

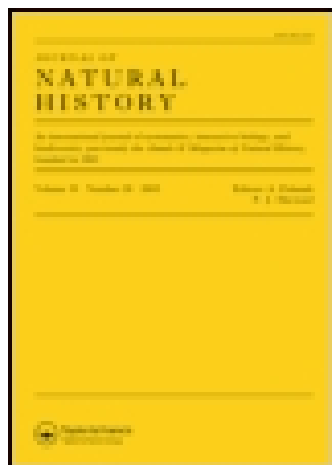
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LXI.—Ostracoda from the Chara-marl of Hitchin, Herts

Frederick Chapman A.L.S. F.R.M.S.

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here adopted. The brain in this Dinosaur seems to resemble that of *Iguanodon* more closely than any other of which figures have been published.

Some measurements of this specimen are appended :—

| | millim. |
|--|---------|
| Greatest width of cerebral hemispheres | 62 |
| „ height „ „ | 46 |
| „ „ at cerebellar prominence..... | 69 |
| „ width „ „ | 38 |
| Depth of pituitary body from base of infundibulum .. | 31 |
| Width between roots of trigeminal | 36 |
| Width of medulla at vagus root | 30 |
| Height „ „ „ | 38 |

EXPLANATION OF PLATE XVI.

Brain of *Iguanodon*, $\frac{3}{4}$ natural size :

1. From above.
2. From side.
3. From below.

car., point of entry of the internal carotids into the pituitary fossa ;
c., cerebral hemispheres ; *cb.*, cerebellum ; *l.l.*, lateral lobe of cerebellum ;
med., medulla ; *ol.*, base of olfactory lobes ; *op.c.*, optic chiasma ; *pit.*,
 pituitary body.

The Roman numerals refer to the numbers of the cranial nerves.

LXI.—*Ostracoda from the Chara-marl of Hitchin, Herts.*

By FREDERICK CHAPMAN, A.L.S., F.R.M.S.

[Plate XV.]

THE *Chara*-marl or “freshwater bed” of Hitchin, Herts, is so remarkably rich in Ostracoda that it appears desirable to put upon record more detailed information regarding them than has been attempted up to the present time.

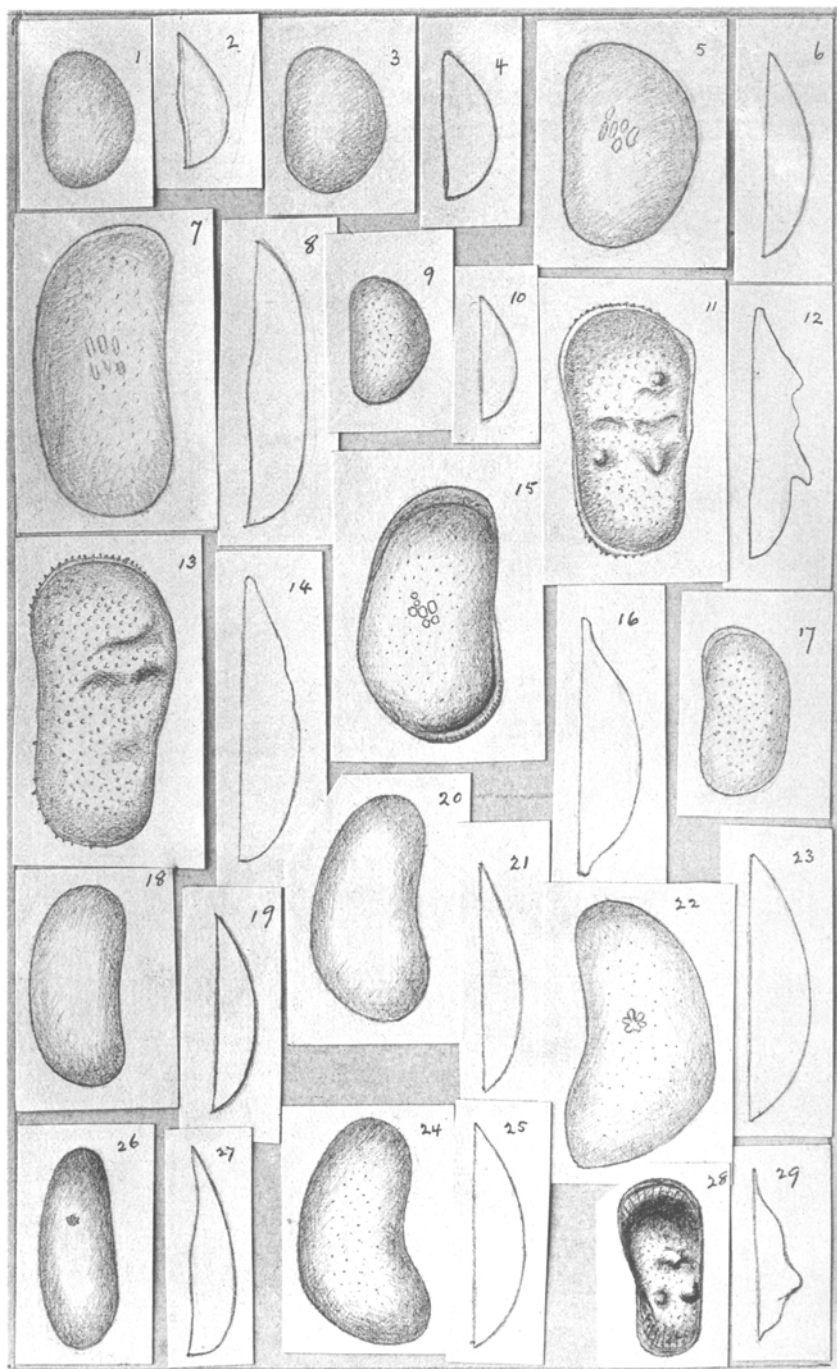
These Ostracoda of Hitchin have already been referred to in a note by Messrs. Jones and Sherborn, in 1887, on a collection made by W. Hill, Jun., Esq., F.G.S.* The four species there recorded are *Cypris incongruens*, Ramdohr ; *Scottia Browniana* (Jones) ; *Erpetocypris reptans* (Baird) ; and *Candona candida* (Müller).

The same authors subsequently † note an additional species from the Hitchin beds—*Cypridopsis vidua* (Müller) ; whilst for the previously recorded *Cypris incongruens* they substitute *Candona pubescens* (Koch) ‡.

* Geol. Mag. dec. iii. vol. iv. p. 459.

† Suppl. Monogr. Tert. Entom. (Pal. Soc.) 1889, p. 10.

‡ *Op. cit.* p. 12.



PLEISTOCENE OSTRACODA FROM HITCHIN.

For the material from which the species here enumerated have been extracted I am indebted to Prof. T. Rupert Jones, F.R.S., who had received it from Mr. W. Hill a long time ago. This present list contains only one species which I have not myself found, and nine species and varieties are now added to the earlier records.

The bed containing the *Ostracoda* here under notice lies upon a bed of gravel, and is itself overlain by a bed of brick-earth 20 feet thick. It is a "soft calcareous loam, of a light colour, from brown to almost white, which has been found, in other parts of the brickfield, to pass down into a dark grey or almost black deposit, fairly evenly stratified" *.

Besides the *Ostracoda*, this deposit contains numerous stems and fruits (oogonia) of *Chara*, eleven species of *Mollusca*, and the remains of bear, deer, and rhinoceros. Further details of this and the associated beds are to be found in the Proc. Geol. Assoc. 1896 †, the locality having been visited by the members of the above association during their excursion to Hitchin.

The sample of marl examined was exceedingly rich in *Ostracod* valves; they are very fragile and require some care in the extraction. The process of washing the marl and separating the organisms is best carried out by submerging a sieve, containing some of the marl, under water, the sieve having meshes fine enough to retain the minute fossils, and from time to time agitating the sieve vertically as well as in a horizontal and circular direction.

The following is a descriptive list of the *Ostracoda* from the deposit at Hitchin as far as at present known. For valuable help in the writing of this account I tender my sincere thanks to Prof. Rupert Jones, F.R.S.

Family *Cyprididæ*.

Genus *CYCLOCYPRIS*, Brady and Norman.

Cyclocypris lævis (O. F. Müller).

(Pl. XV. figs. 1, 2.)

Cypris lævis, Müller, 1785, Entomostraca, p. 52, pl. iii. figs. 7-9.

Monoculus ovum, Jurine, 1829, Hist. des Monocles, p. 179, pl. xix. figs. 18, 19.

Cypris ovum, Jones, 1856, Monogr. Tert. Entom. p. 14, pl. i. figs. 4 a, b; Brady, Crosskey, and Robertson, 1874, Monogr. Post-tert. Entom. p. 125, pl. i. figs. 29-31.

* Proc. Geol. Assoc. vol. xiv. p. 416.

† Vol. xiv. pp. 415-419.

Cypria lavis, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 69.

Cyclocypris lavis, Brady and Norman, 1896, *op. cit.* vol. v. p. 718.

The species is fairly common in the "freshwater bed" of Hitchin. It is a common form in this country in fresh and brackish water.

Cyclocypris globosa (G. O. Sars).

(Pl. XV. figs. 3, 4.)

Cypria globosa, G. O. Sars, 1863, Om en i Sommeren 1862 foretagen Zoologisk Reise i Christianias og Trondhjems Stifter, p. 27.

Cypria ciurea, Brady, 1868, Monogr. Rec. Brit. Ostrac. p. 374, pl. xxiv. figs. 39-42, pl. xxxvi. fig. 7.

Cyclocypris globosa, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 71, pl. xi. figs. 10-18, pl. xiv. figs. 1, 2.

The discovery of this species in the Hitchin deposits is of much interest, for it is quite a northern species, having been recorded from fossil deposits in Scotland; and as a recent form it is still found living in the lochs and pools of the border counties of England, in Scotland, and in Norway. The species is by no means uncommon at Hitchin.

Genus SCOTTIA, Brady and Norman.

Scottia Browniana (Jones).

Cypria Browniana, Jones, 1850, Ann. & Mag. Nat. Hist. ser. 2, vol. vi. p. 25, pl. iii. fig. 1; 1856, Monogr. Tert. Entom. p. 13, pl. i. figs. 1a-d.

This is also a northern species. Mr. T. Scott found it living in pools in the island of Bute (*Brady and Norman*). It was found fossil at Clacton, Essex, by Professor Rupert Jones, and since recorded by him from Hitchin and from Sidestrand, Suffolk, and Chesilton, Dorset.

Genus CYPRIS, Müller.

Cypris virens (Jurine). (Pl. XV. figs. 5, 6.)

Monoculus virens, Jurine, 1820, Hist. des Monocles, p. 174, pl. xviii. figs. 15, 16.

Cypris virens, Zaddach, 1844, Syn. Crust. Pruss. Prod. p. 35; Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 74.

A common and widely distributed form, and as a recent species inhabiting "grassy pools and ditches which dry up in the summer" (*Brady and Norman*).

Only one valve of this species was found in the marl from Hitchin.

Genus *ERPETOCYPRIS*, Brady and Norman.*Erpetocypris reptans* (Baird).

(Pl. XV. figs. 7, 8.)

Cypris reptans, Baird, 1835, Trans. Berwickshire Nat. Club, vol. i. p. 99, pl. iii. fig. 11.*Candona reptans*, Baird, 1845, *op. cit.* vol. ii. p. 153; and Nat. Hist. Brit. Entom. 1850, p. 160, pl. xix. fig. 3.*Cypris reptans*, Brady, Crosskey, and Robertson, 1875, Monogr. Post-tert. Entom. p. 128, pl. ii. figs. 31, 32.*Erpetocypris reptans*, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 84, pl. xiii. fig. 27.

E. reptans is a common British species and its European distribution is wide. As a fossil it has been found in strata as old as the Weybourn Crag. In the post-Tertiary bed of Hitchin it is common and often of large size, some of the valves measuring as much as 3·3 millim. in length.

Genus *PIONOCYPRIS*, Brady and Norman.*Pionocypris vidua* (O. F. Müller).

(Pl. XV. figs. 9, 10.)

Cypris vidua, Müller, 1785, Entom. p. 55, pl. iv. figs. 7-9.*Cypridopsis vidua*, Brady, 1868, Monogr. Rec. Brit. Ostrac. p. 375, pl. xxiv. figs. 27-36, 46.*Pionocypris vidua*, Brady and Norman, 1896, Sci. Trans. R. Dubl. Soc. ser. 2, vol. v. p. 726, pl. lxiv. fig. 19.

This species has been found as a post-Tertiary fossil in the Fen district, and it is common as a freshwater form in England and Europe generally. At Hitchin this species is not uncommon.

Genus *ILYOCYPRIS*, Brady and Norman.*Ilyocypris gibba* (Ramdohr).

(Pl. XV. figs. 11, 12.)

Cypris gibba, Ramdohr, 1808, Magaz. d. Gesellsch. naturforsch. Freunde zu Berlin, Quartal ii. p. 91, pl. iii. figs. 13, 14, 17.*Ilyocypris gibba*, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 107, pl. xxii. figs. 1-5; *ibid.* 1896, vol. v. p. 727, pl. lxxviii. figs. 20, 21.

This species, well known as a recent form, is also known from the Hamstead beds (Oligocene) of the Isle of Wight, and it is common as a post-Tertiary fossil in England and Scotland.

At Hitchin only one well-differentiated specimen of *I. gibba* was found, and in this the principal tubercle is prominent and recurved.

Ilyocypris Bradii, G. O. Sars.
(Pl. XV. figs. 13, 14.)

Ilyocypris Bradii, G. O. Sars, 1890, Oversigt af Norges Crustaceer, II. Branch. Ostrac. Cirrip., Christ. Vidensk. Selsk. Forhand. p. 50; Brady and Norman, 1896, Sci. Trans. R. Dubl. Soc. ser. 2, vol. v. p. 728, pl. lxiii. figs. 22, 23, pl. lxviii. figs. 18, 19.

The commoner form of this genus in the Hitchin deposit appears to be the non-tuberculate type defined by G. O. Sars under the above name, of which three valves were found.

Genus CANDONA, Baird.

Candona pubescens (Koch).
(Pl. XV. figs. 15-17.)

Cypris pubescens, Koch, 1837, Deutschlands Crustaceen &c., Heft xi. p. 5.

Candona pubescens, Brady and Norman, 1896, Sci. Trans. R. Dubl. Soc. ser. 2, vol. v. p. 729, pl. lxiii. fig. 24, pl. lxiv. figs. 20, 21, pl. lxviii. figs. 7-9.

This is a common species in the living condition. As a post-Tertiary fossil it has been recorded from Whittlesea, the Valley-drift near Salisbury, the old land-drift at Chesilton, Portland, the gravels at Barnwell, near Cambridge, and from Hitchin. In the last-named deposit well-formed valves of the species are found, but they are not very common. There are also present several valves of the form usually described under the name of *C. albicans*, but now thought to be only the young form of *C. pubescens*.

Candona lactea, Baird.
(Pl. XV. figs. 18, 19.)

Candona lactea, Baird, 1850, Proc. Zool. Soc. Lond. p. 255, pl. xviii. figs. 25-27; Brady, 1868, Monogr. Rec. Brit. Ostrac. p. 382, pl. xxiv. figs. 55-58; Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 100.

This common freshwater species, which is well known from numerous post-Tertiary deposits, is very common at Hitchin.

Candona candida (O. F. Müller).
(Pl. XV. figs. 20, 21.)

Cypris candida, Müller, 1785, Entom. p. 62, pl. vi. figs. 7-9.

Candona candida, Jones, 1857, Monogr. Tert. Entom. p. 19, pl. i. figs. 8 a-f; Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 98, pl. x. figs. 20-23.

This species is very common in ponds and ditches.

As a fossil it is known from the Weybourn Crag and from most deposits of post-Pliocene age. It is common in the "freshwater bed" at Hitchin.

Candona candida (O. F. Müller), var. *tumida*, Brady and Robertson. (Pl. XV. figs. 22, 23.)

Candona candida (Müller), var. *tumida*, Brady and Robertson, 1870, Ann. & Mag. Nat. Hist. ser. 4, vol. vi. p. 16, pl. ix. figs. 13-15; Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 99, pl. x. figs. 14-17.

This variety has been found commonly in rivers and dykes subject to tidal influence. It differs from the typical species, so common in fresh water, in the shortness and the tumidity of the carapace. Another distinguishing character is the rosette-like arrangement of the muscle-spots, and this is clearly seen in at least one of the valves from Hitchin. The variety is somewhat rare in that deposit.

Candona candida (O. F. Müller), var. *claviformis*, Brady and Norman. (Pl. XV. figs. 24, 25.)

Candona candida (Müller), var. *claviformis*, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 99, pl. x. figs. 1, 2.

This variety was taken in the living condition from canals and ponds.

In the Pleistocene of Hitchin this variety is not unfrequent.

Family Darwinulidæ.

Genus DARWINULA, Brady and Robertson.

Darwinula Stevensoni, Brady and Robertson.
(Pl. XV. figs. 26, 27.)

Polycheles Stevensoni, Brady and Robertson, 1870, Ann. & Mag. Nat. Hist. ser. 4, vol. vi. p. 25, pl. vii. figs. 1-7, pl. x. figs. 4-14.

Darwinella Stevensoni, Brady, Crosskey, and Robertson, 1874, Post-tert. Entom. p. 141, pl. ii. figs. 13-17.

Darwinula Stevensoni, Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 122, pl. x. figs. 7-13, pl. xiii. figs. 1-9, pl. xxiii. fig. 5.

It is of much interest to note the occurrence of this species from Hitchin, since in the living state it is a characteristic form in the East-Anglian Fen district; and it is also found in rivers, lochs, and canals in various parts of the British Islands.

Several separate valves of *D. Stevensoni* were found in the Pleistocene deposit at Hitchin.

Family Cytheridæ.

Genus LIMNICYTHERE, Brady.

Limnocythere inopinata (Baird).

(Pl. XV. figs. 28, 29.)

Cythere inopinata, Baird, 1850, Brit. Entom. p. 172, pl. xx. figs. 1, 1 a-e.*Limnocythere inopinata*, Brady, 1868, Monogr. Rec. Brit. Ostrac. p. 419, pl. xxix. figs. 15-18, pl. xxxviii. fig. 9, pl. xxxix. fig. 1; Brady, Crosskey, and Robertson, 1874, Monogr. Post-tert. Entom. p. 173, pl. x. figs. 8-11; Brady and Norman, 1889, Sci. Trans. R. Dubl. Soc. ser. 2, vol. iv. p. 170.

This species is now found inhabiting ditches, lakes, and slowly running streams. It has been recorded from various post-Tertiary clays of Scotland and England.

L. inopinata is of frequent occurrence in the "freshwater" bed of Hitchin.

EXPLANATION OF PLATE XV.

- Fig. 1. *Cyclocypris lævis* (O. F. Müller). Left valve. × 30.
 Fig. 2. Ditto. Edge view. × 30.
 Fig. 3. *Cyclocypris globosa* (G. O. Sars). Left valve. × 24.
 Fig. 4. Ditto. Edge view. × 24.
 Fig. 5. *Cypris virens* (Jurine). Left valve. × 24.
 Fig. 6. Ditto. Edge view. × 24.
 Fig. 7. *Erpetocypris reptans* (Baird). Right valve. × 15.
 Fig. 8. Ditto. Edge view. × 15.
 Fig. 9. *Pionocypris vidua* (O. F. Müller). Left valve. × 30.
 Fig. 10. Ditto. Edge view. × 30.
 Fig. 11. *Ilyocypris gibba* (Ramdohr). Left valve. × 30.
 Fig. 12. Ditto. Edge view. × 30.
 Fig. 13. *Ilyocypris Bradii*, G. O. Sars. Left valve. × 30.
 Fig. 14. Ditto. Edge view. × 30.
 Fig. 15. *Candona pubescens* (Koch). Right valve. × 30.
 Fig. 16. Ditto. Edge view. × 30.
 Fig. 17. Ditto. Young form, left valve. × 30.
 Fig. 18. *Candona lactea*, Baird. Right valve. × 30.
 Fig. 19. Ditto. Edge view. × 30.
 Fig. 20. *Candona candida* (O. F. Müller). Right valve. × 20.
 Fig. 21. Ditto. Edge view. × 20.
 Fig. 22. *Candona candida*, var. *tumida*, Brady and Robertson. Left valve. × 30.
 Fig. 23. Ditto. Edge view. × 30.
 Fig. 24. *Candona candida*, var. *claviformis*, Brady and Norman. Right valve. × 20.
 Fig. 25. Ditto. Edge view. × 20.
 Fig. 26. *Darwinula Stevensoni*, Brady and Robertson. Right valve. × 30.
 Fig. 27. Ditto. Edge view. × 30.
 Fig. 28. *Limnocythere inopinata* (Baird). Left valve. × 30.
 Fig. 29. Ditto. Edge view. × 30.