

REPORT ON THE FRESH-WATER OSTRACODA OF THE  
UNITED STATES NATIONAL MUSEUM, INCLUDING A  
REVISION OF THE SUBFAMILIES AND GENERA OF  
THE FAMILY CYPRIDIDÆ.

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INTRODUCTION.

The following report presents in part the results of a study of the fresh-water Ostracoda belonging to the United States National Museum. The greater portion of the material was collected from quite widely separated regions. Places as remote from one another as New Jersey and California on the one hand, and Oregon and Mexico on the other, are represented.

The material has been collected by friends of the U. S. National Museum, somewhat cursorily and in small quantities. Dr. E. Palmer, Dr. Alfredo Dugés, Mr. E. W. Berry, and Prof. H. I. Smith, are among those who have contributed.

So much confusion and error has arisen on account of the genus name *Cyprinotus*, that I shall here use it as a subgeneric name under the genus *Cypris*. The attempt has been made to distinguish the genus *Cyprinotus* from the genus *Cypris* by means of the method of propagation and the presence or absence of tubercles on the right shell margin. *Cyprinotus* was distinguished from *Cypris* by being sexual—while *Cypris* parthenogenetic—also by possessing a row of tubercles on the right shell margin, which *Cypris* lacked.

As regards the method of propagation, it is undeniably the case that it is not always a genus character among the Ostracoda. For instance, *Ilyocypris gibba* Rahmdohr is not represented by males, while *Ilyocypris lacustris* Kaufmann is propagated sexually.

Indeed, European forms of *Cypris clavata* Baird are parthenogenetic, while African forms of the same species are sexual. Furthermore, *Cypris testudinaria* Sharpe is sexual, a character which might have allied it with *Cyprinotus*, but it is entirely without tubercles on the shell margins. In fact, it seems that this species breaks down any possible barrier between *Cypris* and *Cyprinotus*, indicating that

at most *Cyprinotus* should have but the rank of a division of the genus *Cypris*.

Furthermore, I entirely agree with the observations of Kaufmann where he says:

Ebenso ist das Vorhandensein einer Tuberkelreihe auf dem Shalenrand ein Gattungsmerkmal von sehr fraglichen Wert, da es eben ein rein äusserliches ist, und was für bedenkliche Folgen eine Berücksichtigung solcher rein äusserlicher Merkmale in der Systematik herbeiführt, haben uns die Diagnosen älterer Autoren zur Genüge gelehrt.

The tubercles also seem to be quite variously present on both right and left valves, and regardless of the method of propagation.

I shall therefore regard the genus *Cyprinotus* as a subgenus of the genus *Cypris*, the genera *Heterocypris* Claus and *Amphicypris* Sars being similarly used and for similar reasons (see key, genus *Cypris*).

All species of *Cypris* that are evidently sexual and have a row of tubercles on the right shell margin should fall in the *Cyprinotus* group. Those seemingly sexual and armed with tubercles on the left valve margin and with "pore canals" should fall under the *Heterocypris* group. Provisionally it seems necessary to establish another subgenus, with *Cypris grandis* Chambers as the type. Insufficient data, however, makes this division a doubtful one. All other forms of *Cypris* not included in the above four subgenera will here be classed in *Cypris* proper.

Of the nine species described in this report, I have been enabled to identify seven with forms already recorded. The remaining two species, as also the genus *Spirocypris*, I regard as new to science. As a whole, the museum collection so far affords an addition of three genera and five species as new to the United States, and of these all but *Chlamydotheca* as new to America, this genus being originally described from Mexico.

I owe thanks to Dr. S. A. Forbes, of the University of Illinois, for loan of literature; to Dr. Richard Rathbun and Mr. Charles T. Simpson, of the U. S. National Museum, for loan of material, and to Dr. A. C. Eyclesheimer and Mr. C. C. Adams, of the University of Chicago, for many courtesies extended.

#### SYSTEMATIC SUMMARY.

The fresh-water Ostracoda of the U. S. National Museum are distributed as indicated in the following summaries. The species comprise nine names, distributed in six genera and four subfamilies, as follows:

Family.	Subfamily.	Genus.	Subgenus.	Species.
Cyprididae .....	Cypridinae .....	2	1	4
	Herpetocypridinae .....	2	.....	3
	Cypridopsinae .....	1	.....	1
	Cyclocypridinae .....	1	.....	1
Total .....	.....	6	1	9

It is yet too soon to hazard any remarks regarding geographical distribution in America, as too little is known of the range of individual forms.

The following table will, however, show the relative abundance of the museum forms at the time and place of collection:

SUMMARY OF SPECIES OF FRESH-WATER OSTRACODA OF THE NATIONAL MUSEUM.

I. Family CYPRIDIDÆ.

(a) Subfamily CYPRIDINÆ.

1. Genus *Cypris*.

(a) Subgenus *Cypris*.

1. *C. cirens*, Guanajuato, Mexico, April (few).

2. *C. pubera* Jurine, Oregon (abundant).

3. *C. pellucida* Sharpe, Guanajuato, Mexico, April (abundant).

Big Butte, Idaho, September (abundant).

2. Genus *Spirocypis*, new genus.

4. *S. passaica*, new species (few).

(b) Subfamily HERPETOCYPRIDINÆ.

3. Genus *Herpetocypis*.

5. *H. reptans* Baird, California, September (abundant).

4. Genus *Chlamydotheca*.

6. *C. mexicana*, new species, Mexico, September (abundant).

7. *C. azteca* Saussure, Texas, October (common).

(c) Subfamily CYPRIDOPINÆ.

5. Genus *Potamocypis*.

8. *P. smaragdina* (Vavra), Mexico, April (few).

(d) Subfamily CYCLOCYPRIDINÆ.

6. Genus *Cypria*.

9. *C. exculpta* Fischer, Michigan, November (common).

SYNOPTICAL KEY TO THE SUBFAMILIES, GENERA, AND SUBGENERA OF THE FRESH-WATER OSTRACODA, INCLUDED IN THE FAMILY CYPRIDIDÆ.

Family CYPRIDIDÆ.

- a* Natatory setæ commonly reaching beyond end claws. Second feet usually with three terminal setæ of different lengths, two backwardly directed and the middle one sometimes claw-like. First maxillary process usually armed with 6 strong spines .....Subfamily NOTODROMADINÆ, 1.
- b* Second antennæ 6-segmented in both sexes.
- c* Second feet normal. Terminal seta of caudal ramus missing. Branchial plate on second maxilla of 2 setæ .....*Notodromus*, 1.
- cc* Second feet with a claw on end segment. Furca normal, but terminal seta small or missing in female. No branchial plate.....*Newhamia*, 2.
- bb* Second antennæ 5-segmented in both sexes. Branchial plate present.
- c* Two terminal claws of ramus, seta-like. Second foot with a claw-like seta.  
*Cypris*, 3.
- aa* Natatory setæ shortened; no swimmers. Second foot with a beak-shaped end segment and a short claw .....Subfamily HERPETOCYPRIDINÆ, 11.
- b* Furca ending in 3 claws; dorsal seta replaced by a short spine. Males unknown .....*Ilydromus*, 4.
- bb* Furca normal.
- c* Second segment of first foot with 2 setæ on anterior margin. Three spines on first maxillary process, the first one commonly toothed.  
*Chlamydotheca*, 5.

- cc* Second segment of first foot normal, but 1 seta. Two spines on first maxillary process.
- d* Spines of maxillary process plainly toothed.
- e* Length, 1.8 mm. or more. Two setae on first segment of first foot. *Herpetocypris*, 6.
- ce* Length, 1.0 mm. or less. One seta on first segment of first foot. *Microocypris*, 7.
- dd* Spines of maxillary process not toothed ..... *Prionocypris*, 8.
- aaa* Natatory setae reaching beyond end claws, or approximately to tips of end claws. Second foot with a beak-like end-segment and a claw. Subfamily CYPRIDINÆ, III.
- b* Two eyes. Natatory setae reaching beyond end claws. Shell thick and strong ..... *Centrocypris*, 9.
- bb* No eyes, unless rudimentary.
- c* Testes, if present, originating in anterior part of shell, and anteriorly in form of concentric circles or half-circles.
- d* Testes in form of concentric half-circles, anteriorly. Shell small, not more than 0.6 mm. or 0.8 mm. in length ..... *Cypridella*, 10.
- dd* Testes in form of concentric circles, anteriorly. Shell more than 0.8 mm. in length.
- e* Shell tumid and excessively hairy. Furca normal, slender, no more than one-half length of shell ..... *Spirocypris*, 11.
- ce* Shell, as seen from side, narrow, oblong, and smooth. Furca excessively developed, more than one-half length of shell ..... *Cypricercus*, 17.
- ddd* Males unknown. Furca with 2 long terminal setae in place of the usual claws; also usually a short dorsal one. Ovary spirally wound. *Cyprretta*, 12.
- cc* Testes, if present, not originating in the anterior part of shell, and usually not in circles or half-circles.
- d* Right shell prominently armed with a dorsal, longitudinal, ridge-like process.
- e* Dorsal process, with thorn-like projections at both extremities. Testes appearing as 8 concentric half-circles in posterior part of shell. *Strandesia*, 13.
- ce* Dorsal process, with a thorn-like projection at posterior part only. Furca excessively large ..... *Acanthocypris*, 14.
- dd* Shell comparatively smooth, at least no dorsal ridge-like process present.
- e* Furcal dorsal seta rudimentary or absent. Males present. *Steuocypris*, 15.
- ce* Furcal dorsal seta plainly present.
- f* First foot 4-segmented, third and fourth segments united. Shell unusually broad. Furca and its claws smooth ..... *Eurycypris*, 16.
- ff* First foot not 4-segmented, usually five. Furca usually normal. Propagation sexual or asexual ..... *Cypris*, 18.
- g* Furca normal.
- h* Length, 3.00 mm. to 3.50 mm. Sexual. Subgenus *Amphicypris*, 5.
- hh* Length less than 3 mm.
- i* Parthenogenetic. Valves with or without tubercles. Subgenus *Cypris*, 1.
- ii* Sexual. Right valve with marginal tubercles. Subgenus *Cyprinotus*, 2.
- iii* Sexual. Left valve with marginal tubercles. Subgenus *Heterocypris*, 3.



*dd* Furca abnormal.

*c* Anterior or terminal seta of furca missing. Eye rudimentary, disappearing with age.....*Typhlocypris*, 30.

*ce* Posterior or dorsal seta missing. Branchial plate of 3 setae.  
*Candonopsis*, 31.

*bb* Shell reticulated, tumid. Small, not more than 0.8 mm. in length.

*Paracandona*, 32.

The following text contains a few revised generic descriptions—notably that of the genus *Cypris*—as also short keys to the known North American species. A few other forms are included for purposes of comparison; these, however, being marked with an asterisk (\*).

## I. Subfamily NOTODROMADINÆ.

### 1. NOTODROMAS Lilljeborg, 1853.

*Monoculus* JURINE, Histoire des Monocles, qui se trouvent aux environs de Genève, 1820.—LILLJEBORG, De Crustaceis ex ordinibus tribus, 1853, p. 94.

*Cypris* ZENKER, Monographie der Ostracoden, 1854, p. 80.

*Notodromas* BRADY and NORMAN, A Monograph of the marine and fresh water Ostracoda, Trans. Royal Dublin Soc., 1889, p. 95.

Shell high, smooth. Natatory setae reach to tips of terminal claws. Second antennae six-segmented in both sexes. First maxillary process with six toothed spines. Second foot four-segmented, terminating in three setae, of which two are directed backward. Branchial plate of two setae. Furca with the two terminal claws seta-like, terminal seta missing, so that furca seems to end in three setae. Two eyes, separate. Sexual.

*a* Female with spine-like projection at lower posterior extremity of shell. Shell smooth, noticeably quadrangular.....*N. monacha* O. F. Müller.

### 2. NEWHAMIA King, 1855.

*Newhamia* KING, On Australian Entomos., Proc. Royal Soc. Van Diemens Land, III, 1855.—VAVRA, Die Ostracoden vom Bismarck-Archipel, 1901, p. 179.

Shell roughly granulate or tuberculate on outside. Natatory setae reaching tips of terminal claws. Second antennae six-segmented in both sexes, that of female terminating with a simple terminal seta, while that of male terminates with a coarsely toothed spine. Branchial plate missing. Terminal seta of furca is usually present in male, but lacking in female. Two separate eyes. Second foot with three setae of different lengths, one almost claw-like. Ductus of numerous, thickly arranged, chitinous whorls. Furca normal, but terminal seta occasionally missing in female.

This genus includes but two species at present, *N. patagonica* Vavra (1898) from Patagonia, and *N. fenestra* King, Vavra (1901), from Bismarck Archipelago.

## 3. CYPROIS Zenker, 1854.

*Cyprois* ZENKER, Monog. der Ostracoden, Wieg. Archiv. f. Naturg., XX, 1854, Pt. 1, p. 80.—BRADY and NORMAN, A Monog. of the marine and fresh water Ostrac., Trans. Royal Dublin Soc., 1889, p. 96.—DADAY, Die anatomischen Verhältnisse von *Cyprois dispar*, Termesz. Füsz., XVIII, 1895.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 258.

Shell somewhat high, compressed, smooth. Second antennae five-segmented in both sexes. First maxillary process with six strong toothed spines. Branchial plate of six setae. Second foot ending with a claw and a reflexed seta. Furca with two terminal claws seta-like, therefore an appearance as though four setae on tip of ramus. No American forms known.

## II. Subfamily HERPETOCYPRIDINÆ.

## 4. ILYODROMUS Sars, 1894.

*Erpetocypris* BRADY and NORMAN, A Monograph of the marine and fresh water Ostracoda, Trans. Royal Dublin Soc., 1889, p. 84.

*Herpetocypris* SARS, Oversigt af Norges Crustaceer. Christ., Vid. Selsk. Förhd., No. 1, 1890, p. 60.

*Cypris* VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 82.

*Erpetocypris* CRONENBERG, Beitrag zur Ostracoden-Fauna der Umgegend von Moscou, Bull. Soc. Imp. d. Moscou, 1894, p. 14.

*Ilyodromus* SARS, Cont. to knowledge of the f. w. Entomos. of New Zealand, Vid. Selsk. Skr. Math. Natur. Klasse, 1894, p. 41.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 298.

Natatory setae much shortened. Spines of first maxillary process toothed. Caudal ramus ending in three claws, dorsal seta replaced by a short spine. Terminal seta present. Males unknown. No American species known.

## 5. CHLAMYDOTHECA Saussure, 1858.

*Cypris* DANA, U. S. Explor. Exped. (Com. Ch. Wilkes), XIII, Crustacea, Pt. 1, 1852.

*Chlamydotheca* SAUSSURE, Mémoire sur divers crustacés nouveaux des Antilles, et du Mexique, Mém. Soc. Phys. et Nat. Genève, 1858, p. 487.—BRADY, Notes on Entomos. coll. by Mr. A. Haley in Ceylon, Jour. Linn. Soc., XIX, 1885; Notes on f. w. Entomos. from S. Australia, Proc. Zool. Soc. London, 1886.

*Pachycypris* CLAUS, Beiträge zur Kenntniss der Süßwasser-Ostracoden, Arb. Zool. Inst. Wien, X, 1892, p. 55.

*Cypris* WIERZEJSKI, Süßwasser Crustaceen und Rotatorien, gesammelt in Argentinien, Anz. der Akad. der Wiss. in Krakau, Pt. 5, 1892.—TURNER, Notes on the Cladocera, Copepoda, Ostracoda, and Rotifera of Cincinnati, Bull. Sci. Lab. Denison Univ., VI, 1892.—SARS, Cont. to the knowl. of the f. w. Entomos. of New Zealand, Vid. Selsk. Skr. Math. Natur. Klasse, No. 5, 1894.

*Chlamydotheca* VAVRA, Süßwasser-Ostracoden der Hamb. Magal. Samml., 1898, p. 16; Hamburg.

*Herpetocypris* DADAY, Micros. Süßwasserthiere aus Patagonien, Termesz. Füsz., XXV, 1902, p. 296.

Shell with flange-like projections, both anteriorly and posteriorly. Swimming setae moderately long. Maxillary process with three strong spines. Second segment of first foot with two setae on anterior margin.

Furca commonly normal, toothed on ventral margin. This genus is at once distinguished by the presence of two setae on anterior margin of second segment of first foot, instead of one, as in other freshwater Ostracoda. Genus established by Saussure in 1858, with the peculiar flange-like projections on the shell as the basis of distinction.

- a* Furca about 24 times as long as wide, its dorsal margin faintly toothed for one-half its length; shell broadly oval from above ..... *mexicana* Sharpe.  
*aa* Furca about 18 times as long as wide, its dorsal margin faintly ciliate its entire length. Shell wedge shaped anteriorly from above ..... *azteca* Saussure.

#### 1. CHLAMYDOTHECA MEXICANA, new species.

Plate LXIV, figs. 1-6.

Length, 2.75 mm.: breadth, 1.60 mm.; height, 1.55 mm.

Color noticeably brownish yellow, two narrow, greenish stripes running from the lower posterior margin diagonally toward the anterior upper margin, passing on either side of the muscle impressions and terminating a short distance beyond them (fig. 1).

Surface of shell comparatively smooth, but with a few very short, sparsely scattered papillae.

Seen from the side (fig. 1) the shell is highest at the middle and posterior third, sloping abruptly to the posterior lower angle, which is provided with a very noticeable hyaline flange. Seen from above (fig. 2) the shell is widest in the middle, rather broadly oval, evenly rounded posteriorly, and rather acutely pointed anteriorly. The anterior extremity has a very broad, strikingly noticeable flange, fringed with rather long hairs.

Ventral margin nearly straight, except for a sinus at its union with the anterior flange (fig. 1).

Natatory setae of the second antennae are very plumose, reaching about to tips of terminal claws. Terminal claws slightly curved, the longest about six times as long as the terminal segment, or seven-fifths as long as the last two segments, the shorter claw two-thirds the length of the longer.

The "sense club" is quite near the base of the segment on which it is located.

The second segment of the first pair of feet is provided with two setae, a feature characteristic of the genus (fig. 3). Terminal claw stout, nearly smooth, and about seven-ninths as long as the last four segments taken together.

The second foot ends in a beak-shaped segment: the terminal claw very much bent and nearly smooth (fig. 4). The longer seta is about three-fifths the length of the penultimate segment, or twice as long as the terminal claw.

Furca almost straight, about twenty-three times as long as wide and very faintly toothed on dorsal margin for about one-half its length (fig. 5).

Terminal claw straight, rather stout, nearly smooth, and one-half as long as furca. Subterminal claw four-sevenths length of terminal one and straight. Terminal seta very slender, two-thirds length of dorsal one, which is slightly more than one-half as long as subterminal claw. No males seen by me.

Described from several specimens which were sent to the United States National Museum by Dr. E. Palmer from Durango, Mexico. Received by the Museum September 11, 1897. Accession No. 32559.

But one other species has been reported from America, *C. azteca* (Saussure), which differs from the above in the form of the shell, furca, and other minor details. In *C. azteca* the ratio of length to breadth of furca is as 17 to 1, while in *C. mexicana* this ratio is about as 24 to 1; moreover, its entire dorsal margin is faintly ciliate in *C. azteca*, while but about one-half this edge is faintly toothed in *C. mexicana*.

## 2. CHLAMYDOTHECA AZTECA Saussure.

Plate LXIX, figs. 1-4.

*Cypris* (*Chlamydotheca*) *azteca* SAUSSURE, Mémoire sur divers crustacés nouveaux des Antilles et du Mexique, Mém. Soc. Phys. et Nat. Genève, 1858, p. 487, pl. vi, figs. 45-54.

Length, 3.30 mm.; height, 2 mm.; width, 1.80 mm.

One of the largest forms of this genus known, uniformly yellowish gray in color, with occasionally a dark patch posteriorly. Shell smooth and glistening to the naked eye, but shown to be quite thickly covered with small papillar elevations by using a one-fourth-inch objective.

Seen from the side (fig. 1) the shell is highest at the posterior one-third, sloping rather abruptly to the posterior lower angle, which is provided with a small hyaline flange.

Seen from above (fig. 3), as in *C. mexicana*, the shell is widest at the posterior one-third, bluntly rounded posteriorly, and wedge-shaped anteriorly. There is a very noticeable hyaline flange, fringed with hair, on the anterior margin. Ventral margin nearly straight, except for a sinus at its union with the anterior flange.

Natatory setæ of the second antennæ plumose, reaching to tips of terminal claws. Terminal claws stout, slightly curved, the longest about six times as long as the terminal segment, or five-fourths that of the last two segments. As in *C. mexicana*, the second segment of the first pair of feet is provided with two setæ at its distal angle—a most prominent generic character.

Second foot not especially different from that of *C. mexicana*. Furca almost straight, from 18 to 20 times as long as wide, and faintly pectinate on almost entire dorsal margin (fig. 4).

Terminal claw nearly straight, rather stout, nearly smooth, and one-half length of furca. Subterminal claw two-thirds length of terminal one and straight. Terminal seta slender, six-fifths length of dorsal one, which is two-thirds as long as subterminal claw. No males found in the material at hand.

Described from eighteen specimens sent to the United States National Museum by Mr. J. D. Mitchell, Victoria, Texas. Collected by Mr. Mitchell from a ditch on a rice farm on the west side of the Guadalupe River, Victoria County, Texas, October, 1902; also pools in the neighborhood of Vera Cruz.<sup>a</sup>

This species differs from *C. mexicana* in size, markings, form of shell as seen from above, and ratio of length of furca to its breadth. *C. azteca* is larger, much more wedge-shaped anteriorly as seen from above, lacks the greenish stripes on shell, and furca stouter and shorter as compared with width.

#### 6. HERPETOCYPRIS Brady and Norman, 1889.

*Erpetocypris* BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 84.

*Herpetocypris* SARS, Oversigt af Norges Crustaceer, Christ. Vid. Selsk. Forhd., No. 1, 1890, p. 62.—CRONENBERG, Beitrag zur Ostracoden-Fauna der Umgegend Moscou, Bull. Soc. Imp. d. Moscou, No. 3, 1894.—BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Pt. 2, Trans. Royal Dublin Soc., 1896, p. 722.—KAUFMANN, Zur Systematik der Cypriden, Mitteil. der Naturf. Gesell. in Bern, 1900, p. 105.

Natatory setæ rudimentary; no swimmers. Spines of first maxillary process plainly toothed. Length, 1.80 mm. or more. First segment of first foot with two setæ. Dorsal seta of furca very small. Sexual or asexual. Three of the following species are reported from America:

a Length about 4.00 mm. Furca about twenty times as long as wide.

*barbatus* (Forbes).

aa Length between 2.00 mm. and 3.00 mm.

b Terminal claw of second foot at least three times as long as terminal segment.

c Natatory setæ of second antennæ nearly reaching tips of terminal claws.

*intermedia*\* Kaufmann.

cc Natatory setæ of second antennæ not longer than the fourth segment.

d Dorsal edge of furca with five combs of coarse teeth. Terminal claw of furca long and slender.....*reptans* Baird.

dd Dorsal edge of furca with seven combs of weak setæ. Terminal claw of furca short and stout.....*brevicaudata*\* Kaufmann.

bb Terminal claw of second foot about as long as last segment.

c Caudal ramus about ten times as long as wide.....*strigatu*\* O. F. Müller.

cc Caudal ramus about seventeen times as long as wide...*peregrina*\* Kaufmann.

aaa Length between 1.00 mm. and 2.00 mm.

b "Furca with only terminal claws, lacking both terminal and dorsal setæ"?

*minnesotensis* (Herrick).

<sup>a</sup>De Saussure, Mém. Soc. Phys. et Nat. Genève, 1858, p. 490.

## 3. HERPETOCYPRIS REPTANS Baird.

Plate LXXV, figs. 1-4.

*Cypris reptans* LILLJEBORG, De Crustaceis ex Ordinibus tribus, 1853, p. 123, pl. XI, figs. 21-23; pl. XII, figs. 7-9.—BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc., XXVI, Pt. 2, 1868, p. 370, pl. XXV, figs. 10-14; pl. XXXVI, fig. 4.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 86, fig. 28.—WIERZEJSKI, Süßwasser-Crustaceen und Rotatorien, gesammelt in Argentinien, Abz. der Akad. der Wiss. in Krakau, Pt. 5, 1892, p. 187.—ZACHARIAS, Faunistische Mitteilungen, Forsch. d. biol. Station zu Plön, Pt. 2, VI, 1894, p. 63.

*Erpetocypris reptans* BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 84, pl. XIII, fig. 27.—CROENENBERG, Beitrag zur Ostracoden-Fauna der Umgegend von Moscon, Bull. Soc. Imp. d. Moscou, No. 3, 1894, p. 15, pl. VII, fig. 14.—RICHARD, Sur la faune des eaux douces des Açores, Bull. Soc. Zool. de France, XXI, 1896, p. 173.

*Herpetocypris reptans* SAER, Oversigt af Norges Crustaceer, Christ. Vid. Selsk. Forhd., No. 1, 1890, p. 17.—CLAUS, Beiträge zur Kenntniss der Süßwasser-Ostracoden, Arb. Zool. Inst. Wien, X, 1892, pl. IV, figs. 13-14.—KAUFMANN, Die Ostracoden der Umgegend Berns, Mittlg. d. Naturf. Gesell. in Bern, p. 74, 1892.—HARTWIG, Verzeichniss der lebenden Kriebthiere der Provinz Brandenburg, Statt. handsch. Mittlg., 1893, p. 25; Berlin.—DADAY, Fauna Regni Hungariæ, 1897, p. 6; Budapest.—LIENENKLAUS, Erster Beitrag zur Kenntniss der Ostracoden fauna des Regierungs bezirks Osnabrück, 12 Jahresber. d. naturw. Vereins zu Osnabrück f. d. Jahr. 1897, p. 111.—SCHNEIDER, Die Tierwelt der Nordseeinsel Borkum, Ostracoda, Abhand. Naturw. Verein, XVI, 1898, p. 161; Bremen.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 282, pl. XVI, figs. 1-3; pl. XVIII, figs. 21-26.

Dimensions, American: Length, 2.00 mm.; height, 0.80 mm.; breadth, 0.65 mm. European: Length, 2.50 mm.; height, 1.10 mm.; breadth, 0.90 mm.

Shell somewhat brownish yellow, with a darker patch as seen from the side, smooth and glistening, yet rather opaque, and covered with very small papillæ.

Seen from the side the shell is more than twice as long as wide (fig. 1), the upper and lower margins nearly parallel. The lower margin is weakly sinuate. Seen from above (fig. 2) the shell is a narrow oval, rather sharply pointed anteriorly, blunter posteriorly, and widest just back of the middle.

The second antennæ are stout, terminal claws about as long as the penultimate segment. Natatory setæ short, extending about to the base of the terminal segment. The two spines on the first maxillary process are stout and toothed.

Terminal claw of the second foot more than twice as long as the terminal segment and strongly curved (fig. 3). Furca rather stout (fig. 4), about sixteen times as long as wide, broad at base, slightly curved, and the dorsal edge armed with five combs of coarse teeth.

Terminal claw stout, slightly bent, about one-half as long as the furca. Subterminal claw as long as terminal seta, which is slightly more than one-half length of terminal claw. Dorsal seta slender, about twice as long as width of furca and situated about one-fourth width of furca from subterminal claw.

This species is characterized by the shape of its shell, long terminal claw of second foot, and the five combs of teeth on the dorsal edge of the furca. While the specimens examined by me were somewhat smaller than the European forms as described by Vavra and Kaufmann, yet they retain the same relative proportions. The European forms of this species vary within quite wide limits, hence the variation of the American form as regards size is not at all surprising.

The specimens studied by me were obtained in part from Ensenada, Lower California, and from Oakland, California, and are now in the collection of the U. S. National Museum. Those from Ensenada were collected by Mr. C. R. Orcutt and received by the Museum October 18, 1889, Accession No. 22456. Those from Oakland were collected by Dr. R. E. C. Stearns, Cat. No. 12221.

This species occurs in England, Scotland, Ireland, Sweden, Norway, France, Germany, Switzerland, Sicily, Lower California, and California.

It has not heretofore been reported from America.

#### 7. MICROCYPRIS Kaufmann, 1900.

*Microcypris* KAUFMANN, Neue Ostrac. aus der Schweiz, Zoöl. Anz., XXIII, 1900, p. 32.

Natatory setæ, very short. Spines of first maxillæ, toothed. First foot with but one seta on its first segment. Small Ostracods, 1.00 mm. or less in length.

Kaufmann has established this genus to receive those forms differing from *Herpetocypris* in number of setæ on basal segment of first foot. I have added the genus character as to size.

No American forms known.

#### 8. PRIONOCYPRIS Brady and Norman, 1896.

*Erpetocypris* BRADY and NORMAN, A monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 87.

*Prionocypris* BRADY and NORMAN, A monog. of the marine and fresh-water Ostracoda, Pt. 2, Trans. Royal Dublin Soc., V, 1896, p. 724.—KAUFMANN, Cypriiden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 292.

Natatory setæ, short. Spines of first maxillæ, not toothed. Length, from 0.9 mm. to 1.6 mm.

This genus seems not to be well distinguished from *Herpetocypris*, except by means of the two maxillary spines and smaller size. No American forms known. *Erpetocypris serrata* Brady and Norman, 1889, page 87, used as the type form.

## III. Subfamily CYPRIDINÆ.

## 9. CENTROCYPRIS Vavra, 1895.

*Centrocypris* VAVRA, Süßwasser-Ostracodon Zanzibars, Beiheft d. Hamb. Wiss. Anstalten, XII, 1895, p. 15.

Two distinct eyes. Shell unusually strong. Natatory setæ reaching well beyond terminal claws. Two last segments of second antennæ with weak seta-like spines. First mandibular process with four plain spines. Third and fourth segments of second feet long and narrow. Propagation, sexual. Ductus thickly covered with closely arranged rows of chitinous spines. No American forms known.

This genus was established by Vavra to receive a very strikingly spinous form from Zanzibar.

## 10. CYPRIDELLA Vavra, 1895.

*Cypridella* VAVRA, Süßwass. Ostrac. Zanzibars, Beiheft d. Hamb. Wiss. Anstalten, XII, 1895, p. 7.

Shell short and tumid. Natatory setæ reach to tips of end claws. Furca, normal. Propagation, sexual. The testes originate in the anterior part of the shell and extend to the lower posterior part, intermediately forming three or four concentric half circles. Their anterior origin in circles seems to be a characteristic of but two other genera—*Spirocypris* and *Cypricereus*.

Genus established by Vavra to receive a form found in Zanzibar.

No American forms known.

## 11. SPIROCYPRIS, new genus.

Shell excessively hairy; plump. Natatory setæ simple, reaching barely beyond the terminal claws. Feet, as in *Cypris*. Caudal rami normal, slender, and not more than one-half length of shell. Propagation sexual. Testes of male originating in anterior half of shell and arranged in form of concentric circles.

This genus is established to receive an excessively hairy Ostracod, having testes arranged in an unusually pronounced concentric whorl in anterior part of shell. It differs from *Cypridella* in form of testes, which in *Cypridella* is in form of four half circles, also in being much larger; from *Cypricereus*, its nearest relative, in shell characters and size of furca.

These three genera are seemingly the only ones so far known characterized by testes originating in circles in anterior part of shell.

*a* Shell about twice as long as high, excessively hairy. Testes arranged in form of about four concentric circles in anterior part of shell. Furca about one-half as long as shell ..... *passiva* Sharpe.

## 4. SPIROCYPRIS PASSAICA, new species.

Plate LXVI, figs. 1-3.

Length, 1.60 mm.; height, 0.80 mm.; breadth, 0.82 mm.

Color brownish, with dark blue patches laterally, which connect dorsally with a dorsal band; another patch with a greenish tinge anteriorly, and still another in the posterior region. These both connect with the dorsal band (fig. 2) which runs longitudinally on either side of the hinge.

Shell excessively hairy; hairs fully 0.08 mm. long; coarse and backwardly directed.

Seen from the side (fig. 1) the anterior extremity is wider than the posterior, evenly rounded; dorsal margin almost straight, sloping slightly more rapidly posteriorly. Ventral margin slightly sinuate.

Seen from above (fig. 2) the shell is almost a perfect elongate oval, widest just in front of the dorsal transverse dark band, which is midway.

The testes of the male are arranged in the form of concentric circles in the anterior half of the shell (fig. 1), a very noticeable and striking feature.

Natatory setæ simple, reaching slightly beyond the terminal claws.

Terminal claws moderately curved, and as long as the penultimate segment. Sense club long and slender, three-fifths as long as width of segment at its point of attachment. Terminal claw of the first foot moderately curved, faintly toothed; the two terminal setæ about the same length.

Terminal claw of second foot one and one-half times length of terminal segment. Furca slightly S shaped (fig. 3), 23 times as long as wide; dorsal margin very weakly pectinate. Terminal claw nearly straight, faintly toothed, one-half as long as furca. Terminal seta little more than one-half length of terminal claw, which is one and three-eighths times length of subterminal one. Dorsal seta one-half length of terminal one, and width of furca from subterminal claw.

Described from specimens obtained by Mr. E. W. Berry at Passaic, New Jersey, and now in the collection of the National Museum. Received by the museum June 5, 1894. Accession No. 28378.

## 12. CYPRETTA Vavra, 1895.

*Cypretta* VAVRA, Süßwasser-Ostrac. Zanzibars, Beiheft d. Hamb. Wiss. Anstalten, XI, 1895.—G. W. MÜLLER, Ostrac. aus Madagas. und Ost-Afrika, Abhand. Senck. Naturf. Ges., XXI, 1898, p. 283.

Shell short and tumid. Natatory setæ reaching beyond end claws. Furca with two long terminal setæ in place of spines, and a short dorsal seta. Usual terminal seta missing. Ovary spirally wound. Males unknown.

Genus established by Vavra to include a very small, plump Ostracod with furcal armature of three terminal setæ, but no spines. But two species are known, *C. tenuicauda* from Zanzibar and *C. costata* from Madagascar and also East Africa.

### 13. STRANDESIA Stuhlmann, 1889.

*Strandesia* STUHLMANN, Vorl. Bericht über eine Reise Nach Ost-Afrika, Sitz. K. Akad. der Wiss., XXXII, 1889; Berlin.—VAVRA, Süßwasser-Ostrac. Zanzibars, Beiheft d. Hamb. Wiss. Anstalten, XI, 1895, p. 18.

Shell 2 mm. to 3 mm. long. Natatory setæ reaching tips of end claws. Furca very straight, but normal. Propagation sexual. Testes of male in form of concentric half circles in posterior part of shell. Most characteristically, however, the right shell is armed with a dorsal longitudinal ridge-like flange, having thorn-like projections at both extremities. Ductus of thickly arranged rows of chitinous spines.

No American forms known.

### 14. ACANTHOCYPRIS Claus, 1892.

*Acanthocypris* CLAUS, Beiträge zur Kenntniss der Süßwasser-Ostracoden, Arb. Zool. Inst. Wien, X, 1892, p. 50.

*Neocypris* Sars, Fresh-water Entomostraca of S. America, Archiv. for Math. og Naturvid., XXIV, No. 1, 1901, p. 29.

Shell with a characteristic dorsal ridge-like process on right valve, which is sharply produced at the posterior extremity. Natatory setæ reaching tips of end claws. Furca extraordinarily large. Parthenogenetic.

This genus was established by Claus to receive a peculiar South American form, having the peculiar dorsal flange. It is worthy of note here that its only relative so characterized (*Strandesia*) is from Zanzibar and East Africa. Other examples indicate a close structural relation between the Ostracoden fauna of Africa and South America—a relationship which is so apparent in other faunal groups of these continents. *Neocypris gladiator* Sars evidently belongs here.

No American forms known.

### 15. STENOCYPRIS Sars, 1889.

*Stenocypris* Sars, On some fresh-water Ostracoda raised from dried Australian mud, Christ. Vid. Selsk. Forh., No. 8, 1889, p. 27.—VAVRA, Süßwasser-Ostracoden Zanzibars, Beiheft d. Hamb. Wiss. Anstalten, XI, 1895, p. 10.—VAVRA, Süßwasser-Ostrac. Deutsch-Ost-Afrikas, Tierwelt Ost-Afrika, IV, 1897, p. 14.

Shell usually long and narrow. Natatory setæ reaching tips of end claws. Furca large, somewhat lamelliform, its dorsal edge usually pectinate, dorsal seta rudimentary or absent. Propagation sexual.

This genus was originally described as being parthenogenetic, but the investigations of Vavra (1895), Dalay (1892), and Moniez (1891) disprove this.

Vavra retains *Acocypris* as a group of this genus as being nonsexual and a group *Stenocypris* as being sexual. Kaufmann discards this genus and revises under a new name, *Dolerocypris*, on the ground that *Cypris fasciata* O. F. Müller, of Sars 1890, is deemed *Stenocypris* by him, even though furca has an evident dorsal seta. This seems to me to be an insufficient reason for establishing a new genus. As the shell of this species is long and narrow, it might well be regarded as a transition form between *Cypris* and *Stenocypris*, but still as a *Cypris*, possibly as the type of a new group. The *Cypris fasciata* of Brady and Norman, 1889 (pl. XII, fig. 1) is without the furcal dorsal seta; so evidently a *Stenocypris*.

No American forms known.

#### 16. EURYCYPRIS G. W. Müller, 1898.

*Eurycypris* G. W. MÜLLER, Ostrac. aus Madagas. and Ost-Afrika, Abhand. Senck. Naturf. Ges., XXI, 1898, p. 263.

Shell extraordinarily broad. Natatory setæ reach tips of end claws. First foot four-segmented from union of third and fourth segments. Furca normal, slender, smooth; claws smooth. Sexual. This genus has been established by Müller (1898), to include those forms of the subfamily Cypridinae having the third and fourth segments of the first foot united; foot therefore four-segmented, and with excessively broad shells.

No American forms known.

#### 17. CYPRICERCUS Sars, 1895.

*Cypricercus* Sars, On some S. African Entomos. raised from dried mud, Christ. Vid. Selsk. Skr. Math. Naturw. Klasse, No. 8, 1895, p. 37.

Shell as in *Cypris*, smooth, narrow, oblong, as seen from the side. Natatory setæ reaching tips of end claws. Feet as in *Cypris*. Furca excessively developed, toothed on dorsal margin, and longer than half-length of shell.

Sexual, the spermatie ducts of male forming a dense coil in the anterior part of each valve. This genus was established by Sars, to receive those forms resembling *Cypris* in most respects, except that the furca is unusually well developed and spermatie ducts as above.

No American forms known.

#### 18. CYPRIS O. F. Müller, 1792.

*Cypris* O. F. MÜLLER, Entomos. seu Insecta testacea, etc., 1792.—BRADY, A Monog. of the recent British Entomostraca, Trans. Linn. Soc., XXVI, 1868, Pt. 2, p. 360.

*Cyprinotus* BRADY, Notes on Entomos. coll. by Mr. Haley in Ceylon, Jour. Linn. Soc., XIX, 1855, p. 301.

*Heterocypris* CLAUS, Beiträge zur Kenntniss der Süs-wasser-Ostracoden, Arb. Zool. Inst. Wien, X, 1892, p. 7.

*Stenocypris* G. W. MÜLLER, Zool. Anz., No. 653, 1901.

*Amphicypris* SARRS, Fresh-water Entomos. of South America, Archiv. for Math. og Naturvid., XXIV, No. 1, 1901, p. 16.

*Neocypris* SARRS, Fresh-water Entomos. of South America, Archiv. for Math. og Naturvid., XXIV, No. 1, 1901, p. 29.

Natatory setae reaching to tips of terminal claws or somewhat beyond.

Second antennae five-segmented in both male and female. Branchial plate of six plumose setae. Terminal segment of second foot beak-shaped, with a toothed hook-shaped claw. Furca normal, with two claws and two setae.

Propagation sexual or asexual. Ductus, when present, of numerous chitinous spines thickly crowded over entire surface of cylinder and usually not in wreaths. I have tentatively divided this genus into the five following groups, for reasons given in the introduction (p. 969; see Key, p. 971).

#### 1. Subgenus CYPRIIS.

*a* Length between 1 mm. and 2 mm.

*b* Both spines on first process of first maxilla smooth.

*c* Terminal claw of second foot as long as terminal segment.

*d* Caudal ramus straight; subterminal claw two-thirds as long as the terminal. Shell four-ninths as high as long. . . . . *clarata* \* Baird.

*dd* Caudal ramus weakly S-shaped.

*e* Subterminal claw of furca half as long as the terminal. Shell two-thirds as high as long . . . . . *virens* Jurine.

*ee* Subterminal claw of furca nearly as long as terminal. Shell one-half as high as long . . . . . *altissimus* Chambers.

*cc* Terminal claw of second foot twice as long as terminal segment. Terminal claw of furca nearly as long as entire furca . . . . . *ornata* \* O. F. Müller.

*bb* Both spines on first process of first maxilla toothed.

*c* Shell not reticulated with broken lines.

*d* Shell less than twice as long as high. Terminal claw of furca half as long as furca.

*e* Subterminal claw of furca three-fourths as long as terminal, both smooth, . . . . . *pellucida* Sharpe.

*ee* Subterminal claw two-thirds as long as the terminal . . . . . *fusca* (Jurine).

*dd* Shell more than twice as long as high. Terminal claw of furca one-third as long as furca. Subterminal claw two-thirds as long as terminal.

. . . . . *fischeri* \* Lilljeborg.

*cc* Shell reticulated. Terminal claw of furca about three-fifths as long as ramus. Terminal seta not more than one-fourth as long as terminal claw.

. . . . . *reticulata* Zaddach.

*aa* Length between 2 mm. and 3 mm. Third and fourth segments of first foot fused. Shell spinous . . . . . *pubera* O. F. Müller.

*b* Both spines of maxillary process smooth. Dorsal margin of shell strongly convex, marked with dark bands. . . . . *herrieki* Turner.

*bb* Both spines of maxillary process toothed. Dorsal margin of shell nearly straight, marked with dark bands. . . . . *perlequans* Herriek.

## 5. CYPRIS VIRENS (Jurine).

Plate LXVI, figs. 4-6.

*Monocalus virens* JURINE, Histoire des Monocles, qui se trouvent aux environs de Genève, 1820, p. 174, pl. xviii, figs. 15-16.

*Cypris pilosa* ZADDACH, Synopseos Crustaceorum Prussicorum Prodromus, 1844, p. 36.

*Cypris tristriata* BAIRD, The Nat. Hist. of the British Entomos., Ray Society, 1850, p. 152, pl. xviii, figs. 1-3.

*Cypris ornata* FISCHER, Abhand. über das Genus Cypris und dessen bei Petersburg vorkommende Arten, Mém. des savants étrangers des sciences de St. Pétersbourg, VII, 1851, p. 157, pl. ix, figs. 7-10.

*Cypris pubera* FRIC and NEKUT, Korysi země české, Prag. Zeits. Ziva, v. J., 1868, p. 46, fig. 26.

*Cypris ventricosa* BRADY and ROBERTSON, The Ostracoda and Foraminifera of Tidal Rivers, Ann. and Mag. Nat. Hist., VI, 1870, p. 12, pl. iv, figs. 1-3.

*Cypris helena* MONIEZ, Liste des Copépodes, Ostracodes, etc., recueillis à Lille en 1886, Bull. Soc. Zool. de France, 1887, p. 2.

*Cypris virens* ZADDACH, Synopseos Crustaceorum Prussicorum Prodromus, 1844, p. 35.—LILLEBERG, De Crustaceis ex ordinibus tribus, 1853, p. 117, pl. viii, fig. 16; pl. ix, figs. 4-5; pls. x, xii, and xix.—BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc., XXVI, Pt. 2, 1868, p. 364, pls. xxiii, xxxvi, fig. 1.—ROBERTSON, Fauna of Scotland, with special reference to Clydesdale and the western districts, Proc. Nat. Hist. Soc. Glasgow, IV, 1880, p. 14.—HERRICK, Cont. to the Fauna of the Gulf of Mexico and the South, Mem. of Denison Sci. Assc., I, 1887, p. 22.—BRADY and NORMAN, A Monog. of the marine and fresh water Ostracoda, Sec. I, Trans. Royal Dublin Society, 1889, p. 75.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 102, figs. 3-5; fig. 36.—TURNER, Fresh-water Ostracoda of the U. S., Report State Zoologist of Minnesota, 1895, p. 321, pl. lxxiv, figs. 3-3e.—SARS, On a new Ostracoda, *Stenocypris cherreuxi* SARS, with notes on other Entomos. raised from dried mud, Archiv. f. Math. Natur. Christiania, 1896, p. 24.

Length, 1.69 mm.; height, 0.95 mm.; breadth, 0.90 mm.

Seen from the side (fig. 4) the shell is highest just back of the eyespot, the height being much more than one-half the length. The upper edge is "humped" just back of the eyespot. Anterior and posterior extremities nearly similar, rounded, the posterior dorsal margin sloping more gradually than the anterior. Shell covered with short hairs.

Seen from above (fig. 5) the shell is rather broadly egg-shaped, narrowed anteriorly, the greater breadth being less than the height of the shell. The anterior extremity is tipped with bluish-black, the entire dorsal side is the same color, while in the region of the eyes are two decidedly yellowish areas which extend diagonally downward and anteriorly for about one-half width of shell. Margins of shell with "pore-canals."

The natatory setae of the second antenna reach to the end of the terminal claws. The spines on the first maxillary process are toothed,

a peculiarity which may constitute this form a variety, as Vavra speaks of the European forms as having plain spines on this process.

The terminal claw of the second foot is about one and one-half times length of terminal segment.

Furca very weakly S-shaped (fig. 6), about twenty times as long as wide, dorsal margin smooth. Terminal claw weak, smooth, nearly straight, four-sevenths as long as ramus. Terminal seta weak, about twice as long as width of ramus. Subterminal claw about one-half length of terminal one, straight, smooth. Dorsal seta about length of terminal one, weak.

The specimens studied by me seem to be somewhat smaller than the European form of this species as described by Vavra, but agree in most other respects. The furca are of somewhat different proportions; the European form with width to length about as 1 to 12, while the American form exhibits a proportion of about 1 to 18.

The anterior diagonal light patches are very well marked in this species—so much so that even when examined with a hand lens they attract immediate attention.

The specimens examined by me were collected by Dr. Alfredo Dugés (French Consular Agent) at Guanajuato, Mexico, April, 1901, and sent to the U. S. National Museum.

Distribution world-wide.

#### 6. CYPRIS PUBERA O. F. Müller.

Plate LXVII, figs. 1-6.

*Monoculus oratus* JURINE, Histoire des Monocles, etc., 1820, p. 170, pl. xvii, figs. 5-6; Genève.

*Cypris stricta* ZADDACH, Synopseos Crustaceorum Prussicorum Prodomus, 1844, p. 32.

*Cypris eumata* BAIRD, The Nat. Hist. of the British Entomos., Ray Soc., 1850, p. 256, pl. xviii, figs. 22-24.

*Cypris punctillata* BRADY, A Monog. of the Recent British Entomos., Ray Society, 1850, p. 365, pl. xxvi, figs. 1-7; pl. xxxxi, fig. 11.

*Cypris pubera* O. F. MÜLLER, Entomostraca, 1785, p. 56, pl. v, figs. 1-5.—ZADDACH, Synopseos Crustaceorum Prussicorum Prodomus, 1844, p. 34.—FISCHER, Abhand. über das Genus Cypris, etc., Mém. des Savants étrangers des sciences de St. Pétersbourg, VII, 1851, p. 154, pl. viii, figs. 1-8.—ZENKER, Monographie der Ostracoden, Wieg. Archiv. f. Naturg., XX Jahrg., 1, 1854, p. 70.—BRADY and NORMAN, A Monog. of the marine and freshwater Ostracoda, Sec. 1, Trans. Royal Dublin Soc., 1889, p. 74.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 90, figs. 2, 4, 30.

Length, 2.10 mm.; height, 1.25 mm.; breadth, 1.20 mm.

This species is of a greenish color, with a darker patch at its highest and central part, as seen from the side. A light yellowish band extends diagonally backward from about the center of the shell. Shell very sparsely hairy.

Seen from the side (fig. 1) the shell is highest in its anterior one-third, the highest point being decidedly of a hump-like appearance. The anterior end is more evenly rounded than the posterior, wider, and is armed on the outer lip of both valves with a row of from 9 to 11 semitransparent tubercles. The posterior outer margin of the right shell (fig. 2) is armed with two spine-like tubercles, both being at the lower angle near one another and of approximately the same size. The European form of this species seems to be larger, and the two posterior spine-like tubercles vary in size.

Seen from above the shell is broadly egg-shaped, widest just back of the middle, narrowed anteriorly and bluntly rounded posteriorly. The spines of the first maxillary process are toothed. The natatory setae of the second antennae (fig. 3) reach about to the tips of the terminal claws and are plumose.

The terminal segment of the first foot is armed with a long, strong claw and two setae, the outer one of which is not more than one-half the length of the inner, which is about one-third the length of the claw. Third and fourth segments of the first foot fused, so that the foot is four-segmented (fig. 4).

The claw on the terminal segment of the second foot (fig. 5) is very weak, about as long as the segment, the accompanying seta very slender and about three times as long as the claw. Furca nearly straight, twenty-four times as long as wide, dorsal margin smooth (fig. 6). Terminal claw nearly straight, faintly toothed near tip, and three-fifths as long as furca; subterminal claws three-fifths as long as terminal one, smooth. Terminal seta weak, twice as long as width of furca.

Dorsal seta twice as long as the terminal one, and situated one and one-half times width of furca from subterminal claw.

This species may be at once distinguished by the presence of the tubercles and spines on the shell and the fusion of the third and fourth segments of the first foot (fig. 4).

This description is from specimens sent to the U. S. National Museum by Mr. Bailey, from Oregon. (Date unknown to me.)

It has not heretofore been reported from America.

Distribution world-wide.

#### 7. CYPRIS PELLUCIDA Sharpe.

Plate LXVIII, figs. 1-5.

*Cyprinotus pellucida* SHARPE, Cont. to a knowl. of the N. Amer. f. w. ostrac. incl. in the Fam. Cytheridae and Cyprididae, Bull. Ill. State Lab. N. Hist., IV, 1897, p. 434, pl. XLII, figs. 1-6.

Average length: 1.20 mm.; height, 0.75 mm.; breadth, 0.60 mm.

Color a clear, uniform yellowish brown, with no especial marking.

<sup>a</sup>This name would seem to be preoccupied by *C. pellucida* Koch. However, this proves to be a synonym for *Candona lucens* Baird.

Shell almost smooth, with the exception of a few small scattered papillar elevations and anterior and posterior margins with a fringe of sparsely scattered long hairs.

Seen from above (fig. 2) the shell is quite a uniform elongate oval, anterior end narrowed somewhat, posterior end rounded, broadest in the middle.

Seen from the side (fig. 1) the shell is highest about the middle, ventral margin nearly straight, with a slight sinuosity at the middle. The right valve of shell is slightly smaller than the left, its anterior margins armed with a row of about twenty-five tuberculiform teeth (fig. 3). The margin of the left valve has a rather wide hyaline flange and a row of scattered tubercles along the inner margin (fig. 4).

Spines of the first maxillary process are toothed. Natatory setae of the first antennae are plumose and reach well beyond the terminal claws.

Terminal claws three and one-half times as long as the terminal segment. Sense club large, about five-sixths as long as width of segment at its point of attachment.

Furca rather stout, slightly bent, about twice as long as terminal claw. Shorter claw about three-fourths as long as the longer. Dorsal seta width of furca from subterminal claw, bent, somewhat plumose, and as long as subterminal claw; terminal seta three-fifths as long as dorsal one.

Collected by Dr. E. Palmer from a trough fed by a spring flowing from a butte near Big Butte Station, Idaho, in September, 1893, and now in the collection of the U. S. National Museum (Accession No. 27409); also collected at Guanajuato, Mexico, by Dr. Alfredo Dugés, April, 1901, and sent to the U. S. National Museum.

Quincy, Illinois, 1882, Havana, Illinois, 1895, and Urbana, Illinois, 1895.

This species was originally described as *Cyprinotus pellucida*, based largely on the marginal rows of tubercles on the valves, the manner of propagation being uncertain, although the material on hand contained no males. The additional material now on hand contains no males, and it is therefore listed under the subgenus *Cypris*, in accordance with the preceding synopsis.

## 2. Subgenus CYPRINOTUS.

- a* Dorsal seta of furca more than one-half length of subterminal claw.
- b* Dorsal seta at least twice width of furca from subterminal claw. Terminal claw of second foot strongly curved. .... *incongruus* Ramdohr.
- aa* Dorsal seta of furca not more than one-half length of subterminal claw.
- b* Dorsal seta width of furca from subterminal claw.
- c* Shell yellowish-brown, marked with bluish-black longitudinal stripes on dorsum and sides, hairy. .... *burlingtonensis* Turner.
- cc* Shell dirty brown, leathery in consistency, no markings. .... *testudinaria* Sharpe.
- bb* Dorsal seta twice width of furca from subterminal claw. Color yellowish-green, shell marked with contorted lines, most noticeably on cephalic portion of valves. .... *crena* Turner.

3. Subgenus **HETEROCYPRIS**.

No American forms known.

## 4. Subgenus, unnamed.

*a* Length, 3.69 mm; height, 2.09 mm. Color, livid white ..... *grandis* Chambers.

5. Subgenus **AMPHICYPRIS**.

No American forms known.

IV. Subfamily **CYPRIDOPSISINÆ**.19. **ONCOCYPRIS** G. W. Müller, 1898.

*Oncocypris* G. W. MÜLLER, Ostrac. aus Madagas. und Ost-Afrika, Abhand. Senck. Naturf. Ges., XXI, 1898, p. 286.

Shell irregularly roughened, with numerous prominent tubercles. Second antennæ four-segmented in both sexes. First foot four-segmented. Ductus of about eighteen rows of chitinous spines, in sack. Terminal segment of second foot not beak-shaped, but small and conical. Furca with no dorsal seta, lamellar and ending in a long bristle.

This genus was established by Müller to receive a form collected near Majunga, Madagascar.

No American forms known.

20. **ZONOCYPRIS** G. W. Müller, 1898.

*Zonocypris* G. W. MÜLLER, Ostrac. aus Madagas. und Ost-Afrika, Abhand. Senck. Naturf. Ges., XXI, 1898, p. 284.

Shell covered with a prominent series of concentric zones. Second antennæ of sexes different. Furca usually with no dorsal seta, lamellar and ending in a long bristle.

This genus was established to receive two forms from Madagascar.

*Cypridopsis costata*, a form from East Africa, evidently belongs here. Vavra describes it as having a furcal dorsal seta, a feature not mentioned by Müller. This might, then, constitute the type of a group of the genus.

No American forms reported.

21. **CYPRIDOPSIS** Brady, 1868.

*Monoculus* JURINE, Histoire des Monocles qui se trouvent aux environs de Genève, 1820.

*Pionocypris* BRADY and NORMAN, A. Monog. of the marine and freshwater Ostracoda, Sec. II, Trans. Royal Dublin Soc., 1896, p. 725.

*Cypridopsis* BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc. XXVI, Pt. 2.—BRADY and NORMAN, A Monog. of the marine and freshwater Ostracoda, Sec. I. Trans. Royal Dublin Soc., 1889.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 8.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, p. 304.

Shell very plump. Natatory setæ extending much beyond the terminal claws. Branchial plate of two to five plumose setæ. Second foot five-segmented, with a strong claw at its extremity. Furca flagelliform, with a small dorsal cilium, or at least two terminal setæ. Males unknown.

Those *Cypridopsis*-like forms with a compressed dorsal aspect, branchial plate of not more than two setæ, and sexual or asexual propagation, I shall include under the genus *Potamocypris*.

*a* Three transverse dark bands on dorsal and lateral aspect of shell; very plump; common.....*ridua* (O. F. Müller).

## 22. POTAMOCYPRIS Brady, 1870.

*Monoculus* JURINE, Histoire des Monocles qui se trouvent aux environs de Genève, 1820.

*Cypridopsis* BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc. XXVI, Pt. 2.

*Candonella* CLAUS, Beiträge zur Kenntniss der Süßwasser-Ostracoden, Arb. Zool. Inst. Wien, X, 1892.—VAVRA, Süßwasser-Ostrac. Deutsch-Ost-Afrikas, Tierwelt Ost-Afrika, IV, Berlin, 1897, p. 12.

*Cypridopsis* VAVRA, Monog. der Ostracoden Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 73.—SHARPE, Cont. to a Knowl. of the N. American freshwater Ostracoda, incl. in the Fam. Cytheride and Cypridide, Bull. Ill. State Lab. Nat. Hist., IV, 1897, p. 468.

*Cypridopsella* KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 131.

*Potamocypris* BRADY, Notes on Entomos. from Northumberland and Durham District, Nat. Hist. Trans. Northumb. and Durham, III, 1870.—BRADY and NORMAN, A Monog. of the marine and freshwater Ostracoda, Sec. I, Trans. Royal Dublin Society, 1889, p. 92.—DADAY, Mikros. Süßwasserthiere aus Patagonia gesammelt von Dr. Filippo Sylvestri im Jahre, 1899 und 1900, Termesz. Füsz., XXV, 1902, p. 291.

Natatory setæ about as long or somewhat longer than end claws. Second antennæ usually four-segmented, armature of male coarser than that of female.

Shell narrow from above, rather smooth. Branchial plate of not more than two setæ. Furca rudimentary, with a small dorsal cilium and ending in a long slender bristle. Propagation, sexual or asexual. Ductus of male of about fourteen spiral rows of chitinous spines.

This genus was first established by Brady to include those *Cypridopsis*-like forms having rather short natatory setæ, four-segmented antennæ, compressed shell, and sexual propagation. To prevent confusion, it seems necessary to add the additional characters, as above.

I consider *Candonella* and therefore *Cypridopsella* as synonymous with the above.

*a* Furca cylindrical, turgid at base, suddenly narrowing to a bristle, which is little longer than the basal part.....*newtoni* (Brady and Robertson).

*aa* Furca broad, gradually narrowing to a bristle. Shell much compressed.

- b* Natatory setae of second antennae reaching to tips of terminal claws. Shell pale green.....*villosa*\* (Jurine).  
*bb* Natatory setae of second antennae reaching beyond tips of terminal claws. Shell grass-green, at least dorsally.....*smaragdina* (Vavra).

### 8. POTAMOCYPRIS SMARAGDINA (Vavra).

Plate LXV, figs. 5-7.

*Cypridopsis smaragdina* VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 80, fig. 26, 1-3.—SHARPE, Cont. to a Knowl. of the N. American freshwater Ostracoda incl. in the fam. Cytheridae and Cyprididae, Bull. Ill. State Lab. Nat. Hist., IV, 1897, p. 470, pl. XLVU, figs. 11-12.

*Caulonella smaragdina* VAVRA, Süßwasser-Ostracoden der Hamb. Magal. Sammel, 1898, p. 12; Hamburg.

Length, 0.65 mm.; height, 0.45 mm.; breadth, 0.34 mm.

I here give the description as given in my paper of 1897:

This striking and interesting form appears at first glance, if seen from the side (fig. 6), to be in the shape of a half moon, except that the ventral margin is nearly straight. The shell is light to grass green, especially on its dorsal aspect; alcoholic specimens, however, commonly show but a trace of this coloration. Surface thickly covered with long hairs, which are all parallel to one another, backwardly directed and closely appressed to the shell (fig. 6).

The eye-spot, instead of being at the highest part of the shell, as in the typical forms described by Vavra, is slightly below and anterior to this location. Natatory setae of the second antennae, long, reaching beyond the tips of the terminal claws by the length of the claws, thus differing from *C. villosa* (Jurine), its nearest relative, the natatory setae of which reach but to the end of the terminal claws.

Furca rudimentary (fig. 7), the basal part cylindrical, more than three times as long as wide, then suddenly narrowing into a long flagellum, which is fully twice as long as the basal part. The furca also has a dorsal seta at the termination of the basal part, which is slightly longer than the width of the ramus.

At the time the above description was written, I was not sufficiently familiar with the genus *Potamocypris* to rank this form as belonging to it. Further study causes me to believe that this genus is a logical one, and that this form belongs here.

The specimens in the U. S. National Museum were collected in April, 1901, by Dr. Alfredo Dugés, French consular agent at Guanajuato, Mexico.

This form occurs in Bohemia (Vavra); South Chicago (Sharpe), and Guanajuato, Mexico.

### 23. PARACYPRIDOPSIS Kaufmann, 1900.

*Cypridopsis* BRADY and NORMAN, A Monog. of the marine and freshwater Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 90.

*Paracypridopsis* KAUFMANN, Cypriden and Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 131.

Shell rather narrow from above. Natatory setae rudimentary, not adapted for swimming. Furca rudimentary, lamellar, with a lash-like end bristle and a small dorsal seta. Branchial plate of two setae.

This genus has been established by Kaufmann to receive those *Potamoecypris*-like forms which have rudimentary natatory setæ.

No American forms known.

V. Subfamily CYCLOCYPRIDINÆ.

24. CYPRIA Zenker, 1854.

*Cypris* AUCTORUM, 1785-1854.

*Monoculus* JURINE, Histoire des Monocles qui se trouvent aux environs de Genève, 1820.

*Cypris* ZENKER, Monog. der Ostracoden, Wieg. Archiv. f. Naturg., XX Jahrg., 1, 1854.—BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 68.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 62.—CRONENBERG, Beitrag zur Ostracoden-Fauna der Umgegend von Moscou, Bull. Soc. Imp. d. Moscou, No. 3, 1894, p. 13.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 329.

Shell rather compressed. Second antennæ of male six-segmented, of female five-segmented, two sense organs on end of fourth segment. Natatory setæ excessively long, reaching far beyond tips of terminal claws. Branchial plate of six setæ. Terminal segment of second foot small. Ductus of male of cirrlets of spine-like setæ, with a distinct central axis and not inclosed in a sack.

Furca normal, stout. Dorsal furcal seta situated about middle of dorsal margin.

Vavra has described a species of this genus as sufficiently characteristic to justify a subgenus *Physocypris*. I here use it in the group sense, as the characters given seem to be of somewhat doubtful worth, if our experience with the old genus *Cyprinotus* is any criterion.

The subgenus *Physocypris* is distinguished by the following characters, one shell higher or larger than the other, and the anterior and posterior margins of the right shell crenulate. Otherwise as Genus *Cypris*. The subgenus *Cypris* includes the remaining *Cypris* forms.

Seven species have been reported from America.

1. Subgenus CYPRIA.

- a Terminal short setæ of the second foot approximately equal.
- b Terminal short setæ of second foot about as long as terminal segment.
- c Terminal claw of furca half as long as furca.
- d Shell covered with a close reticulum of longitudinally subparallel lines. Abdomen without processes.....*exculpta* Fischer.
- dd Shell plain, but with small puncta. Abdomen with two cylindrical processes.....*ophthalmica* Jurine.
- cc Terminal claw of furca three-fifths its length or longer.
- d Subterminal claw with well developed comb of teeth near tip.  
*dentifera* Sharpe.
- aa Terminal short setæ of second foot evidently unequal.
- b Shell clear to brownish yellow, with a few scattered puncta. Dorsal seta of furca three times width of furca from subterminal claw.....*obesa* Sharpe.
- bb Shell white, shining, smooth, with numerous almost confluent puncta. Length 0.70 mm.....*mons* Chanibers.

## 9. CYPRIA EXSCULPTA (Fischer).

Plate LXVIII, figs. 6-9.

- Cypris elegantula* LILLJEBORG, De Crustaceis ex ordinibus tribus, 1853, p. 206.
- Cypris punctata* var. *striata* ZENKER, Monog. der Ostracoden, Wieg. Archiv. f. Naturg., XX Jahrg., I, 1854, p. 77, pl. III.
- Cypris striolata* BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc., XXVI, Pt. 2, 1868, p. 372, pl. XXIV, figs. 6-10.
- Cypris exsculpta* FISCHER, Beitrag zur Kenntniss der Ostracoden, Abhdlg. der math. phys. Klasse der k. bayr. Akad. d. Wiss., VII, 1855, p. 18, pl. XIX, figs. 36-38.
- Cypris exsculpta* BRADY and NORMAN, A Monog. of the marine and freshwater Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 68, pl. XI, figs. 1-4.—SARS, Oversigt af Norges Crustaceer med, etc., Christ. Vid. Selsk. Forhd., No. 1, 1890, pp. 24-25.—KAUFMANN, Die Ostracoden der Umgebung Berns, Mittlg. d. naturf. Ges., 1892, p. 2; Bern.—TURNER, Freshwater Ostracoda of the United States, Report State Zool. of Minn., 1895, p. 305, pl. LXX, figs. 1-8; pl. LXXII, fig. 3.—HARTWIG, Die Krebstiere der Provinz Brandenburg, Naturw. Wochenschrift, XI, 1896, p. 321.—SHARPE, Cont. to a Knowl. of the N. American f. w. Ostrac. incl. in the Fam. Cytheridae and Cyprididae, Bull. Ill. State Lab. N. H., IV, 1897, p. 465, pl. XLVII, fig. 4.—LIENENKLAUS, Erster Beitrag zur Kenntniss der Ostracodenfauna des Regierungs-bezirks Osnabrück, 12 Jahresber. d. naturw. Vereins zu Osnabrück f. d. Jahr 1897, p. 109.—STENROOS, Das Tierleben im Nurmiärvi-See, Helsingfors, 1898, p. 226.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 330, pl. XX, figs. 4-6; pl. XXIII, figs. 17-27; pl. XXXI, fig. 24.

Length. 0.60 mm.; height, 0.38 mm.; width, 0.26 mm.

This species is seemingly as widely distributed as the ubiquitous *Cypridopsis vidua*. It may be readily distinguished by means of the mesh work of longitudinally parallel and anastomosing lines, which extend over the entire surface of the shell (fig. 8).

Those in possession of the U. S. National Museum were collected April 12, 1892, at First Sister Lake, Ann Arbor, Michigan, by Prof. H. I. Smith. Received by the Museum, December 13, 1892. Distribution, world wide.

## 2. Subgenus PHYSOCYPRIA.

- a* Left shell higher than right. Terminal short setæ of second foot about twice as long as terminal segment ..... *pustulosa* Sharpes
- aa* Left shell longer than right. Terminal short setæ of second foot only about as long as terminal segment..... *inequivalva* Turner

## 25. CYCLOCYPRIS Brady and Norman, 1889

*Cypris* AUCTORUM, 1785-1820.

*Monoculus* JURINE, Histoire des Monocles qui se trouvent aux environs de Genève, 1820.

*Cypris* ZENKER, Monog. der Ostracoden, Wieg. Archiv. f. Naturg., XX Jahrg., I, 1854.

*Cyclocypris* BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 70.—VAVRA, Monog. der Ostrac. Böhmen, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 67.

Shells approximately same height. Second antennæ six-segmented in male, five-segmented in female, no sense organ on distal end of fourth segment.

Natatory setæ very long. Terminal segment of second foot, long and narrow, three times as long as broad. Ductus of numerous long filaments, not on a distinct central axis, but all inclosed in a sack. Penultimate segment of second foot with a coarse seta on dorsal distal angle. Furca as in *Cypria*.

Kaufmann speaks of one of the smaller terminal setæ of the second feet as being bent S-shaped, and uses it as of generic value. Since this is not true of *C. globosa*, at any rate, I have omitted this as a genus character. Three species have been reported from America.

*a* Anterior edge of furca about twice as long as its terminal claw. *larvis* O. F. Müller.

*aa* Anterior edge of furca clearly more than twice as long as its terminal claw.

*b* Anterior edge of furca about two and one-half times length of terminal claw.

*c* The terminal claws of furca strong and much bent ..... *forbesi* Sharpe.

*cc* Terminal claws of furca slender and not bent ..... *modesta* (Herrick).

*bb* Anterior edge of furca about three times length of terminal claws. Terminal claws strong, nearly straight, weakly bent near end. Furca toothed on posterior edge, also with comb of teeth on its side ..... *globosa*\* Sars.

## 26. PONTOPARTA Vavra, 1901.

*Pontoparta* VAVRA, Die Ostracoden vom Bismarck-Archipel. Prag., 1901, p. 184.

Shell white, smooth. Natatory setæ reaching approximately to tips of terminal claws. Terminal segment of second foot cylindrical, not bill shaped, with two terminal bristles and a long reflexed one. Males unknown. Furca strong, with two end claws, a terminal seta, and two dorsal ones.

This genus has been established by Vavra with *P. rara* as the type, a peculiar form from Bismarck Archipelago.

No American forms known.

## 27. ILYOCYPRIS Brady and Norman, 1889.

*Monoculus* JURINE, Histoire des Monocles qui se trouvent aux environs de Genève, 1820.

*Ilyocypris* BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 106.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 343.

Shell hard, entire surface usually pitted or tubercled, and furrowed in region of eyes, thus resembling marine forms or *Limnocythere*.

Natatory setæ reaching approximately to tips of terminal claws. Ductus composed of eighteen or twenty spirally wound chitinous setæ, in sack. Second foot five-segmented, its terminal segment cylindrical and with three long setæ of different lengths, all pointing in same general direction as foot. Penultimate segment of second foot with from two to three setæ. Furca strong, usually with combs of cilia on dorsal margin or sides.

This genus, first established by Brady and Norman with *I. gibba* as the type, has been further defined by Vavra (1891) and Kaufmann (1900) until it now numbers about eight species and two varieties, all found in Europe.

VI. Subfamily CANDONINÆ.

28. CRYPTOCANDONA Kaufmann, 1900.

*Cryptocandona* KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 361.

Shell smooth, somewhat translucent. First antenna weak, its natatory setæ longer than the entire antenna. Branchial plate of three setæ. Penultimate segment of second foot unsegmented, therefore foot four segmented. Terminal segment of second foot with three setæ of different lengths. Furca normal.

This genus has been established by Kaufmann to include *Candona*-like forms, but having very long natatory setæ on the first antennæ and a branchial plate of three setæ. I believe it will ultimately rank as a group of the genus *Candona*, but consider it best here to use it as given by Kaufmann.<sup>a</sup>

No American forms known.

29. CANDONA Baird, 1850.

*Cypris* O. F. MÜLLER, Entomos. seu Insecta testacea, etc., 1792.

*Candona* BAIRD, The natural history of the British Entomos., Ray Society, 1850.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 41.

Shell white, translucent. Natatory setæ of first antennæ shorter than entire antenna. No natatory setæ on second antennæ. Second antennæ of male six-segmented with two special sense organs, of female five-segmented.

Branchial plate of two setæ. Palp of second maxilla of female two-segmented, of male not segmented, and different in shape. Second foot five- or six-segmented, with two unequally long backwardly directed setæ and one forwardly directed seta. Furca normal, strong. Ductus of about seven rows of chitinous spines. Shell of male ordinarily larger and of another form than that of the female. Can not swim, but creep along the bottom, or burrow.

Eight forms are reported for America.

*a* One of shorter setæ at tip of second foot sharply reflexed ..... *reflexa* Sharpe.

*aa* Setæ at tip of second foot not reflexed.

*b* Length of shell about 1.50 mm. Shell inequivalve, second foot six-segmented. *crogmami* Turner.

*bb* Length of shell about 1.25 mm, or less.

*c* Furca curved.

*d* Second foot six-segmented.

*e* Claws of furca stout, terminal one one-third length of ramus.

*fabaxformis* Fischer.

<sup>a</sup> Kaufmann, Revue Suisse de Zool., VIII, 1900, p. 361.

*ce* Claws of furca slender, maxillary spines not toothed.

*f* Color uniform, white to brownish.....*acuminata* Fischer.

*ff* Color greenish yellow, blotched with brown.....*delawarensis* Turner.

*dd* Second foot five-segmented. Length 0.73 mm.....*simpsoni* Sharpe.

*cc* Furca not curved.

*d* Both claws of furca S-shaped.....*sigmoides* Sharpe.

*dd* Both claws of furca not S-shaped, both gently curved. Terminal claw half as long as furca.....*reticulata* Sharpe.

### 30. TYPHLOCYPRIS Vejdovsky, 1882.

*Cypris* (*Typhlocypris*) VEJDOVSKY, Thierische Organismen der Brunnenwässer von Prag, 1882, p. 64.

*Typhlocypris* VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 51.

*Candona* TURNER, Freshwater Ostrac. of the U. S., Rept. State Zool. Minn., 1895, p. 301.

Shell as in *Candona*. Natatory setae of first antennae shorter than entire antenna. Natatory setae of second antennae lacking, similar to *Candona*. Eyes rudimentary, disappearing with age. Furca abnormal, anterior or terminal seta missing.

This genus was established by Vejdovsky to include forms generally resembling *Candona*, but lacking terminal seta of furca. *Candona peircei* Turner evidently belongs here, judging from his figures.

*a* Terminal claws of furca of male about same size; with female one claw is about two-thirds length of other. Color greenish yellow with blotches of brown.

(*Candona*) *peircei* (Turner).

### 31. CANDONOPSIS Vavra, 1891.

*Candonopsis* VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 54; Süßwasser-Ostrac. Deutsch-Ost-Afrikas, Tierwelt Ost-Afrika, IV, 1897, p. 4; Berlin.—SARS, Freshwater Entomos. of Sydney, 1896, p. 62.—VAVRA, Süßwasser-Ostrac. der Hamb. Magal. Sammel., 1898, p. 9; Hamburg.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 357.

Shell and second antennae similar to *Candona*. Mandible with an excessively long palp. Branchial plate of three plumose setae. Furca slender, usual dorsal seta absent.

This genus was established by Vavra to receive those *Candona*-like forms which lack the usual furcal dorsal seta.

No American forms known.

### 32. PARACANDONA Hartwig, 1900.

*Paracandona* HARTWIG, *Candona euplectella* bildet eine selbständige Gattung, Zool. Anz., XXII, 1900.

Shell tumid, reticulated, pitted as a honeycomb. Appendages as in *Candona*, but small and slender. Small, beautiful forms, not more than 0.80 mm. long.

This genus has been established by Hartwig to include forms, the type of which is *Paracandona* (*Candona*) *euplectella* Robertson.

No American forms known.

## Family CYTHERIDÆ.

## 33. LIMNICYTHERE Brady, 1868.

*Cythere* BAIRD, The Nat. Hist. of the British Entomos., Ray Society, 1850, p. 163.  
*Acanthopus* VERNET, *Acanthopus*, un nouveau genre d'Ostracodes, Forel's Matériaux pour servir à l'étude de la faune profonde du Lac Léman, Ser. 4. 1878, p. 506.

*Limnocythere* DAHL, Die Cytheriden der westlichen Ostsee, Zool. Jahrbucher, III, Abth. f. Systematik, 1888, p. 597.

*Limnocythere* BRADY, A Monog. of the recent British Entomos., Trans. Linn. Soc., XXVI, Pt. 2, 1868, p. 419.—BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 170.—VAVRA, Monog. der Ostrac. Böhmens, Arch. Naturw. Durchforsch. v. Böhmen, VIII, 1891, p. 107.

Shell strong, irregularly tuberculate or spinous, rather thin. First pair of antennæ five-segmented, with short bristles on their outer edge; second pair four-segmented, the "spinning claw" being either two-segmented or unsegmented. Branchial plate of the mandible strongly developed (commonly rudimentary in other members of this group). Furca rudimentary, commonly but two short bristles. Males uncommon.

- a Terminal segment of first antennæ seven times as long as wide. Furca cylindrical, about three times as long as wide. Terminal claw of second antenna of male smooth ..... *reticulata* Sharpe.
- aa Terminal segment of first antennæ four or five times as long as wide. Furca lamellar, six to seven times as long as broad, ending in a bristle. Terminal claw of second antenna of male armed with three or four strong teeth. *illinoisensis* Sharpe.

## Family DARWINULIDÆ.

## 34. DARWINULA Brady and Robertson, 1872.

*Polychæles* BRADY and ROBERTSON, The Ostracoda and Foraminifera of Tidal Rivers, Ann. and Mag. of Nat. Hist., VI, 1870.

*Darwinula* BRADY and NORMAN, A Monog. of the marine and fresh-water Ostracoda, Sec. I, Trans. Royal Dublin Soc., 1889, p. 121.—KAUFMANN, Cypriden und Darwinuliden der Schweiz, Revue Suisse de Zool., VIII, 1900, p. 393.

Shell, smooth and fragile. Right shell larger than the left. First antennæ shorter than in the Cyprididæ, and armed with stout setæ. Second antennæ four-segmented, with four or five terminal claws, and without "spinning seta" or "sense seta." First maxilla with a large branchial plate. First pair of feet five-segmented, and shorter than the second pair. Furca subconical, small.

- a First antennæ six-segmented, the second four-segmented. Antepenultimate segment of second antenna without a conspicuous one-jointed appendage. *strensoni* Brady and Robertson.
- aa First and second antennæ five-segmented. Antepenultimate segment of second antenna with a conspicuous one-jointed appendage, which terminates in one long and one short filament ..... *improvisa* Turner.

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## EXPLANATION OF PLATES.

## PLATE LXIV.

- Fig. 1. *Chlamydotheca mexicana*, new species, lateral view.  
 2. *Chlamydotheca mexicana*, new species, dorsal view.  
 3. *Chlamydotheca mexicana*, new species, first foot.  
 4. *Chlamydotheca mexicana*, new species, terminal segments of second foot.  
 5. *Chlamydotheca mexicana*, new species, furca.  
 6. *Chlamydotheca mexicana*, new species, spines of first maxillary process.

## PLATE LXV.

- Fig. 1. *Herpetocypris reptans* Baird, lateral view.  
 2. *Herpetocypris reptans* Baird, dorsal view.  
 3. *Herpetocypris reptans* Baird, terminal segment of second foot.  
 4. *Herpetocypris reptans* Baird, furca.  
 5. *Potamocypris* (*Cypridopsis*) *smaragdina* (Vavra), dorsal view.  
 6. *Potamocypris* (*Cypridopsis*) *smaragdina* (Vavra), lateral view.  
 7. *Potamocypris* (*Cypridopsis*) *smaragdina* (Vavra), furca.

## PLATE LXVI.

- Fig. 1. *Spirocypris passaica*, new species, lateral view.  
 2. *Spirocypris passaica*, new species, dorsal view.  
 3. *Spirocypris passaica*, new species, furca.  
 4. *Cypris virens* (Jurine), lateral view.  
 5. *Cypris virens* (Jurine), dorsal view.  
 6. *Cypris virens* (Jurine), furca.

## PLATE LXVII.

- Fig. 1. *Cypris pubera* O. F. Müller, lateral view.  
 2. *Cypris pubera* O. F. Müller, lower posterior part of right shell.  
 3. *Cypris pubera* O. F. Müller, third, fourth, and fifth segments of second antenna.  
 4. *Cypris pubera* O. F. Müller, first foot.  
 5. *Cypris pubera* O. F. Müller, terminal segments of second foot.  
 6. *Cypris pubera* O. F. Müller, furca.

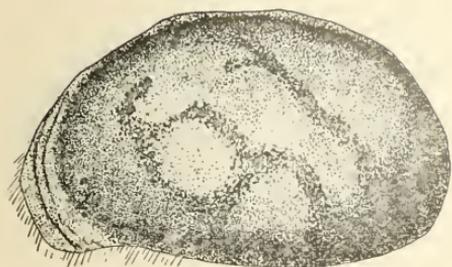
## PLATE LXVIII.

- Fig. 1. *Cypris pellucida* Sharpe, lateral view.  
 2. *Cypris pellucida* Sharpe, dorsal view.  
 3. *Cypris pellucida* Sharpe, lower outer anterior margin of right shell.  
 4. *Cypris pellucida* Sharpe, inner anterior margin of left shell.  
 5. *Cypris pellucida* Sharpe, furca.  
 6. *Cyprina exsculpta* Fischer, lateral view.  
 7. *Cyprina exsculpta* Fischer, dorsal view.  
 8. *Cyprina exsculpta* Fischer, portion of shell showing parallel and anastomosing lines.  
 9. *Cyprina exsculpta* Fischer, furca.

## PLATE LXIX.

- Fig. 1. *Chlamydotheca azteca* Saussure, lateral view.  
 2. *Chlamydotheca azteca* Saussure, first foot, showing two setae on its second segment.  
 3. *Chlamydotheca azteca* Saussure, dorsal view.  
 4. *Chlamydotheca azteca* Saussure, furca.

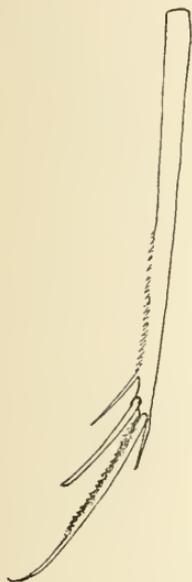




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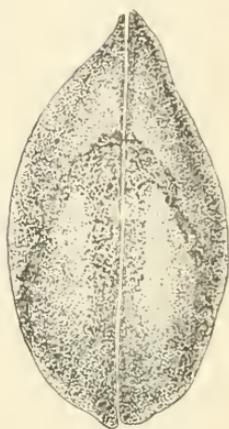
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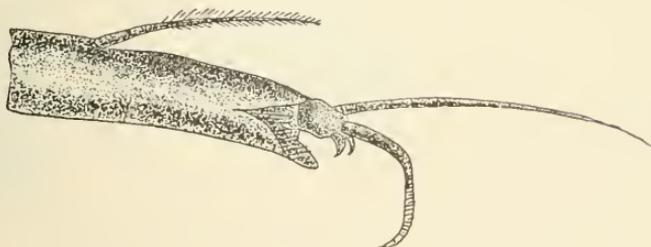
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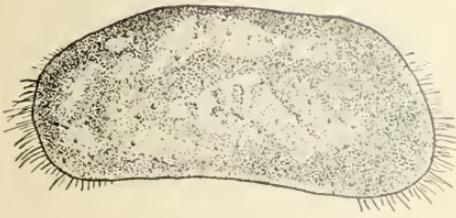


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CHLAMYDOTHECA MEXICANA, NEW SPECIES.

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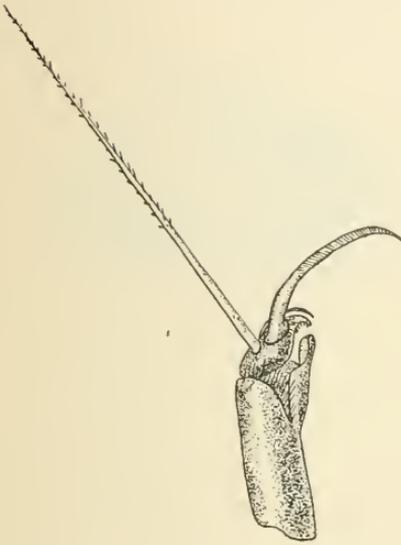




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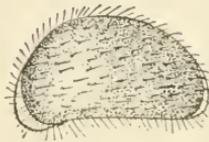
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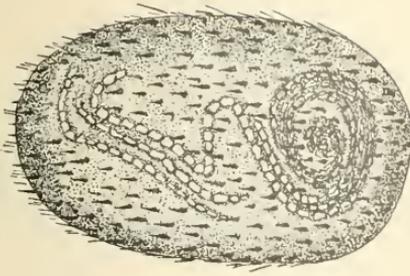


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HERPETOCYPRIS REPTANS AND POTAMOCYPRIS SMARAGDINA.

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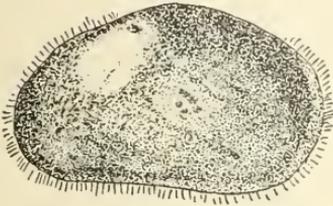




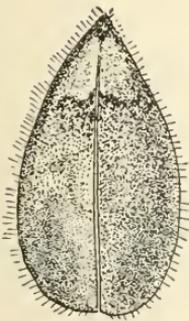
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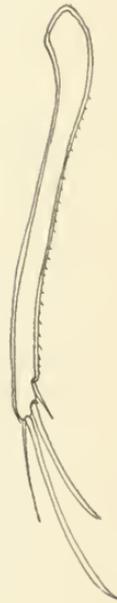
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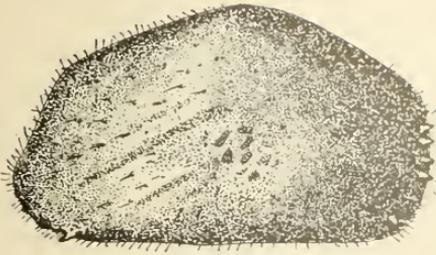


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SPIROCYPRIS FASSAICA AND CYPRIS VIRENS.

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CYPRIS PUBERA.

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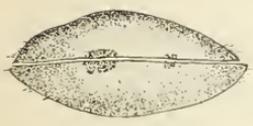
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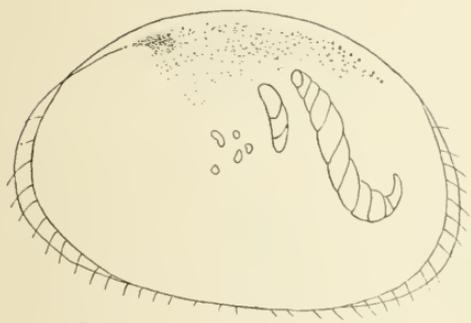
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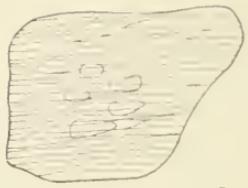
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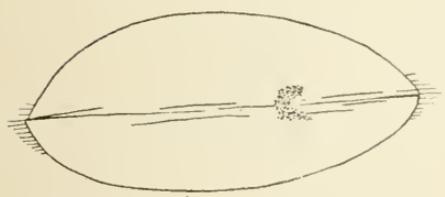
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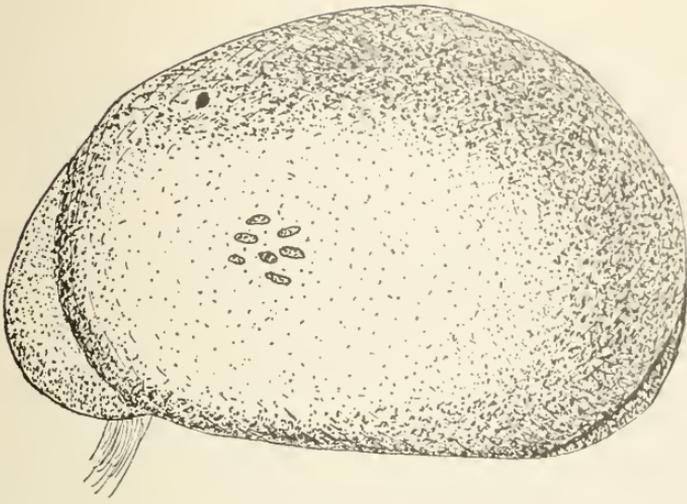


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CYPRIS FELLUCIDA AND CYPRIA EXSCULPTA.

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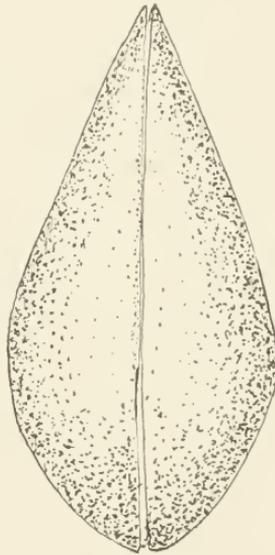




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CHLAMYDOTHECA AZTECA.

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