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On the Entomostracan Fauna of the New Zealand Lakes.

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C.M.Z.S.

(Plates XLVIII.—LI.*)

I am indebted to my friends Messrs. Keith Lucas, M.A., and G. Hodgkin, M.A., for the opportunity of examining the very interesting Plankton collections made by them during their bathymetrical survey of the New Zealand Lakes. The present paper deals with the Entomostraca only.

The higher Crustacea—comparatively few in number—are reported upon by Professor C. Chilton of Canterbury College, Christchurch, in a separate paper (*infra*, p. 702). Besides the Crustacea, which constituted almost the whole bulk of the nettings, there were a few Hydrachnæ, a very few insect larvæ, and in some of the gatherings a considerable number of a rotifer belonging to, or closely resembling, the genus *Asplanchna*. Fragments of confervoid and unicellular Algae were also abundant, and some very small fragments of a polyzoan were also noticed. Samples of about seventy nettings came under my review. These were taken from seven different lakes in depths varying from the shallow-water of the shore to an extreme depth of about 1450 feet. The proceeds were preserved in various solutions—piconitric, formalin, and alcoholic. The piconitric solution is objectionable, acting as a solvent on the calcic material of the shells, and formalin is liable in a less degree to the same objection. But, as a rule, the specimens were well preserved.

The most striking fact arising out of this research is the small number of species found in so extensive a series of nettings from so many different lakes. The climatic and physical conditions of these lakes may be taken as closely approximating to those of the English Lake-district of Cumberland and Westmoreland; and it is interesting to compare the results of the investigation of the two areas so far as is at present possible. The following table embraces those species which occur only in the lakes themselves,

* For explanation of the Plates, see p. 701.

—not those of nameless outlying pools. Had these latter been included the English list would have been much longer, but would have compared unfairly with that of New Zealand, where similar gatherings are not at present attainable.

The list represents as nearly as possible what one might expect to get in the English Lakes from a series of hauls such as those dealt with from New Zealand.

ENGLISH LAKES.

NEW ZEALAND LAKES.

CLADOCERA.

Sida crystallina O. F. Müller.
Diaphanosima brachyurum Lévén.
Latona setifera O. F. Müller.
Holopedium gibberum Zaddach.
Daphnia galeata G. O. Sars.
Hyalodaphnia jardinii Baird.
Simocephalus vetulus O. F. Müller.
Ceriodaphnia quadrangula? O. F. Müller.
Bosmina obtusirostris G. O. Sars.
Drepanothrix dentata Euren.
Camptocercus macrurus O. F. Müller.
Eurycercus lamellatus O. F. Müller.
Acroperus harpæ Baird.
Alanopsis elongata G. O. Sars.
Lynceus costatus G. O. Sars.
 „ *guttatus* G. O. Sars.
Graptoleberis testudinarius Fischer.
Alonella exigua Lilljeborg.
 „ *nana* Baird.
Peracantha truncata, O. F. Müller.
Pleuroxus uncinatus Baird.
Chydorus globosus Baird.
 „ *sphaericus* O. F. Müller.
 „ *barbatus* G. S. Brady.
Bythotrephes longimanus Leydig.
Polyphemus pediculus Linné.
Leptodora kindti Focke.

Simocephalus gibbosus G. O. Sars.
 „ *obtusatus* G. M. Thomson.
Ceriodaphnia globosa, sp. n.
Bosmina meridionalis, G. O. Sars.
Chydorus sphaericus Baird.
 „ *globosus*? Baird.

COPEPODA.

Diaptomus gracilis G. O. Sars.
Cyclops albidus Jurine.
 „ *bicolor* G. O. Sars.
 „ *fuscus* Jurine.
 „ *gigas* Claus.
 „ *leuckarti* Claus.
 „ *robustus* G. O. Sars.
 „ *serrulatus* Fischer.
 „ *strenuus* Fischer.
 „ *abyssorum* G. O. Sars.
 „ *vicinus*, Uljanin.

Boeckella triarticulata G. M. Thomson.
Calanoccia lucasi, gen. & sp. nov.
Cyclops distinctus Richard.
 „ *serrulatus* Fischer.

OSTRACODA.

Cypria ophthalmica Jurine.
 „ *exsculpta* Fischer.
Cyclocypris laevis O. F. Müller.
 „ *serena* Koch.
Cypris fuscata Jurine.
 „ *obliqua* G. S. Brady.
Notodromas monachus O. F. Müller.
Herpetocypris reptans Baird.
Cypridopsis vidua O. F. Müller.
Candona candida O. F. Müller.

Newnhamia fenestrata King.
Cyprinotus sarsi, sp. n.

ISOPODA.

Asellus aquaticus Linné.*Paranthura nigrofusca* Lucas.

AMPHIPODA.

Gammarus pulex De Geer.*Paracalliope fluviatilis* G. M. Thomson.*Paracorophium excavatum* G. M. Thomson.

SCHIZOPODA.

Tenagomysis novæ-zealandiæ G. M. Thomson.

MACRURA.

Xiphocaris curvirostris Heller.

BRACHYURA.

Hymenosoma lacustris Chilton.

The foregoing list of British species might have been considerably enlarged, but of many I do not possess accurate records and have therefore omitted them altogether. The disproportion, however, between the numbers of British Lake species and of species inhabiting similar places in New Zealand—so far as our present knowledge extends—does not need to be further dwelt upon. The disproportion is not, perhaps, greater than that found among vertebrate animals, both aquatic and terrestrial. To name, for example, only aquatic animals, it may be noted that while New Zealand possesses only one native Amphibian, Great Britain has eight; and that while the freshwater fishes of Great Britain are very numerous, the number of New Zealand species is extremely small. It is not, therefore, at all surprising to find that the freshwater Crustacea of New Zealand, as at present known, number only about one-third or one-fourth of the British species, and it seems scarcely likely that further research will materially alter these proportions. But it is noticeable that the great preponderance of British species is confined to the Entomostraca; while of the higher Crustacea, which are very poorly represented in Great Britain, New Zealand possesses a considerable number.

The lakes explored by Messrs. Lucas and Hodgkin were Waikare, Taupo, Rotoiti, Roto Aira, Waikaremoana, Wakatipu, and Manapouri.

CLADOCERA.

SIMOCEPHALUS GIBBOSUS G. O. Sars.

Simocephalus gibbosus Sars, On Freshwater Entomostraca from the Neighbourhood of Sydney (1896), p. 15, pl. ii. figs. 4-6.

Numerous examples of this fine species were found in "nettings from among reeds at a depth of six feet," in Lakes Rotoiti and Waikare.

SIMOCEPHALUS OBTUSATUS (Thomson).

Daphnia obtusata Thomson, On New Zealand Entomostraca,

(fig. 2), the greatest width of the cephalothorax scarcely equalling one-third of its length, a distinct cervical sinus in front; urosome very narrow, and, including the caudal rami, less than half the length of the cephalothorax; caudal rami short, scarcely longer than the last abdominal segment, about twice as long as broad (fig. 10). Anterior antennæ very long and slender (fig. 3), reaching as far as the extremities of the longest caudal setæ, very sparingly setiferous; the two branches of the posterior antennæ (fig. 4) nearly equal in length, the median joints of the outer branch very small and indistinctly separate, three (or perhaps four) in number. Mandibles and maxillæ of the usual calanoid type; anterior maxillipeds (fig. 5) very densely setiferous; basal joint of the posterior maxillipeds produced distally into a short, blunt, digitiform lobe; second joint swollen, its inner margin rather strongly arcuate (fig. 6). Swimming-feet long and slender, the basal portion much elongated. Fifth pair bearing on the second joint of the outer branch a strong marginal spine which reaches as far as the apex of the last joint, this joint bears one long terminal seta and two very short ones; the inner branch is biarticulate and bears terminal setæ similar to those of the outer branch (fig. 8). The ova are excessively large and very few in number—never more than four (fig. 1). Length, exclusive of tail-setæ, .85 mm.

Male. The anterior antennæ of the male (fig. 3) are geniculated, but none of the joints is excessively enlarged or tumid, neither are there any marginal serrations, though there are two not very conspicuous spines on the 13th and 14th joints. The foot of the fifth pair (fig. 9) on the right side has the outer branch ending in a very long flexuous spine, the inner branch short and simply biarticulate; the left foot has both branches simple and uni-articulate, the outer branch curved, emarginate near the apex and bearing a single terminal bristle, the inner branch much longer and simply setiferous at the apex.

Habitat. Abundant in a netting taken among reeds in Lake Waikare and in a "vertical netting" up to 120 feet, Lake Rototiti.

I have much pleasure in naming this interesting species after Mr. Keith Lucas, to whom I am indebted for the opportunity of examining the proceeds of his painstaking investigation of the New Zealand Lakes.

Apart from its small size, this species proved unusually difficult of examination owing to the tenuity of its tissues and the very indistinct jointing of the various appendages, and I am by no means sure that the account I have given is in all cases entirely correct, as, for instance, in that of the swimming-feet, where some specimens seemed to show doubtful traces of three joints in the inner branches.

CYCLOPS DISTINCTUS Jules Richard.

Cyclops tenuicornis var. *distinctus* Richard, Liste des Cladocères et des Copépodes d'eau douce observés en France (1887).

Cyclops distinctus Lilljeborg, Synopsis specierum huc usque in Suecia observatarum generis Cyclopis (1901).

This species was found in most of the nettings. It is closely allied to *C. albidus* Jurine. So far as appears from Mr. Lucas's collections, it seems to be the prevailing form of *Cyclops* in the New Zealand Lakes.

CYCLOPS SERRULATUS Fischer.

This common Northern species occurred, though only sparingly, in several of the nettings; but the serrulation of the caudal stylets is seldom so distinctly marked as in European specimens.

OSTRACODA.

Genus NEWNHAMIA King.

Like *Notodromas*, except that the mandibular palp bears a small rudimentary branchial appendage the filaments of which are directed upwards, and that the posterior maxillæ have two branchial filaments attached directly to the limb and not arising from a distinct plate: the shell profusely tuberculated over the whole surface. (Mr. King's description of the genus is: "eyes two, distinct, pedunculated, with a corresponding tubercle on each valve: a boat-shaped plate on ventral margin.")

NEWNHAMIA FENESTRATA King*. (Plate XLVIII. figs. 6-9 and Plate L. figs. 1-13.)

Newnhamia fenestrata King, On Australian Entomostraca (Proc. Royal Soc. Van Diemen's Land, vol. iii. pl. ix A. 1-12; Vávra, Die Ostracoden vom Bismarck-Archipel (Archiv f. Naturgesch. 1901, p. 180, pl. viii. figs. 1-15).

Female. Shell seen laterally broadly elliptical; height equal to three-fourths of the length; extremities rounded, subtruncate, the anterior rather the narrower of the two; dorsal margin feebly arcuate, ventral rectilinear in the middle, rounded off toward each extremity: seen from above (Pl. L. fig. 2) the outline is ovate, broadly rounded behind, tapering evenly from the middle to the acuminate anterior extremity; greatest width equal to more than two-thirds of the length and situated behind the middle; the greater part of the ventral surface occupied by two broad, sinuous flanges on the contact margins of the two valves, and by broad crescentic flattened plates stretching from these flanges nearly as far as the lateral margins of the shell; the flanges are smooth and longitudinally sulcate, but each lateral plate is beautifully ornamented with four rows of concentric parallel rows of rounded tubercles (fig. 3); the general surface

* "On Australian Entomostraca," by the Rev. R. L. King, B.A. (Papers and Proceedings of the Royal Society of Van Diemen's Land, January 1855).

Trans. & Proc. New Zealand Institute, vol. xi. (1878) p. 261, pl. xi. fig. E, 2, *a-e*; G. O. Sars, Freshwater Entomostraca of New Zealand, 1894, p. 10, pl. ii.

A few specimens found in company with the preceding species in the Rotoiti gathering and in a similar netting from Waikare Lake.

CERIODAPHNIA GLOBOSA, sp. n. (Plate XLVIII. figs. 1-3.)

Female. Outline as seen laterally subquadrangular, rounded; the head separated from the rest of the body by a very deep cervical depression, much flattened in front and produced ventrally into a rounded lobe the extremity of which is almost filled by the large eye; hinder part of the body almost circular, with a large triangular, sharply pointed projection above the middle of the posterior margin (fig. 2); dorsal margin boldly arched, ventral also arched but less so than the dorsal; seen ventrally the outline is broadly elliptical (fig. 1), greatest width in the middle and equal to about two-thirds of the length, anterior extremity forming a rounded protuberance which is nearly filled by the eye, posterior produced into a sharp triangular spine. Shell devoid of marginal hairs, and showing no surface-markings except a uniform dotting. The antennæ and other appendages are of the usual form. Caudal lamina armed with a long, slender terminal claw (fig. 3), which is quite simple and destitute of marginal setæ or pectinations; posterior margin of the lamina bearing at the distal extremity a series of about eight slender spines.

Length .76 mm.

Habitat. Roto Aira, in vertical nettings to a depth of 50 feet, in Taupo Lake at 450 feet, and in a netting among reeds in Waikare Lake—abundant in all these gatherings.

It is interesting to note that all the three lakes in which this *Ceriodaphnia* occurs lie, as Mr. Lucas tells me, on a single river, the Waikato.

BOSMINA MERIDIONALIS G. O. Sars. (Plate XLVIII. figs. 4, 5.)

Bosmina meridionalis G. O. Sars, *Pacifische Plankton-Crustaceen* (Zoolog. Jahrbüch. v. 1903) p. 631, Taf. 34. figs. 3 *a-c*.

Professor Sars's type specimens were taken in Wakatipu Lake, New Zealand, and it occurs in greater or less abundance in most of the lake gatherings. I have seen only females, nor did any males occur in the gatherings examined by Sars.

COPEPODA.

BOECKELLA TRIARTICULATA (G. M. Thomson).

Boeckia triarticulata Thomson, Trans. & Proc. New Zealand Institute, vol. xv. (1882) pl. vi. figs. 1-9.

Boeckella triarticulata G. O. Sars, Freshwater Entomostraca of New Zealand, p. 49, pls. vii. & viii.

Boeckella propinqua G. O. Sars, Pacifiche Plankton-Crustaceen (Zoologisch. Jahrbüch. v. 1903), p. 636, Taf. 35. figs. 10 a-h.

This species seems to be the commonest of all the lacustrine Copepoda of New Zealand. It occurs abundantly in almost all the gatherings submitted to me. It has been fully figured and described by Professor G. O. Sars (*loc. cit.*) and by Mr. G. M. Thomson. Mr. Thomson's specimens were found in a pond near Canterbury, and those described by Sars were raised artificially from mud collected in the same place. Those described by the latter author under the name "*propinqua*" differ only very slightly from the type species, chiefly in the greater length of the anterior antennæ and in the build of the fifth pair of feet, more particularly in the males. But specimens referable to both forms occur intermixed in various New Zealand gatherings, and I think can scarcely be looked upon as distinct one from the other. The *propinqua*-form is generally the longer and more deeply pigmented, and I am disposed to think is really the fully developed condition of *triarticulata*.

The types of *B. propinqua* were taken in a freshwater pond in D'Urville Island, New Zealand.

Genus CALAMECIA *, gen. nov.

Body slender and elongated; posterior angles of the metasome in the *female* produced sharply backwards; urosome of the *female* four-jointed, of the *male* five-jointed; caudal rami short and rather broad. Anterior antennæ of the *female* composed of twenty-four joints; posterior antennæ two-branched, the outer branch six- (or seven?) jointed and equal in length to the inner branch. Mouth-organs as in *Limnocalamus*, except that the anterior maxillipeds are destitute of strong terminal claws, being simply setiferous. Inner branches of the first four pairs of feet biarticulate, and, like the outer branches, bearing very long and delicate marginal setæ. Fifth pair of feet in both sexes two-branched; in the *female* the penultimate joint of the three-jointed outer branch is produced into a strong marginal spine, the inner branch is simply biarticulate: in the *male* (Plate XLIX. fig. 9) the terminal joint of the outer branch of the right foot forms a very long curved claw, the inner branch is simply biarticulate; the foot of the left side somewhat smaller, its outer branch short and club-shaped, inner branch elongated and composed of a single joint.

This is more nearly allied to *Limnocalamus* than to any other described genus, but differs as regards the two-jointed inner rami of the swimming-feet and in the build of the fifth pair of feet in the male.

CALAMECIA LUCASI, sp. n. (Plate XLIX. figs. 1-10.)

Female. Seen dorsally the outline is very narrow and elongated

* κάλαμος, a reed; ὀίχέω, I dwell.

of the shell is covered with closely-set and irregularly shaped rounded or pointed tubercles (figs. 1, 2, 3): a prominent transparent tubercle in front of the middle and just within the dorsal margin, through which the darkly coloured eye is conspicuous. Colour dark grey. Length .77 mm.

Male. The shell of the male, seen dorsally (fig. 2), is more angular in outline, widest near the rounded, subtruncate, posterior extremity, abruptly tapered in front. The two pairs of antennæ are like those of *Notodromas monachus*, the posterior pair with very slender apical joints (fig. 5) and with swimming-setæ reaching beyond the apices of the terminal unguis; the second joint bears at its distal extremity a long hair with a delicately bulbous base; the terminal unguis in the male is minutely bipectinate. Mandible-palp (fig. 6) bearing a minute branchial process which has a few (4 or 5?) upward-pointing setæ. The first pair of maxillæ (Pl. XLVIII. fig. 6) of the usual type and provided with a large branchial plate; second maxilla in the *female* (Pl. L. fig. 7) consisting of an expanded club-shaped lamina which bears a fringe of plumed setæ at the distal extremity and a simple fusiform palp near the base, between which and the apical fringe are two stout plumose branchial filaments: in the *male* the maxillæ of the second pair form strong prehensile organs (figs. 8, 9), differing somewhat on the two sides and destitute of branchial setæ. The feet of the first pair are of the usual type (fig. 10), but have an unusually long apical claw; those of the second pair (fig. 11) bear two slender apical setæ, one of which (the longer) is reflexed. Caudal rami (fig. 12) slender, with three slender, closely approximated apical setæ. The male sexual apparatus is of the usual type (Pl. XLVIII. figs. 8, 9): a pair of simple, very prominent, subspherical, pedunculated eyes (Pl. L. fig. 13), which are deeply pigmented and have a colourless transparent cornea.

Habitat. About a dozen examples of this species were taken in a netting among reeds in Lake Waikare. Being preserved mostly in picric acid, the shells have lost their mineral substance and become very thin and flexible, so that the normal characters are not easily ascertained—especially the distinctive sexual characters. I have no doubt, however, that this is the species described by the Rev. R. L. King (*loc. cit.*); but his figures are scarcely adequate, and I have here given drawings, so far as my material would allow, of the more important parts. As regards the shell, some allowance must be made for the softened, membranous condition. The slight differences between this species and *Notodromas* seem, perhaps, scarcely to call for a separate generic name, but the term *Neunhamia* having been already proposed by Mr. King it may very properly be retained, at any rate provisionally.

[Since writing the foregoing description, I find that *N. fenestrata* has been described and figured by Vávra in a paper—"Die Ostracoden vom Bismarck-Archipel" (Archiv f. Naturgesch. 1901). Vávra's specimens were taken in the Island of Neu-Pommern. Mr. King's specimens were from Tasmania.]

CYPRINOTUS SARSI, sp. n. (Plate LI. figs. 1-11.)

Shell of the *female*, seen laterally (fig. 1), subreniform, highest near the middle, height equal to more than half the length; anterior extremity narrower than the posterior, evenly rounded; posterior wider, rounded off below, sloping with a steep curve above; dorsal margin boldly arched, almost gibbous, highest in the middle, thence sloping rather steeply and almost in a right line toward the front and with a more gentle curve backwards; ventral margin slightly sinuated in the middle. Seen from above (fig. 2) the outline is elongate-ovate, more than twice as long as broad, the greatest width in the middle; lateral margins evenly curved, anterior extremity obtuse, posterior subacuminate. Surface of the shell smooth, rather densely clothed at the anterior extremity with very fine, silky hairs, very sparingly hairy behind; colour creamy buff, profusely blotched or almost covered with patches of dark brown. The valves of the two sides are equal or nearly equal in size, without any overlapping dorsally or at the extremities; the right valve is very feebly—almost imperceptibly—tuberculated round the postero-ventral angle. Length 1.4 mm. The swimming-setae of the posterior antennae (fig. 4) reach slightly beyond the apices of the claws; caudal rami (fig. 10) very slender, bearing one very long and one short apical seta and two posterior marginal setae, both of which are closely approximated to the apex.

The shell of the *male* (fig. 3) is smaller and higher in proportion to length than that of the female. The maxillae of both sides (figs. 6, 7) are strongly built, that of the right side bearing a very strong, falcate terminal claw, that of the left side a triangular plate which ends in a slightly hooked prominence; copulative organs (fig. 11) and ejaculatory duct of the usual type.

Habitat. Taupo Lake. About eight specimens divided evenly between the two sexes: taken by "netting on bottom in a depth of 5-25 feet—sandy, with patches of weeds."

So far as the soft parts of the animal are concerned, there is little or nothing to distinguish this species from *Cyprinotus dahli* G. O. Sars, but the characters of the shell differ in some important points. There is not the very steep posterior declivity of *C. dahli* nor the marked convexity of the ventral margin: moreover, the valves of the two sides are nearly equal and the right valve is not raised dorsally above the level of the left, neither is there any tuberculation of the margins except perhaps a very indistinct appearance of it at the anterior extremity of the right valve. The New Zealand shells, as they reached me, were very thin and membranous in structure, but this was probably a consequence of their having been preserved in picric acid. The specimens of *Cyprinotus dahli** on which Professor G. O. Sars founded the species were raised by him in his laboratory from

* G. O. Sars, "On some West-Australian Entomostraca raised from dried sand" (Archiv f. Mathem. og Naturvidenskab), 1896, p. 24, pl. iv. figs. 1-5.

dried Australian sand, and I am much indebted to him for having kindly sent me specimens for the purpose of comparison. I have pleasure in naming the species in honour of Professor Sars.

EXPLANATION OF THE PLATES.

PLATE XLVIII.

Ceriodaphnia globosa, p. 695.

- Fig. 1. Female seen ventrally. $\times 84$.
 2. Female seen from right side. $\times 84$.
 3. Extremity of post-abdomen. $\times 240$.

Bosmina meridionalis, p. 695.

4. Female seen from right side. $\times 90$.
 5. Post-abdomen. $\times 240$.

Neunhamia fenestrata, p. 698.

6. Maxillar lobes. $\times 240$.
 7. Caudal rami with egg-masses and spermatid bundles. $\times 84$.
 8. Ejaculatory duct of male. $\times 100$.
 9. External copulatory organ of male. $\times 240$.

PLATE XLIX.

Calanæcia lucasi, p. 696.

- Fig. 1. Female seen from right side. $\times 84$.
 2. Do. dorsally. $\times 84$.
 3. Anterior antenna of male, distal portion. $\times 240$.
 4. Posterior antenna. $\times 300$.
 5. Anterior foot-jaw. $\times 240$.
 6. Posterior foot-jaw. $\times 240$.
 7. One of the swimming-feet. $\times 240$.
 8. Foot of fifth pair of female. $\times 240$.
 9. Fifth pair of feet of male. $\times 240$.
 10. Furca. $\times 240$.

PLATE L.

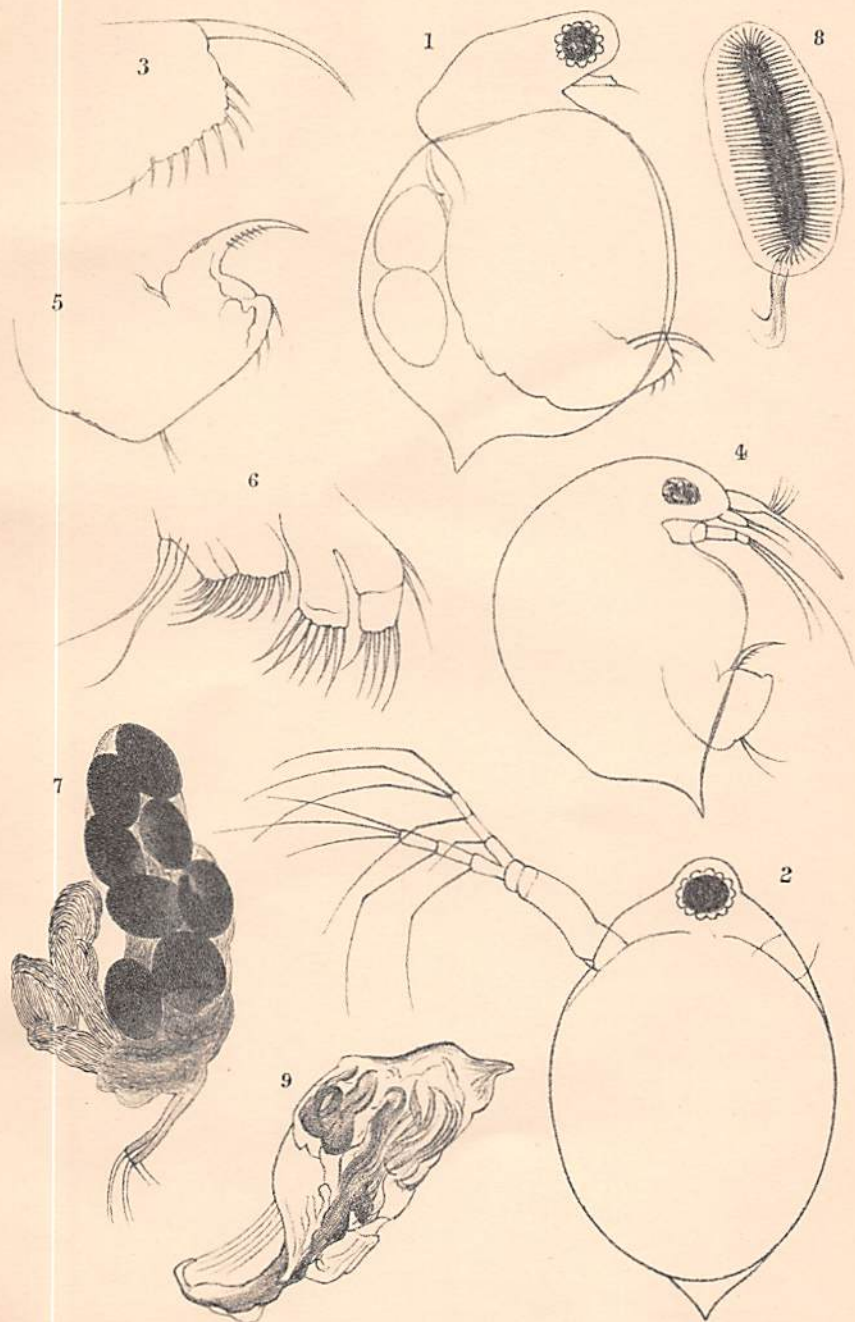
Neunhamia fenestrata, p. 698.

- Fig. 1. Outline of shell of male—from left side. $\times 85$.
 2. Do. do. from above. $\times 85$.
 3. Shell of female seen from below. $\times 84$.
 4. Posterior antenna of male. $\times 84$.
 5. Apical joint of posterior antenna; female. $\times 240$.
 6. Mandible and palp. $\times 240$.
 7. Second foot-jaw of female. $\times 240$.
 8, 9. Do. male, right and left. $\times 240$.
 10. Foot of first pair. $\times 200$.
 11. Do. second pair. $\times 200$.
 12. Caudal ramus. $\times 200$.
 13. Eye. $\times 140$.

PLATE LI.

Cyprinotus sarsi, p. 700.

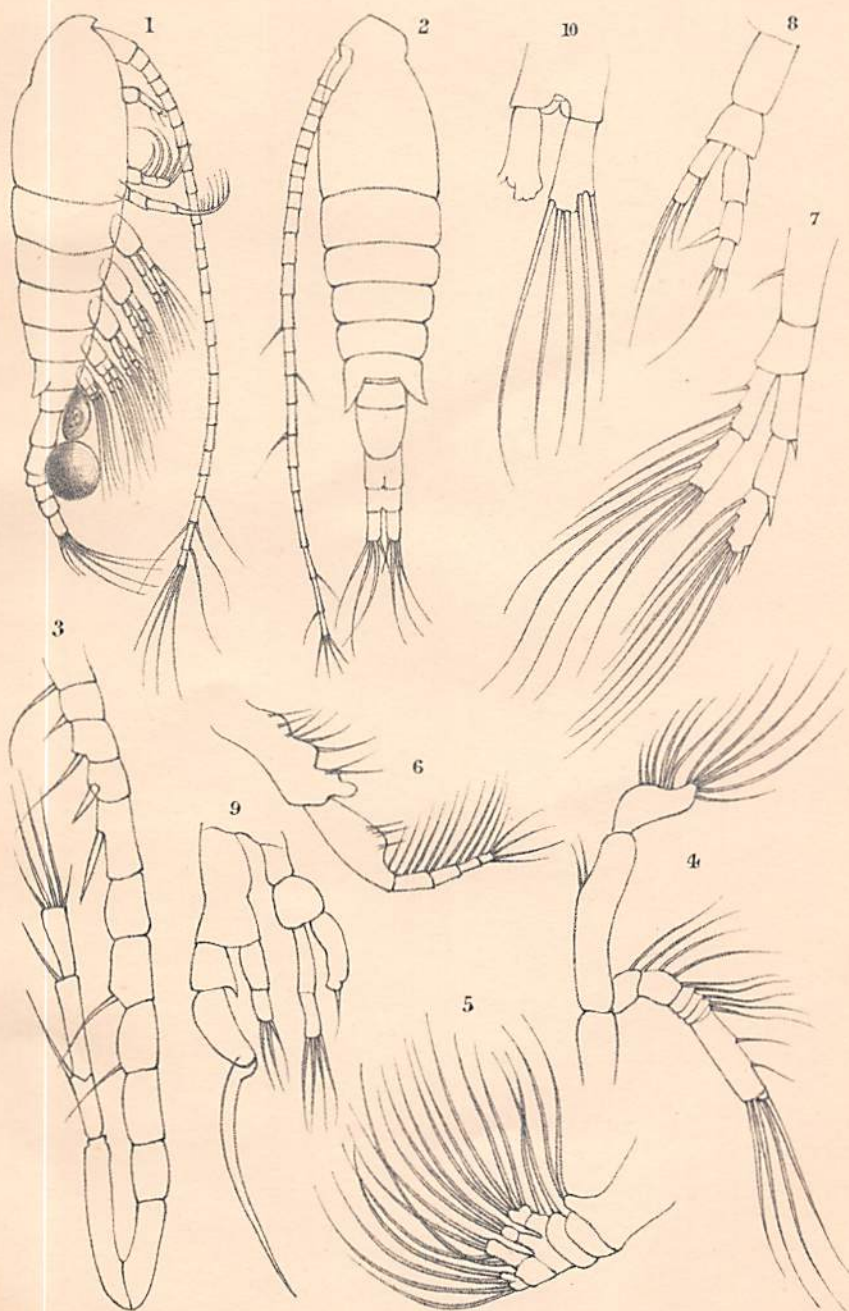
- Fig. 1. Outline of shell of female, from left side. $\times 40$.
 2. Do. do. from above. $\times 40$.
 3. Do. of male, from left side. $\times 40$.
 4. Posterior antenna. $\times 84$.
 5. Mandible and palp. $\times 84$.
 6. Second maxilla of right side (male). $\times 200$.
 7. Do. prehensile portion, left side. $\times 200$.
 8. Foot of first pair. $\times 84$.
 9. Last joint of second foot. $\times 84$.
 10. Caudal ramus. $\times 84$.
 11. External copulatory organs. $\times 84$.



G. S. Brady del.

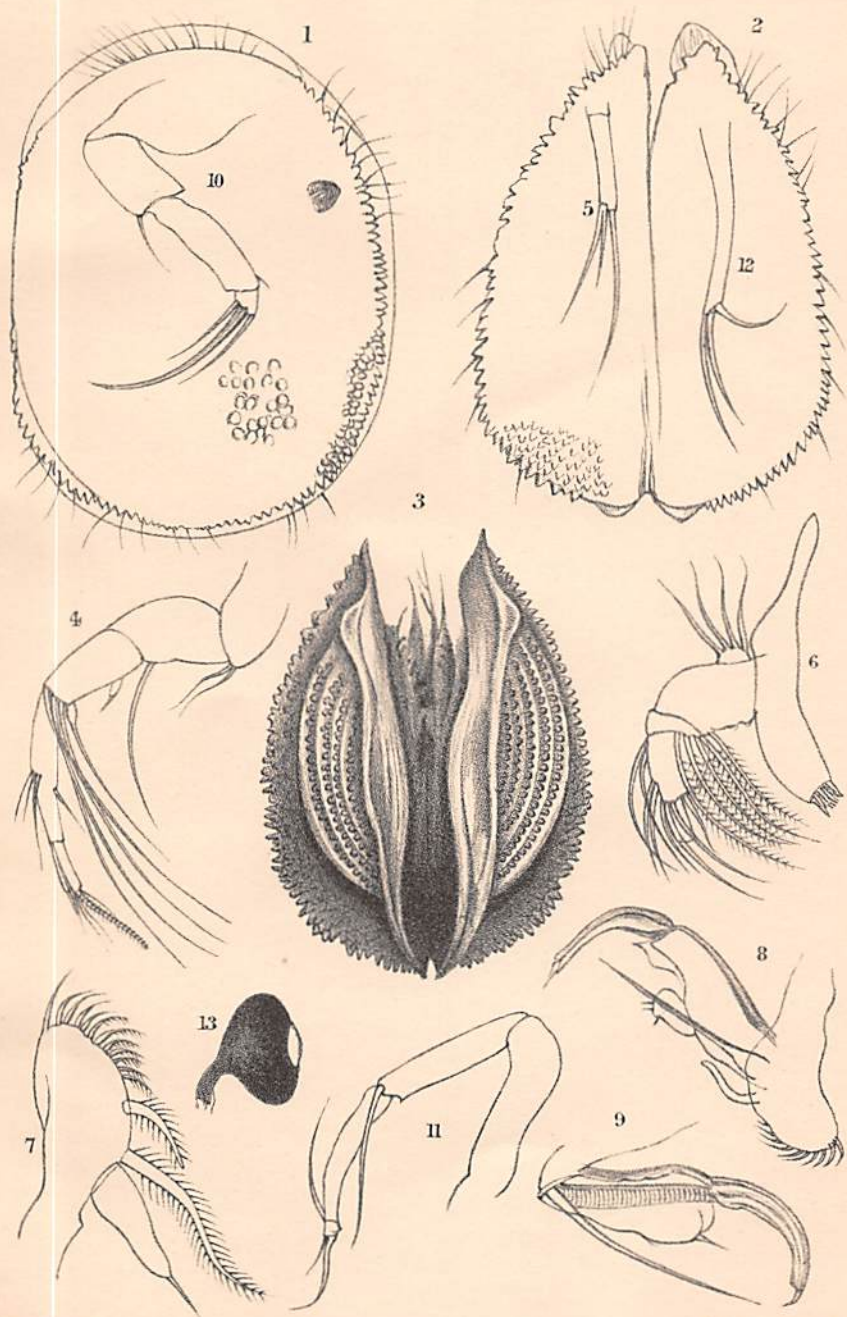
M. P. Parker lith.
Parker & West imp.

ENTOMOSTRACA FROM NEW ZEALAND LAKES.



G.S. Brady del.

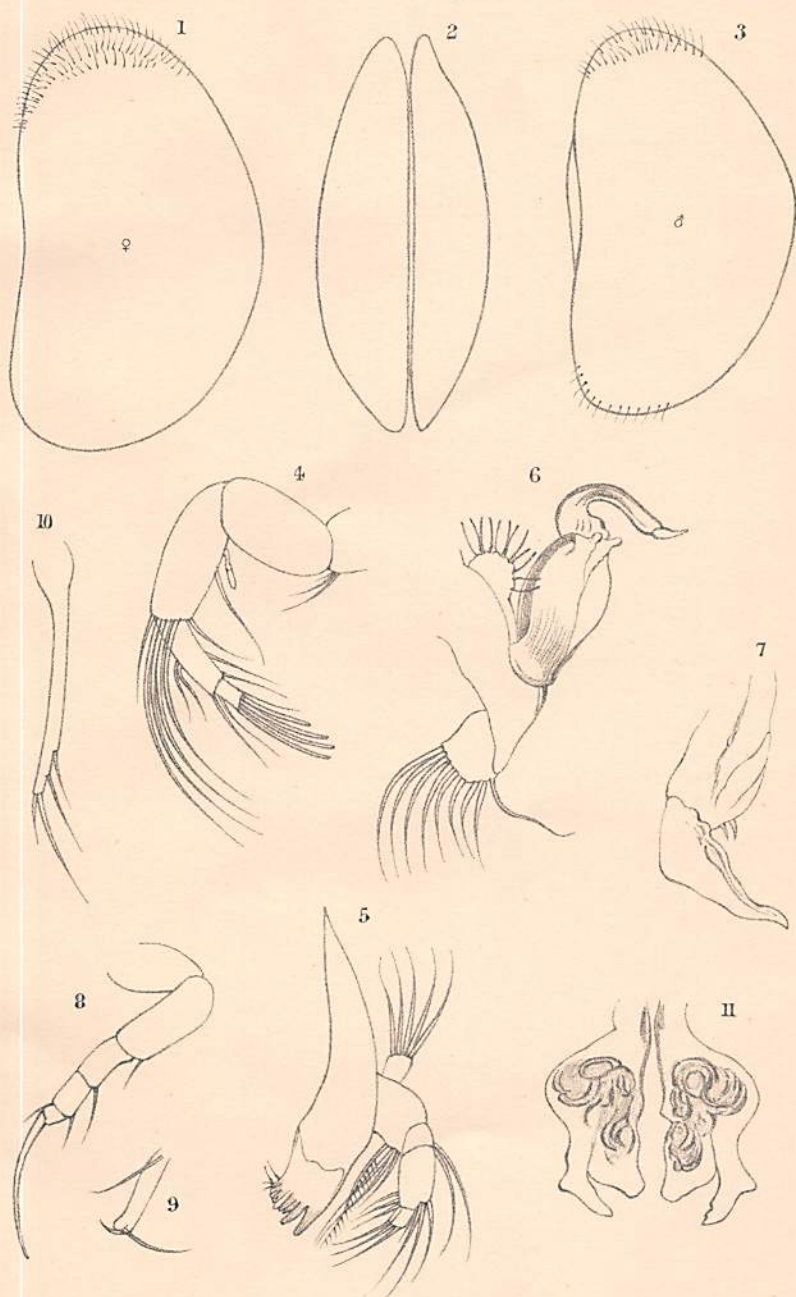
M.P. Parker lith.
Parker & West imp.



G. S. Brady del.

M. P. Parker lith.
Parker & West imp.

ENTOMOSTRACA FROM NEW ZEALAND LAKES.



G.S. Brady del.

M.P. Parker lith.
Parker & West imp.