Hind tibiæ with a fixed small spur.

b. Pronotum lurid, striped with brown. Abdomen chestnut-coloured. Cerci of male somewhat terete. Hind tibiæ with three spines on the external margin besides the apical ones. New Zealand.

D. thoracica, White.

bb. Pronotum brown. Abdomen lurid, each segment banded brown at base and apex. Cerci of male depressed. Hind tibiæ externally with four spines besides the apical. New Zealand.

D. ligata, Brunner.

aa. Pronotum very rough. Hind femora spined on both sides. Middle tibiæ above with two spines on external margin, besides apical. Hind tibiæ with large articulately inserted spurs. New Zealand.

D. heteracantha, White.

4.4. Hind tibiæ above rounded with numerous spines, not dilated.

5. Vertex compressed (seen from above). Fastigium not so wide as first antennal joint, sulcate. Occiput rounded, not carinate. Pronotum truncate behind. Fore tibiæ above flat or terete. Tarsi without arolia between the claws. Femoral knee-lobes all spined. ANASTOOTOMA, *Gray* (*Br. Mon.*, 270, fig. 6).

a. Size large. Colour chestnut, dusky. Femora all spined below. Hind femora roughly granulated all over. Queensland, New Zealand, New South Wales. *A. Australasiae*, Gray.

aa. Size small. Reddish piceous. Fore and middle femora below unarmed, or nearly so. Hind femora spined above.

b. Colour bright. Hind tibiae above with seven spines on each side. Ovipositor scarcely exceeding the cerci. Queensland, New South Wales. *A. erinaceus*, Burmeister.

bb. Colour dull. Hind tibiae above with eight to nine spines. Ovipositor scarcely shorter than hind femora. Queensland.

A. opacum, Brunner.

5.5. Vertex flat (seen from above). Fastigium as wide or wider than the first antennal joint, not sulcate, flat, of equal width throughout or contracted towards the apex, contiguous with the frontal in a line, not produced.

6. Subgenital lamina of male transverse, styles flat.

7. Fore tibiae with internal margin bispinose above. Wingless.

8. Head of male as broad as pronotum, mandibles extremely large. Fastigium depressed, not narrowed at the apex, contiguous with the frontal in a line.

CARCINOPSIS, *Br.* (Mon., 275, fig. 9).

a. Wingless. Hind tibiae with first and second internal spurs short, subequal in length. Australian species.

b. Legs concolorous. Vertex high. Fastigium not as wide as first antennal joint. New Caledonia. *C. unicolor*, Brunner.

bb. Femora and tibiae banded brown towards the apex. Vertex depressed. Fastigium wider than the first antennal joint. New Caledonia. *C. signata*, Brunner.

aa. Winged species. India; not Australian.

8.8. Head never as wide as pronotum, mandibles normal. Fastigium contracted at the apex, acuminate, contiguous with the frontal.

AISTUS, *Brunner* (Mon., 278, fig. 10).

Monotypic. Size small, chestnut-coloured, shining. *A. gracilis*, Br.

6.6. Subgenital lamina of male elongate, styles narrow.

7.7. Fore tibiae above terete, internal margin below with three to five spines. Hind tibiae shortly spinulose. Second spur as long or longer than the first.

8. Fore tibiae with foramina on both sides. Second internal spur of hind tibiae scarcely as long as the first. Australian species.

9. Foramina distinct. Hind femora extending much beyond the body. Fore tibiae with three spines on the internal margin.

TRIHOPLOPHORA, *Br.* (Mon., 280, fig. 13).

Monotypic. Piceous, sides and underside pale. Face pale, marbled with piceous. Eastern Australia. *T. abnormis*, Brunner.

9.9. Foramina rudimentary. Hind femora scarcely exceeding the body. Fore tibiae with five spines on the internal margin.

PENTHOPLOPHORA, *Tepper*.

Monotypic. Yellowish testaceous. Pronotum and abdomen banded black. Central Australia. *P. Driffeldi*, Tepper.

8.8. Foramina on internal margin only. Madagascar genus.

33. Fore tibiae without foramina. MIMNERMI.

4. Fastigium rounded or flattened, not sulcate. Hind tibiae slender, with short spines. (Elytra abbreviated). Five African genera.

4.4. Fastigium deflexed between the antennae, compressed, sulcate. Hind tibiae stout, above with strong spines. Australian and American genera.

5. Head not wider than pronotum. Fastigium not as wide as first antennal joint. Hind tibiae above with two spines on internal margin. Lobes of pronotum very low, angular. American species. CRATOMELUS, *Brunner* (ibid, fig. 24).

5.5. Head wider than pronotum. Fastigium about four times as wide as first antennal joint. Lobes of pronotum high, rounded. Hind tibiae above not spined. Australian species.

PACHYPODAGRUS, *Tepper*.

a. Size large. Brownish ferruginous, banded with brown. Hind femora below with 12 internal and four to six external spines. Ovipositor long. *P. crassipes*, *Tepper*.

aa. Size moderate. Greyish-testaceous, concolorous. Hind femora below with six internal and no external spines. Ovipositor short. *P. Magareyi*, *Tepper*.

2.2. Pronotum wider in front, narrower behind, fore margin sinuous, intramarginal furrow distinct, &c. Extra-Australian genera. STENOPELMATUS, &c.

1.1. Tarsi without pulvilli (except one American genus, *Gammarotettix*, with one pulvillus on the metatarsus), very much compressed. Angle of insertion of the base of the hind femora visible only on the *inner* side. Bases of antennae approximate. Fore tibiae without foramina. SECTION B.

2. Fore and middle femora with movable spines at the apex. Hind tibiae above with crowded spines of equal length, below terete and unarmed. Asiatic and Australian species.

RAPHIDOPHORÆ.

3. Fore femora with a movable, rather large spine on the inner side at the apex. Malayan and Australian species.

RAPHIDOPHORA, *Serville* (Br. Mon., 294, fig. 25).

a. Hind metatarsus above unarmed and smooth (except apical spine). Spines of the knees of the anterior femora long. Hind femora below spined on the inner margin. Antennae stout. Australia. *R. crassicornis*, *Brunner*.

a. Hind metatarsus above hirsute and spined. Abdomen with seventh dorsal segment obtusely produced. New Guinea.

R. foeda, *Brunner*.

3.3. Fore femora with small spines on both sides of the apex. Eyes very prominent seen from above. First spur on internal margin much shorter than the metatarsus.

NEONETUS, *Br.* (Mon., 300, fig. 27).

Size very small. Testaceous, variegated with brownish. Monotypic.
New Zealand. *N. variegatus*, Brunner.

2.2. Fore and middle femora unarmed at the apex, or with only a few spinelets. European, American and Australian genera.

3. Hind tibiae above with one of the spinelets usually remote from the others, which are crowded, below terete, rarely spined.

DOLICHOPODÆ.

4. Antennæ slender. Styles absent. European species.

4.4. Antennæ incrassated, contiguous at the base. Subgenital lamina of male lanceolate, styles present. New Zealand species.

PACHYRHAMMA, Br. (Mon., 301, fig. 29).

α. Fore femora below unarmed, hind ones very narrowed, about one and a half times the length of the body.

P. Edwardsi, Scudder.

αα. Fore femora below with three or four small spinelets on the anterior margin. Hind femora scarcely longer than the body, base incrassated.

P. Nova-zealandiæ, Br.

3.3. Hind tibiae above with most of the spines remote from each other, also the spinelets small or tooth-like rarely crowded. One European, five American, and one Australian genus.

CEUTEPHILI.

4. Hind tibiae below with crowded spinelets, sulcate. Europe.

TROGLOPHILUS, Krauss.

4.4. Hind tibiae below with distant spinelets, terete. All American and Australian species.

5. Hind tarsi above with first and second joints hirsute or with two rows of spinelets. Antennæ fasciculately pilose beyond the middle. American genus.

HETEROMALLUS, Br. (Mon., fig. 35).

5.5. Hind tarsi above with first and second joints unarmed or shining, except the apex of the latter. New Zealand.

TALITROPIS, Bollen (Br., Mon., 312, fig. 36).

Monotypic. Shiningly ferruginous. Rather small.

T. Sedilloti, Bollen.

PENTHOPLOPHORA,* *gen. nov.*

Head elongate. Vertex produced beyond the eyes. Fastigium rounded, narrow towards the apex. Medial ocelliform spot, minute, annular, indistinct, *lateral spots absent*. Antennæ scarcely *one and a half times* the length of the body. Eyes large, reniform, depressed. Face flat. Clypeus transverse. Labrum obovate, longer than wide, base stout. Mandibles covered. Palpi very slender. Pronotum rounded, lobes higher than long, highest behind, inferior sub-semicircular. Fore coxæ

* Five-armed,

very stout, spined. Femora sulcate below. Hind femora much dilated at the base, not longer than the body. Foramina of fore tibiae *quite rudimentary* (notably posteriorly), terete above, below *with five spines on each margin*. Hind tibiae above with two long terminal spurs inside, and with four short ones externally, also below one on each side. Abdomen stout, cylindrical, segments not granulose. Cerci of female very slender, shorter than supra-anal lamina. Subanal valves elongate-oval. Ovipositor slender, gradually incurved, acuminate from below, apex very acute. Subgenital lamina broad, nearly semicircular.

The large insect, for whose reception the genus is established, differs too much from all others to admit of its inclusion in *Trihoplophora*, its nearest ally, as will be seen by inspecting the synoptical key.

PENTHOPLOPHORA DRIFFIELDI, *spec. nov.*

Size large. Yellowish testaceous. Head concolorous, except a small blackish spot on each external superior angle of clypeus. Eyes black. Pronotum with anterior and posterior margins broadly black. Abdominal segments banded blackish.

	Female.			
Length of body	35 mm.
Length of pronotum	6.5 "
Length of hind femora	16 "
Length of ovipositor	37 "

Habitat.—Angebuckina in the Far North of South Australia, whence this remarkable insect was brought by my friend, the late C. E. Driffield, to whose memory it is dedicated. Collection S.A. Museum.

The rudimentary foramina render this species very interesting, connecting those species without them directly with the others which possess them in a perfect form. On the anterior side they are tolerably distinct, although small, and denoted by brownish shading, but on the opposite side are only indicated by a minute impression.

PACHYPODAGRUS,* *gen. nov.*

Head distinctly wider than pronotum, oval. Occiput elevated. Vertex declined. Fastigium rounded, slightly sulcate, three to four times wider than the first antennal joint. Medial ocelliform spot small, circular, not very distinct, lateral ones inconspicuous or absent. Antennæ very slender, not much longer than the body. Eyes large, *elliptical*, depressed. Pronotum cylindrical, sulci deep, lobes high, inferior margin semicircular. Elytra ab-

* Thick-gouty.

breviate, veins distinct. Wings scale-like. Mesosternal lobes short broad, metasternal large rounded. Femora all sulcate below. Hind femora incrassated, pinnate striæ biserial and indistinct, upper margins smooth, lower margins spined. Fore tibiae stout, above terete, spineless, without foramina, below with four to five external and three internal spinelets. Hind tibiae *very much incrassated*, terete and smooth at the base, then suddenly thickened, above slightly flattened with numerous spines, some of them being connected by low transverse ridges. First external spur with two small ones at its base, second of equal length. Pulvilli of tarsi small, those of first joint elongated. Abdomen with eighth dorsal segment of male produced, medially divided at the apex into two broad triangular lobes. Cerci short, terete, hirsute. Subgenital lamina of male short, divided into three lobes, the middle one narrow, thick and long, apex obtuse; lateral lobes in the form of low tubercles. Ovipositor nearly straight, apex bluntly acuminate.

The genus appears to me much more nearly related to the American *Cratomelus* than to the geographically nearer Asiatic members of the tribe. The differences are indicated in the synopsis.

PACHYPODAGRUS CRASSIPES, *spec. nov.*

Size large. Brownish ferruginous, banded with brown. Legs pale, spines and claws tipped with black. Ocelliform spot small, circular, indistinct. Hind femora below with 12 internal and four to six external spinelets. Hind tibiae very stout, above with six spinelets on each margin, besides the apical spurs. Ovipositor straight, very long. Two males, one female.

	Male.	Female.
Length of body ...	25 -30 mm.	30 mm.
Length of pronotum...	6 "	7.5 "
Length of elytra ...	3.5- 5 "	6 "
Length of hind femora	17 "	18 "
Length of ovipositor	—	47 "

Habitat.—Oladdie, South Australia (*McGregor*); Silverton, New South Wales (*F. A. Fiveash*); Northern Territory of South Australia (*Hon. S. J. Magarey, M.B.*); (Collection of S.A. Museum). The smaller male had been preserved originally in spirit, then dried, the body is therefore in a considerably shrunken condition; the other specimens were simply dried, which may account for the difference in dimensions.

PACHYPODAGRUS MAGAREYI, *spec. nov.*

Size moderate. Greyish-testaceous, concolorous. Clypeus quadrangular, transverse, lower margin distinctly sulcate, about

one-third less in width than the upper. Mandibles blackish, almost embracing the labrum. Fore and middle tibiae with four external and three internal spines. Hind femora with six spinelets on the inner margin, the outer being unarmed. Hind tibiae moderately stout, with six spinelets on each margin. Ovipositor short, slightly incurved.

					Female.
Length of body	...	...	...	...	27 mm.
Length of pronotum	...	...	...	...	5 "
Length of elytra	...	...	...	...	2 "
Length of hind femora	...	...	...	...	14 "
Length of ovipositor	...	...	...	...	23 "

Habitat.—Northern Territory of South Australia.

The species is dedicated to Dr. S. J. Magarey, M.L.C., who presented it in 1886, with a number of other insects, to the S.A. Museum.





Tepper, J. G. O. 1892. "The Gryllacrididae and Stenopelmatidae of Australia and Polynesia." *Transactions of the Royal Society of South Australia* 15, 137–178.

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