ON A NEW ISOPODAN GENUS (FAMILY *ONISCIDAE*) FROM LAKE CORANGAMITE, VICTORIA.

By Chas. Chilton, M.A., D.Sc., LL.D., F.L.S., C.M.Z.S.,
Professor of Biology, Canterbury College, New Zealand.

(With twenty Text-figures.)

In 1918 I received from Professor W. A. Haswell, of Sydney, a single specimen of an Isopod that had been collected in Lake Corangamite, Victoria, by Mr. J. Searle, of Melbourne. Examination showed that the Isopod could not be placed under any of the genera known to me and that a full examination of the species was desirable. On my inquiring for further specimens, Mr. Searle very kindly sent on the whole of the remaining animals, eight in number, which he had collected. They had been gathered during an excursion to Lake Corangamite and district in March and April, 1918, and the circumstances under which they were found are described by Mr. Searle as follows:—

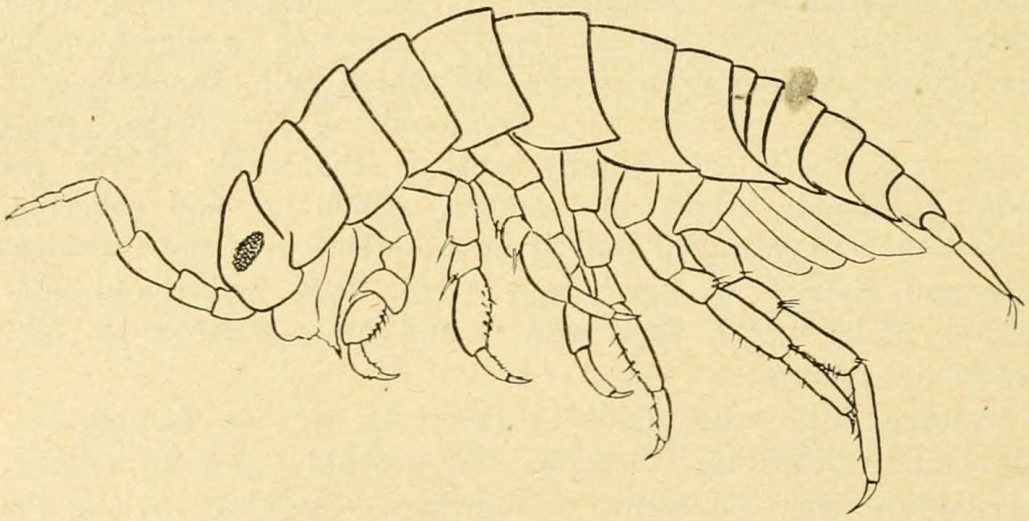
"Another interesting 'find' in this lake was an Isopod, certainly undescribed for Victoria, and probably new to science. Its capture was the result of inductive reasoning. Along the lake shore and in the shallow water Dottrel were observed. As the netting operations captured nothing larger than Copepoda, and the algae on the rocks sheltered Ostracoda and the little univalve mollusc *Cociella striatula*, curiosity was aroused as to what the Dottrell found to eat. Selecting a rock on the shore where one could kneel without getting unduly wet, the muddy bottom of the lake was scrutinised for any appearance of living creatures. Finally our patience was rewarded by observing a movement just under the surface of the fine silt, and the quick insertion of the fingers resulted in the capture of an Isopod. Twenty minutes' close search was rewarded by the capture of eight or ten specimens. When next there is an opportunity of visiting this lake, apparatus will be taken for the special inves-

tigation of this class of animal life, and perhaps further new species may be secured."*

I suggest the following name and diagnosis for this interesting Isopod, the specific name being chosen in honour of Mr. J. Searle, its discoverer.

HALONISCUS SEARLEI, nov. gen. et sp. (Text-figs 1 to 20.)

Diagnosis.—Body narrow oval, moderately convex, with lateral portions not greatly expanded. Dorsal surface smooth, and, like the appendages, covered with very minute short hairs. Cephalon slightly rounded in front and without lateral lobes. Pleon not greatly narrowed, first and second segments without epimera, third, fourth and fifth with epimera well developed, last segment large and with well developed lateral portions in ad-



Text-fig. 1. *Haloniscus searlei*, male, side view.

dition to the triangular extremity. Eyes well developed, lateral. First antenna very minute. Second antenna well developed, flagellum with 3 joints. Mandibles with not more than 2 penicils behind the cutting part. Second maxilla with outer edge not angularly produced near the base. Legs consisting of two series, the anterior four more or less subchelate and of approximately the same size and shape; the fifth, sixth, and seventh simple, longer than the anterior pairs, and increasing in length posteriorly, dactyls bi-unguiculate, without special dactylar seta. Pleopoda with opercular plates greatly de-

*Victorian Naturalist, xxxv., p.27. (June, 1918.)

veloped, delicate and without air cavities; the endopods small. Uropods well produced and exposed, inner ramus attached only slightly in front of the outer which it resembles in structure.

Colour.—Slaty grey, whole surface thickly covered with irregular pigment spots, appendages lighter.

Length of largest specimen, 8 mm. *Breadth* about 3.5 mm.

Locality.—Lake Corangamite, Victoria (in salt water).

I have considerable difficulty in assigning this species to its proper place in the Oniscoidea. In the second antenna and the mouth parts, and in the absence of a special dactylar seta,* it agrees well with the characters laid down by Sars† for the *Oniscidae,* and must certainly be placed in that family. It differs, however, in having the second maxilla not angularly produced near the base and the outer branch of the uropod is not flattened; moreover, the terminal segment of the body is much better developed than in other members of this family, and has the lateral portions distinct as well as the terminal triangular part. In the last character the animal is more like *Ligia,* a genus which it also resembles in the general appearance of the body and of the legs; these characters, however, being perhaps purely adaptive. Of the genera usually assigned to *Oniscidae* it seems to come perhaps nearest to *Philoscia,* though it differs very markedly from this genus in the points mentioned above and in its aquatic mode of life.

I give below a more detailed account of the animal and of its appendages.

Antenna 1 (fig. 2) minute, of 3 joints, the 1st longer and broader than the 2nd, 3rd tapering, with one or two simple setæ at the apex and near the apex.

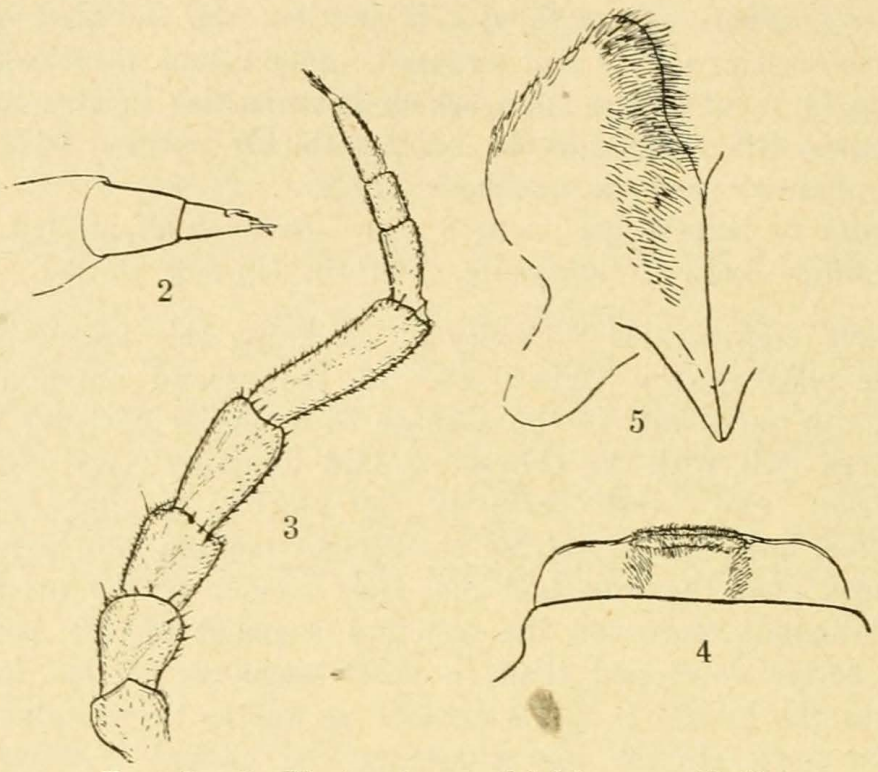
Antenna 2 (fig. 3) with first 3 joints subequal, 4th longer, and 5th considerably longer than the 4th; flagellum slightly longer than the last joint of peduncle, of 3 joints, 1st and 3rd subequal and longer than the 2nd, 3rd tipped with tuft of setæ; all the joints covered with minute setæ, a few stouter ones at the extremities of the joints of the peduncle as shown in the figure.

Upper lip (fig. 4) much broader than long, central part fringed with fine setæ.

---

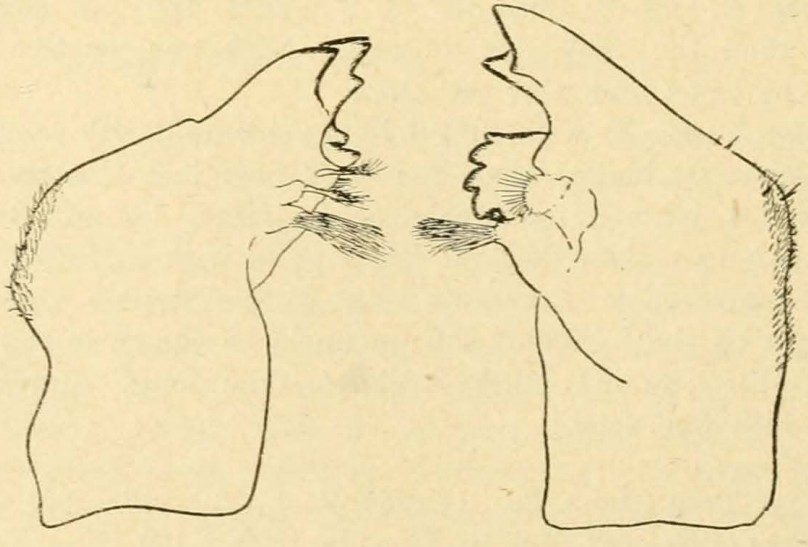
*Chilton. Trans. Linn. Soc. London, Zool., Vol. viii., 1901, p.102.

†Crustacea of Norway, Vol. ii., Isopoda, 1899, p.169.



Text-fig. 2. First antenna (highly magnified).
Text-fig. 3. Second antenna. Text-fig. 4. Upper lip.
Text-fig. 5. Lower lip.

Right mandible (fig. 6) of the usual form, outer cutting edge strong, composed of 3 teeth, dark brown in colour, inner cutting edge small, ending in 2 teeth, two penicils between the inner cutting edge and the usual tuft of long plumose setæ; ciliated lappet small.



Text-fig. 6. Right mandible. Text-fig. 7. Left mandible.

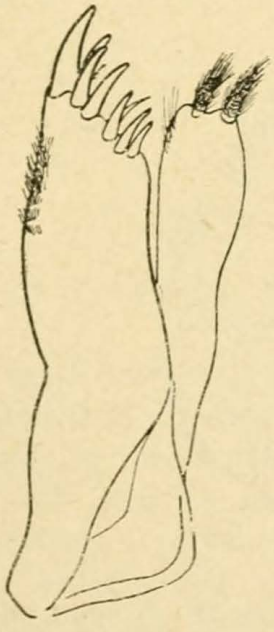
Left mandible (fig. 7) with the inner cutting edge large, formed of 4 teeth, dark brown in colour, only one penicil visible; ciliated lappet delicate, fringed with many fine setæ.

Both mandibles with numerous fine setæ near the bend in the outer margin.

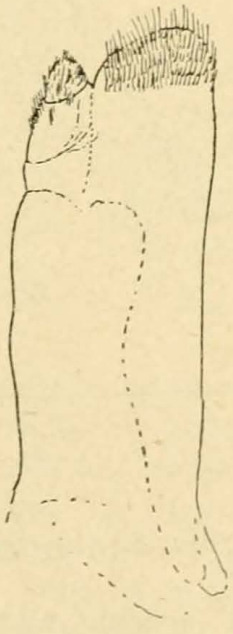
Lower lip (fig. 5) small, narrow, outer and inner margins and surface near the inner margin thickly covered with fine setæ.

Maxilla 1 (fig. 8) with the outer margin of outer lobe somewhat sinuous; a tuft of fine setæ towards distal end; apex bearing 6 or 7 strong teeth, the outer stronger than the inner and brown in colour. Inner lobe delicate, rather broad, a small tuft of fine setæ at distal end of outer border, apex with the usual two plumose setæ.

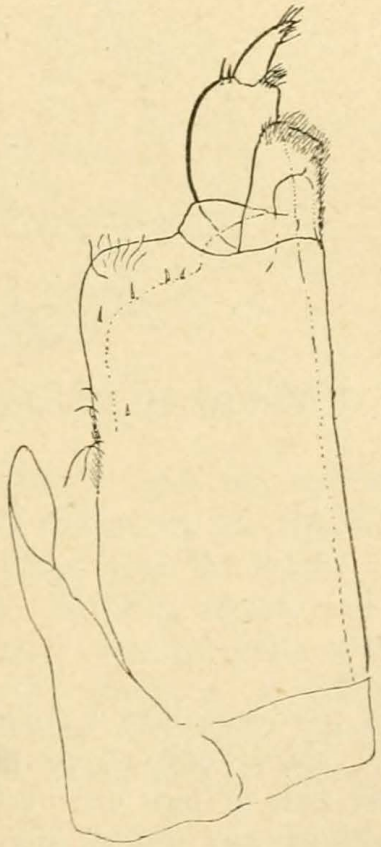
Maxilla 2 (fig. 9) very delicate, inner lobe broad, covered at the apex with fine setæ, outer lobe narrower, more strongly chitinous, apparently marked off from the inner by a suture and indistinctly divided into two joints, both thickly supplied with short setæ.



Text-fig. 8.
First maxilla.



Text-fig. 9.
Second maxilla.

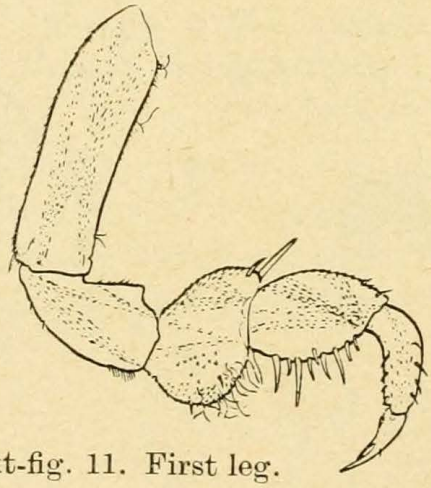


Text-fig. 10. Maxilliped.

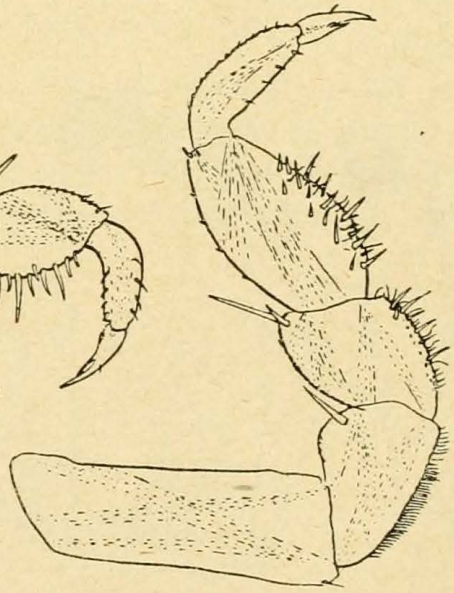
Maxilliped (fig. 10) with basal joints broad, rectangular, terminal portion short with two joints, last one narrow and tipped with setæ. Masticatory lobe truncate, covered with short setæ. Epipod rather more than half as long as the basal joint, narrowing distally, delicate.

First pair of legs (in the male) (fig. 11) short, the merus expanded, much broader than long, produced on inner side into a rounded, scabrous lobe bearing a few fine setæ in addition to the short setæ forming the scabrous surface, carpus oval, longer than merus, much narrower, its inner surface bearing a number of stout setæ of different lengths; propod narrow, curved, and together with the dactyl bent back upon the carpus forming a subchelate limb; dactyl slender, bi-unguiculate, its inner margin minutely roughened, no special dactylar seta to be seen.

Second pair of legs (fig. 12) similar to the first but slightly longer, whole inner margin of ischium regularly fringed with fine setæ; merus narrower than in the first leg, inner margin



Text-fig. 11. First leg.

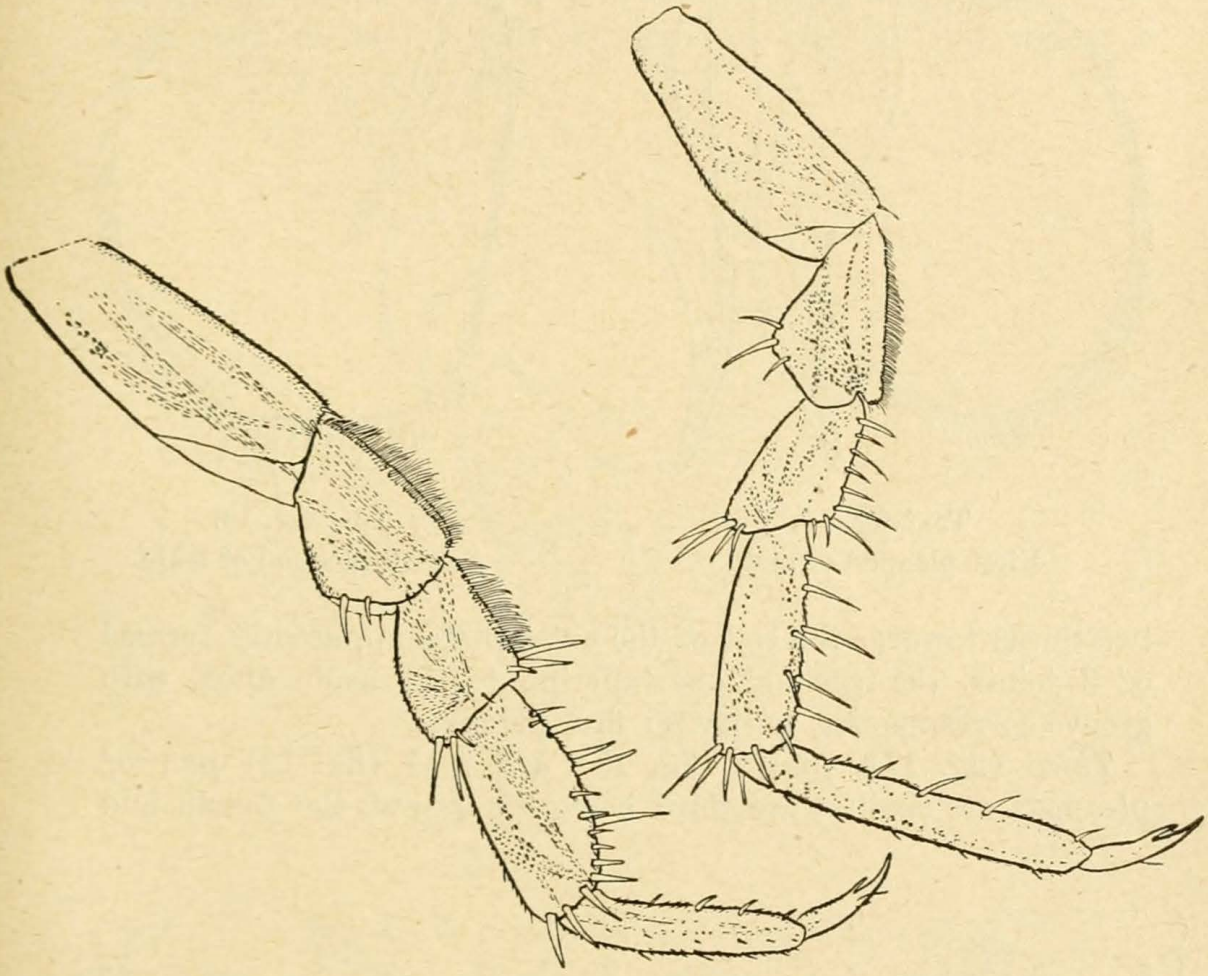


Text-fig. 12. Second leg.

not produced into a lobe but bearing numerous stout setæ and fine hairs; carpus, propod and dactyl similar to those of the first pair of legs except that the carpus is longer.

Third and fourth pairs of legs similar to the second, each slightly longer than the preceding.

Fifth, sixth and seventh pairs of legs similar and longer than any of the anterior four pairs. In the fifth (fig. 13) both ischium and merus have the inner margin regularly fringed with fine setæ; in the sixth and seventh (fig. 14) the ischium is thus

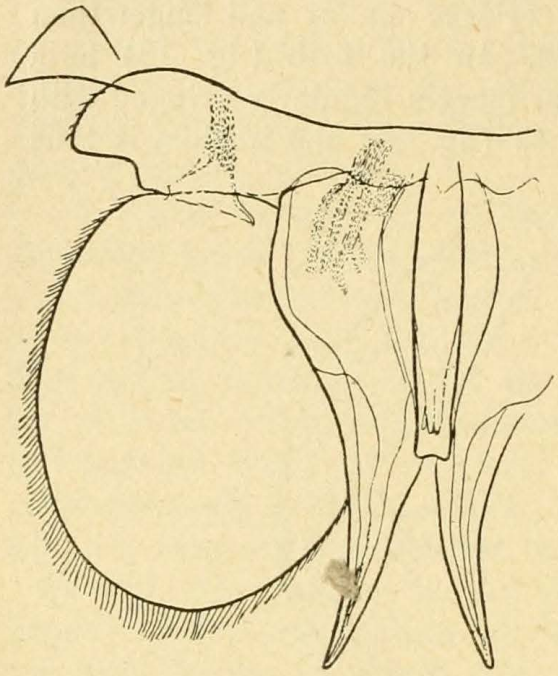


Text-fig. 13. Fifth leg. Text-fig. 14. Seventh leg.

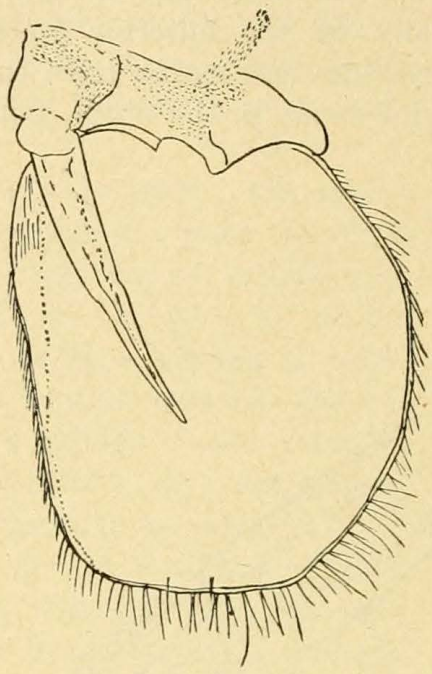
fringed but the fine setæ are almost absent from the merus. Stout setæ or spines on all the joints as shown in the figures. Sixth leg longer than fifth and seventh longer than the sixth.

First pair of pleopods (in the male) (fig. 15) of the usual structure, exopod forming a very delicate rounded plate with the margin regularly fringed with setæ; endopod modified, broad at the base, tapering to the apex and bearing a groove fringed distally with short setules; male organ single, narrow, slightly emarginate at the end.

Second pair of pleopods (fig. 16) with the exopod or outer plate similar to that of the first, the modified endopod reaching



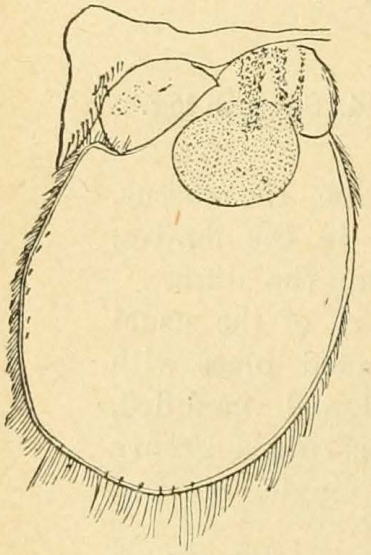
Text-fig. 15.
First pleopod of male.



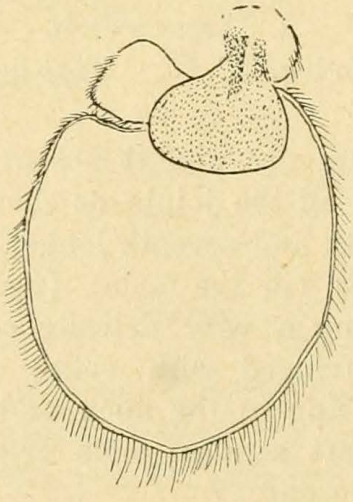
Text-fig. 16.
Second pleopod of male.

two-thirds towards the end of the outer plate, apparently formed of 2 joints, the terminal one tapering to the acute apex, with groove corresponding to that in first pleopod.

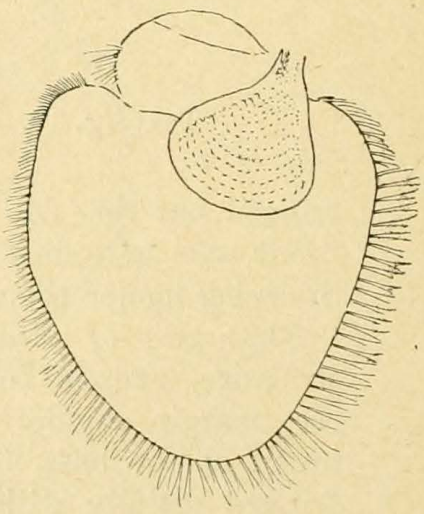
Third (fig. 17), *fourth* (fig. 18), *and fifth* (fig. 19) *pair of pleopods* are similar, the third being the largest, the fourth and



Text-fig. 17.
Third pleopod.



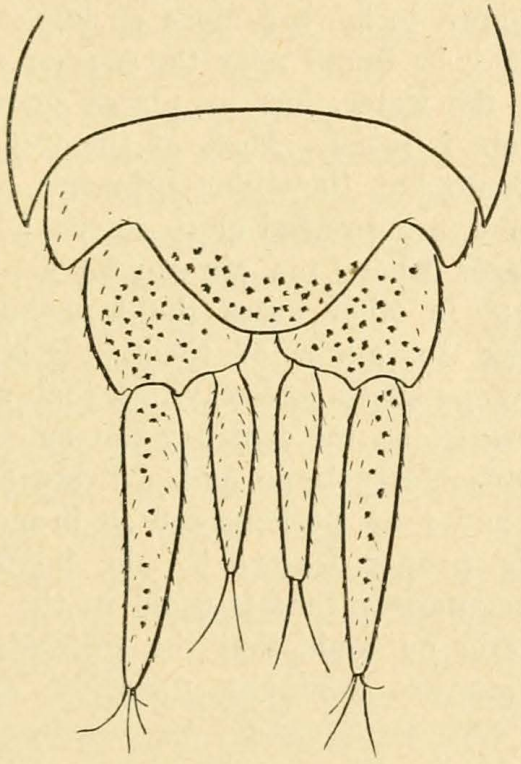
Text-fig. 18.
Fourth pleopod.



Text-fig. 19.
Fifth pleopod.

fifth subequal, in each the outer or opercular plate is large, rounded, very delicate in structure and regularly fringed with fine setæ, the endopod is small and rounded.

The *uropods* (fig. 20) have the basal joint about as broad as long, inner ramus attached only slightly anteriorly to the outer, both rami slender, cylindrical, tapering slightly and ending in a small tuft of long setæ.



Text-fig. 20. Uropoda and terminal segment.

The terminal segment (fig. 20) is only slightly narrower than the preceding segment, and has the lateral portions better developed than in other *Oniscidae* in which the terminal segment is usually reduced to a small triangular plate.

The above description has been taken mainly from the large male specimen first received and dissected. None of the other specimens bear eggs or can for other reasons be definitely recognised as female, and in all of them the legs have the same general character as those already described, though in the smaller specimens the special characters of the first and second pairs of legs are not so well marked. Two or three of the eight specimens are certainly males, as can be seen without dissection

from their first and second pleopods, the others may also be males, but I cannot feel certain without dissecting the pleopods, and as they appear quite similar in all other characters, it seemed hardly necessary to do this.

Remarks.—The occurrence of this Oniscid living in the waters of Lake Corangamite raises an interesting question to which it is not easy to give a decisive answer. All the other members of the *Oniscidae* known to me are more or less strictly terrestrial. Some of them may be found near the seashore, but they do not live actually in the water, but in places under stones, leaves, etc., where the air is moist. Most of them it is true are still branchial breathers, but the outer branches of their pleopods form opercula and are pressed close to the body enclosing the branchiae in spaces where the air can be kept moist for long periods of time;* in other cases the branchiæ themselves are specially modified to allow of their breathing air or they even contain air passages and cavities that act as tracheae†. In *Haloniscus searlei* on the contrary the outer branches of the pleopoda are particularly large and delicate and hang loosely below the body and they perhaps act as branchiæ supplementing the branchiæ proper formed by the inner branches which are smaller in comparison than is usual in the family.

There is however no doubt that the *Oniscidae* and the other terrestrial Isopoda are originally descended from marine ancestors. Some such as *Scyphax, Scyphoniscus* and *Deto,*‡ belonging to the family *Scyphacidae* closely allied to the *Oniscidae,* still live on the seashore between tide marks and are consequently periodically submerged. Their mouth parts, pleopoda, etc., are on the whole of a slightly more primitive character and not so specialised as in the more strictly terrestrial *Oniscidae* under which *Haloniscus searlei* must be placed. The

*Dorothy A. Stewart has shown (Mem. and Proc. Manchester Lit. and Phil. Soc., lviii., Session 1913-1914, No. 1) that in *Ligia oceanica* the respiratory functions of the exopod, "if they exist, are very slight," and that though the animals eventually die if constantly submerged in water, either fresh or salt, they possess "a considerable adaptability in regard to immersion in sea-water."

†J. H. Stoller. "On the organs of Respiration of the *Oniscidae*," Zoologica, Heft 25, 1899.

‡Chilton. Jour. Linn. Soc. London, Vol. 32, 1915, p.435.

question therefore arises—is *Haloniscus* a form that has always lived in salt water or is it a terrestrial form that has become re-adapted to aquatic life? To decide this question we naturally examine its characters to see if any of them show the primitive structure we would expect if it has always lived in the water. But none of them give decisive evidence of this. The terminal segment of the body is more fully developed than in other *Oniscidae* and the uropods are more exserted but not more so than in *Ligia, Trichoniscus* and other genera which live almost or quite wholly on land. The pleopoda, as already mentioned, do differ somewhat from those of other *Oniscidae* but this may be due to secondary adaptation. The mouth parts, antennæ, etc., agree so closely with those of the *Oniscidae,* one of the most strictly terrestrial families, that it seems improbable that *Haloniscus* should differ from the other members in never having taken to a life on land.

This tentative conclusion may be confirmed or disproved by a consideration of the origin of Lake Corangamite—is it a portion of the ocean that has become separated from the rest or is it of separate origin and its saltness due to other causes? For information on these points I applied to Professor W. N. Benson of the University of Otago who replied that in the article on Lakes of the Commonwealth in the Commonwealth Yearbook, No. 4, 1911, p. 73, Lake Corangamite is classed as one of the "Lakes filling subsided areas which have resulted from the adjustment of the surface to the new conditions following the transference of large quantities of rock from underground to the surface in the form of lava flow (basalt)." It is one of the "lakes in basalt plains." "Most of these have no streams entering them." Professor Benson adds that the maximum depth of the lake is 10 ft., its height above sea-level 380 ft., and that the basalt in which the lake lies is of late Tertiary age.

It seems evident from the information thus kindly supplied by Professor Benson that the Lake is not of marine origin and this appears to be confirmed by the brief account of the plants of Lake Corangamite given by Mr. A. D. Hardy,* for though on its shores there occur *Salicornia, Enteromorpha* and other halophytic plants there does not seem to be anything distinctly

*Victorian Naturalist, Vol. xxxv., p.28.

marine in its flora. Moreover Lake Colac, which is situated only a few miles away, is fresh and in its waters lives the little freshwater crab *Hymenosoma lacustris* found in fresh water streams and lakes in Australia, Tasmania, New Zealand, Norfolk Island and Lord Howe Island,* thus apparently showing that the places where it is found cannot have been submerged below the sea for a period extending sufficiently far back in the past to account for its present wide distribution.

On the whole therefore I incline to the opinion that *Halomiscus* is the descendant of a form that was terrestrial in habits and that, owing to the special circumstances arising from its habitat, it has become re-adapted to aquatic life.

I wish to record my thanks to Professor W. A. Haswell and Mr. J. Searle for the opportunity of examining and describing this Isopod, and to Miss E. M. Herriott, M.A., Assistant at the Canterbury College Biological Laboratory, for the care and accuracy with which she has prepared the figures illustrating the paper.

---

*Chilton. Trans. N.Z. Inst., Vol. 47, p.316, and Proc. Roy. Soc. Tasmania, 1919, p.93.

(*Issued 15th March, 1920.*)

Vol. XLIV.
Part 4. No. 176.

THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES

FOR THE YEAR.

1919

PART IV. (*pp. 719-912*, i.-xxxii.)

CONTAINING PAPERS READ IN

OCTOBER-NOVEMBER.

WITH TWELVE PLATES

[Plates xxxvi.-xlvii.]

SYDNEY:

PRINTED AND PUBLISHED FOR THE SOCIETY BY

THE SYDNEY AND MELBOURNE PUBLISHING CO., LTD.,
11 Wilmot Street, Sydney,

AND

SOLD BY THE SOCIETY.

1920.

PRICE 13/-

Agent in Europe:

Messrs. DULAU & Co., 34-36 Margaret St., Cavendish Square.
London, W.

PROCEEDINGS, 1919, PART 4.

CONTENTS.