THE SPECIES OF *APTERYGON* (INSECTA: PHTHIRAPTERA: AMBLYCERA) PARASITIC ON KIWIS *(APTERYX)*

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Summary

A new species of *Apterygon* (Amblycera: Menoponidae) from *Apteryx australis lawryi* is described, the characters of the two known species discussed, and a key to the three species given.

INTRODUCTION

In the first key to the genera of the Menoponidae (Clay, 1947) one female from *Apteryx* was allocated to a new genus, D. Subsequent availability of specimens from *Apteryx australis mantelli* confirmed *Apteryx* as the host of genus D and it was described under the name *Apterygon* (Clay, 1961). Additional generic characters of *Apterygon* are given and discussed in the second key to the genera of the Menoponidae (Clay, 1969) in which it occupies couplet 22, together with *Hohorstiella.*

With the description of one new species in this paper, three species of *Apterygon* are now known.

The chaetotaxy as shown in the figures agrees with the specimen from which it was drawn. Broken and missing setae in the specimen drawn have been completed from the other side or from another specimen. Measurements (in mm) have usually been corrected to two decimal places. Unless otherwise stated, the figures in parentheses denote number of specimens.

TAXONOMIC CHARACTERS OF *Apterygon*

The three species of *Apterygon* have the following characters in common. Eyes absent; hypopharynx reduced; postnotum well developed; 4–4 ventral campaniform sensilla on trochanters II and III; spiracles on tergites. Head seta 10 stouter than but approximately the same length as 11; relative proportions of dorsal pair of setae on last segment of maxillary palp much as in *Myrsidea thoracica* (fig. 1P in Clay, 1966); submental setae 3+3; gular setae normally 4+4. Row of marginal pleural setae present on segments I–VIII; anterior pleural setae usually absent on

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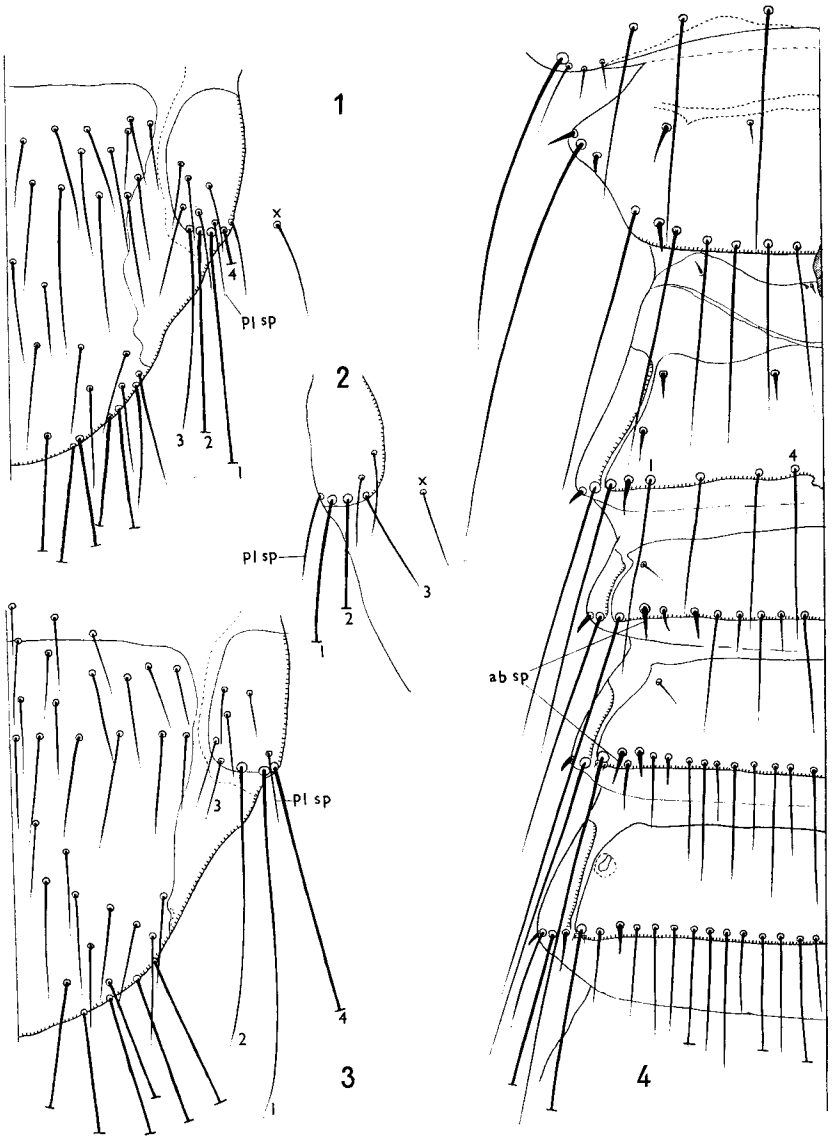


FIGS 1–4—*Apterygon* species, males. (1) *dumosum*, genital region. (2) *hintoni*, pleurite VIII. (3) *mirum*, genital region. (4) *dumosum*, thorax and abdominal segments I–III, dorsal. 1, 2, and 3, long pleural (pl lg) setae; 4, post-spiracular seta; ab sp, abdominal spiniform seta; pl sp, pleural spiniform seta; x, shortest pl sp seta.

segment I, absent or present on II and present on III–VIII. Male genital opening dorsal.

The following setae are also common to the three species and are not included under the descriptions of the chaetotaxy. PROTHORAX (Fig. 4): 2+2 antero-lateral setae (or propleurals, as available evidence shows these to be the serial homologues of metapleural setae) of which 1 each side is peg-like and 1 long; 3+3 pronotal setae, of which 1+1 are sub-marginal and peg-like and 2+2 (dorsal prothoracic setae of Clay, 1962, fig. 4) are near the transverse prothoracic carina; a number of posterior marginal setae of which the outermost each side is very long (prothoracic post-spiracular), the next is peg-like, followed by 4 long (occasionally 5) setae.

METATHORAX (Fig. 4): 3+3 anterior spiniform metanotal setae. The marginal metanotal setae which comprise 1 very long seta (metathoracic post-spiracular) and 1 characteristic stout spiniform seta at each end, and a row of setae. The setae of the row have been numbered, the first being next to the spiniform seta and always long. Each metapleurite with 1 peg-like (outer) and 1 long (inner) seta. 1+1 short or spiniform setae on mesosternum.

ABDOMEN: Tergal (Fig. 4): 1+1 post-spiracular setae on segment I, and the 4 setae of the post-spiracular setal complex on II–VIII (*see* Clay, 1970: 84); normally 1+1, occasionally 2+1 or 2+2 short, antero-lateral setae on I and II; 1+1 stout, spiniform setae inner and anterior to the post-spiracular setae on I and II, but showing much variation in position (Figs 4, 10, ab sp); 1+1 long and stout on margin of tergum IX, antero-lateral to which a minute seta occurs each side in the male. Pleural (Figs 1, 9, 11): VIII, 3+3, of these 1 each side is latero-ventral and characteristic (pl sp) and 2 are ventral, stout, and very long (pl lg_1 and pl lg_2). Sternal: 2+2 spiniform or short on sternite II and 1+1 long and stout, lateral to the anal opening, in the female.

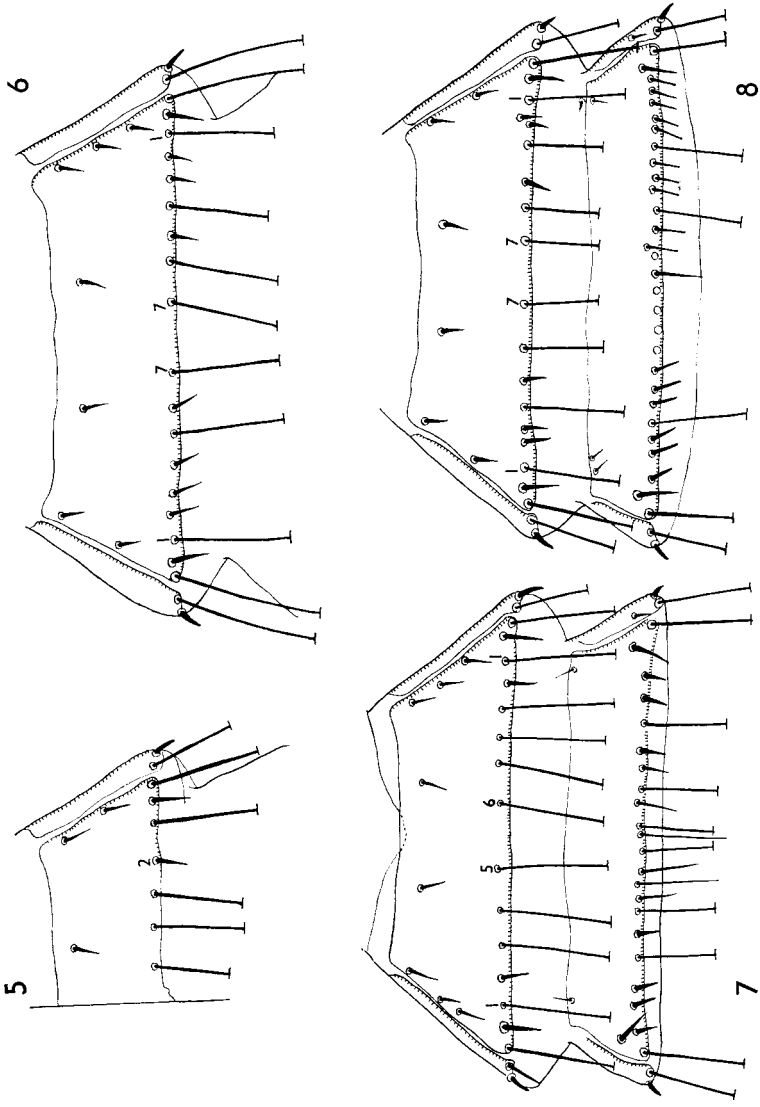
DESCRIPTIONS OF SPECIES

Apterygon dumosum Tandan, n. sp.

(Figs 1, 4, 5, 11–15, 20–30)

Type host: *Apteryx australis lawryi* Rothschild

This species is readily distinguished from *hintoni* and *mirum* in the female by the arrangement of the vulval marginal setae and the longer and larger number of setae in the lateral clusters each side of the genital opening. In the male it is distinguished from *hintoni* by the absence of marginal peg-like setae on the metanotum, the abdominal chaetotaxy, especially of tergite I and of the sternites, and the shape of the spermatophore; from



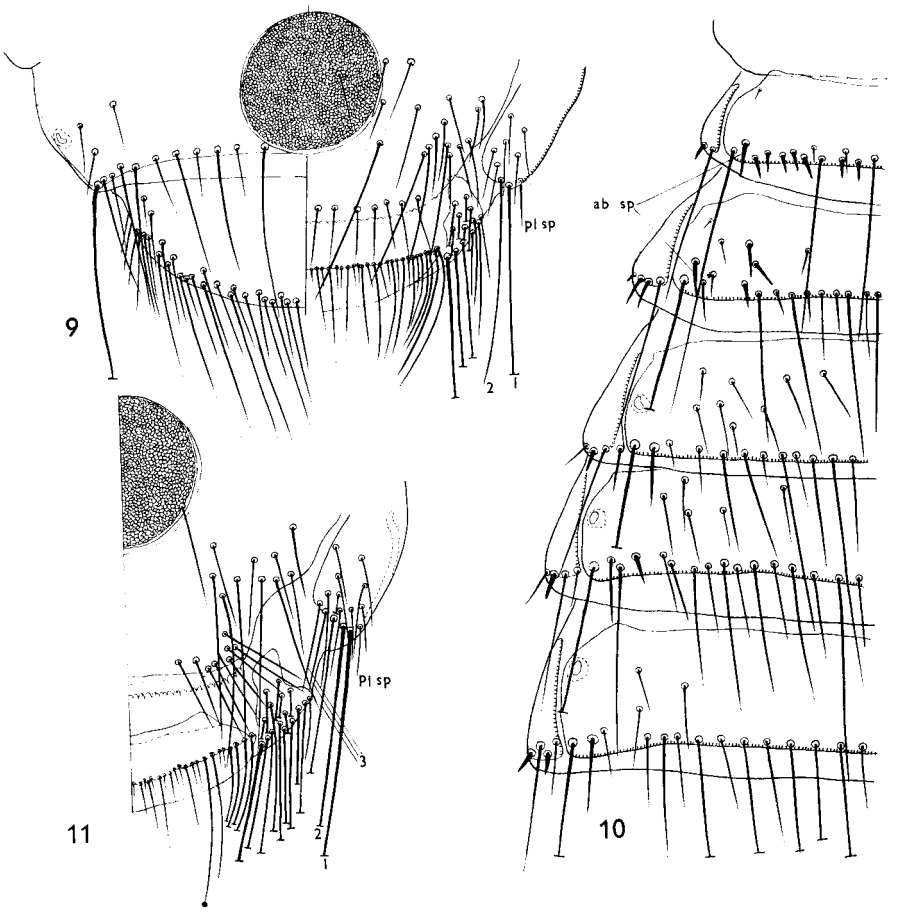
FIGS 5–8—*Apterygon* species. (5) *dumosum*, metanotum, female. (6–8) *hintoni*, metanotum and abdominal segment I, (6, 8) female, (7) male. 1 to 5, 6, or 7, marginal metanotal setae of each side.

mirum by the details of the genitalia and chaetotaxy, especially the smaller number of metasternal setae, the proportions of pleural seta pl lg_3 and the usually short and extremely stout nature of the first to second outer setae of the marginal row on sternite II.

FEMALE AND MALE: Prosternal plate relatively smaller and the spiniform seta of the post-spiracular setal complex thinner than in *hintoni*. The genital sac of the male genitalia in the resting state overlaps the parameres laterally and sclerite e lies almost directly below sclerite a. Sclerite f (a ventral thickening fused laterally to the anterior end of the parameres) (Figs 12, 13) and sclerite e (Fig. 14) apparently slightly longer than in *hintoni*. Spermatophore (Fig. 15) somewhat cigar-shaped, present in almost all males. In the female the marginal row of setae on tergite VIII usually without a median gap (unlike *hintoni*) and with 2–3 lateral setae each side crossing the posterior margin of tergum IX. Vulval margin moderately to strongly serrated.

Mesosternal setae: ♀, 8–12, mean 10 (8); ♂, 9–12, mean 9·72 (11), but 1 ♂ has only 5; occasionally 1 seta considerably longer and thicker than others. Metanotal setae: anterior; 2 ♂ out of 12 with 5 instead of usual 6. Marginal: ♀ (10); each side 5–6, total 10–12, mean 10·70. Of these each side 1–2, total 2–4, mean 2·90 peg-like and each side 3–4, total 7–8, mean 7·80 long. Second seta usually peg-like, occasionally also third and/or fourth on one or both sides. ♂, 4+4 (10) all long and none peg-like, except for one specimen with 1 peg-like seta (Fig. 5). In *hintoni* second seta normally peg-like (Fig. 7). Metasternal setae: ♀, 8–11, mean 9·62 (8); ♂, 8–13, mean 10·90 (11). Outer dorsal setae of tibia I: ♀, 10–12, mean 11·12 (16 tibiae); ♂, 8–13, mean 10·77 (22). Setae of femoral brush: ♀, 16–23, mean 19 (15 femora); ♂, 13–19, mean 15·86 (22).

ABDOMINAL CHAETOTAXY: Tergal: ♀ (8). Anterior setae: I, absent; II, each side 2–4, total 5–8, mean 6·62; III, 4–7, 8–13, mean 10·25; IV, 2–5, 6–10, mean 7·00; V, 1–5, 2–9, mean 4·62; VI, 1–3, 3–4, mean 3·62; VII, 1–4, 3–6, mean 4·50; VIII, 2–5, 4–9, mean 5·80 (10). Marginal setae: I, 16–21, mean 18·36; II, 23–27, mean 25·12; III, 25–28, mean 26·87; IV, 25–28, mean 26·37; V, 23–27, mean 25·25; VI, 24–28, mean 25·75; VII, 19–24, mean 21·87; VIII, 18–22, mean 19·20 (10). ♂ (8). Anterior setae: I, II, IV–VII, and IX absent, but in 1 having 19 setae on II and 22 on IV, 1+0 anterior also present on these segments; III, each side, 0–1, total 0–2, mean 0·62 (present in 4); VIII, 0–1, 0–2, mean 0·87 (present in 5). Marginal setae: I, 12–14, mean 12·75; II, 18–23, mean 21·37; III, 22–25, mean 23·37; IV, 22–26, mean 23·75; V, 22–26, mean 24·37; VI, 22–28, mean 24·50; VII, 22–29, mean 24·25; VIII, 20–23, mean 21·62; IX, 27–37, mean 31·77. Peg-like setae in marginal row: ♀ (8); I, 7–12, mean 9·50; II, 3–7,



FIGS 9–11—*Apterygon* species, females. (9) *hintoni*, terminal segments of abdomen, dorsal and ventral. (10) *hintoni*, abdominal segments I–V, dorsal. (11) *dumosum*, genital region. Dorsal anal setae omitted in Figs 9 and 11. Abbreviations as in Figs 1–4.

mean 5·87. ♂ (10); I, 2–7, mean 4·90; II, 2–5, mean 3·20; these tend to be fewer than in *hintoni*. Nature of first seta, or of more setae, of marginal row mediad to post-spiracular seta or setal complex: ♀ (10) (Figs 20–22); I, each side 2–4, total 5–8, mean 6 peg-like, the next seta is always long; II, each side 1–5, total 2–10, mean 4·50 peg-like, the next seta may be spiniform to long; III–VI, 1+1 peg-like, usually closer to post-spiracular setal complex than to second seta; VII, 1+1 usually moderately long to long, but first seta may be spiniform (1) or peg-like (2) on one side only. Unlike the male (and female of *hintoni* and *mirum*) the first seta on tergite

VII is not normally peg-like. ♂ (Figs 23–30); I, each side 1–3, total 2–5, mean 3·91 (11) peg-like, next seta always long; II, each side 0–4, total 1–5, mean 2·21 (10) peg-like; on III and IV normally 1, and on V–VII, 1–2 each side peg-like, mean: V, 1·08 (24 sides); VI, 1·50 (18); VII, 1·28 (14).

Pleural (Figs 1, 11): ♀; VIII, anterior, each side 5–10, mean 7·12 (24 sides), total 11–17; marginal seta pl lg_2 extends greatly beyond posterior margin of the abdomen and setae pl lg_3 each side 2–3, mean 2·29 (24 sides), total 4–6; seta pl lg_2 longer and pl lg_3 longer and stouter than in *hintoni*. ♂; VIII, anterior, each side 2–5, mean 3·70 (30 sides), total 4–6; marginal setae pl lg_3 normally 1+1, range each side 0–2, mean 0·97 (28 sides), total 1–3, usually longer and stouter than in *hintoni*.

Sternal (Tables 1–3): Total: ♀; I, 6–10, mean 7·85 (7); II, 28–37, mean 34·28 (7). Vulval marginal setae arranged as lateral groups (Fig. 11); each side 7–12, total 16–23, mean 19 (12) (in 1 ♀ 1 median seta present not included in count). Posterior to genital opening a fairly dense cluster of very long and stout setae on each side. ♂; I, 6–9, mean 7·45 (11); II, 27–37, mean 30·57 (7); VII, 25–30, mean 27·43 (7); VIII, 20–25, mean 21·16 (6).

MEASUREMENTS: 8 ♀ and 8 ♂. Length. Head: ♀, 0·35–0·38, mean 0·37; ♂, 0·35–0·37, mean 0·36. Abdomen: ♀, 1·69–1·75, mean 1·72; ♂, 1·60–1·70, mean 1·67. Total: ♀, 2·50–2·62, mean 2·55; ♂, 2·45–2·57, mean 2·52. Breadth. Head: at level of setae 10 and 11; ♀, 0·41–0·43, mean 0·42; ♂, 0·40–0·42, mean 0·41. Across temples: ♀, 0·60–0·62, mean 0·61; ♂, 0·57–0·60, mean 0·58. Pronotum: ♀, 0·50–0·52, mean 0·504; ♂, 0·44–0·48, mean 0·46. Metanotum: ♀, 0·47–0·52, mean 0·50; ♂, 0·40–0·45, mean 0·43 (7). Broadest tergum (usually VI): ♀, 0·79–0·82, mean 0·80; ♂, 0·56–0·61, mean 0·58 (6).

Almost all measurements of female *dumosum* are slightly greater than those of *mirum* and *hintoni*, excepting the breadth of the head at the level of setae 10 and 11, this being the same in the three species. The males of *dumosum* and *mirum* are more or less the same size and slightly larger than *hintoni*.

MATERIAL EXAMINED: 15 ♀ (2 dissected), 18 ♂ (4 dissected) from *Apteryx australis lawryi*, NEW ZEALAND: Stewart Is., 27.ii.1968 (J. McBurney).

Holotype ♀, in Entomology Division, Department of Scientific and Industrial Research, Nelson, from the type host, Stewart Is., New Zealand, 27.ii.1968.

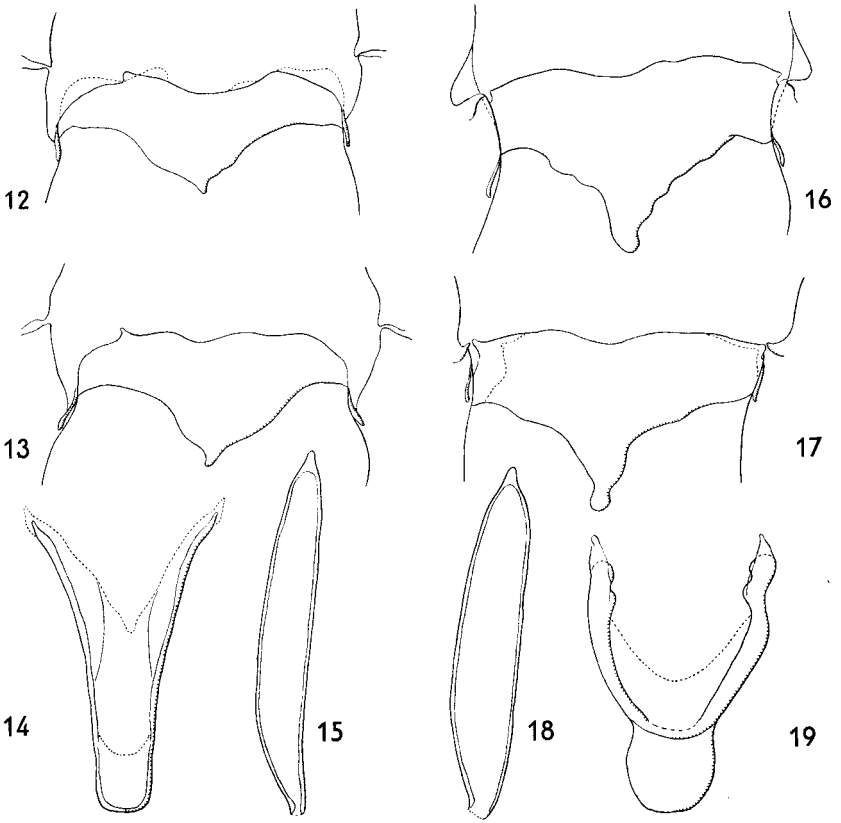
Paratypes 14 ♀ and 18 ♂ (and 13 nymphs) from the same host individual with data as given above, in Entomology Division, DSIR, Nelson, and British Museum (Natural History).

Apterygon hintoni Clay, 1966
(Figs 2, 6–10, 16–18)
Type host: *Apteryx haasti* Potts

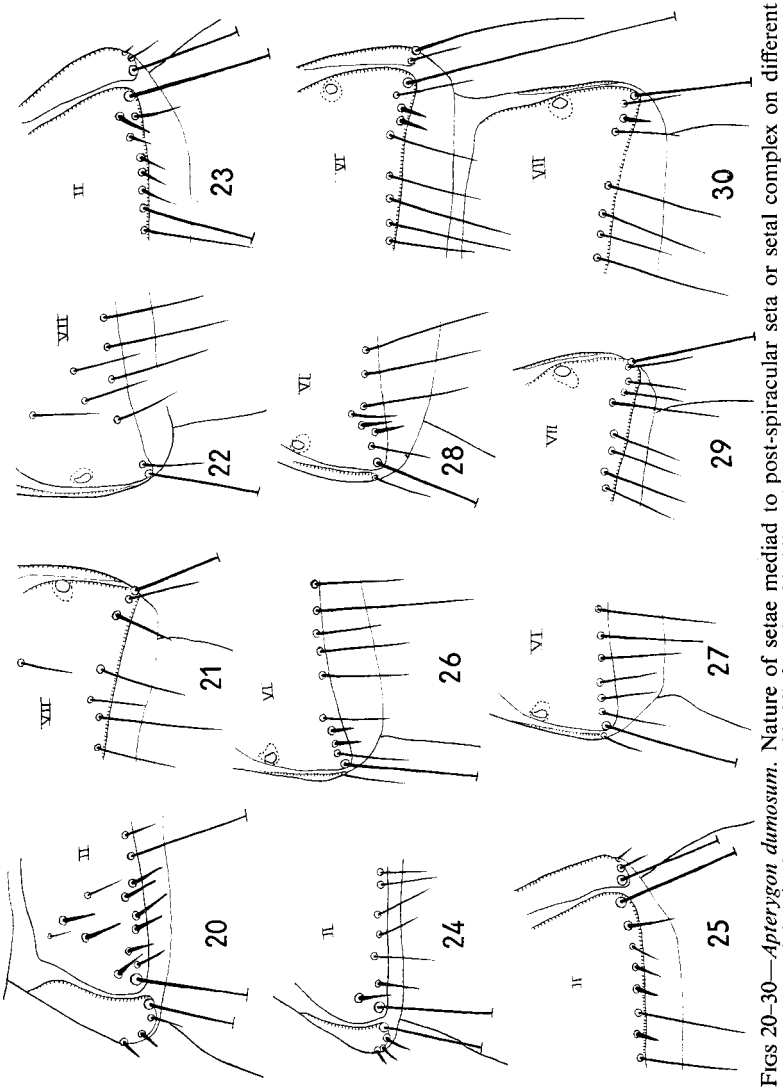
Apterygon hintoni Clay, 1966, Entomologist 99: 292, figs 1-3; Pl. 5, fig 2; Pl. 6, figs 2, 4. Host: *Apteryx haasti* Potts.

Characters which distinguish *hintoni* from *dumosum* and *mirum* are given under those species.

FEMALE AND MALE: The genital sac of the male genitalia in the resting state falls short of the parameres laterally and sclerite e usually lies anterior to sclerite a. Sclerite f slightly larger (Figs 16, 17), sclerite e apparently slightly shorter, and the spermatophore (Fig. 18), present in 1 ♂ only, shorter and broader than in *dumosum*. In the female the marginal



FIGS 12–19—*Apterygon* species. (12–14) *dumosum*, sclerite f (12, 13) and sclerite e (14) of male genitalia. (15) *dumosum*, spermatophore. (16, 17) *hintoni*, sclerite f. (18) *hintoni*, spermatophore. (19) *mirum*, sclerite e.



FIGS 20–30—*Apterygon dumosum*. Nature of setae mediad to post-spiracular seta or setal complex on different abdominal segments. (20–22) female, (23–30) male.

row of setae on tergite VIII with a median gap and the setae as long as in *dumosum*. Vulval margin feebly to moderately serrated. In the male the marginal setae on tergum IX longer than in *dumosum*.

Mesosternal setae: ♀, 10–13, mean 11·50 (6); ♂, 9–12, mean 10·40 (10). Metanotal setae: anterior additional setae may be present on one or both sides (Figs 6, 7) (lacking in *dumosum*) near the lateral margin as follows. ♀, normal count (3), 7–9 (4), mean 7 (7); ♂, normal count (4), 7–8 (6), mean 6·80 (10). Marginal: ♀ (8); each side 6–7, total 12–14, mean 13·25. Of these each side 2–4, total 4–7, mean 5·50 peg-like and each side 3–4, total 7–8, mean 7·75 long. Normally second seta peg-like, besides which each side 1–3 others (third, fourth, fifth, or sixth), total 2–5, may also be so. ♂ (10); each side 4–6, total 9–11, mean 9·50. Of these each side 0–2, total 1–4, mean 2·20 peg-like and each side 3–5, total 6–9, mean 7·30 long. Second seta usually peg-like (6) and third also sometimes on one or both sides (3). Metasternal setae: ♀, 11–18, mean 15·40 (5); ♂, 14–15, mean 14·33 (6). Outer dorsal setae of tibia I: ♀, 8–9, mean 8·50 (4 tibiae). ♂, 8–11, mean 9·75 (16).

ABDOMINAL CHAETOTAXY: Tergal: ♀ (6). Anterior setae: I, absent; II, each side 2–6, total 6–11, mean 8·71; III, 4–10, 10–20, mean 14·28; IV, 3–7, 8–13, mean 9·86; V, 2–5, 6–9, mean 6·83; VI, 2–4, 5–6, mean 5·60 (5); VII, 1–5, 4–9, mean 5·83; VIII, 2–4, 4–6, mean 5·40 (5). Marginal setae: I, 23–27, mean 25; II, 27–30, mean 28·71; III, 28–33, mean 29·57; IV, 26–32, mean 28·28; V, 23–29, mean 25·50; VI, 21–25, mean 23·60 (5); VII, 19–23, mean 21·50; VIII, 15–18, mean 15·80 (5). ♂ (8). Anterior setae: I, V–VII and IX, absent; II, each side 0–2, total 0–2, mean 0·70 (10); III, 0–2, 0–3, mean 1 (10); IV, 0–1, 0–1, mean 0·25 (10); VIII, 0–2, 0–3, mean 1. Marginal setae: I, 16–21, mean 18·20 (10); II, 23–27, mean 25·10 (10); III, 24–30, mean 26·87 (10); IV, 22–28, mean 25 (10); V, 22–26, mean 23·87; VI, 22–26, mean 24·62; VII, 21–25, mean 22·75; VIII, 16–19, mean 17·87; IX, 33–44, mean 36·20. Marginal row of setae on tergite I uneven, more so in the female (Fig. 10) than in the male. Peg-like setae in marginal row: ♀ (7); I, 9–15, mean 12·30; II, 5–10, mean 7·14. ♂ (10); I, 6–8, mean 7·20; II, 3–8, mean 5·50. Many setae being broken this number is inaccurate; even so the peg-like setae are more numerous than in *dumosum*. Nature of first seta, or of more setae, of marginal row mediad to post-spiracular seta or setal complex: ♀ (Fig. 10); I, each side 3–5, total 8–10, mean 8·66 (6) peg-like, next seta always long; II, first seta either peg-like, spiniform or short and next 3 vary from peg-like to long; III–VII, normally 1+1 peg-like, but first seta may be spiniform on one or both sides, and on VII moderately long also. Unlike *dumosum*, first seta on III–VI, especially on tergite III, tends to be spiniform and is usually peg-

TABLE 1—Marginal setae of sternites

		Females			Males		
		dumosum (7)	*hintoni*	*mirum*	*dumosum* (7)	*hintoni*	*mirum*
I	Range	4–7	6–8	2–5	3–6	5–8	4–7
	Mean	4·71	7 (7)	4·40 (5)	4·45 (11)	6·40 (10)	4·75 (4)
II	Range	13–18	19–22	15–20	12–16	18–21	15–17
	Mean	16	20·33 (6)	17·80 (5)	15·14	19 (5)	16·20 (5)
III	Range	18–24	23–26	19–22	18–21	20–22	16–20
	Mean	21	25 (5)	19·75 (4)	20	21·50 (6)	18·40 (5)
IV	Range	23–28	25–30	20–23	19–26	23–27	17–20
	Mean	25·14	27·50 (4)	21 (3)	23·14	24·66 (6)	18·60 (5)
V	Range	22–26	24–29	18–21	21–25	23–27	17–20
	Mean	24·14	25·80 (5)	19·50 (4)	23·14	24·33 (6)	16 (4)
VI	Range	17–22	20–22	16–20	18–23	18–21	19–20
	Mean	19·43	21 (6)	18·75 (4)	19·57	20 (6)	19·66 (3)
VII	Range	10–15	13–15	13–15	13–15	12–15	14–15
	Mean	13	14 (6)	14·25 (4)	13·71	13·66 (4)	14·75 (4)
VIII	Range				8–10	7–9	10–12
	Mean				8·71	8 (5)	10·66 (3)

like on VII. ♂; I, each side 2–5, total 5–7, mean 6 (10) peg-like, next seta always long; II, 1 + 1 peg-like (4) and short and fine or spiniform on one or both sides (6); III–VI, more or less as in *dumosum*, but first seta frequently spiniform and outer peg-like setae on V–VII average more; V, 1·33 (18 sides); VI, each side 1–3, mean 1·81 (16); VII, 1·72 (18).

Pleural (Figs 2, 9): ♀; VIII, anterior, each side 3–7, mean 5·50 (8 sides), total 9–13; marginal seta pl lg_2 extends slightly to considerably beyond posterior margin of abdomen, being longer than in *mirum*; setae pl lg_3 each side 0–1, mean 0·75 (8 sides), total 0–2, complete on one side of 1 specimen only, being shorter and thinner than in *dumosum*; seta pl sp stouter than in *dumosum*. ♂; VIII, anterior, each side 2–4, mean 3 (18 sides), total 5–7; marginal seta pl lg_3 each side 0–1, mean 0·55 (18 sides), total 0–2, finer and shorter than in *dumosum*.

Sternal (Tables 1–3): Total: ♀; I, 12–14, mean 13 (7); II, 41–49, mean 44·83 (6). Vulval marginal setae as a continuous row without a median gap; 13–17, mean 14·66 (6). Posterior to genital opening a fairly dense cluster of setae each side, considerably shorter than in *dumosum*. ♂; I, 10–14, mean 12·20 (10); II, 37–43, mean 40 (4); VII, 31–36, mean 33·16 (6); VIII, 19–25, mean 22 (5).

TABLE 2—Anterior, lateral, and central sternal setae of females

			dumosum		*hintoni*		*mirum*	
			Range	Mean (7)	Range	Mean	Range	Mean
I	Central		2–5	3·14	5–7	6 (7)	5–8	7 (5)
II	Central		15–23	18·28	20–29	24·50 (6)	23–29	24·75 (4)
III	Lateral	1 side	5–10	7·14 (14)*	8–12	10·10 (10)*	7–9	8·50 (8)*
		2 sides	11–19	14·28	18–23	20·20	16–18	17
	Central		11–16	13·71	16–24	19	14–17	15·25
	Total		26–30	28	34–44	39·20 (5)	31–35	32·25 (4)
IV	Lateral	1 side	11–16	12·50 (14)*	11–18	15 (8)*	7–12	10·16 (6)*
		2 sides	22–29	25	25–34	30	18–23	20·33
	Central		11–15	13·43	18–23	19·75	13–16	14·33
	Total		35–44	38·43	45–52	49·75 (4)	34–36	34·66 (3)
V	Lateral	1 side	9–14	11·64 (14)*	12–17	14·10 (10)*	10·13	11 (8)
		2 sides	21–26	23·28	27–31	28·20	20–25	22
	Central		10–17	13·43	14–22	17·60	12–18	16·25
	Total		31–41	36·71	42–49	45·80 (5)	32–42	38·25 (4)
VI	Lateral	1 side	6–9	7·43 (14)*	9–12	10·08 (12)*	7–10	9 (8)*
		2 sides	12–14	14·85	18–22	20·16	17–20	18
	Central		10–13	11·71	15–20	17·16	13–15	14
	Total		24–29	26·57	34–41	37·33 (6)	30–33	32 (4)
VII	Lateral	1 sides	4–7	5·35 (14)*	5–8	6·66 (12)*		
		2 sides	8–13	10·71	11–16	13·33		
	Central		6–10	8	11–15	12·66		
	Total		17–21	18·72	24·29	26 (6)	22–25	23·75 (4)
Genital region		Each side	10–14	11·85 (14)*	11–18	13·50 (10)*	10–17	13·66 (6)*
		Total	21–27	23·70	24–30	27 (5)	27–28	27·33 (3)

* Sides

MEASUREMENTS (those not given, as in *mirum*): Length. Head: ♂, 0·33–0·35, mean 0·34 (4). Abdomen: ♀, 1·11–1·41, mean 1·23 (6); ♂, 1·24–1·55, mean 1·34 (6). Total: ♀, 1·92–2·21, mean 2·05 (6); ♂, 2·04–2·37, mean 2·14 (6). Breadth. Head: across temples; ♀, mean 0·59 (7); ♂, 0·55–0·59, mean 0·57 (6). Pronotum: ♀, mean 0·48 (7); ♂, 0·42–0·45, mean 0·44 (7). Metanotum: ♀, mean 0·48 (7); ♂, 0·41–0·44, mean 0·43 (6). Broadest tergum (usually VI): ♀, 0·74–0·78, mean 0·76 (4); ♂, 0·55–0·59, mean 0·57 (8).

The male *hintoni* is smaller than *mirum* and *dumosum*. The measurements

of total lengths given for *hintoni* females are less than those of *mirum*; however, as other body measurements are near to or the same as those of *mirum*, the difference is evidently due to the telescoped state of the abdominal segments.

MATERIAL EXAMINED: All paratypes; 8 ♀ (2 dissected), 14 ♂ (6 dissected), NEW ZEALAND: Nelson, 6.ii.1924 (E. S. Gourlay).

The ♂ holotype and 7 ♂ and 5 ♀ paratypes are in Entomology Division, Department of Scientific and Industrial Research, Nelson, and not in the Canterbury Museum, Christchurch, as stated in the original description.

TABLE 3—Anterior, lateral, and central sternal setae of males

			dumosum		*hintoni*		*mirum*	
			Range	Mean (7)	Range	Mean	Range	Mean
I	Central		3–6	4·45 (11)	4–7	5·80 (10)	3–9	6·50 (4)
II	Central		12–25	15·43	19–23	20·75 (4)	19–30	23·80 (5)
III	Lateral	1 side	3–8	5·71 (14)*	5–9	6·70 (10)*	5–10	6·40 (10)*
		2 sides	8–13	11·43	10–17	13·40	11–15	12·80
	Central		7–13	10·85	12–19	16	11–14	12·60
	Total		19–25	22·28	28–32	29·40 (5)	23–28	25·40 (5)
IV	Lateral	1 side	4–12	8·14 (14)*	10–13	11·33 (12)*	6–11	8·30 (10)*
		2 sides	9–21	16·30	20–25	22·66	12–21	16·60
	Central		10–15	11·28	12–16	14·50	8–15	11·20
	Total		20–36	27·57	33–41	37·16 (6)	20–33	27·80 (5)
V	Lateral	1 side	6–9	7·57 (14)*	9–13	11 (10)*	5–7	6·25 (8)*
		2 sides	13–18	15·14	20–24	22	10–14	12·50
	Central		8–11	9·43	13–17	14·20	10–12	11
	Total		21–29	24·57	34–40	36·20 (5)	20–25	23·50 (4)
VI	Lateral	1 side	4–7	5·14 (14)	6–10	7·58 (12)	5–6	5·33 (6)
		2 sides	8–12	10·30	13–18	15·16	10–11	10·66
	Central		8–10	8·85	11–16	13·16	10–11	10·33
	Total		16–20	19·14	26–30	28·33 (6)	20–22	21 (3)
VII	Lateral	1 side			3–6	4·16 (12)*		
		2 sides			7–10	8·33		
	Central				10–14	11·16		
	Total		12–16	13·71	17–22	19·50 (6)	18–23	21·25 (4)
VIII	Total		11–16	11·83	10–16	14 (5)	20–22	21 (3)

* Sides

Apterygon mirum Clay, 1961
(Figs 3, 19, 31–42)
Type host: *Apteryx australis mantelli* Bartlett

Apterygon mirum Clay, 1961 Ann. Mag. nat. Hist. (13) 3: 573, figs 1–8. Host: *Apteryx australis mantelli* Bartlett.

This species is distinguished from *hintoni* in both sexes by the chaetotaxy; in the male by the details of the genitalia (*see* Clay, 1966) and in the female by the greater number of marginal vulval setae, the feebly serrated vulval margin, the smaller size of the prosternal plate, and shorter setae in the marginal row on terga VIII and IX and in the lateral brushes each side of the genital opening. Characters which distinguish it from *dumosum* are given under that species.

FEMALE AND MALE: Prosternal plate of the female much, of the male rather, smaller than that of *dumosum* and *hintoni*. Sclerite e of the male genitalia as in Fig. 19. Spermatophore not seen in any male. In the female the marginal row of setae on tergite VIII with a median gap, all the setae fall short of the posterior margin of tergum IX; marginal setae on IX shorter than in *dumosum* and *hintoni*. Vulval margin feebly serrated.

Mesosternal setae: ♀, 9–10, mean 9·25 (4); ♂, 8–13, mean 10·50 (4). Metanotal setae: marginal; ♀ (11); each side 4–6, total 9–11, mean 10. Of these each side 0–2, total 1–3, mean 2.27 peg-like and each side 3–4, total 7–8, mean 7·72 long. Second seta usually peg-like (6); absent on one side (1); second and third so on one side (2) and second and fourth so on one side (2). ♂; each side 4–5, total 8–9, mean 8·20 (8). Of these each side 0–1, mean 0·12 (16 sides) peg-like; 4+4 long (6) and broken on 4 sides (2). Second seta peg-like (2 sides), long (12 sides), broken (2 sides). Count and nature of these intermediate between *dumosum* and *hintoni*. Metasternal setae: ♀, 12–17, mean 14·25 (4); ♂, 15–20, mean 17 (3). Outer dorsal setae of tibia I: ♀, 9–12, mean 10·55 (9 tibiae); ♂, 8–12, mean 10·22 (9).

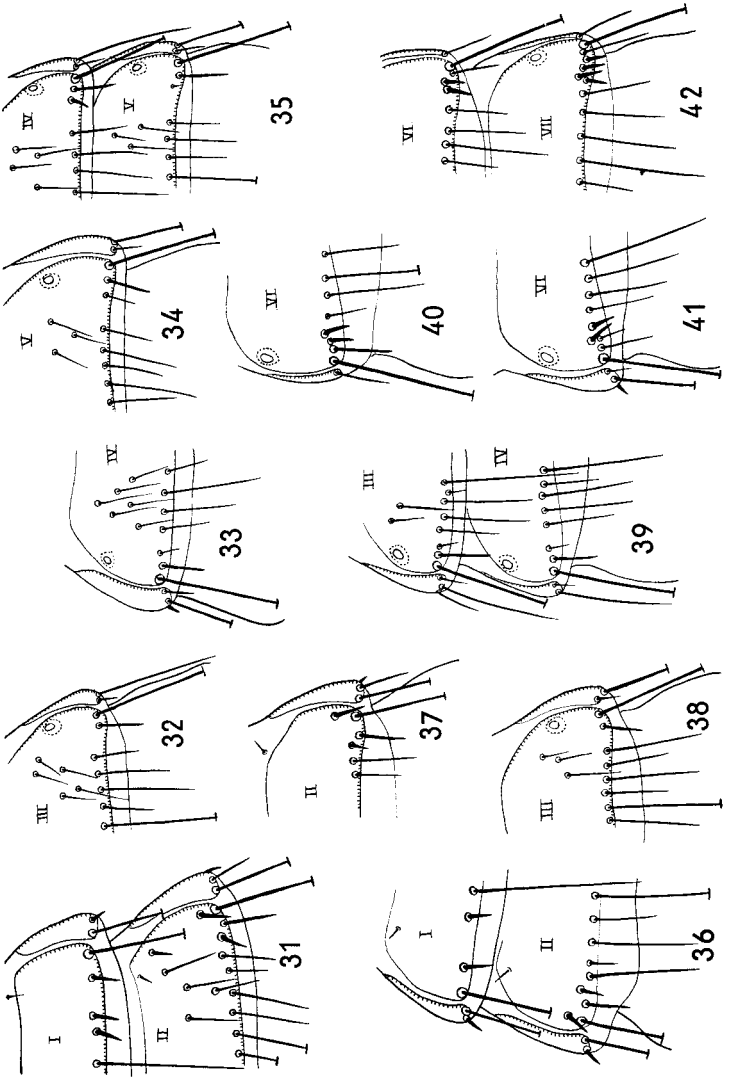
ABDOMINAL CHAETOTAXY: Tergal: ♀ (5). Anterior setae: I, absent, but 1+0 present in one; II, each side 2–5, total 6–9, mean 7; III, 4–8, 10–15, mean 12 (4); IV, 3–6, 7–10, mean 8·80; V, 0–4, 2–7, mean 4·20; VI, 1–4, 3–6, mean 4·80; VII, 0–2, 1–3, mean 2·75 (4); VIII, 1–3, 2–5, mean 3·50 (4). Marginal setae: I, 14–16, mean 14·60; II, 20–27, mean 24; III, 24–30, mean 26 (4); IV, 23–26, mean 24.60; V, 21–26, mean 23; VI, 23–25, mean 24·20; VII, 18–22, mean 20·50 (4); VIII, 17–20, mean 18·25 (4). Anterior setae: I, II, IV–VII and IX, absent; III, each side 0–3, total 1–4, mean 2·50; VIII, 0–2, 1–2, mean 1·33 (3). Marginal setae: I, 10–13, mean 11·75, II, 23–25, mean 23·75; III, 25, mean 25; IV, 22–23, mean 22·75; V, 22–27, mean 24·50; VI, 24–28, mean 26·25; VII, 26–30, mean 27·75; VIII, 20–21,

mean 20·66 (3); IX, 33–41, mean 36·33 (3). Peg-like setae in marginal row: ♀ (6); I, 3–5, mean 4·16; II, 1–2, mean 1·33. ♂ (3); I, 2–4, mean 3·33; II, 2–3, mean 2·33. These are fewer than in *dumosum* and *hintoni*. Nature of first seta, or of more setae, of marginal row mediad to post-spiracular seta or setal complex: ♀ (6) (Figs 31–35); I, each side 1–3, total 2–5, mean 3·33 peg-like, next seta usually spiniform or short and stout but occasionally long. In *dumosum* and *hintoni* this seta is long. II, III, each side 0–1, total 1–2, mean 1·33 peg-like. On IV, VI, and VII usually 1+1 peg-like, but on IV (2), VI (2) either spiniform or indeterminate through being broken, and on VII (2) indeterminate; V, first seta peg-like, spiniform or short on one or both sides. If the peg-like or spiniform seta is absent, then the first seta is short and stout to long on II and moderately long or long on III–VII. The first seta on III–VII is usually closer to the post-spiracular setal complex than to the second one. ♂ (5) (Figs 36–42); I, each side 1–2, total 2–3, mean 2·80 peg-like, next seta long, unlike female; II, each side 0–1, total 1–2, mean 1·80 (5) peg-like; III–VII, more as in *hintoni* but the number of peg-like setae on V–VII averages more; V, 1·75 (8 sides); VI, each side 2–3, mean 2·66 (6); VII, 2–6, mean 3·90 (10).

Pleural (Fig. 3): ♀; VIII, anterior, each side 5–8, mean 5·90 (10 sides), total 10–13; marginal seta pl lg_2 falls short of or extends just beyond posterior margin of the abdomen; seta pl lg_3 absent. ♂; VIII, anterior 4–5, mean 4·50 (8 sides), total 8–10; marginal setae pl lg_3, 0 (2), 0+1 (2), broken in one and almost long in the other and well removed from seta pl lg_2. On segment II second marginal pleural seta (counting from inner side) usually short to moderately long and stout and rarely peg-like, in both sexes; third seta peg-like in female and either peg-like, spiniform or short to moderately long in male. In both sexes of *dumosum* and *hintoni*, the second is spiniform and the third peg-like.

Sternal (Tables 1–3): Total: ♀; I, 10–13, mean 11·40 (5); II, 38–49, mean 42·50 (4). Vulval marginal setae as a continuous row, laterally one row and medially one or more rows; 22–27, mean 23·71 (7). ♂; I, 7–16, mean 11·25 (4); II, 36–46, mean 40 (5); VII, 33–38, mean 36 (4); VIII, 30–34, mean 31·66 (3).

MEASUREMENTS: Length. Head: ♀, 0·35–0·37, mean 0·36 (4); ♂, 0·34–0·38, mean 0·36 (5). Abdomen: ♀, 1·47–1·53, mean 1·50 (3); ♂ 1·66–1·81, mean 1·72 (3). Total: ♀, 2·27–2·41, mean 2·33 (3); ♂, 2·46–2·63, mean 2·54 (3). Breadth. Head: across temples; ♀, 0·58–0·61, mean 0·60 (4); ♂, 0·56–0·59, 0·58 (5). Pronotum: ♀, 0·46–0·49, mean 0·47 (4); ♂, 0·44–0·45, mean 0·445 (5). Metanotum: ♀, 0·45–0·47, mean 0·46 (4); ♂, 0·42–0·44, mean 0·438 (4). Broadest tergum (usually VI); ♀, 0·78–0·81, mean 0·80 (4); ♂, 0·56–0·61, mean 0·59 (4).



FIGS 31–42—*Apterygon mirum*. Nature of setae mediad to post-spiracular seta or setal complex on different abdominal segments. (31–35) female, (36–42) male.

MATERIAL EXAMINED: Holotype ♂, allotype ♀, slide no. 655 in British Museum (Natural History), and paratypes 5 ♀ (2 dissected) and 4 ♂ (2 dissected), NEW ZEALAND: Opotiki, North Is.; 5♀, 3♂ from the type host, NEW ZEALAND: Rotorua, North Is., 26.viii.1971 (R.L. Pilgrim).

AFFINITIES: The sclerites of the male genitalia of *dumosum* and *hintoni* resemble each other closely, but in the characters of the female genital region it is *hintoni* and *mirum* that show similarity and differ from *dumosum* in which this region is distinctive. Since the male genitalia of Amblycera are usually more reliable guides to their affinities, and further, as several non-sexual characters (e.g., chaetotaxy of tergum IX, proportions of 1–2 outer setae on sternite II, prosternal plate) of females of *hintoni* and *dumosum* show greater resemblance to each other, it is inferred that *dumosum* and *hintoni* are closer to each other than either is to *mirum*.

Apterygon sp. *incertae sedis*

Two males from *Apteryx australis mantelli* resemble *dumosum* males in the characters of the genitalia, especially of sclerite e, the proportions of pleural setae pl lg_2 and pl lg_3 on pleurite VIII, and the number and arrangement of peg-like setae on tergites I–VII. The setal count of most tergites falls within the range of *dumosum*. However, in one or both the males the numbers of certain setae (mesosternal, metasternal 14 and 15, on tergites II–IV and on the sternites) exceed slightly and that on the margin of tergum IX (39 in both) exceeds considerably the range in *dumosum*. The count of metanotal setae in one male is 4+4 and the second seta is long on one and broken on the other side. In the other male the count is 5+5 and the second seta of both sides is broken. Thus, while in the first male the condition is the same as in *dumosum* males, in the second the number is greater and the proportions of the second seta indeterminable. Of the three known species of *Apterygon* these males resemble *dumosum* most closely; however, the differences in the chaetotaxy, especially the greater number on tergum IX, raise some doubts of their being conspecific with the latter species. As *A. australis mantelli* is the type host of *mirum*, it seems that either this kiwi harbours two sympatric species of *Apterygon* or the host record of the two males or of *mirum* is wrong.

MATERIAL EXAMINED: 2 ♂ (and 4 nymphs) from *Apteryx australis mantelli* Bartlett, NEW ZEALAND: Manawatu, North Is., 7.iv.1965 (G. Singh), BMNH no. 1965–470.

KEY TO THE SPECIES OF *Apterygon*

FEMALES

1. Vulval marginal setae in lateral groups separated by median gap (Fig. 11) ..... **dumosum**
   Vulval marginal setae as a continuous row (Fig. 9, fig. 7 *in* Clay, 1961).....2
2. 13–17, mean 14·66, vulval marginal setae in one row (Fig. 9). Marginal metanotal setae 12–14, mean 13·25, of which 4–7, mean 5·50, are peg-like (Figs 6, 8).....**hintoni**
   22–27, mean 23·71, vulval marginal setae forming one row laterally and one or more rows medially (fig. 7 *in* Clay, 1961). Marginal metanotal setae 9–11, mean 9·83, of which normally 2 (second each side) are peg-like.....**mirum**

MALES

1. Sclerite e of male genitalia as in Fig. 19. (Seta pl lg; absent or present on one side only of pleurite VIII and of medium length or long).....**mirum**
   Sclerite e of male genitalia as in Fig. 14.....2
2. Marginal metanotal setae normally 8, none peg-like (Fig. 4); seta pl lg_3 normally present on both sides, relatively longer and stouter (Fig. 1). Setae on tergites: I, 12–14, mean 12·75; II, 18–23, mean 21·37..... **dumosum**
   Marginal metanotal setae 9–11, mean 9·50, of which 1–4, mean 2·20, are peg-like (second usually so) (Fig. 7); seta pl lg_3 usually present on one side only, relatively shorter and finer (Fig. 2). Setae on tergites: I, 16–21, mean 18·20; II, 24–29, mean 25·80.....**hintoni**

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THE SPECIES OF *APTERYGON* (INSECTA: PHTHIRAPTERA: AMBLYCERA) PARASITIC ON KIWIS (*APTERYX*)

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