XIV.—*A Description of the Copepod* Cylindropsyllus brevicornis, *Van Douwe, and of a new Species of* D'Arcythompsonia, *Scott.* By Robert Gurney, M.A.

[Plates V.–VII.]

Cylindropsyllus brevicornis was first described by Van Douwe from two male specimens taken in brackish water at Greifswald, and a single female was found by Brehm in 1914 in a collection made in fresh water at Sebenico in Dalmatia. In neither case did the material permit of the publication of a full description, and as I have had the opportunity of examining a number of specimens, and have come to the conclusion that a new genus should be formed for its reception, I think it advisable to give a further account of it with figures.

Horsiella, gen. nov.

Body vermiform, the abdomen not distinct from the thorax. Genital segment partly or wholly divided into two. First pair of antennæ short, with few joints. Second pair three-jointed, without external ramus. Mandible without external ramus. Maxillipedes absent. Swimming-legs alike in both sexes, the internal rami of two and the external of three joints. Fifth pair of legs minute, one-jointed.

A comparison of the single representative of this genus with *Cylindropsyllus* shows very striking differences in structure, particularly with regard to the swimming-legs, *Horsiella* approaching in this respect more nearly to the genera *Leptocaris* and *D'Arcythompsonia*. It differs from these two genera and also from *Cylindropsyllus* in the absence of the external ramus of the second pair of antennæ and of the mandibles, and in the absence of the maxillipedes.

Horsiella brevicornis (Van Douwe). (Pls. V. & VI.)

Cylindropsyllus brevicornis, Van Douwe, Zool. Anz. xxviii. 1905, p. 437; Brehm, Zool. Anz. xliii. 1914, p. 337.

Shape of body cylindrical and vermiform, as in *Cylindropsyllus*; the first segment of the thorax marked off from the head by a slight dorsal groove extending partly down the sides. Integument thin and without markings. The genital segment is completely separated into two in the male, but in the female the line of division does not extend across the ventral surface. The fifth abdominal segment is twice as

long as the preceding segment in the female. Anal operculum not prominent, and without spines. The furcal rami are twice as long as they are broad, with a large apical seta which is nearly one-third the length of the body. All the segments of the body are smooth, without spines, but there are groups of exceedingly minute cilia on the ventral side of the abdominal segments (Pl. V. fig. 1) and a pair of minute setæ on the dorsal margin of each (Pl. V. fig. 3).

The first antenna (Pl. VI. fig. 1) of the female is short and consists of five joints, the first two being thicker than the remainder and forming a distinct basal part. The third and fourth joints are short, the fourth bearing a thick æsthete extending far beyond the end of the antenna. The distal joint is as long as the third and fourth combined, and armed at its apex with two setæ and an æsthete, the latter springing from the same base as one of the setæ. In the male the antenna is not geniculated and appears to be composed of two joints only, since the two basal joints are fused, and the remaining joints are only partially distinct. Viewed from above, the last three joints appear completely fused, the long æsthete springing from the edge of a peculiar notch, which probably serves as a hook for grasping the female (Pl. VI. figs. 11, 12).

The second antenna is the same in both sexes and consists of three joints (Pl. VI. figs. 2, 3). The second joint bears two small setæ in place of the external ramus, which is absent. I have seen one specimen in which this joint, in both limbs, bore a long blunt-pointed seta (Pl. VI. fig. 3). The distal joint is armed with five or six strong claws and a pair of setæ which spring from the same basis. One of these setæ has a bifurcated tip, and in some specimens there appears to be a hyaline prolongation with a bead at the end similar to the æsthetes of the antennæ of *Cladocera*.

The mouth-parts (text-fig. 1) consist, as in *Cylindropsyllus*, of three pairs of appendages only, the maxillipedes being absent. In *C. lævis* there are a pair of minute triangular plates behind the second pair of maxillæ which, as Prof. Sars suggests, may represent the maxillipedes, but there is no trace of them in *Horsiella*. The mandible consists of a large quadrangular base and a slender chewing part with three or four blunt teeth, no trace of an external ramus being found. The first maxilla has a two-jointed palp and a single broad terminal lobe armed with three teeth and a few spines. The second maxilla is two-jointed, the basal part bearing, in place of the usual setigerous lobes, a single finger-like process with a comb of minute hook-like spines. The second

joint carries two large spines reaching forward nearly to the mouth.

The mouth-parts are overhung by a large anterior lip with a toothed edge. I have not been able to detect the presence of a bilobed posterior lip as shown by Prof. Sars in *C. lævis*, but there is a delicate flap or epistome bounding the mouth anteriorly and fringed with short cilia.

The first four pairs of legs are of approximately the same structure in both sexes, consisting of an external branch of three joints and an inner two-jointed branch as long as the first two joints of the outer branch. The first pair (Pl. VI. fig. 4) is the shortest, and the succeeding pairs increase somewhat in length, the fourth being considerably longer than the first pair. The external branches of all legs are alike, except that the third and fourth pair bear an additional seta on the apical joint. The internal branch of the first pair is alike in both sexes. The first joint bears a long seta with a blunt point fringed with cilia, which, in its normal position, is directed forward, reaching nearly to the mouth. The distal joint bears a spine and a long seta. In the female the internal branches of the remaining swimming-legs are alike, but differ from the first pair in having the long sensory seta upon the base of the second joint and in having two apical setæ (Pl. VI. figs. 5, 6). In the male the apical setæ are as in the female, but, in place of the long basal seta of the second joint, the second and third legs have a peculiar sharply-pointed spine with a small barb (Pl. VI. fig. 9). The basal seta of the fourth leg is similar to that of the female, but longer and very much stouter (Pl. VI. fig. 10).

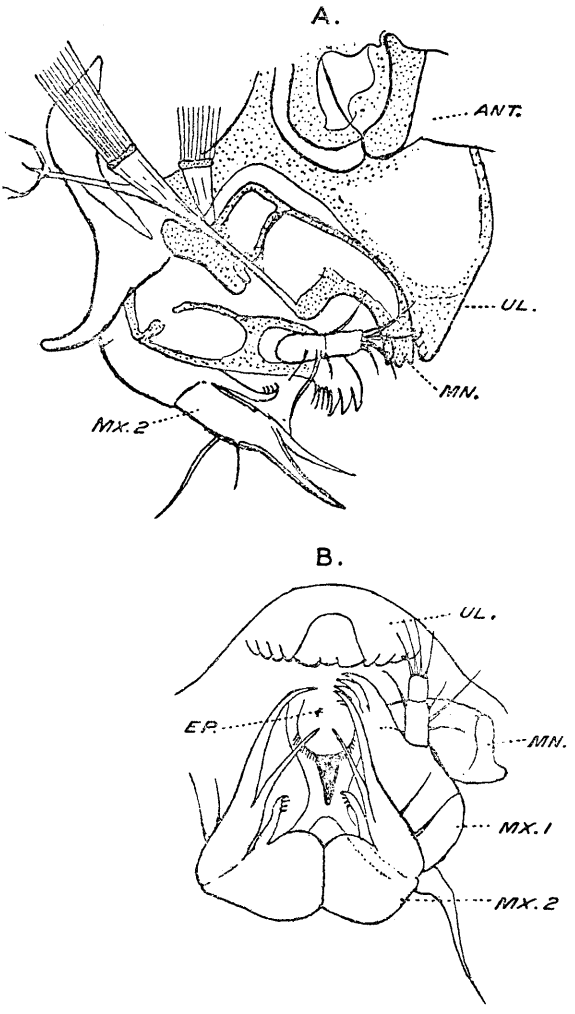
The fifth pair of legs in both sexes are minute knobs bearing two short spines in the female and four in the male (Pl. VI. figs. 7, 8).

I have not seen any female bearing egg-sacs, but on one occasion a female which had been kept alive for a few days was found to be carrying a single egg attached to the genital segment by a slender stalk. The egg was soon burst and flattened by the movements of the animal under the cover-glass.

Length. Female ·56 to ·65 mm.; male ·6 mm.

I owe the discovery of this species to Mr. D. J. Scourfield, who suggested to me that the submerged parts of dead *Scirpus* and *Typha* might harbour peculiar Entomostraca. The first specimen met with was found on July 14, 1919, in a small piece of dead *Typha* floating in Hickling Broad, and by squeezing such decayed stems, I have found that it is not

Fig. 1.



Mouth-parts: A, side view; B, ventral view.

UL., upper lip; *EP.*, epistome; *MN.*, mandible; *MX. 1*, first maxilla; *MX. 2*, second maxilla.

uncommon in Hickling Broad and Horsey Mere where the water is slightly brackish *. It is probably widely distributed in the Norfolk Broads District wherever there is a trace of salt in the water, since I have also found it in Barton Broad and in the River Ant below Irstead. It also occurs in Calthorpe Broad, which is a very small Broad, not connected with the river, in which the water is, I believe, quite fresh. I have failed to find it in Sutton, South Walsham, and Ranworth Broads.

Mr. Scourfield has sent me a sketch of an Harpacticid found by him at Littlehampton this year which undoubtedly belongs to this species, so that it is probable that it is generally distributed in brackish water wherever the vegetation provides a suitable habitat. I have found it in the decaying leaves of *Sparganium ramosum* and *Scirpus lacustris*, but it seems to prefer to live under the leaf-sheaths of the dead stems of *Typha angustifolia*. I have not hitherto been able to make any observations on its life-history, since I have only once seen an egg-bearing female and have met with only two immature individuals, both of these being in late Cyclopid stages. It seems probable that the eggs are not carried in egg-sacs, but are laid freely, and that possibly reproduction is mainly confined to the spring or early snmmer. Against this supposition is the fact that the males always have developed spermatophores in the vas deferens.

D'Arcythompsonia scotti, sp. n. (Pl. VII.)

Body similar in shape to *D. jairliensis*, Scott, with soft cuticle without markings. The anal operculum of the female is scarcely prominent and somewhat pointed, while that of the male, as in *D. fairliensis*, is deeply cleft and projects as a pair of conspicuous hooks (Pl. VII. fig. 10). The furcal rami in both sexes are tapering, not contracted at the end as in *D. fairliensis*, with a single large terminal seta which is not jointed as it is in *Cylindropsyllus lævis*. The second abdominal segment of the male has a median sucker-like projection on the dorsal surface, which appears to be crowned with a striated horseshoe-shaped membrane (Pl. VII. fig. 11).

The first antenna in both sexes consists of six joints, with no marked division between basal and distal parts, the large æsthete being borne by the third joint in the female and by the fourth in the male. In the latter the fourth joint

* The salinity is very variable, ranging from about 40 to over 70 grains of chlorine as chlorides per gallon.

is much dilated and deeply notched. The second antenna is three-jointed, the third joint bearing six strong spines and a single long spine-like seta (Pl. VII. fig. 1). The external ramus is reduced to a small knob bearing a single seta. The mouth-parts are as in *D. fairliensis*, consisting of mandibles, two pairs of maxillæ, and a pair of maxillipedes. The mandible bears a one-jointed palp with two setæ (Pl. VII. fig. 2). The maxillipedes are well developed and appear to agree with those of *D. fairliensis*, as figured by Prof. Sars.

The swimming-legs are almost the same in both sexes, and are less slender than in *D. fairliensis*. In the first pair (Pl. VII. fig. 3) the second basal joint bears a strong spine on its inner angle, which is absent from the succeeding legs. In the male (Pl. VII. fig. 4) this spine is curved and slightly barbed. The internal rami of all legs are two-jointed, nearly as long as the external branch, but they differ somewhat in the different legs in respect of the setæ borne by them. The internal rami of the third and fourth pairs of legs of the male differ from those of the female in having the inner spine of the second joint considerably longer, and in having a long spine springing from the middle of the first joint of the fourth leg in space of a short apical spine.

The fifth pair of legs are the same in both sexes, consisting of small knobs bearing each a small lateral seta and three terminal setæ of which the middle one is very small (Pl. VII. fig. 12).

Length. Female 1·15 and 1·3 mm.; male 1·2 and 1·45 mm.

The specimens described above form part of the Norman Collection in the British Museum (Natural History), and are labelled "*Cylindropsyllus lævis*, E. Loch Tarbert, Loch Fyne, 1886, T. Scott." (B.M. nos. 45248–252). I have to express my thanks to Dr. W. T. Calman and the authorities of the Museum for allowing me to examine them.

The species differs from *D. fairliensis* in the form of the furcal rami of the female, in the structure of the antennæ, and in certain details of the length and arrangement of the setæ of the swimming-legs.

EXPLANATION OF THE PLATES.

Plate V.

Horsiella brevicornis (Van Douwe).

Fig. 1. Female, ventral view.
Fig. 2. Male, dorsal view.
Fig. 3. Male, lateral view.

PLATE VI.

Horsiella brevicornis (Van Douwe).

Fig. 1. First antenna of female.
Fig. 2. Second antenna of female, seen from the inside (the setæ of the second joint are seen through).
Fig. 3. Second antenna of female, from outside.
Fig. 4. First leg of female.
Fig. 5. Second leg of female.
Fig. 6. Fourth leg of female.
Fig. 7. Fifth pair of legs of female.
Fig. 8. Fifth pair of legs of male.
Fig. 9. Internal ramus of second leg of male.
Fig. 10. Internal ramus of fourth leg of male.
Fig. 11. First antenna of male from the side.
Fig. 12. First antenna of male—last two joints seen from inside.

PLATE VII.

D'Arcythompsonia scotti, sp. n.

Fig. 1. Second antenna of male.
Fig. 2. Mandible palp.
Fig. 3. First leg of female.
Fig. 4. First leg of male (rather more magnified).
Fig. 5. Fourth leg of female.
Fig. 6. Last two joints of external branch of third leg of female.
Fig. 7. Second leg of male.
Fig. 8. Fourth leg of male.
Fig. 9. Last abdominal segment and furca of female.
Fig. 10. Operculum and furcal ramus of male.
Fig. 11. Protuberance of dorsal side of second abdominal segment of male. Seen from side.
Fig. 12. Fifth leg of female.
Fig. 13. Second leg of female.

XV.—*The Generic Positions of* "Mus" nigricauda, *Thos.*, *and* woosnami, *Schwann.* By OLDFIELD THOMAS.

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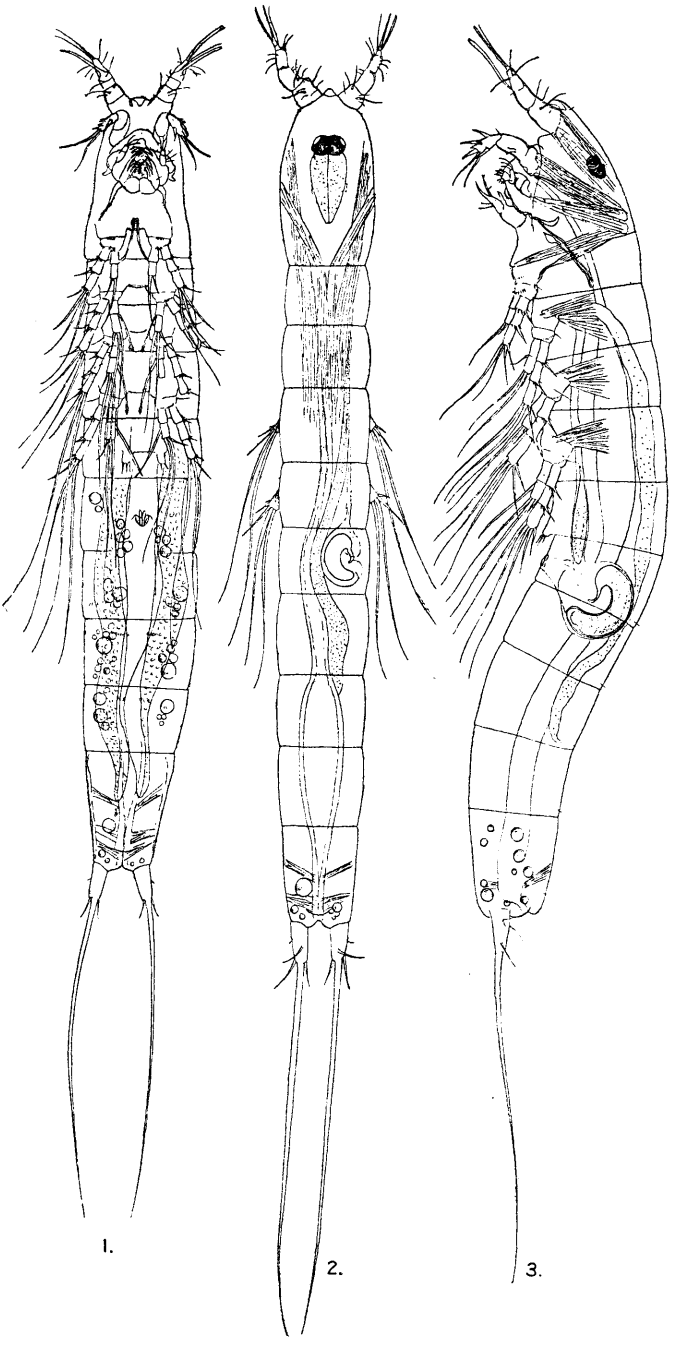
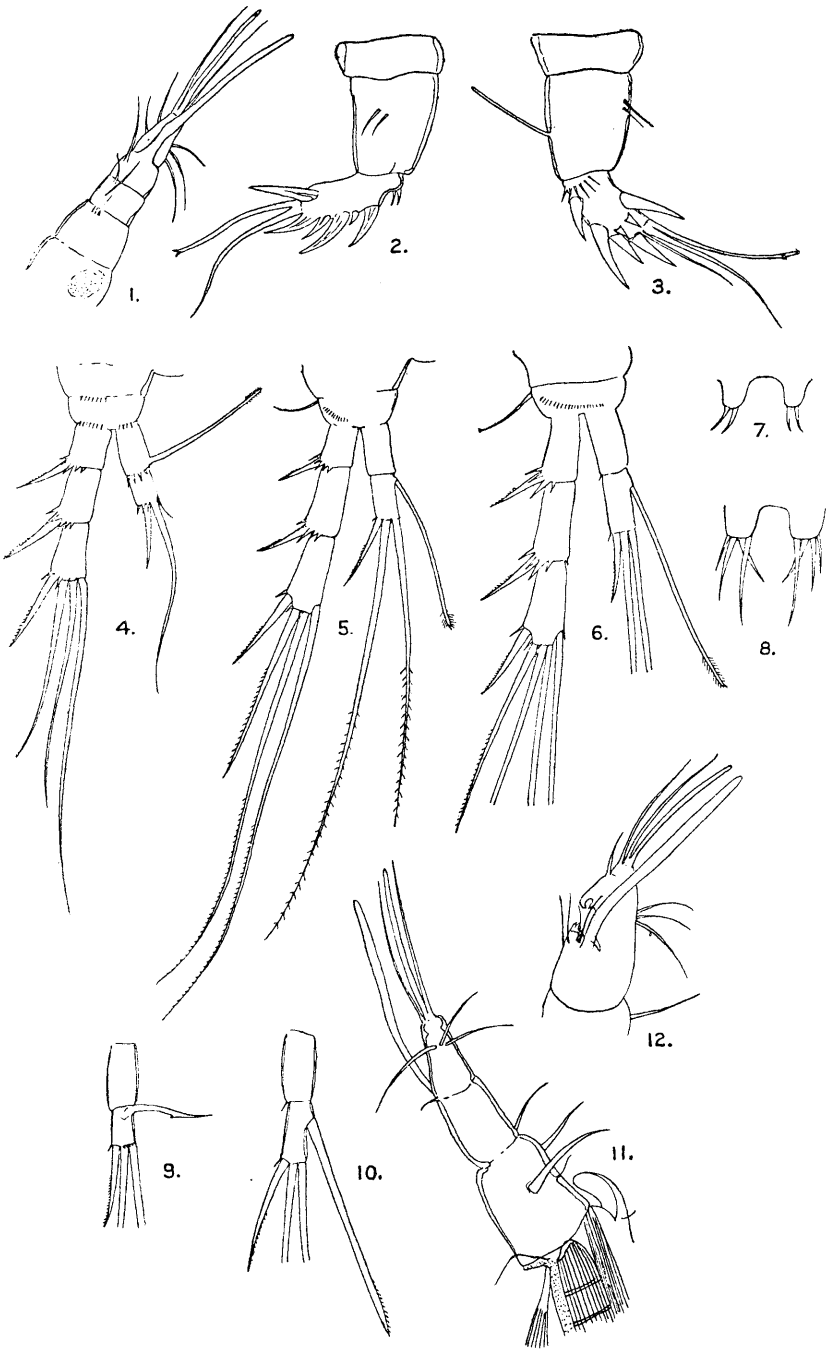
WHEN dividing, some years ago *, the African members of what is now called *Rattus* into subgenera, I only dealt with the large and prominent groups of species, leaving isolated forms for further consideration. My attention has now, however, been called to a species which was one of the first I ever described †, "*Mus nigricauda*," based on a single Namaqualand specimen that has more recently been reinforced by a number collected by Dr. Ansorge and Mr.

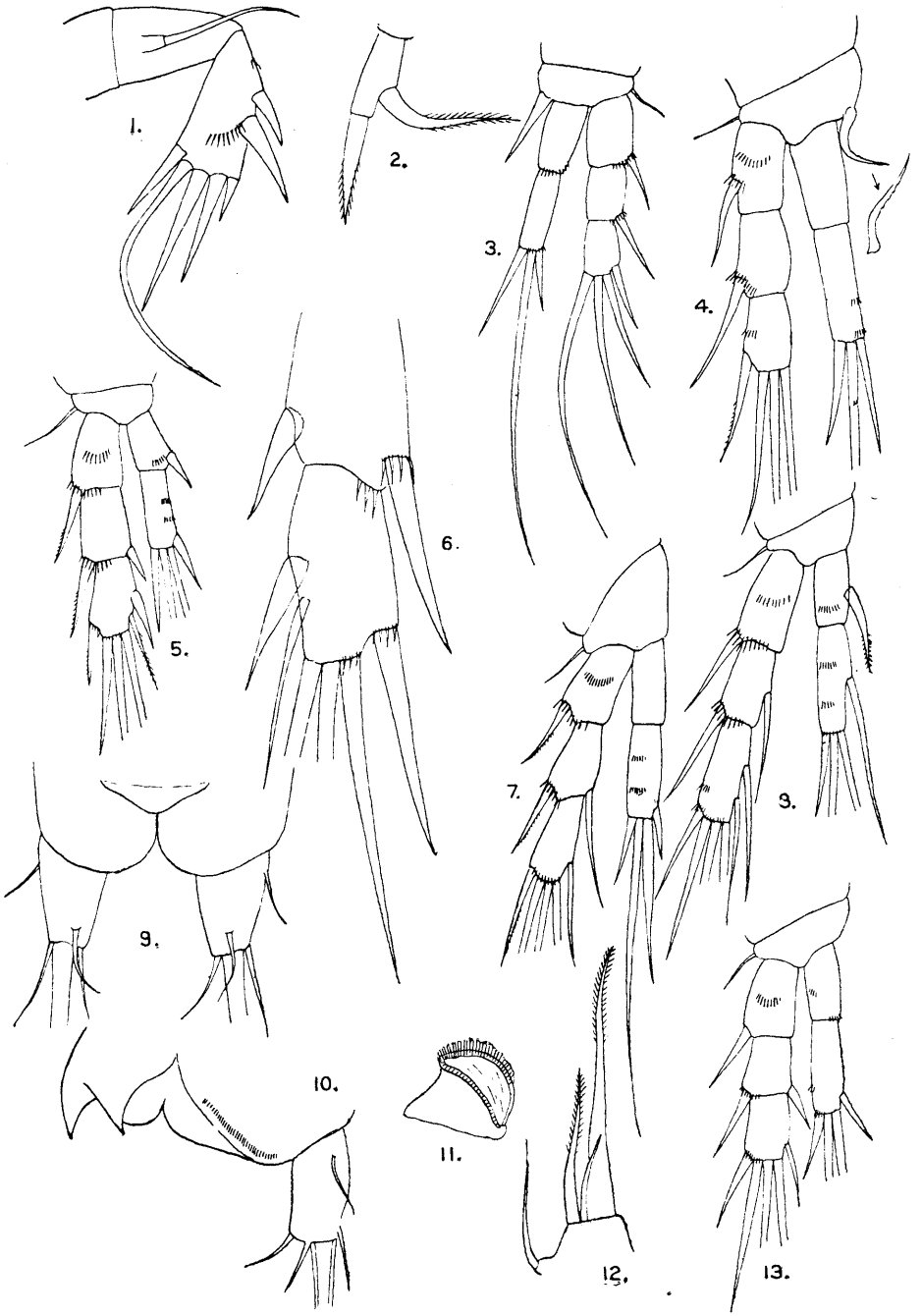
* Ann. & Mag. N. H. (8) xvi. p. 477 (1915).
† P. Z. S. 1882, p. 266, pl. xiv. fig. 1.



Horsiella brevicornis (Van Douwe).



Horsiella brevicornis (Van Douwe).



D'Arcythompsonia scotti, sp. n.