Art. 26.—*Notes on the Blepharoceridae (Diptera) of New Zealand.*

By J. W. Campbell.

[*Read before the Philosophical Institute of Canterbury, 2nd November, 1921; received by Editor, 31st December, 1921; issued separately, 30th April, 1923.*]

Unexpected circumstances prohibit more than a fragmentary continuance of the notes published in the writer's previous paper,* where there were figured three forms of larvae, assumed to be identical with Bezzi's larvae, and, following his papers,† they were designated larva A, B, and C. A study of the larval stages of *Curupira chiltoni* Campb. shows conclusively that larva C is a young stage of larva A (*C. chiltoni* Campb.), and not the larva of *Peritheates turrifer* Lamb, as was suggested. There is no evidence for the presence of any species other than *C. chiltoni* Campb. in the Banks Peninsula creeks searched by the writer, and it seems probable that *C. chiltoni* alone inhabits the whole of those creeks, where it will be remembered the larvae A, B, C of Bezzi were secured. Professor Bezzi's description of his larva C fits no larva known to the writer except the so-called larva C of Purau Creek (Lyttelton Harbour), and this is the only known larva with the subquadrate yellow spot in the middle of the dorsum of the fourth segment.‡ In their development the larvae of *chiltoni*, after completion of the colour-pattern, develop subdermally the large black spines of a third form of armature, and at the next moult emerge with the characteristic black spines of the species (see figs. 1–9). From evidence in the writer's possession it seems certain that larvae of the *chiltoni* type alone have the three distinct forms of armature (*i.e.*, V-shaped, cone, and long black spines) during development, the other New Zealand species, of the *hudsoni* or *harrisi* or the Queenstown types, having but two forms, the second consisting of the transparent cone spines referred to in the writer's previous paper* (figs. 22–27). Further communication with

---

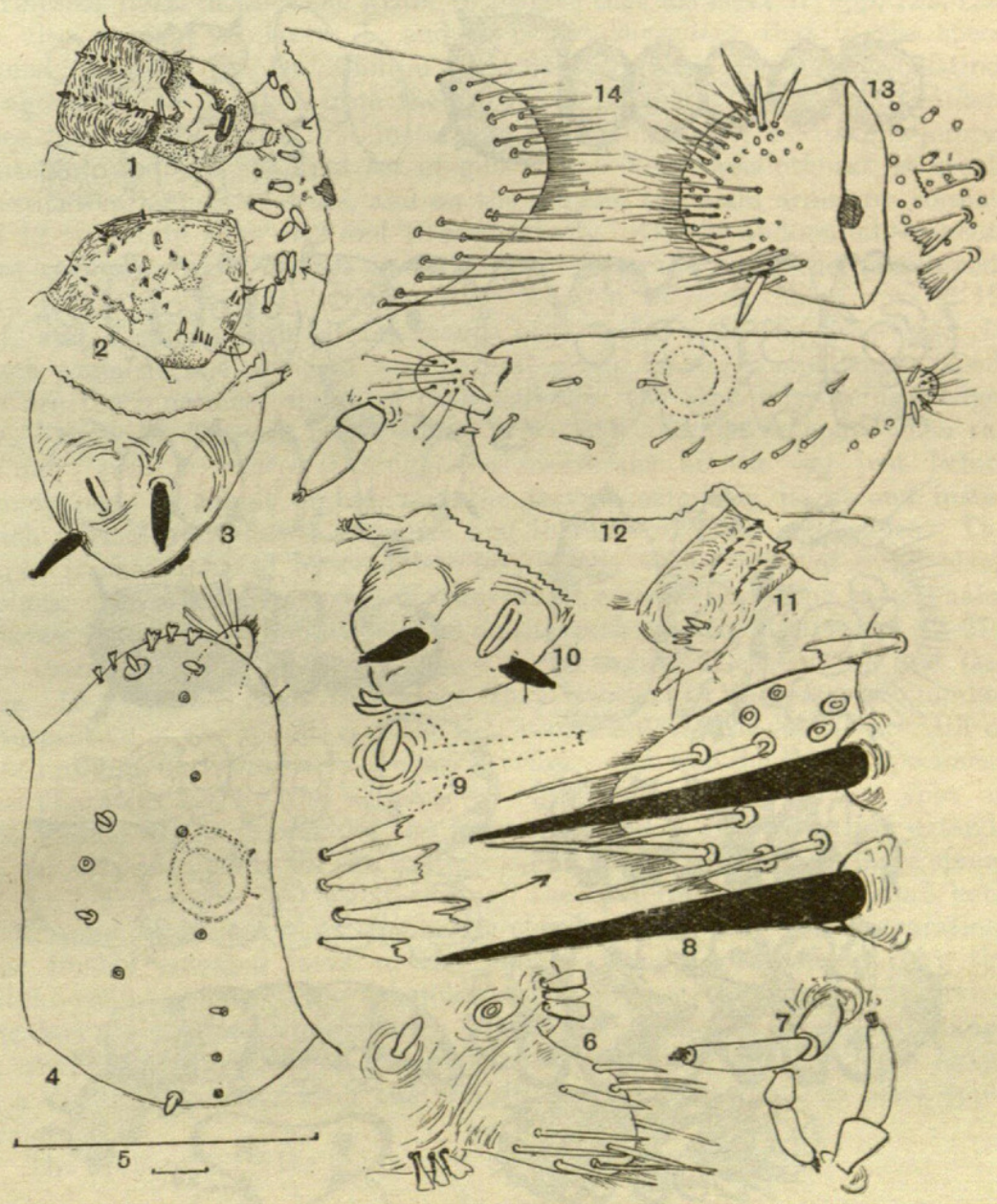
* J. W. Campbell, *Trans. N.Z. Inst.*, vol. 53, pp. 258–88, 1921.

† M. Bezzi, *Bull. Soc. Ent. Ital.*, vol. 44, pp. 1–113, 1913; vol. 45, pp. 115–29, 1914.

‡ The following table is added to make the position clear :—

(Bezzi, 1913–14.)	1921. *(Campbell, 1921.)*
Larva.	Fig.
A (assumed to be *N. hudsoni*) ..	.. A = *C. chiltoni* Campb.
B (unrelated)	.. B = *N. hudsoni* Lamb.
C (probably *P. turrifer* Lamb) ..	.. C (possibly *P. turrifer* Lamb).

1922.	
Larva.	Fig.
A = *C. chiltoni* Campb. ..	.. A = *C. chiltoni* Campb.
B = *C. chiltoni* Campb., young stage	.. B = *N. hudsoni* Lamb.
C = *C. chiltoni* Campb., young stage	.. C = *C. chiltoni* Campb., young stage.



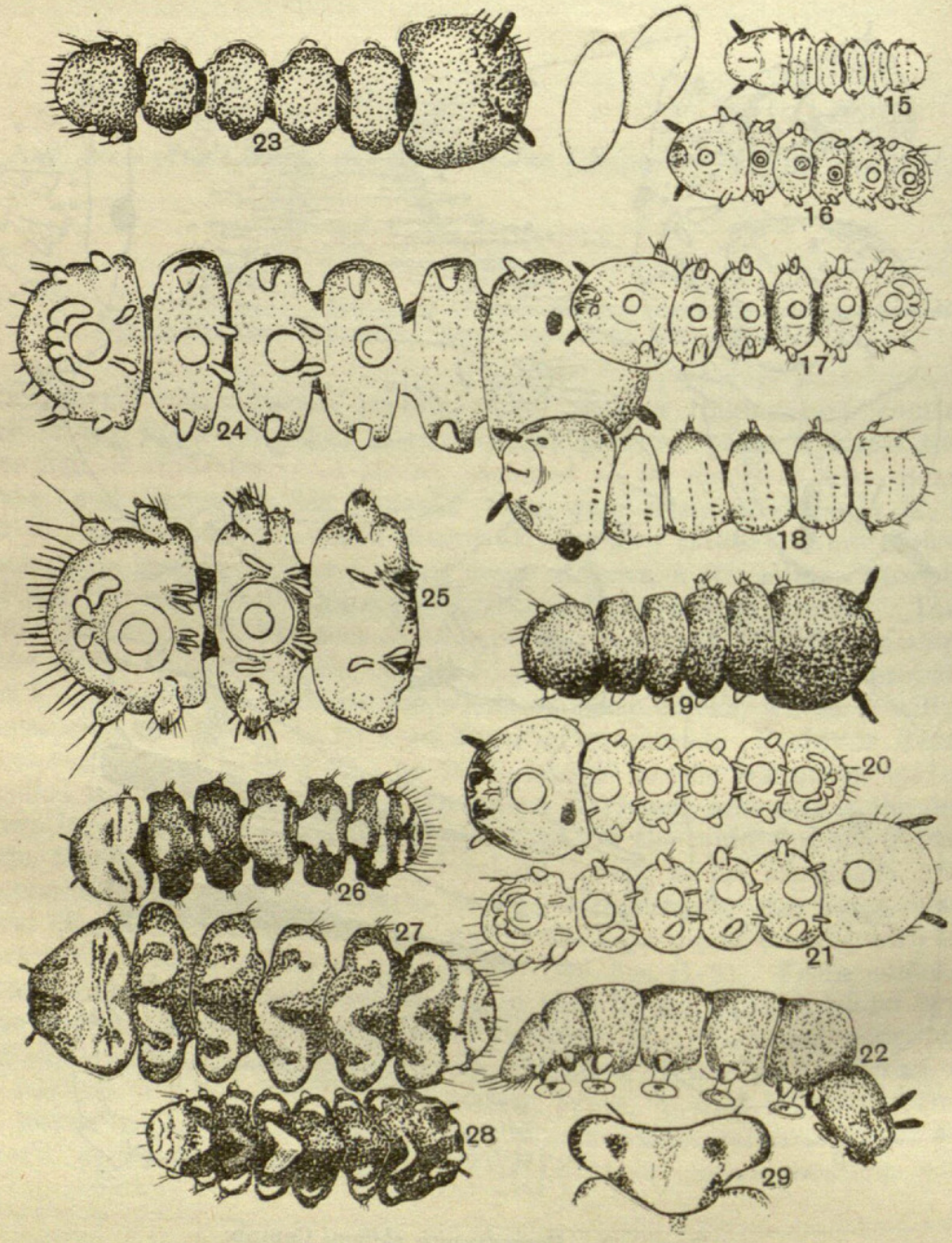
FIGS. 1–9.—*Paracurupira chiltoni* Campb.

1. Abdominal segment, first instar.
2. Sixth segment, first instar.
3. Cephalothorax, first instar.
4. Abdominal segment, showing second armature.
5. Relative increase of diameter of disc.
6. Lateral process and second armature.
7. Increases of size of antenna (four stages).
8. Lateral process (tip), third armature.
9. Position of spines in transition stage.

FIGS. 10–13.—*Peritheates harrisi* Campb.

10. Head, first instar.
11. Abdominal segment, first instar.
12. Abdominal segment, showing second armature.
13. Lateral process (mixed spines).

FIG. 14.—Queenstown larva, lateral process. Gills, 7 in. tuft anterior margin segments. Armature and first instar similar to *harrisi*. Male imago larger than *chiltoni*; venation similar. Eyes bisected, dichoptic.



FIGS. 15–26.—*Paracurupira chiltoni* Campb.

15–18. Ova and four sizes of larva with the first-stage armature. No increase in size of disc. First instar ?

19–24. Five sizes of larva, with additional one gill aside. Disc approximately doubles in diameter. Sixth segment marginal spines increase to 6 or 7. Armature, 12, 14, 18 cone spines.

25. Four gills. Lateral process assumes club form. Marginal spines 18–20. Colour-pattern commences with subquadrate yellow spot. Disc again doubles in diameter.

26. Completed pattern.

FIGS. 27–29.—Queenstown larvae.

27. Adult larva.

28. Young, with pattern developing.

29. Abdominal segment, extreme form.

The average larva has the broad V separated from the lateral lunar marks

Professor Bezzi inclines the writer to believe that his larva B* (pp. 122–123) is also a stage of larva A, and it is not surprising that in the specimens collected by Dr. Chilton there should have been three distinct stages of larva A taken from the stream at Akaroa. The larva of *chiltoni* (see figs. 15–26) in its first instar can be distinguished by its one-jointed antenna, and has the anal set of gills only. The cephalothorax is nearly destitute of spines or setae, and on the dorsum the main armature consists of 12 spines, in rows of 2 and 10 respectively. On the abdominal segments are two rows of 10 spines in each row. Laterally near the pseudopods are groups of 4 spines. On the sixth segment there are three rows of 12, 14, and 6 spines, with lateral groups of 4 spines near the processes. In each segment one spine of each lateral group is larger and cone-shaped, as are the innermost spines of each half-row, the remainder being wedge- or V-shaped. These 6 larger spines are visible in each segment when the young larva is viewed through the membrane of the egg just before emergence. A moult occurs, and the larva emerges in its second instar with normal two-jointed antennae and increase of setae and spines. The larva is characterized by complete loss of the whole series of small black spines. The armature consists of transparent cone spines, 12 on the cephalothorax, 14 on the abdominal, and 18 on the sixth segment (1921†, figs. 22–27). An increase of one gill a side occurs on all segments except the first (see figs. 19–24), and from this stage they appear to increase in number irrespective of the moults. After the second ecdysis the larvae are still of the uniform dark-brown or "black" colour, and well-developed specimens are characterized by the appearance of the subquadrate yellow spot on the middle of the dorsum of the fourth segment. This coloration extends to the other segments till the pattern is completed. The black large spines of the fourth instar are visible through the epiderm of the third, and both cone spines and large black spines are clearly visible in a slide preparation. The freshly emerged larva of the fourth instar is characterized by the bright-yellow colour of the tubercles of the large erect black spines, giving the larva a spotted appearance. The lateral processes gradually change in shape from a cone to a club-shaped structure, and the club shape is a definite character after the transition from cone spine to black-spine armature.

The table on p. 264 is temporary, and subject to correction.

The writer wishes to express his keen appreciation of the help and encouragement he has invariably received from Professor Bezzi, and his indebtedness to Messrs. Myers and Hamilton, and many friends, for specimens and new species. Investigation of the immature stages has only been possible through the very determined and disinterested efforts of Messrs. W. G. Howes, Leon Curtis, and T. R. Harris to secure from their various localities a series ranging from the egg to the mature larva and pupa.

Dr. R. J. Tillyard's revision of these interesting flies will be found in the *N.Z. Journal of Science and Technology*, vol. 5, pp. 101–7, 1922; and students will look forward with interest to the work of Monsieur E. Tonnoir, of the Brussels University, now at the Cawthron Institute, Nelson, who is at present engaged in a study of the whole Australasian group of Blepharoceridae.

---

* M. BEZZI, *Bull. Soc. Ent. Ital.*, vol. 45, pp. 115–29, 1914.
† J. W. CAMPBELL, *Trans. N.Z. Inst.*, vol. 53, p. 270.

Table of Larvae.

Species.	Instars.	Gills.*	Antenna Joints.	Primary Spines.				Lateral Processes.	
				Cephalothorax.	Abdominal.	Sixth Division	Lateral Groups.	Characters.	Shape.
Paracurupira chiltoni Campb.	1st	4A	1	2, 4, cone; 4, 4, wedge	2, 4, cone; 8, 8, wedge	4, 4, 2, cone; 8, 10, 6, wedge	4	Spines strong, stout, 2–3	Cone.
	2nd	+1	2	12 cone ..	14 cone ..	4, 8, 6, cone ..	..	Spines increase, 6–8 ..	Cone.
	4th+	2–7	2	12, long black ..	14, long black ..	18, long black ..	..	Spines increase, 25+	Club.
Peritheates harrisi Campb.	1st	4A	1	2, 4, cone; 8, wedge	2, 4, cone; 8, 8, wedge	4, 4, 2, cone; 8, 10, 6, wedge	4	Spines stout, 2 ..	Cone.
	2nd	+1	2	4, 8, sharp-point cone	12, 4, sharp-point cone	6, 8, 6, sharp-point cone	..	Spines stout, 3; fine, 5–6	Cone.
	4th+	2–7	2	12, sharp-point cone	14, sharp-point cone	20 sharp-point cone	..	Spines mixed, 25–30 ..	Cone.
Neocurupira hudsoni Lamb	..	Young stages not known. Primary armature present (not determined) ..						Spines long, fine, 30 ?	Cone.
Peritheates turrifer Lamb	..	..	..	Not known ..	..	..	..	..	Cone ?
Peritheates n. sp. Tillyard	..	..	..	Not known.					
Peritheates n. sp. Campb.									
Peritheates n. sp. 2 Campb. (Wellington, Kaitoke)	..	..	..	..	4, 8, cone ? ..	12, 4, cone ..	6, 8, 6, cone	Spines stout and fine, mixed	Cone.
Paracurupira n. sp. Campb.	1st	4A	1	2, 4, cone; 4, 4, wedge	2, 4, cone; 8, 8, wedge	4, 4, 2, cone; 8, 10, 8, wedge	4	Spines fine, 2 ..	Cone.
Queenstown	2nd	+1	2	4, 8, cone ? ..	16 ? cone ..	20 ? cone ..	..	Spines fine, 8–10 ..	Cone.
Waipori	4th+	2–7	2	12 ? cone ..	16 ? cone ..	20 ? cone ..	..	Spines fine, 25–30; not so long and fine as in *hudsoni*	Cone.
Paracurupira n. sp. Tonnoir	..	..	..	Larvae and pupae	collected ..	..	..	Ditto	Cone.
West Coast	..	..	..	Probably identical	with Queenstown form.				

* A = anal gills only.

Note.—The number and position of these armatures is probably the same for all species, the slight difference being due to the fusions in the first and sixth divisions. Indications of a greater number than the average 12, 14, 18 are present in the reduced areas.