A FURTHER REPORT ON THE OSTRACODA OF THE UNITED STATES NATIONAL MUSEUM.

By Richard W. Sharpe,

Instructor in Biology, DeWitt Clinton High School, New York City.

In a previous paper bearing a similar title[a] a number of species of fresh-water Ostracoda belonging to the U. S. National Museum were briefly discussed, and two presumably new species described. Most of these forms were from scattered localities in the United States and Mexico, and represented the known ostracod fauna of these countries but meagerly. Since that paper was published, a number of marine as well as fresh-water forms have come to my hands for study. The marine forms were mostly collected by the U. S. Fisheries steamer *Albatross*.

It therefore remains for me to give an account of these forms, and the present paper offers some results. Four species, apparently new to science, are here figured and described. It also seems wise to insert a revised systematic summary, indicating the extent of the National Museum collections examined to date of this paper.

Systematic Summary.

Tribe.	Family.	Subfamily.	Genus.	Species.
Podocopa	Cyprididæ	Candoninæ	2	2
		Cypridinæ	2	8
		Cypridopsinæ	2	2
		Cyclocypridinæ	3	5
		Herpetocypridinæ	3	4
		Notodromadinæ	2	2
	Cytheridæ		1	2
Myodocopa	Cypridinidæ		3	4
Total			18	29

[a] Report on the Fresh-water Ostracoda of the United States National Museum, including a Revision of the Subfamilies and Genera of the Family Cyprididæ, Proc. U. S. Nat. Mus., XXVI, p. 969.

Revised summary of species of Ostracoda of the National Museum.

1. Family CYPRIDIDÆ.
   (*a*) Subfamily Candoninæ.
      1. Genus *Candona*.
         1. *C. parallela* G. W. Müller, Colorado; May.
      2. Genus *Paracandona*.
         2. *P. euplectella* (Brady and Norman), New Jersey; March.
   (*b*) Subfamily Cypridinæ.
      3. Genus *Cypris*.
         3. *C. fuscata* (Jurine), common in United States and Mexico; spring.
         4. *C. pellucida* Sharpe, Illinois, Idaho, Mexico.
         5. *C. pubera* Jurine, Oregon.
         6. *C. reticulata* Zaddach, Illinois, Massachusetts, New York (Catskill Mountains), New Jersey.
         7. *C. virens* Jurine, Massachusetts, Ohio, Mexico.
         8. *C. incongruens* (Ramdohr), Florida, Ohio, Pennsylvania.
      4. Genus *Spirocypris*.
         9. *S. passaica* Sharpe, Massachusetts, New Jersey.
         10. *S. tuberculata* Sharpe, Indiana, Illinois; May.
   (*c*) Subfamily Cypridopsinæ.
      5. Genus *Cypridopsis*.
         11. *C. vidua*, common everywhere.
      6. Genus *Potamocypris*.
         12. *P. smaragdina* Vavra, Illinois, Mexico.
   (*d*) Subfamily Cyclocypridinæ.
      7. Genus *Cyclocypris*.
         13. *C. laevis* (O. F. Müller), Delaware, Indiana, Illinois, New Jersey, New York (Catskill Mountains).
      8. Genus *Cypria*.
         14. *C. dentifera* Sharpe, Illinois, Ohio, New York, New Jersey.
         15. *C. exsculpta* Fischer, common everywhere.
      9. Genus *Ilyocypris*.
         16. *I. gibba* (Ramdohr), Colorado; March.
         17. *I. bradyi* G. O. Sars, Colorado; March.
   (*e*) Subfamily Herpetocypridinæ.
      10. Genus *Chlamydotheca*.
         18. *C. azteka* Saussure, Texas; October.
         19. *C. mexicana* Sharpe, Mexico; September.
      11. Genus *Herpetocypris*.
         20. *H. reptans* Baird, California; September.
      12. Genus *Ilyodromus*.
         21. *I. pectinatus* Sharpe, stomach of *Spatula clypeata* Linnæus, South Carolina. Europe? (Jeffreys collection).
   (*f*) Subfamily Notodromadinæ.
      13. Genus *Cyprois*.
         22. *C. marginata* (Strauss), Jackson Park, Chicago; May.
      14. Genus *Notodromas*.
         23. *N. monacha* (O. F. Müller), Indiana, Minnesota; May.
2. Family CYTHERIDÆ.
      15. Genus *Cythere*.
         24. *C. americana* Sharpe, brackish pools, Long Island; June.
         25. *C. papillosa* Sharpe, brackish pools, Long Island; June.

3. Family CYPRIDINIDÆ.
   16. Genus *Cylindroleberis*.
      26. *C. oblonga* (Grube), California coast.
      27. *C. lobianci* G. W. Müller, California coast, Catalina Islands.
   17. Genus *Pyrocypris*.
      28. *P. americana* G. W. Müller, off Honolulu, Hawaiian Islands; May; night anchorage.
   18. Genus *Philomedes*.
      29. *P. brenda* (Baird), Gulf of St. Lawrence, Greenland coast.

1. Family CYPRIDIDÆ.

Subfamily CANDONINÆ.

1. Genus CANDONA Baird, 1850.

1. CANDONA PARALLELA G. W. Müller.

Plate LI, figs. 1–5.

Candona parallela MÜLLER, Zoologica, XII, Heft 30, 1900, p. 25, pl. v, figs. 5–6, 23–25.

Dimensions of female.—Length, 0.78 to 0.85 mm.; height, 0.42 to 46 mm.; breadth, 0.35 to 0.42 mm. Males unknown.

Seen from the side (fig. 1), the highest part lies at the posterior part, where the shell edge forms an angle, from which the dorsal margin runs nearly straight and approximately parallel to the ventral edge to about the region of the eyespot, from which it abruptly slopes forward with even an appreciable concavity to a narrowly rounded anterior margin.

Ventral margin slightly sinuate, the most so just opposite the muscle impressions.

Height to length about as 1 : 18. The growing line is farther from the shell edge anteriorly and posteriorly, its distance anteriorly being about one-fourth the distance to the muscle impressions. Shell comparatively plain, with but a few scattered papillæ and setose both anteriorly and posteriorly.

Seen from above (fig. 2), the shell is bluntly pointed anteriorly, more so posteriorly, the left shell clearly overlapping the right one. The greatest breadth is approximately in the middle, its ratio to the length being about as three to seven.

Seta on anterior edge of penultimate segment of second antenna of female longer than the last segment.

Shorter seta of terminal segment of second foot (fig. 5) more than twice as long as terminal segment. Second foot 5-segmented; no seta at distal outer angle of third segment. Seta on median side of penultimate segment of mandibular palp not plumose, short.

Genital plate of female flat, without a backwardly directed process. Caudal ramus (fig. 3) rather stout, about one-seventh as wide in the

middle as the greatest length; dorsal seta about twice width of ramus from subterminal claw and reaching slightly beyond tip of ramus; terminal claw about seven-ninths length of furca measured along the anterior edge; subterminal claw slightly shorter, and both toothed in a peculiar manner, a double set of teeth apparently being present (fig. 4), the upper set being coarser and defined by larger teeth at either limit, the other or distal set being smaller and more numerous. Terminal seta aborted and scarcely discernible.

Described from a number of specimens sent me by Prof. A. E. Beardsley, of the State Normal School, Greeley, Colorado. Collected near Greeley, Colorado, May 5, 1901.

2. PARACANDONA Hartwig, 1899.

Paracandona Hartwig, Zool. Anzeiger, XXII, 1899, pp. 309–311.—Sharpe, Proc. U. S. Nat. Mus., XXVI, 1903, p. 997.

Terminal claws of the second antennæ very long; the penultimate segment at least as long as the united second and third segments. The terminal segment of the mandibular palp provided with two very strong claws, of which one is united by fusion to the segment. Second feet with an extra long seta on each of the third and fourth segments. Appendages otherwise as in *Candona*, but small and slender.

Shell tumid, reticulate pitted, as a honey-comb. Small, beautiful forms not more than 0.8 mm. long. Branchial plate of two setæ. Second antennæ of both sexes 5-segmented.

This genus was established by Hartwig to include forms the type of which is *Paracandona* (*Candona*) *euplectella* Robertson. Represented by only the species *euplectella*, which has not heretofore been reported from America. Heretofore reported only from England and Germany.

2. PARACANDONA EUPLECTELLA (Brady and Norman).

Plate LII, figs. 1–5.

Candona euplectella Brady and Norman, Trans. Royal Dublin Soc., IV, 2d ser., 1889, p. 105, pl. IX, figs. 7–8.—Müller, Zoologica, XII, Heft 30, 1900, p. 37, pl. IX, figs. 1–9, 14.

Dimensions of female.—Length, 0.56 to 0.65 mm.; breadth, 0.32 to 0.34 mm.; height, 0.32 to 0.36 mm. Male, somewhat larger.

Seen from the side (fig. 1), the shell is about twice as long as high, dorsal margin nearly straight, ventral margin weakly sinuate, nearly the same width throughout, and both extremities evenly and very similarly rounded.

Seen from above (fig. 2), the shell appears very plump, the breadth being to the length about as 1 : 2 or as 3 : 5, the greatest breadth lying just posterior to the middle. Anterior end rather more pointed than

the posterior, both quite gently rounded. Both shells similar in appearance and size.

The most striking character of this species is seen on the shell, it being covered with a profuse ornamentation of polygonal areas (fig. 1) or reticulations, thus causing a net-like appearance, which at once attracts attention. I know of no other *Candona*-like Ostracod having a similar appearance; the specific name very happily refers to this striking external appearance. The shell is also covered with a number of conspicuous papillar elevations, which show more thickly and conspicuously anteriorly when noted in profile from above.

Terminal claws of the second antennæ plain and unusually long, longer than the last three segments. Terminal segment of the mandibular palp (fig. 4) with two strong toothed claws, one of which is fused to the segment.

Terminal claw of first foot as long as the rest of the foot. Second foot (fig. 3) 5-segmented, the terminal segment being but slightly longer than broad, or one-half the length of the preceding segment, which is slightly longer than the antepenultimate segment. The shorter terminal claw is about the length of the terminal segment, or about one-fifth the length of the other similarly directed claw. The third and fourth segments each armed with unusually long setæ. Furca (fig. 5) thick and stout, nearly straight, average width one-sixth the length as measured along the dorsal edge. Terminal seta weak, scarcely evident; terminal claw stout, slightly curved, plain, and one-half length of furca; subterminal claw but slightly shorter, and both faintly toothed near tip. Dorsal seta less than width of ramus from subterminal claw and about same length as subterminal claw. Second maxillary palp of male unusually long and slender.

This species has been reported from England (Brady) and Germany (Lienenklaus, Hartwig, and Müller, G. W.). Not heretofore reported from America.

Rather sparsely found in the shallower parts of a swamp near a small branch of the Elizabeth River, northwest of Roselle Park, New Jersey, March 28, 1908.

Subfamily CYPRIDINÆ.

3. CYPRIS O. F. Müller, 1792.

3. CYPRIS FUSCATA (Jurine).

Plate LIII, figs. 1–4.

Monoculus fuscatus JURINE, Histoire des Monocles, etc., 1820, p. 174, pl. XIX, figs. 1–2.

Cypris fuscata ZADDACH, Synop. Crust. Pruss. Prodr., 1844, p. 32.—LILLJEBORG, De Crust, ex ord. tribus, etc., in Scania occurrentibus, 1853, p. 114, pl. X, figs. 6–9; pl. XII, fig. 3.

Cypris hirsuta FISCHER, Mém. des Sav. étrang. Acad. St. Pétersbourg, VII, 1854, p. 159, pl. X, figs. 6–8.

Cypris fusca BRADY. Trans. Linn. Soc. London, XXVI, 1868, p. 362, pl. XXIII, figs. 10–15.

Cypris fuscata BRADY and NORMAN. Trans. Royal Dublin Soc., IV, 2d ser., 1889, p. 73, pl. XII, figs. 3–4.—VAVRA, Archiv. Naturw. Durchforsch. Böhmen, VIII, Heft 3, 1891, p. 98.—CRONEBERG, Bull. Soc. Imp. Natur. Moscou, VIII, 1894, p. 305, fig. 22.—SHARPE, Bull. Illinois State Lab. Nat. Hist., IV, Art. 15, 1897, p. 442, pl. XLIII, fig. 5.—G. W. MÜLLER, Zoologica, XII, Heft 30, 1900, p. 66, pl. XVI, figs. 5–9.—KAUFMANN, Revue Suisse de Zool., VIII, 1900, p. 270, pl. XV, figs. 14–16; pl. XVIII, figs. 14–20.

Dimensions.—Length, 1.48 to 1.45 mm.; breadth, 0.80 to 0.85 mm.; height, 0.85 to 0.95 mm. Shell plain, not reticulate, and sparsely covered with small papillar elevations.

Seen from above (figs. 2, 3), the shell is broadly ovate, breadth being to length about as 5 is to 9, the greatest breadth lying just behind the middle; left shell slightly overlapping the right. The general color is dark green except in the region of the eyes. The variety *minor* after Müller,[a] in addition to showing the light patches near region of the eyes, also shows similar patches just posterior to the middle of the body and on the sides. This variety is somewhat smaller in all its dimensions.

Seen from the side (fig. 1), the shell is decidedly humped just back of the eye-spot, so as to form a noticeable angle when viewed in exact profile. Extremities well rounded and ventral margin slightly convex.

Natatory setæ of the second antennæ reach about to the tips of the terminal claws, long enough so that the animal is free swimming. Terminal claw of first leg rather short, two-thirds of its length being shorter than the last three segments of the leg, while in *Cypris reticulata* this is just reversed. Spines of the first maxillary process toothed.

Caudal ramus (fig. 4) finely toothed on dorsal edge, long, slender, weakly S-shaped to nearly straight, from 18 to 20 times as long as wide: terminal claw very slender, finely toothed at tip, from one-half to three-fifths as long as the ramus: subterminal claw two-thirds as long as the terminal one, nearly straight: terminal seta weak, about one-third as long as terminal claw: dorsal seta about width of ramus from subterminal claw and about one-half as long as the terminal seta. Propagation sexual.

Both varieties, *major* and *minor*, were found in great abundance in all the shallow grassy ponds or swamps southeast of Chicago, Illinois, as far as Clarke Junction, Indiana. Most of them were collected during the month of May. Scarcely a collection was made during the month but contained both varieties and both sexes.

[a] Zoologica, XII, 1900, p. 66.

An attempt was made to breed them true, with a view to ascertaining if they would cross, but all specimens invariably died within a week or so when placed in any of the ordinary aquaria. Their life period is evidently very short and transitory, which may account in part for lack of success. Of course, a short life history might be expected from the transitory nature of their habitat.

They were found associated with *Cypria obesa*, *Spirocypris tuberculata*, *Cypridopsis vidua*, *Cypria dentifera*, *Cyclocypris laevis*, *Candona recticauda*, and *Cyprois marginata*. These, of course, were not certainly present in any one locality. For instance, *Cyprois marginata* was found in only one small temporary grassy pool in Jackson Park, which very soon dried up, while most of the remaining forms occurred quite generally in all the swamp and dune ponds of the region southeast of Chicago and of northwestern Indiana. For the character of the plant life of the waters of this region see under *Notodromas monacha*.

Distribution world-wide; all Europe; Guanajuato, Mexico, in a collection sent to the U. S. National Museum by Dr. A. Dugès, French consular agent. Accession No. 15606. A few specimens were here found associated with *Cypris pellucida*.

8. CYPRIS INCONGRUENS (Ramdohr).

Plate LIV, figs. 1–3.

Cypris incongruens Ramdohr, Mag. der Gesell. Naturforsch. Freunde, Berlin, II, 1808, p. 86.

Cypris aurantia Baird, Nat. Hist. Brit. Entomos., London, 1850, p. 159, pl. xix, fig. 13.—Fischer, Abh. der Mathem. Phys. Klasse der kgl. Bayerischen Akad. der Wiss., VII, 1855, p. 650, pl. i, figs. 29–31, 60, 61.

Cypris incongruens Brady, Trans. Linn. Soc. London, 1868, XXVI, p. 362, pl. xxiii, figs. 16–22.—Brady and Norman, Trans. Royal Dublin Soc., 1889, IV, 2d ser., p. 73, pl. xii, figs. 8–9.—Vavra, Arch. Naturw. Durchforsch. Böhmen, VIII, Heft 3, 1891, p. 95.—Cronebero, Bull. Soc. Imp. Natur. Moscou, VIII, 1894, p. 304, fig. 21.—Kauffman, Revue Suisse de Zool., VIII, Fasc. 3, 1900, p. 264, pl. xv, figs. 10–12; pl. xviii, fig. 5.—Müller, Zoologica, XII, Heft 30, 1900, p. 77; pl. xiii, figs. 12–22.

Cyprinotus incongruens Sharpe, Bull. Illinois State Lab. Nat. Hist., IV, 1897, p. 437.—Sars, Ann. Musée Zool. de l'Acad. Imp. des Sci. de St. Pétersbourg, VIII, 1903, p. 222 [28].

Dimensions.—Length, 1.58 to 1.75 mm.; height, 1 to 1.04 mm.; breadth, 0.85 to 0.90 mm.

Seen from above (fig. 2), the shell is widest at its posterior one-third, about one-half as wide as long, rounded posteriorly and anteriorly, the left shell overlapping the right. Seen from the side (fig. 1), the right shell is highest just back of the middle, the height here being about three-fifths as great as the length and sloping rapidly anteriorly from just back of the eye-spot; the anterior and lower posterior margins of the right valve armed with a row of prominent tubercles (fig. 1).

The left shell is somewhat larger than the right and not armed with tubercles at its anterior and posterior margins. The color varies from brownish yellow to a clear yellow.

Natatory setæ of the second antennæ reach slightly beyond the tips of the terminal claws. Spines of the first maxillary process toothed.

Terminal claw of the second foot slender, slightly longer than the terminal segment. Furca (fig. 3) approximately straight, the terminal claw about one-half its length; subterminal claw about two-thirds the length of the terminal one; dorsal seta about width of furca from subterminal claw, and approximately as long as the claw; terminal seta slender, nearly one-half length of terminal claw.

A large number of these forms were found in recent indurated mud deposits near Carlisle, Pennsylvania. The specimens were picked from the dried mud, soaked in a solution of potassium hydroxide for a number of hours, then placed in dilute glycerin. In this manner the apparently hopelessly dried specimens were put into such condition as to permit of dissection.

Kaufmann,[a] speaks of this form as not being sexual except possibly in favorable localities, while Müller,[b] speaks of this form as being occasionally sexual. No doubt most, if not all, Entomostraca may prove to be both sexual and parthenogenetic, depending upon the surrounding conditions, so much so that this character may prove of slight value either as a generic or as a specific character.

Distribution, Europe, Asia, and America.

4. SPIROCYPRIS Sharpe, 1903.

10. SPIROCYPRIS TUBERCULATA, new species.

Plate L, figs. 1, 2; Plate LIV, fig. 4; Plate LV, figs. 1–6.

Dimensions.—Length, 0.93 mm.; height, 0.53 mm.; breadth, 0.7 mm.

A beautiful purplish brown tuberculate form, always showing a transverse dorsal band of a lighter color in region of the eye-spot, and occasionally another similar band similarly situated posteriorly. Preserved specimens show these bands rather indistinctly, the general purplish color showing, however.

The shell (Plate L, figs. 1, 2) is thickly covered with a large number of unusually large and prominent papillary elevations. This feature is so strikingly apparent as at once to distinguish the species, even neglecting the color markings, which are also unusual. Shell also covered with short hairs, mostly situated upon the tubercles.

Seen from the side (Plate LIV, fig. 4), the shell is nearly the same width throughout, both extremities evenly rounded, and fully four-sevenths as high as long.

[a] Revue Suisse de Zool., VIII, 1900, p. 268.

[b] Zoologica, XII, 1900, p. 79.

Seen from above (Plate L, figs. 1, 2), the shell is very broadly oval, even approximately subcircular, so plump is it. Right valve slightly overlapping left anteriorly.

Palps of the right and left maxillæ of the male (Plate LV, figs. 4, 6) with hooked terminal segments, these each terminating with a recurved hyaline tip. As is usual with the genus *Spirocypris*, the testes of the male arise in a number of concentric circles in the anterior part of the shell (Plate LIV, fig 4), and after separating into two groups just back of the eye-spot, extend postero-ventrally.

Natatory setæ simple, extending but slightly beyond terminal claws.

Terminal claws toothed at tip, the three larger the same length, and somewhat longer than the penultimate segment.

Terminal claws of the first feet strong, toothed at tip, slightly curved, and about one-half longer than the penultimate segment.

Terminal claws of second feet (fig. 1) one and one-half times length of terminal segment. Terminal segment beak-shaped; terminal reflexed seta about twice as long as terminal claw.

Ejaculatory duct of male in sack (fig. 2) elongate and narrow, and with about 20 wreaths of spines.

Furca nearly straight, very slender (fig. 3), about 32 times as long as average width; dorsal margin smooth. Terminal claw nearly straight, very faintly pectinate at tip, one-half as long as furca; subterminal claw four-fifths as long as terminal one. Terminal seta less than two-fifths as long as terminal claw. Dorsal seta slender, twice width of furca from subterminal claw and reaching about to tip of furca.

This form differs from *Spirocypris passaica*, the only other described member of the genus, in the prominent tubercles of the shell, shell coloration, much smaller size, plumpness, and slenderness of furca, its length to breadth being about as 32 to 1, while in *S. passaica* the ratio is about as 23 to 1.

Observations.—This form is not especially free swimming, and is usually pretty well confined to the débris and algæ of the bottom. It was found in company with many *Cladocera*, *Hydra*, *Hydrachnids*, *Cyprois monacha*, *Cypris fuscata*, *Cypria dentifera*, etc. A number of cultures were made in battery jars, also in Syracuse watch glasses. Those made in the watch glasses were started April 26, 1906, and kept in good shape until the latter part of May of the same year in an attempt to get their eggs, but none noted.

Occurrence.—The specimens examined were collected from various localities southeast of Chicago, Illinois. They were first noted in an aquarium started January 28, 1906, with débris, etc., taken through the ice from a shallow permanent pond, situated near the waterworks station in the south end of Jackson Park, Chicago. They were continuously noted in collections made in April and May from

nearly all the ponds and swamps of this region and from ditches and shallow sphagnum swamps near Roby, Indiana, May 6, 1906.

In some respects this species somewhat superficially resembles the figures given for *Candona euplectella* Robertson in Brady and Norman.[a] Alcoholic or formalin specimens retain a purplish appearance. Furthermore, so plump are these forms that when placed in water in Syracuse glasses for superficial examination instead of lying on their sides, as is so commonly the case with most Ostracods, they nearly invariably remain dorsal or ventral side up.

Type-locality.—Swampy ponds, Jackson Park, Chicago, Illinois.

Type.—Cat. No. 38345, U.S.N.M.

Subfamily CYCLOCYPRIDINÆ.

7. CYCLOCYPRIS Brady and Norman, 1889.

Cypris Authors, 1785–1820.

Cypria Zenker, Wieg. Archiv. f. Naturg., XX Jahrg., I, 1854.

Cyclocypris Brady and Norman, Trans. Royal Dublin Soc., 1889, p. 70.—Vavra, Arch. Naturw. Durchforsch. Böhmen, VIII, 1891, p. 67.—Müller, Orig. Abh. aus dem Gesamt. der Zool., XII, Heft 30, 1900, p. 39.—Kaufmann, Revue Suisse de Zool., VIII, Fasc. 3, 1900, p. 319.—Sharpe, Proc. U. S. Nat. Mus., XXVI, 1903, p. 994.

Natatory setæ very long. Terminal segment of second foot long and narrow, three times as long as broad. Ductus of numerous long filaments and no distinct central axis. Fourth segment of second antenna of male with no sense organ on its distal end.

a. Length at least 0.8 mm. Anterior edge of furca about three times length of terminal claw. Terminal claws strong, nearly straight, weakly bent near end. Furca toothed on anterior edge, and with a comb of teeth on its side ..... *C. globosa.*

a^2. Length at most 0.55 mm.

b. Dorsal seta evident.

c. Furca of female without a comb of teeth near its base. Terminal claws hook-shaped ..... *C. forbesi.*

c^2. Furca of female with a comb of teeth near its base ..... *C. pygmæa.*

b^2. Dorsal seta lacking, or seen with difficulty. Terminal claws but slightly curved ..... *C. lævis.*

13. CYCLOCYPRIS LÆVIS (O. F. Müller).

Plate L, fig. 5; Plate LIV, figs. 5–7.

Cypris lævis O. F. Müller, Entomos. seu Insecta testacea, etc., 1785, p. 52, pl. III, figs. 7–9.

Cyclocypris lævis Vavra, Arch. Naturw. Durchforsch. Böhmen, VIII, Heft 3, 1891, p. 68, figs. 21–26.—Kaufmann, Revue Suisse de Zool., VIII, Fasc. 3, 1900, p. 320, pl. XIX, figs. 23–25; pl. XXIII, figs. 9–12; pl. XXIX, fig. 17.—Müller, Zoologica, XII, Heft 30, 1900, p. 41, pl. X, figs. 14–22.

[a] Trans. Royal Dublin Soc., IV, 1889, p. 105.

Dimensions.—Length, 0.45 to 0.48 mm.; breadth, 0.24 to 0.28 mm.; height, 0.3 to 0.34 mm.

The shell varies in color from a lemon yellow to chestnut red. Vavra, 1891, even reporting them of a whitish color but ordinarily horn-brown. I have seen none of any other color than lemon yellow to chestnut red.

Seen from the side (Plate LIV, fig. 5), the highest point of the shell is almost exactly in the middle, approximately seven-ninths as high as long. The dorsal margin is rather plainly humped in the middle, posterior margin evenly rounded, ventral margin nearly straight, or weakly convex.

Seen from above (Plate L, fig. 5), the shell is egg-shaped, pointed anteriorly, the left shell slightly overlapping the right anteriorly; greatest width in the middle, the width being slightly more than one-half or about three-fifths of the length.

Terminal segment of the second foot (fig. 7) about three times as long as wide. Terminal claw about as long as the width of the terminal segment; shorter seta about four times as long as the claw; penultimate segment about five-thirds as long as the terminal one, and armed with two setæ on its inner edge, while *C. forbesi* has but one such seta, the outer margin of the segment having three combs of minute teeth. The terminal claw of one of the specimens examined was weakly S-shaped. Kaufmann[a] mentions this peculiarity as a common occurrence, and uses it as of specific worth. It would rather seem to be characteristic of the younger stages of growth, however, as it was in no wise a constant character in the American specimens examined.

Furca (fig. 6) stout, nearly straight, one-sixth as wide as long, measured along the anterior edge; terminal seta varying from one-half to two-thirds length of the terminal claw. Terminal claw stout, slightly curved near tip, toothed near tip, and about one-half length of ramus measured along anterior margin, while in *C. globosa* this proportion is about as 1 to 3. Subterminal claw also slightly curved near tip, toothed, and but little shorter than terminal claw. Dorsal seta hardly distinguishable, and, indeed, usually entirely lacking.

This species seems to be a somewhat variable one, which likely in part accounts for the unusually large synonymy as given by some authors.

Described from several specimens collected rather commonly from ponds and swamps southeast of Chicago, Illinois, and at Clarke Junction, Indiana. They were collected amongst rushes, water lilies, sphagnum moss, typha, etc.; also found at Kissena Park lake, Long

[a] Revue Suisse de Zool., VIII, 1900, p. 320.

Island. The latter collections were made November 10, 1907, while all the former were made from May 3 to May 20, 1906.

Distribution world-wide. Fossil in the Tertiary, England.

8. CYPRIA Zenker, 1854.

14. CYPRIA DENTIFERA Sharpe.

Plate L, figs. 3, 4.

Cypria dentifera SHARPE, Bull. Illinois State Lab. Nat. Hist., IV, 1897, pp. 463–465, pl. XLVII, figs. 6–11.

Dimensions.—Length, 0.69 mm.; height, 0.38 mm.; breadth, 0.26 mm.

Described from several specimens found in the Zoölogical Gardens, Cincinnati, Ohio, August, 1881. Also found in museum collections from ponds in Long Island, New York, and a pond near Westfield, New Jersey, June, 1908. Those from the pond near Westfield were collected by Mr. John J. Schoonhoven, president of the department of microscopy, Brooklyn Institute of Arts and Sciences.

This species is distinguished by having combs of remarkably long teeth on the distal halves of the terminal claws of the ramus.

9. ILYOCYPRIS Brady and Norman, 1889.

16. ILYOCYPRIS GIBBA (Ramdohr).

Plate LVI, figs. 1, 2.

Cypris gibba RAMDOHR, Mag. der Gesell. Naturforsch. Freunde Berlin, II, 1808, p. 91, pl. III, figs. 13–17.

Cypris biplicata KOCH, Deutschlands Crustaceen, Myriopoden und Arachniden, etc., 1838, Heft 21, fig. 16.

Cypris sinuata FISCHER, Mém. des. Sav. étrang. Acad. St. Pétersbourg, VI, 1847, p. 193, pl. X, fig. 4.

Cypris biplicata FISCHER, Mém. des Sav. étrang. Acad. St. Pétersbourg, VII, 1854, p. 150, pl. V, figs. 5–8.

Cypris gibba BRADY, Trans. Linn. Soc. London, XXVI, 1868, p. 369, pl. XXIV, figs. 47–54; pl. XXXVI, fig. 2.

Ilyocypris gibba BRADY and NORMAN, Trans. Royal Dublin Soc., IV, 1889, p. 107, pl. XXII, figs. 1–5.—VAVRA, Arch. Naturw. Durchforsch. Böhmen, VIII, Heft 3, 1891, p. 57, fig. 17 (1–7).—MÜLLER, Zoologica, XII, Heft 30, 1900, p. 88, pl. XIX, figs. 7, 8, 10, 14–19; pl. XX, figs. 17, 18.

Dimensions of female.—Length, 0.85 to 0.95 mm.; height, 0.42 mm. to 0.48 mm.; breadth, 0.38 to 0.44 mm.

Seen from the side (fig. 1), the shell is quite similar to *I. bradyi*, excepting that there are two prominent tubercles just back of the eye-spot, another in the region of the muscle impressions, and yet two others posterior to this one situated at about the beginning of the posterior third of the shell. The smaller tubercles at the anterior and posterior ends are more prominent than those of *I. bradyi*.

Seen from above (fig. 2), the shell is proportionately broader than that of *I. bradyi*, being about four-ninths of the length, while with *I. bradyi* this proportion is about as 1 to 3.

Anterior and posterior ends showing a number of prominent tubercles, a prominent constriction just back of the region of the eye-spot, and still another laterally just about the middle of the body region. The posterior third of the shell is widest of all, but suddenly incurved dorsally, so as to cause an appearance of two very decided rounded swellings of shell along postero-dorsal margin (fig. 2). All these furrows and humps give the shell a decidedly crumpled appearance; this appearance may vary somewhat from the figure given, but, in the main, averages as shown.

Natatory setæ of the second antennæ reach about to tips of terminal claws. Second foot as in *I. bradyi*. Furca very much as in *I. bradyi*, except that the terminal seta is longer, it being approximately two-fifths length of terminal claw, or about two and one-half times as long as the average width of furca, the subterminal claw being slightly longer than the terminal one. These proportions varied somewhat in different specimens, so that I am of the opinion that both *I. gibba* and *I. bradyi* are very variable in details of structure, so much as to cause great confusion in diagnosis.

I believe that Müller[a] very wisely chose to speak of these forms as occurring under four variations, namely, with humps or without humps, or with long natatory setæ (reaching beyond tips of end claws) or short natatory setæ (reaching not beyond base of end claws). The terminal seta of the furca also seems to be somewhat variable in length in the same species, as is also the length of the subterminal as compared with the terminal claw.

Described from a number of specimens kindly sent me by Prof. A. E. Beardsley, which were collected by him in the same locality as *I. bradyi* (Carters Slough, March, 1905).

Distribution same as *I. bradyi*.

17. ILYOCYPRIS BRADYI G. O. Sars.

Plate LVI, figs. 3–6.

Ilyocypris bradyi Sars. Forh. Vid. Selsk., Christiania, 1890, No. 1, p. 59.—Müller, Zoologica, XII, Heft 30, 1900, p. 90, pl. VIII, figs. 9, 11–13.—Kaufmann, Revue Suisse de Zool., VIII, 1900, p. 353, pl. XXIV, figs. 1, 2; pl. XXV, figs. 17, 18.

Dimensions of female.—Length, 0.85 to 0.95 mm.; height, 0.45 to 0.5 mm.; breadth, 0.32 to 0.5 mm. Male slightly larger.

Seen from the side (fig. 4), the shell is about twice as long as high, dorsal margin nearly straight, ventral rather decidedly sinuate, an-

[a] Zoologica, XII, 1900, p. 88.

terior and posterior ends evenly rounded and tuberculate. Anterior end slightly wider than the posterior, and tubercles more numerous.

Seen from above (fig. 3), the shell is elongate, sides nearly parallel, anterior end pointed, with left shell overlapping right; posterior margin rather bluntly rounded. The characteristic protuberances and furrows of the shell in the region of its anterior third are not so decided as in *I. gibba*. *I. gibba* has, in addition, a protuberance on each shell just posterior to its middle, which is larger than the others and characterizes the species; several other small tubercles at the anterior and posterior margins may also be plainly seen from above.

Natatory setæ of the second antennæ reach but to the tips of the terminal claws.

Terminal segment of second foot (fig. 5) conical, five-eighths as broad as long and bearing three setæ, the two terminal backwardly directed, the shorter being about one-half the length of the longer, the longer being approximately seven times the length of the terminal segment. A third seta is present which is commonly pointed in the same direction as the two terminal ones, thus causing an appearance of three terminal backwardly directed setæ. This seta is situated laterally rather than terminally, approximately near the middle of the segment, and is nearly as long as the longer of the two terminal setæ. Inner margins of penultimate segment of second foot with two long setæ, of which the distal one is the longer, the shorter one being two-thirds its length, or about the length of the shorter terminal seta.

Furca (fig. 6) strong, curved, much broadened at base, and approximately ten times as long as width at middle. The two terminal claws slender, plain, approximately same length, and seven-twelfths as long as furca; terminal seta very weak, about as long as average of furca. Dorsal seta situated at one-third length of furca from tip, slender, plumose, bent near tip, and reaching about three-fourths distance to tip of furca. Distal half of dorsal part of furca ciliate, also sparsely ciliate laterally.

This species is not free swimming, but creeps or burrows. It appears to be closely similar to *I. gibba*, var. *repens*, of Vavra,[a] excepting that the natatory setæ are longer than is the case with *repens*.

Described from a number of specimens kindly sent me by Prof. A. E. Beardsley, of the State Normal School, Greeley, Colorado. Professor Beardsley collected them from Carters Slough, near Greeley, Colorado, March 9, 1905. He has already made note of its occurrence.[b]

Distribution.—Europe (Sars, Müller, and Kaufmann), Britain (Brady and Norman), Colorado.

[a] Arch. Naturw. Durchforsch. Böhmen, VIII, 1891, p. 60.

[b] Science, new ser., XXI, pp. 587–588.

Subfamily HERPETOCYPRIDINAE.

12. ILYODROMUS Sars, 1894.

Herpetocypris BRADY and NORMAN, Trans. Royal Dublin Soc., 1889, p. 84.
Herpetocypris SARS, Forh. Vid. Selsk. Christiania, No. 1, 1890, p. 60.
Cypris VAVRA, Arch. Naturw. Durchforsch. Böhmen, VIII, 1891, p. 82.
Herpetocypris CRONEBERG, Bull. Soc. Imp. d. Moscou, 1894, p. 14.
Ilyodromus SARS, Vid. Selsk. Skr. Math. Natur. Klasse, 1894, p. 38.—KAUFMANN, Revue Suisse de Zool., VIII, 1900, p. 298.—SHARPE, Proc. U. S. Nat. Mus., XXVI, 1903, p. 975.—MÜLLER, Ergeb. der deutsch. Tiefsee-Expedition, 1898–99, VII, 1906, p. 136 (Valdivia).

Natatory setæ sparse and much shortened. Surface of shell of most species striated longitudinally. First maxillary process with two toothed spines. Caudal ramus ending in three strong claws which increase in length distally, the usual dorsal seta being replaced by a spine or claw. Terminal seta present as usual. Propagation sexual.

Remarks.—This genus was first established by Prof. G. O. Sars in 1894 to receive a new species from New Zealand. As originally described, it was one of two new subdivisions of the genus *Herpetocypris*, the other division being the genus *Candonocypris*, which seems to be less definitely established, as the distinction rests very largely upon comparative size and overlapping of valves of shells. *Candonocypris* appears little more, therefore, than at most a subgenus of the genus *Herpetocypris*. Sars evidently found no males, hence describes the genus "with propagation exclusively parthenogenetical." The collections belonging to the U. S. National Museum contained at least one male, hence the generic description is revised to that extent.

21. ILYODROMUS PECTINATUS, new species.

Plate LVII, figs. 1–5.

Length of male, 1.18 mm.; height, 0.58 mm.; breadth, 0.49 mm. Female slightly smaller.

Shell sparsely covered with small papillar elevations, and showing small parallel longitudinal striations (fig. 1).

Seen from the side (fig. 1), the shell is twice as long as high, the upper margin evenly and gently curved, the lower edge nearly straight, weakly sinuate.

Seen from above (fig. 4), the shell is narrowly oval, both ends similar.

The second antennæ are large, terminal claws as long as the last two segments. Natatory setæ very rudimentary, scarcely noticeable. The two spines of the first maxillary process stout and toothed.

Terminal claw of second foot (fig. 5) stout, broad, nearly straight, with curved tip.

Furca (fig. 3) very faintly curved at middle, approximately 15 times as long as wide throughout, the dorsal edge armed with a row of closely set, coarse teeth for about one-half its length.

Terminal claw stout, nearly straight, about six and one-half times as long as width of furca. Subterminal claw about four and one-half times as long as width of furca, the terminal seta being about the same length. The usual dorsal seta of *Cypris* is replaced by a spine, which is one and one-half times as long as average width of furca, and situated about one-half width of furca from subterminal claw. This spine is one of the chief characteristics of the genus. All of the claws are smooth and show little evidence of pectinations.

Maxillary palps of the male (fig. 2) resembling those of the genus *Cypria*, but blunt and strong. Copulatory organs of male plate-like.

This species may be at once distinguished from all other described species of the genus by the strongly pectinated furca. But nine species of the genus have heretofore been described, seven from Australia by Prof. G. O. Sars and two from Europe by Dr. G. S. Brady. Most of these were characterized by faint longitudinal striations on the shell, which I fancy might not always be in evidence, depending on age.

The shell of the female is somewhat smaller than that of the male, all dimensions being in proportion.

Described from a number of specimens belonging to the U. S. National Museum from Europe?, type locality. (Jeffreys collection, No. 707.) The male was described from a single specimen found in the stomach of *Spatula clypeata* (Linnæus), South Carolina. Biological survey Nos. 12645 and 59664.

Type.—Cat. No. 38346, U.S.N.M.

Subfamily NOTODROMADINÆ.

13. Genus CYPROIS Zenker, 1854.

Cyprois ZENKER, Wieg. Archiv. f. Naturg., XX, 1854, Pt. 1, p. 80.—BRADY and NORMAN, Trans. Royal Dublin Soc., 1889, p. 96.—DADAY, Termesz. Fus., XVIII, 1895.—KAUFMANN, Revue Suisse de Zool., VIII, 1900, p. 258.—MÜLLER, Zoologica, XII, Heft 30, 1900, p. 49.—SHARPE, Proc. U. S. Nat. Mus., XXVI, 1903, p. 975.

Shell high, compressed, smooth, and showing a similarity to that of the genus *Notodromas*. Second antenna 5-segmented in both sexes. First maxillary process with six strong toothed spines. Natatory setæ reach the tips of the terminal claws. Second foot ending with a claw and a reflexed seta. Furca with the two terminal claws seta-like, therefore an appearance as though four long setæ at tip of ramus. Furca of the male more bent than that of the female. No American forms heretofore reported. Sexual.

22. CYPROIS MARGINATA (Strauss).

Plate LVIII, figs. 1–5.

Cypris marginata H. E. Strauss, Mem. du Mus. d'Hist. Nat., VII, 1821, p. 59, pl. 1, figs. 20–22.

Cypris flava Zaddach, Synop. Crust. Pruss. Prodr., 1844, p. 33.

Cyprois flava Brady and Norman, Trans. Royal Dublin Soc., Pt. 1, 1889, p. 97, pl. viii, figs. 18–19; pl. xii, figs. 13–21, 38.—Claus, Arb. aus den Zool. Inst. Wien, X, 1892, Heft 2, pl. v, fig. 10; pl. vi, fig. 6.—Müller, Zoologica, XII, 1900, Heft 30, p. 49, pl. xii, figs. 1–10, 12–16.

Cyprois marginata Sars, Forh. Vid. Selsk. Christiania, 1890, p. 54.—Brady and Norman, Trans. Royal Dublin Soc., V, 1896, p. 727.—Kaufmann, Revue Suisse de Zool., 1900, p. 259, pl. xv, figs. 5–9; pl. xvii, figs. 11–19; pl. xviii, fig. 4; pl. xxix, fig. 16.

Dimensions.—Length, 1.52 mm.; breadth, 0.75 mm.; height, 0.96 mm.

A very markedly peculiar form, uniformly yellowish in color, with no especial markings except numerous small papillæ and a few scattered hairs.

Seen from the side (fig. 1), the dorsal edge is humped just back of the eye-spots, thence sloping rapidly to the evenly rounded posterior margin. The ventral edge nearly straight, the anterior edge evenly rounded. A hyaline margin is very plainly evident about the entire edge of shell, especially wide and prominent anteriorly, less so posteriorly and least of all dorsally and ventrally. This, no doubt, gave rise to the specific name as given by Strauss in 1821. The entire margin of the shell just within the hyaline flange appears to be tuberculate, because of the presence of unusually prominent "pore-canals."

Seen from above (fig. 2), the shell is elongate, oval, sharply pointed anteriorly, less so posteriorly, the greatest breadth in the middle being about one-half the length. Testes and ovaries show plainly through the shell.

Natatory setæ of the second antennæ plumose, and reaching to tips of the terminal claws. Terminal claws of the last segment rather slender, nearly straight, three and one-half times length of terminal segment. Terminal claw of penultimate segment reaching to tips of terminal claws.

The second foot ends in a beak-like segment (fig. 5); the terminal claw bent at right angles to the foot; the terminal three-fourths part being straight and about three times length of terminal segment, the terminal segment being about as long as broad.

The first maxillary process has six strong, toothed spines (fig. 4), these being much similar to those of *Notodromas*, but more coarsely toothed.

Furca stout (fig. 3), slightly curved, about seven times as long on dorsal edge as the average width, and terminating in four long setæ;

the two terminal being coarser, and somewhat claw-like, faintly toothed, the other two rather plumose. Terminal seta three-fifths as long as anterior edge of furca; dorsal seta longer, four-fifths as long as furca, and sharply bent near the tip, the two terminal claw-like setæ about the same length, and as long as the anterior edge of the furca. The dorsal seta here is unusually long, more strikingly so than amongst any Ostracods with which I am familiar.

Remarks.—I know of but one other species of *Cyprois* having been described—*C. madaraszi* Orley. This species is about twice the size of *C. marginata*, it being about 3 mm. in length, while *C. marginata* is only about 1.50 mm. long. It is evidently closely related to *Notodromas* in habits, and, in part, structurally, noticeably the six spines on the first maxillary process. Both genera are sexual, the different sexes showing slight differences of furca and form of shell.

Observations.—This form was kept for several weeks in aquaria. It was quite active, restless, and swam freely through the water, numbers of them coming to the surface of the water, where it has a unique habit of swimming along in an erratic way just below the surface film, acting as though trying to support itself there; in fact it may often be seen resting quiescent just below the surface film, at some distance from the edge of the aquarium. Many were also noticed creeping among débris at the bottom of the aquarium. Many were noted copulating.

Occurrence.—Large numbers frequented a shallow grassy pool just south of the old Columbian Exposition grounds in Jackson Park, Chicago. This pond was a temporary one, lasting from early spring to early June, when it became perfectly dry. This agrees with all hitherto recorded reports on habitat. It has hitherto been reported only from Europe, in England (Brady and Norman, 1896), Norway (Sars, 1891), Switzerland (Kaufmann, 1900), Germany (Müller, 1900), and Russia.

Collected May 3, 1906, Jackson Park, Chicago.

14. NOTODROMAS Lilljeborg, 1853.

Monoculus Jurine, Histoire des Monocles, etc., 1820.

Cyprois Zenker, Monog. der Ostracoden, 1854, p. 80.

Notodromas Lilljeborg, De Crust. ex Ord. tribus, 1853, p. 54.—Brady and Norman, Trans. Royal Dublin Soc., 1889, p. 95.—Kaufmann, Revue Suisse de Zool., VIII, 1900, p. 251.—Müller, Zoologica, 1900, p. 46.—Sharpe, Proc. U. S. Nat. Mus., XXVI, 1903, p. 974.

Shell high, smooth. Natatory setæ reach to tips of terminal claws. Second antennæ six-segmented in both sexes. First maxillary process with six toothed spines. Second foot five-segmented, terminating in three setæ, of which two are backwardly directed. Furca with two terminal claws seta-like, and terminal missing, so that furca seems to end in three setæ. Two eyes, separate. Sexual.

Five species of this genus have been described—*N. entzi* Daday (Ceylon), *N. fuscatus* Brady (Australia), *N. madaraszi* Orley (Hungary), *N. monacha* O. F. Müller, *N. oculatus* Sars (Sumatra). *Newnhamia patagonica* Vavra, 1898, was originally described as a species of *Notodromas*, but was later decided by Vavra to be a *Newnhamia*. *N. madaraszi* seems to be a type of a new genus, as it differs from the typical *Notodromas* in many ways, notably the spine-like setæ of the furca being five in number, in place of three, character of armature of the terminal segment of the second foot, the end segment being beak-shaped and with short claws, more similar to the Cypridinæ. It is therefore my opinion that the species *N. madaraszi* Orley should be the type of a new genus.

23. NOTODROMAS MONACHA (O. F. Müller).

Plate LIX, figs. 1–8.

Cypris monacha O. F. Müller, Entomos. seu Insecta testacea, 1785, p. 60, pl. v, figs. 6–8.—Zaddach, Synop. Crust. Pruss. Prodr., 1844, p. 31.—Fischer, Mém. des Sav. Etrang. de l'Acad. de St. Pétersbourg, VII, 1854, p. 146, pl. iv, figs. 1–11.

Notodromas monacha Lilljeborg, Om de inom Skane forekommende Crust. af Ord. Cladocera, Ostracoda och Copepoda. Lund., 1853, p. 95, pl. viii, figs. 1–15; pl. xii, figs. 1, 2; pl. xxv, fig. 16.—Brady and Norman, Trans. Royal Soc. Dublin, 1889, p. 96.—Vavra, Arch. Naturw. Durchforsch. Böhmen., 1891, p. 32, figs. 6–9.—Kaufmann, Revue Suisse de Zool., VIII, 1900, p. 251, pl. xv, figs. 1–4; pl. xvii, figs. 1–10; pl. xviii, figs. 1–3; pl. xxix, fig. 15.—Müller, Zoologica, XII, Heft. 30, 1900, p. 47, pl. xi, figs. 8–22; pl. xii, fig. 11.

Dimensions.—Length, 1.18 mm.; breadth, 0.75 mm.; height, 0.9 mm.

Seen from the side (fig. 1), this peculiar form is at once distinguished by its humpbacked appearance. The dorsal and ventral margins of the anterior half of the shell nearly parallel, after which the dorsal edge suddenly diverges to form a dorsal hump just back of the eyes, this shell widest just back of the middle. Posterior end bluntly rounded, sparingly hairy; the anterior end with a wide hyaline flange, sparingly hairy, and appearing as though crenulate, because of the small tuberculations which more or less cover the anterior part.

Seen from above (fig. 2), the shell is regularly oval, egg-shaped, but pointed anteriorly. Eyes two, plainly separate.

Second antenna 6-segmented. Natatory setæ reaching almost to tips of terminal claws, five in number, and plumose. Terminal and penultimate segments approximately the same length. Antepenultimate segment but two-thirds as long. Terminal segment narrow, eight times as long as wide: penultimate segment wider, about four times as long as wide.

First maxillary process with six broad spines, which are faintly ciliate at tip (fig. 7). Right maxillary foot of male (fig. 3) with a sickle-like terminal claw, which is about two-thirds length of terminal segment. Left maxillary foot much shorter, with a strong sickle-like terminal claw, which is about four-fifths length of terminal segment. Outer distal angle of terminal segment with a strong protuberance.

Terminal spine of first foot strong, about three times length of terminal segment, or about same length as penultimate segment. Second segment broad, with a tuft of hair on the curved dorsal edge, also a plumose seta on its dorsal distal margin which reaches to the end of the following segment. The third segment is two-thirds length of the following one, with a decided angular projection at its proximal dorsal edge, and a short seta at its distal dorsal edge, which is about two-thirds length of the following segment.

Terminal segment of the second foot very small, about as long as broad, about one-eleventh as long as preceding segment, and with three setæ of unequal lengths, two of which are terminal, and extend in the direction of the length of the foot; the third, subterminal and pointing in the opposite direction (fig. 5). One terminal seta about three-fourths length of longer one, which is seven-eighths length of penultimate segment; the remaining or subterminal seta being about the length of the longer one of the three.

Furca strongly bent (fig. 8), with two terminal bristles in place of the usual terminal claws of the Cyprididæ, these bristles being nearly the same length, the shorter about three-fourths length of the longer one, which is slightly more than two-thirds length of the posterior or dorsal edge of the furca; the dorsal bristle situated less than width of furca from subterminal bristle, and about two-thirds length of same. The anterior bristle, corresponding to the usual terminal seta of the Cyprididæ, is entirely lacking. The furca of the female is hardly so much bent as that of the male, but otherwise nearly similar.

The specimens studied by me were collected from the dune ponds of the southern shore of Lake Michigan, near Clarke Junction, Indiana. This is a typical undrained swamp region, with many peat bogs. The ponds were originally formed between established dunes, and in most cases are but relicts at present, having been destroyed by successive encroachments of different types of vegetation—first bulrush (*Scirpus*), sedge (*Carex*), willow (*Salix*), and the grasses. The filling-in process has usually been accelerated by abundant growths of *Chara*, the water lilies *Castalia* and *Nymphaea*, and *Utricularia*. These were all found in great abundance in this region. Among the marginal plants noted were the swamp cinquefoil (*Potentilla palustre*), buckbean (*Menyanthes trifoliata*), and the

leather leaf (*Chamaedaphne calyculata*). Other shrubs noted were the dwarf birch (*Betula pumila*), the alder (*Alnus incana*), the swamp blueberry (*Vaccinium corymbosum*), and the poison sumach (*Rhus vernix*). This region was also characterized as the home of various orchids, the sundew (*Drosera rotundifolia*), the pitcher plant (*Sarracenia purpurea*), and the peat moss (*Sphagnum*).

Observations.—These Ostracods were somewhat brownish yellow in color, a little darker ventrally, and a light yellow blotch just posterior to and below the eye-spot. There are two distinct eyes, a red eye-spot surrounded by a black pigment band. They swim very actively and persistently, remaining near the bottom most of the time. They also resemble the Cladocera in many of their swimming motions, at times turning so that the anterior part of the body is upwards, until they reach the surface of the water, where they hang, back downward, a very unusual and especially curious position for an Ostracod.

Distribution.—This form seems to occur only in permanent bodies of pure fresh water which is also rich with aquatic vegetation. They usually appear in April, and are abundant during the summer months, disappearing in the early autumn. It has been reported from all northern and middle Europe and from Minnesota.[a] A few specimens were found by me near Clarke Junction, Indiana, May 12, 1906, in permanent dune ponds. Found in company with *Cypris fuscata*, *Cypria dentifera*, and *Cypridopsis vidua*.

2. Family CYTHERIDÆ.

15. Genus CYTHERE O. F. Müller.

Cythere O. F. Müller, Entomos, seu Insecta testacea, 1785, p. 63.—Sars, Forh. Vid. Selsk. Christiania, 1865, p. 28.—Dahl, Zool. Jahrb., III, 1888, Heft 4, p. 605.—G. W. Müller, Die Ostracoden des Golfes von Neapel, 1894, p. 350, pl. xxvii, figs. 25–35; pl. xxviii, figs. 11–13, 15–18, 20, 28, 29; pl. xxix, figs. 11, 12, 14, 16.

Shell thick, mostly pitted, without distinct flanges; muscle impressions 4, which form a row. The growing line runs at a moderate distance from the shell edge, however, in the anterior half this is always nearer than the muscle impressions.

Seen from above, always somewhat strongly compressed, not so broad as high, compound eyes prominent. Hinge margin always with large teeth on the right shell at its anterior and posterior ends. The shell edges do not overlap anteriorly or posteriorly.

First antenna short and thickset, 5-segmented, the penultimate segment formed of the union of the fifth and sixth segments; the penultimate and antepenultimate segments short, hardly longer than

[a] Herrick, 10th Ann. Rept. Minn. Geol. and Nat. Hist. Survey, 1882, p. 252.

broad, the ultimate slender, more than twice as long as broad, and originating on the under terminal half of the penultimate segment. The setæ shorter than the limb, mostly spine-like and bent.

Second antenna 4-segmented, segments 3 and 4 united, and flagellum always well developed in both sexes. Mandible with short, strong, mandibular process and 4-segmented palp; its penultimate segment much broadened beyond the middle, its dorsal edge forming a plain blunt angle, at which the dorsal seta group originates (fig. 4). The terminal segment short, thick, little, or very little, longer than its breadth at base.

Maxilla of typical structure, thickset, maxillary process and palp with short strong bristles; respiratory plate without mouthwardly directed or abnormal rays.

First to third pairs of legs moderately elongate, their first segments with one seta on the anterior and posterior edges (without knee-seta).

Furca of female formed of a small basal part with two bristles.

G. W. Müller divides the genus into two groups:

(1) Those with females with shells of length less than once the height.

(2) Those with females with shells of length more than once the height.

All species show a plainly apparent yellowish color, formed because of a pale yellow color of the entire shell and from pigment spots in the body.

Dahl[a] mentions as of generic worth that the penultimate segment of the first antenna is many times as thick as the terminal segment and all locomotor appendages of a yellowish color. This is also true, at least, of the genera *Cytheridea* and *Cythereis*.

24. CYTHERE AMERICANA, new species.

Plate LX, figs. 1–6.

Dimensions.—Length, 1.2 mm.; height, 0.66 mm.; breadth, 0.64 mm.

Seen from the side (fig. 1), the shell is about 1.8 times as long as high, both ends evenly rounded, dorsal edge sloping anteriorly a little more rapidly. Ventral edge slightly sinuate, greatest height just back of the middle.

Seen from above (fig. 6), the shell is about one-half as wide as long, pointed anteriorly and broadest at the posterior third, where it is about four-sevenths as wide as long; surface of shell covered rather sparsely with small papillar elevations.

The preserved specimens as seen by reflected light appear of a porcelain color, covered with a few papillar elevations and not sculptured, as is the case with the great majority of the Cytheridæ.

[a] Zool. Jahrb., Abth. System, Geogr. v. Biol. der Thiere., 1888, p. 603.

As seen from above, the right shell shows from 8 to 10 small blunt teeth in the region of the hinge (fig. 2).

Seen from the side, the growing line runs approximately at about the same distance from the shell edge and with pore canals about the entire margin, numerous, and not branching (fig. 1).

First antenna stout, 5-segmented; terminal segment slightly more than four times as long as broad; penultimate segment with two spines and two spine-like setæ (fig. 5), which alternate; its terminal spine and seta being about the same length; the lateral spine being about seven-ninths the length of the terminal one; its lateral seta being slightly longer than its lateral spine. Antepenultimate segment broader than long, with a strong spine.

Second antenna 4-segmented, flagellum 2-segmented, as usual, and reaching slightly beyond tip of terminal segment. Mandible with strong 4-segmented palp, the penultimate segment of which is broadly widened just beyond the middle (fig. 4), thus forming a sharp angle, at which place is located a group of setæ.

Respiratory plate without any abnormal or mouthwardly directed rays. First pair of legs (fig. 2) strong, basal segment with a seta on each margin, the posterior one unusually thick; both of them plumose and barred, two toothed spines of about the same length at its outer angle. Antepenultimate segment with a strong spine as long as the last two segments; last two segments the same length, and no armature. Terminal spine sickle-shaped, and as long as the last two segments.

Second and third legs similar (fig. 3), having one spine in place of two at the knee joint and other spines more slender.

Collected by means of a Birge net from shallow tidal pools near Brighton Beach, New York, June 6, 1906 (type locality); also near old mill, Jamaica Bay, June 21, 1908, where it was more common.

Described from five specimens which were obtained only after repeated hauls with the Birge net. They burrowed about in the slime, and could not swim.

They are distinguished from most other species, especially by the regular character of the shell, which with most species of *Cythere* is more or less ridged or pitted or tuberculate, as also by its more regular gray color in life.

Type.—Cat. No. 38347, U.S.N.M.

25. CYTHERE PAPILLOSA, new species.

Plate LXI, figs. 1–4.

Dimensions.—Length, 0.8 to 0.85 mm.; height, 0.49 to 0.51 mm.; breadth, 0.42 to 0.45 mm.

Seen from the side (fig. 2), the shell is approximately 1.6 times as long as its greatest height; highest in the middle just back of eyes,

sloping gently anteriorly, but quite rapidly posteriorly for a short distance, then again produced so that the posterior end is almost truncate, and thus forming a dorso-posterior angle; lower margin essentially straight.

Muscle impressions four, lying one above another in a straight line. Just posterior to the muscle impressions are situated two large conical protuberances or tubercles, so prominent as to at once characterize the species.

Seen from above (fig. 1), the shell is broadest in the middle, about half as broad as long, rather sharply pointed anteriorly, more evenly and broadly rounded posteriorly, and plainly showing the two large protuberances of each side, situated just posterior to the widest part. Surface of the shell sparsely covered with small papillar elevations; the central area also, as seen from the side, with from 30 to 40 small lucid spots. Shell grayish in color. Pore canals not as evident as in most species of *Cythere*.

First antenna (fig. 3) about as usual for the genus, the terminal spine of the penultimate segment the largest, the seta proximal to it spine-like, and about the same length, the next spine blunt and shorter; the proximal seta slender, and not more than three-fourths length of spine beside it. In *Cythere americana* these proportions are different, the proximal seta of the penultimate segment being longer than the spine just distal to it.

Second antenna stout and of the usual type (fig. 4). Penultimate segment of the mandibular palp widened just beyond the middle. Feet slender and as usual with the genus.

Collected, along with *Cythere americana*, from shallow tidal pools near Brighton Beach, New York, June 6, 1906.

A very few of these forms could be obtained by repeated use of the Birge net, not more than four to five specimens of each of the two forms just described, from at least a dozen hauls of the net.

They are poor swimmers, and were only with difficulty seen, as they burrowed about in the slime and ooze when placed in shallow glass vessels.

Type.—Cat. No. 38348, U.S.N.M.

3. Family CYPRIDINIDÆ.

16. Genus CYLINDROLEBERIS Brady.

Cypridina AUTHORS, 1868.

Asterope PHILIPPI, Arch. Naturg., 6 Jahrg. 1840, Pt. 1, p. 186.—CLAUS, Untersuch. zur Erforsch. der genealog. grundlage des Crustaceensystems, Wein, 1876, p. 94.—SARS, Arch. Math. Naturv., Christiania, XII, 1887, p. 11.—MÜLLER, Zool. Jahrb., Abth. Syst., V, 1890, p. 239.

Cylindroleberis BRADY Intellectual Observer, London, XII, 1867, p. 127; Trans. Linn. Soc. Lond., XXVI, 1868, p. 464.—MÜLLER, Die Ostracoden des Golfes von Neapel, XXI, 1894, p. 216.

Shell smooth, more or less oblong or elliptical, and always with a distinct rostral sinus. Both sexes present and with well developed eyes. Frontal organ long and slender. First antenna 6 or 7 segmented; in both sexes the fifth joint with a sensory organ; in the female the terminal segment bearing only rather short setæ, while the male bears two that are unusually long, almost as long as the entire animal. Natatory branch of the antenna well developed; secondary branch small in the female, sometimes jointed; in the male three-jointed, the third joint reflexed upon the second, forming a grasping organ. First maxilla without masticating process, in its stead a group of long plumose setæ; main portion of limb falcate, with many long, stiff setæ on the inner margin; in front a naked lamella arises from the main limb. The second maxilla consists of a tongue-like plate which is setose on its inner margin, and a large semicircular lamina which bears many long plumose setæ on its margin. The first pair of legs arises directly behind the mouth; not jointed and without lobes; bearing some plumose setæ on the ventral margin. The vermiform limb has a double row of teeth at its extremity. Furca broader than long, bearing several claws. There are seven pairs of rather large dorsal branchiæ. Sexual.

It seems wise to follow the lead of Dr. G. W. Müller in using the genus name *Cylindroleberis* rather than *Asterope* for reasons very well discussed by him in his splendid work on the Ostracoda of the Gulf of Naples.

26. CYLINDROLEBERIS OBLONGA (Grube).

Plate LXII, figs. 1–4.

Cypridina mariæ Baird, Proc. Zool. Soc. London, 1850, p. 257, pl. xvii, figs. 5–7.

Cypridina oblonga Grube, Archiv. fur Naturg., 1859, p. 322, pl. xii.

Cylindroleberis mariæ Brady, Intellectual Observer, 1867, p. 127, pl. ii, figs. 11–14; Trans. Linn. Soc., XXVI, 1868, p. 465, pl. xxxiii, figs. 18–22.

Asterope oblonga Sars, Archiv. for Mathem. og Naturvid., XXII, 1887, p. 31, pl. i, figs. 5–8; pl. ii, figs. 1, 2; pls. v, vi.

Cylindroleberis oblonga G. W. Müller, Die Ostracoden des Golfes von Neapel, 1894, p. 219, pl. iv, figs. 14–18, 39, 41, 49–55; pl. v, figs. 1, 4, 5, 13, 14, 33, 41–44; pl. viii, fig. 4.

Cylindroleberis mariæ Cushman, Proc. Boston Soc. Nat. Hist., XXXII, 1906, No. 10, p. 366, pl. xxix, figs. 19–25.—Juday, Univ. of Cal. Pub., III, 1907, No. 9, p. 143, pl. xix, figs. 7–11.

Dimensions.—Length, 1.45 mm.; height, 0.8 mm.

Seen from the side (fig. 1), the shell is nearly twice as long as high, elongate, upper and lower margins nearly parallel, the greatest height just back of the middle. Upper margin higher posteriorly, the lower margin slightly sinuate anteriorly; posterior extremity broadly and evenly rounded.

Rostral sinus oblique, narrow, situated below the middle. Surface of the shell finely punctate, and yellowish red in color.

The vermiform limb (fig. 4) has both apical lips serrately divided, and with but a few spine-like setæ on its margin.

Caudal lamina each with eight rather slender spines and setæ (fig. 2), thus appearing as though sixteen in a row, the spines twelve in a row, and larger, very faintly serrate; the smaller four in number, seta-like.

Higher magnification of a claw (fig. 3) plainly shows characteristic serrations, every eighth or tenth one being larger than the rest.

Distribution.—British seas (Brady); Mediterranean Sea (Müller); Scandinavian seas (Sars); California coast (Juday); Vineyard Sound (Cushman); San Diego Bay, California, Cat. No. 13108; U.S.N.M.

27. CYLINDROLEBERIS LOBIANCI G. W. Müller.

Plate LXIII, figs. 1–5; Plate LXV, figs. 3–7.

Cylindroleberis lobiaci G. W. MÜLLER, Die Ostracoden des Golfes von Neapel, 1894, p. 220, pl. IV, figs. 40–42; pl. V, figs. 2, 3, 26, 32, 34, 40.

Dimensions of male.—Length, 5.25 mm.; height, 3.65 mm.

Dimensions of female.—Length, 5.85 to 6 mm.; height, 4.8 to 5 mm.

Shell of the male (fig. 2) longer than that of the female (fig. 1) and of different shape; the height being to length approximately as 1 to 1.45, while the shell of the female is approximately as 1 to 1.2, thus being slightly oblong to almost circular in outline. Surface of shell covered with small pittings in both sexes.

The rostral incision is rather obliquely set, not deep, narrow, and a little above the middle.

First antennæ rather stout, elongate, terminal segment short, about one-fifth as long as the fifth segment; second segment with seven lateral setæ and three marginal outer ones, two of the latter long and plumose; third segment about half as long as the second, outer margin about twice as long as the inner, and armed with about seven long plumose setæ, most of them clustered at the outer distal margin. Terminal spine stout, slightly curved, and as long as the part distal to the fourth segment.

About all the natatory setæ of the second antennæ armed on their lower margins with a row of teeth (fig. 7).

Inner rudimentary branch of the second antennæ of the female composed of three segments, the basal one as long as the other two, with a tuft of short setæ at its base, and seven to eight marginal ones. Penultimate segment about one-half length of basal one, with four to five short setæ; terminal segment conical, and terminating in a long ringed seta (Plate LXV, fig. 5). Occasionally another form of branch is to be seen (Plate LXV, fig. 4), which, however, is evidently that of the younger stages. This is usually four-segmented, the basal segment with two or three short setæ, antepenultimate segment with a

seta at its inner distal angle; penultimate segment with a long ringed seta at its outer distal angle; terminal segment conical, about length of previous segment, and terminating in a short seta.

Mandibular process falcate (Plate LXIII, fig. 5), pointed and with many hooked serrations, and a slender outer branch. Vermiform limb broadened at end, the last forty to fifty segments setose, the last six or eight segments often with two setæ on each margin. Its tip is armed with a double row of toothed spines (Plate LXIII, fig. 4), each with a curved tip.

Furcal plate with three strong claws (Plate LXV, fig. 3), the second and third on special processes of the furcal plate, and from seven to nine curved seta-like spines, these being mostly toothed and barbed near tip (fig. 3). The base of each claw is armed with two or three rows of setæ, mostly arranged in clusters. Claws very strongly toothed, except near tip. Lower posterior margin of furcal plate very densely setose.

Observations.—The many collections of the United States Bureau of Fisheries containing this form also contained many that were evidently the young, and all showed various modifications of the inner branch of the second antenna, but these in the main resembling fig. 5. Inner rudimentary branch of the second antenna of the male composed of two segments, the terminal one reflexed against the basal one, thus forming a prehensile organ for grasping (fig. 6). Basal segment about four times as long as broad, inner margin swollen about the middle, and with six short setæ; terminal segment irregularly falcate, with a seta near its union with the basal segment, and a serrate tip (fig. 6*a*.)

Remarks.—Müller, 1894, first describes this species as occurring in the Mediterranean Sea in a depth of about 5 fathoms, among coarse sand, in company with *Amphioxus*. He based his description on but two examples, both of which were females, males being therefore unknown to him.

The males are seemingly not very abundant. Two males were found among the twenty or more specimens critically examined by the author.

Distribution.—Mediterranean Sea (Müller, 1894); San Pedro, California, Acc. No. 43766, U.S.N.M.; San Diego Bay, California, Cat. No. 13791, U.S.N.M.; San Pedro, California, Acc. No. 37972, U.S.N.M.; off Abreojos Point, Lower California, 5½ fathoms, station 2835, *Albatross*, and off San Diego, California, 25 fathoms, station 4304, *Albatross;* San Diego Bay, California, Cat. No. 13107, U.S.N.M.; Catalina Islands, California, and Ensenada, Lower California, Acc. No. 22456, U.S.N.M. (Orcutt).

The two males examined were from a collection taken at Ballenas Bay, Lower California, U. S. Bureau of Fisheries, No. 1884 (*Albatross*).

17. Genus PYROCYPRIS Müller, 1890.

Cypridina AUTHORS, 1852 (Dana), 1868.

Pyrocypris G. W. MÜLLER, Zool. Jahrb., Abth. Syst., V, 1890, p. 231, pl. XXV, figs. 1–8; pl. XXVI, figs. 10, 12, 16, 19; pl. XXVII, figs. 1, 2, 18, 24, 34–37.—BRADY, Trans. Zool. Soc. Lond., XVI, 1902, p. 185.—G. W. MÜLLER, Ostracoda, Abdr. aus Wiss. Ergeb. der deutsch. Tiefsee Expedition "Valdivia," 1898–99, 1906, p. 107.

Eupathistoma BRADY, Trans. Zool. Soc. Lond., 1898, XIV, Pt. 8, p. 437, pl. XLIV, figs. 21–26.

Shell membranous, about 2 mm. long, and produced posteriorly to form a prominent rounded beak or process.

Especially characteristic is the upper lip, which Müller [a] believes serves as a phosphorescent organ. It is unusually well developed to form six finger-like processes (Plate LXIV, fig. 5), the two anterior unpaired, and four are in pairs, of which the two posterior ones are the longest. It is always peculiarly pigmented with a dark-colored pigment which presumably possesses the power of producing phosphorescent light by chemical means.[b]

Rudimentary branch of the second antennæ similar in both sexes, hardly noticeable, and with five setæ.

Furca always with nine toothed spines, of which the second is immovably fixed with the furcal plate. Vermiform limb with a terminal armature of from three to five unequal slender claw-like setæ, all curved to one side. Brady [c] figures *P. americana* as having a furca with but seven spines or spine-like setæ. This is undoubtedly an error, probably due to poor specimens.

Commonly caught at night with a surface net in tropical seas. Many instances are on record of hauls containing as high as 15,000 to 20,000 individuals. Sexual. Heretofore recorded as occurring off the American coast only by the Galatea expedition, September 10, 1875, the species *P. americana* being reported off the west coast of Central America.

Brady believes this genus intermediate in character between *Cypridina* and *Philomedes*.

28. PYROCYPRIS AMERICANA G. W. Müller.

Plate LXIV, figs. 1–5.

Pyrocypris americana MÜLLER, Zool. Jahrb., Abth. Syst., V, 1890, p. 233, pl. XXV, fig. 3.—BRADY, On new or imperfectly known Ostracoda, chiefly from a collection in the Zool. Museum, Copenhagen, 1902, p. 185, pl. XXI, figs. 14–19.

Dimensions.—Length, 1.55 mm.; height, 0.85 mm.; breadth, 0.56 mm.

[a] Neue Cypridiniden, Zool. Jahrb. Abth. Syst., V, 1890, p. 231.

[b] Watanabe, H., 1897, Jour. R. Micr. Soc., Pt. 5, p. 384.

[c] Trans. Zool. Soc. London, XVI, 1902, p. 185.

Seen from the side, the shell is about twice as long as broad (fig. 1), ventral margin very much curved, dorsal margin less so; antennal notch narrow, vertical, and with a small tuft of setæ; rostral arch much produced, posterior extremity much produced into a conspicuous beak which is gently curved ventrally, but dorsally forms a very decided angle with the shell (fig. 1).

Secondary branch of the second antenna is formed of six setæ (fig. 3). The vermiform limb is armed at tip with five slender curved claws (fig. 2).

Furca with nine toothed spines (fig. 4), of which the second or subterminal one is united with the furcal plate, the remainder being plainly articulated to the plate.

The upper lip (fig. 5) as seen from the side is very strikingly developed, the hindmost tooth being the largest and notched, the others finger-like.

The pigmentation, which is supposed to be the seat of its ability to produce phosphorescent light, shows plainly as a dark pigmentation. I have never seen anything of like character associated with any other Ostracoda.

One specimen studied by me which was collected by the Bureau of Fisheries Steamer *Albatross*, Station 3921, May 6, 1902, 8.45 p. m., night anchorage; surface; off Honolulu.

18. Genus PHILOMEDES Lilljeborg 1853.

Cypridina Authors, 1853.

Eurypylus Brady, Descriptions of Ostracoda, Les Fonds de la Mer, 1867–1886, Bordeaux, I, p. 141, pl. xviii, figs. 1, 2.

Philomedes Lilljeborg, Om de inom Skane for. Crust. af ord. Cladocera, Ostracoda och Copepoda, Lund., 1853, p. 175.—Baird, Proc. Zool. Soc. Lond., XXVIII, 1860, p. 202.—Sars, Arch. Math. Naturv. Christiania, XII, 1887, p. 45.—Brady and Norman, Trans. Royal Dublin Soc., Pt. 2, 1896, p. 653.—G. W. Müller, Die Ostracoden des Golfes von Neapel, p. 207, 1904, pl. iii, figs. 1–33, 36–44.—Juday, Univ. of Cal. pubs., III, 1907, No. 9, p. 139.

Bradycinctus Sars, Forh. Vid. Selsk. Christiania, 1865, p. 109.—Brady, Trans. Linn. Soc. Lond., XXVI, 1868, p. 466.

Shell always with a distinct rostral sinus which is overhung by a broad, blunt rostral process. First antenna six-segmented, with medium long, sparsely plumose setæ, and female with no sensory setæ. Second antenna with a weak secondary branch. Secondary branch of second antenna of male three-jointed, prehensile, the last joint reflexed upon the second. First maxilla of female rather large and strong; of male indistinctly joined, weak, and armed with delicate setæ. Second maxilla of female with two rather large teeth at its anterior angle, the inner tooth the smaller and bifid; the maxilla of the male without teeth. Eyes of female rudimentary or lacking; those of male well developed. First pair of legs more or less distinctly jointed.

29. PHILOMEDES BRENDA (Baird).

Plate LXV, figs. 1, 2.

Cypridina brenda BAIRD, Nat. Hist. British Entomos., 1850, p. 181, pl. XXIII, figs. 1*a–g*.

Bradycinetus brenda BRADY, Trans. Linn. Soc., XXVI, 1868, p. 466, pl. XXXIII, figs. 1–5; pl. XLI, fig. 5.—NORMAN, Proc. Roy. Soc., XXV, 1875, p. 206.

Philomedes brenda NORMAN, Ann. Mag. Nat. Hist., 6th ser., VI, 1891, p. 119.—BRADY and NORMAN, Trans. Royal Dublin Soc., Pt. 2, 1896, p. 654.—G. W. MÜLLER, Nordisches Plankton, VII, Ostracoda, Kiel, 1901, p. 10, figs. 18, 19.

Dimensions.—Length, 3 mm.; height, 1.85 mm.; breadth, 1.52 mm.

Color a pale straw yellow. As seen from the side (fig. 1), the shell of the male is oblong, dorsal margin gently curved; ventral margin slightly sinuate, posterior margin obliquely truncate, thus forming an angle at the infero-posterior margin. The anterior sinus is ciliate, widely opened, the anterior extremity produced much beyond the sinus.

Secondary or grasping branch of the second antenna of the male (fig. 2), with its terminal segment long and narrow, twelve to fourteen times as long as wide, curved, and reflexed against the second segment, thus forming a grasping organ, and with a short ringed seta near its point of union with the second segment. Second segment bent backwards, and with three-ringed setæ of nearly equal length situated along its inner margin.

One specimen was sent to the U. S. National Museum, which was collected by Dr. J. Schmitt from off the coast of Anticosti Island, Gulf of St. Lawrence, Acc. No. 39193.

Distribution.—British coasts (Brady and Norman, 1896), Holsteinbourg Harbor, Greenland (Valorous, 1875), Scandinavian harbors (Norman, Sars, Lilljeborg).

EXPLANATION OF PLATES.

PLATE L.

Fig. 1. *Spirocypris tuberculata*, new species, dorsal view.
2. *Spirocypris tuberculata*, new species, dorsal view (variety).
3. *Cypria dentifera*, dorsal view.
4. *Cypria dentifera*, lateral view.
5. *Cyclocypris lævis*, dorsal view.

PLATE LI.

Fig. 1. *Candona parallela*, lateral view.
2. *Candona parallela*, dorsal view.
3. *Candona parallela*, furca.
4. *Candona parallela*, terminal claws of furca.
5. *Candona parallela*, second foot.

PLATE LII.

Fig. 1. *Paracandona euplectella*, lateral view.
2. *Paracandona euplectella*, dorsal view.
3. *Paracandona euplectella*, second foot.
4. *Paracandona euplectella*, mandibular palp.
5. *Paracandona euplectella*, furca.

PLATE LIII.

Fig. 1. *Cypris fuscata*, lateral view.
2. *Cypris fuscata*, variety *minor*, dorsal view.
3. *Cypris fuscata*, variety *major*, dorsal view.
4. *Cypris fuscata*, furca.

PLATE LIV.

Fig. 1. *Cypris incongruens*, lateral view.
2. *Cypris incongruens*, dorsal view.
3. *Cypris incongruens*, furca.
4. *Spirocypris tuberculata*, new species, lateral view.
5. *Cyclocypris lævis*, lateral view.
6. *Cyclocypris lævis*, furca.
7. *Cyclocypris lævis*, terminal segments of second foot.

PLATE LV.

Fig. 1. *Spirocypris tuberculata*, new species, terminal segments of second foot.
2. *Spirocypris tuberculata*, new species, ejaculatory duct, in sack.
3. *Spirocypris tuberculata*, new species, furca.
4. *Spirocypris tuberculata*, new species, right maxillary foot of male.
5. *Spirocypris tuberculata*, new species, portion of shell, showing tubercles.
6. *Spirocypris tuberculata*, new species, left maxillary foot of male.

PLATE LVI.

Fig. 1. *Ilyocypris gibba*, lateral view.
2. *Ilyocypris gibba*, dorsal view.
3. *Ilyocypris bradyi*, dorsal view.
4. *Ilyocypris bradyi*, lateral view.
5. *Ilyocypris bradyi*, terminal segments of second foot.
6. *Ilyocypris bradyi*, furca.

PLATE LVII.

Fig. 1. *Ilyodromus pectinatus*, new species, lateral view.
2. *Ilyodromus pectinatus*, new species, maxillary palps of male.
3. *Ilyodromus pectinatus*, new species, furca.
4. *Ilyodromus pectinatus*, new species, dorsal view.
5. *Ilyodromus pectinatus*, new species, terminal segments of second foot.

PLATE LVIII.

Fig. 1. *Cyprois marginata*, lateral view.
2. *Cyprois marginata*, dorsal view.
3. *Cyprois marginata*, furca.
4. *Cyprois marginata*, first maxillary process.
5. *Cyprois marginata*, terminal segments of second foot.

PLATE LIX.

Fig. 1. *Notodromas monacha*, lateral view.
2. *Notodromas monacha*, dorsal view.
3. *Notodromas monacha*, right maxillary foot of male.
4. *Notodromas monacha*, left maxillary foot of male.
5. *Notodromas monacha*, terminal segments of second foot.
6. *Notodromas monacha*, ventral view.
7. *Notodromas monacha*, spines of maxillary process.
8. *Notodromas monacha*, furca.

PLATE LX.

Fig. 1. *Cythere americana*, new species, lateral view.
2. *Cythere americana*, new species, first leg.
3. *Cythere americana*, new species, second leg.
4. *Cythere americana*, new species, mandibular palp.
5. *Cythere americana*, new species, first antenna.
6. *Cythere americana*, new species, dorsal view.

PLATE LXI.

Fig. 1. *Cythere papillosa*, new species, dorsal view.
2. *Cythere papillosa*, new species, lateral view.
3. *Cythere papillosa*, new species, first antenna.
4. *Cythere papillosa*, new species, second antenna.

PLATE LXII.

Fig. 1. *Cylindroleberis oblonga*, lateral view.
2. *Cylindroleberis oblonga*, furca.
3. *Cylindroleberis oblonga*, part of a terminal claw of furca.
4. *Cylindroleberis oblonga*, extremity of vermiform limb.

PLATE LXIII.

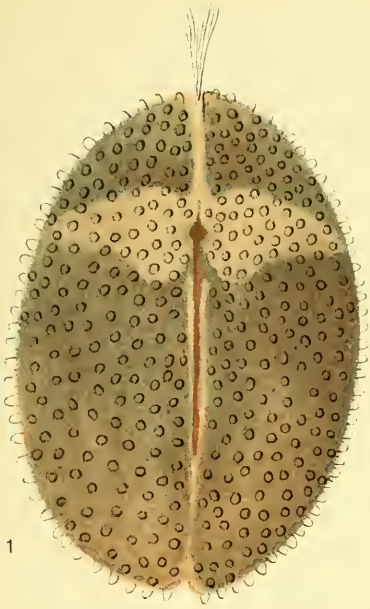
Fig. 1. *Cylindroleberis lobianci*, lateral view of female.
2. *Cylindroleberis lobianci*, lateral view of male.
3. *Cylindroleberis lobianci*, dorsal view.
4. *Cylindroleberis lobianci*, terminal part of vermiform limb.
5. *Cylindroleberis lobianci*, mandibular process.

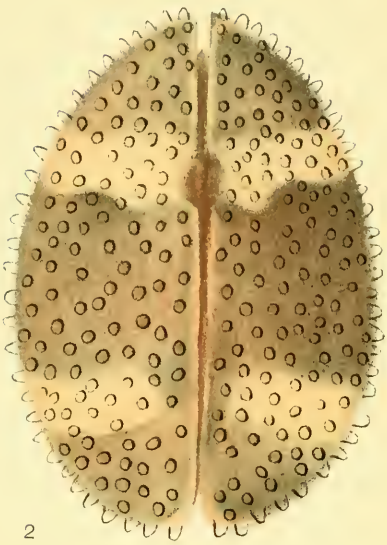
PLATE LXIV.

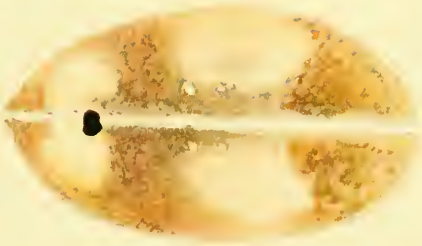
Fig. 1. *Pyrocypris americana*, lateral view.
2. *Pyrocypris americana*, terminal part, vermiform limb of female.
3. *Pyrocypris americana*, inner branch, antenna of female.
4. *Pyrocypris americana*, furca.
5. *Pyrocypris americana*, upper lip, side view.

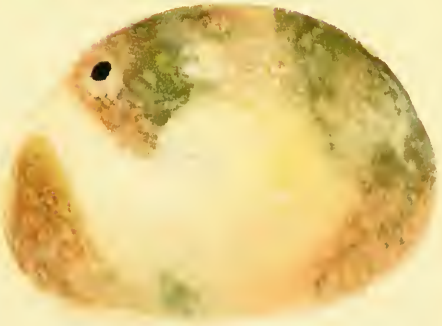
PLATE LXV.

Fig. 1. *Philomedes brenda*, lateral view.
2. *Philomedes brenda*, secondary branch of antenna of male.
3. *Cylindroleberis lobianci*, furca, showing an enlarged seta.
4. *Cylindroleberis lobianci*, another young stage, as fig. 5.
5. *Cylindroleberis lobianci*, rudimentary inner branch; second antenna of female (young).
6. *Cylindroleberis lobianci*, rudimentary inner branch, second antenna of male.
7. *Cylindroleberis lobianci*, portion of a natatory seta.



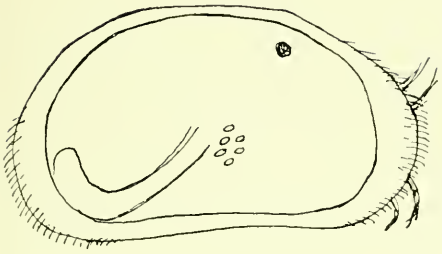






SPIROCYPRIS TUBERCULATA, CYPRIA DENTIFERA, AND CYCLOCYPRIS LÆVIS

FOR EXPLANATION OF PLATE SEE PAGE 428



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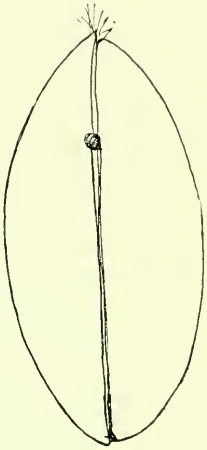

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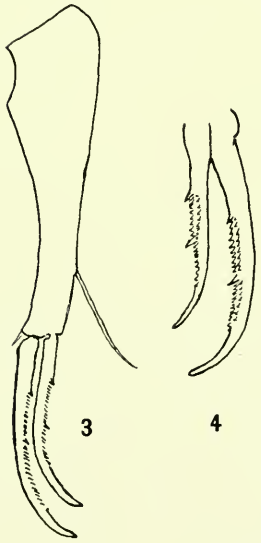

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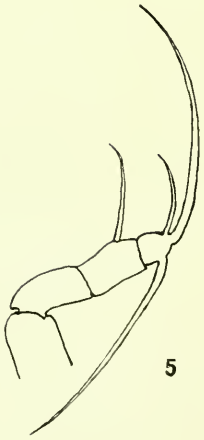
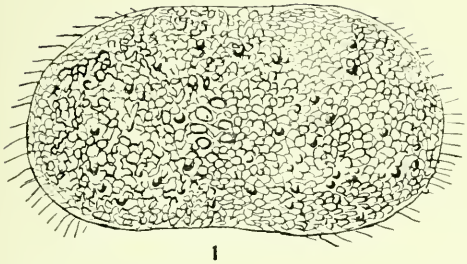


5

CANDONA PARALLELA.

FOR EXPLANATION OF PLATE SEE PAGE 428.



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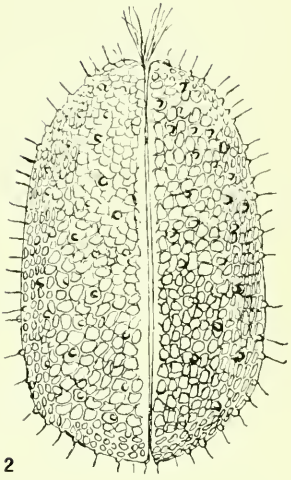

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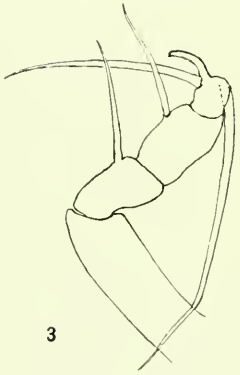

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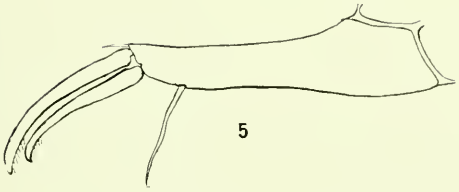

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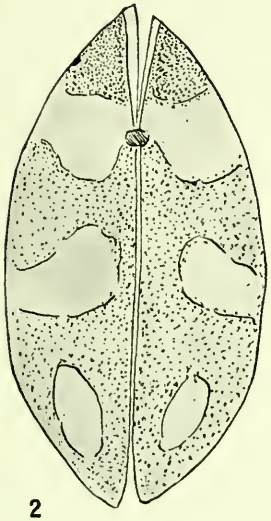
PARACANDONA EUPLECTELLA.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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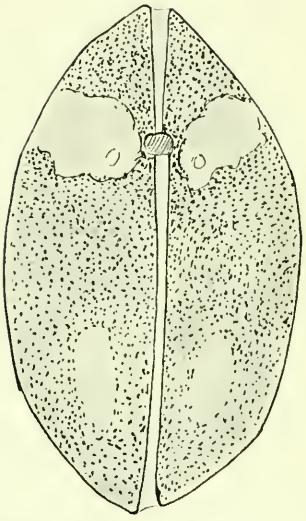

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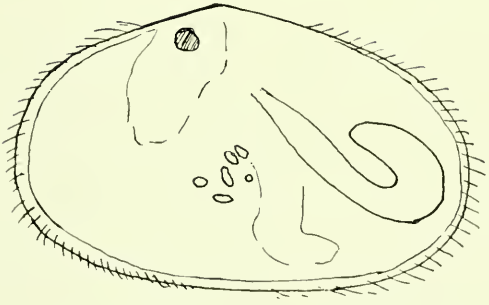

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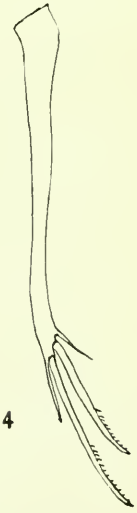
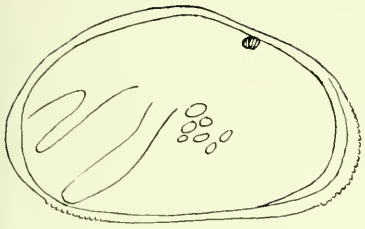


4

CYPRIS FUSCATA.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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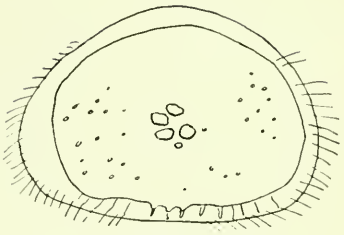

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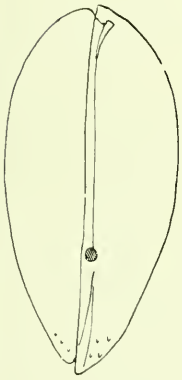

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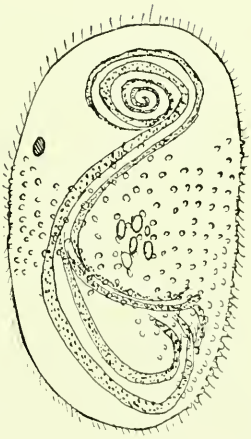

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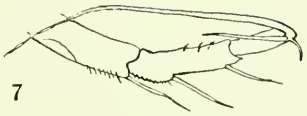
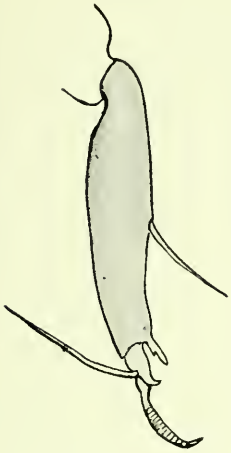


7

CYPRIS INCONGRUENS, SPIROCYPRIS TUBERCULATA, AND CYCLOCYPRIS LÆVIS.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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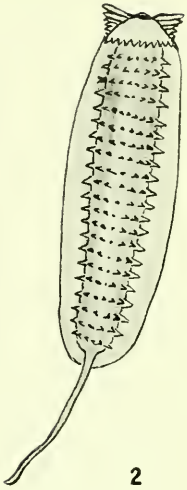

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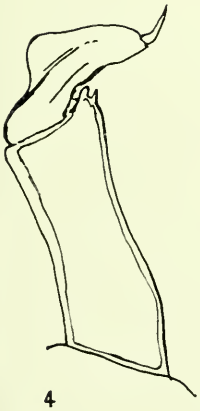

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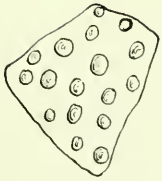

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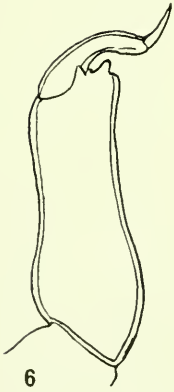
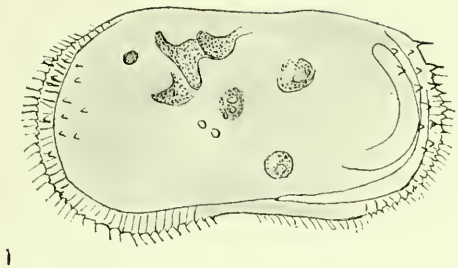


6

SPIROCYPRIS TUBERCULATA, NEW SPECIES.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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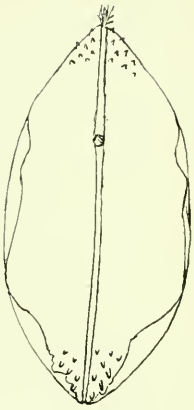

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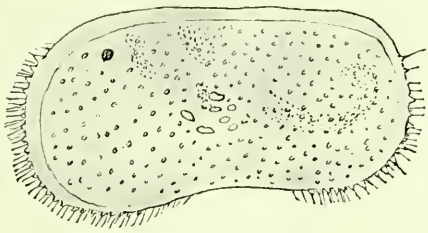

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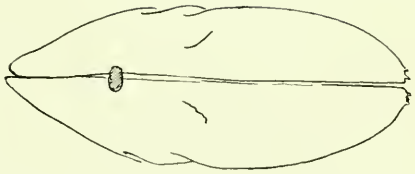

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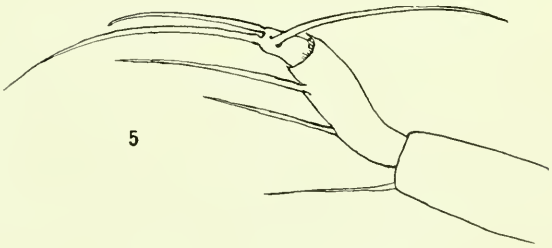
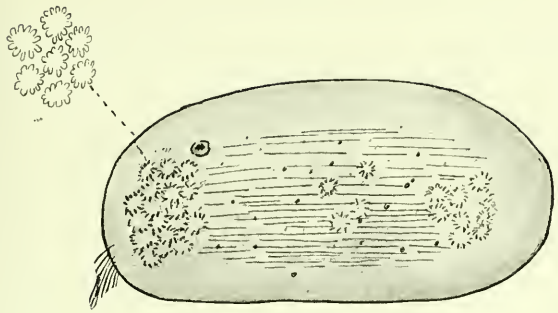


5

ILYOCYPRIS GIBBA AND ILYOCYPRIS BRADYI.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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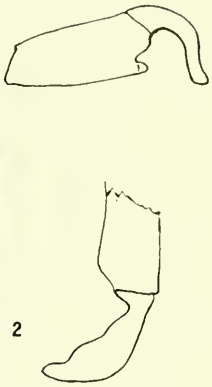

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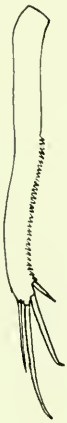

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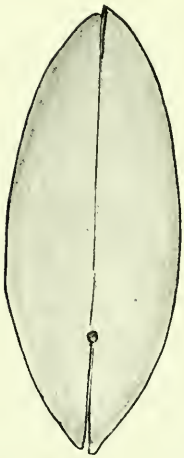

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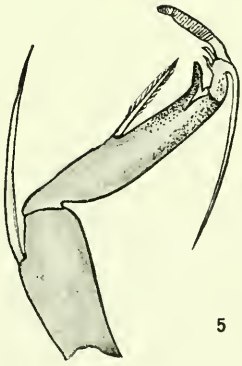
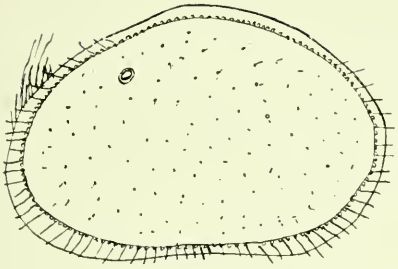


5

ILYODROMUS PECTINATUS, NEW SPECIES.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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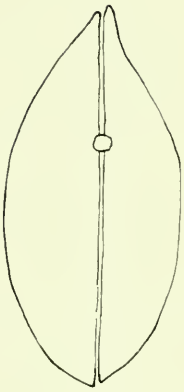

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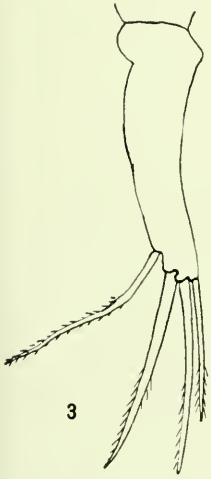

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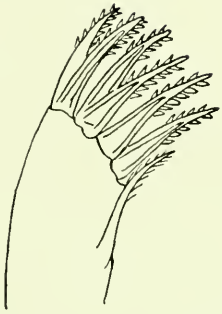

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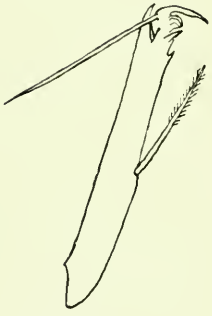
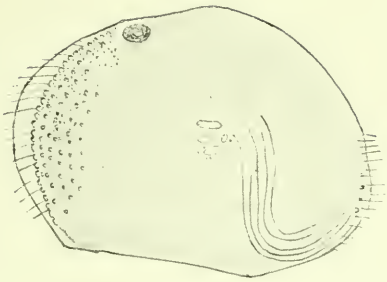


5

CYPROIS MARGINATA.

FOR EXPLANATION OF PLATE SEE PAGE 429.



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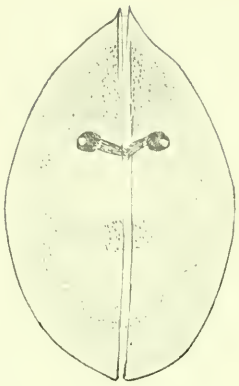

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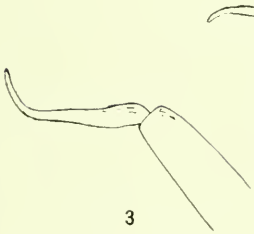

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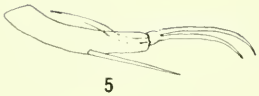

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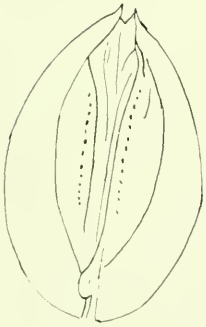

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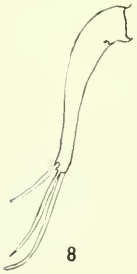
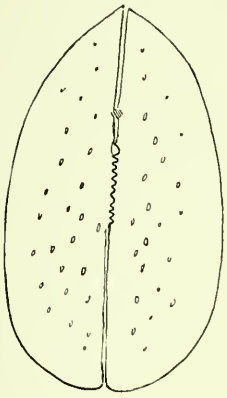


8

NOTODROMAS MONACHA.

FOR EXPLANATION OF PLATE SEE PAGE 430.



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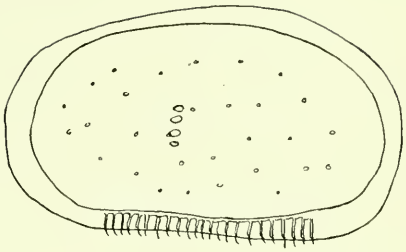

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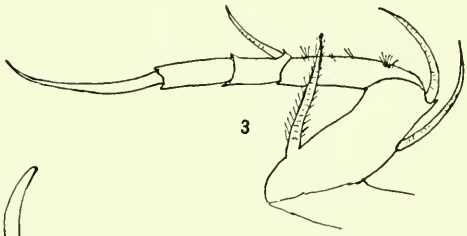

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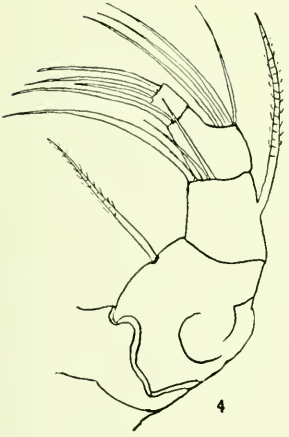

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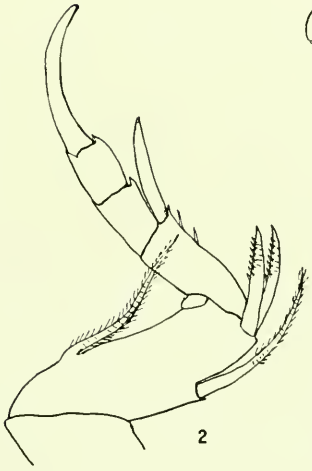

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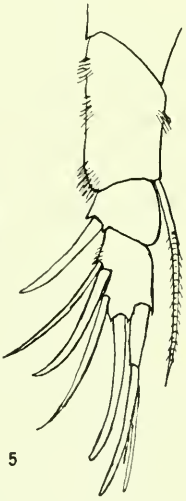
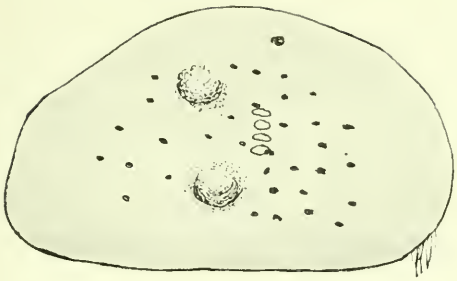


5

CYTHERE AMERICANA, NEW SPECIES.

FOR EXPLANATION OF PLATE SEE PAGE 430.



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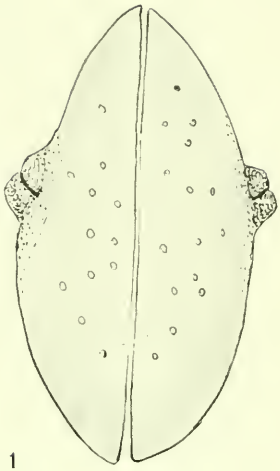

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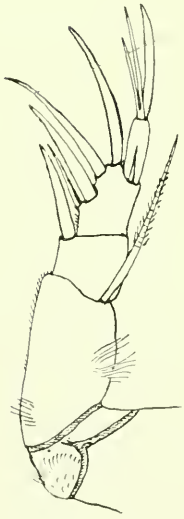
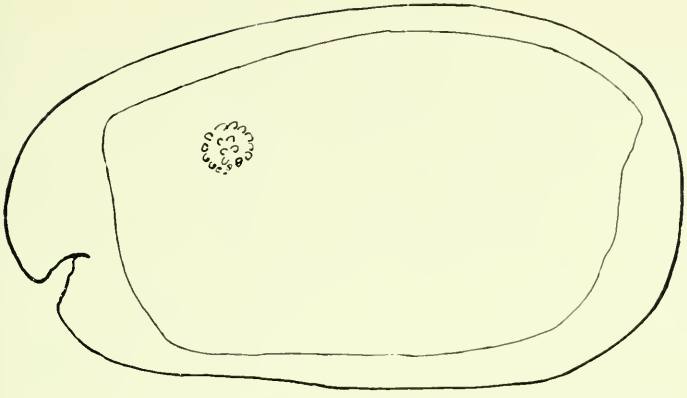


3

CYTHERE PAPILLOSA, NEW SPECIES

FOR EXPLANATION OF PLATE SEE PAGE 430.



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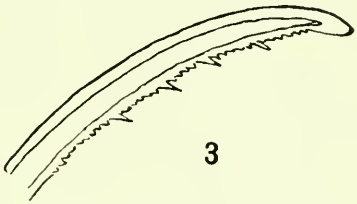

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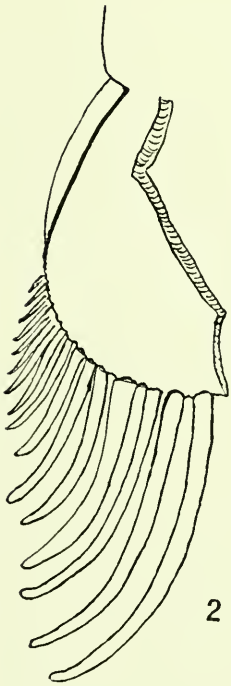

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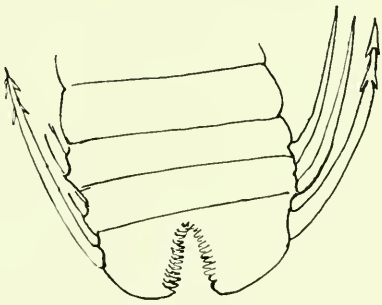
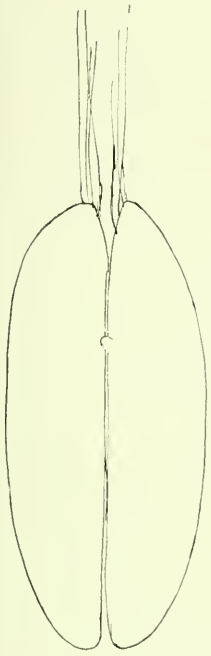


4

CYLINDROLEBERIS OBLONGA.

FOR EXPLANATION OF PLATE SEE PAGE 430.



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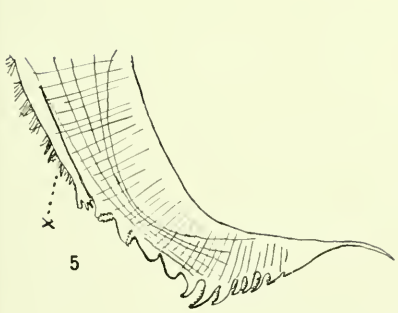

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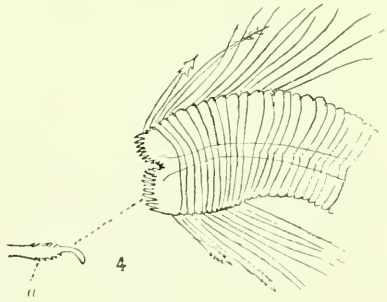
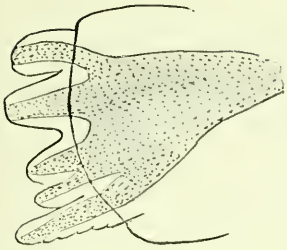


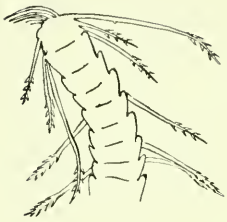
4

CYLINDROLEBERIS LOBIANCI.

FOR EXPLANATION OF PLATE SEE PAGE 430.



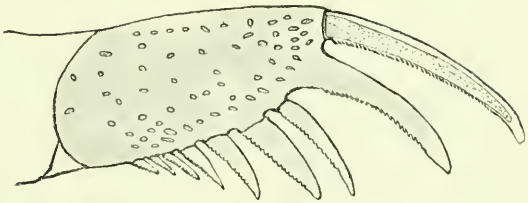
5



2

1

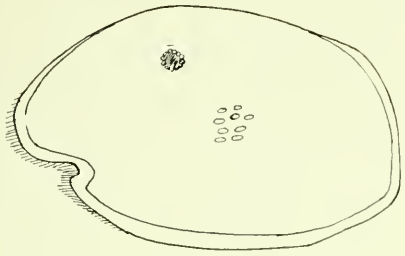
3

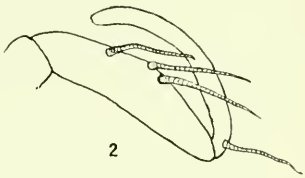


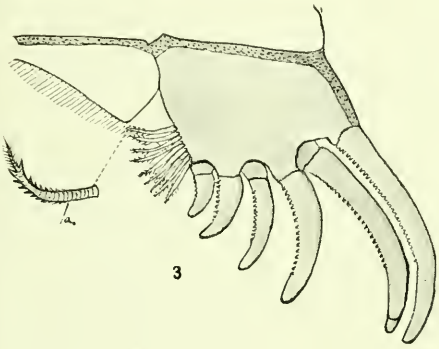
4

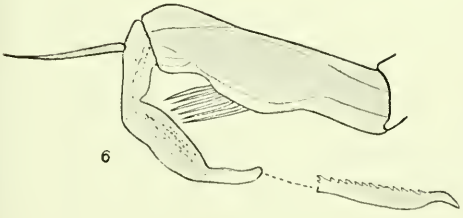
PYROCYPRIS AMERICANA.

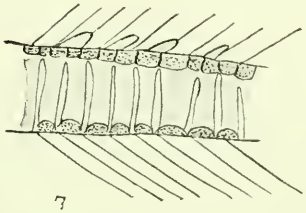
FOR EXPLANATION OF PLATE SEE PAGE 430.











PHILOMEDES BRENDA AND CYLINDROLEBERIS LOBIANCI.

FOR EXPLANATION OF PLATE SEE PAGE 430.