VI.—THE INVERTEBRATE FAUNA OF THE INLAND WATERS OF SCOTLAND.—PART V. By Thomas Scott, F.L.S. (Plates IX., X.)

During the past year a considerable number of the fresh water lochs of Scotland have been visited and examined. They include all, or nearly all, the lochs on the Island of Barra (Outer Hebrides); three of the principal Lochs of North Uist; three Lochs in Perthshire; one near East Tarbert, Argyllshire; and three in the vicinity of Glasgow. Not a few of them contain trout, and are more or less frequented by anglers. The following are the names of the various lochs referred to, and which are described in this report:—

Group I. Lochs in the Outer Hebrides	Sinclair's Loch or Loch Mór	1*st.* Lochs on the Island of Barra, Outer Hebrides.
	Loch na Doirlinn	
	Small Loch near Loch na Doirlinn	
	Loch Benloden	
	Loch Cadha Mór	
	Pools on the top of Ben Heaval	
	Loch an Ail	
	Loch Scotagary	
	Lochan nam Faoileann, North	
	Lochan nam Faoileann, South	
	Loch an Duin	
	Loch na Nighinn Ruaidhe	
	Loch Scadowa	2*nd.* Lochs on the Island of North Uist, Outer Hebrides.
	Loch Skealtar	
	Loch Fada	
	Loch na Kenna, or the Lilly Loch	1*st.* Loch near E. Tarbert, Argyllshire.
Group II. Lochs on the Mainland	Lochan a Chaite	2*nd.* Lochs in Perthshire.
	Lochan Lairig Eala	
	Loch Lubnaig	
	Possil Marsh	3*rd.* Lochs in the vicinity of Glasgow.
	Bardowie Loch	
	St German's Loch	

In describing the results of the examination of these lochs, I propose to take them in the order in which they are here arranged. It is not intended to describe in detail the various organisms obtained in each loch. A summary only of them will be given, along with notes on a few of the more interesting species; and at the end of the description of each group of lochs a Table will be added containing the names of all the species identified, and showing their distribution in the various lochs described.

Group I.—LOCHS IN THE OUTER HEBRIDES.

1*st.*—The Lochs on the Island of Barra, Outer Hebrides.

Preliminary Note.

Last year, during the Herring Fishing season, I was requested by the Fishery Board for Scotland to proceed to the Island of Barra to make some inquiries concerning the mackerel, that are known to frequent the

shores of the Outer Hebrides. Unfortunately, owing to the unfavourable state of the weather at the time, little could be done toward acquiring the information desired. Rather than that the time should be altogether wasted, it was decided to take advantage of the opportunity to make an examination of the fresh water lochs of Barra. A day was also devoted to the examination of three of the principal fresh water lochs of North Uist. Mr Robert Duthie, Fishery Officer, who also proceeded to Barra to assist in the same inquiry, rendered me very effective help in the examination of the lochs. I have also to acknowledge my indebtedness to Mr Donaldson, the Fishery Officer stationed at Barra. He endeavoured in every way he could, consistent with his official duties, to make our examination of the lochs successful.

When any of the lochs were to be visited, our outfit usually consisted of a hand-net, a tow-net, several bottles, and 60 to 100 fathoms of strong but light cord,—for the lochs were examined both by hand-net and tow-net. As we did not have the use of a boat for working the tow-net on any of the lochs visited, it was our custom to select for work those parts of the loch where the outline of the shore was more or less angular. One of us would then take hold of the tow-net, to which one end of the cord had been attached; while the other would, with the cord in his hand, work round the shore as far as the length of the cord would admit of. In this way a considerable space of water, more or less free from obstruction, would be obtained through which the tow-net could be dragged. On a signal being given, the one holding the net would let it go, while the other pulled it through the water: the net had to be pulled quickly, especially in shallow water, else it would sink and get filled with mud, or perhaps catch on stones at the bottom.

Many good gatherings were obtained in this way, and as a consequence the examination of the lochs of Barra was fairly successful.

Several of the Barra lochs contain trout, and are frequently fished during the summer months, but they are usually fished from the shore.

Sinclair's Loch (or Loch Mór), Loch na Doirlinn, and Small Loch near Loch na Doirlinn.

Near the hamlet of Tangusdale, and at the foot of the cliffs that form the northern boundary of the mass of high rocky ground known as Ben Tangaval, are situated the three small lochs mentioned above, the eastmost of which, in dry weather, is little better than a morass. They are all within a short distance of the sea, and not much above sea-level. It is asserted that sometimes during high water of spring tides the sea flows into Loch Mór, especially if there happens to be a fresh on-shore wind at the time. At the date when these lochs were examined, however, the water was quite pleasant to the taste and no trace of brackishness could be observed in it, so that evidently there had been no inflow of the sea for a considerable period previous to our visit. At a short distance from the east end of Loch Mór,—which is the eastmost and largest of the three,—is a small island containing the remains of a square keep or stronghold of some kind, a considerable part of the walls of which still exist.* The water around the island is of considerable depth, and, so far as could be ascertained, this appears to be the deepest part of the loch. The bottom at this part consists of fine mud, and large eels are said to be sometimes obtained here. During the summer months beds of aquatic plants—*Littorella*, Pondweeds, Rushes, &c.—occupy the shallower parts near the west end of the loch. A short distance northwestward of Loch

* This ruin is known by the name of *Dun Mhic Leoid*.

Mór is Loch na Doirlinn, which is considerably smaller and shallower than the other; while still farther to the west is the third loch. The overflow water from this loch drains into Loch na Doirlinn, but Loch na Doirlinn and Loch Mór have separate effluents, which unite before reaching the sea. Though, as already stated, we found the water of these lochs quite fresh to the taste, yet in the two larger ones, swarms of *Mysis vulgaris* were observed swimming about over the shallow sandy bottom and quite close to the shore, and numbers of them were caught by the hand-net. The *Gammarus* observed in these lochs, and in other lochs in Barra and North Uist, appear all to belong to the form described in Prof. G. O. Sars' *Crustacea of Norway* as *Gammarus duabeni*, Lilljeborg; the inner ramus of the last pair of uropoda is considerably shorter than the outer ramus, and the telson, uropods, and dorsal surface of urosome have a dense covering of strong hairs. Among the Copepoda observed in these lochs is a *Canthocamptus* apparently new to science—it is described and figured at the end of this report. The same species of *Canthocamptus* was subsequently obtained in a number of other localities in Barra, in North Uist, and in Shetland, and also near the head of Loch Tarbert. In these lochs there was also a greater variety of Ostracoda than was observed anywhere else in Barra or North Uist, and included among them was the somewhat rare *Darwinula Stevensoni*.

The total numbers of species of Mollusca and Crustacea obtained and identified in the gatherings from the three lochs just described are as follow:—Loch Mór,—six species of Mollusca, one of Schizopoda, one of Amphipoda, seven of Copepoda, nine of Ostracoda, and only one species of Cladocera. Loch na Doirlinn,—three species of Mollusca, one of Schizopoda, one of Amphipoda, five of Copepoda, six of Ostracoda, and three of Cladocera. Small Loch West of Loch na Doirlinn,—one species of Amphipoda, five of Copepoda, three of Ostracoda, and eleven of Cladocera. The names of all the species are given in the Table of Distribution (Table I.).

Loch Benloden.

This loch occupies a hollow on the south side and near the summit of the mass of the high rocky land called Ben Tangaval, already referred to, which forms the south-west corner of the Island of Barra. The altitude of Loch Benloden is about 750 feet above the level of the sea. Access to it is somewhat difficult, owing to the rough nature of the ground that has to be traversed to reach it. The surroundings of the loch consist largely of peat moss, and the variety of Crustacean life was not very great,—three species of Copepoda (including *Ophiocamptus sarsi*, Mrazek) and seven species of Cladocera, were the only Crustacea observed.

Loch Cadha Mór and Pools near the Summit of Ben Heaval.

I have placed these two together, as they are comparatively near to each other and were visited on the same day. Loch Cadha Mór is situated among the hills that rise immediately behind the village of Castlebay. Part of the water used for domestic purposes in Castlebay comes from this loch, and the following reference to the means adopted to obtain the water may be of interest. The loch occupies a natural hollow among the rocky uplands, rocky ground rises above the loch all round except at the north end, and the natural course for the overflow water is from this end away down the valley to the west coast, and therefore out of

reach of Castlebay. In order to overcome the natural obstacles in the way of obtaining a supply of water for the use of the village, the following ingenious device has been adopted :—a series of metal pipes carefully fitted together have been laid from the loch up over the high ground and for some distance down the valley on the other side, thus forming a very effective siphon. The water, on leaving the outlet end of the siphon, runs down the natural water-way of the valley to the store-pond from which the village of Castlebay is supplied. Loch Cadha Mór is in this way made to contribute its share of the water required by the people of the village.

One of the most common of the organisms observed in this loch was *Diaptomus serricornis*. It is somewhat singular that this hitherto apparently rare British Copepod was the only *Diaptomus* observed in the Barra lochs, and it occurred in no fewer than eight of them. It was also the only species of *Diaptomus* observed in the North Uist lochs, and in several of the lochs of Shetland that were examined last year (see separate report on the Shetland Lochs by myself and Mr Duthie F.O.). Eight species of Copepoda, six of Ostracoda, and eleven of Cladocera, were obtained in Loch Cadha Mór ; *Gammarus* was also fairly common ; a few *Limnæa peregra* and *Pisidium pusillum* were the only Mollusca observed. The altitude of Loch Cadha Mór is over 500 feet above sea-level.

Ben Heaval, which is the highest hill on the Island of Barra, has an altitude of 1200 feet above the sea. At the time of my visit there were several pools that had been formed by the rain water collecting in the hollows scooped out of the peat, which, in some places near the summit of the hill, forms beds of considerable thickness. A comparatively large number of Crustacea were obtained in these pools, among which were *Diaptomus serricornis*, four species of *Cyclops*, three of *Harpacticidæ* two of Ostracoda, and seven of Cladocera. Fine specimens of *Acantholeberis curvirostris* were obtained in the Ben Heaval pools. *Alona rustica*, n. sp.—an apparently new Cladoceran—was obtained in the gatherings from Loch Cadha Mór (see Notes on rare Crustacea at the end of the paper).

Loch an Ail.

Loch an Ail is a small loch on the east side of, and a short distance from, the highway between Ruliess and Balnabodach, and occupies a natural hollow in the rocky ground forming one side of the narrow water-way through which the sea flows into Loch Obe. Its altitude is about 40 feet above sea-level. Some large specimens of (?) *Bosmina longirostris* were obtained here (see note on *Bosmina*, with drawings of specimen). The species observed and identified in the tow-net gatherings from Loch an Ail comprise *Planorbis nautileus*, *Gammarus duabeni*, together with nine species of Copepoda, four of Ostracoda, and four of Cladocera.

Loch Scotagary.

The south-east end of this loch almost touches the highway a short distance north of the village of Ruliess. It is one of several small lochs situated in a stretch of bog-land that extends for a considerable distance to the north and west of the village just referred to. Loch Scotagary is about 100 feet above the level of the sea, and moderately deep.

The Crustacea obtained in this loch comprised seven species of Copepoda (including *Diaptomus serricornis*), and nine species of Cladocera ; *Gammarus duabeni* was frequent.

Lochan nam Faoileann—North and South.*

These two lochs, which are situated in the same stretch of peat-bog with Loch Scotagary, from which the south loch is distant about 300 yards, are separated from each other by quite a narrow ridge of hard ground. There appeared to be no connection whatever between them; but though the distance that separated the one loch from the other was so small, there was a considerable difference in the number and variety of the organisms obtained in the two lochs. In the south loch one species of bivalve Mollusca (*Pisidium*, sp.), and *Gammarus duabeni* were observed, also the following Copepoda and Cladocera:—*Cyclops strenuus* (very common with ovisacs), *Cyclops serrulatus*, and *Cyclops fimbriatus*; *Diaptomus serricornis*, and *Attheyella crassa*; *Drepanothrix dentata*, *Bosmina longirostris*, *Alonopsis elongatus*, *Alona quadrangularis*, and *Chydorus sphæricus*,—in all twelve species, exclusive of species of Notonectidæ, Water-mites, Insect larvæ, &c.; whereas in the north loch twenty-four species were obtained. The organisms identified in the gatherings from this loch comprised two species of *Pisidium*; seven species of Copepoda (including *Cyclops affinis* (G. O. Sars) with oviscas); *Diaptomus serricornis*, and *Ophiocamptus sarsi*; and fifteen species of Cladocera. It is somewhat curious that there are no records of Ostracoda in this loch, where other groups of Crustacea are so well represented; but it is quite possible some species of them may exist in the loch, though not observed in our gatherings, for it is not pretended that our examination of the various lochs was an exhaustive one.

Loch na Nighinn Ruaidhe.

About 600 yards (or the one-third of a statute mile) north-west from the northernmost of the two lochs last described brings us to Loch na Nighinn Ruaidhe, which is surrounded on all sides by bog-land and heather; some low hilly ground separates this one from the others. When we reached this loch we discovered that it had an interest for other people as well as for us: two clergymen were at work angling for trout, and when the purpose of our visit was explained to them, they appeared greatly interested. The trout in this loch are small but are said to be very good. Twenty-two species of Crustacea and one of Mollusca were obtained as the result of our examination of Loch na Nighinn Ruaidhe; the common brown *Hydra* was observed to be frequent in this loch; Water-mites, Insect larvæ, Diatoms, &c., were more or less frequent. The Crustacea obtained comprised seven species of Copepoda, one of Ostracoda, and fourteen species of Cladocera. *Diaptomus serricornis* was found in this loch, and some large and fine *Acantholeberis curvirostris*.

Loch an Duin.

The distance from Castlebay to Loch an Duin as the crow flies is only about 3½ miles, but by the road, such as it is, the distance is at least 3 miles more. The road that crosses the Island from east to west between the head of Bay Hirivagh and Ard Allasdale passes close along the north side of Loch an Duin. This loch appears to be one of the largest lochs on the Island of Barra, and it is considered to be a fairly good loch for trout. It was examined by us on the 21st of May, and the result was rather disappointing,—only nine species of Crustacea altogether were obtained in the gatherings collected here. *Diaptomus serricornis* was

* Or, more correctly, North-west and South-east.

frequent, and several large *Bosminæ* (? *Bosmina longirostris*), were also observed.

This completes the list of Barra lochs that were examined. I will now proceed to describe the results of the examination of the lochs of North Uist.

2nd.—Lochs on the Island of North Uist, Outer Hebrides.

The inland portion of the Island of North Uist is low-lying and the surface gently undulating; and owing to the peculiar conformation of this inland portion, a large part of it is simply a net-work of lochs and tarns. So much is this the case, that a person not acquainted with the island, who has happened to leave the highway to enjoy a stroll upon the moors, may have to wander for hours among an apparently endless entanglement of water-ways before he again finds the road. Through the kindness of the Fishery Officer at Castlebay, whose jurisdiction extends to Loch Maddy, I was introduced to Mr M'Kenzie (who was post-master at Loch Maddy at that time, but who has since been promoted to another locality), and by him to Mr Frazer, the Banker at Loch Maddy, a gentleman well acquainted with the peculiar features of the Island. Mr Frazer, as soon as he understood the object of my visit, endeavoured to help me all he could by giving me most useful information about the intricacies of the moors, and by lending me a map of the district and tracing upon it a route by following which I might make the most of the time at my disposal.

Loch Skealtar.

This was the first loch visited. The east end of it is easily reached by the road that at a short distance from Loch Maddy diverges towards the south. Leaving the road where Loch Skealtar impinges upon it, I followed its shore line as closely as circumstances would allow, and worked the hand-net wherever a suitable place was observed. The shore of this loch seems to be in general bare and stony, at anyrate very little vegetation other than *Litorella* and small species of *Juncus* was observed anywhere at the time of my visit; so therefore, when the gatherings that had been collected were examined, I was somewhat surprised to find that they contained a large variety of micro-crustacea, including among them several rare species. No fewer than thirty-one different kinds of Crustacea were obtained, besides specimens of the bivalve Molluscan species *Pisidium pusillum*; they comprised one species of Amphipoda (*Gammarus duabeni*), ten species of Copepoda, four of Ostracoda (including *Candona Kingslei*, and *Darwinula Stevensoni*), and sixteen species of Cladocera. Among the Cladocera there were besides *Drepanothrix dentata* and *Acantholeberis curvirostris*, the rare and curious *Monospilis dispar*. *Alona neglecta*, n. sp., an apparently new Cladoceran, was obtained here (see Notes on this and other rare Crustacea at the end of the paper).

Loch Scadowa.

Leaving the west end of Loch Skealtar, I struck across the moor south-west to Loch Scadowa. This is a beautiful loch, with long reaches of clear water. Its configuration is very irregular and confusing, especially till one can get upon some high ground from which a view of its general outline may be obtained. Only in some of the shallower parts of the loch is vegetation at all common; nevertheless it has, like Loch Skealtar, a prolific crustacean fauna, particularly Cladocera, in which the gatherings collected at this time were very rich. Mollusca appear to be very scarce. I find there is no record among my notes of any species of Mollusca

having been observed, yet it is almost certain that the more common species of *Pisidia* and *Limnæa* will be found in the loch,—in fact it would be rather interesting were it proved that no Mollusca existed in Loch Scadowa, considering its comparatively large size and its suitability as a habitat for such species. The Crustacea obtained in Loch Scadowa comprised, besides the commonly distributed *Gammarus* (?) *duabeni*, eight species of Copepoda, three species of Ostracoda, and nineteen species of Cladocera. Notonectidæ, Water-mites, Insect larvæ, Diatoms, &c., were also obtained in considerable abundance. Two of the species of Cladocera appear to be undescribed—they are described and figured at the end of the Report on the Shetland Lochs under the names of *Alona neglecta*, n. sp., and *Alona rustica*, n. sp.

Loch Fada.

Proceeding northward from Loch Scadowa, across the moor, I at length reached Loch Fada. In this loch, or rather in some of its arms that stretch for a greater or less distance up the hollows that branch off from the general shore line, and where the water shallows much, aquatic vegetation was more abundant than it appeared to be in the other two lochs visited. Yellow water-lilies just bursting into blossom filled up the shallow bays, while *Litorella* formed a green spongy carpet that extended up the almost level sandy beach to a considerable distance beyond the edge of the water. In the more swampy parts the long trailing stems of the Bog Bean formed an intricate net-work, from which arose at short intervals the ternate leaves and beautiful feathery flowers so characteristic of the plant. But this fine loch with all its floral beauty and apparent suitability as a habitat for an abundant micro-fauna was, if one may judge by the results of the examination of the gatherings collected here, much less prolific in such organisms than either Loch Skealtar or Loch Scadowa.

Eighteen species of Crustacea were obtained in the gatherings from Loch Fada, four of which were Copepoda, the other fourteen being Cladocera; neither Ostracoda nor Mollusca were observed, and this was the only loch in the group of Hebridian Lochs now described in which *Camptocercus macrurus* was obtained. The only effluent of Loch Fada is a stream of clear pure water which flows from the east end down into Loch an Aastrum,—a tidal loch much nearer Loch Maddy than this. On making a partial examination of this stream (it is called the Fada Burn), I found that Mollusca were, as regards numbers, well represented here, though no specimens had been obtained in the loch itself. Three species, —*Pisidium pusillum*, *Limnæa peregra* and *Ancylus fluviatilis*,—appeared to be of common occurrence, harbouring about the boulders in mid-stream. These species are entered in the Table (Table I.) under Loch Fada.

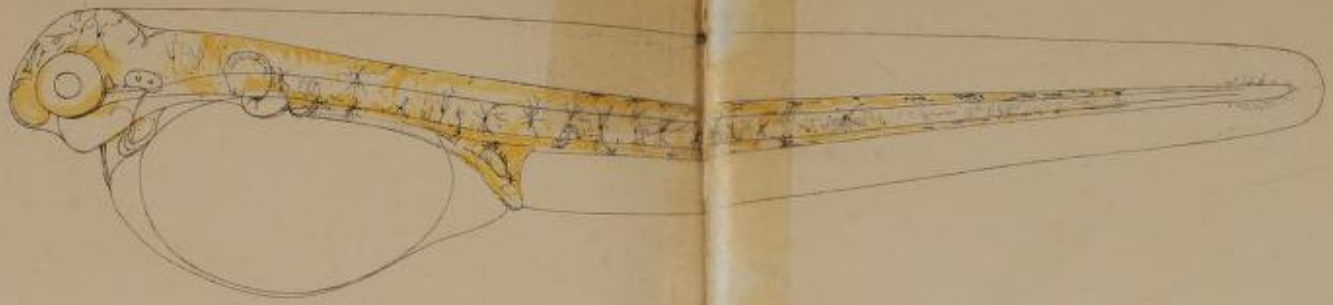
With the examination of Fada Burn my visit to Loch Maddy and the North Uist Lochs came to a close. No attempt appears to have hitherto been made to carry out a systematic investigation of the lochs of the Outer Hebrides, and it is evident, from what has now been done, that such an investigation might be expected to yield interesting results and extend very considerably our knowledge of the fresh water invertebrate fauna of our country. But this is a work that would require the services of several students—each with a special knowledge of one or other of the groups of organisms likely to be met with.

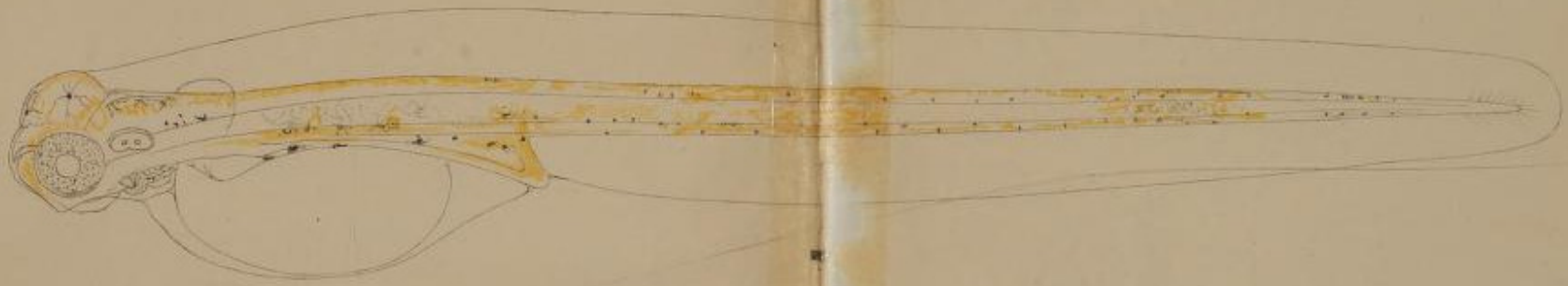
Appended hereto is a Table (Table I.) in which will be found the names of the species that have been obtained—and identified—in the lochs of Barra and North Uist described in the preceding notes, and showing their distribution in the various lochs.

TABLE I.—Containing the names of all the species identified in the Lochs of Barra and North Uist, described in the preceding pages, and showing the Lochs in which each species was found. An × is used to indicate the Loch or Lochs in which the species was obtained.

Names of the Species.	Barra Lochs.												N. Uist Lochs.		
	Loch Mór.	Loch na Doirlinn.	Small Loch near Loch na Doirlinn.	Loch Benloden.	Loch Cadha Mór.	Pools on the top of Ben Heaval.	Loch an Ail.	Loch Scotagarry.	Loch an Duin.	Lochan na Nighinn Ruaidhe.	Lochan nam Faoileann, N.	Lochan nam Faoileann, S.	Loch Scadowa.	Loch Skealtar.	Loch Fada.
Mollusca.															
Pisidium fontinale (Drap.),	×														
,, *pusillum* (Gmelin),	×	×			×									×	
,, *nitidum*, Jenyns,															
Planorbis glaber, Jeffreys,	×								×						
,, *nautileus* (Linné),	×	×					×								
,, *nautileus*, var. *cristata*,	×														
Limnæa peregra (Müller).	×	×			×										×
,, *truncatula* (Müller),	×														
Ancylus fluviatilis, Müller,															×
Crustacea—Schizopoda.															
Mysis vulgaris, Thompson,	×	×													
Amphipoda.															
Gammarus duabeni,	×	×	×		×		×	×				×	×	×	
Copepoda.															
Diaptomus serricornis, Lilljeborg,					×	×	×	×	×	×	×	×		×	
Cyclops viridis, Jurine,	×				×				×				×	×	×
,, *signatus*, Koch,	×		×		×	×		×	×	×				×	
,, *strenuus*, Fischer,					×		×	×		×		×	×	×	
,, *bicuspidatus*, Claus,		×				×									
,, *serrulatus*, Fischer,	×		×	×	×	×	×	×	×	×	×	×	×	×	×
,, *affinis*, G. O. Sars,							×			×	×				
,, *fimbriatus*, Fischer,	×	×				×	×	×	×	×	×	×		×	
Canthocamptus hirticornis, n. sp.,	×	×											×	×	
Attheyella crassa, (G. O. Sars),	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
,, *pygmæa* (G. O. Sars),	×	×	×		×	×	×	×					×	×	
,, *zschokkei* (Schmeil),					×								×	×	×
Ophiocamptus sarsi, Mrazek,			×	×		×					×		×		

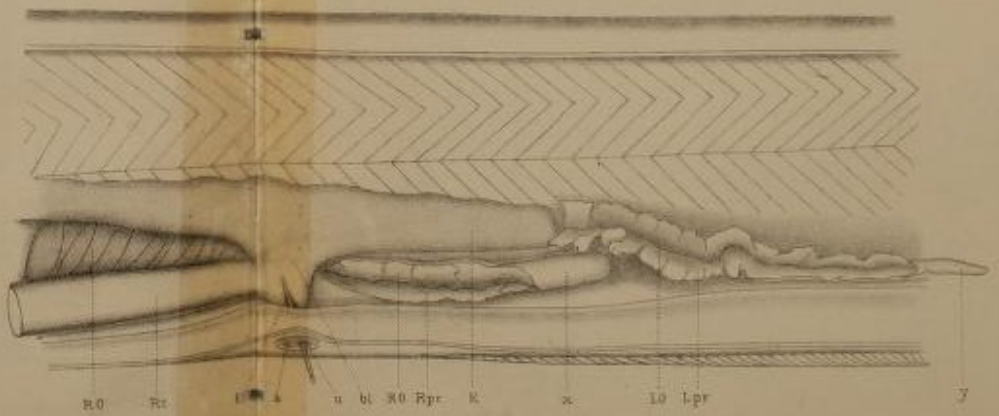
1.





3.

4.



5.

Figs 1-3, W.C.M. Figs 4 & 5, H.C.W. del.

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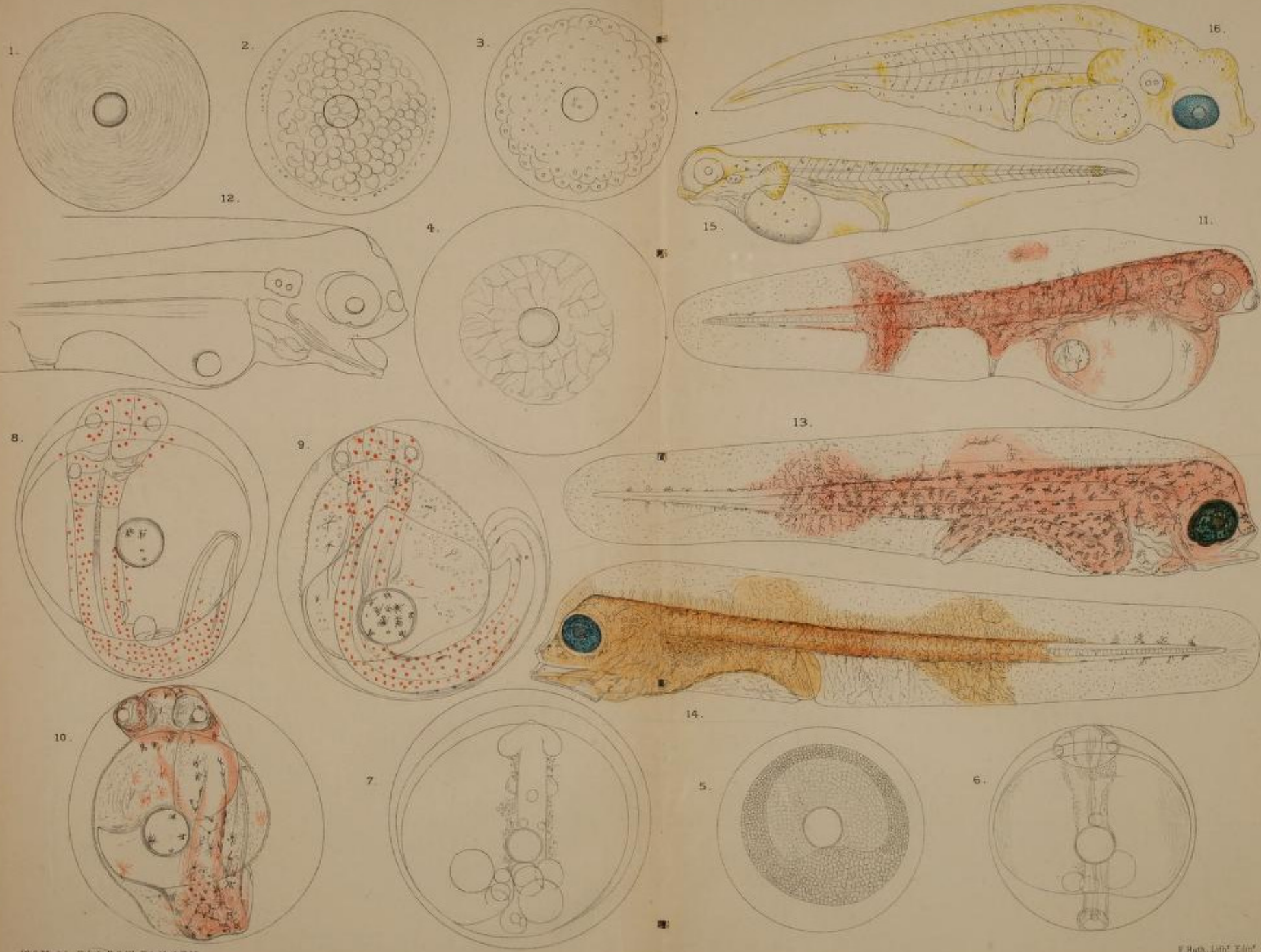

W.C.M. del. Fig. 5. R.C.W. Fig. 15. A.T.M.

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F. Huth, Lith.r Edin.r

TABLE I.—*continued.*

Names of the Species.	Barra Lochs.												N. Uist Lochs.		
	Loch Mór.	Loch na Doirlinn.	Small Loch near Loch na Doirlinn.	Loch Benloden.	Loch Cadha Mór.	Pools on the top of Ben Heaval.	Loch an All.	Loch Scotagary.	Loch an Druin.	Lochan na Nighinn Ruidhe.	Lochan nam Faoileann, N.	Lochan nam Faoileann, S.	Loch Scadowa.	Loch Skealtar.	Loch Fada.
OSTRACODA.															
Cypria ophthalmica (Jurine),	×				×	×	×								
,, *serena* (Koch), . .	×	×			×	×	×			×			×	×	
Cypris fuscata, Jurine, . .	×														
Erpetocypris reptans (Baird), .	×														
Cypridopsis vidua (Müller), .	×														
,, *villosa* (Jurine), .					×										
,, *aculeata* (Lilljeborg), . .		×													
Potamocypris fulva, Brady, .	×														
Candona candida (Müller), .	×	×	×		×		×						×	×	
,, *pubescens* (Koch), .	×	×	×												
,, *Kingsleii*, B. & R.,					×									×	
Darwinula Stevensoni, B. and R., ...		×												×	
Limnicythere inopinata (Baird), ...	×	×	×											×	
CLADOCERA.															
Sida crystallina (Müller), .								×		×			×		×
Daphnella brachyura (Lievin),		×									×				
Bosmina longirostris (Müller),				×	×	×	×	×	×	×	×	×	×	×	×
Drepanothrix dentata (Euren),											×	×	×	×	×
Acantholeberis curvirostris (Müller), ...						×				×	×		×	×	×
Ilyocryptus sordidus (Lievin),		×	×		×	×				×	×				
Daphnia (?) *galeata*, G. O. Sars,													×		
Simocephalus vetulus (Müller),			×												
Ceriodaphnia (?) *quadrangula* (Müller), ...					×		×		×						
Eurycercus lamellatus (Müller),								×		×	×		(?)		
Acroperus harpæ, Baird, .			×						×	×	×		×	×	×
Camptocercus macrurus (Müller), ...													×	×	
Alonopsis elongatus, G. O. Sars, ...															×
			×	×				×		×	×	×	×	×	×
Graptoleberis testudinarius (Fischer), ...			×	×							×		×		×
Alona neglecta, n. sp., . .													×	×	
,, *rustica*, n. sp., . .					×								×		
,, *guttata*, G. O. Sars, .								×							
,, *quadrangularis* (Müller), ...	×	×	×	×	×	×	×	×	×		×	×	×	×	×
Alonella exigua (Lilljeborg), .			×	×	×									×	
Alonella nana (Baird), . .			×		×	×		×		×				×	×
Peracantha truncata (Müller),										×	×		×	×	×
Pleuroxus trigonellus (Müller),			×												
Harporhynchus falcatus, G. O. Sars, ...								×		×			×	×	
Chydorus sphæricus (Müller),			×	×	×	×		×		×	×	×	×	×	×
,, *barbatus* (G. Brady), . .			×	×	×	×					×		×	×	×
Monospilus dispar, G. O. Sars,													×	×	
Polyphemus pediculus (De Geer), ...											×		×	×	×

Group II.—LOCHS ON THE MAINLAND.

1*st*. Loch na Kenna (or the Lilly Loch) near E. Tarbert, Argyllshire.

I now proceed to describe the second group of lochs—viz., those in the Mainland—that have been examined during the past year; and the first I propose to refer to is a little hill loch called Loch na Kenna, and sometimes the Lilly Loch, from the number of white water lilies that grow in it. It was examined in the month of July, and though minute organisms such as Infusoria, Rotifera, Diatoms and other algæ, &c., were abundant, comparatively few Mollusca or Crustacea were obtained. The Mollusca included two species of *Pisidia* and two of *Limnæa*, while the Crustacea comprised two species of Copepoda and six species of Cladocera, none of which are very uncommon.

2*nd*. Lochs in Perthshire.

Lochan a Chaite (on Ben Lawers).

This is a small loch situated fully half-way up the famous Perthshire mountain so well known to botanists for the many rare alpine plants that are to be obtained among its rocks and gullies. Lochan a Chaite occupies a hollow in a kind of natural recess at the foot of the precipitous ridge of rocks that extends from a little below the summit of Ben Lawers to the mountain on the east side, apparently as if it were binding the two together. As the two mountain masses extend some distance forward in a southerly direction, a kind of natural recess, as I have called it, is formed, the mountain summits forming the sides, while the ridge encloses it on the north; the ground within this recess is comparatively flat, with the loch near the middle. The nearest way to the loch is to 'make a Bee line' right up and across the moor from Lawers Inn; but an easier though longer way is by the hill road that joins the highway a short distance east from the Inn, and close beside the Lawers Burn, which is the effluent from Lochan a Chaite. This hill road follows the track of the Burn, more or less closely, nearly all the way up to the Loch.

The water in the loch is supplied by the streamlets that drain off the surface moisture from the adjacent sides of the two mountains, and which during a great part of the year consists chiefly of rain water or melted snow, or a mixture of both. The loch appears to be rapidly filling up with the sediment carried into it by its affluents, and even as it is a large portion of it is very shallow, so much so that a small tow-net with a ring about 12 inches diameter, when dragged across the loch some distance up from its lower end touched the bottom in several places, when part of the ring was still appearing above the surface of the water. The deepest part appears to be at the upper end, but I was unable at the time of my visit to ascertain its depth here.

The altitude of Lochan a Chaite is about 2400 feet above sea-level, and over 2000 feet above Loch Tay. It was examined about the middle of September.

Because of the great altitude of this little loch, I considered that it was just possible that organisms might be obtained in it that are not to be found in lochs lower down. The examination of the gatherings collected in September, however, does not seem to bear this out, for, with one or two exceptions, all the species obtained are similar to those frequently observed in lochs and pools within a few feet of the level of the sea. But though the results were somewhat disappointing, I was rewarded by the discovery of one organism—a Copepod quite distinct from any other

British fresh water species known to me,—a description of it is given at the end of this Report.

I was informed that the loch contains trout, and as a matter of fact a few post-larval specimens were found in my tow-net gatherings, but it is rarely visited by anglers. The invertebrates obtained and, so far, identified, in the tow-net and hand-net gatherings from Lochan a Chaite are as follows:—a few specimens of a variety of *Limnæa peregra*, a few specimens (apparently not mature) of *Gammarus*, seven species of Copepoda (including the form referred to above), four species of Ostracoda, and ten species of Cladocera, also some Insects, Insect-larvae, one or two spiders (probably recently washed into the loch), Diatoms, and some other minute organisms.

Lochan Lairig Eala.

The altitude of Lochan Lairig Eala is 984 feet above sea-level. It is situated close to the old Killin Passenger Station of the Callander and Oban Railway—on the side opposite from the Station—and the present Station at Killin Junction is about two miles north-west from the loch. It is not a very large loch, but appears to be a good loch for trout-fishing; a few boats are kept on it for the use of anglers, but permission to fish has to be obtained.

This loch was examined on the 13th of September by hand-net, from the shore. Micro-organisms appeared to be abundant and varied. When an examination of the gatherings that were collected was made, the following were obtained:—viz., seven species of Copepoda and sixteen species of Cladocera, or a total of twenty-three species of Crustacea. Mollusca were apparently scarce in Loch Lairig Eala, so also were Ostracoda. The somewhat rare *Cyclops affinis*—carrying ovisacs—was obtained here; *Latona setifera* and *Acantholebris curvirostris* were also obtained.

Loch Lubnaig.

An examination of this beautiful loch was made on September 29th. Loch Lubnaig is simply an expansion of the River Leny, which, flowing down through Strathyre, fills up the deepest part of the valley with its pellucid waters, before continuing its course amid the rugged and bewildering mazes of the Pass of Leny. Owing to the configuration of the valley of Strathyre the loch is narrow and elongate, being little more than a third of a mile across, while its length is nearly four miles. The lower half extends nearly in a north and south direction, but the upper half bends round to the north-west, and it is fully four hundred feet above the level of the sea. Among the organisms obtained in the gatherings from this loch are four species of Mollusca, seven species of Copepoda, four species of Ostracoda, and fourteen species of Cladocera, besides Insect-larvæ, Acaridæ, Notonectidæ, Diatoms and other algæ, Rotifera, &c. Among the more interesting Crustaceans found in this loch are *Cyclops macrurus*, G. O. Sars, which as a member of the British fauna has so far been recorded from only a few places in England and Scotland,—Loch Lubnaig being a new station for it; *Ophiocamptus brevipes* (G. O. Sars), another of the Loch Lubnaig Copepods, is new to Britain, it somewhat resembles *Ophiocamptus sarsi* in general appearance, but the structure of the fifth pair of swimming feet is very different. *Darwinula Stevensoni*, Brady and Robertson,—a rare British Ostracod—was also obtained in Loch Lubnaig, as well as an apparently new Cladoceran which I have described as *Alona neglecta* (see Notes at the end of the Report on the lochs of Shetland).

3*rd*. Lochs in the Vicinity of Glasgow.

Possil Marsh.

Though Glasgow continues to extend its boundaries on all sides, this loch or marsh continues to exist and to be the 'happy hunting ground' for naturalists of all sorts. This loch was visited on the 2nd of October, when a number of interesting Crustacea were obtained. *Eurytemora Clausii*, *Cyclops Thomasi*, and *Cyclops affinis*, *Attheyella pygmæa*, *Ilyocryptus sordidus*, *Ceriodaphnia reticulata*, and *Chydorus globosus*, are some of the organisms observed in the gatherings from Possil Marsh. Of the thirty-six species obtained five of them were Mollusca, ten were Copepoda, eight were Ostracoda, twelve were Cladocera, and one a fresh water Isopod, *Asellus aquaticus*. Many other things besides those named were observed, such as Acaridæ, Notonectidae, *Coleoptera*, Rotifera, Infusoria, Diatoms, &c. It may be mentioned that this is only the second time that *Eurytemora Clausii* has been obtained in a fresh water loch in Scotland.

Bardowie Loch.

Bardowie Loch is about six miles north of Glasgow, and a mile and a half from Milngavie, and the old Castle of Bardowie occupies a kind of headland on the north side. The water is pure and clear, and numbers of interesting things are to be obtained in it. Twenty-nine species of Crustracea were identified in the gatherings from Bardowie Loch, and among them were *Cyclops phaleratus*, *Scapholeberis mucronata*, and *Chydorus globosus*. Two species of fresh water Polyzoa—*Paludicella Ehrenbergi* and *Plumatella repens*—as well as a fresh water sponge, were obtained in this loch. Mollusca were not very plentiful at the time of my visit, one or two of the common Pisidia and Planorbi being the only species obtained. Among the Crustacea obtained there were *Asellus aquaticus*, eight species of Copepoda, four species of Ostracoda, and sixteen species of Cladocera.

St German's Loch.

This little loch is now so much surrounded by houses and hidden by trees and walls, that only those acquainted with the district can find their way to it. A stranger to the district can hardly believe that a loch can exist in the neighbourhood, but not only does such a loch exist, it is also still large enough to be the resort of numerous amateur anglers that come to it from various parts of the surrounding district. Though personally unacquainted with the locality, I was favoured with the company of a friend who has been familiar with Glasgow and its environs from his youth.

I found St German's Loch to contain an abundant micro-fauna, but there was scarcely so great a variety as in Possil Marsh or Bardowie Loch. The common *Asellus aquaticus* and fresh water *Gammarus* were both here, together with five species of Copepoda, three species of Ostracoda, and thirteen species of Cladocera. One of the Cladoceran species was the rare *Leydigia quadrangularis* (Leydig). I have obtained this in only two other localities in Scotland. A form of *Daphnia Jardini* was also obtained here. Only two species of Mollusca were observed —viz., *Planorbis albus* and *Physa fontinalis*. Many other micro-organisms belonging to other groups were noticed during the examination of the gatherings that were collected at this time, but they were not identified.

This completes the description of the Scottish lochs that form the subject of the present Report. A Table (Table II.) is appended containing the names of all the organisms obtained and identified in this second group of the lochs, similar to the Table appended to the first group. A description, with drawings of some of the rarer Crustacea obtained in the lochs included in both groups, is also added.

TABLE II.—Containing the names of all the species identified in the Lochs of Perthshire, Argyllshire, and in the vicinity of Glasgow, as described in the preceding pages, and showing the distribution of each species in the various Lochs. An × is used to indicate the Loch or Lochs in which the species was obtained.

Names of the Species.	Perthshire.			Argyll-shire.	Vicinity of Glasgow.		
	Lochan a Chaite.	Lochan Lairig Eala.	Loch Lubnaig.	Loch na Kenna, East Tarbert.	Possil Marsh.	Bardowie Loch.	St German's Loch.
MOLLUSCA.							
Pisidium pusillum (Gmelin),				×	×		
Valvata piscinalis (Müller),			×		×		
Planorbis albus, Müller,			×		×	×	×
,, *contortus* (Linné),			×				
,, *nitidus*, Müller,					×		
Physa fontinalis (Linné),					×		×
Limnæa peregra (Müller),	×			×			
,, *truncatula*,				×			
Ancylus fluviatilus, Müller,			×				
CRUSTACEA—AMPHIPODA.							
Gammarus duabeni, Lilljeborg,	×		×				
ISOPODA.							
Asellus aquaticus,					×	×	×
COPEPODA.							
Diaptomus gracilis (G. O. Sars),		×	×			×	×
Eurytemora Clausii (Hoek),					×		
Cyclops viridis, Jurine,	×	×		×	×	×	
,, *signatus*, Koch,		×	×		×	×	×
,, *Thomasi*, Forbes,					×		×
,, *serrulatus*, Fischer,	×	×	×	×	×	×	×
,, *macrurus*, G. O. Sars,			×				
,, *affinis*, G. O. Sars,		×			×		
,, *phaleratus*, Koch,						×	
,, *fimbriatus*, Fischer,	×	×			×	×	×
Canthocamptus staphylinus (Jurine),					×	×	
Attheyella crassa (G. O. Sars),	×		×		×	×	
,, *pygmæa* (G. O. Sars),	×				×		
,, *zschokkei* (Schmeil),		×	×				
,, *Macandrewæ*, n. sp.,	×						
Ophiocamptus sarsi, Mrazek,	×						
,, *brevipes* (G. O. Sars),			×				
OSTRACODA.							
Cypria ophthalmica (Jurine),	×				×		
,, *lævis* (Müller),	×						

TABLE II.—*continued.*

Names of the Species.	Perthshire.			Argyll-shire.	Vicinity of Glasgow.		
	Lochan a Chaite.	Lochan Lairig Eala.	Loch Lubnaig.	Loch na Kenna, East Tarbert.	Possil Marsh.	Bardowie Loch.	St German's Loch.
OSTRACODA—*continued.*							
Cypria serena (Koch),			×		×	×	
Cyclocypris globosa (G. O. Sars),							×
Cypris fuscata, Jurine,					×		
Erpetocypris reptans (Baird),			×		×	×	×
Cypridopsis vidua (Müller),					×	×	×
Candona candida (Müller),	×		×		×	×	
,, *pubescens* (Koch),	×						
,, *rostrata*, Brady and Norman,					×		
,, *fabæformis* (Fischer),					×		
Darwinula Stevensoni, B. & R.,			×				
CLADOCERA.							
Sida crystallina (Müller),						×	×
Daphnella brachyura (Lievin),		×				×	
Latona setifera (Müller),		×	×				
Holopedium gibberum (Zaddach),	×						
Bosmina longirostris (Müller),	×	×				×	
Drepanothrix dentata (Euren),			×				
Acantholeberis curvirostris (Müller),		×					
Ilyocryptus sordidus (Lievin),		×			×		
Ceriodaphnia quadrangula (Müller),		×				×	×
,, *reticulata* (Jurine),					×		
Ceriodaphnia (?) *laticaudata*,					×		
Scapholeberis mucronatus (Müller),						×	
Simocephalus vetulus (Müller),					×	×	×
Daphnia pulex (De Geer),	×						
,, *Jardini*, Baird,							×
Eurycercus lamellatus (Müller),	×	×	×		×	×	
Acroperus harpæ, Baird,	×	×	×	×	×	×	×
Alonopsis elongatus, G. O. Sars,	×	×	×	×		×	
Leydigia quadrangularis (Leydig),							×
Graptoleberis testudinarius (Fischer),	×	×				×	×
Alona costata, G. O. Sars,							×
,, *neglecta*, n. sp.,			×				
,, *guttata*, G. O. Sars,			×				
,, *quadrangularis* (Müller),	×	×	×	×	×	×	×
Alonella exigua (Lilljeborg),		×	×			×	×
,, *nana* (Baird),		×	×	×			
Harporhynchus falcatus, G. O. Sars,		×					
Peracantha truncata (Müller),	×		×			×	×
Pleuroxus trigonellus (Müller),					×		
,, *lævis* (G. O. Sars),					×		
,, *uncinatus*, Baird,							×
Chydorus sphæricus (Müller),					×	×	×
,, *globosus*, Baird,					×	×	
,, *barbatus* (G. S. Brady),	×	×	×			×	
Polyphemus pediculus (De Geer),		×	×		×		

NOTES AND DESCRIPTIONS OF SOME OF THE SPECIES CONTAINED IN THE TABLES I. AND II.

CRUSTACEA.

COPEPODA.

Calanidæ.

Eurytemora Clausii (Hock).

This Calanid, though frequent in some tidal lagoons and estuaries, is, so far, of rare occurrence in Britain as an inhabitant of purely fresh water. Its occurrence in Possil Marsh, near Glasgow, is therefore of interest, especially as it has been obtained in only one other fresh water locality in Scotland. The fifth feet of the female, of which I have given a drawing from one of the Possil Marsh specimens (Pl. IX. fig. 1), are quite characteristic of the species. The only apparent difference in the female fifth pair from Possil Marsh is that the terminal seta of each branch is plain, or so indistinctly plumose that the feathering was not distinguishable by my ¼-inch objective.

Cyclopidæ.

Cyclops Thomasi, Forbes, *Cyclops affinis*, G. O. Sars, and *Cyclops phaleratus*, Koch.

All these three species of Cyclops are comparatively rare. The first was obtained in two of the lochs near Glasgow—viz., Possil Marsh and St German's Loch. The second was found in three of the Barra lochs,—a few specimens from one loch bore ovisacs; it also occurred in one of the Perthshire lochs (a few specimens with ovisacs), and in Possil Marsh. The third species, *Cyclops phaleratus*, was obtained in only one of the lochs that form the subject of this paper—viz., Bardowie Loch, near Glasgow.

Cyclops macrurus, G. O. Sars.

This rare Cyclops was moderately frequent in the gatherings from Loch Lubnaig. The structure of the antennules is somewhat like that of the same appendages in *Cyclops serrulatus*, but they are considerably shorter. The long and slender abdominal stylets not only want the longitudinal row of minute teeth, but possess a peculiar fascicle of small setæ near the distal end. Discrimination of the species is easy when once the eye becomes familiar with it. The British localities for this species are very few, and Loch Achray—one of the lochs of the Trossachs, and within a comparatively few miles of Loch Lubnaig, but having no connection with it—is one of them.

Harpacticidæ.

Canthocamptus hirticornis, n. sp. (Pl. IX. figs. 13–26).

Description of the species.—Female, length ·58 mm. ($\frac{1}{44}$ of an inch). Body moderately robust. Antennules stout, seven-jointed; joints subequal in length except the first, which is considerably longer, and the

fifth and sixth, which are shorter than the others; the first and second joints are densely covered with small hairs on the upper aspect,—especially the first joint; the proportional lengths of the joints are as follows (see also fig. 14):—

Proportional lengths of the joints,	14 · 10 · 10 · 9 · 6 · 7 · 9
Number of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7

Antennæ stout, secondary branch very small, one-jointed. Mandibles stout, the broad biting part is armed with three strong blunt teeth and a few small spines, there is also a papilliform lateral process, as shown by the drawing (fig. 17); mandible-palp very small, one-jointed, and furnished with one terminal and three lateral setæ. Anterior foot-jaws dilated, short, armed with a stout terminal claw and two marginal spiniferous processes. Posterior foot-jaws are less robust, and consist of two moderately long and nearly equal joints, and a very small terminal joint which forms the base of a moderately stout but not very elongate claw; the margins of the second joint are ciliated, and a setiferous spine springs from the upper distal angle of the first joint. The first pair of swimming feet have both branches three-jointed, the joints of the outer branches are subequal, and armed with strong spines at the outer distal angles; the first joint of the inner branches reaches to about the extremity of the outer branches; the second and third are shorter and subequal, their combined length being scarcely equal to the first joint (fig. 21). Outer branches of the second, third and fourth pairs elongate, and composed of three subequal joints; inner branches very short, two-jointed; in the second pair, the inner branches extend a little beyond the second joint of the outer branches; in the third pair, the inner branches extend to about the middle of the second joint of the outer branches, while in the fourth pair, the inner branches are still shorter, and do not extend much beyond the first joint of the outer branches (fig. 22). The fifth pair has the produced inner portion of the basal joint broadly subcylindrical, the rounded extremity is provided with six moderately long setæ, but the principal apical setæ is about twice as long as the one on either side of it; secondary joint small, subovate, and furnished with six setæ, arranged round the outer margin and end, the middle apical setæ being much longer than any of the others. Caudal stylets very short (fig. 26).

Male.—Antennules indistinctly eight-jointed, and strongly hinged; the third and fourth joints are very short but considerably dilated laterally, and the seventh and eighth form together a claw-like apex. Mouth organs and swimming feet similar to those of the female, except that the third pair are somewhat distorted, the first and second joints of the outer branches are dilated, while the third is small and armed with two strong terminal and two lateral spines—the inner apical spine being very large; the inner branches are composed of three small joints (fig. 23). The basal joint of the fifth pair is not much produced and broadly rounded, and carries two short but very stout blunt-pointed spines and a minute seta; the secondary branch is very small and provided with three setæ (fig. 25).

Habitat.—Lochs in Barra and North Uist, Outer Hebrides. In lochs in the Shetland Islands, and in shore-pools near the head of West Loch Tarbert, Argyllshire.

Remarks.—*Canthocamptus hirticornis* appears to be widely distributed throughout the Hebridian islands and in Shetland, but is apparently rare on the Mainland. The structure of the first feet resembles that of the first pair in *Canthocamptus trispinosus*, Brady, but the antennules, which are only seven-jointed, and the form of the fifth feet in male and female,

clearly distinguish it from that species; and, taking the sum of its various characters described and figured here, there is no species known to me that it can be identified with. The hairy integument of the first two joints of the antennules—a character that suggested the specific name—is peculiar.

Attheyella Macandrewæ, T. and A. Scott (Pl. IX. figs. 1–12).

1895. *Attheyella Macandrewæ*, T. and A. Scott, Ann and Mag. Nat. Hist., ser. 6, vol. XV., p. 457, Pl. XVI. figs. 1–6.

Description of the species.—Female, length ·58 mm. ($\frac{1}{43}$ of an inch). In general appearance somewhat similar to *Attheyella pygmæa*, G. O. Sars, but rather smaller and less hirsute. Antennules moderately stout, eight-jointed; the end joint is distinctly more elongate than any of the others, and the first four joints are considerably stouter than the last four; the proportionate lengths of the various joints are nearly as in the formula—

Proportional lengths of the joints,	9 · 9 · 9 · 6 · 6 · 7 · 6 · 11
Numbers of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8

The secondary branch of the antennæ is two-jointed, but the end joint is only about half the length of the other (fig. 4). The second joint of the posterior foot-jaws has the inner margin fringed with short but stout seta arranged in a pectinate manner, the stout seta on the inner distal angle of the first joints plumose only on one side (fig. 8). In the first pair of swimming feet the end joint of the two-jointed inner branch is considerably shorter than the first joint,—being only about two-thirds of its length; the end joint is also narrower than the other; the entire length of the inner and outer branches is about equal (fig. 9). The inner branches of the next three pairs are two-jointed and very short,—they do not extend much beyond the end of the first joint of the outer branches; the outer branches, on the other hand, are elongate and robust, and consist of three nearly equal joints, as shown by the drawing (fig. 10). In the fifth pair the inner produced part of the basal joint is subcylindrical, rather longer than broad, and bearing on the rounded distal end six very unequal setæ arranged thus: two small setæ on the outer margin and four stout setæ round the apex,—the third one from the inside being stouter and much more elongate than the others; the secondary joint is in outline somewhat like the produced part of the basal joint but rather broader, it is furnished with a long stout and coarsely plumose apical seta, a small subapical seta interiorly also plumose, and with three small plain setæ on the distal half of the outer margin, as shown by the drawing (fig. 11). Caudal stylets short, narrow, with a considerable space between them, each provided with a very long, stout, and coarsely plumose seta articulated near the base; there is also a second and much smaller apical seta having a stout basal part (fig. 12).

Habitat.—Lochan a Chaite, a small loch on the south-east side of Ben Lawers, Perthshire, altitude about 2400 feet above sea-level. Rather rare; a few specimens only obtained.

Remarks.—The characters by which this species is distinguished are—the structure of the antennules, the armature of the posterior foot-jaws, and especially by the structure of the first and fifth pairs of feet; the difference in the structure of the first pair is so marked that neither my son nor I experienced any difficulty in distinguishing the species from among others when mixed up together with them, from the end joint being so distinctly shorter than the first in the two-jointed inner branches of the first swimming feet.

Ophiocamptus brevipes (G. O. Sars), (Pl. X. figs. 1–9).

1862. *Canthocamptus brevipes*, G. O. Sars, 'Oversigt. af de ind. Ferskvandscopepoder': Forhandl. Vedensk. Selsk. Christiania (1862).

1893. *Ophiocamptus brevipes*, Al. Mrazek, 'Beitrag zur Kenntniss der Harpacticiden fauna des Süsswassers': Zoologischen Jahrbüchern; Siebenter Band, p. 116, Taf. 5, fig. 66; Taf. 6, figs. 67–70.

Description of the species.—Female, length ·72 mm. (about $\frac{1}{35}$ of an inch). Body slender, in general appearance somewhat like *Ophiocamptus sarsii*, Mrazek; antennules seven-jointed, the end joint is rather longer than any of the others, as shown by the formula—

Proportional lengths of the joints,	9 · 9 · 8 · 7 · 8 · 8 · 12
Number of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7

Antennæ and mouth organs somewhat similar to those of *Ophiocamptus sarsii*. The first pair of swimming feet also resemble those of that species, but the inner branch is proportionally longer, being about equal in length to the outer branch; the end joint of the inner branch is proportionally rather longer and narrower in relation to the first joint than the end joint of the inner branch of the first pair in *Ophiocamptus sarsii*; the armature of the first pair also differs in the two species,—in *Ophiocamptus brevipes* the marginal spines are of greater length, and the apical setæ also more elongate (fig. 6).

The second, third, and fourth pairs are all very much alike; in the fourth pair, the end joint of the outer branches bears exteriorly two stout subterminal hairs of unequal length,—the inner being nearly twice the length of the outer; the apical seta is long and spiniform, it is fully one and a half times the entire length of the outer branch; on the interior side of the apical seta are two subterminal setæ, of nearly equal length and more slender than the others, they are each fully half the length of the apical seta; the first joint of the very short two-jointed inner branch bears a slender spine on the distal half of the inner margin, and four small setæ round the end of the last joint (fig. 7). In the fifth pair, the produced inner part of the basal joint is narrow, cone-shaped—the length being about one and a half times the breadth at the base; the secondary joint is narrow, subcylindrical, and reaches to the apex of the basal joint; both joints are furnished with setæ of considerable length, some of which are plain, they are arranged as shown on the drawing (fig. 8). Caudal stylets somewhat similar to those of *Ophiocamptus sarsii* (fig. 9).

Habitat.—Loch Lubnaig, Perthshire, altitude 405 feet above sea-level. Apparently rare.

Remarks.—This species, which somewhat resembles *Ophiocamptus sarsii* in general appearance, is at once distinguished from it by the form and armature of the fifth pair of thoracic feet, and, as a matter of fact, this forms its most marked characteristic. In most of the other characters it approaches very near to *Ophiocamptus sarsii*.

The species was described by G. O. Sars in 1862 as *Canthocamptus brevipes*. In 1893 it was re-described by Al. Mrazek under the new genus *Ophiocamptus* that he had instituted for the reception of this and one or two other aberrant forms of *Canthocamptus*. One of these others was *Canthocamptus gracilis*, Poppe (not the *Canthocamptus gracilis*, G. O. Sars), the name of which he changed to *Ophiocamptus sarsii*.

About the same time, the genus *Ophiocamptus* was instituted by Mrazek, a description of the genus *Moraria*, T. and A. Scott, was published in the Annals and Magazine of Natural History. It turned out afterwards that the characters of these two genera were found to be

practically identical. I have not yet been able to ascertain satisfactorily which name was first published, and am therefore unable to say which has precedence of the other; in any case, the difference in the time of publication is not more than two or three months. Meantime, I have adopted Mrazek's *Ophiocamptus*,—leaving the question of priority to be settled afterwards.

Ostracoda.

Comparatively few Ostracoda were obtained in the lochs referred to in this paper. A few of them, however, may be noted here. *Cyclocypris globosa* (G. O. Sars) was obtained in St German's Loch, but in none of the others. *Candona rostrata*, Brady and Norman, and *Candona fabæformis* (Fischer), were both found in Possil Marsh, which appears to be a new station for them. *Candona Kingsleii*, B. and R., were obtained in Loch Cadha Mór, in Barra, and in Loch Skealtar, North Uist, and both are new stations for this species. *Darwinula Stevensoni*, B. and R., this interesting species was obtained in three lochs,—in Loch Doirlinn, Barra, Loch Skealtar, North Uist, and in Loch Lubnaig, Perthshire, which are all new stations for *Darwinula*.

Cladocera.

Several interesting species of Cladocera have been obtained in the lochs described in the preceding pages. *Sida crystallina* (Müller) was obtained in six of the lochs. *Bosmina longirostris* (Müller) was a comparatively common species, and the specimens varied greatly in size. In Plate II. figs. 22–25, I have shown figures of two specimens from two different localities: the larger measured ·84 mm. ($\frac{1}{30}$ of an inch), but the size of the smaller was only ·43 mm. ($\frac{1}{58}$ of an inch), yet the difference between them otherwise is very little, as shown by the drawings.

Latona setifera (Müller) was obtained in two of the Perthshire lochs—Lochan Lairig Eala and Loch Lubnaig, but in none of the others.

Holopidium gibberum, Zaddach, was only observed in one of the lochs —viz., Lochan a Chaite on Ben Lawers.

Drepanothrix dentata (Euren), was obtained in six of the lochs—in Lochan nam Faoileann (North and South), Barra; in the three lochs of North Uist; and in Loch Lubnaig, Perthshire.

Acantholeberis curvirostris (Müller). This fine species was obtained in seven localities—three in Barra, three in North Uist, and in Lochan Lairig Eala, Perthshire.

Leydigia quadrangularis (Leydig). This rare species was obtained in St German's Loch, which is the third station for it in Scotland; it appears to be quite distinct from its near ally, *Leydigia acanthocercoides*, Fischer, which I have not yet observed in any of the Scotch lochs.

Alona neglecta, n. sp., and *Alona rustica*, n. sp., are two species that are apparently undescribed. Descriptions and figures of them will be found at the end of the Report on the lochs of Shetland prepared by Robert Duthie, Fishery Officer, and myself. They are small species, and this may account for their apparent rarity in the gatherings from the lochs described in this paper. *Alona neglecta* was obtained in Loch Scadowa and Loch Skealtar in North Uist, and in Loch Lubnaig, Perthshire. *Alona rustica* was obtained in Loch Cadha Mór, Barra, and in Loch Scadowa, North Uist.

Ceriodaphnia reticulata (Jurine) is not unfrequent in Possil Marsh, but

that is the only loch among those described in the present paper in which it was observed; its pectinate post-abdominal claw (Pl. X. fig. 10) appears to be a distinctive character.

Ceriodaphnia (?) *laticaudata*, P. E. Müller (Pl. X. figs. 11–14). This Ceriodaphnia, which appears to be of rare occurrence in Possil Marsh—the only loch in which it was observed—may belong to the comparatively common species *Ceriodaphnia rotunda* (Straus), but the figures of that species in C. L. Herrick's *Crustacea of Minnesota* shows the end of the post-abdomen to be evenly and boldy rounded, whereas the post-abdomen of the Possil Marsh specimens is subtruncate and angular (fig. 13). The few specimens obtained in Possil Marsh all agreed very closely in the form of the post-abdomen with the one figured.

Ceriodaphnia, sp. A. (Pl. X. figs. 15–17). This is a form from Bardowie Loch, near Glasgow, which may be *Ceriodaphnia quadrangula* (O. F. Müller), but the form of the post-abdomen differs somewhat from the post-abdomen of that species. It is considerably smaller than that of the last species.

Ceriodaphnia, sp. B. (Pl. X. figs. 18, 19). This *Ceriodaphnia* is from Scadowa Loch, North Uist. I am uncertain as to the species it belongs to. The post-abdomen is considerably narrower than that of *Ceriodaphnia* (?) *laticaudata*, and at the end it slopes more gradually and evenly downwards towards the claw, and in this respect it differs from the post-abdomen of *Ceriodaphnia*, sp. A.

Daphnia Jardinii, Baird (Pl. X. figs. 20, 21). Figs. 20 and 20A show two different forms of the head of this species from the same locality —St German's Loch. The posterio-distal angle of the head is more produced in fig. 20A than in the other specimen.

Note.—The drawings of Cladocera in Plate X. have been prepared by my daughter, Christina M. Scott. The drawings of the Copepoda are by my son, Andrew Scott, fisheries assistant, Liverpool.

DESCRIPTION OF THE PLATES.

PLATE IX.

Eurytemora clausii (Hock).

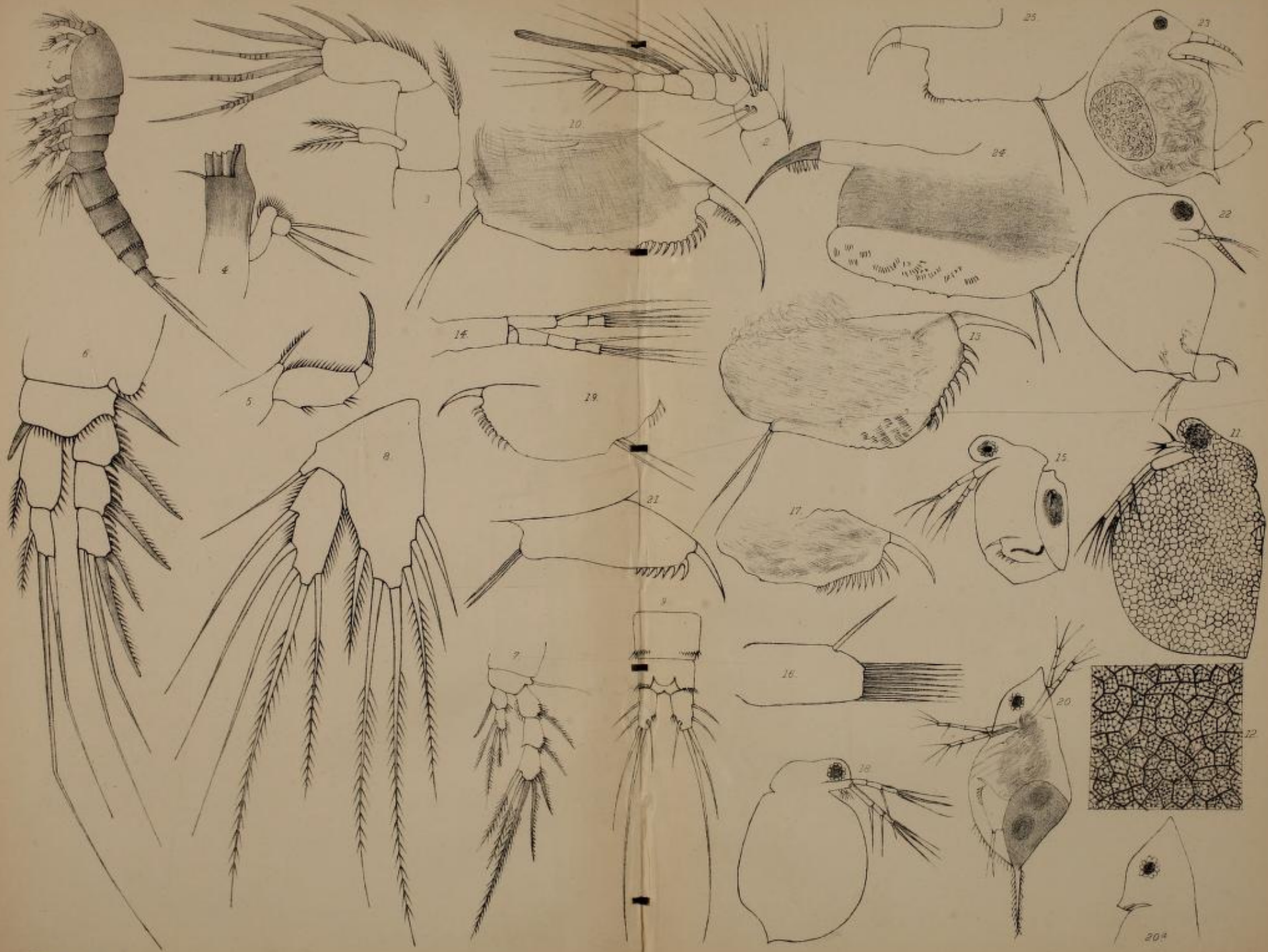
Fig. 1. Fifth pair of thoracic feet—female, . . . × 200 diameters.

Attheyella Macandrewæ, n. sp.

Fig. 2. Female—lateral view, ... × 106 diameters.
Fig. 3. Antennule—female, ... × 506 ,,
Fig. 4. Antenna, ... × 506 ,,
Fig. 5. Mandible and palp, ... × 506 ,,
Fig. 6. Maxilla, ... × 506 ,,
Fig. 7. Anterior foot-jaw, ... × 506 ,,
Fig. 8. Posterior foot-jaw, ... × 506 ,,
Fig. 9. Foot of first pair of swimming feet, . . . × 506 ,,
Fig. 10. Foot of fourth pair, ... × 380 ,,
Fig. 11. Foot of fifth pair, ... × 506 ,,
Fig. 12. Last abdominal segments and caudal stylets, . × 190 ,,

Fig. 1, *C. Scott, del.*
The others, *A. Scott, del.*

FIG. 1.—*Eurytemora clausi* (Hock). FIGS. 2-12.—*Atthcyella M'Andrew*, n. sp. FIGS. 13-26.—*Canthocamptus hirticornis*, n. sp.



Figs. 1-9, *A. S. del.*
The others, *C. S. del.*

FIGS. 1-9.—*Ophiocamptus brevipes*, (G. O. Sars).

FIGS. 10-25.—*Cladocera.*

Canthocamptus hirticornis, n. sp.

Fig. 13. Female—lateral view, ... × 106 diameters.
Fig. 14. Antennule—female, ... × 506 ,,
Fig. 15. Antennule—male, ... × 506 ,,
Fig. 16. Antenna, ... × 506 ,,
Fig. 17. Mandible and palp, ... × 760 ,,
Fig. 18. Maxilla, ... × 760 ,,
Fig. 19. Anterior foot-jaw, ... × 760 ,,
Fig. 20. Posterior foot-jaw, ... × 760 ,,
Fig. 21. Foot of first pair of swimming feet, . . . × 380 ,,
Fig. 22. Foot of fourth pair, ... × 253 ,,
Fig. 23. Foot of third pair—male, ... × 506 ,,
Fig. 24. Foot of fifth pair—female, ... × 506 ,,
Fig. 25. Foot of fifth pair—male, ... × 760 ,,
Fig. 26. Last abdominal segments and caudal stylets, . × 190 ,,

Plate X.

Ophiocamptus brevipes (G. O. Sars).

Fig. 1. Female—lateral view, ... × 106 diameters.
Fig. 2. Antennule—female, ... × 506 ,,
Fig. 3. Antenna, ... × 760 ,,
Fig. 4. Mandible and palp, ... × 760 ,,
Fig. 5. Posterior foot-jaw, ... × 760 ,,
Fig. 6. Foot of first pair of swimming feet, . . . × 760 ,,
Fig. 7. Foot of fourth pair, ... × 380 ,,
Fig. 8. Foot of fifth pair, ... × 760 ,,
Fig. 9. Last abdominal segments and caudal stylets, . × 190 ,,

Cladocera.

Fig. 10. *Ceriodaphnia reticulata* (Jurine), post-abdomen, . × 200 diameters.
Fig. 11. *Ceriodaphnia* (?) *laticaudata*, P. E. Müller, lateral view (from Possil Marsh), ... × 63 ,,
Fig. 12. ,, ,, portion of test highly magnified.
Fig. 13. ,, ,, post-abdomen, . . × 133 ,,
Fig. 14. ,, ,, antenna, . . × 66 ,,
Fig. 15. *Ceriodaphnia*, sp. A., lateral view (from Bardowie Loch), ... × 46 ,,
Fig. 16. ,, ,, antennule, . . × 133 ,,
Fig. 17. ,, ,, post-abdomen, . . × 133 ,,
Fig. 18. *Ceriodaphnia*, sp. B., lateral view (from Loch Scadowa, North Uist), ... × 63 ,,
Fig. 19. ,, ,, post-abdomen, . . × 133 ,,
Fig. 20. *Daphnia Jardinii*, Baird, lateral view (from St. German's Loch), ... × 46 ,,
Fig. 20A. ,, ,, (another form from the same locality), ... × 46 ,,
Fig. 21. ,, ,, post-abdomen, . . × 133 ,,
Fig. 22. *Bosmina longicornis* (Müller), lateral view, (from Barra), ... × 48 ,,
Fig. 23. ,, ,, (a small form from N. Uist), × 95 ,,
Fig. 24. ,, ,, post-abdomen (large form), . × 133 ,,
Fig. 25. ,, ,, post-abdomen (small form), × 300 ,,