HISTORY

OF THE

BERWICKSHIRE

NATURALISTS' CLUB.

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—"MARE ET TELLUS, ET, QUOD TEGIT OMNIA, CŒLUM."

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1.	1–32	Feb. 1834	
2	–64		5
3	–100		6
4	–136		7
5	–160		8
6	–178		9
7	–210 ⁂	1840	
8	–242		1
9	–278		2

⁂ sign. on p. 195 should be viiii.

C.D.S.

List of Entomostraca found in Berwickshire. By Mr William Baird, Surgeon.

The great Class Crustacea is divided by naturalists into two general sections, the *Malacostraca* and *Entomostraca*. The greater number of the animals of this second division are contained within a regular shell, and they have therefore received the name of Entomostraca, from the two Greek words signifying "insects with a shell." Little attention has been paid by British naturalists to the history of those exceedingly interesting little animals, and what we do know of them, we owe almost solely to our continental neighbours. Baker, indeed, in his microscopical researches, has taken notice of several species, and given plates of them, but he has done little to add to our information with regard to their anatomy and economy generally. Joblot and Ledermuller, in their works on microscopical objects, have given plates also of several species; whilst De Geer, Schæffer, and several other celebrated continental naturalists of the last century, have added each a little to our knowledge of them. Linnæus included all that he knew in one genus *Monoculus* (so called from their possessing only one eye), and gives descriptions of nine species only. Otho Fridericus Muller is the first regular historian of these animals who has done them justice. To him it is that we owe the greater part perhaps of our knowledge with regard to their economy; to his labours we owe our acquaintance with so many curious little creatures; and to his eloquence is perhaps owing the further researches and more detailed histories of succeeding naturalists. His work on the Entomostraca, published in 1785, is one of the most interesting memoirs in Natural History that we are acquainted with; and though it appears from later naturalists that he has fallen into many errors, still it is the most complete and best history of the Entomostraca that has ever been published. Since the time of Muller, much has been done to add to our knowledge of these interesting animals; and the memoirs of Jurine, father and son, Ramdohr, and M. Straus, contain the most excellent and most minute histories of detached genera that can be met with. Their researches have been conducted with the greatest zeal and care, and their labours have been abundantly crowned with success, their memoirs leaving little to be done by succeeding naturalists but to add to the species. Hermann (fils), Daudebart de Ferussac, Adolphe Brongniart, and other continental naturalists, have also given some excellent memoirs upon detached genera and species, whilst our own celebrated Leach is the only British naturalist we know that has paid any attention to the history of the Entomostraca; his labours, too, being chiefly directed to the parasitic animals of the division. It surely is not from want of interest belonging to them, that the naturalists of this country have neglected the Entomostraca, for many of them are worthy of

all admiration. "The multifarious and complicated structure of their body," says Muller in his admirable work; "the wonderful agility of their members; the very great fineness of their organs; their singular method of living and copulating; their living in waters which our cattle and we ourselves are daily drinking; the evils which they may give rise to, and to which fishes are seen to be liable; the emoluments* which, although we are in the greatest part ignorant of, they nevertheless produce in the economy of nature; that these things are very worthy of being known, scarce any one will doubt. Not to mention their external similitude to shells, and the natural transition which takes place in them from insects to testaceous animals, who ever knew before the cypris was detected, of an insect quadruped†? Before the limulus and caligus were properly observed, who ever knew of an insect acephalous, or with a head scarcely visible? Who ever imagined of a copulation of two males with one female at one time, such as takes place in the famous Pulex aquaticus; or of an animal whose head was all eye, as we see in the Polyphemus? These and more wonders are to be met with in the history of the Entomostraca."‡ At commencing this catalogue, it was my intention to have prefixed some details of each of the genera, as they had come under my own observation, and as they have been made known to us by the continental naturalists; but I found that, to do justice to the subject, the paper would be swollen to too great a length, and that it would afford abundant materials for several papers which might be communicated at different intervals. I have confined myself, therefore, at present to the catalogue of the Berwickshire species of the Entomostraca, adding observations on each of the species as they occur. We are indebted to the labours of this Club for the knowledge of the fact, that Berwickshire and the district to which our labours extend, abound in a very great variety of species both of the animal and vegetable kingdoms, many of which too are very rare, some scarcely to be found in other counties; and we also know that the geology of the district is one of very great interest. Sea and land have both been ransacked, and made to give up their hidden treasures, and though the minute and microscopic insects which form the division Entomostraca have hitherto been neglected, I have no doubt that our county and district will yield a plentiful harvest to the gleaner in this department also. Dr Leach, in his article *Crustacea* in the Edinburgh Encyclopædia, has only enumerated sixteen species of Entomostraca as found in Great Britain, a list which is increased by Samouelle, in his British Insects, to twenty. This strikingly shews what little attention has been paid to the subject by British naturalists, as I

* "It is the common opinion that it is the Caligus which forces the salmon from the sea up rivers towards the cataracts."

† The Cypris, according to M. Straus, has six feet, two being always concealed within the shell; according to Ramdohr they have four.

‡ Muller's Entomostraca, p. 4.

have, in an autumn's search in one district, found thirty-eight species belonging to the order *Branchiopoda* alone. In the arrangement of the genera I have followed Latreille in Cuvier's Regne Animal; but with regard to species I have taken Muller as my text-book, along with Desmarest in his work on the Crustacea. Latreille divides the Entomostraca into two Orders, the *Branchiopoda* and the *Pœcilopoda*. The order Branchiopoda he divides again into two principal sections, the *Lophyropa* and *Phyllopa*; to the first of which I for the present confine this catalogue.

Class ENTOMOSTRACA—Order BRANCHIOPODA.

Section I. LOPHYROPA.

Genus I. Cyclops.

1. *Cyclops staphylinus*, Desmarest.—*C. minutus*, Muller, p. 101, tab. xvii. fig. 1–7.—*Canthocarpus staphylinus*, J. O. Westwood, MS.——Common in pools of fresh water and ditches. The figure of this species, as given by Muller, is but indifferently correct; I have therefore sketched it as it has occurred to me. Pl. II, fig. 1. Desmarest calls it "staphylinus," from its habit of turning up its tail like the staphylinus. From some difference in the antennæ, and from the peduncle attached to the tail, it has been proposed to form a particular division for this species. My friend Mr Westwood has formed a new genus of it, which he calls "Canthocarpus." Pl. II. figs. 19, 20, are the young of this species in different stages.

2. *Cyclops rubens*, Muller, p. 104, tab. xvi. fig. 1–3.—*C. castor*, Desmarest.—*Disptomus castor*, J. O. Westwood, MS.——Found in Dunglass Pond, and about Yetholm. It has been proposed to form a distinct group for the reception of this species, from the division of the inferior antennæ and palpi. It has been formed into a new genus by Mr Westwood, and called *Disptomus*. Pl. II. fig. 2 is the young of this species, a few hours after birth.

3. *C. lacinulatus*, Muller, p. 105, tab. xvi. fig. 4–6.—*C. castor*, Desmarest.——Found in Yetholm Loch, along with *C. rubens*. Desmarest makes the *C. cæruleus*, *rubens*, and *lacinulatus*, into one species, which he calls *C. castor*, the laciniæ of this species being considered infusory animalcula attached to the tail. If it be a mere variety, it is somewhat curious that these animals should adhere only to this species, and that they should occur the same in Scotland as in Denmark.

4. *C. vulgaris*, Desmarest.—*C. quadricornis*, Muller, p. 109, tab. xviii. fig. 1–14.—*Pediculus aquaticus*, Baker, Microsc. p. 496, tab. xv. fig. 1–4.—*Monoculus quadricornis*, Linné, Fabricius, and Donovan.——Very common in all pools, ditches, &c. throughout the district. Desmarest has changed the name of this species from *quadricornis* to *vulgaris*, and much for the better, as the epithet *quadricornis* would lead one to suppose that this species alone had four antennæ, whereas all the species we know have that number. Pl. II. fig. 3 is the young of this species twenty-four hours after birth; and fig. 21, three weeks old, being the *Nauplius saltatorius* of Muller.

5. *C. minuticornis*, Muller, p. 117, tab. xix. fig. 14, 15.——Pools of sea-water at Cockburnspath and Berwick. The young is the *Amymone thyas* of Muller, p. 47, tab. xi. fig. 16, 17.

6. *C. brevicornis*, Muller, p. 118.——Pools of sea-water at Cockburnspath.

7. *C. Johnstoni*. Nova species. Pl. II. fig. 4.—Pools of sea-water at Berwick and Cockburnspath.——Body of four segments, tail of six, terminated by two short lobes, from which issue two long setæ, fully the length of the body. Superior antennæ of about six articulations, stronger than inferior pair. In the male there is a bulla about fifth articulation. In the female they are more slender, more setiferous, and destitute of bullæ. Inferior antennæ of three or four articulations;

terminated by two or three short setæ. All four antennæ setiferous at base of articulations. Head beaked. Beneath the antennæ are two organs (palpis ?) of two articulations, setiferous at base of articulations and at extremities. Beneath these are two organs, which Muller calls hands, of two articulations, terminated by a strong curved moveable claw or hook; and beneath these again, are two double organs, or *membres particulieres* of the French authors, each pair consisting of a short strong common footstalk, from which arise two flat bodies, the superior of which is the longer, of two articulations, serrated above, and terminated by three short setæ; the inferior, also serrated above, and terminated by three setæ, but consisting only of one articulation. From the three inferior articulations of the body arise three pairs of long setiferous feet; and from the second articulation of the tail arise the sexual organs in either sex. This species approaches the *C. chelifer* of Muller, but differs in many points when closely examined. In Muller's species there are no articulations to the body, which gradually tapers to the tail, and which he describes as "farciminis facie." The superior antennæ are only of three articulations; the inferior, which he calls "palpi", of two. The organs beneath these, which I call "palpi," are furnished with a claw, and only of one articulation, whilst the last pair of particular members, have only the shorter of the two bodies of which they are composed, serrated, the longer being entire. The male in Muller's figure has not the bullæ on antennæ.

Genus II. Cythere.

None of the authors, since Muller's time, who have written upon the "Entomostraca," from their residing in inland situations, have had opportunities of seeing the insects belonging to the genus Cythere, as they are only to be found in sea-water. Their history, therefore, is in more obscurity than any of the other genera, both as regards their economy and the number of species. No new species, as far as I am aware, have been added to the five of Muller, by any of the writers on "Entomostraca;" but that there are more to be met with by a little investigation, is very evident from those I have discovered on the coast.

1. *Cythere flavida*, Muller, p. 66, tab. vii. fig. 5, 6.——Amongst Confervæ in pools of sea-water at Cockburnspath.

2. *C. gibbera*, Muller, p. 66, tab. vii. fig. 10–12.——Sea shore at Cockburnspath.

3. *C. reniformis.* Nova species. Pl. III. fig. 5.—Sea-shore at Berwick and Eyemouth, &c.——Shell reniform; flesh-coloured; covered with hairs; both extremities of equal size; antennæ furnished with numerous short setæ to all articulations; anterior feet falcate, entire; all the feet furnished with claws. This species approaches the *C. viridis* of Muller, but differs in colour, in both extremities of shell being equal, and in anterior feet not being serrulated. It differs from *C. lutea* in shell being covered with hairs.

4. *C. alba.* Nova species. Pl. III. fig. 6.—Shore near Dunbar.—— Shell white, transparent, hairy, acute at posterior extremity, and broader at anterior; a rim round edge of shell whiter than the rest of shell; antennæ beset with short setæ at each articulation.

5. *C. variabilis.* Nova species. Pl. III. fig. 7. a. b.—Shore at Cockburnspath and Eyemouth.——Shell glaucous, without hairs, ovate, anterior narrower than the posterior extremity; anterior legs falcate, and furnished with pretty strong claws; antennæ slender, without setæ. This species varies much in colour and markings. Some specimens are white, with two black fasciæ, one at posterior margin, and the other across centre of shell, while the posterior extremity is marked besides by a beautiful reddish or bright bronze spot; *fig.* a., other specimens are of a light flesh colour, with the edges of shell slightly greenish, and the body of the shell marked with dark streaks running across. Some are altogether of a fine flesh colour; *fig.* b, while others again are of a very dark brown. All the varieties, however, agree in shape of shell, in size, &c., merely differing in colour and marking. Future observations may perhaps determine them to be of two different species.

Genus III. Cypris.

1. *Cypris detecta*, Muller, p. 49, tab. iii. fig. 1–3.—*C. conchacea*, Desmarest.—— Pool on Beaumont Water at Yetholm.

2. *C. strigata*, Muller, p. 54, tab. iv. fig. 4–6.——Brackish water on sea-shore at Thornton Loch, near Cockburnspath.

3. *C. vidua*, Muller, p. 55, tab. iv. fig. 7–9.——Dunglass Pond.

4. *C. pubera*, Muller, p. 56, tab. v. fig. 1–5.—*C. conchacea*, Leach and Latreille. —*Monoculus conchaceus*, Linné and Fabricius.——Ditches at Berwick, Cockburnspath, &c. Muller's figure does not appear to me to be a good one of this species.

. *C. monacha*, Muller, p. 60, tab. v. fig. 6–8.——Dunglass Pond.

6 *C. candida*, Muller, p. 60, tab. vi. fig. 7–9.——At Cockburnspath.

7. *C. reniformis*, Daudebart de Ferussac, fils. Annales du Museum d'Histoire Naturelle, tom. 7. p. 212, (1806); Leach, in Edinburgh Encyclopedia, art. *Crustacea*.——Ditch near Berwick, and at Coldstream.

8. *C. Joanna*. Nova species. Pl. III. fig. 8.—Pool near Abbey St Bathans.—— Shell roundish, ovate, narrower anteriorly than posteriorly; of a brown colour, with an orange mark across back of shell and lower margin; shell beset all round with rigid hairs, and covered with minute black points or dots: setæ of antennæ numerous, about twelve or more. Resembles *C. vidua* a good deal in shape, but differs totally in colour and markings. Differs from *C. pilosa* somewhat in shape, and in not being glabrous, but marked all over with black roughish-looking points.

9. *C. minuta*. Nova species. Pl. III. fig. 9.—Pool on Beaumont Water at Yetholm.——Shell broader posteriorly than anteriorly; elevated and rounded on upper margin; slightly sinuated on under margin; hairy all round; of a light brown colour with a tinge of green; body of shell smooth, shining; posterior legs terminated by one long claw; anterior legs furnished with a pencil of long hairs from penultimate joint, and terminated by several strong hairs or setæ; setæ of antennæ numerous.

10. *C. elongata*. Nova species. Pl. III. fig. 10.—Pool on Beaumont Water at Yetholm.——Shell much broader at anterior than posterior extremity, which is narrow and much elongated; elevated on upper margin towards anterior extremity, and sinuated on under margin more towards the posterior extremity; white; transparent; hairy; setæ of antennæ five or six; anterior feet of about three articulations, each articulation furnished with setæ; posterior legs denticulated.

11. *C. reptans*. Nova species. Pl. III. fig. 11.—Yetholm Loch.——Shell long almost elliptical, nearly plane on upper, and slightly hollowed out or sinuated on under margin, rather ventricose, hairy; densely ciliated on anterior extremity; the ciliæ on posterior extremity fewer but much longer, of a light colour with dark green markings, which appear to be rather irregular; both extremities have a large broad green spot, which send out processes as it were towards the centre of the shell; antennæ and feet short in comparison to the size of shell. I have never seen this species swimming about in the vessel in which I have kept it, but always creeping on the bottom.

12. *C. Westwoodii*. Nova species. Pl. III. fig. 12.—Yetholm Loch.——Shell much elevated and rounded on upper margin, and sinuated on lower, broader at anterior extremity, green-coloured, semi-transparent, densely covered with pretty long hairs all over; second last joint of anterior feet furnished with a pencil of long hairs; posterior feet furnished with a short seta at each articulation, and with a long curved claw at extremities; antennæ indistinctly articulated.

13. *C. tristriata*. Nova species. Pl. III. fig. 13.—Pond at Little Swinton.—— Shell ovate, ventricose, anterior extremity a little narrower than posterior, upper margin rounded, lower sinuated slightly, green, hairy; on the the upper margin, nearly in middle of length of shell, there is a dark mark, from which run to posterior extremity three dark green streaks, the centre one of which is the most distinct and the darkest coloured; anterior extremity of a rather darker green than the rest of shell. Between the centre and most anterior of the streaks are five or six small lucid spots.

14. *C. hispida*. Nova species. Pl. III. fig. 14.—Pool on Beaumont Water at Yetholm.——Shell almost elliptical; the anterior extremity being a little broader than posterior; rather ventricose; very roughly and densely hairy; of a brown colour all over, with one or two dark brown marks running across centre of shell, in the anterior of which are four or five translucent spots; both extremities of a darker colour than other parts of shell. The whole shell is very hispid, spines rather than

hairs covering the shell; antennæ slender; setæ seldom much divaricated, about twelve in number. The markings of shell are not in all specimens very distinct.

15. *C. lucens.* Nova species, Pl. III. fig. 15.—Yetholm Loch and pools on Beaumont Water.——Shell white, shining, without spot; almost opaque; ventricose; elevated on upper margin towards posterior extremity, and reniform underneath; anterior extremity narrower and flatter than posterior, which is arched and broad, the inferior angle being, however, prolonged to a point; a few fine hairs at each extremity. This species differs from *C. detecta* in being ventricose, and more arched in upper margin; and from *C. candida* in being reniform, in not being ovate, and in want of rigid hairs which beset that species.

16. *C. compressa.* Nova species. Pl. III. fig. 16.—Yetholm Loch.——Shell round, shaped, compressed rather narrower anteriorly than posteriorly; of a grey colour, more or less deep; semi-transparent; at either extremity beset with fine hairs; in some specimens spotted as if little pieces were hollowed out; anterior feet provided with several long bristles; eye large; antennæ terminated by numerous long setæ. From the flat compressed shape of shell, its motion through the water is very much like that of some species of Lynceus.

Genus IV. Daphnia.

1. *Daphnia quadrangula*, Muller, p. 90, tab. xiii. fig. 3, 4.——Ditch near Berwick.

2. *D. pulex*, Desmarest, Leach, Latreille.—*D. pennata*, Muller, p. 82, tab. xii. fig. 4–7.—*Monoculus pulex*, Linné and Fabricius.—*Pulex caudatus*, Schæffer.——Near Berwick, at Coldstream, and near Routing Linn at Fenton.

3. *D. sima*, Muller, p. 90, tab. xii. fig. 11–12.—*D. vetula*, Straus.—*Pulex non caudatus*, Schæffer.——Common about Cockburnspath, Yetholm, &c.

Genus V. Lynceus.

1 *Lynceus sphæricus* Muller, p. 71, tab. ix. fig. 7–9.—*Monoculus sphæricus*, Fabricius.——Common in all the ditches and ponds throughout the district.

2. *L. quadrangularis*, Muller, p. 72, tab. ix. fig. 1–3.——In the Pease Burn, and in a pool on Beaumont Water at Yetholm.

3. *L. lamellatus*, Muller, p. 73, tab. ix. fig. 4–6.—Yetholm Loch, and in a pool on Beaumont Water at Yetholm.——This is a very fine large species, about the size of *Daphnia pulex*, but Muller's plate of it does not appear to me to be a good one.

4. *L. trigonellus*, Muller, p. 74, tab. x. fig. 5–6.—*L. laticornis*, Desmarest.——Pond at Foulden, and at Yetholm.

5. *L. truncatus*, Muller, p. 75, tab. xi. fig. 4–8.—Pool on Beaumont water at Yetholm.——Muller says he found this species once in autumn 1782, but never met with it afterwards. It appears, therefore, to be a very rare species, and is a very beautiful one.

6. *L. harpæ.* Nova species. Pl. II. fig. 17.—Pool on Beaumont Water, and in Dunglass Pond.——Shell harp-shaped; ribbed longitudinally, the ribs resembling the strings of the harp; rounded posteriorly, sinuated anteriorly, and terminating in a point projecting forwards; antennæ four, long, nearly the length of the shell, each consisting of three articulations, and terminated by three long linear setæ; shell smooth, except anterior edge where it is sinuated, being there ciliated; tail serrated, terminated by two strong setæ; head rounded, and beak blunt. Differs from *L. truncatus* in sinuated anterior margin of shell, blunt beak, and long antennæ; in not being truncated on posterior extremity; in wanting the thirteen little teeth at the base; and in wanting the two thick and large upper feet: differs from *L. quadrangularis* in shape, in sinuated anterior margin, in more distinct ribs, and in blunt beak.

7. *L. hamatus.* Nova species. Pl. II. fig. 18.—Yetholm Loch.——Shell truncated anteriorly, and ciliated; upper part gibbous; tail not serrated, gibbous, terminated by two setæ; two upper feet large, and each furnished at extremity with a strong claw or hook curved upwards; antennæ of three setæ each: approaches *L. trigonellus*, but differs from it in beak being blunted and stronger; in tail not being serrated; in wanting the strong pediform organ below palpi and above the feet; and in the upper feet having the strong hooks.

Natica helicoides.

Galathea *nexa.*

Fossil Tooth. p. 88.

Plate ii


18


17


fem.


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mas.

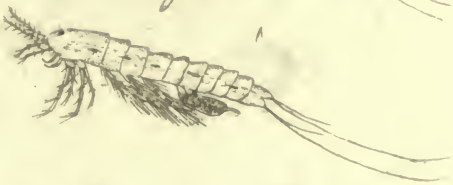
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Plate iii