The Heteroptera of New Zealand

Part II—The Enicocephalidae

WITH A SUPPLEMENT TO PART I (CYDNIDAE AND PENTATOMIDAE)

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Summary

Three new genera and five new species of Enicocephalidae are described and their affinities discussed *Maoristolus tonnoiri* (Bergroth) and the genus *Phthirocoris* Enderlein are redescribed. The eight New Zealand species are keyed out, their known distribution is given, and the available nymphal instars are described. New Zealand has an exceptionally high proportion both of apterous and micropterous species and of members of the relatively primitive subfamily Aenictopechinae

Acknowledgments

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Introduction

Until the nomenclatural decision of the International Zoological Congress at Copenhagen in 1953, the spelling of the name of the family Enicocephalidae and of its type genus were subject to differences of individual opinion. *Enicocephalus* Westwood, 1838, has priority over the emendation *Henicocephalus* made by Agassiz in 1846, but under the old Rules the latter name was valid as correcting an error of transliteration from the Greek to the Latin Which spelling was accepted thus depended on whether strict priority or the recommended transliteration was pre-

ferred Under the new Rules, however, an original spelling is valid when it reveals no inadvertent error (not including an error of transliterating into the Latin alphabet). The generic name *Enicocephalus* and the family-group names Enicocephalidae and Enicocephalinae must therefore be retained.

There is an apparently growing tendency to drop the term "nymph" in favour of the more general term "larva"; this is related to the disfavour into which has fallen Berlese's theory of the origin of insect larvae However, the word "nymph" still has descriptive value as pertaining to a particular kind of less specialized larva, and since it is still widely employed in systematic and biological work on the Heteroptera, its use has been retained in this series.

To date, only three species of Enicocephalidae, belonging to three genera, have been recorded from New Zealand The new forms described in this paper now bring the total to eight species and five genera. The composition of the New Zealand fauna is most interesting in several respects. Three of the genera and four of the species belong to the small subfamily Aenictopechinae, a primitive group with a southerly distribution. Outside New Zealand only two species are known certainly to belong to this subfamily, *Gamostolus subantarcticus* Berg (Patagonia) and *Aenictopechys necopinatus* Breddin (Java and Sumatra); *Cocles contemplator* Bergroth (Madagascar) has been included, but its position is still uncertain (p. 395). Thus about half of the known genera and over half the known species of this archaic group are found in New Zealand, though it seems probable that more representatives remain to be discovered from the less intensively worked areas of the Southern Hemisphere.

Two of the four New Zealand species of Enicocephalinae belong to the monogeneric tribe Phthirocorini, a peculiar and in some respects probably primitive group otherwise known only by one species from the Crozet Is. The other two species belong to the widespread genus *Systelloderes* Blanchard.

Four-fifths of the genera and three-quarters of the species of New Zealand Enicocephalidae thus belong to two relatively primitive groups of southern affinities. By contrast, less than one-third of the world genera and less than one-eighth of the world species belong to these groups. The predominant and widespread tribe Enicocephalini, which is probably the latest evolved, is not represented in New Zealand at all.

Another interesting feature of the New Zealand fauna, paralleled in other groups of animals, is the unusually high proportion of flightless, apterous or micropterous species. Four of the eight species are of this form, while three of the five genera, so far as known, include only flightless species.

There is a high degree of endemicity. All eight species so far as known are endemic to the Maorian subregion (*Phthirocoris magnus* occurs in the Auckland Islands as well as in the South Island of New Zealand proper). Three of the five genera are endemic, and four of the eight species belong to endemic genera.

The Enicocephalidae are related to the Reduviidae and have usually been placed in the superfamily Reduvioidea. They comprise, however, a very distinct family which some recent workers have raised to the status of a separate superfamily, the Enicocephaloidea (e g, Poisson, in Grassé, 1951). The present tendency is to regard them as having originated from a very early offshoot of the Heteroptera. The Enicocephalidae differ from all other Heteroptera in the following combination of characters: terrestrial bugs with the body not excessively flattened; predacious, with the rostrum held well away from head at base; antennae and rostrum 4-segmented; head usually divided by a transverse constriction into two lobes (divided in all New Zealand species), the postocular lobe often subglobular and bearing the ocelli near its anterior margin (in the adult, ocelli absent only in *Phthirocoris* and *Nymphocoris*, both occurring in New Zealand); pronotum widening towards the base, usually with two transverse constrictions, the anterior one sometimes obscure, the posterior one sometimes obscure or absent (absent or obsolete in the New Zealand genera *Nymphocoris*

and *Aenictocoris*); prosternum without a median stridulatory groove; front wings when fully developed entirely membranous (corium lacking) and with the venation extending uninterrupted throughout whole length, in *Phthirocoris, Aenictocoris* and *Nymphocoris* wings absent or vestigial and veinless or with few veins; front legs raptorial, more or less incrassate; apex of front tibiae usually dilated, armed with spines, tubercles or plate-like processes and with a pecten or row of close spines along inner (anterior) margin; front tarsi 1- or 2-segmented; middle and hind tarsi 2-segmented, the basal segment very short; tarsi with one or two claws. The Enicocephalids also differ from other Gymnocerata in lacking the paired scent-gland openings of the thoracic venter; the adults instead retain from the nymphal instars the single median opening on the fourth abdominal tergum. Some species show marked sexual dimorphism (in New Zealand, the species of *Systelloderes*). The family is more fully redescribed and its systematics dealt with by Jeannel (1942) and Usinger (1945).

The nymphs are similar in general structure to the adults, but lack ocelli and fully developed wings, while the eyes are smaller, with fewer ommatidia, and the prothorax, especially the posterior lobe, is reduced and often differently formed. Nymphs are thus readily distinguished from adults of alate species, but are not so obviously different from neotenic, apterous or micropterous adults like those of *Phthirocoris, Aenictocoris* and *Nymphocoris*. Such neotenic adults, however, have fully developed terminalia or genitalia (the pygophor and associated structures fully formed in the male; the apical plates of the abdomen sclerotised in the female) and have two-segmented middle and hind tarsi, whereas in nymphs these are always of one segment only.

In all stages the first abdominal segment is reduced, the first sternum small and divided and usually not visible in intact specimens, and the first tergum is without connexiva and separated only by a groove from the second tergum, which is not overlapped by it as are the other terga by their predecessors. The first tergum is thus relatively inconspicuous, and indeed may be covered by the wings in the last instar nymphs of alate species; the second tergum is often referred to in the literature as "the first visible tergite". However, in all species considered here, the reduced first tergum is present at all stages and clearly visible in the earlier instar nymphs and also in adults when the wings, if present, are spread Where there is any doubt, the segments may be orientated from the fourth tergum, with its median orifice in both nymphs and adult, or by reference to the genital segments (in the female the last complete sternum is the eighth, the last complete tergum the ninth; in the male the tergum and sternum of the ninth segment are fused to form a capsule-like or ring-like pygophor (pygidium)). In the descriptions the abdominal terga and sterna are numbered by reference to their appropriate segments, as indicated above.

Since only preserved material has been available for study, the nymphal instars were assigned to their respective species by a serial comparison with the adult forms, starting with the last instar and working down to progressively earlier stages. As indicated in the descriptions, certain of the distinctive specific characters of the adults are displayed also in the nymphs. Comparison of locality with the known adult distribution was an additional guide in the initial sorting. Instars of any one species are usually readily distinguishable by a combination of size differences (as shown in the usual way, utilising "Dyar's Law", by measurements of hard parts, such as head and pronotum) and differences in structure and proportions.

Total length is exclusive of the rostrum (which may be extended at varying angles) and thus of the labrum (an elongate triangular sclerite curving above the short first rostral segment); for apterous and brachypterous adults and for nymphs it is measured to the apex of the abdomen, but in macropterous adults to the apex of the closed fore wings, since in the female the abdomen is very variable in size and

in some species may extend beyond the wings to different degrees depending largely on the state of ovarian development. Similarly, head length, except where otherwise stated, is exclusive of labrum and rostrum in front and of the eversible "neck" behind (the length of which may vary with the degree of extension of the head from the prothorax), i.e., as far forward as the clypeo-labral suture, just anterior to the base of the antennae. The "neck" may be obviously delimited in front from the rest of the postocular lobe by a sub-basal transverse constriction or, when not obviously constricted, may still be differentiated by its finely granular appearance.

The proportionate measurements, except where otherwise defined, are the maximum flat measurements of the parts concerned. It should be remembered that with slide-mounted specimens, unless the coverslip is adequately supported, there is a certain amount of differential flattening and spreading of parts, affecting the normal proportions, and in slow-drying media this effect probably increases with time. In the descriptions of the legs the usual convention is adopted of orientating the parts as they lie with the limbs extended at right angles to the body, and this probably expresses the primitive relationships. Usually the topographical position is indicated in brackets, e.g., "the anterior (inner) claw of the fore leg" is that nearest the body when the front legs are in their usual forwardly directed position. It should be noted that in Enderlein's (1909) description of the fore leg of *Phthirocoris,* the tibial pecten is considered as dorsal and the other structures orientated correspondingly.

In proportionate measurements, 75 units = 1 mm.

In the locality lists, material from the Canterbury Museum is indicated by (C.M.), that from the Dominion Museum by (D.M), and from the Cawthron Institute (C.I.)

Subfamily Aenictopechinae Usinger, 1932.

Genus Maoristolus gen. nov.

Rather small and slender Aenictopechinae with the head, abdomen and appendages shining. the thoracic segments and the fore wings dull; with a covering of fine hairs. *Head* less than half as broad across the eyes as long, with a distinct transverse dorsal impression behind the eyes; posterior lobe (excluding granular "neck") wider than long and subequal to or only slightly wider than anterior lobe across eyes, not strongly globose, disc above nearly flat, only very slightly convex from front to rear, sides only slightly convex, narrowest in front Eyes relatively small, separated beneath, and as seen from above not strongly prominent and each much less than half as wide as interocular space Ocelli elevated, conspicuous, placed at anterior margin of posterior lobe near the transverse constriction Antennae rather shorter than head and pronotum combined, with first segment shortest, the others subequal in length. Rostral segment III nearly three times as long as II, IV considerably longer than II. *Pronotum* unarmed, nearly flat; the anterior transverse impression well formed at the sides, though not excessively deep, rather weak in the middle; posterior transverse impression obsolescent in middle, not demarcating a definite third lobe; lateral margins as seen from above diverging from front to rear, slightly sinuate; anterior and posterior margins nearly straight; humeral angles cut away at sides to expose the hemelytral articulations. *Scutellum* scarcely raised, broadly exposed, subtriangular, with apex rounded and not carinate or lobed. *Front wings* with the claval suture and often the subcostal vein white, the former particularly conspicuous; costal margin towards middle with a distinct transverse fracture extending to subcosta; basal cell present; discal cell usually completely closed, sometimes with the subapical transverse vein incomplete anteriorly; discal and stigmal cells nowhere confluent, with a transverse connecting vein present between them (r-m of Jeannel (1942), m-cu of Usinger (1945)); stigmal cell divided by one or sometimes two transverse veins, and thus with one or sometimes two apical appendicular cells; main part of disc almost devoid of hairs, which are most numerous towards humeral angle; costal and apical margins with a fringe of rather long, pale brown hairs *Legs*: Fore legs moderately incrassate; front coxae oblong; front coxal cavities open behind (proepimera not meeting behind them); fore tibiae considerably but gradually expanded to apex, which bears a pecten on anterior (inner) margin and ventrally a group of eight long simple spines, without tubercles or plate-like processes. Middle and hind tibiae without pectines, with an apical ventral row of four long spines. All tarsi two-segmented, the first segment extremely short, longest ventrally; the second segment of front tarsi with two pairs of ventral spines, the more basal pair the longer, and with two subequal claws; the second segment of middle and hind tarsi with particularly long hairs but without spines, with two slender claws, the inner rather longer than the outer. *Abdomen*: Ninth tergum of female a dorsal pygidial

plate, with an apical pair of especially long dorso-lateral hairs; anal lobe (tenth segment) short; no ovipositor, valvulae vestigial. Male with a pair of hairy claspers; without a ventral apophysis.

TYPE SPECIES. *Gamostolus tonnoiri* Bergroth, 1927.

Notes on the Taxonomic Position of Maoristolus:

Usinger (1945: p. 326), after redescribing the genus *Gamostolus* Bergroth and the type species *G. subantarcticus* (Berg), from Tierra del Fuego, noted that he had been unable to examine a specimen of *G. tonnoiri* Bergroth, adding, however, that "Bergroth did not describe the venation of *tonnoiri* but it seems unlikely, on the bases of other characters, that the New Zealand species and the Fuegian species are congeneric".

Maoristolus appears rather closely related to *Gamostolus,* but differs in certain diagnostic features. The apex of the fore tibiae bears long, relatively slender spines and lacks the plate-like expansions and the peg-like and hemispherical spines of *Gamostolus.* Other differences from the latter genus are the much smaller size, the relatively smaller and less prominent eyes, the differently proportioned antennal segments, the longer third and fourth rostral segments, the stigmal cell divided by one or two transverse veins, the more complete venation of the hind wings, the subequal claws of the front tarsi, and the vestigial valvulae of the female. *Maoristolus* is readily differentiated from *Aenictopechys* Breddin by a number of characters, including the much longer and transversely impressed head, the non-tuberculated and much less produced apex of the front tibiae, the presence of a basal cell and of a completely or incompletely closed discal cell on the fore wing, and in the absence of a ventral apophysis in the male. From *Cocles* Bergroth it differs conspicuously in the much smaller eyes, not occupying the greater part of the head.

Because of the presence of harpagones in the male, and the general affinities shown to *Gamostolus, Maoristolus* has been placed in the Aenictopechinae. This subfamily, which was established by Usinger in 1932 on the basis of the unlobed or imperfectly lobed pronotum, and included *Aenictopechys* Breddin, *Gamostolus* Bergroth and *Cocles* Bergroth, was shown by Jeannel (1942), from a study of the male genitalia of *Aenictopechys necopinatus* Breddin (unavailable to Usinger), to be a relatively primitive group. Unlike the Enicocephalinae, the male of the above species possesses undoubted claspers (harpagones), while the ventral apophysis of the pygophor is of a very different form and probably, as regards its unperforated structure only, more primitive. (Its hypertrophied and sucker-like form must, however, almost certainly be regarded as specialised (p. 402 and p. 410).) Wygodzinsky (1949), in his detailed redescription of *Gamostolus subantarcticus* (Berg), showed that this species not only has claspers in the male but also has a valved ovipositor in the female, likewise lacking in the Enicocephalinae. In the present paper similar genitalic structures are described for both sexes of *Nymphocoris maoricus;* the female of *Aenictocoris powelli* has the valvulae much reduced.

The nature of the female terminalia of *Aenictopechys* and of the terminalia of both sexes of *Cocles* is unfortunately unknown. The subfamily position of the latter genus thus remains uncertain. The extreme reduction of the valvulae in the female of *Maoristolus* appears somewhat anomalous, but the related *Aenictocoris* shows an intermediate condition, and it is not yet known to what extent this discrepancy between the sexes applies within the Aenictopechinae. The condition in *Maoristolus* and *Aenictocoris* is perhaps indicative of the way in which the simplified terminalia of the Enicocephalinae could have been derived. Reduction and loss of gonapophyses is more likely to occur first in the female, because of the direct relation between the form of the ovipositor and the egg-laying habits. Modification of the male genitalia, including reduction, is then likely to follow. The harpagones of *Maoristolus* are short and pad-like rather than clasper-like This form and their concave inner margins suggest that they may be used to grasp the apex of the female abdomen between them. The male terminalia of *Aenictocoris* are yet unknown.

As Usinger (1945) has intimated, the absence or imperfection of the transverse pronotal constrictions can no longer be considered diagnostic in separating the two subfamilies, which stand on the structure of the genitalia, especially of the male. The lobation of the pronotum is too liable to secondary reduction to have a certain and critical systematic value at the suprageneric level, and among undoubted Enicocephalinae there is considerable variation in the degree of distinctness of the constrictions. Notwithstanding this, it is of course possible that in the Aenictopechinae, since these are by other evidence closer to the ancestral Reduvioid stem, the unlobed or imperfectly lobed condition of the pronotum may be a primary one. However, it is difficult to avoid the impression that the peculiar form of the pronotum and the complete absence of the posterior impression in *Nymphocoris* have been arrived at by reduction associated with a long-established flightless condition.

Maoristolus tonnoiri (Bergroth) **New comb.** Figs 11–18

Gamostolus tonnoiri Bergroth, 1927, *Trans N.Z Inst.*, 57: 684 Myers and China, 1928, *Ann. Mag. nat. Hist.*, (10) 1: 382 Usinger, 1945, *Ann ent Soc Amer*, 38· 326, 340 (considered *tonnoiri* unlikely to belong to *Gamostolus*)

Redescription

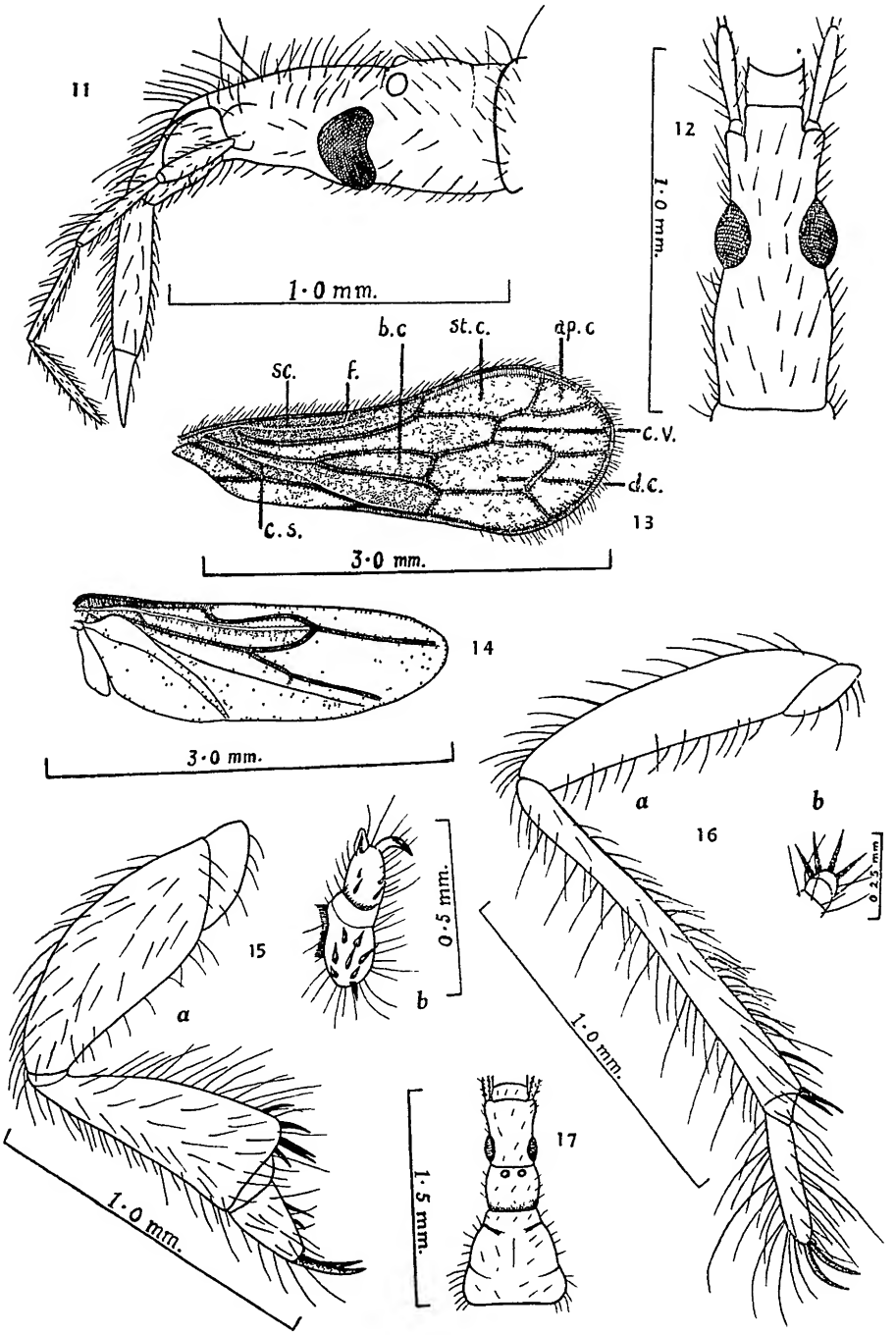
♀. Impunctate. Hairs sparse on underside of head and thorax; those of veins of disc of fore wings extremely short and sparse and inconspicuous; those of upper surface of head and pronotum and along the costal and apical margin and the basal parts of the veins of the fore wings long, mostly erect or suberect, and fairly close, hairs longest and closest on legs and at posterior end of abdomen; a dorso-lateral pair of long, erect hairs on anterior lobe of head above base of antennifers; a second lateral pair of long, erect hairs sub-basally on pronotum, just behind the obsolescent posterior transverse constriction.

From above, *head* (excluding rostrum, labrum and granular "neck") longer than pronotum (57:47) (including "neck", 63:47); anterior lobe as wide across eyes as posterior lobe and in median line rather more than twice as long as posterior lobe (39:18); posterior lobe nearly half as wide again as long (26:18) (including "neck", 26:24), narrowest in front, gradually convexly widening to just behind middle, thence only slightly narrowed at base (23·26:25) *Eyes* rather small, scarcely prominent, from above each only about ¼ as wide as interocular space (4 25:17 5), from below ⅘ as wide to subequal (8:10); in side view kidney-shaped, with anterior margin strongly convex and posterior margin markedly concave, occupying ⅞ the height of head (19:22); from above ⅓ as long as anterior lobe (13:39). *Ocelli* moderately prominent, about one ocellus-width apart. *Rostrum* relatively slender; third segment linear, not incrassate, of nearly uniform thickness throughout, about ¼ as deep as long, narrowing slightly for the basal third; relative length of segments I-IV, measured from the side, 11:13:35:18 *Antennae* clothed with erect and semi-erect hairs longer than width of the segments, about ⅞ as long as head and pronotum together (88:104); first three segments nearly cylindrical, narrowing towards base, fourth segment narrowed towards apex and at extreme base, relative length of segments I-IV, 18:24:23:23.

Pronotum ¼ wider across basal angles than long (58:47); anterior margin only slightly concave; in the median line, anterior lobe about ⅓ as long as posterior part of pronotum (12·35), the latter with a weakly impressed median line not reaching base; posterior transverse constriction obsolescent in middle, at sides appearing as oblique depressions in front of humeral angles; posterior lobe thus only imperfectly demarcated; lateral margins somewhat sinuate, incurved at levels of anterior and posterior constrictions; posterior margin nearly straight

Fore wings extending far beyond apex of abdomen; with venation as described for genus, the discal cell completely closed in both fore wings of all specimens seen and the stigmal cell divided by a single cross-vein, with thus one apical appendicular cell.

Legs Front coxae nearly ⅔ as long as front femora (40:63) Front femora moderately dilated, about ¼ as wide as long and a little more than ⅓ as deep in middle as long (23:63). Front tibiae laterally compressed, with sides flattened on apical half; base narrow, gradually and considerably expanded towards apex, where the depth is ⅖ length (20:50); apex bearing ventrally a group of 8 strong spines arranged in four rows, from above respectively of 2, 3, 2, 1, the uppermost two the shortest, the next three the longest, and the following pair the next longest; in one specimen examined, on the right tibia only, is an additional smaller but distinct spine just behind the single basal spine, both of these being on the ventral surface Front tarsi ⅘ as long as depth of tibiae at apex (16:20); claws subequal in length to each other and to tarsus; basal segment very short and inconspicuous; apical segment with four ventral spines,



FIGS. 11–17.—*Maoristolus tonnoiri* (Bergroth), ♀. FIG. 11.—Head, lateral FIG 12.—Head, ventral; with bases of rostrum and antennae. FIG 13.—Fore wing FIG 14.—Hind wing FIG. 15.—a, front leg, posterior (external) aspect; b, front tarsus and apex of tibia, apico-ventral aspect. FIG. 16.—a, hind leg, posterior (internal) aspect; b, apex of tibia, apico-ventral aspect. FIG. 17.—Head and pronotum, dorsal.

ap c, apical cell; b.c, basal cell; c.s, claval suture; c.v, connecting vein; d.c, discal cell, f, costal fracture, sc, subcosta; st c, stigmal cell.

the more basal pair about twice as long as the more apical, the latter thorn-like and slightly recurved. Middle and hind legs slender. Hind coxae about ¼ as long as hind femora (45:73). Hind femora about ⅕ as deep as long (15:73). Hind tibiae curved; considerably longer than hind femora; at apical third, where deepest, barely $\frac{1}{10}$ as deep as long (8.5:90). Hind tarsi with basal segment nearly ⅓ as long as apical segment on ventral aspect (6:21); claws subequal and half as long as tarsus (15:30). Inner claw of middle legs ⅔ as long as tarsus and half as long again as outer claw (15:20:10). All segments of legs with long bristles; in addition, middle and hind tibiae with a transverse row of four long ventral spines at apex; hind tibiae also with a ventral spine at about apical ninth, and basad of this a series of spine-like setae merging in form with the strong hairs.

Colour. Head and antennae shining testaceous. Eyes brownish black. Rostrum and legs shining yellowish brown; claws and spines darker brown. The short cephalic "neck", the pronotum and other thoracic tergites finely granular, dull brown. Abdomen with reddish tinges, particularly connexivum beneath. Front wings brown; veins dark brown; claval suture, costal fracture, and subcosta white.

Length to apex of wings (excluding rostrum) 4.3–4.8 mm. Length of body (to apex of abdomen) 3.7–4.3 mm. *Width* (across base of pronotum) 0.71–0.77 mm, (across eyes) 0.33–0.35 mm. Length of fore-wing 3.1–3.3 mm.

♂ differs from ♀ . —

Head. Length, head: pronotum :: 43:37 (including "neck", 46:37); anterior lobe: posterior lobe :: 29:14. Width, anterior lobe across eyes: posterior lobe :: 23:23. Eyes larger and more prominent than in ♀, from above nearly half as wide as interocular space (5.5:12); nearly meeting below (10.5:2); in side view projecting well below level of preocular region and occupying most of height of head; from above about ⅔ as long as anterior lobe (12:29). Ocelli large, less than half an ocellus-width apart (2:5). Rostral segments I-IV, 7:10:26:15; III barely ⅕ as deep as long. Antennal segments I-IV, 12:21:20:17.

Pronotum, width at base: length :: 48:37; length, anterior lobe: posterior part :: 9:28; posterior margin broadly convex.

Legs more slender than in ♀. Length, front coxae: front femora :: 25:47. Front femora, length: depth :: 47:12.5. Front tibiae, depth at apex: length :: 12:42; ventral margin, in addition to apical spines, with a row of subspinose hairs. Length of front tarsi: depth of front tibiae at apex :: 11:12. Length, hind femora:tibiae:tarsi:claws, as 60:83:26:13 Hind femora, depth:length :: 8:60. Hind tibiae, depth at apical third:length :: 5:83. Hind tarsi (ventral aspect), length of basal segment:apical segment :: 5:21.

Length to apex of wings (excluding rostrum) 3.8–4.4 mm. Length of body (to apex of abdomen) 2.7–3.7 mm. *Width* (across base of pronotum) 0.64–0.67 mm, (across eyes) 0.31–0.33 mm. Length of fore wing 3.0–3.1 mm.

Terminalia. Pygophor (9th abdominal segment) widely open behind; posterior ventral margin broadly convex, nearly straight; postero-lateral margins sinuately concave; tergal region much narrower than sternal, transversely rugose, posterior margin convex, somewhat produced in middle; anal tube short. No apparent ventral apophysis. Claspers strongly developed, short, stout, heavily sclerotised, bearing rather long hairs; outer surface convex; postero-mesial margin deeply excavated, so that from behind the claspers appear internally bilobed; inner surface membranous.

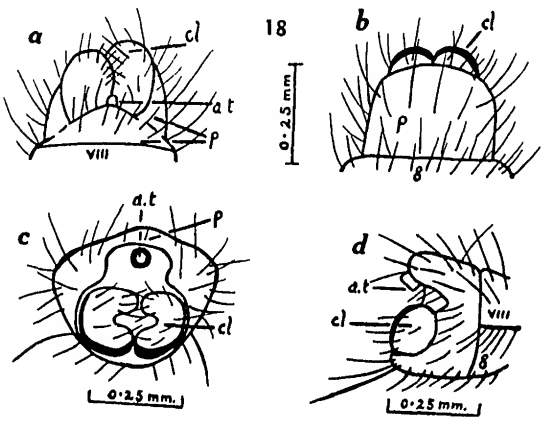


FIG. 18.—*Maoristolus tonnoiri* (Bergroth), ♂ terminalia a, dorsal, b, ventral, c, posterior; d, lateral; a.t, anal tube; cl, clasper; p, pygophor, VIII, 8th abdominal tergum; 8, 8th abdominal sternum

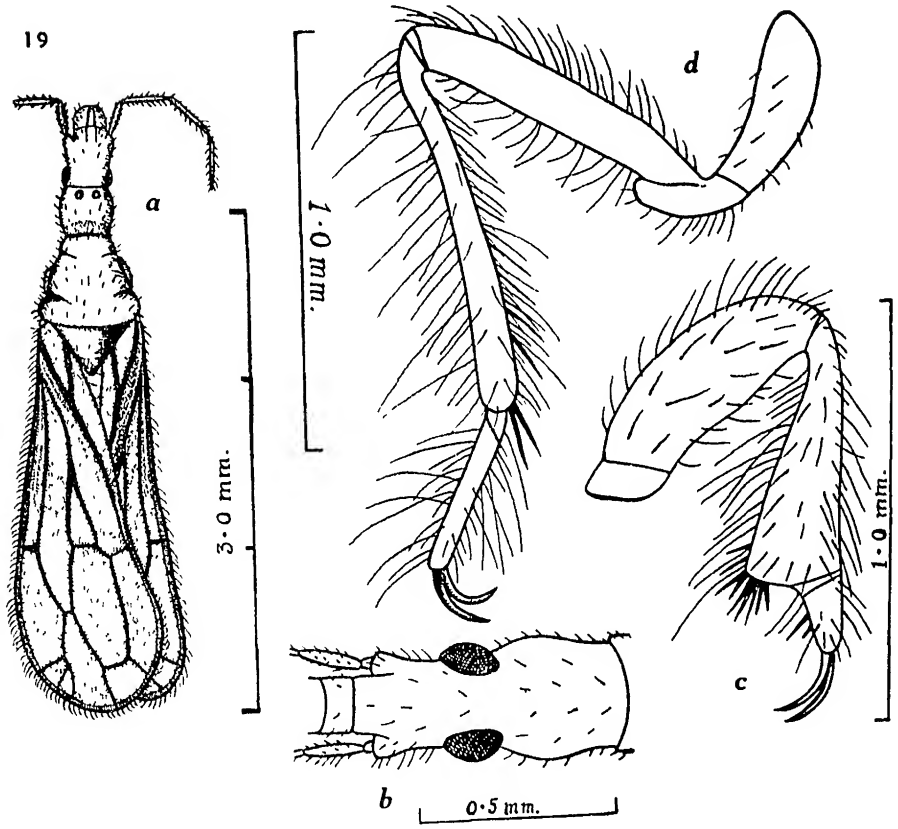


FIG. 19—*Maoristolus parvulus* sp. nov. a, dorsal; b, head, ventral; c, front leg, posterior (external) aspect (slightly tilted to show all apical tibial spines (8 or 9); d, hind leg, anterior (external) aspect

Specimens Examined. 1 ♀, Wainui-O-Mata (Wellington Province), 26.3.1927 (No 108a), G. V Hudson (D.M.). 1 ♂, Whaka State Forest, Rotorua (under bark of *Eucalyptus*), summer, 1952-53, G. B. Rawlings. 6 ♂, 8 ♀, Solomon's I., S.W. of Stewart I. (under bark of rotten tree), 25.1.1955, R. K. Dell and B. A. Holloway (D.M.).

M. tonnoiri is widely spread in New Zealand, and evidently there are large gaps in the known distribution. Bergroth's specimens were from Wellington and Nelson.

Maoristolus parvulus sp. nov. Fig. 19.

♀ Surface impunctate, minutely roughened on head and pronotum. Hairs sparse on underside of head and thorax and very sparse on disc of fore wings; those on upper surface of head and pronotum and along costal margin of fore wings long, erect or suberect, and fairly close, hairs longest and closest on legs and towards posterior end of abdomen.

Head from above (excluding labrum and "neck"), longer than pronotum (48:38); anterior lobe very nearly as wide across eyes as posterior lobe (21:22) and in median line twice as long (32:16); posterior lobe (excluding "neck") considerably broader than long (22:16), narrowest in front, gradually widening to posterior third and only slightly narrowing at base. Eyes rather small, not very prominent, from above each only ¼ as wide as interocular space (3·5:14), from below about half as wide (5.5:11); in side view flattened kidney-shaped, with anterior margin strongly convex and posterior margin markedly concave, occupying ⅘ the height of head (16:20); from above nearly ⅔ as long as anterior lobe (10:32). Ocelli prominent, about one ocellus-width apart. Rostrum relatively slender; third segment linear, not incrassate, of nearly uniform width and depth throughout, barely ⅕ as deep as long; relative

length of segments I-IV, measured from the side, 10:10:28:15. Antennae clothed with fine, pale hairs longer than width of the segments; shorter than head and pronotum together (76:86); relative length of segments I-IV, 15:20:20:21, first three segments nearly cylindrical, narrowing towards base; fourth segment a little thickened, fusiform.

Pronotum about ¼ wider across humeral angles than long (48:38), in the median line, anterior lobe rather more than ⅓ as long as posterior part of pronotum (10:28); the latter with a weakly impressed median line not reaching base, surface obliquely depressed at sides before humeral angles in position of obsolescent posterior constriction; anterior margin only slightly concave; lateral margins slightly sinuate; posterior margin slightly, broadly convex.

Fore wings extending for only a moderate distance beyond apex of abdomen; with venation as described for genus (the discal cell usually completely closed, sometimes incompletely, with the subapical transverse vein represented only by a short strut).

Legs. Front coxae ⅗ as long as front femora (30:50). Front femora not very strongly dilated, only ¼ as wide as long and about ⅓ as deep as long (16:50). Front tibiae laterally compressed, with sides flattened on apical half; base narrow, gradually and considerably expanded towards apex, where the depth is more than ⅓ length (16:42); apex bearing ventrally a group of 8 strong spines arranged in 4 rows, from above below respectively of 2, 3, 2, 1, the lowest spine the most slender, the uppermost two the shortest, the next three the longest, and the following pair the next longest. Front tarsi ¾ as long as depth of tibia at apex (12:16), claws subequal in length to each other and to tarsus; basal segment very short, inconspicuous; apical segment with 4 ventral spines, the more basal pair the longer. Middle and hind legs slender; hind tibiae little longer than hind femora; hind femora 1/6 as deep as long (10:60) and hind tibiae at apical third, where deepest, only about 1/9th as deep as long (7.5:65); hind tarsi with basal segment ¼ as long as second on ventral aspect (5:20); inner claw nearly ⅗ as long as tarsus (15:27), outer claw only slightly shorter. Inner claw of middle legs about ⅔ as long as tarsus and nearly half as long again as outer claw (14:18:10). All segments of legs with long bristles; in addition, middle and hind tibiae with a transverse row of four long ventral spines at apex; hind tibiae also with a ventral spine at about apical sixth and basad of this a series of spine-like setae merging in form with the strong hairs.

Colour. Head and pronotum dark blackish brown. Scutellum and venter of abdomen paler brown, often with reddish tinge. Eyes and ocelli usually more or less reddish. Antennae, rostrum and legs yellowish brown. Front wings dark brown or ferruginous; veins brown; claval suture, costal fracture and usually subcosta white.

Length 3.4–3.7 mm; width (across base of pronotum) 0.64 mm, (across closed wings) 0.89–0.96 mm, (across eyes) 0.28 mm.

Length of body 3.1–3.2 mm. Length of fore wing 2.3 mm.

Specimens Examined. 2 ♀ (holotype and paratype), Lake Te Au, near S. arm of L. Te Anau, S.I. (leaf mould), 12-24.1.1953, R. R. Forster (C.M.). 1 ♀, Mt. Sumner, S.I. (moss), 13.4.1952, R. R. Forster (C.M.).

Types. Holotype in Canterbury Museum. Paratype in Dominion Museum.

Close to *M. tonnoiri* (Bergroth), the more obvious differences being the following: the smaller size; the eyes as seen from below narrower in proportion to interocular space; the hind tibiae proportionately shorter in relation both to hind femora and to front tibiae, with the subapical ventral spine relatively further from apex; the shorter wings relative to the body

It would be interesting to know the distribution of this species relative to *tonnoiri*. So far *parvulus* has been taken only in two localities rather distant from each other, but both at fairly high altitude not far from the north-south mountain system

Nymphs

Last (fifth) Instar.

Head Length, head: pronotum :: 45:34 Sides of posterior lobe nearly straight and parallel Eyes and ocelli red. the latter conspicuous but not prominent; the former shaped as in adult, each with about 30 black ommatidia, which occupy only the central part of the red ocular area, and of which the more ventral ones in particular are well separated. Rostral and antennal segments shaped and proportioned as in adult. *Pronotum* with anterior transverse impression distinct, posterior impression obsolete; posterior margin broadly convex; lateral convexities above coxae uniformly convex, not depressed towards posterior margin A little wider across humeral angles than long (38:34), width including lateral convexities 42 The median ecdysial cleavage line well defined on thorax, appearing as a fine white line on metanotum and scutellum, as a sulcus on posterior pronotal lobe, and continued as a faint impression over anterior lobe of pronotum and posterior lobe of head. *Scutellum* transversely

subtriangular, posterior margin broadly convex *Front wing pads* about ⅔ as long again as pronotum (58·34), reaching to about basal third of abdomen; with a transverse sulcus separating basal corium from apical semitranslucent membrane; whole surface covered with long pale hairs, anal margins meeting or nearly meeting in median line Hind wing rudiments projecting very slightly beyond apices of the fore. *Legs* shaped as in adult, length of femur, tibia, tarsus, 47:40:12.5 (front); 48:48:24 (hind). Depth, femur: apex of tibia :: 17:16 (fore); 10:8 (hind). Tarsi of all legs with only one segment. Claws, tibial and tarsal spines as in adult. *Colour* yellowish brown, thorax and abdomen more or less tinged with pink. Clothed with fine, pale brown, suberect hairs.

Length, about 2.4 mm (dried)

Width, across eyes, 0 29 mm

Fourth Instar

Very similar in most respects to the 5th, but readily distinguished by the smaller size, fewer ommatidia, shorter wing buds.

Eyes each with only about 10 ommatidia, in a group in postero-dorsal sector of red ocular area. Length, head: pronotum .. 38.30. Length, rostral segments I-IV, 9:7:23:9. Antennal segments II and III relatively short, I-IV, 10:13:13:20. Pronotum as long as wide across humeral angles; anterior lobe half as long as posterior (10:20). Posterior margin of scutellum straight or nearly straight. Front wing sheaths shorter than pronotum (25:30), reaching base of abdomen; without a transverse sulcus; anal margins distantly separated. Hind wing rudiments notably surpassing fore. Both pairs colourless, with erect hairs Length, front coxa, femur, tibia, tarsus, 25:40:33:10. Depth, front femur: tibia :: 15:13. Tibial and tarsal spines as in 5th instar, except that the single ventral spine of the anterior tibiae, the more basal of the two median ventral spines of the hind tibiae, and the outer pair of apical spines of the middle tibiae are very slender and difficult to distinguish from the adjacent hairs.

Length, about 2.3–2.6 mm (alcohol specimens).

Width, across eyes, 0.25–0 26 mm

Specimens Examined. Mt Sumner, S I. (moss), 13 4 1952, R. R Forster (C.M.); 5th (1), 4th (2)

Genus NYMPHOCORIS gen. nov.

Small Aenictopechinae, the known species flightless, with vestigial fore wings; body and appendages shining, with a covering of fine pale hairs, those of legs and apex of abdomen particularly long. *Head* scarcely half as broad across eyes as long, with a distinct transverse dorsal impression behind eyes; postocular lobe transverse, not subglobular, with dorsal surface nearly flat and sides nearly straight, somewhat widened posteriorly. Eyes very small, in type species each with only one apparent ommatidium Ocelli absent. Antennae subequal in length to head and pronotum together, first segment shortest, the other segments subequal in length. Rostrum with third and fourth segments elongate, third subcylindrical, not at all incrassate, more than three times as long as second, fourth much longer than second *Pronotum* hexagonal, unarmed, bilobed; anterior constriction obscure, obsolescent in middle, sides not incised at its level, no posterior constriction, anterior and posterior margins nearly straight; the short and imperfect anterior lobe with sides straight, widening behind; posterior lobe widest near middle, with disc nearly flat from front to rear, gradually declivous towards sides, lateral margins convex. *Scutellum* short, transversely subtriangular, without a posterior lobe or carina. *Wings* vestigial; front wings reduced to very short, obliquely transverse scales, without trace of venation. *Legs*: Fore legs fairly strongly incrassate; front coxal cavities open behind; front tibiae gradually increasing in depth towards apex, which bears a pecten along inner margin and a ventral group of four strong spines; ventral surface of tibiae with two strong spines within apical half towards posterior (outer) margin; front tarsi one-segmented, with two claws, the anterior (inner) longer than the posterior (outer); ventral surface of tarsi with two pairs of spines, the more basal at about half-way and much longer than the more apical pair. Middle and hind legs short, somewhat incrassate; middle and hind tibiae without pectines, each with a row of about five apical ventral spines and two pairs of long preapical ventral spines; middle and hind tarsi two-segmented, the basal segment extremely small and inconspicuous; apical segment with two claws, the inner somewhat the longer. Seen from beneath, fore coxae elongate subglobular; middle and hind coxae elongate, especially the hind, not subglobular, middle coxae close to hind coxae. *Genitalia*: Female with a well developed ovipositor of generalised Hemipterous type, consisting of a pair of ventral valvulae from the eighth abdominal segment and a dorsal valve, from the ninth segment, representing the fused pair of dorsal valvulae; ninth tergum well developed, forming a pygidial plate before and at sides of the base of the anal tube; ninth sternum apparently represented by a pair of small, triangular, postero-lateral plates between the tergum and the base of the upper valvulae. Pygophor of male with the ventral hypophysis apparently represented by a pair of small lobes, claspers (harpagones) large, laterally compressed, resembling those of *Aenictopechys* and differing from the lateral lobes

of the pseudosternite of the Enicocephalinae in being mobile, not fused posteriorly with a median lobe, and in bearing hairs.

TYPE SPECIES. *Nymphocoris maoricus* sp. nov.

DISCUSSION OF AFFINITIES. *Nymphocoris* bears a superficial resemblance to *Phthirocoris* Enderlein due to the reduction of eyes and wings and the loss of ocelli, but the two genera are taxonomically very distant and must be placed in different subfamilies. The resemblances are evidently those of convergence and an independently acquired neoteny in accordance with a similar forest-floor existence. *Phthirocoris* seems to be derivable from a *Systelloderes*-like winger ancestor (p. 410).

Nymphocoris does not appear very closely related to any other known genus, but the males resemble those of *Aenictopechys* and other Aenictopechinae in having a pair of hairy, mobile claspers (absent in all Enicocephalinae and in the recently described subfamily Alienatinae Barber (1953)), while in both sexes the two genera agree in that the posterior pronotal constriction is lacking and the anterior pronotal constriction obsolete. The question of the taxonomic value to be assigned to these and other structural features is further discussed on pp. 395–6; there seems no doubt that the possession of true harpagones, as shown in *Aenictopechys* by Jeannel (1942), in *Gamostolus* by Wygodzinsky (1949), and in *Maoristolus* by the writer (p. 395), warrants the separation of Usinger's relatively archaic subfamily Aenictopechinae, and it is to this subfamily that *Nymphocoris* must be assigned. The new genus differs from *Aenictopechys* in the reduced, bilobed condition of the ventral apophysis of the male pygophor. Wygodzinsky (1949) found the ventral apophysis to be entirely lacking in *Gamostolus;* this is true also of the related *Maoristolus*. The peculiar elongate sucker-like form of the ventral apophysis in *Aenictopechys* (Jeannel, 1942; p. 300, Fig. 23e, f) must be regarded as of generic (or at the most tribal) significance, and not a subfamily character. The female of *Nymphocoris maoricus* also shows a primitive feature in the possession of a large valved ovipositor, present also in *Gamostolus* (Wygodzinsky, 1949), but lacking in members of the Enicocephalinae; the female genitalia of *Aenictopechys* have not yet been described.

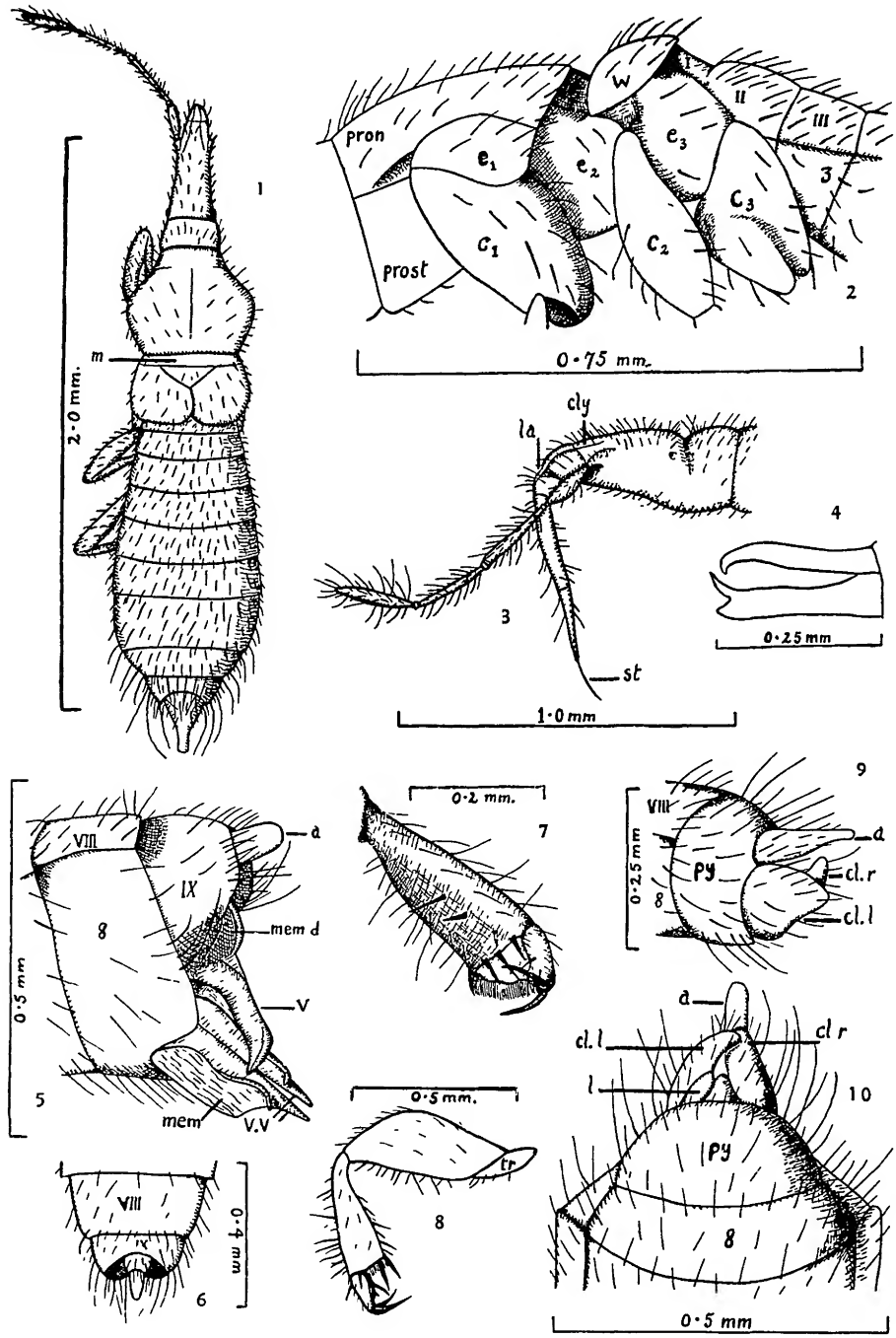
In other respects *Nymphocoris* is readily separable from any of the other genera known to belong to the Aenictopechinae, most obviously by the veinless, vestigial wings, the greatly reduced eyes, the absence of ocelli, the hexagonal pronotum and the relatively longer and more slender rostrum, especially the last two segments. There are also considerable differences in the armature of the apex of the fore tibiae; from *Aenictopechys* in the absence of an elongate ventral process, from *Gamostolus* in the spines being all long and slender instead of some peg-like and others hemispherical, and from *Maoristolus* in the smaller number of spines. From the last two genera *Nymphocoris* also differs in having no trace of the posterior pronotal constriction.

Because of the superficial similarity between *Nymphocoris* and *Phthirocoris,* the main features, in addition to the genitalia, by which the former differs from the latter are listed: the much more elongate third and fourth rostral segments, the third not incrassate, the more reduced eyes, the flatter, more transverse postocular lobe of head, with the "neck" much less distinctly constricted, the more obscure anterior pronotal constriction, the absence of a posterior pronotal constriction and lobe, the fewer apical spines of the fore tibiae, the presence of strong preapical ventral spines, the larger number of apical spines and the absence of pectines on middle and hind tibiae, the much shorter metanotum, and the longer, less globose, more closely apposed coxae. As the genera are at present constituted, *Nymphocoris* differs also in its short, coriaceous, transversely ovoid fore-wing rudiments.

Nymphocoris maoricus sp. nov. Figs. 1–10.

Surface impunctate, shining, minutely granular.

Head. Posterior lobe with basal "neck" region only obscurely delimited and constricted, as wide as, or slightly wider than base of posterior lobe Head (excluding "neck") about ⅕



FIGS. 1–10—*Nymphocoris maoricus* gen. & sp. nov. FIG. 1.—♂, dorsal. FIG. 2.—Thorax, lateral FIG. 3.—Head of ♂, lateral. FIG. 4.—Ovopositor of ♀, lateral; dorsal valve and right ventral valvula. FIG 5.—Terminalia of ♀, lateral. FIG. 6.—Terminalia of ♀, dorsal. FIG. 7—Front tibia and tarsus, postero-ventral aspect. FIG. 8.—Fore leg, anterior (inner) aspect FIG. 9.—Terminalia of ♂, lateral. FIG. 10—Terminalia of ♂, ventral.

a, anal tube; C_1, C_2, C_3, 1st, 2nd, 3rd coxae; cl.l, cl.r, left, right claspers; cly, clypeus; e_1, e_2, e_3, pro-, meso-, meta-epimera; la, labrum, m, mesoscutum; mem, distended membrane between ventral valvulae; mem. d, posterior membrane of segment IX; pron, pronotum, prost, prosternum, py, pygophor; st, extruded stylets, v, upper valve (= fused dorsal valvulae); v v, ventral valvulae; w, vestigial fore wing; I-IX, 1st–9th abdominal terga; 3–8, 3rd–8th abdominal sterna.

as long again as pronotum (34:28 in ♀, 32:27 in ♂), including "neck" about ⅓ longer than pronotum (38:28 in ♀, 35:27 in ♂); anterior lobe over 3 times as long as posterior lobe excluding "neck" (26:8 in ♀, 25:7 in ♂) and over twice as long including "neck" (26:12 in ♀, 25:10 in ♂); anterior lobe across eyes slightly narrower than posterior lobe at base (16:18 in ♀, 15:17 in ♂). (Note that length of "neck" extruded is probably somewhat variable.) Eyes very small, flattened, each with only one apparent ommatidium. Ocelli absent. Antennae somewhat shorter than head and pronotum together in ♀ (60:66), somewhat longer in ♂ (66·62), with a covering of pale, erect and suberect hairs longer than width of the segments; length of segments I-IV, 11:17:15:17 (♀), 11:17:17:17 (♂); first stout, narrowed at base; second and third subcylindrical, second gradually and slightly thickened towards apex, third narrowed at base and apex; fourth fusiform, bluntly rounded at apex, nearly as wide in middle as first segment. Rostrum with first two segments short, third and fourth elongate, third subcylindrical, gradually narrowed towards apex, not at all incrassated; fourth elongate conical, very slightly deflected towards apex; first three segments with fine pale hairs, fourth bare; length of segments I-IV, 9:7:24:16 (♀), 7:5:21:15 (♂).

Pronotum wider across middle of posterior lobe than long (33: 28 in ♀, 31:27 in ♂), anterior lobe ⅖ as long as posterior lobe (8:20 in ♀, 7:20 in ♂), ⅔ as wide at base as posterior lobe in middle (22:33 in ♀, 21:31 in ♂) and about ⅝ as wide as posterior lobe at base (22:27 in ♀, 21:25 in ♂); posterior lobe with a shallowly incised median longitudinal ecdysial line, with no median sulcus and no sub-lateral foveae or tuberosities. Metathorax very short, metanotum covered by fore-wing pads. *Fore wings* reduced to coriaceous scale-like vestiges barely overlapping base of abdomen, their short inner margins meeting behind scutellum, each obliquely transverse ovoid, with pale hairs and without veins.

Legs. Relative length of coxa, femur, tibia, tarsus; 17:35:25:8 (fore leg), 24:35:31:11 (hind leg). Front femur, length: depth in middle :: 35:13. Front tibia, length:depth at apex :: 25:9. Hind femur, length: depth in middle :: 35:12 Hind tibiae with dorsal margin straight, ventral margin convex; depth, base:middle:apex ::: 3:7:5. Legs with spines as described for genus; in addition, a spine near anterior (inner) apical margin of front tibiae just above the pecten; of the four apical spines of front tibiae, the two more anterior (inner) ones shorter than the other two; middle tibiae with a pair of preapical dorsal spines and hind tibiae with a single preapical dorsal spine; of the two pairs of ventral spines on the front tarsi, the more basal pair long and slender, the more apical pair several times shorter, neither modified in form as a special sense-organ, of the five apical spines on middle and hind tibiae, the middle three much longer than the outer two; legs with long, pale, erect and suberect hairs, many, particularly on ventral surface of middle and hind legs, strong and subspinous Inner claw of front tarsus rather longer than tarsus (10:8), outer claw equal in length to tarsus. Posterior (inner) claw of hind tarsus rather shorter than tarsus (9·11), outer claw scarcely shorter than inner.

Genitalia. Female with ventral valvulae laterally flattened, strongly bifid at apex, with two apical processes separated by a V-shaped incision, the upper process longer and upwardly curved and more narrowly and sharply acuminate as seen from the side; dorsal valvulae fused to form a single elongate valve arched from side to side to form roof of ovipositor, with apex simple, subangulate, somewhat downcurved, posterior border of ninth abdominal tergum concavely emarginate; anal tube prominent, posterior surface of ninth abdominal segment, between anal tube and upper valve, membranous (Note: In allotype ♀ the left ventral valvula is twisted, so that its upper apical process points down.) Male with ninth abdominal segment with posterior dorsal margin, as in female, concavely emarginate before the base of the large anal tube, but complete and undivided ventrally, forming a broad pygophor relatively narrowly open behind. Claspers large, broad, simple, with apices rounded. Ventral apophysis apparently represented in a reduced form by a pair of short, subtriangular processes.

Colour. Stramineous yellow-brown, legs, especially middle and hind, antennae and rostrum paler stramineous.

Length (excluding rostrum), 2.9 mm (♀), 2.3 mm (♂). Width (across eyes) 0.21 mm (♀), 0.20 (♂); (across middle of posterior pronotal lobe) 0.44 mm (♀), 0.41 mm (♂).

Specimens Examined. Holotype ♂, Arthur's Pass, S. Alps (N W. Cant.), ex leaf mould, 10.1.1949, E. Dawson (C.M.) Allotype ♀, Notornis Valley, Southland, ex leaf mould, 18.12.1951, R. S. Duff (C.M.).

Genus AENICTOCORIS gen. nov.

Small, nymph-like Aenictopechinae, the known species micropterous; head and appendages shining, thorax and abdomen dull; with a covering of fine hairs, most dense on legs and abdomen *Head* less than half as broad as long, with a distinct transverse dorsal impression behind eyes, posterior lobe not globose, wider than long, broadening posteriorly, where wider

than anterior lobe across eyes, sides nearly straight, disc above nearly flat Eyes small, nymphoid, distantly separated both above and beneath, only slightly projecting, from above each only about ¼ interocular space, each with about 10 ommatidia Ocelli scarcely elevated, placed near anterior margin of posterior lobe Antennae considerably shorter than head and pronotum together; first segment shortest, others subequal. Rostral segment III more than twice as long as II, IV considerably longer than II. *Pronotum* unarmed, nearly flat; the anterior transverse impression well formed at sides, weak in middle; posterior transverse impression obsolete, represented by two shallow lateral foveae, absent in middle, not demarcating a third lobe; from above, lateral margins shallowly sinuate; widest at posterior two-thirds (including proepimera, widest at middle), anterior and posterior margins nearly straight; humeral angles covering the hemelytral articulations *Scutellum* small, about ¼ as long as pronotum and less than ½ as wide as pronotal base; scarcely raised, subtriangular, with apex rounded and not carinate or lobed. *Wings* vestigial in known species Front wings reduced to short pads reaching only to base of abdomen Hind wings reduced to short flaps *Legs*: Fore legs rather strongly incrassate; front coxae oblong-conical; front coxal cavities open behind (proepimera not meeting behind them); fore tibiae considerably expanded towards apex, which is without tubercles or plate-like processes and bears a well developed pecten on anterior (inner) margin and ventrally a group of 10 strong spines, the 2 nearest tarsus apically bifid. Middle and hind legs moderately thickened, short (hind tibiae about ½ as long as head and pronotum together). Middle and hind tibiae without pectines, with a ventral apical row of 4 long spines; hind tibiae in addition with several preapical spines. All tarsi two segmented, the first segment extremely short; second segment of front tarsi with 2 pairs of ventral spines, the more basal pair the longer; second segment of middle and hind tarsi with long hairs but without spines. All tarsi with 2 claws; those of fore tarsi subequal: the inner claw of middle and hind tarsi rather longer than the outer *Abdomen* with long hairs above and below; apex of ninth tergum of female with a pair of especially long dorso-lateral hairs; anal lobe short; valvulae reduced to small lobes.

TYPE SPECIES. *Aenictocoris powelli* sp. nov

Aenictocoris is evidently closest to *Maoristolus*, with less immediate affinities to *Nymphocoris*. All three genera show relationship to the South American *Gamostolus* and apparently represent three autochthonous lines derived from a common stock of southern (Antarctic or Bassian) origin. *Nymphocoris* retains the most primitive genitalic structure.

Aenictocoris differs from *Maoristolus* in the spination of the legs, particularly in the pair of bifid spines and the greater number of apical spines on the fore tibiae: the shorter and stouter legs; the vestigial wings; the reduced eyes and ocelli; the differently shaped pronotum, with the posterior transverse impression even more obsolete; the much smaller scutellum From *Nymphocoris* it differs notably in the much greater number of apical spines on the fore tibiae and the presence of bifid spines; the subequal front claws; the fore wings longitudinally elongated and retaining a few veins: the differently shaped pronotum; the longer head; the larger eyes; the presence of ocelli: the relatively shorter antennae and third rostral segment; the vestigial valvulae in the female.

Aenictocoris powelli sp nov. Fig 20

Known only in the micropterous form.

♀ Impunctate Body, fore-wings and legs clothed with rather long, erect and suberect hairs, longest on legs and apex of abdomen, a dorso-lateral pair of long erect hairs on anterior lobe of head above bases of antennifers

Head (excluding rostrum, labrum and posterior granular "neck") longer than pronotum (54:45) including "neck", 59:45). Anterior lobe distinctly narrower across eyes than posterior lobe (19.5:23) and in median line twice as long as posterior lobe (36:18) (including "neck", 36·23). Posterior lobe nearly ⅓ as wide again as long (23:18), narrowest in front (where as wide as long), gradually widening to base: sides nearly straight. *Eyes* very small, each with only about 10, mostly separated ommatidia, ocular area red; from above only about ⅓ as wide as interocular space (2:15 5), from below about 1/7 as wide (2 25·15); in side view kidney-shaped, with anterior margin strongly convex and posterior margin concave, occupying ½ height of head (10:20); from above 1/7 as long as anterior lobe *Ocelli* scarcely prominent, about one ocellus-width apart *Rostrum* relatively slender; third segment linear, slightly tapering toward apex, not at all ventrally incrassate, ¼ as deep in middle as long, relative lengths of segments I-IV, measured from the side, 11:10:24·15. Antennae clothed with erect and semi-erect hairs longer than width of the segments; about ¾ as long as head and pronotum together; inter-

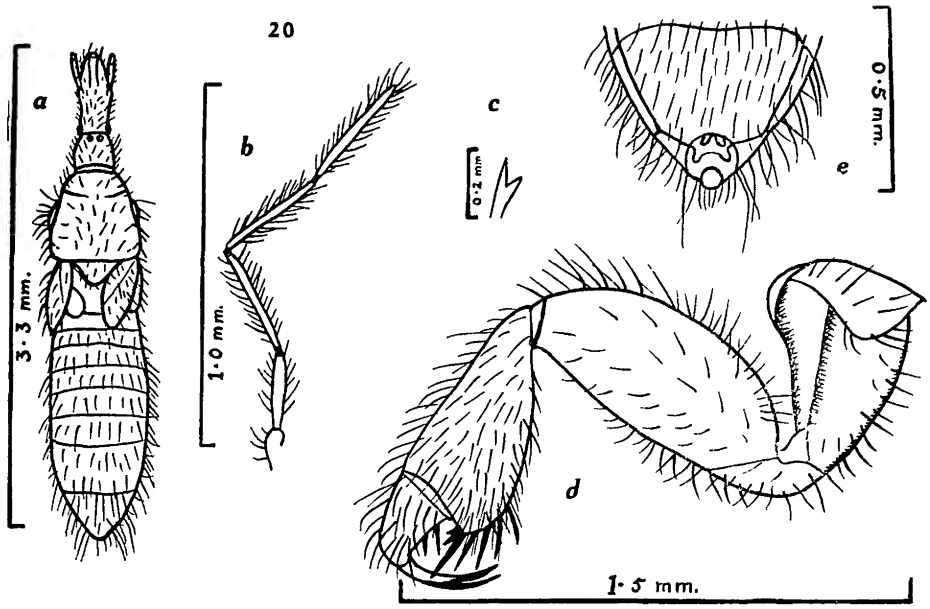


FIG. 20.—*Aenictocoris powelli* gen. & sp. nov. a, ♀, dorsal (left fore wing turned aside to expose left hind wing); b, left antenna and antennifer; c, one of the two dorsal spines of apex of front tibia; d, fore leg, ♀, outer (posterior) aspect; e, apex of abdomen, ♀, ventral

segmental membranes each with a short annular sclerite, those basad of III and IV near middle of membrane, the other close to apex of I; segments I-III nearly cylindrical, I and II narrowing to base (II only slightly), IV tapered toward apex; relative length, I-IV (excluding intersegmental membranes and subsegments), 14:20:21:22.

Pronotum wider across basal angles than long (49:45); anterior transverse constriction obsolescent in middle; posterior constriction reduced to two widely separated, weak, lateral, oblique lines; pronotum thus imperfectly two-lobed; length, anterior lobe:posterior lobe :: 11:34; sides shallowly sinuate; anterior and posterior margins nearly straight. *Scutellum* broadly rounded at apex; anterior width:length :: 23:12.5.

Fore wings greatly reduced, subellipsoid; shorter than pronotum (37:45); reaching only to or near apex of first abdominal tergum. Venation nearly lacking, but the claval suture and the transverse costal fracture present, both pale. Costal margin slightly incised at the fracture, somewhat more than half-way from base; distad and particularly basad of fracture, darker than disc of wing. Anal margins of the two wings widely separated throughout their length, exposing metanotum and first abdominal tergum between them. Length:greatest width :: 37:17. *Hind wings* reduced to small, pale subovoid flaps, without venation; completely covered by the fore wings.

Legs Front coxae about $\frac{2}{3}$ as long as front femora (36:55). Front femora swollen, about $\frac{1}{3}$ as wide as long and considerably more than $\frac{1}{4}$ as deep in middle as long (23:55). Front tibiae laterally compressed, with sides flattened on apical half; considerably expanded toward apex, where rather more than $\frac{1}{2}$ as deep as long (23:43); apex with a cluster of 10 strong spines, in rows of 2, 3, 3, 2, the two uppermost (nearest tarsus) short and apically bifid, the others simple, the next row of 3 the longest, the others decreasing in length away from tarsus; another, more slender, ventral subapical spine shortly basad of and below the main group; inner margin with a well developed subapical pecten. Front tarsi about $\frac{2}{3}$ as long as depth of tibiae at apex (16:23); claws subequal in length, longer than tarsus, as long as depth of tibiae at apex; basal segment very short and inconspicuous; apical segment beneath with two pairs of spines, the more apical the shorter. Middle and hind legs rather slender. Hind coxae about $\frac{4}{5}$ as long as hind femora (45:56). Hind femora less than $\frac{1}{3}$ as deep in middle as long (17:56) Hind tibiae as long as hind femora; dorsal margin nearly straight; ventral margin gradually and convexly curved to shortly beyond half-way, thence nearly straight; deepening beyond half-way; about $5\frac{1}{2}$ times as long as deep at apical third (56:10). Hind tarsi with basal segment $\frac{1}{4}$ as long as apical segment on ventral aspect; inner (posterior) claw longer

than outer and ⅔ as long as tarsus (17·14·25). All segments of legs with long bristles. Middle and hind tibiae with a ventral row of 4 long spines at apex; hind tibiae in addition with 2 more slender spines posterior (internal) to these, and 2 ventral spines within apical half

Terminalia. Valvulae vestigial, reduced to small lobes.

Colour. Upper surface reddish brown; scutellum and posterior lobe of head yellowish brown; first abdominal tergum and posterior margins of the others reddish; wings brown, claval sutures pale. Eyes and ocelli red, the ommatidia of the former black. Antennae, rostrum and legs yellowish brown; antennae slightly infuscated; rostrum and front legs apical to trochanters with a darker, rufescent tinge. Abdomen beneath pale brown, infuscated toward apex.

Length (excluding rostrum) 3.3 mm. *Width* (across base of pronotum) 0.60 mm, (across eyes) 0.26 mm.

LOCALITY. Holotype ♀ and 2 nymphs (V and IV), Seddonville (N.E. of Westport), W. Nelson, S.I., ex leaf mould, 10.4.1948, A. W. B. Powell (D.M.). Type in Dominion Museum, Wellington.

Nymphs. Fifth and fourth instar nymphs are similar to the adult except in size, paler colour, absence of terminalia, the smaller wing pads, the one-segmented tarsi, the much smaller eyes with fewer ommatidia, and the only rudimentary ocelli. They are readily distinguished from nymphs of any other species by the spination of the fore tibiae, including the 2 bifid spines.

Width of head across eyes: instar V, 0.23 mm; instar IV, 0.20 mm. Eye more or less ovoid in outline; in instar V with 4 large black eye-spots and 4 or 5 smaller red spots; the latter absent in instar IV. Ocellar spots red, linear, not raised in instar V; absent in instar IV. Front wing sheaths in instar V widely separated, reaching base of abdomen, the posterior pair surpassing them, in instar IV not distinct, present only as imperfectly differentiated lateral lobes.

Subfamily ENICOCEPHALINAE Usinger, 1932

Tribe PHTHIROCORINI Jeannel, 1942: 316

Genus PHTHIROCORIS Enderlein

Phthirocoris Enderlein, 1904, *Zool Anz.*, 27:783, 785, 786; 1909, *Deutsche Südpolar-Expedition*, 10, Zoologie (2) : 403. Jeannel, 1942, *Ann. Soc. ent. Fr* (1941), 110 (4) : 317-321. Poisson, 1951, *in* Grassé (ed.), *Traité de Zoologie*, 10 (2) · 1778–1779.

Henicocephalus Westwood, emend. Agassiz, *partim*, Breddin, 1905, *Mitt. Naturh. Mus.*, Hamburg, 22: 142. Bergroth, 1906, *Wien. ent. Zeit.*, 25: 6; 1906, *Ann. Mus. Nat. Hung.*, 4: 326.

Systelloderes Blanchard, *partim*, Bergroth, 1916, *Proc. Roy. Soc. Vict*, 29 (1) · 17

TYPE SPECIES. *Phthirocoris antarcticus* Enderlein, 1904, *Zool. Anz.*, 27: 787. Fig. 2–5 (nymphs) ; 1909, *Deut. Südp.-Exped.*, 10, Zoologie (2) 404–406; pl 54, figs 163–166; text-fig. O-R (adult and nymphs). Jeannel, 1942, *Ann. Soc. ent. Fr* (1941), 110 (4) : 321; fig 28–33 (including genitalia).

Small, flightless Enicocephalinae, with wings absent or vestigial; head, thorax and appendages shining; with a covering of fine, pale hairs longest at apex of abdomen. *Head* less than half as wide across eyes as long, behind eyes with a more or less distinct dorsal transverse impression; anterior lobe long and subcylindrical; postocular lobe more or less globose or ovoid, with dorsal surface convex, ventral surface at base more or less swollen beyond level of "neck". Eyes very small, scarcely prominent, each with only a few ommatidia (2–15). Ocelli absent Antennae subequal in length to head and pronotum together; first segment shortest, other segments subequal in length, fourth fusiform, segments with bases constricted as small subsegments Rostrum with third segment more or less thickened, less than three times as long as second, fourth subequal in length to second Labrum elongate triangular. *Pronotum* unarmed, three-lobed; anterior and posterior margins straight or nearly straight; anterior lobe fairly large, either rather indefinitely delimited behind or separated by a distinct constriction; middle lobe the longest and widest, roughly hexagonal, with sides convex, widest near the middle; posterior lobe short, its constriction more or less obscure, tending to obsolescence in middle; middle lobe with a median longitudinal impression and with a pair of more or less well defined sublateral foveae Scutellum not defined or short and obscurely delimited. Meso- and meta-thorax short, transverse Mesoscutum more or less convex. Metanotum with disc nearly flat. *Wings* either entirely lacking or fore wings represented by narrow, elongate, ribbon-like vestiges, with no trace of venation. *Legs* short. Fore legs strongly incrassate; proepimera not meeting behind fore coxae, leaving front coxal cavities open behind; front coxae globose; front femora much swollen, dorsal surface strongly convex; front tibiae short, gradually increasing in depth towards apex, which bears a pecten along anterior (inner) margin and a ventral group of seven spines,

without preapical ventral spines; front tarsi one-segmented, with two claws, the anterior (inner) one the longer; ventral surface of front tarsi with a pair of long, strong spines at about half-way, more apically a posterior (outer) spine, shorter and thorn-like, and a short anterior (inner) process, either tubercular or curved (sense-organ of Enderlein (1909)) Middle coxae ovoid, set close to hind coxae, distant from fore coxae; hind coxae stouter but longer, middle and hind tibiae rather compressed, apex with a pair of short, ventro-lateral pectines separated mid-ventrally by a pair of spines longer than the pectines, without preapical ventral spines; mid- and hind tarsi two-segmented, the basal segment very short, apical segment with two subequal claws. *Terminalia*: Female without obvious ovipositor; ninth abdominal tergum forming a dorsal pygidial plate; eighth sternum (subgenital plate) with posterior margin broadly convex, on or near margin either a single small, median, tubercle-like process or a close pair of such processes. Pygophor of male a relatively wide sclerotised capsule, open and membranous behind; pseudosternite well developed, three-lobed; ventral apophysis not per forated, either plate-like, sometimes largely membranous, or acuminately triangular.

Notes on the Status of Phthirocoris Enderlein

Breddin (1905) and Bergroth (1906) rejected the genus *Phthirocoris*, regarding Enderlein's *Ph. antarcticus* as a nymphal instar of *Enicocephalus* Westwood Bergroth (1916) stated, " . the insect described by Enderlein from Crozet Island under the name *Phthirocoris antarcticus* is doubtless the larva of a *Systelloderes*."

Enderlein's original specimens, from which he described *antarcticus* in 1904, were, in fact, nymphs, as he acknowledges himself in his later paper (1909: p. 404), and these were correctly described and figured as having the middle and hind tarsi one-segmented. It was not until 1909 that he described the adult from a single female and clearly indicated the two-segmented nature of these tarsi (pp. 403, 404; Pl 54, Fig 165a, 165b). Jeannel (1942) also figures and describes (Fig. 30; p 319) the two-segmented middle and hind tarsi of the adult of *antarcticus*. A similar condition holds in the two New Zealand species of the genus; in all three species, as indeed in all Enicocephalids with two-segmented tarsi, the basal segment is small and largely concealed dorsally by the base of the second. The male of *antarcticus* was not described until Jeannel's paper of 1942. Breddin (1905) and Bergroth (1906) were thus correct in their diagnosis of Enderlein's type material as nymphs, and moreover, with the evidence available at the time they wrote (before the adult descriptions appeared), were entirely justified in rejecting the genus *Phthirocoris*.

Breddin's criteria (1905: p. 142) for regarding *Ph. antarcticus* as a nymphal instar of a species of *Enicocephalus* were the small number of separate ommatidia of the eyes, the absence of ocelli, the apterous condition, and the one-segmented middle and hind tarsi of Enderlein's types. These are undoubtedly all distinctively nymphal features in the previously known genera of Enicocephalidae (except possibly for the last character in *Aerorchestes* Bergroth; see Usinger, 1945, p. 339) and. from 1909 until the publication of Jeannel's paper in 1942, the only evidence for the existence of apterous adults of *antarcticus* were the two-segmented middle and hind tarsi and the outline of an egg in Enderlein's line drawing of a female. Further. because of the war, Jeannel's monograph (1942), with its clinching descriptions and figures of both male and female genitalia (pp. 319–320; Figs. 31, 32), was not generally accessible until several years after its publication. In this paper Jeannel lists the characters by which *antarcticus* must be accepted as an adult form and *Phthirocoris* as a valid genus.

In all three described species at present referred to *Phthirocoris*, specimens of both sexes are now known which have fully formed and sclerotised terminalia and are undoubtedly adults, though of a neotenic form. A fairly large series of *Ph. mirabilis* has now been examined by Gourlay (1952) and by the writer, and all adults are of this form Neoteny is probably to be correlated with the adoption of a completely ground-dwelling habit in the dark, moist conditions of the forest floor, with its abundance of small food-species As Jeannel (1942: p 292) has pointed out, neoteny in the Enicocephalidae seems to be due to a slower rate of development of the body

generally in relation to that of the reproductive system. In a general discussion of neoteny in this family (pp. 289–293), he points out that the extremely "reduced" condition attained in *Phthirocoris* is due to an extreme degree of retardation in development of a kind that occurs intraspecifically in other genera of Enicocephalidae, as well as in other families, i e , greater or lesser degrees of brachyptery which are commonly associated with corresponding modification and "reduction" of the pronotum and usually also of the eyes and ocelli. It further seems that the retention, throughout the Enicocephalidae, of the nymphal type of abdominal scent-gland openings in the adult is an example of a neotenic tendency unique to this family.

There remains the question of the taxonomic relationships of *antarcticus* and the two related New Zealand species. They cannot now be placed where Breddin and Bergroth relegated the nymphal types of *antarcticus,* in the genus *Enicocephalus* Westwood, in its present restricted sense, being immediately excluded by their two-clawed front tarsi and the form of the ventral apophysis of the male pygophor. (These authors, and some others writing at about the same time, used *Enicocephalus* in a very wide sense, to include a large number of already established genera, though, as Usinger points out (1945, p 322), Bergroth later changed his views in this respect.) In a group the species of which have become entirely apterous or with reduced wings lacking veins, it is difficult, if not impossible, to relate the species with certainty to genera in which the wing venation is a critical diagnostic feature, as it is in the alate Enicocephalidae On the basis of other structural features, the species concerned appear to come nearest to the tribe Systelloderini Jeannel, but on these grounds could, it seems to the writer, be placed with equal justification in either of the genera *Systelloderes* Blanchard or *Henschiella* Horvath These species have irrevocably diverged as a flightless side-branch with the neotenic characteristics listed above and also as seen in the "reduced" posterior pronotal lobe and scutellum. It seems that, at least with our present knowledge, it would make for an uncertain and possibly unnatural taxonomy to include them in any of the alate genera Additional and very important evidence for the retention of *Phthirocoris* was provided by Jeannel's study (1942) of the male genitalia of *antarcticus* The genitalia of this species are certainly strikingly unique, but some of their most distinctive features are not found in the two undoubtedly related New Zealand species, and these particular characters must now be regarded as specific only However, at least one other remains, as seen below, which might be considered to support generic or even tribal separation For these reasons the author has followed other recent workers, including Womersley (1937), Jeannel (1942), Usinger (1946), Poisson (1951), and Gourlay (1952), in accepting *Phthirocoris* Enderlein as a valid genus The redescription of the genus, given above, is necessitated by the incorporation of two additional species since the descriptions of Enderlein and Jeannel.

The three known species of *Phthirocoris* differ very considerably in the form of the ventral apophysis of the male pygophor The spine-like extension of the apophysis and the long epiphallic process of the median lobe of the pseudosternite above it, as described and figured by Jeannel (1942) for *antarcticus,* are entirely lacking in the two New Zealand species These two peculiar structures of *Ph antarcticus,* which were important diagnostic features of Jeannel's monotypic tribe Phthirocorini, must now be regarded as of specific value only But despite the very different form of the apophysis, in all three species it is unperforated, whereas, according to Jeannel, in all other members of the Enicocephalinae (including the Systelloderini) it is perforated to act as a "guide" for the aedeagus. The unperforated condition of the apophysis might thus be considered strong grounds for the tribal separation of the Phthirocorini

There are two possibilities for the origin in this group of the imperforate apophysis, which could be either secondary, due to closure of a *Systelloderes*-type apophysis, or primitive, being a character retained from the common ancestral stock

of the Enicocephalinae, before the evolution of the apophysis as a "guide". The writer agrees with Jeannel (1942, p. 284) in considering the former the more probable. On present evidence it seems we may best follow Jeannel in considering the Phthirocorini as a separate tribe having closest affinities with the Systelloderini. In *Phthirocoris mirabilis* the general form of the male genitalia is very close to that in *Systelloderes,* apart from the imperforate apophysis. The more primitive *Aenictopechys* also have an unperforated apophysis, but this is of a very distinctive and otherwise specialised form and apparently functions as a sort of sucker during copulation (Jeannel, 1942, p. 284; Fig. 23 e, f). The possession of true harpagones separate this and allied genera as a distinct subfamily; the other known genera have the apophysis reduced or absent. Since the evidence suggests an unperforated apophysis to be a primitive condition in the family, and since it would seem rather unlikely that the specialised function as a "guide" for the aedeagus, once acquired, would be subsequently lost, we may apparently regard the Phthirocorini, at least in this respect, as a relatively primitive section of the Enicocephalinae. They are perhaps best considered as neotenic off-shoots from a winged stock that was derived from the Aenictopechinae and retained the unperforated apophysis of that subfamily but had already lost the gonapophyses, and that gave rise in turn to the Systelloderini and the Enicocephalini. An unperforated apophysis is adaptable to a wide range of morphological and functional variation, including both hypertrophy and reduction or loss; such variation is well displayed among the known species of Aenictopechinae and Phthirocorini. But variation of a perforated apophysis, committed to act as a guide, is restricted to details of shape; it is this difference in shape that has been used by Jeannel as a major criterion in separating the Systelloderini and Enicocephalini.

The neotenic features of the Phthirocorini, already discussed, while by themselves scarcely sufficient to separate a tribe, supplement the genitalia as tribal characters. The Phthirocorini are the only known members of the subfamily Enicocephalinae in which such an extreme degree of neoteny exists.

According to Jeannel (1942), *Ph. antarcticus* has no trace of a connexivum, but its absence may well depend on the condition of the abdomen of the specimens examined. In both New Zealand species the presence or absence of a visible connexivum depends on the degree of distension of the abdomen, a condition that, as Jeannel has remarked, holds through the other genera of Enicocephalidae. This may be associated with the blood-sucking habits of these bugs.

The type species, *Ph. antarcticus* Enderlein, 1904, was described from the Crozet Islands. Jeannel (1942), and Gourlay (1952) in describing *Ph. mirabilis* from New Zealand, pointed out that additional species might well be expected from the islands in and near the Antarctic area. The discovery of the new form from the South Island of New Zealand and the Auckland Islands would seem to be only a further step towards filling in the probable distributional gaps foretold by these writers.

Phthirocoris mirabilis Gourlay. Figs 21, 22.

Phthirocoris mirabilis Gourlay, 1952, *Trans R. Soc N.Z.,* 79 (3–4): 363; pls. 68–69.

Numbers of adult specimens from a wide range of localities are to hand which are considerably smaller than the type material, but which are similar in all details of structure (including, so far as can be seen, the form of the male genitalia). A large series of measurements of all major sclerotised parts show no significant differences in linear ratios. There is, moreover, no question of two size groups being involved, there is a continuous range from smallest to largest. All these specimens are therefore considered as belonging to *mirabilis,* and the measurements given below for this species include those of the smaller adults.

The following additional specific features may be noted, in which this species differs from *antarcticus* and *magnus*:

Eyes. The pigment spots of the two ommatidia are usually closely apposed in the adult (occasionally separated), the anterior one larger than the posterior.

Rostrum. Segment II about half as long again as I; III about twice as long as II and about half as long again as IV.

Pronotum. Greatest width (near middle) about half as much again as across anterior lobe.

Legs Spination as described for *magnus.* Pecten of anterior tibia with about 24 fine hairs.

Length Exclusive of rostrum, ♂ 2 4–3 4 mm; ♀ 2 5–3 9 mm Including rostrum, ♂ 2.8–4.0 mm; ♀ 2 9–4.5 mm.

Width of head across eyes: ♂, ♀, 0 21–0 30 mm

Terminalia. ♂: 9th abdominal segment a capsule-like pygophor open, not extensively, postero-dorsally; no epiphallic spine. Ventral apophysis plate-like, transverse, imperforate, not acuminately produced, upper (apical) margin broadly convex, reflected forward Pseudosternite with margins much thickened, sclerotised, convoluted, divided into a posterior median

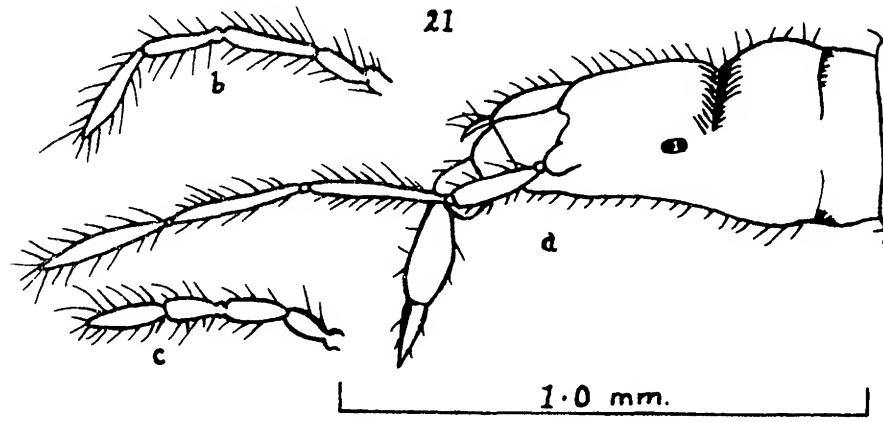


FIG 21.—*Phthirocoris mirabilis* Goulay a, head, lateral (paratype ♂, slide specimen), b, antenna of nymph last instar (V) c, antenna of nymph, probably penultimate instar (IV)

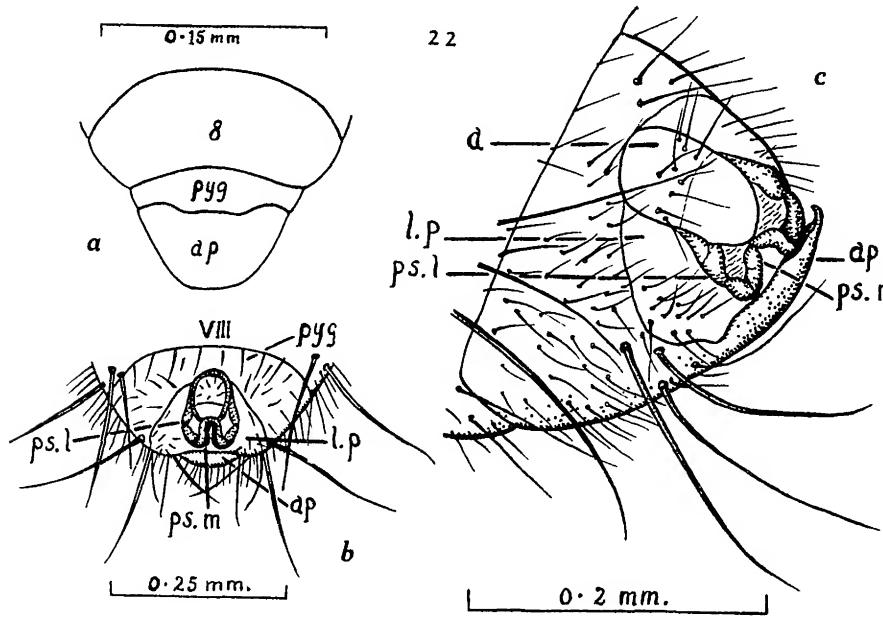


FIG 22.—*Phthirocoris mirabilis* Goulay a, terminalia of ♂, postero-ventral, b, terminalia of ♂, dorsal (holotype, slide specimen); c, pygophor of ♂, dorso-lateral (paratype, slide specimen)

a, anal tube, ap, ventral apophysis, l.p, lateral plate, ps l, ps m, lateral and median lobes of pseudosternite pyg, pygophor, VIII, 8th abdominal tergum 8 8th abdominal sternum

and two lateral lobes. A pair of plate-like sclerites are present at the sides of the anal perforation and plate, separated from the walls of the pygophor by well-marked sutures, it seems that these plates should be interpreted as the basal portions of the pseudosternite, and if so differ from the pseudosternite of other Enicocephalids, so far as known, in bearing a group of hairs (Fig. 22). However, it seems possible that the plates are later sclerotised additions to the pseudosternite; they occupy similar relative positions to those of entirely membranous and hairless areas in *Ph. magnus* (Figs. 25–27).

♀: 8th abdominal sternum (subgenital plate) with a single median tubercle-like process near the convex posterior margin (in this, resembling *magnus* and differing from *antarcticus*)

Associated with the neotenic development of this species is a variation in the degree of resemblance between adult and last instar nymph in certain characters In the adult the two pigment spots of the eye are usually contiguous but clearly distinguishable; rarely the two spots are fused so that their limits are scarcely to be determined; occasionally the nymph-like condition is retained of two quite separate spots. In the adult antennae, a considerable gradation occurs between relatively long and slender and relatively short and stout segments In *Ph. antarcticus* the antennal segments of the adult, as figured by Enderlein and by Jeannel, are much shorter and more nymph-like than in any adult specimens of the two New Zealand species. The most reliable characters for separating nymphs from adults are the single-segmented middle and hind tarsi and the absence of the adult type terminalia

The known range of *Ph. mirabilis* is now considerably extended to include Westland, northern Marlborough, and north and west Nelson in the South Island, and the south-west part of Auckland province in the North Island.

Ovarian Eggs. Oval, length ca 0 45, width ca 0.32 mm.

Nymphs. The nymphal instars of *Phthirocoris* can be distinguished from nymphs of other New Zealand Enicocephalids by the general structural resemblance to their adults From the later instars of the New Zealand species of *Systelloderes* and *Maoristolus* they differ conspicuously in their smaller size, paler colour, absence of wing rudiments and well developed scutellum, shape of pronotum, spination of legs, and the smaller eyes with fewer ommatidia. The last two characters also separate them from the earlier instars of these species, which in addition are larger than the earlier instars of *Phthirocoris*. The nymphs of *Nymphocoris maoricus* are unknown, but the spination of the legs and the form of the rostrum of this species are very different from those of *Phthirocoris* The eye of at least the last two instars of *Phthirocoris* has two ommatidia (against only one ommatidium even in adults of *Nymphocoris*).

Nymphs of *Phthirocoris mirabilis* differ from their adults in the following characters tarsi of middle and hind legs of only one segment, ♂ without sclerotised pygophor, apophysis and pseudosternite, ♀ with the last (eighth) abdominal sternum not darkened and relatively sclerotised, concolorous with the others; integument softer and paler; antennal segments generally shorter in relation to their width, especially segment III (in which ratio of length to greatest diameter is 4–5 in fifth instar nymphs, 3 in earlier instar (probably fourth), 6–8 in adults); antennal segments with basal subsegments not or only incompletely separated; antennal segment IV longer relative to III, especially in earlier instars (subequal in adult, IV about ¼ longer in fifth instar, and about ½ as long again as III in (?) fourth instar), the two ommatidial pigment spots usually separate (occasionally contiguous in the last instar), width across eyes in specimens examined: instar V, 0.21–0.24 mm, instar (?) IV, 0 17 mm The spination of the legs in at least the last two instars is similar to that of the adult

Because of the great size range in *Ph. mirabilis* and the absence of wing pads in the nymphs, it is difficult without rearing and with a small number of specimens to determine accurately the nymphal instars. In the following list of specimens the probable instars are included in brackets Those noted as last (fifth) instar are almost certainly such, having head-capsule widths within the adult range.

Range of head-capsule width most probably decreases, as usual, in the earlier instars, this measurement and the antennal ratios seem the characters most likely to be useful in distinguishing the nymphal instars, in the earlier stages it is possible reduction will be found in the number of pectinal hairs

Specimens Examined (from leaf mould except where otherwise stated): Holotype ♂, paratype ♂ and ♀, 2 paratype nymphs, Upper Maitai R. Valley, Nelson, S.I., 3.4.1950, E S Gourlay (C I), (see Gourlay, 1952) 1 ♂, 1 ♀, L. Paringa, Westland, S.I., 23.10.1950, G. P Hughson (C M.) 2 nymphs (V), Camerons, Westland, S.I., 5.9.1950, R. Chapman (C M.) 1 ♂, 1 ♀, L. Mahinapua, Westland, S I, 6.1.1951, R Jacobs (C M) 4 ♂, 1 nymph (? IV), Okarito, Westland, S.I. (moss),

26.4.1951, R R. Forster (C.M.). 1 ♀, Haast R. (S. bank), S. Westland, S.I., 31.12.1951, I. Wheeler (C.M.). 1 nymph (V), Bruce Bay, 10.1.1954, W. Clark (C.M.). 2 ♀, Leslie Valley Track (beech forest), 23.1.1948, R. R. Forster (C.M.). 1 nymph (V), Mt. Arthur Track, Nelson, S.I (moss and lichens, 3,400ft), 22.1.1948, R. R. Forster (D M.) 1 nymph (V), Salisbury's Opening, Mt. Arthur Tableland, Nelson, S.I. (moss and lichens), 23.1.1948, J T. Salmon (D.M.). 1 ♀, Canaan Track, Nelson, S.I., 25 10.1948, R. A Cumber. 1 ♂, 1 ♀, Oparara, W. Nelson, S.I., 18-20.1.50, R R. Forster (C.M.). 1 ♀, Moana, L Brunner, S.W. Nelson, S.I., 10.3.1950, R R Forster (C.M.). 1 ♂, Bluemine I., Queen Charlotte Sound, Marlborough, S I, 11 9 1948, J T Salmon (D.M.) 2 ♂, 1 ♀, 2 nymphs (V and ? IV), Pelorus Bridge, Marlborough, S I. (ca. 900ft), 17 12.1951, R Pilgrim (C.M.) 1 ♂, 2 nymphs (V), near Waitomo, S.W. Auckland, N.I., 4.12.1947, A. J. Healy (D.M.). 5 nymphs (V), Taumatatotara, Kawhia County, S.W. Auckland, N.I., 5.12.1947, A. J. Healy (D.M.) 1 ♂, 1 nymph (V), Oparau R, Kawhia County, S W. Auckland, N I., 6 12 1947, A J Healy (D M) 2 nymphs (V), Pakoka R, Kawhia R., S.W Auckland, N.I., 11 12 1947, A. J Healy (D M.). 1 ♂, Raglan, S.W. Auckland, N.I., 13.12.1947, A. J. Healy (D.M.). 1 ♂, 1 ♀, Waiharakeke, Kawhia Hbr., S.W Auckland, N I. (*Weinmannia* forest), 1.1951, J. W. Ronaldson.

Phthirocoris magnus sp nov. Figs. 23–31.

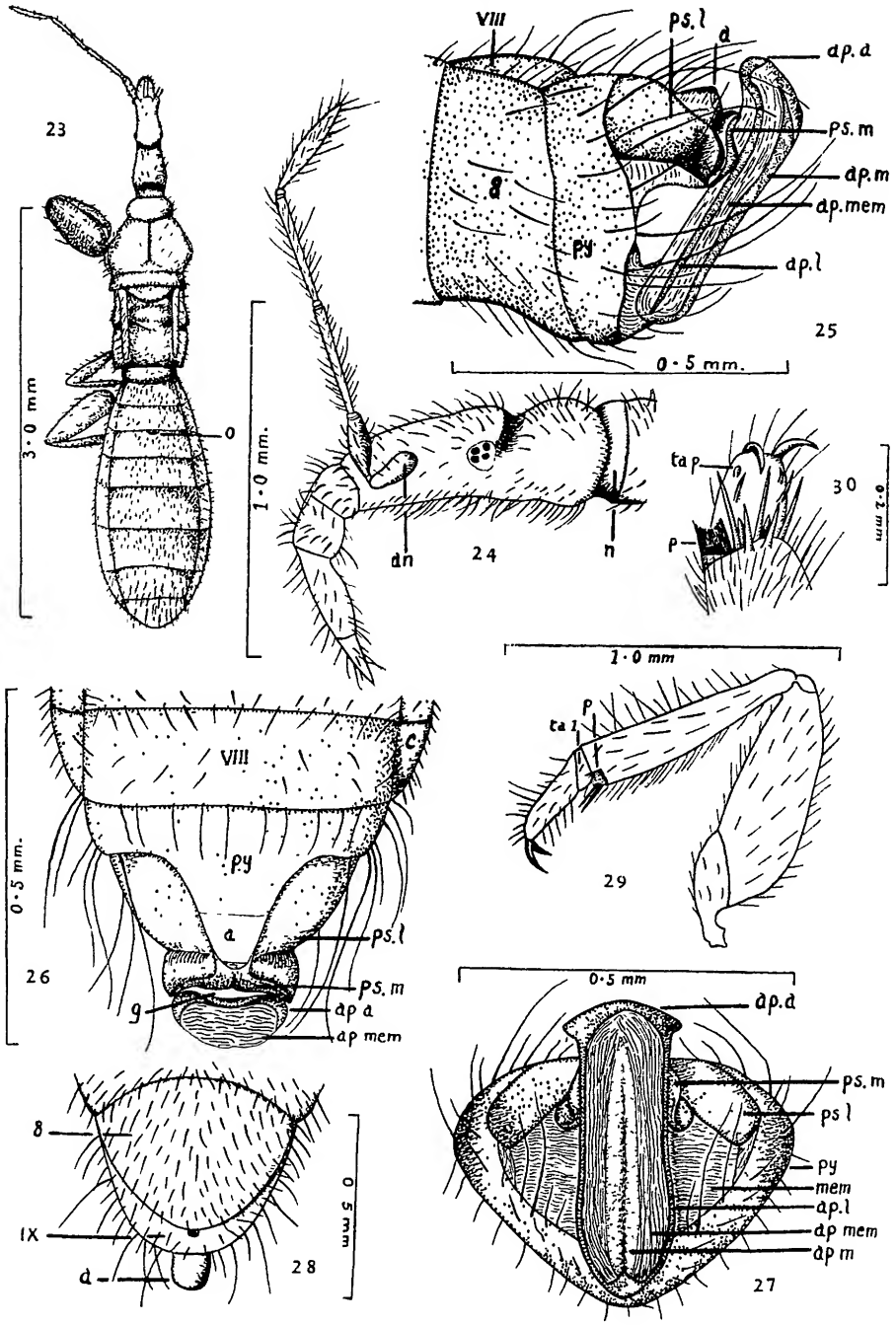
Surface shining, with a covering of fine, pale brown hairs, impunctate except for obsolete punctures on posterior pronotal lobe and sometimes a few scattered elsewhere on thorax.

Head (excluding "neck" and rostrum) ¼–⅕ as long again as pronotum; anterior lobe 1⅘ to twice as long as wide across eyes and equal or very nearly equal in width to posterior lobe, about twice as long as posterior lobe (39:20), posterior lobe separated by strong transverse constrictions from both anterior lobe and "neck", rather elongate subglobular, but, owing to concavity of anterior constriction, median length only equal or closely subequal to width, dorsal surface moderately convex, sides weakly convex, widest near basal third, ventrally gradually deepening towards base, where considerably swollen beyond level of "neck". Eyes small, each with four relatively large ommatidia (represented by black pigment spots), two anterior ones closely opposed and two posterior ones which are often more separated, sometimes a smaller fifth ommatidium below the anterior pair Ocelli absent. Antennae subequal in length to head and pronotum together, with a covering of erect and suberect hairs longer than width of the segments, first stout, narrowed at base; second and third subcylindrical, thickening towards apex, subequal in width, fourth fusiform, about as wide in middle as first; relative length of segments I-IV, 13:25·25:24 Rostrum with third segment moderately stout and only moderately incrassated below; relative length of segments I-IV, 8:10:20:11; all segments with fine pale hairs.

Pronotum with anterior margin very shallowly concave, posterior margin nearly straight, posterior constriction better defined than in *antarcticus* or *mirabilis* and posterior lobe longer and more distinct, its sides nearly straight, middle lobe with sides sinuately convex, posteriorly gently incurved, anteriorly forming broadly rounded shoulders; measured from these shoulders, middle lobe about twice as long as anterior lobe and over 2½ times posterior lobe (27:13:10), middle lobe ¼ as wide again as anterior lobe (46 28) and 1/10-⅙ as wide again as posterior lobe, middle lobe with sublateral foveae distinct and median longitudinal incision deep, the latter behind with two diverging shallower arms demarcating a median triangular area before posterior lobe, in front median incision extending more shallowly on to anterior lobe, where it separates a pair of moderately raised transverse callosities occupying most of dorsum. Mesonotum with base depressed and finely granular, posteriorly convexly raised and shining, widest behind, posterior angles obtusely rounded, sides straight, converging anteriorly Scutellum short, finely granular, not at all raised, transversely subtriangular, with base concave, apex obscurely delimited Metathorax, as seen from above, widest anteriorly, sides straight, posterior angles acutely rounded, projecting backward. Pronotum nearly ½ as long again as meso- and metanotum together, (50:35) and scarcely (about 1/10) wider across middle lobe than metanotum.

Wings vestigial, fore wings in form of elongate, narrow, pale ribbons, about 6 times as long as wide (35:6), widely separated and nearly parallel to each other, applied sublaterally to surface of mesonotum and metanotum, reaching posterior ¼ of the latter, without veins and with a covering of rather long, pale brown hairs

Legs Relative length of coxa, femur, tibia, tarsus, 25:55:40:13 (fore leg), 28:50.48:20 (hind leg) Front femora, length:depth in middle .: 55:25; hind femora, length.depth at basal ¼ 50 17 Tibiae, length depth at apex :: 40:16 (front), 48·9 (hind) Hind tibiae



FIGS 23–30.—*Phthirocoris magnus* sp nov FIG. 23.—♀, dorsal. FIG. 24.—Head of ♂, lateral. FIG 25.—Terminalia of ♂, lateral. FIG. 26.—Terminalia of ♂, dorsal FIG 27.—Terminalia of ♂, posterior FIG 28.—♀, apex of distended abdomen, ventral (anal tube exserted) FIG. 29.—Hind leg. FIG. 30.—Front tarsus and apex of tibia, ventral

a, anal tube, an, antennifer; ap.a, ap.l, ap.m, apical, lateral, and median sclerotisations of ventral apophysis, ap mem, membrane of ventral apophysis (in undistended condition), c, connexivum; g, opening for aedeagus; n, "neck" (posterior cephalic collar), o, orifice of scent gland, p, tibial pecten, ps.l, ps.m, lateral and median lobes of pseudosternite, py, pygophor, ta p, anterior subapical process of tarsus ("Sinneskolben" of Enderlein); ta 1, basal segment of tarsus; tr, trochanter; VIII, IX, 8th, 9th abdominal terga. 8, 8th abdominal sternum.

slightly narrower at apex than at middle (9:10) Posterior (outer) claw of fore tarsus as long as, and anterior (inner) claw longer than tarsus (16:13). Claws of hind tarsus subequal, nearly ½ as long as tarsus (9:20). Legs with spination as described for genus; spines of fore tibiae arranged in three transverse rows of 2, 3, and 2, those of middle row longest, the uppermost pair shorter, stout, thorn-like, recurved, directed obliquely upward toward ventral surface of tarsus; anterior subapical process of fore tarsi tubercular, rounded.

Abdominal Terminalia. ♀: 9th sternum a large subgenital plate (width:median length :: 50:30), posterior margin broadly convex, with a very small median tubercle-like projection. 9th tergum and posterior margin of 8th tergum with hairs longer than on rest of abdomen. 9th tergum with posterior margin broadly and simply convex; basal width:median length :: 36:11. Anal tube when completely extended a pale cylinder (length:width :: 8:6), when not, appearing as a short hemisphere, projecting from posterior face of 9th tergum above the genital orifice, a transverse slit between 9th tergum and 8th sternum.

♂: 8th sternum with posterior margin, in direct ventral view, nearly straight; curving forward at sides, when segment extended, basal width:median length :: 46:20. 9th segment and posterior part of 8th tergum with posteriorly directed hairs longer than on rest of abdomen, especially long on postero-ventral margins and postero-lateral angles of 9th segment, where they are up to more than twice as long as the 9th sternum. 9th segment forming a rather short, ring-like pygophor widely and deeply open behind. Posterior margin of 9th tergum widely excavated at sides, apically truncate between emarginations; the anal tube pale, subcylindrical, projecting behind the truncate margin. Basal width of 9th tergum:median length of tergum:length of anal tube : · 36:10:5. 9th sternum strongly convexly arched from side to side.

Ventral apophysis of pygophor (Fig 25) long (about three times as long as wide), erect; sides nearly parallel, forming a nearly oblong plate with apical margin convex, apex marginally sclerotised and of a rounded arrow-head shape; sides narrowly dark and sclerotised; with a medium sclerotised strut, between this and the margins the apophysis membranous, the membranes capable of considerable distension (Fig. 27). Lateral lobes of pseudosternite (Jeannel's

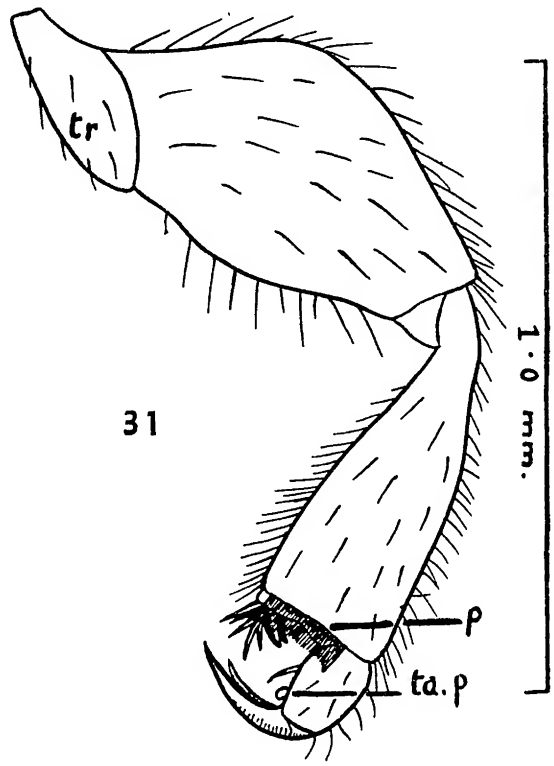


FIG 31.—*Phthirocoris magnus* sp. nov, fore leg, anterior (inner) aspect. p, tibial pecten, ta.p, inner tarsal process, tr, trochanter

terminology) stout, clasper-like, but without hairs, fitting against postero-lateral emarginations of 9th tergum, upper surface of each depressed just before apex, which is truncate, marginally dark and heavily sclerotised, and separated by a deep, narrow cleft from the posterior lobe, the clefts are formed by the abrupt vertical folding of the pseudosternite at these points, the posterior lobe a vertical sclerotised plate, with upper margin broadly concave, set between anal tube and ventral apophysis. Jeannel (1942, p 284) does not consider the three-lobed structure as the homologue of the claspers (harpagones) found in the related Reduviidae and the primitive Enicocephalid subfamily Aenictopechinae, but compares it rather with the "pseudosternite" of E. M. Walker in the Orthoptera, which is regarded as an intersegmental "chitinisation"; in addition, in support of this interpretation, Jeannel points out that the pseudosternite in Enicocephalinae does not bear hairs (which are present on the claspers of Aenictopechinae). An apparent exception is in *Ph. mirabilis* (p. 412 and Fig. 22).

In the absence of a perforation in the apophysis (which Jeannel shows as functioning as a "guide" for the aedeagus in most Enicocephalidae) the aedeagus in *Phthirocoris* is presumably extruded between the apophysis and the posterior lobe of the pseudosternite

Colour. ♀: Head and pronotum dark, more or less ferruginous testaceous, legs and rest of thorax rather paler testaceous, fore legs darker than mid and hind; ommatida black, antennae and rostrum yellowish brown, abdomen pale, duller yellowish or greyish brown, relatively unsclerotised except for the testaceous first and second terga, the 8th tergum, except at apical margin, the 9th tergum and the 8th sternum

♂: a shining, more or less ferruginous testaceous, including all abdominal segments except for their paler posterior margins Antennae, rostrum, and middle and hind legs paler testaceous

Length (excluding rostrum). ♂, 3.3–4 1 mm, ♀, 3 8–4.5 mm

Length (including rostrum). ♂, 3.9–4 7 mm, ♀, 4.5–5.2 mm

Width across eyes: ♂, 0.26–0.27 mm, ♀, 0.27–0 29 mm

Width across middle pronotal lobe: ♂, 0.56–0.59 mm, ♀, 0 60–0.68 mm

The most striking difference between *magnus* and the other two known species of *Phthirocoris* is the possession of the extraordinary ribbon-like vestiges of the fore wings. Other differences from *mirabilis* are the generally greater size, the larger number of ommatidia, the pronotum wider in the middle in proportion to anterior lobe, the more distinct posterior pronotal lobe, the third rostral segment longer relative to fourth, the darker and more sclerotised 8th and 9th abdominal terga of the ♀, and the differently formed ♂ terminalia, the ventral apophysis of the pygophor being particularly distinctive. From *antarcticus, magnus* also differs in the relatively longer antennae, the more strongly constricted postocular and anterior pronotal transverse impressions, the deeper median longitudinal impression of the middle lobe of pronotum, with its diverging posterior arms. the larger and more distinct posterior pronotal lobe, the presence of a reduced and poorly defined scutellum, the more heavily pigmented body, the tubercular anterior subapical process of fore tarsi (sense-organ of Enderlein; strongly curved horseshoe shaped in *antarcticus*), the presence of a single median apical tubercle near posterior margin of 8th sternum of ♀ (a premarginal pair in *antarcticus*), and the very different ♂ terminalia, particularly the form of the ventral apophysis of the pygophor and the absence of a long, upwardly and forwardly curved epiphallic spine

Type Specimens Holotype ♂, allotype ♀, Auckland Is (leaf mould), —.12.1944, E G Turbott (D M. coll.). Paratypes. 2 ♀, Musgrave Pen., Auckland Is. ("trunks of rata trees"), 19 4.1947, J. H. Sorensen (D.M.); 2 ♂, 1 ♀, Leslie Valley Track, (leaf mould), 23.1.1948, R. R Forster (C.M.).

Small form of magnus Two females (D M.) from Musgrave Pen, Auckland Is (coll. J. H. Sorensen, 19 4 1947, from debris, forest floor), apparently represent a small form of this species In size they fall within the range for *mirabilis* and resemble this species and differ from typical *magnus* also in having only two ommatidial spots to each eye, the width across the middle of the pronotum only about half as much again as across the anterior lobe, the posterior pronotal lobe and constriction poorly defined, and the 8th and 9th abdominal terga concolorous with the rest and not more strongly sclerotised However, all these features are the effects of a greater degree of neoteny correlated with smaller size The specimens are regarded as *magnus* because of the presence of linear wing rudiments (more or less as for typical *magnus* on the mesonotum, but becoming narrower and ridge-like on the

metanotum) and the relatively long third rostral segment (III, 16 IV, 9) They illustrate the difficulties of taxonomy in these neotenic groups If only females had been available, existence of such apparently intermediate material would have rendered most uncertain any attempt to separate species But the very different male genitalia, and particularly the two types of ventral apophysis, show clearly that two distinct species are involved

No males of the small form are yet to hand The females are regarded as adults, despite the neotenic facies, because of their two-segmented middle and hind tarsi and sclerotised 8th abdominal sternum

Dimensions of the 2 ♀ Length (excluding rostrum) · 2 6 mm, (including rostrum) . 3 1 mm Width of head across eyes· 0 23 mm, 0 24 mm Width across middle of pronotum: 0 44 mm, 0 47 mm

Mr E. S Gourlay has informed me (*in litt.*) that he recently collected specimens of a new species of *Phthirocoris* from the Auckland Is . in all probability this will be conspecific with *magnus*

Tribe SYSTELLODERINI Jeannel, 1942 301

Genus SYSTELLODERES Blanchard

Systelloderes Blanchard, 1852, *in* Gay, *Historia y fisica y politica de Chile,* Paris, *Zoologia,* 7. 224. Jeannel, 1942, *Ann Soc ent Fr.* (1941), 110: 302–303 (redescribed) Usinger, 1945, *Ann ent Soc Amer* , 38 339 (redescribed)

Systelloderus Stal, 1866, *Hem Afr* , 3 (1865)· 166 Lethierry et Severin, 1896. *Cat Gén Hém.,* 3 Usinger, 1932, *Pan-Pacif. Ent* , 8. 150.

Hymenodectes Uhler, 1892, *Trans Maryl Ac Sci* , 1 180 Ashmead, 1893, *Proc ent Soc. Wash.,* 2. 329.

TYPE SPECIES *Systelloderes moschatus* Blanchard. 1852. *in* Gay *Hist fisica politica Chile, Zol* , 7· 224, pl 2, fig. 14

Systelloderes maclachlani (Kirkaldy) Fig 32

Henicocephalus maclachlani Kirkaldy. 1901, *Ent. mon Mag.,* 37. 218–219, fig. 1 Hutton, 1904, *Index Faun. Nov. Zeal* · 343. Myers, 1922, *N Z J Sci Tech* , 5 (1)· 7. Tillyard, 1926, *Ins. Austr. N.Z* · 151 Bergroth, 1927, *Trans N Z Inst* , 57· 683 Myers and China, 1928, *Ann Mag Nat Hist* , (10) 1 (3)· 382 Hudson, 1950, *Fragments of N Z Ent* , Wellington: 153; pl 1, fig 2

Enicocephalus maclachlani Kirkaldy. 1909, *Trans. N Z Inst* , 41 26

Systelloderes malachlani (Kirk) Jeannel, 1942, *Ann. Soc ent Fr.* (1941), 110: 308. Usinger, 1945, *Ann. ent. Soc. Amer* , 38: 340.

REDESCRIPTION

♀ Dorsal surface and appendages rather shining, impunctate. pronotum and scutellum minutely roughened, head smooth and highly polished, body, appendages, and veins and margins of fore wings with a covering of fine. pale brown hairs, those of head, pronotum and appendages rather long, suberect, not closely down-like

Head From above (excluding rostrum, labrum and "neck") about ⅕ longer than pronotum (95 80), anterior lobe a little wider across eyes than posterior lobe (38:35) and 5/7 as long again (60:35); posterior lobe as long as wide, subglobose, widest at middle, dorsal surface convex, both anterior and posterior constrictions well marked, but the sides of the head not incised at the level of the former and gradually convex behind the eyes, the dorsal surface of anterior and posterior lobes rather gradually declivous into anterior constriction, base of posterior lobe similarly declivous into posterior constriction and the sides only slightly incised at its level (at anterior margin of "neck") Eyes moderate, from above each about ⅓ as wide as interocular space (7 5:23), from below subequal to it (13 12), in side view convexly subovoid, with the postero-ventral margin shallowly concave, nearly as wide across greatest diameter as high (20:22), occupying about ¾ of height of head (22.28). from above about half as long as posterior lobe (18:35). Ocelli moderate, set towards sides of head and about three ocellus-widths apart Rostrum with total length subequal to that of head, third segment with sides only shallowly incurved just beyond base, slightly and gradually widened

toward apex, which is not greatly incrassate ventrad, in side view only slightly deeper than base (10:8); relative length of segments I-IV, 14:27:30:21. Antennae clothed with suberect hairs longer than width of the segments; over ¾ as long again as head and very nearly as long as head and pronotum together; relative length of segments I-IV, 30:54:48:38; first segment the stoutest, gradually thickening toward apex, second and third segments cylindrical, the second stouter than the third: fourth slenderly fusiform.

Pronotum ¼ as wide again across humeral angles as long in median line (100:80), middle lobe ⅝ as long again as posterior lobe (37:27) and 2½ times as long as anterior lobe (37:16), posterior lobe three times as wide as anterior lobe (100:33) and ⅔ as wide again as middle lobe (100:70); anterior lobe with a raised transverse callus posteriorly; middle lobe with a distinct median longitudinal impression deepest and widest just before base, continued as a less distinct impression on anterior lobe and as a low, narrow carina on posterior lobe; middle lobe with a small sublateral fovea on each side at about half its length, and behind it a rounded tuberosity, posterior margin distinctly though rather shallowly emarginate, obtusely angulate in the middle, humeral angles broadly rounded *Scutellum* with disc flattened; apical lobe over ⅓ as long as whole scutellum (15:43), convexly carinate, apex acutely rounded.

Fore wings fuscous, veins brown, venation as for genus (no basal cell, discal cell open, veins not conspicuous nor strongly raised).

Legs. Front legs moderately thickened, middle and hind legs rather slender; front and middle coxae subglobose, hind coxae more linear Front legs: length of coxa, femur, tibia, tarsus, as 34:105:90:26; tarsus one-segmented, nearly cylindrical, ⅔ as wide as long, with two pairs of very short, thorn-like spines ventrally on apical third, posterior (outer) claw equal in length to tarsus, anterior (inner) claw longer (31·26), tibia gradually expanded toward apex, which is as deep as tarsus is long, and bears, in addition to long pale hairs, a well developed pecten along inner margin and a group of six spines on ventral angle, arranged in rows of 1, 3, and 2, the single more dorsal spine slender, the others stout, the three middle ones the longest, femur nearly ¼ as long as deep in middle as long (25.105). Middle and hind tibiae slender, apex with a pair of ventro-lateral pectines and, mid-ventrally between them, a pair of slender spines longer than the pectines Middle and hind tarsi two-segmented, the basal segment very short, longest ventrally; apical segment subcylindrical, somewhat flattened laterally, without spines, with a pair of nearly equal claws ½ as long as tarsus Hind legs. length of coxa, femur, tibia, tarsus, as 45:115:120:45, femur ⅙ as deep as long (19:115), inner claw ⅓ as long as tarsus (15:45), outer claw scarcely shorter (14:15).

Colour Head, pronotum, scutellum, and venter of thorax fuscous reddish brown, fore wings fuscous brown with veins brown, not conspicuous, antennae, rostrum, and legs testaceous, the legs more or less infuscated; abdomen duller, paler, yellowish brown, except for the dark last visible sternum (eighth), the posterior margin of which is strongly convex, the infuscated venter of the basal sternum (second), a dark, median, transverse spot near posterior margin of seventh sternum, two ventro-lateral rows of small dark spots near anterior margin of 4th–7th sterna, and above and laterad of them on each side a row of much larger dark patches on 2nd–7th sterna, not reaching their posterior margins, two sublateral rows of similar patches on the corresponding terga, eighth tergum dark, except for posterior margin, ninth tergum and anal tube dark, the posterior margin of the former concave

Length (to apex of closed wings), 6.2–7.0 mm (length of abdomen varies with state of ovarian development and in pregnant female may greatly exceed wings)

Width (across eyes) 0 51–0 55 mm, (across base of pronotum) 1 33–1 47 mm (across closed wings) 1 33–1.70 mm.

♂: There is a marked sexual dimorphism, and the males are readily distinguished from the females, particularly by the more slender legs, especially the front pair, the larger and more prominent eyes and ocelli, the more yellowish veins of the fore wings, the generally smaller and more slender form, and the presence of the capsule-like pygophor.

Differences from ♀: From above head (excluding rostrum, labrum, and "neck") nearly ¼ as long again as pronotum (68·55); anterior lobe equal or subequal in width across eyes to posterior lobe (31:30); ratio of length, anterior:posterior lobe ·: 43·25, posterior lobe rather wider than long, somewhat more globose than in ♀, with the anterior constriction more abrupt. Eyes relatively larger and more prominent than in ♀, from above each about ½ as wide as interocular space (7 5:16), from below about half as wide again (11 5:8); ratio of dorsal length of eye. posterior lobe ·· 13:25. Ocelli larger and more prominent than in ♀, less than two ocellus-widths apart Rostrum a little shorter than head (62:68); third segment gradually and moderately incrassate near apical third, in side view ratio of depth subapically:depth at base :: 7.5:6; relative length of segments I-IV, 7:15:25:15. Antennae twice as long as head and ⅓ as long again as head and pronotum together; apical segment with four whorls of very long, erect hairs about four times as long as width of segment; relative length of segments I-IV, 20:46·42:32. *Pronotum* ⅔ as wide again across humeral angles as long in median line (77·55), 2½ times as wide as anterior lobe (77:30) and ⅝ as wide again as middle lobe (77:47), middle lobe ⅝ as long again as posterior lobe (27·17) and 2½ times as long as

anterior lobe (27.11), constriction between anterior and middle lobes much longer antero-posteriorly than in ♀, forming a definite trough (this has been included with the middle lobe in the measurements of length above), posterior margin more deeply emarginate than in ♀ (posterior lobe thus relatively shorter in mid-line) *Fore wings* subfuscous, veins distinct, though not strongly raised. *Legs,* especially tibiae, more slender than in ♀. Tibiae, especially hind tibiae, curved Front legs: length of coxa, femur, tibia, tarsus, inner claw, as 23:76: 70:16.20, front tibiae less expanded than in ♀ at apex, where only ⅕ as deep as long ($\frac{3}{16}$ in ♀), front femora only about ⅙ as deep in middle as long (13:76) Hind legs. length of coxa, femur, tibia, tarsus as 35:90:110:35, femur $\frac{1}{4}$ as deep as long. *Abdomen*: posterior margin of eighth sternum nearly straight; pygophor dark shining brown, open posteriorly; rest of abdomen yellowish brown, eighth sternum rather darker *Length* 5 2–5.5 mm *Width* (across eyes) 0 41–0 44 mm, (across base of pronotum) 1 03–1 09 mm

Specimens Examined 1 ♂, Karori Reservoir Reserve (Wellington), 27.12.1934 (No. 104a) Wainui-o-mata (Well) 1 ♂, Christmas, 1936 (104b); 4 ♂ ♂, Christmas, 1939 (104c); 1 ♂, 16 1 1944 (104d), all G V Hudson Coll. (D.M.). 1 ♀, Akatarawa (Well.), ex lichens, 10.2.1948, J T Salmon (D M) 1 ♀, Vinegar Hill

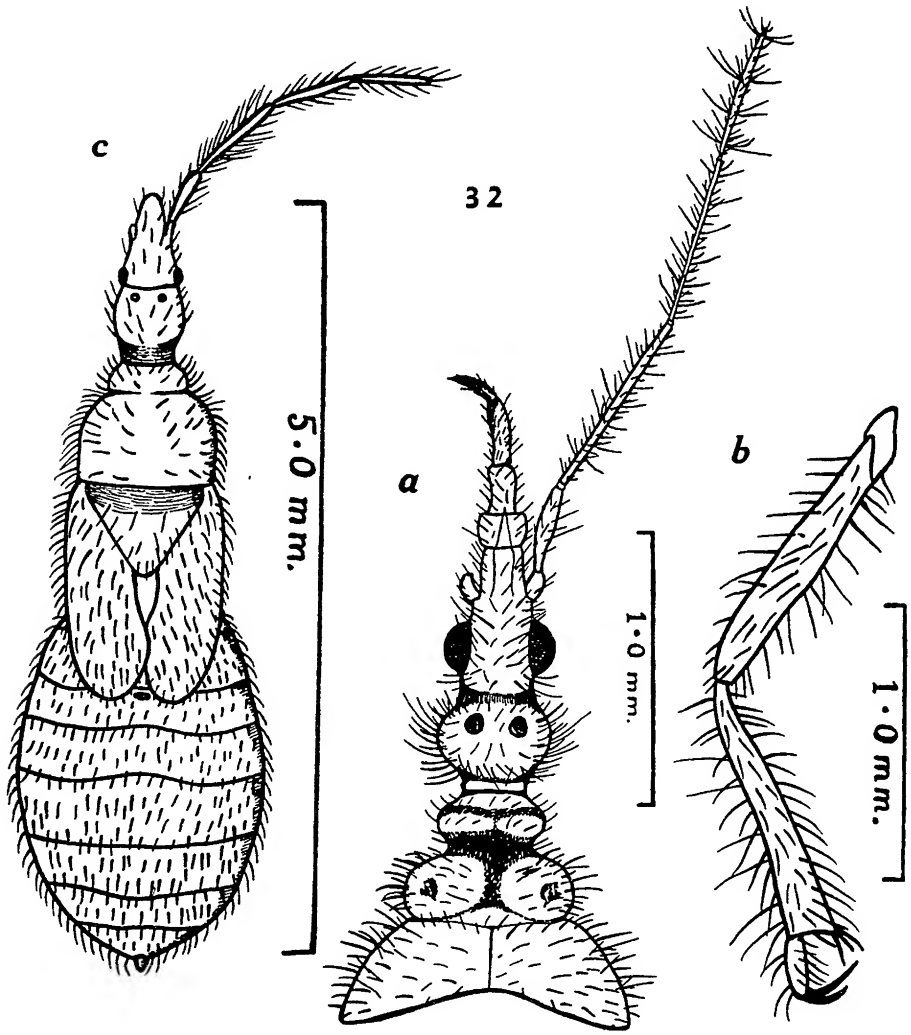


FIG. 32 —*Systelloderes maclachlani* (Kirkaldy) a ♂ head and pronotum, b ♂ fore leg, posterior (outer) aspect, c, 5th instar nymph

Reserve (Upper Rangitikei R), 12 12.1948, R. R. Forster (C M.). 2 ♀ ♀, Feilding (Well.), leaf mould, 16.1.1952, R. R. Forstei (C.M.) 1 ♀, Mt Moehau-Te Hope Track (1,500–2,400ft), Coromandel Peninsula (Auck.), leaf mould, rain forest, 17.1.1952, T. E. Woodward. 1 ♀, Coromandel-Whangapoua Rd. (Auck.), leaf mould, bush on summit, 18 1 1952, E T. Giles 1 ♀, Tararua Ranges (ex leaf mould from Judd Ridge), 12 1.1954, T. E Woodward.

Immature Stages

As Usinger (1939) remarks of the Enicocephalidae, "our knowledge of the biology of these interesting bugs is still very fragmentary." The following descriptions are given both as a basis for future biological observations and to facilitate differentiation of the nymphal instars of our macropterous species from the aberrant micropterous species of *Phthirocoris* and *Nymphocoris*. Almost the only biological notes on the New Zealand Enicocephalidae are those given by Myers (1926, pp 474–475) on two unidentified species listed as *Henicocephalus* spp (see below, p 421) and by Gourlay (1952) on *Phthirocoris mirabilis*.

The following note on the fifth instar nymphs of *S maclachlani* was given (*in litt*) by Dr. R. A. Cumber of the Entomological Research Station, Nelson (lately South Pacific Commission, Apia): "The nymphs collected at Paihia (August, 1951) were taken from the bases of *Phormium* bushes during the gathering of nymphs of the Cixiid *Oliarus atkinsoni* Myers, which are present in great numbers where the dead basal material has gathered about the rhizomes. It is possible that a predatory relationship exists between the two species, but no direct observation was made"

Detailed observations on the behaviour of our Enicocephalids might well reveal relationships important in their effects on the populations of small insects and other Arthropods, particularly those of the soil and the forest floor To quote Jeannel (1942, p 273): "Certainement prédateurs et hématophages, ils ne sont pas été sufissament observés pour qu'on puisse avoir une idée précise sur leur genre de vie. Mais les quelques détails connus sur leur comportement laissent supposer que leurs moeurs, lorsqu'elles seront connues, réserveront sans doute quelques surprises. Il n'est pas exclu, en effet, que ces petits Insectes piqueurs jouent un rôle, directement ou indirectement, dans l'économie humaine"

A résumé of the recorded observations on the habits of these insects is given by Usinger (1932) and Jeannel (1942)

Nymphs

Last (Fifth) Instar

Resembles the adult in most essentials of its structure, the differences being mainly those generally characteristic of nymphs in this family the smaller size, the imperfectly developed wings, the much less prominent ocelli, the one-segmented tarsi of the middle and hind legs, the absence of the adult genitalia and terminalia

Head Length—head:pronotum · 80:58, anterior lobe of head:posterior lobe 50·30 Width—anterior lobe across eyes:posterior lobe :: 34 33, eye.interocular space : 6:22 (above), 8 5·17 (below) Eyes dark, ovoid in side view, granular, ommatidia numerous and contiguous as in adult and occupying whole of ocular area Ocellar areas not prominent Posterior lobe of head subglobular. Rostrum with third segment shaped as in adult, length of segments I-IV, 11:23·26:17 Length of antennal segments I-IV, 25·45:38 32 *Pronotum* with the posterior transverse constriction represented only by a sulcus very shortly before base, deepest towards the sides, obsolete in the middle, the lateral margins not incised at its level, so that there are only two distinct pronotal lobes instead of three, as in the adult Posterior lobe with sides nearly straight, anterior and posterior angles broadly rounded. A pair of sublateral foveae and convex tuberosities present as adult. Posterior margin very broadly convex, nearly straight in middle Length—anterior lobe posterior lobe ·· 14 44 Width—anterior lobe:posterior lobe across numeral angles ·· 40:66 Impressed median longitudinal ecdysial cleavage line visible on pronotum, scutellum, and obscurely on posterior lobe of head, deepest, widest and foveolate in front of sub-basal sulcus of pronotum *Scutellum* subtriangular, deflected at base, apex rounded, as long as wide at base. *Fore wings* about ⅓ as long again as pronotum (100·58), passing base of third abdominal tergum, sometimes reaching base of

fourth; coriaceous throughout, usually somewhat convex from side to side, shining, impunctate, whole surface covered with long, pale, suberect hairs, without trace of a transverse sulcus, costal margins straight, anal margins touching or nearly touching subapically in mid-line for about ¼ of their length, separated behind scutellum by a triangular space Apex of hind wings level or nearly level with that of fore *Legs* with claws and tibial and tarsal spines as in adult All tarsi one-segmented Length of femur, tibia, tarsus, front legs, 90·80:24, hind legs, 95:95.40 *Colour* Head, pronotum, scutellum, and front wing pads shining testaceous, head highly polished, antennae, rostrum and legs yellowish brown, femora white or pale at apex, the front pair most noticeably so, abdomen pale, dull, yellowish brown, the last visible sternum (8th) not strongly sclerotised nor darkened. *Length* about 5.1–5 3 mm *Width* (across eyes) 0.44–0.46 mm; (across humeral angles of pronotum) 0 88–0 97 mm.

Specimens Examined. Paiaka, near Foxton. Manawatu. (Wellington Prov), 15.8 1949, R A Cumber (1); beneath *Phormium tenax*, —8 1951, R A Cumber (4).

3rd Instar (probably ♀) differs from 5th.

Eyes each with 4 large ommatidia rather closely grouped towards centre of ocular area No visible ocellar rudiments Length of rostral segments I-IV, 8 10:15·11 Length of antennal segments I-IV, 14·25·20 27 Length, head:pronotum .. 55 37, anterior lobe of head.posterior lobe 35:20, anterior lobe of pronotum·posterior lobe . 11:26 Width, head across eyes:posterior lobe· 23:27, anterior lobe of pronotum:posterior lobe :: 30.42. Posterior pronotal lobe with sides evenly convex, widest in middle Wing buds obscurely differentiated, front pair rather shorter than posterior lobe of pronotum (23·26), just passing base of metanotum, hind pair reaching nearly to apex of short first abdominal tergum, anal margins widely separated Length of femur, tibia, tarsus, 55·47·16 (fore legs); 55:55:26 (hind legs). Connexivum very wide Colour yellowish brown

Length 3 0 mm

Width (across eyes) 0 31 mm, (across middle of posterior pronotal lobe) 0.56 mm.

Specimens Examined. Norsewood, Wellington Prov. (leaf mould, mixed forest), 27 1 1948, P. Culliford (D M) (1)

3rd Instar (probably ♂) differs from 5th.

Eyes each with a group of 4 large close ommatidia towards centre and about 8–20 small separated ones No ocellar pigment spots. Length of rostral segments I-IV, 5:7:16:11 Length of antennal segments I-IV, 11·21·20·21 Length; head:pronotum :· 43·30, anterior lobe of head: posterior lobe :: 28·15, anterior lobe of pronotum:posterior lobe :: 10:20. Width—head across eyes:posterior lobe : 23:27, anterior lobe of pronotum:posterior lobe · 25:37 Front wing buds as long as pronotum, reaching to base of abdomen, hind pair reaching about ½ way along 1st or even 2nd abdominal tergum. Length of femur, tibia, tarsus, 35:35·10 (front legs); 36·38·17 (hind legs). Head, rostrum and thorax light yellowish brown, antennae, legs and abdomen pale

Length 3 2–3.5 mm

Width (across eyes) 0 31 mm, (posterior pronotal lobe) 0 47–0 59 mm

Specimens Examined. Punakiteri, near Kaikohe, N Auckland, leaf mould, —2 1951, T. E Woodward (2).

EGGS

An alcohol-preserved ♀ (collected Vinegar Hill Reserve, 12 12 1948) with a greatly distended abdomen was dissected and contained six "ripe" eggs (i e, with the chorion fully formed) and in addition three nearly ripe eggs which had darkened and shrivelled owing to the immaturity and thinness of the chorion The fully formed eggs are 1 08–1.13 mm in length and 0 56–0 60 mm in greatest width The chorion itself is transparent and colourless and extremely finely, closely and shallowly pitted, appearing smooth under low magnification, and has no micropylar processes nor operculum The entire egg, however, is amber-coloured, owing to the alcohol-preserved yolky contents showing through the chorion Under strong illumination the large yolk granules within are visible; the shrivelled, immature eggs have a roughened outline due to the pressure of these granules against the thin chorion

The eggs have the form of the Enicocephalid eggs described and figured by Myers (1926, p 474, fig 6) These latter eggs were almost certainly of this species, as they were laid (in the middle of January) "by a large specimen from leaf mould at Ohakune," and Myers differentiates between two unnamed species of this family, a larger one (probably *S maclachlani*), which he had only from leaf mould in the North Island, and a smaller one (probably *Maoristolus tonnoiri*), which he had from under bark at Reefton, Nelson, South Island Myers did not give measurements of the egg, but described it as "more or less elliptical with parallel sides and rounded ends, much longer than thick, and of a beautiful frosted white appearance After preservation in alcohol the chorion appeared perfectly colourless and transparent, with a very faint indication of pitting, this may have been due to contents."

Judging from the size of the eggs of this species, the youngest nymphs of *S maclachlani* in the collections to hand are of the third instar and of *S notialis*, second instar. This accords with the measurements of the adults and of the available nymphs of both species, and gives a total of five nymphal instars, a very common number in the Heteroptera The missing first instar of *S. maclachlani* would probably be in the order of 0.7–1.0 mm in length, with the head width across the eyes about 0 20 mm

Systelloderes notialis sp. nov. Fig. 33.

♀ : Dorsal surface and appendages rather shining, impunctate except for fine, obsolescent punctures on pronotum; head finely granular; body, appendages, and veins of fore wings with a covering of fine, pale hairs, those of head, pronotum, and scutellum, more especially on head and anterior and middle lobes of pronotum, forming a close, down-like investiture; hairs of venter of abdomen very short.

Head. From above (measured as in *maclachlani*) about 1/5 longer than pronotum (80:66), anterior lobe across eyes equal in width to posterior lobe (36:36) and 3/5 as long again (49:31); crown between eyes convex and strongly raised above their level; posterior lobe transversely subglobose, 1/6 wider than long (36:31), dorsal surface and sides strongly convex, widest in middle; both anterior and posterior transverse constrictions deep, abrupt, with sides deeply, concavely incised at level of the former Eyes moderate, from above each about 1/3 as wide as interocular space (7:22), from below about 3/4 as wide (11:14), in side view convexly subovoid, with anterior margin convex and posterior margin nearly straight, much higher than wide (17·12), occupying about 1/2 of height of head (17:25); from about 2/5 as long as posterior lobe (12.5:31). Ocelli moderate, set near sides of anterior constriction and nearly three ocellus-widths apart. Rostrum with total length 5/6 that of head (67:80), third segment slightly and gradually widened towards apex, but convexly incrassate ventrad, in side view the thickest subapical region being half as deep again as the base (11:7); relative length of segments I-IV, 10:15:27:15. Antennae about 5/6 as long again as head, and as long as head and pronotum together, clothed with suberect hairs longer than width of the segments, relative length of segments I-IV, 20:48:43:36; first segment the stoutest, gradually thickening towards apex, second and third cylindrical, narrowing at base, second stouter than third, fourth slenderly fusiform.

Pronotum 1/4 as wide again across humeral angles as long in median line (83:66), middle lobe about 3/5 as long again as posterior lobe (30:21) and twice as long as anterior lobe (30:15); posterior lobe over twice as wide as anterior lobe and 4/9ths as wide again as middle lobe (83:38:58), median impression of middle lobe wide, expanding behind as a wide fovea ending before posterior transverse constriction, median longitudinal carina of posterior lobe obsolescent; middle lobe with a small, oblique, sublateral fovea on each side at about half its length, the posterior angle behind it roundly tuberculate, posterior margin deeply, widely and concavely emarginate, humeral angles broadly rounded *Scutellum* with disc subflattened, its base largely exposed; posterior carina short, convex above, considerably widened and subtruncate behind, often obscured by hairs, only 1/5 as long as scutellum (7:35).

Fore wings with venation as for genus; veins not strongly raised, but more conspicuous than in *maclachlani*, being pale brown against the fuscous brown of the membrane

Legs. Front legs moderately thickened, middle and hind legs rather slender, front and middle coxae subglobose, hind coxae rather more linear. Front legs: length of coxa, femur, tibia, tarsus, 22:82:72.20, tarsus nearly cylindrical, widest at base, where half as wide as long, one-segmented, with two pairs of ventral spines in apical third, the more apical pair shorter and stouter, thorn-like, posterior (outer) claw equal in length to tarsus, anterior (inner) claw much stouter than outer and longer (25:20); tibia gradually expanded toward apex, which is slightly deeper than tarsus is long (22:20), and bears, in addition to long pale hairs, a pecten along anterior (inner) margin, a group of five stout spines on ventral angle, and two spines close above them on posterior face, the inner one the longer and stouter. Middle and hind tibiae slender, apex with a pair of ventro-lateral pectines and, mid-ventrally between them, a pair of slender spines longer than the pectines. Middle and hind tarsi two-segmented, the basal segment very short, longest ventrally, apical segment subcylindrical, somewhat flattened laterally, with a pair of subequal claws about 1/3 as long as tarsus. Hind legs: length of coxa, femur, tibia, tarsus, 25:90·95:32, femur rather less than 1/6 as deep as long (14·90)

Colour Less infuscated than *maclachlani* Head and thorax fuscous reddish-brown, fore wings more or less fuscous brown, lighter than in *maclachlani*, with veins brown or yellowish brown, antennae and rostrum yellowish brown to testaceous; legs testaceous; venter of abdomen paler, duller yellowish brown, except for the darker eighth sternum, and the other dark, sclerotised areas as in *maclachlani*.

Length (to apex of closed wings): 5 2–5.5 mm.

Width. (across eyes) 0.46–0.49 mm, (across base of pronotum) 1 11–1.17 mm, (across closed wings) 1.33–1.36 mm.

The ♀ differs from the ♀ of *maclachlani* principally in its smaller size and paler colour, the less smooth and less polished head, with the posterior lobe more transverse and the anterior (postocular) constriction more abruptly and deeply incised both above and at sides, the eyes differently shaped in side view and relatively narrower below, the more broadly foveate median impression of the middle lobe of the pronotum, the obsolescent and non-carinate median line of the posterior pronotal lobe, the more deeply, broadly, and roundly excavated posterior pronotal margin, the shorter, less erect hairs of both dorsum and venter, those of head and pronotum closer and more down-like, the shorter posterior carina of scutellum, with its widened and truncate apex, the relatively shorter rostrum with the third segment more incrassated, and the paler membrane and rather more conspicuous veins of the fore wings.

♂. As with *maclachlani*, there is considerable sexual dimorphism, the ♂ is readily distinguished by the longer, more slender legs, the larger eyes, the more yellowish veins of the fore wings, and the presence of the capsule-like pygophor.

Differences from ♀ *Head* with anterior lobe ¼ as long again as posterior lobe (40:30) and across eyes slightly wider than it (33:31); posterior lobe slightly wider than long between constrictions, the main globose region definitely transverse Eyes larger and more prominent than in ♀, from above each ⅗ as wide as interocular space (9.15), from below 2¾ times as wide (13.5:5), in side view occupying nearly whole height of head (19:21), from above about half as long as posterior lobe (14:30). Ocelli more prominent than in ♀. Rostrum with third segment less strongly incrassated ventrad than in ♀, the thickest subapical region ⅗ as deep again as the base (7:5), relative length of segments I-IV, 6:14·24:14 Antennae relatively longer than in ♀, about twice as long as head and rather longer than head and pronotum together; relative length of segments I-IV, 20:47·40:30 *Pronotum* relatively broader than in ♀ across humeral angles, where it is 3/7 as wide again as long (82:58), 2¾ times as wide as anterior lobe (82·30), and nearly ¾ as wide again as middle lobe (82:48); middle lobe ¼ as long again as posterior lobe (25:20) and nearly twice as long as anterior lobe (25:13), postero-lateral angles of middle lobe only weakly tuberculate. *Legs*, especially tibiae, longer and more slender than in ♀. Tibiae, especially the hind, curved. Front legs: length of coxa, femur, tibia, tarsus, 22:88:88:17; tarsus only ⅓ as wide at base as long, anterior (inner) claw as long as tarsus, posterior (outer) claw only about ¾ as long; tibia only weakly expanded toward apex, which is less deep than tarsus is long (13.5:17) Hind legs: length of coxa, femur,

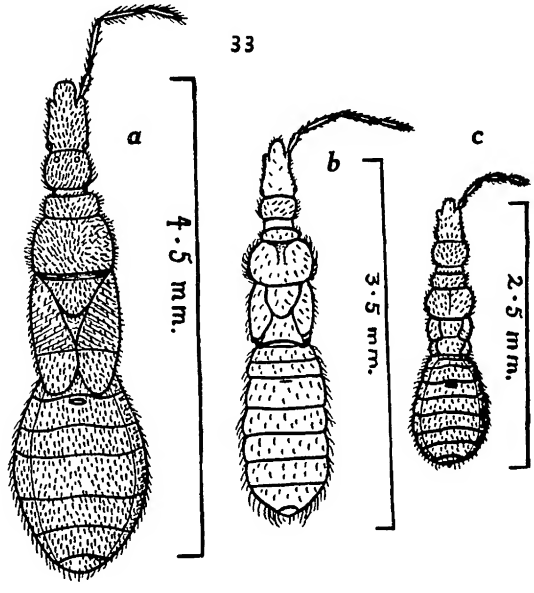


FIG. 33—*Systellodereres notialis* sp nov a, 5th instar nymph, b, 4th instar nymph; c, 3rd instar nymph.

tibia, tarsus, 28:105:120:33, claws subequal and only about ¼ as long as tarsus; femur only about ⅛ as deep as long (10:105) Eighth abdominal sternum with posterior margin nearly straight, pygophor dark shining brown; rest of abdomen beneath yellowish brown, eighth sternum rather darker

Length. 5 3 mm

Width (across eyes) 0 44–0 45 mm, (across base of pronotum) 1 09 mm, (across closed wings) 1.33 mm.

Differs from the ♂ of *maclachlani* mainly in the less shining head, with its down-like covering of much closer hairs; the hairs of the pronotum and scutellum also closer and more down-like; the more trough-like postocular constriction; the eyes wider in proportion to interocular space, particularly in ventral view; the relatively longer femora and tibiae; and the different proportions of the pronotum.

Owing to similar general trends in sexual dimorphism in *maclachlani* and *notialis*, members of the one sex, particularly the male, in the two species, are more similar in a number of features than the opposite sexes of the same species. But within a species there are adequate common characters, as given in the descriptions and the keys, for identification irrespective of sex.

Specimens Examined. 2 ♂ ♂, Leslie Valley Track, leaf mould, beech forest, 23 1.1948, R. R. Forster (C.M.). 2 ♀ ♀, Chalk Hill (Cant.), leaf mould, 4.11.1951, R. R. Forster (C.M.). 1 ♀, Mt Sumner (Cant), ex moss, 13.4.1952, R. R. Forster (C.M). 1 ♀, Lake Te Au (near S arm of L. Te Anau), leaf mould, 12-24 1.1953, R. R. Forster (C.M.). 1 ♀, Otira, — 3.1945, T. P. Harris (C.M). 1 ♀, Fox's Creek (Cant.), ex moss, 22.2 1953, R. R Forster (C M.)

TYPES. Holotype ♂ (Leslie Valley Track) and allotype ♀ (Mt. Sumner), in Canterbury Museum Paratypes in Dominion Museum, Auckland Museum and British Museum (N.H.).

NYMPHS

Last (Fifth) Instar ♀

Head. Eyes ellipsoid in side view, only very finely granular, with numerous, contiguous or nearly contiguous ommatidia small, only narrowly visible from above and largely obscured by the close hairs of the head, the crown rising considerably above them Ocellar areas pale, not prominent. also obscured by hairs, in spirit-preserved specimens appearing as a pair of oblique black pigment spots Posterior lobe of head, as in adult, transversely subglobular, with the anterior constriction abrupt and deep both above and at sides Hairs of head, as in adult, close and down-like Rostrum with third segment ventrally incrassated as in adult, but deepest near middle and relatively shorter, length of rostral segments I-IV, 10:15:20·13. Length of antennal segments I-IV, 17:37 31.31 *Pronotum* with the posterior transverse impression even more obsolete than in *maclachlani* nymphs, at sides very obscurely evident, lateral margins nearly straight and not at all constricted at its level, pronotum thus two-lobed. Posterior margin nearly straight, posterior lobe nearly rectangular, transversely oblong. A pair of sublateral foveae and convex tuberosities as in adult Impressed median longitudinal ecdysial cleavage line rather weakly evident on scutellum, pronotum and posterior lobe of head, shallowly foveolate near middle of posterior pronotal lobe Hairs of head and anterior lobe of pronotum close and down-like *Scutellum* roundly subtriangular, as long as or rather longer than width at base

Length—head·pronotum :: 70:50; anterior lobe of head:posterior lobe · 44:26; anterior lobe of pronotum:posterior lobe :: 15·35 Width—anterior lobe of head across eyes· posterior lobe · 31:35, eye:interocular space · 3:25 (above), anterior lobe of pronotum posterior lobe ·: 36:55

Fore Wings about ⅞ as long again as pronotum (85:50), reaching or passing base of third abdominal segment, often reaching or passing its apex; with a strong transverse sulcus dividing a basal coriacious part from the more or less translucent, often submembranous apical three-eighths, whole surface covered with long, pale, suberect hairs; costal margins straight; anal margins of posterior part meeting or nearly meeting in mid-line, anal margins of anterior part separated by a triangular space behind scutellum Hind wings reaching or slightly surpassing apex of fore.

Legs shaped as in adult ♀, with similar claws and tibial and tarsal spines. All tarsi one-segmented Length of femur, tibia, tarsus, front legs, 70:60·15, hind legs, 65.65·27

Colour yellowish brown much paler than *maclachlani;* head more or less infuscated, antennae pale, cream-coloured, basal segment more or less infuscated, head, thorax, appendages and fore wings rather shining, head finely granular, not highly polished, abdomen with last

visible sternite not strongly sclerotised nor darkened, median stink gland orifice a transverse slit with sclerotised peritreme near base of third visible tergite.

Length. 3.9–5.4 mm.

Width (across eyes) 0.40–0 47 mm, (across posterior angles of pronotum) 0.69–0 81 mm.

4th Instar

Similar in most respects to the fifth instar, but readily distinguished by the smaller size, fewer and more scattered ommatidia, the smaller, dot-like ocellar pigment-spots, and the shorter wing pads

Eyes small, each with only about 16-24 small ommatidia, most of them distinctly separated from one another, 4 central ones tending to be larger Ocellar rudiments small and inconspicuous, in spirit-preserved specimens visible as a pair of minute black pigment-spots just behind transverse constriction of head. Length of rostral segments I-IV, 10:11·15:11; 3rd incrassated as in 5th instar. Length of antennal segments I-IV, 13:30:25:25

Length—head:pronotum :: 55·40; anterior lobe of head·posterior lobe ·· 38·17; anterior lobe of pronotum:posterior lobe ·· 10:30. Width—anterior lobe of head across eyes: posterior lobe :: 26:28; anterior lobe of pronotum·posterior lobe :: 30:45.

Front wing buds rather shorter than pronotum (36·40), reaching to level of anterior margin of hind coxae, or at the most to base of abdomen, without a transverse sulcus; costal margins straight, anal margins widely separated throughout Hind wing buds colourless, with erect hairs; notably exceeding apex of fore wings, reaching base of abdomen, or at the most nearly to apex of first abdominal tergite

Length of femur:tibia:tarsus ·· 45:40·11 (front legs); 40:45:20 (hind legs). Claws and spines as in 5th instar.

Colour pale yellowish brown with antennae and middle and hind legs pale cream

Length 3 4–3 8 mm.

Width (across eyes), 0 32–0 35 mm; (across posterior pronotal lobe), 0.50–0 60 mm

3rd Instar (probably ♀) differs from 4th:

Eyes, in the specimens examined each with only 4 small separated ommatidia, occupying the central portion of the ocular area (possibly the number is greater in the ♂· see *maclachlani*, p —). No ocellar pigment spots Length of rostral segments I-IV, 6·7·12·9; 3rd incrassated as in later instars Length of antennal segments I-IV, 12·22·20·21 Length, head·pronotum ·· 45:30; anterior lobe of head·posterior lobe ·· 32·13· anterior lobe of pronotum:posterior lobe ·: 10·20.

Width Anterior lobe of head across eyes· posterior lobe ·· 21 5·27, anterior lobe of pronotum·posterior lobe :· 24:35

Wing sheaths inconspicuous, not sharply defined Front wings subequal in length to posterior lobe of pronotum (18·20), just passing base of metanotum, subovoid; anal margins widely separated Hind wings reaching or nearly reaching base of abdomen Length of femur, tibia, tarsus, 40:36·10 (fore legs); 37·40:15 (hind legs)

Length. 2.5 mm

Width (across eyes) 0 29 mm; (across posterior pronotal lobe) 0 47 mm

Differs from 3rd instar of *maclachlani* in the head being rather narrower across eyes and with the posterior lobe more transverse, the shorter front wing pads, both pairs of wing pads extending less far back, the more incrassated 3rd rostral segment, and the smaller ommatidia

2nd Instar

Differs from 3rd instar·

The 4 ommatidia of each eye more closely grouped Length of rostral segments I-IV, 3·6·11:9 (3rd segment incrassated near basal third) Length of antennal segments I-IV, 10·15·15·18 Length—head:pronotum :· 38:23, anterior lobe of head·posterior lobe ·· 24·14; anterior lobe of pronotum·posterior lobe ·· 7·16 Width—head across eyes· posterior lobe ·· 18·23, anterior lobe of pronotum·posterior lobe ·· 21 5·30

Wing buds present only as incipient lobes at the sides of their respective segments

Length of femur·tibia:tarsus ·· 30·28:7 (front legs); 25:28:10 (hind legs)

Length 2.0–2 3 mm

Width (across eyes) 0 24 mm; (across posterior pronotal lobe) 0 40 mm.

Specimens Examined. L Te Au, 12-24 1.1953, R. R. Forster (C M.), 1 2nd, 2 3rd, 4 5th Upper Doubtful River leaf mould, 6 4 1953, W Dukes, 1 4th. L. Waikare-Iti, leaf mould, 10 12 1946, R R Forster (D M), 1 4th Horopito, leaf mould, 22 12 1948, R R Forster (C M), 1 2nd, 1 5th L Sumner, moss, 13.4.1952, R. R. Forster (C M), 2 4th Chalk Hill, Cant., leaf mould, 4 11.1951, R. R Forster (C.M.), 2 4th, 7 5th Mt Arthur Track, Nelson, 3.600ft, leaf mould, *Dracophyllum traversii*, 22.1 1948, R. R. Forster (C.M.), 1 5th Kiwi Valley, Lewis Pass, moss, 14 11 1949, R R Forster (C M.), 1 5th.

Key to Adults of New Zealand Enicocephalidae

Because of the high proportion of micropterous species, the ready recognition of nymphs makes identification much easier. All nymphs have single-segmented tarsi on all legs. The adults of all New Zealand species have two-segmented tarsi at least on the middle and hind legs; the basal segment is short. Adult males have sclerotised terminalia lacking in the nymphs and adult females have abdominal sternum VIII darker and more sclerotised than the others; in nymphs they are concolorous. Adult females of *Nymphocoris* have a well-developed valved ovipositor.

1. Wings fully developed. Eyes of normal size, with numerous ommatidia — 2
   Wings absent or reduced to short pad-like or scale-like vestiges with few or no veins. Eyes very small, each with up to 10 ommatidia — 5
2. Fore wings with a closed basal cell; discal cell usually completely, sometimes incompletely closed by a subapical transverse vein; stigmal cell divided by at least one transverse vein; a distinct costal fracture near middle. Apex of fore tibia with a ventral group of 8 spines. Middle and hind tibiae without pectines, with a ventral row of 4 long spines. Posterior transverse constriction of pronotum obsolescent, especially in middle. Males with short claspers. — *Maoristolus* gen nov — 3
   Fore wings without a basal cell or closed discal cell; stigmal cell undivided; no costal fracture Apex of fore tibiae with a ventral group of 5 or 6 spines. Apex of middle and hind tibiae with a pair of ventro-lateral pectines and mid-ventrally between them, a single pair of long spines Posterior transverse constriction of pronotum complete and well defined. Males without claspers — *Systelloderes* Blanchard — 4
3. Larger, with relatively long wings; length to apex of fore wings (excluding rostrum): 4.3–4.8 mm. (♀), 3.8–4.4 mm. (♂). Length of fore wing: 3 1–3.3 mm (♀), 3.0–3.1 mm (♂) Hind tibiae longer; about 1.8 times front tibiae in ♀, about twice in ♂, about 3 times hind tarsi in ♀, 3.2 times in ♂. In ♀, each eye as seen from below 0.8 times as wide as to subequal to interocular space. Widespread in both North and South Islands — *Maoristolus tonnoiri* (Bergroth)
   Smaller, with relatively short wings; length to apex of fore wings (excluding rostrum): 3.4–3.7 mm (♀); length of fore wing: 2.3 mm (♀). Hind tibiae shorter; about 1.6 times front tibiae (♀); about 2.4 times hind tarsi (♀) In ♀, each eye as seen from below about half as wide as interocular space. Recorded only from central and southern parts of South Island — *Maoristolus parvulus* sp nov
4. Hairs of head and pronotum rather long, suberect, not closely down-like. Head smooth, polished and shining; postocular constriction less abruptly and less deeply incised both above and at sides Males smaller than females; length (excluding rostrum), ♂ ca. 5.2–5.5 mm, ♀ ca. 6.2–7.0 mm. Recorded only from North Island — *Systelloderes maclachlani* (Kirkaldy)
   Hairs of head and pronotum shorter, more recumbent, closer and down-like. Head finely granular, less polished and shining; postocular constriction abruptly and deeply incised both above and at sides Males about as large as females; length (excluding rostrum), ♂, ♀,

	ca. 5.2–5 5 mm. Recorded only from South Island ..	*Systelloderes notialis* sp. nov.	
5	Fore wings absent or reduced to narrow, ribbon-like, longitudinal vestiges widely separated in mid-line Third rostral segment ventrally swollen. Eyes each with 2–5 ommatidia (in N.Z. spp.) All tibiae without preapical ventral spines. Apex of fore tibiae with a ventral group of 7 spines. Apex of middle and hind tibiae with a pair of short, ventro-lateral pectines and. between them, 2 long ventral spines. Recorded from North and South Islands and Auckland Islands	*Phthirocoris* Enderlein	6
	Fore wings nymphoid, pad-like or scale-like Third rostral segment sub-cylindrical, not ventrally swollen. Eyes each with either a single ommatidium or about 10 ommatidia. At least hind tibiae with preapical ventral spines. Apex of fore tibiae with a ventral group of either 4 or 10 spines Apex of middle and hind tibiae without pectines, with either 4 or 5 ventral spines. Recorded only from the western part of the South Island .		7
6	Wings absent as separate structures. Each eye with only 2 ommatidia In ♂, ventral apophysis of pygophor plate-like, entirely sclerotised. Recorded from North Island (S.W. Auckland province) and north and west parts of South Island (Marlborough, Nelson, Westland)	*Phthirocoris mirabilis* Gourlay	
	Fore wings present as narrow, ribbon-like, widely separated longitudinal vestiges. Each eye usually with 4 or 5 ommatidia, rarely 2. In ♂, ventral apophysis of pygophor elongately produced upwards, nearly oblong, largely membranous, with median and lateral sclerotised framework Recorded from southern part of South Island and from Auckland Islands	*Phthirocoris magnus* sp. nov.	
7	Fore wings broad, obliquely transverse scales contiguous in mid-line Rostral segments III and IV elongate, III more than 3 times as long as II, IV more than twice as long as II. Eyes smaller, each with only a single ommatidium Ocelli absent Front tibiae with 2 strong ventral spines within apical half; middle and hind tibiae with 2 pairs of long preapical ventral spines. Apex of fore tibiae with a ventral group of 4 simple spines. Apex of middle and hind tibiae with 5 ventral spines Pronotum hexagonal, widest near middle. ♀ with a conspicuous valved ovipositor	*Nymphocoris maoricus* gen. & sp. nov.	
	Fore wings with long axes obliquely longitudinal; anal margins separated Rostral segment III about 2½ times as long as II, IV about 1½ times as long as II. Eyes larger, each with about 10 ommatidia Ocelli present. Front and middle tibiae without preapical spines; hind tibiae with 2 preapical ventral spines Apex of fore tibiae with a group of 10 strong spines (2, 3, 3 2), the two uppermost apically bifid Apex of middle and hind tibiae with 4 strong ventral spines hind tibiae in addition with 2 more slender spines internal to these Pronotum trapezoidal, widest posteriorly. Valvulae of ♀ vestigial	*Aenictocoris powelli* gen. & sp. nov.	

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SUPPLEMENT TO PART I
CYDNIDAE

Philapodemus australis (Erichson)

In Part I (p. 315) the name *Hahnia australis* (Erichson) was attributed to Dallas· in this context it should read *Cydnus australis.*

Mr. D. Leston (*in litt.*), in commenting on the difficulties at present involved in generic determinations in the Cydnidae generally and in this and related genera in particular, makes the following points: Horvath (1919) erected the genus *Geocnethus* to include nine species and also transferred to it 19 species from Signoret's *Geotomus* and *australis* Erichson from *Hahnia.* Horvath did not know *Hahnia gibbulae,* the type of *Hahnia.* If *H gibbulae* is congeneric with *Geocnethus,* the latter falls as a junior synonym of *Philapodemus;* if it is not, and *australis* is not a true *Philapodemus,* then the correct name of the latter species would be *Geocnethus australis* Mr. Leston adds, "Horvath gives *G. numeensis* as type of *Geobia* and sinks it in *Adrisa.* However, the type might be *lifuana* Montr. and Sign., which would make *Geobia* a synonym of *Hahnia* (teste Sign.) and thus *Geobia* Montr., 1858, would replace *Philapodemus.* This is one of the problems which cannot be solved until Montrouzier's types and Ellenreider's types are seen or presumed lost."

ACANTHOSOMIDAE

Leston (1953a: 20) has raised Stal's subfamily to family rank, and in a further paper (1953b) has described and discussed in detail the morphological bases of this decision. He has been followed in this by China and Miller (1955: 259).

Genus RHOPALIMORPHA Dallas

In Part I (p. 315) the reference to the name *Rhopalomorpha* Mayr should continue: 1866, *Reise Novara, Zool.*, 2 (1): 74 The part was published earlier than the whole.

Recent additional publications on the genus are a redescription by Pendergrast (1952: 159) and anatomical work by the same author (1953a, 1953b) and Leston (1953: 128).

Rhopalimorpha obscura A. White

In Part I (p. 316) the reference to Mayr's description of *Rhopalomorpha simulis* should be dated 1866, the date of separate publication of the part (see above).

The species has been redescribed by Pendergrast (1952a: 160) and further anatomical, developmental and biological information are given by Pendergrast (1952b, 1953a, 1953b).

Rhopalimorpha lineolaris Pendergrast

As for the previous species, additional references are Pendergrast (1952a, 1952b, 1953a, 1953b).

Oncacontias vittatus (Fabricius)

In Part I (p. 316) the generic name was misspelled as *Onacontias.*

PENTATOMIDAE

Subfamily ASOPINAE (= AMYOTINAE)

Oechalia schellembergii (Guérin-Méneville)

In Part I this species was listed as *Oechalia consocialis* (Boisduval). Mr. A. Musgrave has kindly drawn my attention to the fact that the plates illustrating and naming Guérin-Méneville's species collected on the voyage of *La Coquille* appeared between 1830-1832, before the publication (1838) of the text describing these species. As pointed out by Musgrave (1932: 133), "Those species which can be identified from the figures in the *Atlas* should take the scientific name and date of that work." Guérin's figures of *Pentatoma schellembergii* appeared in 1831. thus antedating by four years Boisduval's description and figure of *Pentatoma consociale.* This has been overlooked by almost all writers during this century. As Mr. Musgrave has shown, *Pentatoma schellembergii* Guérin-M. has priority over *Pentatoma consociale* Boisduval under Article 25a and Opinion 1A of the Rules. Although Boisduval's name has been used almost exclusively in the literature of the last 50 years, this is not such an extensively quoted species as to justify an application to waive the Rules in favour of *consocialis.*

There seems little doubt that the person after whom Guérin named this species was Schellenberg and not Schellemberg. The only reference I myself have been able to find to an entomologist with either of these names is by Méquignon (1940: *Bull. Soc. ent. Fr.* 45 (2): 16–18), who considers Schellenberg to have illustrated certain species described by Claireville in a Catalogue of Swiss insects published in 1798 and 1806. Mr. Musgrave, who has kindly searched the literature, has found references to Johann Rudolf Schellenberg (1740-1806), a Swiss entomologist, engraver and artist, in publications by W. Horn and S. Schenkling (*Index Litter. Entom.*, Serie I, Bd. 4, 2.1929: 1061) and W. Swainson (*Taxidermy.* Part II. A Bibliography of Zoology; with Biographical Sketches of the principal authors; published as one of the volumes of Lardner's Cabinet Cyclopaedia, London, 1840, p. 319). Mr. Musgrave writes: "This is probably the man Guérin-Méneville had in mind. He is the only Schellenberg I have been able to locate."

This conclusion is strengthened by the action of Stal, Mayr, and others following them in changing the spelling to *schellenbergii* or *schellenbergi*. It appears that these earlier authors were aware of Schellenberg's identity and emended the name accordingly. The Copenhagen Decisions on Zoological Nomenclature (1953) reduce the number of valid emendations. According to paragraph 71 (b) (i) (p. 44), "Where there is clear evidence in the original publication that an Original Spelling was based upon an inadvertent error (e.g., where an author states that he is proposing a name to honour Carolus Linnaeus, but the name is printed *ninnaei*) the erroneous spelling is an *Invalid Original Spelling.*" There is no such direct internal evidence in the case of *Pentatoma schellembergu*, and the Decisions do not seem to take account of any degree of probability based on external evidence. Therefore, for the present at least, the specific name *schellembergu* has been retained.

Cermatulus nasalis (Westwood) subsp. **turbotti** Woodward

Woodward (1954: 215, 216, 217, 218-221); descriptions of male and nymphs.

Subfamily PENTATOMINAE

Cuspicona simplex Walker

Woodward (1954: 215, 217); recorded from Three Kings Is

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