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Some Terrestrial Isopoda from New Zealand and Tasmania, with Description of a New Genus.

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(Plates 36 & 37.)

[Read 7th May, 1914.]

In this paper I establish a new genus for two New Zealand species of terrestrial Isopoda. Both have been already described and provisionally placed under the genus *Haplophthalmus*, to which the new genus seems closely allied, but additional specimens recently obtained have permitted a fuller investigation of them than was previously possible.

I also include descriptions of a new species of *Haplophthalmus* from Tasmania, and of a new species of *Cubaris* from Auckland, New Zealand. In both cases I have only a single specimen, and I have waited for several years in the hope of obtaining others, but as no further specimens have been obtained, and as the species seem to be well characterized and likely to be easily recognized, I now venture to describe them.

Family Trichoniscidæ.

In 1901 I described a new terrestrial Isopod from Greymouth, New Zealand, under the name *Haplophthalmus helmsii*, though I pointed out at the time that it differed from that genus as described by Sars (1898, p. 166) in having the first *three* (instead of *two*) segments of the pleon small and without lateral expansions. In 1909 I described from Campbell Island, lying to the south of New Zealand, another species, *H. australis*, which also differed in this respect from the generic characters, and I stated that a new genus would probably have to be established for these two species, though, as the material at my disposal was small, I postponed doing so at the time.

I have recently received from Mr. T. Hall several specimens collected at Mt. Algidus, Rakaia Gorge, Canterbury, of an Isopod which at first appeared distinct from both of those mentioned above, though agreeing with them in the character referred to. I had commenced to describe this as a new species and had drawn up a diagnosis for a new genus to include these forms. Further investigation, however, has shown that these specimens are not really distinct from *Haplophthalmus helmsii*, and that the characters that appeared to distinguish them are due to the greater development of the dorsal tubercles or crests in the larger and older specimens; *H. helmsii* was

described from a single small immature specimen. I therefore give a fuller description both of this and of *H. australis*, and place them under a new genus *Notoniscus*. This may be described as follows :—

Notoniscus, nov. gen.

Generic characters :—Body oblong, central portion moderately convex, dorsal surface sculptured and bearing ridges or tubercles. Head with the front triangularly produced, lateral lobes directed downwards, rather small, with extremity subacute. Side plates of body lamellarly expanded, projecting almost horizontally, discontiguous. Pleon not abruptly contracted, epimeral plates of the three anterior segments very small or absent, those of the 4th and 5th segments well developed, lamellar; last segment with truncate posterior margin. Eyes small, but with more than one visual element ; antennules, antennæ, and mouth-parts as in *Trichoniscus*. Legs rather short, not increasing much in length posteriorly ; dactylar seta as in *Trichoniscus*. Uropoda with rami rather widely separated, subequal.

This genus seems near to *Haplophthalmus*, but differs in the character of the eyes and in the fact that the first *three* segments of the pleon have the epimeral plates very small or absent.

The genus so far as at present known is confined to New Zealand and the adjacent islands and contains two species which may be distinguished as follows :—

1. Body oblong-oval, with well marked ridges or tubercles . *N. helmsii.*
2. Body oval, with indistinct tubercles . . . . . *N. australis.*

Notoniscus helmsii (*Chilton*). (Pl. 36. figs 1–8.)

Haplophthalmus helmsii, Chilton, 1901, p. 119, pl. 12. fig. 3.
" " Chilton, 1910, p. 288.

Specific characters :—Body oblong-oval, about half as broad as long, moderately convex, central portion raised somewhat abruptly above the epimeral portions, which are well developed, nearly horizontal and widely separated. Head with the dorsal surface bearing posteriorly two prominent tubercles or short ridges projecting upwards and a little forwards, anterior to these are smaller tubercles; the front triangularly produced and somewhat rounded; lateral lobes rather small with extremities subacute, projecting downwards below the raised central portion of the head. Dorsal surface of the body sculptured, each segment with a short ridge or tubercle situated laterally near the outer border of central portion and running obliquely backwards and outwards; on the three posterior segments the tubercles gradually become more distinct and pointed, projecting backwards a little

over the succeeding segments; on the four anterior segments there is a smaller and usually less-marked ridge or tubercle internal to the one already described and parallel to it; on all the segments are slight indications of other tubercles or sculpturings. Pleon not much narrower than the peræon, surface smooth; first two segments small and without epimeral plates, third segment with very small epimeral plates, the fourth and fifth segments with epimeral plates largely developed, lamellar, the last epimeral plates reaching more than half way to the end of the terminal segment; last segment short, broader than long, truncate at the apex.

Eyes small, situated on a slightly rounded prominence above the lateral lobes, containing three ocelli. Antennæ short, hardly one-fourth the length of the body; fourth joint of peduncle slightly expanded on outer side, shorter than the fifth which is narrowed at the base, all with appressed scales and short setæ, one or two longer setæ on the fifth joint; flagellum as long as the fourth joint, containing 3 or 4 subequal joints and ending in a pencil of long setæ. Legs all short and rather stout, not visible in dorsal view, apparently not showing secondary sexual characters in the male. Uropoda short, base large and broad, its outer margin expanded and strongly convex; inner ramus slightly longer and more slender than the outer, arising anteriorly to it but reaching as far backwards.

Length of largest specimen, 8 mm.

Colour. General surface light brown with markings of darker brown.

Habitat. Greymouth, one specimen (*R. Helms*); Mt. Algidus, Rakaia Gorge, several specimens (*T. Hall*).

This species was originally described from a single small specimen found at Greymouth by Mr. R. Helms. The tubercles or ridges on its surface are much less marked than in the larger specimens more recently collected by Mr. T. Hall at Mt. Algidus. It is difficult to represent accurately the appearance of the dorsal surface of an animal such as this, and in my original figure (1901, pl. 12. fig. 3) the ridges are less conspicuous than they should be even for the type-specimen which is there represented; on the other hand the figure which I now give, drawn for me by Mr. B. Broadhead from a larger and more adult specimen, perhaps errs in the other direction of making the ridges or tubercles appear somewhat too prominent. Smaller specimens from Mt. Algidus closely resemble the type-specimen, and I have no doubt that we are dealing with one species only, in which the ridges on the dorsal surfaces become more prominent in the older specimens, and, particularly in the posterior segments, project from the general surface as well-marked, somewhat pointed tubercles.

General description:—The antennæ (fig. 2) have already been sufficiently described, the expansion of the fourth segment of the peduncle is less marked in the older specimens than it was in the type-specimen; in the type the

flagellum consists of three joints, in other specimens it seems usually to contain four.

The mouth-parts show on the whole a pretty close resemblance to those found in species of *Trichoniscus* and are almost the same as those of the next species which are described in greater detail, it will therefore be only necessary here to mention one point of difference; in the maxillipeds (figs. 3 & 4) the epipod is widened at the base and narrows distally, and thus looks somewhat different in shape from that of *N. australis*.

The legs (fig. 5) are all short and of about equal length; they are all somewhat stout, the basal joint is rather broad and has a slight depression on its outer surface to receive the more distal joints when folded back upon it; the carpus is broad and bears few setæ, one towards the distal end being much longer than the others; the propod is much narrower than the carpus and tapers towards its distal end, the outer surface is thickly fringed, especially on the distal half, with fine rather long setæ, while the inner margin bears only one or two stout setæ situated about the middle of the margin; the dactyl is long and slender and bears numerous strongly curved setæ near the base, from which also arises the long dactylar seta which projects a little beyond the end of the dactyl itself, and is of the same general character as in species of *Trichoniscus*.

The pleopoda are also of the same general type as in *Trichoniscus* and the first and second pairs are specially modified in the male. In the first pleopod (fig. 6) the outer branch forms a delicate plate with curved outer margin and minute crenulations at the distal end, the inner plate forms a narrow stout process bearing at the end an extremely long, sharp style; the median organ is broad, expanding towards its distal end, which is deeply emarginate with a small nodule in the centre of the emargination, the basal part seems somewhat strongly chitinized but the extremity appears thin and membranous with a wrinkled appearance. The second pleopoda (fig. 7) have the outer plate lamellar and of the usual shape, the inner branch being modified into a strong biarticulate, cylindrical copulatory organ of nearly the same width throughout its length except towards the end which narrows abruptly; along its inner side there runs a narrow groove which curves upwards towards the end.

The 3rd, 4th, and 5th pleopoda are similar to those of *N. australis* and consist of an outer opercular plate and a smaller inner branchial plate, the branchial plate apparently becoming smaller in proportion to the opercular one in the more posterior pleopoda.

The uropoda (fig. 8) have the basal joint expanded outwardly with strongly convex margin, the two rami are somewhat widely separated, the inner one being slightly the longer and more slender.

In the female I have not succeeded in finding the first pleopoda, they are

probably small as in *Haplophthalmus*. The second pleopod has the inner branch slender, much longer than the outer, tapering, and with the distal portion marked with fine transverse lines apparently due to transverse rows of very minute setæ. The third, fourth, and fifth pleopoda are similar to those of the male.

NOTONISCUS AUSTRALIS (*Chilton*). (Pl. **36**. figs. 9–16, and Pl. **37**. figs. 17–22.)

Haplophthalmns australis, Chilton, 1909, p. 662.
" " Chilton, 1910, p. 288.

Specific description:—Body oval, greatest breadth in the 3rd and 4th segments of peræon, where it is about half the total length; central portion of body moderately convex; epimeral plates large, projecting horizontally, rather widely separated. Head with two small rounded tubercles about the centre and an indistinct obliquely longitudinal ridge on each side, the front triangularly rounded; lateral lobes small, depressed, with extremities subacute. Dorsal surface of peræon sculptured, each segment with a number of rounded or irregular tubercles arranged so as to form a fairly well-marked median ridge and one or two less distinct lateral ridges; the tubercles becoming more indistinct on the posterior segments. Surface of pleon smooth, first three segments short, first two quite without epimeral expansion, the third with very small epimera, fourth and fifth with moderately expanded epimera; terminal segment broad with straight posterior margin.

Eyes with three ocelli. Antennæ rather slender, the 4th joint of peduncle not expanded, slightly longer than the two preceding combined, and rather shorter than the 5th; flagellum about as long as the fifth joint, containing four or five subequal joints, the last tipped with a pencil of long setæ; whole antenna covered with fine short setæ, a stouter seta at the end of each of segments 2, 3, 4, and 5 of peduncle. Legs short, subequal, not visible in dorsal view; no secondary sexual characters observed. Uropoda with the base not greatly expanded, its outer margin straight or only slightly convex; rami subequal, the inner one slightly more slender than the outer, both covered with fine setæ and bearing long setæ at the extremities.

Length 6 mm.

Colour. Light brown.

Habitat. Campbell Island, on decaying wood and at roots of plants (*C. Chilton* and Messrs. *Chambers* and *Des Barres*).

This species, though closely allied to the preceding, appears to be distinguished from it by the more oval shape of the body, the less marked ridges or sculpturings of the dorsal surface, the more slender antennæ, and

less well-marked expansions of the epimera of the third and fourth pleon segments and of the base of the uropoda.

Campbell Island lies about 400 miles to the south-west of New Zealand, and the existence on it of this terrestrial Isopod so nearly allied to the species on the mainland is additional evidence that the island was formerly directly connected with New Zealand. No species of *Notoniscus* has yet been recorded from the Auckland Islands which lie between Campbell Island and the mainland, but probably *N. australis* or a closely allied species will be found to occur there.

General description :—As the mouth-parts and other organs of this species have been investigated more fully than those of *N. helmsii*, it will be convenient to give a more detailed description than was done for that species.

The *antennules* (Pl. **36**. fig. 10) are small, consisting of the usual three joints, the first of which is much the largest, it is more than twice as long as the second and a little longer than the third, which is much narrower than the second and bears at the end one or two minute spinules.

The *antennæ* (fig. 11) hardly require any description beyond that already given.

The *upper lip* (fig. 12) is of the usual shape, quadrangular, narrowing somewhat distally and with the free margin convex and fringed in the centre with very minute setæ.

In the *mandibles* the right and left pairs differ in the character of the accessory appendage. The right mandible (fig. 14) has the main cutting-edge divided into three prominent teeth; the accessory appendage is somewhat cylindrical, curved, and has the apex rounded and bordered with a circular row of stout setæ closely set together, at its base arises a single long fringed seta; the molar tubercle is of the usual form. In the left mandible (fig. 13) the main cutting-edge contains three or four strongly chitinized teeth; the accessory appendage is similar in appearance to the main cutting-edge and it is divided into three similar teeth; at its base and between it and the molar tubercle arise two long fringed setæ.

The *lower lip* is deeply cleft, each lateral lobe with outer margin strongly convex and fringed with minute setæ arranged in small tufts or very short transverse rows; the whole of the extremity and the inner margin of each lobe is fringed with numerous fine, fairly long setæ. There is apparently a median portion to the lower lip somewhat similar to that described by Racovitza (1907 and 1908) for some species of *Trichoniscus* and allied genera, but it is very delicate and I have not made it out with certainty in the single specimen that I was able to dissect.

The *first maxilla* (fig. 17) has the two lobes of the usual form and of about equal length, the outer being as usual much the broader; nearly the whole of its outer margin is fringed with short transverse rows of small setæ, its

extremity bears about eight or nine strongly curved teeth of the usual character and there are a few fine setæ on the distal portion of the inner margin ; the inner lobe bears at the end the usual three plumose setæ of unequal length, the most distal one being the smallest, a few minute setæ are found near its base at the apex of the lobe.

The *second maxilla* (fig. 16) has a few long slender setæ at the base of the inner margin ; the apex is indistinctly divided into the usual two lobes, the outer one being much the smaller, the whole of the inner lobe is thickly covered with rather stout short curved setæ ; more delicate setæ are present on the outer lobe and on the distal part of the outer margin of the maxilla.

The *maxillipeds* (fig. 18) are of the usual form ; the epipod is about half as long as the broadly expanded second joint, it is rounded at the extremity, which bears a few very delicate setæ, and it is slightly narrower near the base where both margins are fringed with fine setæ ; the broadly expanded second joint is about twice as long as broad, the very convex outer margin is regularly fringed in its distal half by long delicate setæ, and the whole of the inner margin is fringed with slightly stouter setæ. The palp portion is formed of a single piece with setæ of different kinds arranged so as to indicate faintly the separate joints which it represents ; at the apex of the masticatory appendix or inner lobe is a small conical portion bearing three or four circlets of minute setæ.

The *legs* are slightly longer and more slender than those of *N. helmsii* and of the same general character, they do not increase in length posteriorly, and I have not observed any secondary sexual characters in connection with them. Plate **37.** fig. 19 represents a leg of the first pair ; the setæ on the merus and carpus are more numerous than those in the corresponding positions in *N. helmsii*, and on the inner margin of the propod are three fairly stout setæ placed at regular intervals along its length ; the propod is slender, narrowing considerably towards the extremity, and on its lateral surface about the middle there is a small area thickly covered with short minute setæ ; this patch of setæ, however, does not appear to be present in the other legs.

In the *pleopoda* I have not made out the first pair in the female, they are probably small as in species of *Haplophthalmus* ; the second pair has the form represented in fig. 20, having the inner branch long, narrow, tapering to the end, which is marked with fine transverse lines which appear to be formed of minute transverse rows of setæ. I had originally described this as the pleopod of a male specimen ; it corresponds, however, to the second pleopoda of the females of some species of *Trichoniscus* and allied genera. I have only a small number of specimens of this species and have not found a male among them. The third (fig. 21), fourth, and fifth pleopoda have the same general character as in *N. helmsii*.

The *uropoda* (fig. 22) are rather more slender and elongated than in *N. helmsii* and the basal portion is not so expanded as in that species, its outer margin being almost straight ; the two rami are of about equal length, the inner one, however, being slightly more slender.

HAPLOPHTHALMUS TASMANICUS, sp. nov. (Pl. **37.** fig. 23.)

Specific characters :—Body oblong oval, rather convex ; epimera of segments of peræon not much produced and projecting more or less downwards, nearly contiguous ; dorsal surface of each segment of the peræon with about six tubercles or ridges arranged so that they form longitudinal ridges along the peræon, the middle pair lying near the median line and the others more laterally ; the outermost ridges less distinct than the others. Surface of pleon nearly smooth, first two segments short and without lateral expansions; the third, fourth, and fifth with moderately large expansions.

The head with surface irregularly tuberculate and roughened, produced in front into a bilobed tubercle. Lateral lobes small and not projecting far from head.

Eyes with three ocelli.

Antennæ short; flagellum as long as last joint of peduncle, indistinctly 3- or 4-jointed.

Legs all short, not seen in dorsal view. Uropoda short, the two branches subequal.

Length 5 mm. Width 2 mm.

Colour. Dark brown.

Habitat. Under rotten logs, Fern Tree Gully, Hobart, Tasmania; collected by Dr. Dendy in 1889. I have only a single specimen.

In the sculpturing of the dorsal surface this species appears to be near to *H. mengii* (Zaddach), but in that species there is a pair of prominent ridges on the third segment of the pleon and the longitudinal ribs on the peræon seem rather better marked.

As I have only the one specimen of this species I have not dissected it to examine the mouth-parts ; the legs appear to be all of about equal length and of the usual character.

I have placed the species under *Haplophthalmus* as it seems to come near to that genus ; it differs, however, from the description given by Sars in having the eyes not simple but composed of three ocelli, and the segments of the peræon are not discontiguous laterally.

Family ONISCIDÆ.

CUBARIS SUTERI, sp. nov. (Pl. **37**. figs. 24–28.)

Specific description :—Oblong oval, breadth rather more than half the length; epimeral portions fairly well developed especially in the first segment of peræon; central portion of each segment very convex, sculptured, and produced into transverse crests. Head with the anterior margin turned upwards into a well-defined ridge which is without a notch in the centre, behind this is a slight depression followed by an irregular transverse ridge in front of the hind margin. First segment of peræon with epimeral portion large, projecting almost horizontally, produced anteriorly almost as far as the antero-lateral angle of the head ; each segment of peræon with its posterior margin produced dorsally upwards into a vertical ridge extending transversely throughout the whole of the central portion ; this ridge becomes better marked in the more posterior segments until in the seventh segment it forms a distinct well-marked flange on the central portion of the segment with its upper margin depressed in the centre and its lateral angles rounded ; in front of the posterior ridge of each segment there is a number of small tubercles on each side of the median line ; on the more posterior segments these are better marked and end more acutely ; on the anterior segments they are more rounded. The inferior margin of first segment of peræon (fig. 26) is deeply cleft posteriorly for reception of the succeeding segment, and the inferior margin of the second segment bears a well-marked tubercle on its inner surface enclosing a notch for the reception of the succeeding segment. Pleon (fig. 25) almost smooth, epimeral portions well developed, projecting almost horizontally ; last segment of usual shape, its posterior margin slightly concave.

Eyes of moderate size, composed of numerous facets. Antennæ (fig. 27) normal, minutely setose ; flagellum much shorter than terminal joint of peduncle, its first joint about one-fourth the length of the second. External ramus of the uropoda very small, inserted in a small notch on the inner margin of the expanded base, not visible from below ; internal ramus very small and short forming a small knob, hardly projecting from the base (see fig. 28).

Length. About 8 mm.

Colour. Light brown, nearly the whole of the body being covered with marblings of a darker brown.

Habitat. Henderson, Auckland, a single specimen (*H. Suter*).

This species, of which I have only the single specimen, can readily be distinguished from all other New Zealand species by the sculpturings on the dorsal surface. The only other one known with sculpturings at all similar

is *Cubaris hamiltoni* (Chilton) (1901, p. 148) *, but in that species the ridges and flanges are far more numerous and are differently arranged.

The fact that both these specimens are known from single specimens only shows how incomplete our knowledge of the terrestrial Isopoda of New Zealand still is. Probably a careful survey, especially in the forests of the North Island, would bring to light several other interesting species.

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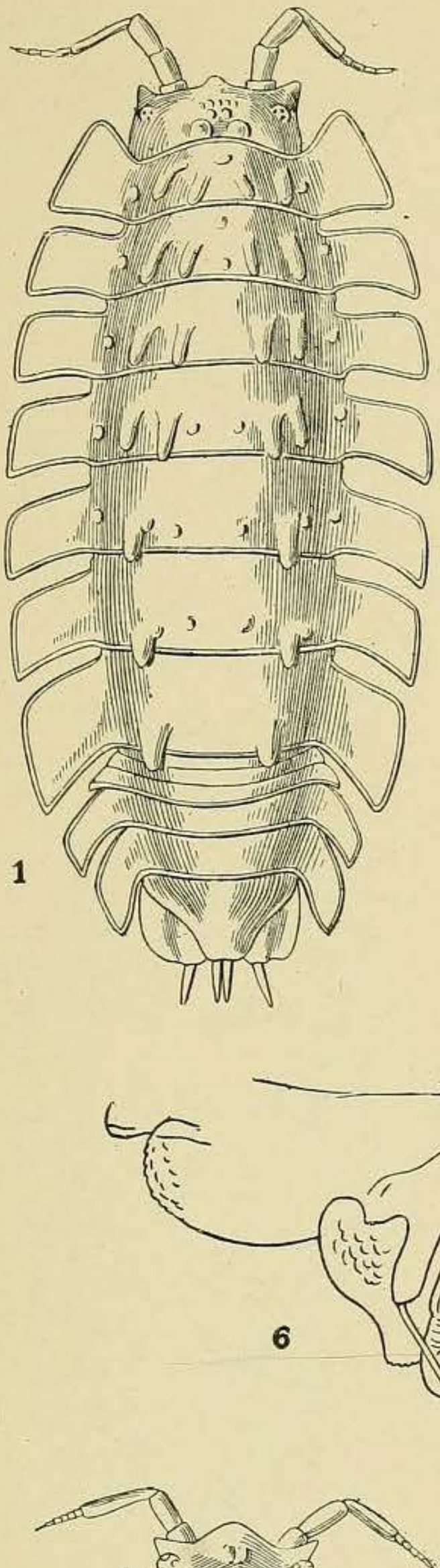
EXPLANATION OF THE PLATES.

PLATE 36.

Fig. 1. *Notoniscus helmsii* (Chilton); dorsal view, × about 10.
2. „ „ antenna.
3. „ „ maxilliped.
4. „ „ extremity of maxilliped, more highly magnified.
5. „ „ first leg.
6. „ „ first pleopod of male.
7. „ „ second pleopod of male.
8. „ „ uropod.
9. *Notoniscus australis* (Chilton); dorsal view, × about 12.
10. „ „ antennule.
11. „ „ antenna.
12. „ „ upper lip.
13. „ „ left mandible.
14. „ „ right mandible.
15. „ „ lower lip.
16. „ „ second maxilla.

* See also G. M. Thomson (1893, p. 225).



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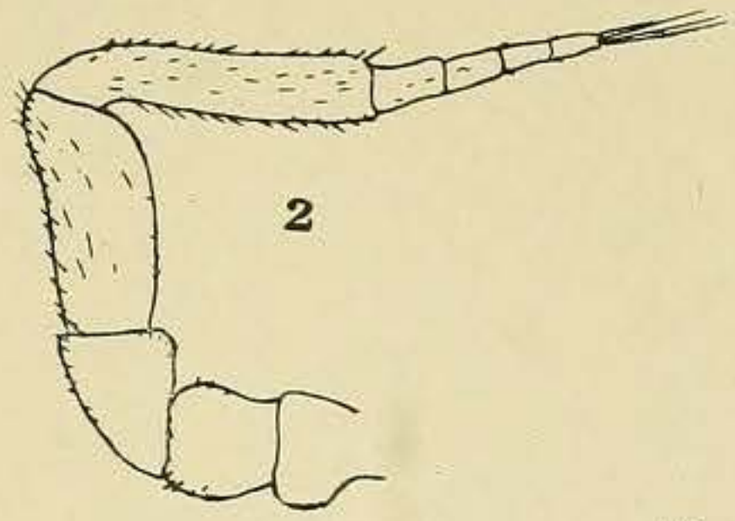

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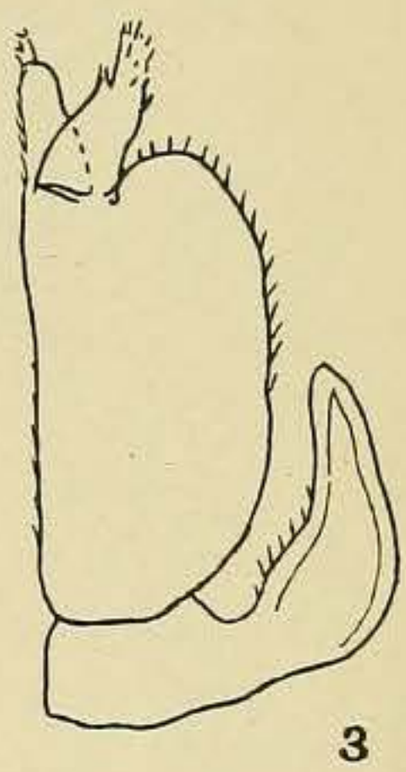

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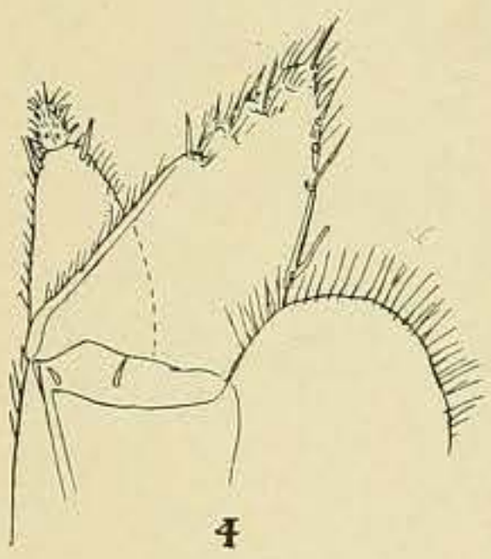

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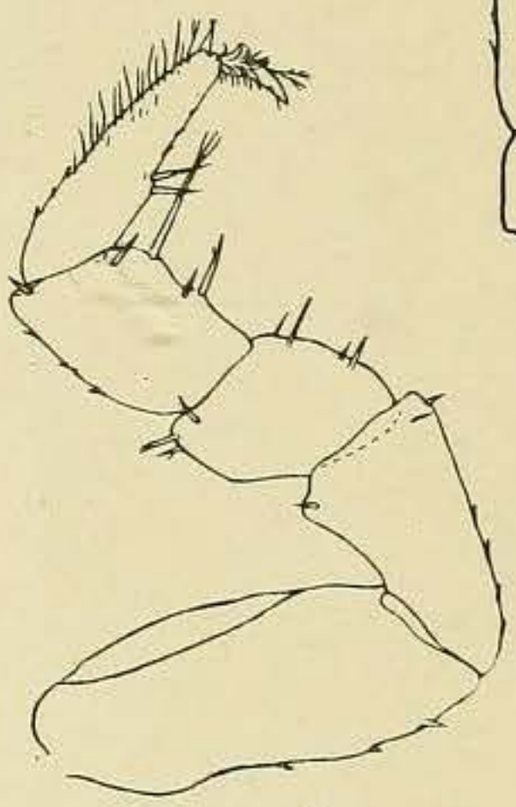

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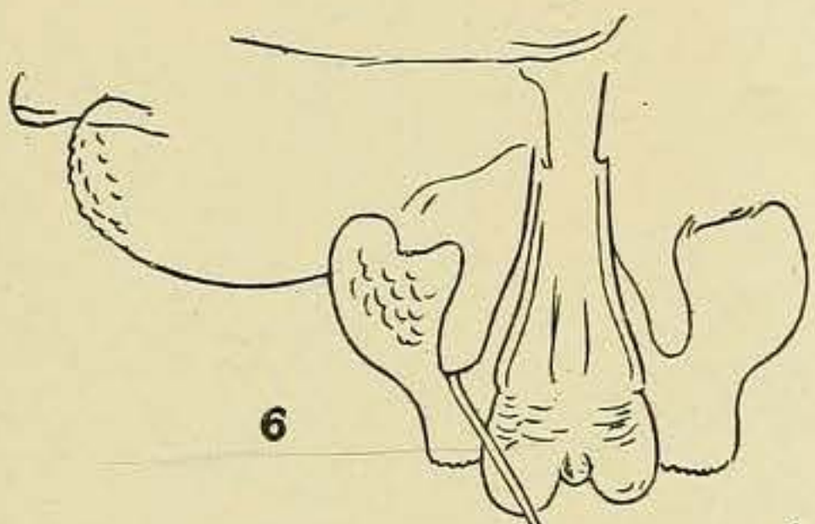

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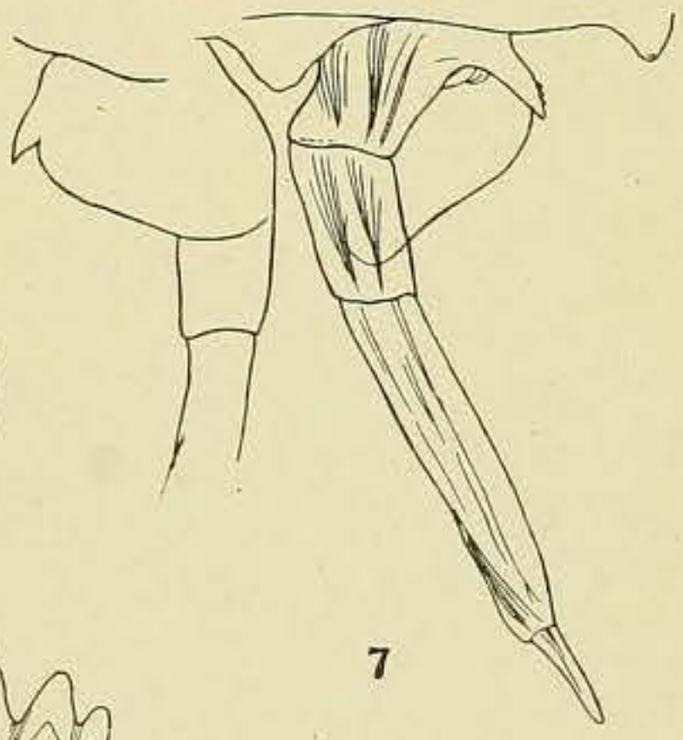

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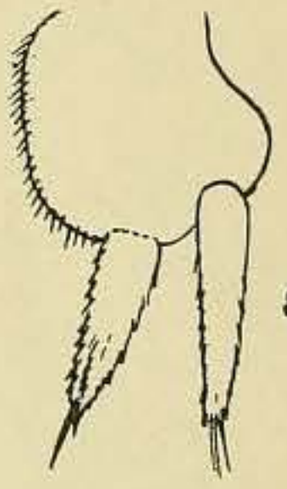

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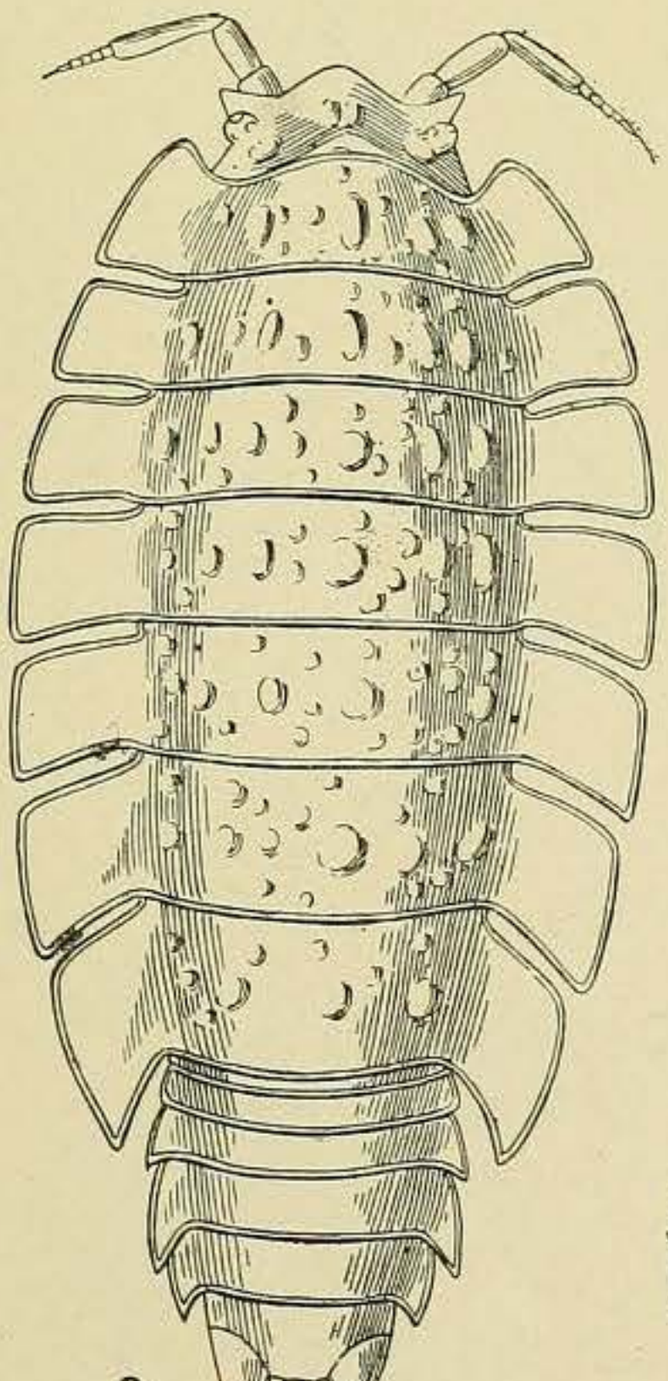

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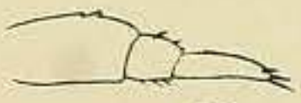

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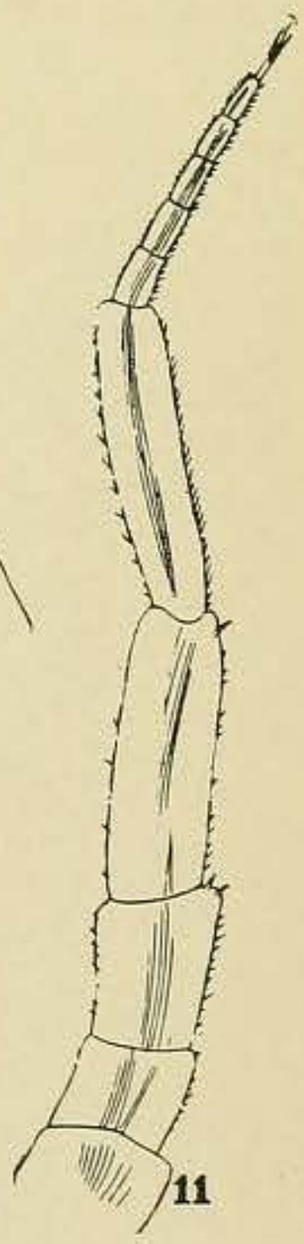

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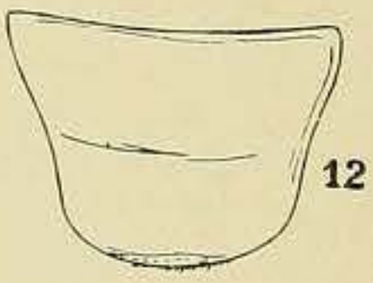

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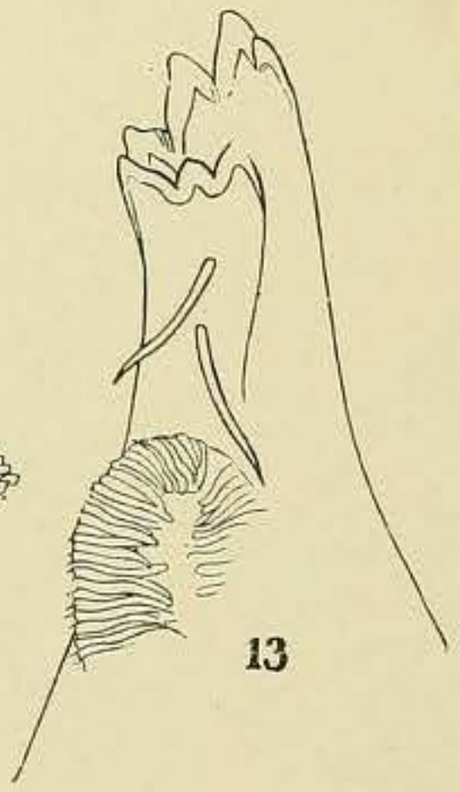

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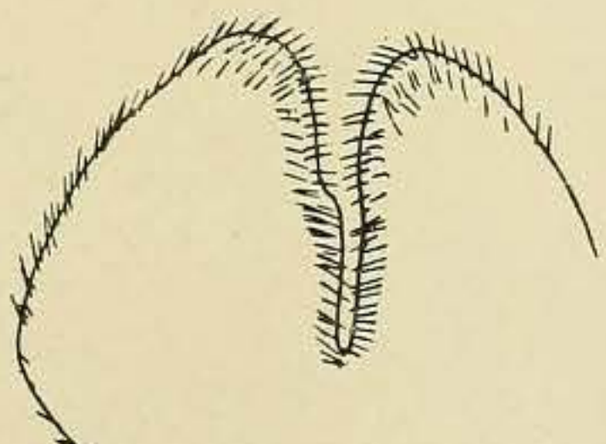

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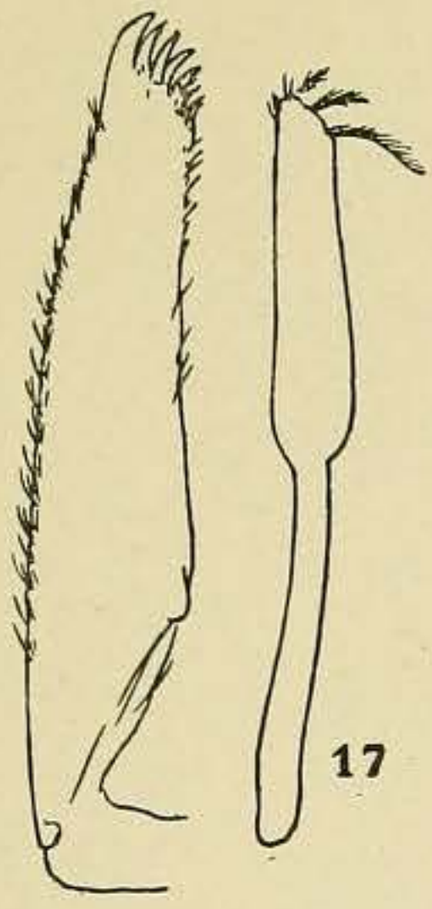
TERRESTRIAL ISOPODA.



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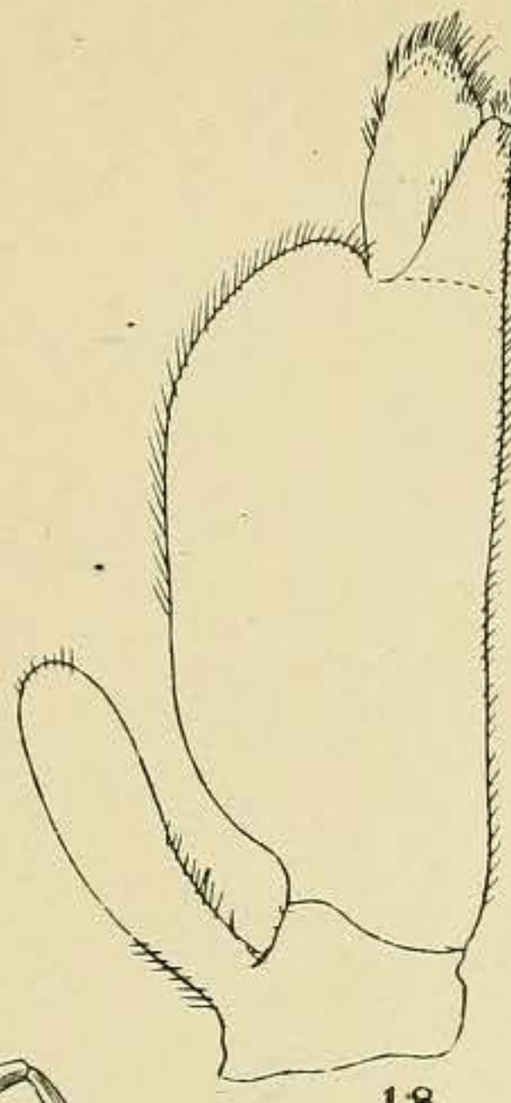

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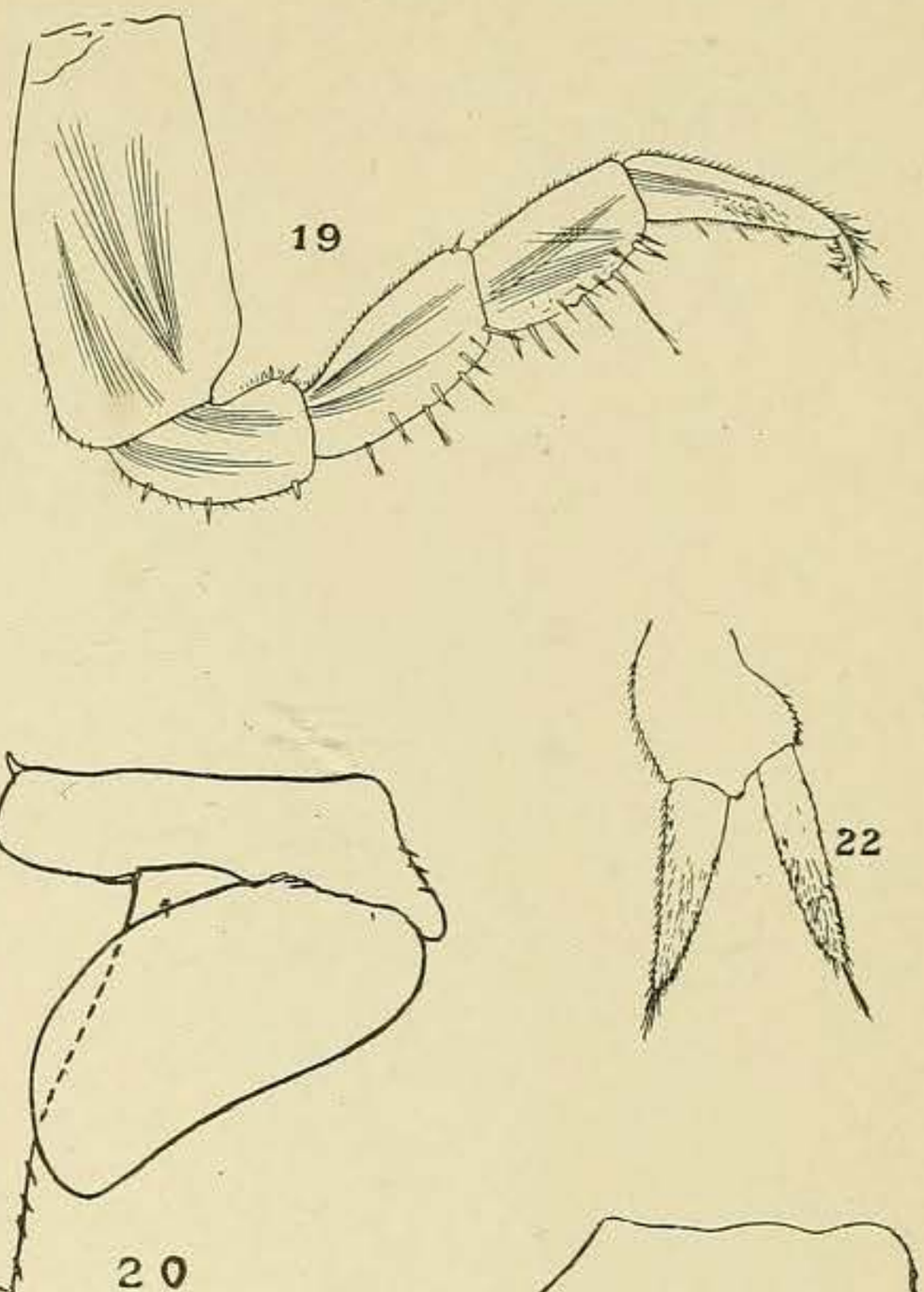

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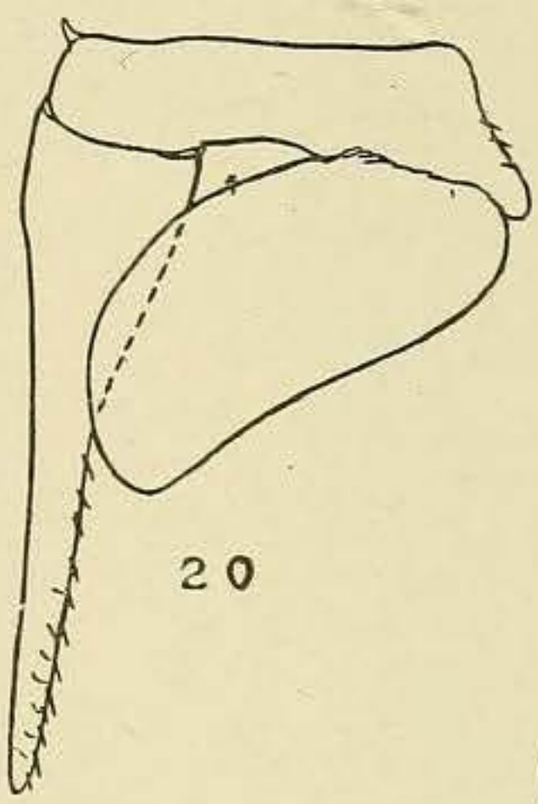

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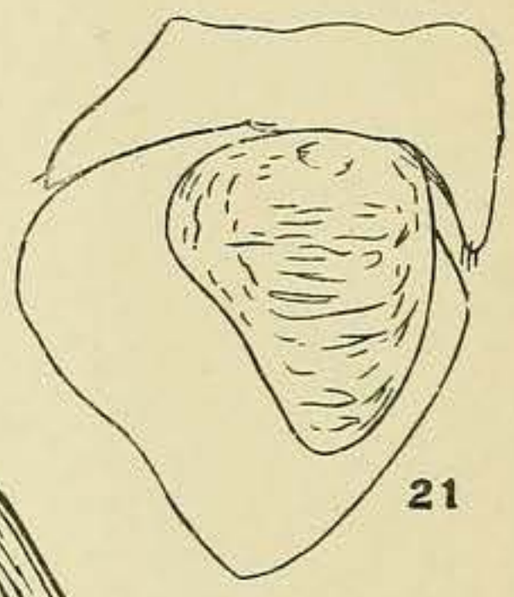

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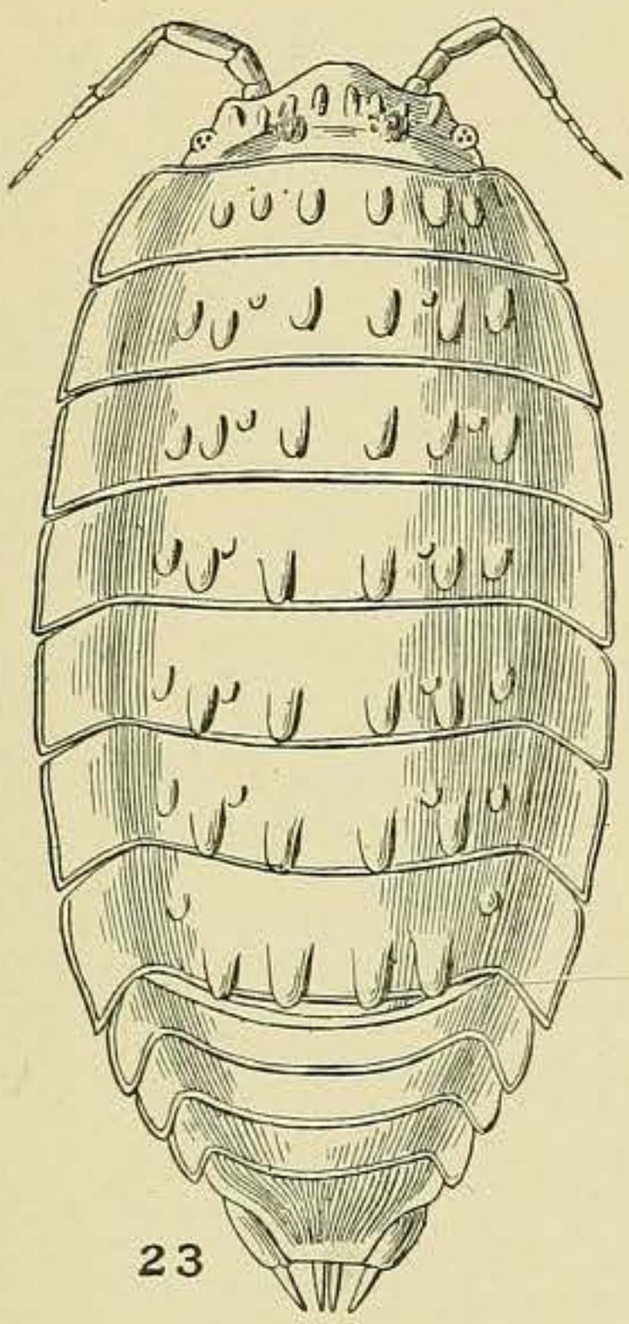

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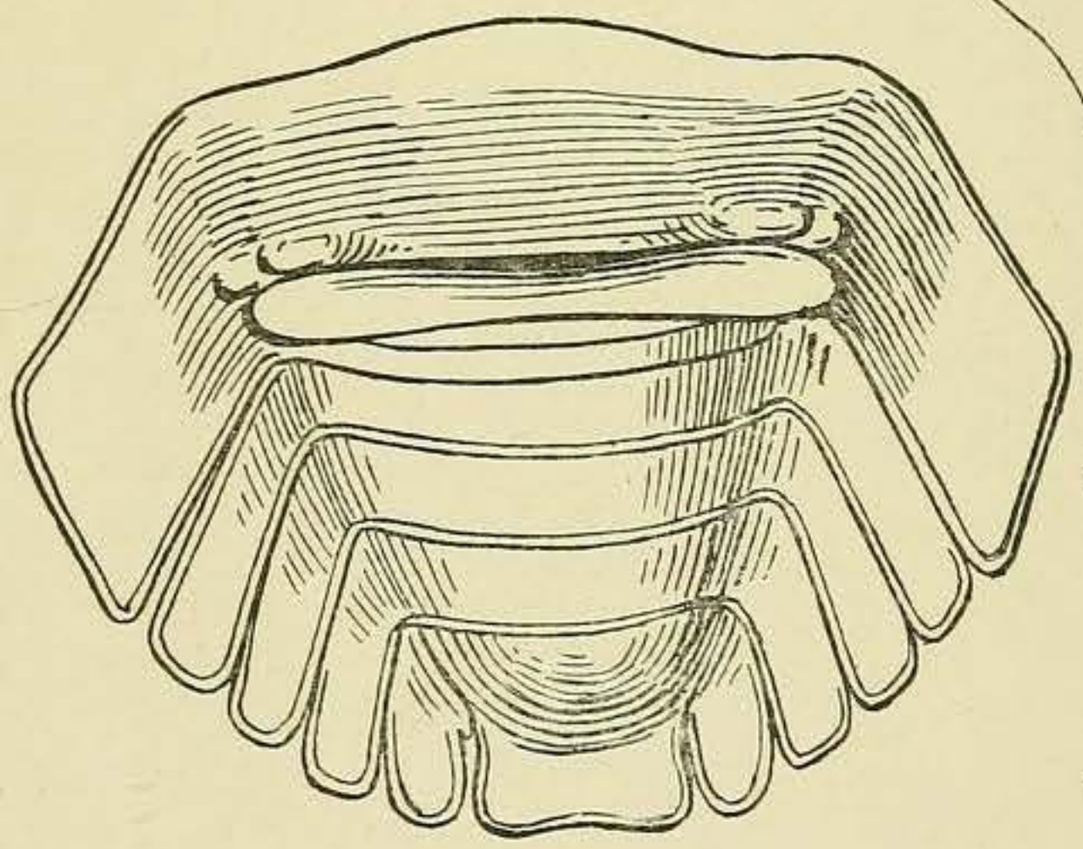

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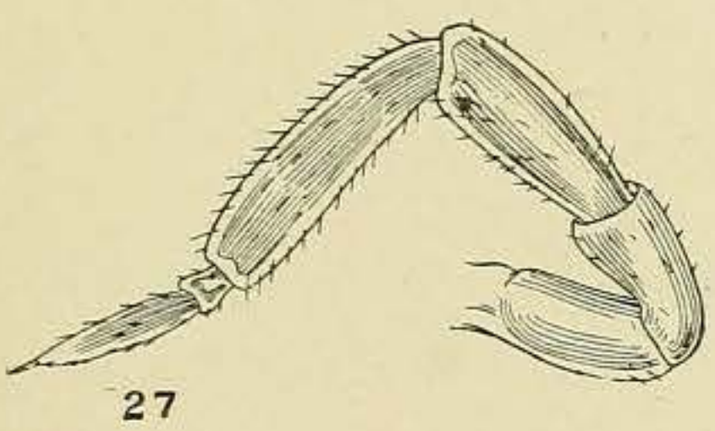

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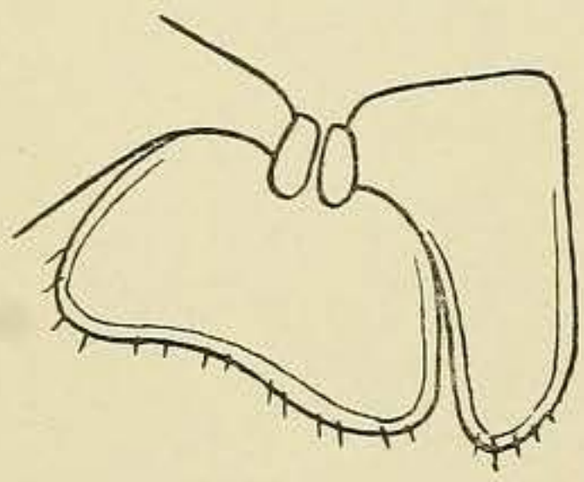

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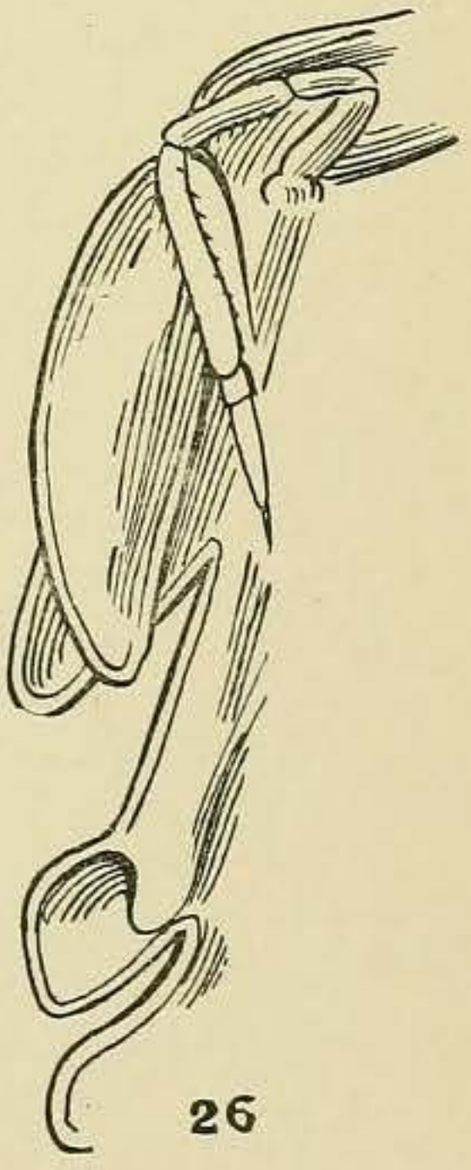

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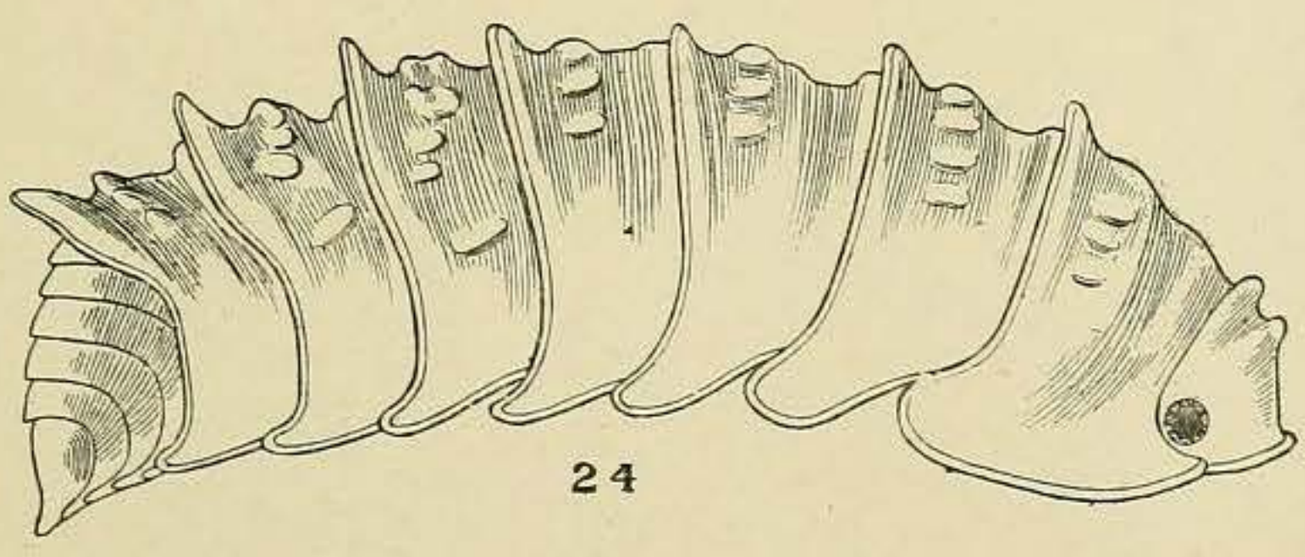

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TERRESTRIAL ISOPODA.

Plate 37.

Fig. 17. *Notoniscus australis* (Chilton); first maxilla.
18. „ „ maxilliped.
19. „ „ first leg.
20. „ „ second pleopod of female.
21. „ „ third pleopod of female.
22. „ „ uropod.
23. *Haplophthalmus tasmanicus*, sp. nov., dorsal view, × about 18.
24. *Cubaris suteri*, sp. nov.: side view, × about 10.
25. „ „ dorsal view of pleon, more highly magnified.
26. „ „ segments 1 and 2 of peræon seen from below.
27. „ „ antenna.
28. „ „ uropod and telson.