Paleozoic Species of 
_Bairdia_ and 
Related Genera

By I. G. SOHN

REVISION OF SOME PALEOZOIC OSTRACODE GENERA

GEOLOGICAL SURVEY PROFESSIONAL PAPER 330-A

A monographic subjective revision of genera and species, including identification keys and stratigraphic ranges

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CONTENTS

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>1</td>
</tr>
<tr>
<td>Methods of study</td>
<td>2</td>
</tr>
<tr>
<td>Punched cards</td>
<td>3</td>
</tr>
<tr>
<td>Definition of terms</td>
<td>6</td>
</tr>
<tr>
<td>Internal casts</td>
<td>7</td>
</tr>
<tr>
<td>Discrimination of species</td>
<td>7</td>
</tr>
<tr>
<td>Individual variation</td>
<td>7</td>
</tr>
<tr>
<td>Muscle scars</td>
<td>8</td>
</tr>
<tr>
<td>Surface texture</td>
<td>8</td>
</tr>
<tr>
<td>Paleontological nomenclature</td>
<td>8</td>
</tr>
<tr>
<td>Synonymy</td>
<td>8</td>
</tr>
<tr>
<td>Homonymy</td>
<td>9</td>
</tr>
<tr>
<td>New names for homonyms</td>
<td>10</td>
</tr>
<tr>
<td>Homonyms not renamed</td>
<td>10</td>
</tr>
<tr>
<td>Collection localities</td>
<td>11</td>
</tr>
<tr>
<td>Systematic descriptions</td>
<td>11</td>
</tr>
<tr>
<td>Key to genera</td>
<td>11</td>
</tr>
<tr>
<td>Family Bairdiidae</td>
<td>12</td>
</tr>
<tr>
<td>Bairdia</td>
<td>12</td>
</tr>
<tr>
<td>Stratigraphic range</td>
<td>12</td>
</tr>
<tr>
<td>Summary of Bairdia</td>
<td>17</td>
</tr>
<tr>
<td>Key to Bairdia s.s.</td>
<td>19</td>
</tr>
<tr>
<td>Assigned species</td>
<td>22</td>
</tr>
<tr>
<td>Misidentified species in Bairdia</td>
<td>33</td>
</tr>
<tr>
<td>Doubtful and indeterminate species</td>
<td>35</td>
</tr>
<tr>
<td>Synonyms and rejected species from Bairdia</td>
<td>42</td>
</tr>
<tr>
<td>Cryptobairdia n. gen</td>
<td>47</td>
</tr>
<tr>
<td>Rectobairdia n. gen</td>
<td>52</td>
</tr>
<tr>
<td>Systematic descriptions—Continued</td>
<td></td>
</tr>
<tr>
<td>Family Bairdiidae—Continued</td>
<td></td>
</tr>
<tr>
<td>Bairdiacypris</td>
<td></td>
</tr>
<tr>
<td>Fabalicypris</td>
<td>57</td>
</tr>
<tr>
<td>Orthobairdia n. gen</td>
<td>60</td>
</tr>
<tr>
<td>Pustulobairdia n. gen</td>
<td>65</td>
</tr>
<tr>
<td>Ceratobairdia</td>
<td>69</td>
</tr>
<tr>
<td>Bairdiolites</td>
<td>69</td>
</tr>
<tr>
<td>Family Healdidiida</td>
<td>72</td>
</tr>
<tr>
<td>Silenites</td>
<td>72</td>
</tr>
<tr>
<td>Family unnamed</td>
<td>74</td>
</tr>
<tr>
<td>Tubulobairdia</td>
<td>74</td>
</tr>
<tr>
<td>Phanassymetria</td>
<td>76</td>
</tr>
<tr>
<td>Pachydomella</td>
<td>76</td>
</tr>
<tr>
<td>Family Rishonida</td>
<td>76</td>
</tr>
<tr>
<td>Rishona n. gen</td>
<td>79</td>
</tr>
<tr>
<td>Sameera</td>
<td>80</td>
</tr>
<tr>
<td>Family position uncertain</td>
<td>81</td>
</tr>
<tr>
<td>Spinobairdia</td>
<td>81</td>
</tr>
<tr>
<td>Bekena</td>
<td>81</td>
</tr>
<tr>
<td>Bairdiocypris</td>
<td>83</td>
</tr>
<tr>
<td>Species assigned to genera not described in this paper</td>
<td>84</td>
</tr>
<tr>
<td>Basslerella</td>
<td>84</td>
</tr>
<tr>
<td>Camenedea</td>
<td>84</td>
</tr>
<tr>
<td>Cavellina</td>
<td>84</td>
</tr>
<tr>
<td>Havorthina</td>
<td>84</td>
</tr>
<tr>
<td>Stenolaffina</td>
<td>84</td>
</tr>
<tr>
<td>Species belonging to undetermined genera</td>
<td>85</td>
</tr>
<tr>
<td>Plate 1. Bairdia and Varacobairdia</td>
<td></td>
</tr>
<tr>
<td>2. Bairdiacypris and genera of the Bairdia group</td>
<td></td>
</tr>
<tr>
<td>3. Bairdiacypris, Fabalicypris, and genera of the Bairdia group</td>
<td></td>
</tr>
<tr>
<td>4. Silenites, Bairdiolites, Ceratobairdia, and Rishona</td>
<td></td>
</tr>
<tr>
<td>5. Rishona, Pachydomella, and related genera</td>
<td></td>
</tr>
<tr>
<td>6. Bekena, Bairdiocypris, Spinobairdia, and miscellaneous genera</td>
<td></td>
</tr>
<tr>
<td><strong>Figure 1.</strong> Disposition of species previously assigned to Bairdia</td>
<td>4</td>
</tr>
<tr>
<td>2. Elements of the lateral and dorsal outlines of the Bairdia group</td>
<td>6</td>
</tr>
<tr>
<td>3. Nesidea Costa, 1849, reproduction of the original plate</td>
<td>14</td>
</tr>
<tr>
<td>4. Stratigraphic range of the genera discussed in this paper</td>
<td>15</td>
</tr>
<tr>
<td>5. Stratigraphic range and frequency distribution of Bairdia s.s.</td>
<td>18</td>
</tr>
</tbody>
</table>

ILLUSTRATIONS

(Plates 1 to 6 follow the index)

**Figure 6.** Species of Bairdia in the upper Pennsylvanian
1. Stratigraphic range and frequency distribution of Cryptobairdia | 20 |
2. Stratigraphic range and frequency distribution of Rectobairdia | 47 |
3. Stratigraphic range and frequency distribution of Bairdiacypris | 53 |
4. Stratigraphic range and frequency distribution of Bairdiolites | 58 |
5. Stratigraphic range and frequency distribution of Fabalicypris | 61 |
6. Stratigraphic range and frequency distribution of Orthobairdia | 65 |
7. Stratigraphic range and frequency distribution of Silenites | 70 |
8. Stratigraphic range and frequency distribution of Spinobairdia | 72 |
9. Stratigraphic range and frequency distribution of Phanassymetria | 77 |
10. Stratigraphic range and frequency distribution of Bekena | 78 |
11. Stratigraphic range and frequency distribution of Pachydomella | 84 |
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

By I. G. SOHN

ABSTRACT

Paleozoic species of the genus Bairdia have been critically examined and revised by use of punched cards. These species are referred to the following genera: Bairdia McCoy, Cryptobairdia n. gen., Rectobairdia n. gen., Bairdiacypris Bradfield, Pabaliaepry Cooper, Orthobairdia n. gen., Pustobairdia n. gen., Ceratobairdia Sohn, Bairdiolites Cronels and Gale, Rishona n. gen., and Bekena Gibson. Other species are referred to Basstereila? Kellett, Canadenidea Swain, Cariellina? Coryell, Havorthina Kellett, and Stenophyra Teichert. The stratigraphic range of Bairdia, as redefined, is restricted to rocks of Middle Devonian to Permian age. It is suggested that the post-Paleozoic species referred to this genus belong to other genera, several of which are listed, and some of which are still undescribed. Homonyms of Paleozoic species are renamed as follows: Bairdia egorovi (B. symmetrica Egorov, 1953), B. elongatella (B. plebia elongata Kirkby, 1859), B. girtyi (B. attenuata Girty), Cryptobairdia contractella (B. hisingeri contracta Jones and Kirkby, 1895), Orthobairdia kirki (B. compressa Gels, 1982), Rectobairdia posneri (Bairdia angulata Posner, 1951).

The following genera are discussed: Silenites Coryell and Booth, Tabulibairdia Swartz, Phanassymetria Roth, Pachydemella Ulrich, Spinobairdia Morris and Hill, and Bairdiacypris Kegel. The new family Rishoniidae is erected for Rishona n. gen. and Samarella Polenova, 1952. Reversocypris Pfally, 1955, is here tentatively considered a junior subjective synonym of Samarella. A new family to be named by Berdan and Sohn is discussed and illustrated by means of polished sections and radiographs.

A key to the more important genera and nine dichotomous keys to the species in these genera are presented. Some of these species are here considered nomina dubia. Misidentifications that belong to new species, except for Bairdia hassi n. sp., and B. pseudogeumnensis n. sp., are not named; they are indicated by letters. Lectotypes for Orthobairdia cestrinensis (Ulrich), 1891, Bekena pecki (Morey), 1935, Cryptobairdia recta (Harlton), 1929, Bairdia crassa Harlton, 1929, and Bairdia giryi Sohn, n. name are described and illustrated. Rishona basteri n. sp. is described and illustrated.

INTRODUCTION

This paper is part of an inventory of the available knowledge of upper Paleozoic ostracode genera. Published data and available types and collections from stratigraphic and paleontologic type localities deposited at the U.S. Geological Survey and the U.S. National Museum, as well as types deposited in other institutions, are used. The project is under the direction of P. E. Cloud, Jr.

Because Bairdia is a smooth genus to which the largest number of Paleozoic species were assigned, it was chosen as a pilot study in order to develop methods of attacking the problem. Bairdia McCoy, 1844, has the added distinction of being the second valid Paleozoic ostracode genus to be described—the first was Entomoconchus McCoy, 1839. The few additional Paleozoic species described prior to 1844 were either not recognized as ostracodes or were assigned to post-Paleozoic, mostly living, genera.

ACKNOWLEDGMENTS

I am indebted to P. E. Cloud, Jr., for suggestions and encouragement during the progress of this project. G. A. Cooper, U.S. National Museum, made available for study all the specimens on deposit in the U.S. National Museum. C. L. Cooper, U.S. Geological Survey, made available his illustrated card catalog of Paleozoic Ostracoda that is current to about 1946. The following individuals very generously loaned types on deposit at their institutions: C. W. Collison, Illinois Geological Survey; Maxim K. Elias, University of Nebraska; John Imbrie, Columbia University; R. V. Kesling, University of Michigan; M. B. Marple, Ohio State University; Norman D. Newell, American Museum of Natural History; R. E. Peck, University of Missouri; and J. J. Galloway and T. G. Perry, University of Indiana. H. H. Bradfield donated the duplicates of his types and C. W. Tomlinson arranged for the collecting of toptype samples at Bradfield's locality 68. A. R. Loeblich, Jr., loaned his collections from the Henryhouse and Haragan formations of Oklahoma. The unpublished index of Ostracoda compiled by H. N. Coryell was consulted. I am grateful to my colleagues in the U.S. National Museum with whom I discussed many of the problems encountered, and

1
METHODS OF STUDY

This study is subjective rather than objective in approach, and as such is liable to the introduction of errors in judgment. An effort has been made to study as many specimens of each species as could be obtained. Only those references to each species that are documented by illustrations have been considered, and each species was evaluated on the basis of available specimens, descriptions, discussions, and illustrations. As work progressed, it was noted that erroneous conceptions of several species were made on the basis of illustrations or on broken or partly abraded specimens.

Criteria for recognizing internal casts of ostracode carapaces are discussed and illustrated on page 7. Because the genus Bairdia was originally described in Europe, specimens of most of the foreign species are not available for examination in the United States. Evaluations of these species are based solely on published data. They are included in this study because the American species cannot be evaluated without the published data alone. Most misconceptions were due to the fact that the species was based either on stinkerns or on broken or partly abraded specimens.

In the following grouping of publications on upper Paleozoic ostracodes, the references to the “Bibliography” are arranged according to the stratigraphic range of each of the genera and species studied. The faunal composition of the Lower Mississippian age has more weight than the same absence in rocks of Early Mississippian age. The above data are to be evaluated on the basis of available specimens. Drs. Karl Krommelbein, Germany, and Vladimir Pokorny, Czechoslovakia, donated European specimens.

A bibliography of upper Paleozoic ostracodes in North America through 1955 is included with the “Bibliography.” In the following grouping of publications on upper Paleozoic ostracodes, the references to the “Bibliography” are arranged according to stratigraphic age of the material discussed. The same reference may appear in several of the geologic divisions because a publication may deal with collections from more than one stratigraphic level.

Publications dealing with upper Paleozoic ostracodes in North America, arranged according to geologic period

 Permian
  Coryell and Rogatz, 1922; Delo, 1939; Girty, 1908; Girty, 1909b; Girty, 1910b; Hamilton, 1942; Harlton, 1927; Harris and Lalicker, 1932; Harris and Lalicker, 1932; Harris and Worell, 1939; Holland, 1934; Kellett, 1929; Kellett, 1933; Kellett, 1934; Kellett, 1948; Kellett, 1952; Knight, 1928; McLaughlin, 1932; Marple, 1932; Moore, 1929; Roth, 1930a; Roth and Skinner, 1930; Scott, 1944a; Scott, 1944b; Scott and Summerson, 1943; Warthin, 1930; Wilson, 1933.

 Upper Pennsylvanian
  Bradfield, 1933; Cooper, 1946; Cordell, 1952; Coryell, 1928a; Coryell, 1928b; Coryell and Billings, 1932; Coryell and Booth, 1933; Coryell and Oserio, 1932; Delo, 1930; Delo, 1931; Harlton, 1927; Harlton, 1928; Harlton, 1929; Harris and Lalicker, 1932; Johnson, 1936; Kellett, 1929; Kellett, 1933; Kellett, 1934; Kellett, 1935; Kellett, 1947; Lalicker, 1935; Moore, 1920; Payne, 1937; Roth, 1928; Roth, 1929a; Scott and Borger, 1941; Tasch, 1953; Ulrich and Bassler, 1906.

 Middle Pennsylvanian
  Bradfield, 1935; Brill, 1942; Cooper, 1945; Cooper, 1946; Coryell, 1928a; Coryell, 1928b; Coryell and Sample, 1932; Harlton, 1928; Kellett, 1947; Kellett, 1948; Kellett, 1952; Knight, 1928; McLaughlin, 1932; Marple, 1932; Moore, 1929; Roth, 1930a; Roth and Skinner, 1930; Scott, 1944a; Scott, 1944b; Scott and Summerson, 1943; Warthin, 1930; Wilson, 1933.

 Lower Pennsylvanian
  Bradfield, 1935; Branson, 1944; Cooper, 1945; Harlton, 1928; Harlton, 1929a; Harlton, 1933; Roth, 1928; Roth, 1929a; Roth, 1929b; Roth and Skinner, 1930; Scott, 1944a.

 Upper Mississippian
  Bell, 1929; Branson, 1944; Brayer, 1952; Cooper, 1941; Cooper, 1947; Coryell and Johnson, 1957; Coryell and Rozanski, 1942; Coryell and Sohn, 1938; Cronie and Bristol, 1939; Cronie and Funkhouser, 1939; Cronie and Gale, 1939; Cronie and Gurke, 1939; Cronie and Thurman, 1939; Easton, 1943; Gels, 1932; Girty, 1909a; Girty, 1910a; Girty, 1911; Girty, 1915a; Harlton, 1929a; Morey, 1930; Roth, 1929a; Roth, 1929b; Roundy, 1920; Scott, 1942; Sohn, 1933; Ulrich, 1891; White and St. John, 1867; Whorf, 1882.

 Lower Mississippian
  Bassler, 1925; Bassler, 1932; Benson, 1955; Branson, 1944; Echols and Gouty, 1959; Girty, 1913a; Herrick, 1891; Morey, 1935a; Morey, 1936.

The number of publications that deal with North American Paleozoic ostracodes in each of the preceding divisions of the Upper Paleozoic is given in the following tabulation. This tabulation is limited by two factors: 1, not all the papers included in the totals contain the genera discussed in this paper; and 2, references to ostracodes outside of North America are omitted.

Number of publications on ostracodes in each of the divisions of the upper Paleozoic in North America

 Permian .................................................. 10
 Upper Pennsylvanian ................................. 28
 Middle Pennsylvanian ................................. 22
 Lower Pennsylvanian ................................. 12
 Upper Mississippian ................................. 29
 Lower Mississippian .................................. 9

These data are important as an aid in establishing the stratigraphic range of each of the genera and species studied. The faunal composition of the Lower Mississippian is not so well known as that of the Upper Pennsylvanian. Consequently the absence of a record for a species or genus in rocks of Late Pennsylvanian age has more weight than the same absence in rocks of Early Mississippian age. The above data are to be
used in interpreting the stratigraphic ranges of the genera illustrated in figures 5-13. On the other hand, the data also indicate areas where an abundance of geographic localities are due to “monographic bursts” (Cooper and Williams, 1952, p. 330). The study, by several individuals, of fossils in the same stratigraphic division results in the increase of the number of localities for a given species or genus. The same taxon may be equally abundant in the adjoining stratigraphic unit, but because the fossils were not studied, the taxon may appear absent from that unit.

Figure 1 shows graphically the disposition of all the Paleozoic species previously assigned to Bairdia. Each taxon is given a unit of one in the decade during which it was first proposed. The 435 units on the graph do not represent all the citations to Bairdia because only original assignments are counted. For example, Bairdia oklahomaeensis Harlton, 1927 (= Orthobairdia) was identified by nine subsequent investigators; on this graph it has the weight of one. Incorrect identifications are considered as units, and each first citation is given the weight of one unit. This unit is referred on the graph to its proper grouping. This grouping may be a new species in any of the genera here indicated, a synonym of a species in one of these genera, a nomen dubium, or the group that consists of undetermined genera and genera not discussed in this revision.

A Russian publication, Posner (1951), became available after this study was completed. The 13 species of Bairdia from Russia are incorporated in the report, but not in figure 1.

Although dealing with the species that were referred to a single genus, this graph reflects the history of the study of upper Paleozoic Ostracoda. The genus Bairdia was described in 1844, but in 1830 Mümster described three species in Cythere that were later referred to Bairdia; consequently, the history of the genus commences with the 1826-1835 decade. Each peak on the graph reflects the interest of one or more individuals who dominated the field at that time, but whose studies were supplemented by the work of other investigators. The first peak, 1846-95, can be attributed to the enthusiasm of Prof. T. Rupert Jones, of England, who collaborated with several investigators including James W. Kirkby on upper Paleozoic forms, with H. B. Holl on lower Paleozoic forms, and with G. S. Brady, C. D. Sherborn, and others on post-Paleozoic forms. The small peak in the decade 1906-16 reflects the efforts of E. O. Ulrich, U.S. Geological Survey, whose work in collaboration with R. S. Bassler was mainly on lower Paleozoic forms, and G. H. Girty, also of the U.S. Geological Survey.

The last three decades reflect in part the influence of Bassler and Kellett’s Bibliographic index of Paleozoic Ostracoda, published in 1934. Four teachers, only one of whom published a short paper on ostracodes (Moore, 1929), influenced the study of ostracodes in the United States. They are J. J. Galloway, of Columbia and Indiana Universities; the late E. B. Branson, University of Missouri; R. C. Moore, University of Kansas; and W. H. Shideler, Miami University, Ohio. They encouraged the study of ostracodes for dissertations. These were augmented beginning in 1928 by the works of H. N. Coryell and his students at Columbia University, Carey Cromeis and his students at Chicago University, H. W. Scott and his students at the University of Illinois, Mrs. Betty Kellett Nadeau, Washington University, St. Louis, Mo., F. M. Swartz and his students at the Pennsylvania State University, Robert Roth, B. H. Harlton, and C. L. Cooper.

The graph (fig. 1) should be compared with the cumulative curves showing the rate of production of new genera, species, and papers on Paleozoic ostracodes up to 1940 (Cooper, 1942, p. 765). Levinson’s histograms (1957, figs. 1-4) that show the number of papers, number of new genera, the stratigraphic distribution of new genera from 1950-56, and the number of species of ostracodes 1853-56 indicate the current rate of study. The Catalogue of Ostracoda, 12 volumes of which have already been issued by Ellis and Messina, American Museum of Natural History, N. Y., will probably assist the study of Ostracoda in the same manner that the Catalogue of Foraminifera has assisted in the study of Foraminifera.

**Punched Cards**

More than 200 species of Paleozoic age have been assigned to the genus Bairdia. This plus the fact that many of the species have been repeatedly cited posed a problem of handling this voluminous information. The application of punched card technique (Casey and Perry, 1951) to the analysis of this group proved to be practical.

A punched card system is a mechanical device for the rapid extraction of any common factor from a mass of data. This is accomplished by the use of specially prepared cards that have holes about 3mm in diameter punched about 2mm from the edge on all four sides. The upper right hand corner of each card is truncated for uniform orientation. The size of the card and the distance between the holes depend on the particular purpose for which the card is designed. Each hole is assigned a given value, and information is coded on the card by notching away the paper between the hole and the edge.
EXPLANATION

- Bairdia, including new species
- Species referred to Cryptobairdia
- Species referred to Rectobairdia
- Species referred to Orthobairdia
- Species referred to Pustulobairdia
- Species referred to Bairdiacypris
- Species referred to Fabalicypris
- Species referred to Bairdiolites
- Species considered as synonyms of species of the above genera
- Species referred to Riskona
- Species referred to Bekena
- Species referred to undetermined genera or to genera not discussed in this paper
- Species referred to as nomina dubia and sp. indet.
- Species considered as synonyms of species of the above genera

Numbers above bar indicates total species described. Numbers on right indicate species in each category.

FIGURE 1.—Number and disposition of original assignments of species or citations previously referred to Bairdia.
After the cards have been punched, every factor can be rapidly extracted by inserting a sorting needle into the proper hole and removing all the cards on which that factor was not punched out. Instructions for efficient use are given in manuals prepared by manufacturers of card punching and sorting equipment and in Casey and Perry (1951).

The following 64 features were coded:

1. Dorsal outline parallel
2. Dorsal outline convex
3. Anterior outline thick
4. Anterior outline thin
5. Dorsal margin straight
6. Dorsal margin curved
7. Anterior margin pointed
8. Anterior margin rounded
9. Anterior point or break in curvature above midheight
10. Anterior point or break in curvature at approximate midheight
11. Anterior point or break in curvature below midheight
12. Dorsoposterior margin equals about one-half the greatest length
13. Dorsoposterior margin equals about one-third the greatest length
14. Dorsoposterior margin equals about one-fourth the greatest length
15. Dorsoposterior margin straight
16. Dorsoposterior margin convex
17. Dorsoposterior margin concave
18. Posterior point above midheight
19. Posterior point approximately at midheight
20. Posterior point below midheight
21. Posterior point in ventral quarter of greatest height
22. Available data for right valve
23. Available data for left valve
24. Available data for carapace
25. Greatest length 1 mm or longer
26. Greatest length 0.75-1.0 mm
27. Greatest length less than 0.75 mm
28. Greatest length unknown
29. Ventral margin straight
30. Ventral margin curved
31. Bottom flat
32. Bottom curved
33. Surface smooth
34. Surface ornamented (punctate, spine, wing, ridge, swelling)
35. Specimen is probably an internal cast
36. Greatest width anterior to midlength
37. Greatest width at approximate midlength
38. Greatest width posterior to midlength
39. Localities in North America
40. Localities in Europe
41. Localities in Asia
42. Localities in Africa
43. Localities in Australia
44. Localities in South America
45. Overlap reversed (right over left)
46. Ordovician
47. Silurian
48. Devonian undifferentiated
49. Lower Devonian
50. Middle Devonian
51. Upper Devonian
52. Mississippian undifferentiated
53. Kinderhook provincial series or equivalent
54. Osage provincial series or equivalent
55. Meramec provincial series or equivalent
56. Chester provincial series or equivalent
57. Pennsylvanian undifferentiated
58. Morrow provincial series or equivalent
59. Atoka provincial series or equivalent
60. Des Moines provincial series or equivalent
61. Missouri provincial series or equivalent
62. Virgil provincial series or equivalent
63. Permian
64. Post-Paleozoic

Experiments with various combinations of characters determined which combinations divide the species most readily into natural groups. The features that proved most serviceable were used to combine groups of species into genera. Keys were constructed for the species in each genus. The subject of keys and their construction and use are adequately discussed by Mayr, Linsley, and Usinger (1953, p. 162-168); Brues, Melander, and Carpenter (1954, p. 6-7); and Metcalf (1954, p. 38). The last named is recommended as a very lucid as well as amusing exposition of the subject.

An indented key was constructed to differentiate the genera considered in this study, and dichotomous bracket keys were constructed for most of the genera.

Each type of key has its own advantages. The indented key is preferred where a small number of units is involved because related taxa are near each other, and therefore may show phylogenetic relationships. It is impractical for large keys because opposing couplets would be separated by a great deal of printed matter, and also because each indentation would reduce the number of words that could be written in each line.

Dichotomous bracket keys are more difficult to construct and do not have related taxa near each other, but additions can easily be made. Whenever an additional species had to be incorporated into the key, it was readily accomplished by following the key to the one species having all the characters in common with this additional species. The next available number was substituted for the name of the species, and a new doublet differentiating the two taxa was added at the end of the key. This type of key is more conservative of space, and, as constructed here, has the added advantage that it can easily be read backward from the species to the first dichotomy.

Keys may be difficult to use because of the subjectivity that enters into their composition. Although the keys to the species in this paper were made as accurate as possible with the information available for each species, errors are undoubtedly incorporated.
Should a specimen key out to an obviously incorrect species, it is possible to backtrack through the antecedent doublets given in parentheses, and the place where the wrong choice was made located. The user of the keys is warned that he travels at his own risk.

Except for an occasional observation interjected into the synonymy, most of the species are not formally defined. All the synonyms of the species recognized as valid in this revision are enclosed by parentheses in the keys.

Where the illustration and the description differ, more weight is given to the illustration. For example, Cooper (1946, p. 42) states that his specimens of *Bairdia blakei* Harlton have convex ventral margins. His photograph (pl. 1, fig. 18) is of a specimen with a straight ventral margin. This specimen is here relegated to *Bairdia* sp. R, which is defined in the key as having a straight ventral margin. The outlines of carapaces can be influenced by the orientation of the specimens during photography.

Each reference is followed by stratigraphic data as given in the original publication. Consequently the formational names used do not necessarily conform with the usage of the U.S. Geological Survey. Wilmarth (1938) was used as a guide in citing the geologic ranges of species in formations of the United States. The locality data is as complete as given in the original publication, and these data vary in precision. Data for foreign localities on the whole are less precise than those for American localities. So far as British localities are concerned, more precise information is available for many of the classical localities (Palaeontographical Society London, 1954). The British localities were not converted into the available more precise information because of the danger of introducing mistakes by one unfamiliar with British geography.

**DEFINITION OF TERMS**

Kesling (1951b) defined most of the terminology used in describing ostracodes.

The group of ostracodes revised in this paper are, with the exception of *Ceratobairdia*, *Pustulobairdia*, and *Spinobairdia*, smooth shelled. Smooth-shelled species are discriminated on the basis of the shape of the various elements that make up the lateral and dorsal outlines of the carapace. Figure 2 defines these elements.

In addition to the elements illustrated in figure 2, the following terms are used in the keys:

- **A**: A ventrally located lateral winglike extension of the valve.
- **Commissure**: Line of junction of two valves as seen from the outside (Bradfield, 1935, p. 86).
- **Lip**: A curved part of the overlapping valve along the ventral margin that extends over the smaller valve, so that the ventral commissure is not subparallel to the ventral edge of the left valve.

**Figure 2**—Elements of the lateral and dorsal outlines of the *Bairdia* group. *A*, lateral outline of *Bairdia grahamensis* Harlton, 1928 (pl. 1, fig. 16); *B*, dorsal outline of *Bairdia grahamensis* Harlton, 1928 (pl. 1, fig. 15); *C*, lateral outline of *Orthobairdia cestriensis* Ulrich, 1891 (pl. 3, fig. 24); *D*, dorsal outline of *Orthobairdia cestriensis* Ulrich, 1891 (pl. 3, fig. 25); *E*, lateral outline of *Cryptobairdia furakerensis* Kellett, 1934, (pl. 2, fig. 2).
Pustules. A pimplelike protuberance on the surface of the valve.
Ridge. An elongate protuberance on the surface of the valve that is steep on both sides.
Shoulder. A ridge that is steep on only one side, the other side merging with the valve surface.
Tubules. Coarse tubular pores which open on the internal surface of the valves but do not reach the exterior (Swartz, 1936, p. 581).

Although the adjectives used to describe these elements are self-explanatory, a great deal of subjectivity entered in the determination of borderline features. A ventral margin that may be "gently curved" to one person may be "straight" to another person, or even to the same person at a different time.

INTERNAL CASTS

The descriptions of many species of fossil ostracodes are based on specimens that are internal casts (steinkerns). Examination of primary types and subsequently figured specimens of upper Paleozoic ostracodes described in 6 publications discloses that in a total of approximately 500 citations, 85 species, including 9 type species, are based on internal casts; and an additional 34, including 1 type species, are probably based on internal casts. Genera based on such species are valid, but unless they are recognized as internal casts, these genera can become receptacles for unrelated and frequently unidentifiable species. This fact hinders phylogenetic and stratigraphic studies.

In order to determine criteria for distinguishing between actual carapaces and internal casts, the calcareous shells of filled carapaces of several genera were dissolved in dilute acid and the resulting casts examined. Polished sections of carapaces and of the artificially created internal casts also were studied. The following are some criteria for recognition derived from this preliminary study:

1. On a pair of closed valves, the hinge line and the ventral and end margins have a fine groove where the two valves meet. Internal casts either are smooth along their perimeters or have one or more grooves or a ridge that reflect structures on the interior of the valves (pl. 6, figs. 7, 12, 13).

2. The infilling of the vestibule will project as a thin lamina on steinkerns (Sylvester-Bradley, 1950, p. 756, footnote 1) (pl. 6, figs. 7, 11).

3. Polished surfaces and thin sections through a carapace usually show both the outer and the inner sides of the shell wall (pl. 2, figs. 29, 30; pl. 3, fig. 28; pl. 5, figs. 12, 26). If the shell is not discernible, the specimen is probably an internal cast.

4. Muscle scars, either as elevations or depressions, on the outside of the fossil may reflect internal structures.

5. Glassy surface textures usually indicate internal casts or specimens from which one or more layers of shell have been peeled.

Many specimens of frilled, ridged, and spinose ostracodes have internal casts with replicas of those structures (compare pl. 6, fig. 7 with fig. 9). Other specimens that have surface ornaments leave smooth casts that differ markedly from the carapace (pl. 6, figs. 1, 4, 5). The identity of many of these species might be demonstrated by the application of the artificial cast technique to topotype material.

DISCRIMINATION OF SPECIES

Kellett (1934, p. 123) listed the following morphologic criteria of specific value in Bairdia; these are here adopted also for the related genera:

1. Position of the anterior and posterior ends in relation to the midheight of the valve.
2. General shape in outline.
3. Shape of the extremities.
4. Amount and character of the dorsal overlap and overreach.

To these might be added the following:

5. Amount and character of ventral overlap.
6. Position of greatest width.

INDIVIDUAL VARIATION

Individuals of the same species should differ from each other because of sexual dimorphism (Sohn, 1950a, 1950b), stages of growth, and stages of evolution.

Sexual dimorphism.—To date it has not been possible to establish the sex of Paleozoic species of Bairdia, although many ostracode genera exhibit sexual dimorphism. Both males and females were probably present in the group. Whether sexual dimorphism was exhibited in the width of the shell, or by any other variation, is not known. This relationship is presumably hidden in different specific or generic names.

Growth stages.—Kellett (1934, pl. 15, figs. 1a–h), Bradfield (1935, pl. 7, figs. 1a–6a), and Marple (1952, pl. 133, figs. 6–11) illustrated ontogenetic series of species of Bairdia, and Sohn (1954, text fig. 1) illustrated stages of growth in B. ? pruniseminata Sohn, the type species of Pustulobairdia n. gen. The lateral outlines of the individual specimens vary but little. According to Kellett (1934, p. 123) immature molts have more pointed ends. It appears reasonable to assume that specimens less than 1 millimeter in greatest length are young stages of growth; consequently, species based on specimens smaller than 1 millimeter are subject to suspicion, and many such names are considered as not valid in this revision.
Stages of evolution.—Living organisms are dynamic; they are continually changing both in space (geographic speciation) and in time (geologic speciation). Although the concept of an ideal species embraces similar individuals within the previously discussed limits of variation, it must be recognized that because of evolution, there are individuals and populations that are transitional between the species and its ancestral or descendant stocks. These cannot be assigned with any degree of certainty to one or another species.

A similar relationship exists between species within a group of genera. Were the entire record of a given family known, there would presumably be characters in a single species that might fall within the range of variation of two or more genera. The assignment of these transitional species to a given genus would be strictly subjective, in spite of the hypothetical availability of all pertinent data. The admittedly fragmental information available in this study adds to the difficulty. Genera are defined with the understanding that certain species may be transitional between two or more genera and their proper assignment may or may not ever be possible.

MUSCLE SCARS

Kellett (1934, p. 122) described the muscle scar of Bathidia as "* * * circular or approximately so, and composed of a slightly raised central dot surrounded in an irregular manner by other more or less regularly shaped elevations * * *." This description is essentially correct for the specimens that she observed (1934, pl. 14, fig. 2). Comparison of Kellett's illustrations with those in other publications (Scott, 1944a, text figs. 1, 2, 4, 6, 7; Sylvester-Bradley, 1950, figs. 3-5; Sohn, 1956, figs. 1, 3, 4) indicates a considerable variation of this general motif. This fact suggests that the Bathidia plexus may be polyphyletic in origin. Sylvester-Bradley (1950, p. 753) quite correctly pointed out that many of the older publications are not accurate in the illustration of muscle scars. According to Sohn (1954, p. 4) the number, shape, and arrangement of individual scars forming the adductor muscle scar pattern are suspect as reliable taxonomic criteria in Bathidia. Sohn (1956, p. 114) inferred the presence of accessory muscle scars in the Pennsylvanian species Bathidia whitesidei Bradfield, 1935 (pl. 1, figs. 30, 31).

SURFACE TEXTURE

The genus Bathidia has generally been considered to have a smooth or glassy outer surface, but this is very likely due to the manner of preservation. Certain specimens have a granulose outer surface (pl. 3, fig. 27); others show distinct normal pore canals that would give pitted texture to the outer surface (pl. 2, figs. 7, 16). It may be significant that no radial pore canals are recorded in Paleozoic species of the Bathidia group.

Pokorny (1955) described a very minute reticulated structure inside the calcified layer of the outer lamella of the Pliocene Candona lobata (Zalanyi), 1929, group. He recalled Müller's (1894, p. 96-98) description of areolation caused by a layer of chitinous rods which lie in the calcified layer of the outer lamella approximately at an equal distance from both its surfaces. This structure may well be represented by the phenomenon exhibited in fortuitous preservation of Paleozoic ostracodes here illustrated (pl. 6, figs. 10, 11). These illustrations demonstrate that the shell of at least one group, the Kirkbyidae, consisted of several layers, one of which is preserved as a honeycomblike structure with the walls perpendicular to the shell surface. This structure has not been discerned in thin sections and polished surfaces of Kirkbyidae (Sohn, 1954) or other groups including Bathidia and related genera that were made during the time of this study. It is possible that the surface texture of certain specimens of Bathidia are related to such internal structures.

PALEONTOLOGICAL NOMENCLATURE

The International Rules of Zoological Nomenclature govern systematic zoology and systematic paleontology. The history, meaning, and application of these rules have been discussed by Mayr, Linsley and Usinger (1953, p. 201-299), who state (p. 201) "Nomenclature thus is the 'language' of zoology, and the rules of nomenclature are its grammar." The main purpose of these rules is to achieve clarity in the recording of families, genera and species. This is accomplished by the following principles:

1. There cannot be two genera or families in the animal kingdom that have the same name.
2. There cannot be two species with the same name in one genus.
3. The valid name of a genus or species is that name under which it was first designated in conformance with the Rules (art. 25).
4. The availability of a name is determined by the date of publication and governed by two conditions: Synonymy and homonymy.

SYNONYMY

In zoological nomenclature two or more names that refer to the same species, genus, or family are synonyms of each other, and the first published valid name of the two has priority. Synonyms may be objective or subjective.

Objective synonyms are defined on the generic level as two or more names of genera that are based on the
same type species (art. 30); on the specific level, it is defined as two or more different names of species that are based on the same specimen. Objective synonymy is not subject to revision; it is indisputable.

Subjective synonyms are defined on the generic level as two or more names of genera that are considered by a specialist to belong to the same genus: on the specific level it is defined as two or more different names of species that are considered by a specialist to belong to the same species. Subjective synonymy is liable to difference of opinion.

**HOMONYMY**

In zoological nomenclature two or more different species, genera, or families having identical names are homonyms of each other. On the specific level, homonymy may be either primary or secondary (objective or subjective).

Primary homonymy is defined as the same specific names used initially for two distinct species in the same genus. The first published valid name has seniority, and any later published names are junior primary homonyms and must be replaced by new available names, even if the species are transferred to different genera.

Secondary homonymy is defined as the same specific names originally described in two or more different genera, which later were assigned to a single genus. Because the assignment of a species to one or another genus is a matter of judgment, there may be differences of opinion as to the validity of such assignments. The first published valid name has seniority. The renaming of junior secondary homonyms depends upon certain recommendations and provisions published in the bulletin of the International Commission on Zoological Nomenclature. The revised rules are to be published at some future date to serve as a standard. Until that time, the old rules, except where modified by the Copenhagen decisions, are followed.

Only those rules of zoological nomenclature that apply to the subject matter in this revision are illustrated by the following examples from the text.

1. *Bairdia curta* McCoy, 1844 (p. 25).

The name of the founder of a new species (or genus) follows the species (or genus) without any punctuation, and the date of publication, when used, is separated from the founder's name by a comma.

2. *Fabalicypris shideleri* (Delo), 1930 (p. 63).

Parentheses around the author's name indicate that the species was originally assigned to a genus other than the one to which it is now assigned. Delo named the species *shideleri* and assigned it to *Bairdia*; the species was later transferred to *Bairdiacypris*, and in this paper the species is referred to *Fabalicypris*.


This is ambiguous because the citation does not indicate that the taxon was originally described as *Bairdia plebia caudata* Kirkby, 1859. Because article 11 of the International Rules of Zoological Nomenclature states that specific and subspecific names are of equal value from the nomenclatorial standpoint, the above citation is proper.

In this paper varietal and subspecific names are considered as equal. According to article 11, a varietal name is governed by the rules of priority just as though it were a specific name. (See also the next item.)

4. *Cryptobairdia compressa* (Kirkby), 1858 (p. 49).

This species was originally described as *Bairdia plebia compressa* Kirkby, 1858. Because it is transferred to a different genus, Kirkby's name is placed in parentheses. *Bairdia compressa* Geis, 1932, is a junior primary homonym, and it requires a different name regardless of the fact that Geis' species is here referred to *Orthobairdia*.


This refers to the species that Bradfield identified as *Bairdia cressa* Harlton, 1929, and not to the species identified by Harlton or by any other investigator. This procedure is not covered by the rules. Some investigators would place a comma or a semicolon between Harlton and Bradfield; others use a different size of type to distinguish between the two names.


This name is preoccupied by *Bairdia acuminata* (Alth). Reuss, 1854, and apparently should require a new name because the specific name *acuminata* was used by Alth (1850, p. 198) as *Cytherina acuminata*, as indicated by the parentheses around Alth. Reuss (1854, p. 139) transferred the species to *Bairdia*. *Bairdia acuminata* Cooper, 1946, is a junior secondary homonym, but because Alth's species is not a true *Bairdia* and, in fact, is referred to *Cytherideis* by Coryell (written communication), Cooper's name is valid.


Jones (1849, p. 26) referred the Cretaceous species *Cythere angusta* Münster, 1830, to *Bairdia*; therefore *Bairdia angustata* Cooper, 1946, is a junior secondary homonym. Because *C. angusta* is not a true *Bairdia*, Cooper's name is valid. (See item 6.) *Bairdia angustata* Sars, 1866 (Recent), was recognized by Müller (1912, p. 123) as a junior secondary homonym, and although he transferred the species to *Macrocypris*, he renamed it *M. sarsi* Müller, 1912. Even though *Bairdia angusta* Sars is now removed from *Bairdia* and bears a different name, Cooper's name is still a junior pri-
mary homonym of *Bairdia angusta* Sars; consequently, Cooper’s species was renamed.

8. *Orthobairdia subreniformis* (Kirby), 1859 (p. 68).

In 1859 Kirby decided that *Bairdia* was a subgenus of *Cythere* and rejected *Bairdia reniformis* Kirby, 1859, as a junior secondary homonym of *Cythere reniformis* Baird, 1835, renaming the species *Cythere subreniformis* Kirby, 1859. This species is now referred to *Orthobairdia* n. gen., and although *reniformis* has priority both in *Bairdia* and in *Orthobairdia*, Kirby’s rejection stands. According to the recommendation of the International Commission on Zoological Nomenclature (1950, p. 121), a specific name that was rejected prior to 1951 on the ground that it was a junior secondary homonym is never to be used again for the same species.


*Cythere elongata* Münster, 1850, was referred to *Bairdia elongata* (Münster), 1850, by Jones and Kirby (1865, p. 408). Consequently, this name makes a junior secondary homonym of *Bairdia plebia* var. *elongata* Kirby, 1858. Although Münster’s name is here considered a nomen dubium, Kirby’s variety, given in this paper a specific rank, requires a new name. This is permitted by a recommendation of the International Commission on Zoological Nomenclature (1950, p. 397) that a senior homonym must not be ignored solely because it is a nomen dubium; therefore, the junior homonym is rejected.

10. *Bairdia kellettae* Glebovskaya, 1939 (p. 28).

*Bairdia kellettae* Glebovskaya was published in 1939, but in a paper published by the same author in 1938, a different specimen was illustrated as *Bairdia* cf. *B. kelletti* Glebovskaya. Although the specimen illustrated in 1938 has priority of publication, the name *kelletti* properly belongs with the specimen published in 1939. The earlier published specimen is accompanied by a “cf.,” and a provisional identification is not a valid description of a species.

The name *kelletti*, as stated in the original description, is in honor of Betty Kellett (Mrs. Nadeau), and the proper ending should be *kellettiae* (art. 14). This correction is mandatory under the Rules of Zoological Nomenclature, and was made by Branson, the first revisor. It is considered as though it were so published in the original description.


*Bairdia subtilla* Gibson, 1955, is here unquestionably referred to *B. hypsoconcha*. Should subsequent study indicate that *B. subtilla* is a valid species, it would require a new name, because it is a junior primary homonym of *Bairdia subtilla* Cooper, 1941. The Rules of Zoological Nomenclature state (art. 35) that specific names of the same origin and meaning shall be considered homonyms if they are distinguished from each other only by a single or double consonant. Neither Cooper nor Gibson indicated the origin and meaning of their specific names, but the fact that Gibson stated (1955, p. 16) that his *B. subtilla* bears a close relationship to *B. subtilla* Cooper suggested that he intended the same meaning.

**NEW NAMES FOR HOMONYMS**

The following new names are proposed in this paper to replace junior homonyms:

- *Bairdia egorovae* for *Cythereia Egorov, 1953* [not Cooper, 1943].
- *B. elongatella* for *B. plebia var. elongata* Kirby, 1858 [not (Münster), 1859].
- *B. giryi* for *B. attenuata* Girty, 1910 [not Brady, 1880].
- *Orthobairdia kirki* for *Bairdia compressa* Geis, 1932 [not *B. plebia var. compressa* Kirby, 1858].
- *Cryptobairdia contractella* for *Bairdia hisingeri var. contracta* Jones and Kirby, 1895 [not Jones, 1857].
- *Rectobairdia posneri* for *B. angulata* Posner, 1951 [not Brady, 1870a].

**HOMONYMS NOT RENAMED**

The following junior homonyms are not renamed in this paper because they are here considered either as junior synonyms or as nomina dubia or were not seen:

- *Cythere (Bairdia) acuta* Jones, 1850 [not *Cythere acuta Cornul, 1844*] = *nomen nudum*.
- *B. moorei* Knight, 1928 [not (Jones)], Issler, 1908 = *B. becei* Ulrich and Bassler, 1906.
- *Cytherina ovata* Eichwald, 1857 [not *B. ovata* Bosquet, 1854] was not seen.
- *Bairdia simiosa* Cooper, 1941 [not Morey, 1936] = *Orthobairdia cistrensis* (Ulrich), 1891.

The following names are junior homonyms of species that are either living or from post-Paleozoic rocks. They are not renamed because the younger species were not included in this study. The possibility of available synonyms makes it desirable not to rename them at present.

- *Bairdia affinis* Terquem, 1885 [not Morris, 1845].
- *B. affinis* Brady, 1886 [not Terquem, 1885, and not Morris, 1845].
- *B. arcuata gracilis* Bosquet, 1854 [not *Bairdia gracilis* McCoy, 1841].
- *B. brevis* Lienenklaus, 1900 [not Jones and Kirby, 1879].
- *B. elongata* Lienenklaus, 1900 [not (Münster), 1830 and not Kummerow, 1924].
- *B. laveipata* Egger, 1910 [not (Eichwald), 1857].
- *B. rhomboidea* Jones and Sherborn, 1889 [not Kirby, 1858].
- *B. subcylindrica* Sandberger, 1895 [not (Münster), 1830].
COLLECTION LOCALITIES

The following are the fossiliferous localities at which collections were made of the fossils discussed here.

U.S. Geological Survey localities

5550A green. Limestone at bottom of the Fayetteville shale or top of the cherty limestone, NW¼NW¼ sec. 27, T. 17 N., R. 20 W., Fayetteville quadrangle, Washington County, Ark. Collected by F. W. Simonds, date unknown.


7908 green. Salem limestone, quarries at Stineville, Monroe County, Ind. Collected by Elliott Marshall for G. H. Girty.

5882 blue. Florena shale, first railroad cut west of Strong City, Cottonwood Falls quadrangle, Kans. Collected by G. H. Girty and P. V. Roundy, Sept. 28, 1925.

6599 blue. Union Dairy member of Hoxbar formation, Carter County, Okla. (See Sohn, 1954, p. 3 for description.)

6728 blue. Labette shale, St. Louis County, Mo. Topotype of Knight's 1928 loc. 38. (See Sohn, 1954, p. 3, for description.)


12844 blue. Shetlerville member of Renault formation, Downey's Bluff section, shale in cliff above pump house. NW¼SW¼ sec. 5, T. 13 S., R. 8 E., Hardin County, Ill. Collected by D. B. Saxby and I. G. Sohn, May 18, 1954.


12846 blue. Devils Kitchen member of Deese formation, slightly to the east of the above locality. Collected by C. A. Miller, March 1951.

12857 blue. Salem limestone, quarries at Stineville, Monroe County, Ind. Collected by Elliott Marshall for G. H. Girty.

U.S. National Museum locality

472c. Henryhouse formation, from 10 ft of silty yellowish-gray calcareous shale, 61 ft above base of section, Chimneyhill Creek and bluff to north, center E¼SE¼ sec. 5, and NW¼SW¼ sec. 4, T. 2 N., R. 6 E., 7 miles south of Ada, Pontotoc County, Okla. Section measured and collected by W. E. Ham, A. R. Loeblich, Jr., and H. A. Lowenstam, May 7, 1947.

SYSTEMATIC DESCRIPTIONS

KEY TO THE GENERA

The features used in the following key are shown in the illustrations cited in parentheses.

1 Both “green” and “blue” have been used after U.S. Geological Survey locality numbers, referring to the color of the labels that identify the master catalog from which these localities are quoted, but currently only “blue” labels are used in the catalog of upper Paleozoic localities.
Family BAIRDIIDAE Sars, 1887

Genus BAIRDIA McCoy, 1844

_Bairdia_ McCoy, 1842 [nomen nudum], in Griffith, Richard. 1842, Notice respecting the fossils of the Mountain Lime­stone of Ireland: p. 22.


_Type species._—Subsequently designated by Ulrich and Bassler, 1929, p. 320, _Bairdia curta_ McCoy, 1844. A synopsis of the characters of the Carboniferous limestone fossils of Ireland, p. 164, pl. 23, figs. 6a, b. Mountain limestone, Carboniferous, Ireland.

_Diagnosis._—Smooth asymmetrical ostracodes; end margins acuminate, posterior more pointed. Dorsal margin convex; ventral margin curved to straight; dorsoanterior and dorsoposterior margins straight to curved. Dorsal outline subelliptical, ends always narrow. Left valve larger, overlaps along dorsum, pos­terodorsal margin, and venter where "lip" may be present. Duplicature broad, adductor muscle scar slightly anterior and below center of valve, circular, consists of rosette of individual scars.

_Discussion._—As previously pointed out (Sohn, 1954, p. 4; Howe, 1955, p. 13) over 600 species from Ordo­vician to Recent in age have been assigned to this genus. Only Paleozoic representatives of this group are discussed in this paper. Criteria for discrimina­tion of species as well as hinge structure and growth series were admirably discussed by Kellett (1934, p. 121–123). Two distinct groups have been described—one with convex sides in dorsal outline and the other with parallel sides in dorsal outline. Both types may be present in the same collection. The possibility that this difference reflects sexual dimorphism is ruled out by the presence of small individuals of both types. These, because of size, probably represent instars younger than the adult–1, at which stage secondary sexual characters are developed in living ostracodes (Kesling, 1951a, p. 235).

The type species, _B. curta_ McCoy, 1844, is of Paleozoic age adds to the complexity of the problem. The recorded stratigraphic range of the genus _Bairdia_ is from Ordo­vician to Recent (Scott, 1944, p. 159); from the Carboniferous to Recent, and perhaps even from the lower Paleozoic (Sylvester Bradley, 1950, p. 756); from Ordo­vician (?) to Recent (Howe, 1955, p. 13). Sohn (1954, p. 4) suggested that many of the post-Paleozoic species assigned to _Bairdia_ belong to several distinct genera. A revision of the post-Paleozoic species assigned to this genus is outside the scope of this paper and would require a more complex study than the one undertaken. One of the difficulties inherent in such a study is the corre­lation of the neontological criteria, based partly on the soft parts of the animal and partly on the shell morphology. The paleontological criteria are based wholly on shell morphology.

The principle that fossil arthropods cannot be as­signed to biologically established families and genera of living arthropods (Tasch, 1956, p. 1251) may be expanded to include the reverse. Living ostracodes cannot be directly assigned with any degree of cer­tainty to genera based on fossil species. This degree of certainty of such assignments is inversely propor­tional to the geologic age of the type species.

The fact that the type species, _Bairdia curta_ McCoy, 1844, is of Paleozoic age adds to the complexity of the problem. Müller (1894, p. 267, 268) discussed living species of _Bairdia_ and stated that the posterior half of the ventral margin of one or both valves is denticu­late. He stated (1894, p. 268) that this criterion holds only for those species that he investigated. He noted that Brady (1880) illustrated many species that are not denticulated and suggested that the denticulations either had broken away or had been overlooked by Brady. None of the Paleozoic species of _Bairdia_ s. 1. has a denticulated ventroposterior margin. Brady (1880, p. 49) stated that out of 23 species discussed in his paper, only one, _Bairdia villosa_ Brady, 1880, contained appendages. The shape of this species (Brady, 1880, pl. 8, figs. 4a–f) excludes it from _Bairdia_ s. s.
The living species of *Bairdia* as conceived by Müller and subsequent workers and the post-Paleozoic fossil species referred to *Bairdia* are very likely not congeneric with the Paleozoic species of *Bairdia* McCoy, 1844, and require one or more new genera for their reception. *Nesidea* Costa, 1849, has been used for post-Paleozoic and living species of *Bairdia* by several students, including Kuiper (1918, p. 14), Doe, and Tressler (1949, p. 342; 1954, p. 433). Costa defined the type species, *N. hirta* Costa, 1849, as having no eyes and as having six sets of legs (1849, p. 183, pl. 4, fig. 2). The absence of eyes eliminates this species from the Podocopa; the six sets of legs and the shape of the shell suggest that *N. hirta* Costa, 1849, is not an ostracode. Costa's original figure is reproduced as fig. 3.

It is impossible to obtain topotype material from which *Nesidea hirta* was described because the type locality, Grotto of the Lazaretto of Nisida, has in the last hundred years been completely filled in, and is now dry land.1

Additional genera can and should be erected for post-Paleozoic species currently referred to *Bairdia*. Criteria for separating the groups are carapace shape, hinge, denticulate margins, presence of ventroterminal loculae, such as illustrated for Cretaceous *Bythocypris* Brady, 1849, *Potamocypris* Brady, 1866 (Recent), and *Ceratobairdia* by Sohn (1954, pl. 2, fig. 19), combined with the soft anatomy of living species.

*Ceratobairdia* and the new genera in this paper are based on species previously assigned to *Bairdia*. The following additional genera have type species that were originally described as *Bairdia*:

**Genera based on species described as Bairdia**

*Bithocypris* Brady, 1880, *Bairdia bosquetiana* Brady, 1866 (Recent).
*Hungarella* Méhes, 1911, *Bairdia? problematica* Méhes, 1911 (Triassic?).
*Monesimilibia* Apostolcu, 1955a, *Bairdia perforata* Bosquet, 1890 (Eocene), [now M. suborata Apostolcu, 1955b].
*Potamocypris* Brady, 1870, *Bairdia fulva* Brady, 1868 (Recent).
*Protoargilloidea* Mandelstam fide Liubimova and Chaborova, 1955, *Bairdia siliqua* var. minor Jones and Hinde, 1890 (Jurassic).

Although the recorded stratigraphic range of this genus is Ordovician to Recent, this study reveals that only 2 American and 10 foreign species of pre-Middle Devonian age were assigned to *Bairdia*. All these species are here removed from *Bairdia* as follows:

*Bairdia anticosiensis* Jones, 1890 = *Krausella anticosiensis* (Jones), 1890, fide Bassier and Kellett (1934, p. 165); (see "Species assigned to genera not described in this paper").

*B. browniana* Jones, 1874, *Geol. Mag.*, dec. 2, v. 1, p. 511, text fig. 1. Silurian, Scotland. According to Jones' original description this species is based on an internal cast, the description and illustration of which suggest that it is not a *Bairdia*. Its proper generic relation is not determinable, and it is referred here as a nomen dubium.


*B. elongata* Kummerow, 1924 [not (Münster), 1830; not Lienenklaus, 1900], *Preuss. Geol. Landesanstalt*, Jahrb. 44, p. 435, pl. 21, fig. 16. Silurian, Germany. Rounded posterior excludes this species from *Bairdia*. This is a junior homonym that requires a new name.

*B. griffithiana* Jones and Holl, 1868, *Annals Mag. Nat. History*, ser. 4, v. 2, p. 58, pl. 7, figs. 10a, b. Ordovician, Ireland. Probably a cast of an indeterminate genus. The illustration (fig. 10a) suggests a ventrolateral ridge or rim (?), on the lateral outline which excludes this species from *Bairdia*.


*B. murchisoniana* Jones and Holl, 1868, *Annals Mag. Nat. History*, ser. 4, v. 2, p. 58, pl. 7, figs. 9a, b. Ordovician, Ireland. Probably a cast of an indeterminate genus. The illustration (fig. 9a) suggests ventrolateral ridge or rim. The rounded posterior removes this species from *Bairdia*.

*B. phillipsiana* Jones and Holl, 1869, *Annals Mag. Nat. History*, ser. 4, v. 3, p. 213, pl. 14, figs. 7a–c. Silurian, England and Germany. Jones and Kirkby (1886, p. 250) refer this species to *Bythocypris* Brady, the illustrations suggest that this species belongs to the same undescribed genus as the species with curved hinge lines referred to *Bairdiocypris* Kegel.


*B. protracta* Elchwald, 1890, *Leth. Ross.*, p. 1338, pl. 52, fig. 19. Silurian, Russia. The illustration shows the right valve overlapping the left along the dorsum and the left overlapping the right along the venter; this suggests that this species probably belongs to *Rishona* n. gen.

*B. selleriana* Jones and Holl, 1868, *Annals Mag. Nat. History*, ser. 4, v. 2, p. 58, pl. 7, figs. 11a, b. Ordovician, Ireland and Wales. Lateral outline excludes this species from *Bairdia*.


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1 Letter from Dr. L. H. Kleinholtz, Naples, Italy, June 17, 1952, to Dr. Waldo L. Schmitt, U.S. Natl. Mus.
REVISION OF SOME PALEOZOIC OSTRACODE GENERA.

FIGURE 3. — *Nesidea* Costa, 1849, reproduction of Costa (1849, pl. 4) original plate, figs. 8-10 removed. Miss Iris Tomasulo, librarian, U.S. Geological Survey, assisted in translating the explanation.

1. *Nesidea* of natural size, simple outline.
2. The same, very much enlarged, as seen through the microscope, with the parts that naturally remain outside the carapace. a, the antenna; b, the three right anterior legs; c, three right posterior legs.
3. One of the posterior legs enlarged. B, femur to which attach the succeeding segments; C, hip with its internal muscle fibers.

Fig. 18b is a lateral view of an *Aparichites*-like ostracode; fig. 18a, stated to be a dorsal view, is unrecognizable.

4. Antenna, external view, same enlargement. 5, its basal articulation; 6 and 7, bundles of hairs.

5. Mouth apparatus. a, sucking part; b, median antennae or pediform palps; c, first pair of masticatory appendages.

6. Ventral view seen under the microscope. a, opening of the genetive organs; c, horny plate rising along the median line; b, single-spined pediform appendages; d, minor other two spined appendages.

7. 6, external masticatory feet; c, with the branchial plates; a, extention of said plates.

Figure 4 shows the stratigraphic range of *Bairdia* and its allies.
### Figure 4.

Stratigraphic range of *Bairdia* and the additional genera that are revised in this paper.
This chart indicates that *Bairdia* s. s. is restricted to Paleozoic rocks of Middle Devonian and younger age. As here defined, the presence of this genus in rocks younger than Paleozoic is questioned.

The time interval for each system is constructed in proportion to the estimated approximate length in millions of years as given in the following table.

*Major divisions of geologic time (after U.S. Geological Survey)*

<table>
<thead>
<tr>
<th>Era</th>
<th>System or Period</th>
<th>Series or Epoch</th>
<th>Estimated ages of time boundaries in millions of years</th>
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<td>Pliocene</td>
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</tr>
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<tr>
<td></td>
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<td>Upper (Late)</td>
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<tr>
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<td>Lower (Early)</td>
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</tr>
<tr>
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<td>Provincial series</td>
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<td>Lower (Early)</td>
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<td>Lower (Early)</td>
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<td>Lower (Early)</td>
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<tr>
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<td></td>
<td>Upper (Late)</td>
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<td>Middle (Middle)</td>
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<td></td>
<td>Lower (Early)</td>
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<tr>
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<td>Upper (Late)</td>
<td>315</td>
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<td>Lower (Early)</td>
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</tr>
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<td>Upper (Late)</td>
<td>350</td>
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<td>Lower (Early)</td>
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</tr>
<tr>
<td>Precambrian</td>
<td>Informal</td>
<td>Subdivisions such as upper, middle, and lower, or upper and lower, or younger and older may be used locally.</td>
<td>3,000</td>
</tr>
</tbody>
</table>

1 Age values given are the Holmes "B" time scale points (Holmes, A., 1947. The construction of a geological time scale. Geol. Soc. Glasgow, Trans. v. 21, pt. 1, p. 145). Dates are rounded to the nearest 5 million years. The errors are unknown, but more recent age determinations by various physical methods are in general agreement with these values.

2 Provincial series recognized in west Texas and southeastern New Mexico. Formal series subdivisions of the Permian are not recognized elsewhere.

3 Morrow, Atoka, Des Moines, Missouri, and Virgil provincial series recognized in the Midwestern region.

4 Kinderhook, Osage, Meramec, and Chester provincial series recognized in the upper Mississippi Valley region.
PALEozoic SPECIES OF BAIRDIA AND RELATED GENERA

This table is significant in the evaluation of the use of ostracodes in the determination of geologic age and in correlation of the upper Paleozoic. For example, the Mississippian system can be estimated to represent 30 million years. This system is divisible into four provincial series. The U.S. Geological Survey now places the Kinderhook and Osage series in the Lower Mississippian and places the Meramec and Chester series in the Upper Mississippian. Let us assume as a starting point that the Upper Mississippian lasted twice as long in time as the Lower Mississippian; this factor would give a magnitude of about 20 million years for the Upper Mississippian. Let us further assume that the Chester series was about twice as long in time as the Meramec series; this would give a duration of about 15 million years for the entire Chester provincial series. The Chester series is composed of 16 formations (Cooper, 1941, p. 7). Although it is recognized that some of these formations may have taken a longer time to be deposited than others, for convenience the same length of time is assigned to each. The time length of each formation would equal approximately a million years.

Teichert (1956, p. 968) estimated the period of time required for the complete replacement by evolution of a marine molluscan fauna in a given area to be from 12 to 20 million years. This approximation is roughly in agreement with what is known of the time span of several living species of ostracodes. Swain (1955) identified 9 species of living ostracodes, 8 of which were previously recorded from the upper Miocene and 1 from the middle Miocene. Although it is pointed out that it is hazardous to assign living species to fossil forms, the fact that the shells of the living individuals cannot be differentiated from shells of individuals that lived 12-20 million years ago is important. This is particularly significant because Swain dealt with shells that have more surface sculpture than Bairdia and related genera.

The above estimates suggest that any faunal differences in ostracodes between formations in the Chester series or in the Pennsylvanian system are probably due to ecologic rather than evolutionary factors. Age determination and correlation of adjacent stratigraphic intervals that were of less than 12-20 million years in duration are not feasible. The stratigraphic distribution of species shown in figures 5-13 should be interpreted in the light of this discussion.

It is of interest to compare the number of species in each of the genera treated that are restricted to the stratigraphic divisions, with the number that cross stratigraphic divisions. The following table shows these data.

<table>
<thead>
<tr>
<th>Number of species restricted to stratigraphic divisions and number crossing stratigraphic boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratigraphic divisions</td>
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<tr>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Permian</td>
</tr>
<tr>
<td>Permian-Pennsylvanian</td>
</tr>
<tr>
<td>Middle Pennsylvanian</td>
</tr>
<tr>
<td>Lower Pennsylvanian</td>
</tr>
<tr>
<td>Upper Pennsylvanian</td>
</tr>
<tr>
<td>Upper Pennsylvanian-Mississippian</td>
</tr>
<tr>
<td>Upper Mississippian</td>
</tr>
<tr>
<td>Lower Mississippian</td>
</tr>
<tr>
<td>Mississippian and Carboniferous (undifferentiated)</td>
</tr>
<tr>
<td>Middle Devonian</td>
</tr>
<tr>
<td>Middle Devonian</td>
</tr>
<tr>
<td>Middle and Upper Devonian</td>
</tr>
</tbody>
</table>

A total of 169 species is restricted to the stratigraphic divisions, and 56 species cross stratigraphic divisions. The fact that approximately 75 percent of all the species are restricted to the above stratigraphic divisions suggests that they are available for age determination and stratigraphic correlation for intervals of the above time-stratigraphic units. This conclusion is, of course, provisional because of the unknown factor of inadequate sampling. Additional collecting, particularly in rocks that have not been thoroughly studied, may show that some of the species here recorded as restricted actually cross stratigraphic boundaries.

SUMMARY OF BAIRDIA

The genus Bairdia is restricted in this paper to Paleozoic species that are smooth and that have curved dorsal margins, pointed posteriors, acuminate anteriors, and distinct dorsoanterior margins. A total of 70 species are recognized. Two of these are new, and an additional 21 of these are probably new species, but are here designated by letters rather than trivial names. All the species are discriminated by means of a dichotomous bracket key. The stratigraphic range and frequency of occurrence of these species are shown in figure 5.

Although the stratigraphic range of Bairdia is shown in figure 4, the range chart indicates neither the number nor the frequency of occurrence of each species. Figure 5, on the other hand, is designed to show the numerical distribution of the species in stratigraphic units, as well as the number of localities in each unit.

The data in this study can be used to construct similar charts showing the distribution and frequency of occurrence of species within each of the major
Carbontiferous formations of North America.

Devonian formations of North America.

Permian formations of North America.

Mississippian and Pennsylvanian outside North America.

Pennsylvanian formations of North America.

Explanations:
- Tall black bar: Number of species recorded in system or part of system, the types of which are from the Mississippian and Pennsylvanian outside North America.
- Tall gray bar: Number of species recorded in system or part of system, the types of which are from the Upper Mississippian.
- Tall black bar with gray top: Number of species recorded in system or part of system, the types of which are from the Upper Pennsylvanian.
- Tall gray bar with gray top: Number of species recorded in system or part of system, the types of which are from the Upper Carboniferous.
- Tall gray bar with black top: Number of species recorded in system or part of system, the types of which are from the Upper Carboniferous.
systems or parts of systems. The stratigraphic range and frequency of occurrence of *Bairdia* in the Upper Pennsylvanian are shown in figure 6.

For the purpose of this chart, the standard section of the midcontinent was taken from Cooper (1946, p. 16). Stratigraphic data for six species could not be determined closer than the series; these species are shown as “Virgil (undifferentiated)” and “Missouri (undifferentiated).” The holotype of *Bairdia pompeiioides* Harlton, 1928, is described from the Holzbar formation, and is indicated on the chart as “Upper Pennsylvanian (undifferentiated).” Specimens of this species have been identified in the following units: Burlingame limestone member of the Bern limestone (Virgil series), and Weston, Stanton, Iola, Winterset formations (Missouri series), as well as Missouri (undifferentiated).

**KEY TO BAIRDIA S. S.**

In the following keys, names in parentheses are synonyms.

| 1. Dorsoposterior margin of larger valve equals one-third or more of greatest length | 2 |
| 1a. Dorsoposterior margin of larger valve equals one-quarter of greatest length | 43 |
| 2 (1). Dorsoposterior margin of larger valve equals approximately one-third of greatest length | 3 |
| 2a. Dorsoposterior margin of larger valve equals between one-third and one-half of the greatest length | 33 |
| 3 (2). Anterior pointed | 4 |
| 3a. Anterior round | 17 |
| 4 (3). Ventral margin straight | 5 |
| 4a. Ventral margin curved | 11 |
| 5 (4). Anterior point approximately at midheight | 6 |
| 5a. Anterior point above midheight | 8 |
| 6 (5). Dorsoanterior margin concave | 7 |
| 6a. Dorsoanterior margin straight or slightly convex | summa (p. 32) |
| 7 (6). Posterior sharply pointed | curta (p. 25) |
| 7a. Posterior blunt | sp. A (p. 33) |
| 8 (5a). Greatest length less than twice the greatest height | radlerae (p. 31) |
| 8a. Greatest length twice or more the greatest height | 9 |
| 9 (8a). Greatest length approximately twice greatest height | 95 |
| 9a. Greatest length more than twice the greatest height | 10 |
| 10a. Posterior sharply pointed | caudata (p. 24) |
| 10a. Posterior blunt | sp. B (p. 33) |
| 11 (4a). Ventral margin concave | 12 |
| 11a. Ventral margin convex | 16 |
| 12 (11). Ventroposterior margin convex | 78 |
| 12a. Ventroposterior margin straight | 13 |
| 13 (12a). Dorsum incised | sohni (p. 32) |
| 13a. Dorsum not incised | 14 |
| 14 (13a). Greatest width about half of the greatest height | sp. C (p. 33) |
| 14a. Greatest width more than half the greatest height | 15 |
| 15 (14a). Posterior blunt | seideradenis (p. 32) |
| 15. Posterior pointed | quastasymmetrica (p. 31) |
| 16 (11a). Greatest length less than twice the greatest height | 92 |
| 16a. Greatest length more than twice the greatest height | gibbera (p. 26) |
| 17 (3a). Ventral margin straight | 18 |
| 17a. Ventral margin curved | 24 |
| 18 (17). Anterior break in curvature above midheight | 19 |
| 18a. Anterior break in curvature approximately at midheight, ventroposterior margin curved | kansasensis (p. 28) |
| 19 (18). Dorsoanterior margin curved | 20 |
| 19a. Dorsoanterior margin straight | 22 |
| 20 (19). Greatest width in the posterior quarter of the greatest length | sp. D (p. 33) |
| 20a. Greatest width median | 21 |
| 21 (20a). Posterior pointed, dorsal overlap of uneven width | sp. I (p. 34) |
| 21a. Posterior blunt, dorsal overlap of constant width | acuminata (p. 22) |
| 22 (19a). Postdorsal area of right valve inflated | crassa (p. 24), (tumida?) |
| 22a. Postdorsal area of right valve not inflated | 23 |
| 23 (22a). Ventroanterior margin gently convex, truncated, anterior pointed | sp. E (p. 33) |
| 23a. Ventroanterior margin convex, not truncated, anterior rounded | 77 |
| 24 (17a). Ventral margin concave | 25 |
| 24a. Ventral margin convex | 29 |
| 25 (24). Junction of anterior and dorsoanterior margins above midheight | 26 |
| 25a. Junction of anterior and dorsoanterior margins at approximate midheight | 28 |
| 26 (25). Dorsoanterior margin concave | 27 |
| 26a. Dorsoanterior margin straight | 84 |
| 27 (26). Anterior half higher than posterior half | eiflensis (p. 25) |
| 27a. Both halves the same height | subfusiformis (p. 32) |
| 28 (25a). Posterior long; greatest width in dorsal outline at approximate midlength, greatest length less than 2 mm | peracuta (p. 30) |
| 28a. Posterior short; greatest width in dorsal outline posterior to midlength, greatest length to 3 mm | asymmetrica (p. 22) |
| 29 (24a). Greatest length more than twice greatest height | sp. F (p. 33) |
| 29a. Greatest length twice or less the greatest height | 30 |
| 30 (29a). Greatest width in dorsal outline in anterior quarter of greatest length | submucronata (p. 32) |
| 30a. Greatest width in dorsal outline at midlength | 31 |
| 31 (30a). Dorsoanterior margin concave | 32 |
| 31a. Dorsoanterior margin straight or convex | harltoni (p. 27) |
| 32 (31). Junction of anterior and dorsoanterior margins at approximate midheight | 73 |
| 32a. Junction of anterior and dorsoanterior margins above midheight | 38 |
| 33 (2a). Anterior margin pointed | 34 |
| 33a. Anterior margin round | 35 |
| 34 (33). Posterior point below midheight | 93 |
| 34a. Posterior point above midheight | leguminoides (p. 29), (amplectens, summacuminata) |
| 35 (33a). Ventral margin straight | grahamensis (p. 26), (deloi?, menardensis, menardislensis?, marginata?) |
### REVISION OF SOME PALEOZOIC OSTRACODE GENERA

**Table 1:**

<table>
<thead>
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<th>Series</th>
<th>Formation (After Cooper, 1946)</th>
<th>Key figure</th>
<th>Number of species and localities</th>
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<tr>
<td>UPPER PENNSYLVANIAN (Undifferentiated)</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 6:** The stratigraphic range and frequency distribution of species in *Bairdia* in the Upper Pennsylvanian.

**Explanatory Notes:**

- Number of species recorded in indicated formation; each square indicates one species; key figure indicates the formation from which the type species came; MP indicates the type species came from the Middle Pennsylvanian, and P indicates the type species came from the Permian; a blank box indicates that the species are restricted to the indicated formation.

- Number of localities from which species are recorded.
<table>
<thead>
<tr>
<th>Rule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35a</td>
<td>Ventral margin curved</td>
</tr>
<tr>
<td>36 (35a)</td>
<td>Ventral margin concave</td>
</tr>
<tr>
<td>36a</td>
<td>Ventral margin convex</td>
</tr>
<tr>
<td>37 (36)</td>
<td>Posterior point in ventral quarter of greatest height</td>
</tr>
<tr>
<td>37a</td>
<td>Posterior point at approximate midheight</td>
</tr>
<tr>
<td>38 (32a)</td>
<td>Posterior point in ventral third of greatest height</td>
</tr>
<tr>
<td>39 (37a)</td>
<td>Dorsoposterior margin straight</td>
</tr>
<tr>
<td>39a</td>
<td>Dorsoposterior margin concave <em>subcylindrica</em></td>
</tr>
<tr>
<td>40 (36a)</td>
<td>Dorsoposterior margin concave or convex</td>
</tr>
<tr>
<td>40a</td>
<td>Dorsoposterior margin straight or convex</td>
</tr>
<tr>
<td>40b</td>
<td>Ventroanterior margin straight</td>
</tr>
<tr>
<td>41a</td>
<td>Ventroanterior margin convex</td>
</tr>
<tr>
<td>41a</td>
<td>Posterior pointed</td>
</tr>
<tr>
<td>42a</td>
<td>Posterior blunt</td>
</tr>
<tr>
<td>43 (1a)</td>
<td>Anterior with dorsal hook</td>
</tr>
<tr>
<td>43a</td>
<td>Ventral without dorsal hook</td>
</tr>
<tr>
<td>44 (43a)</td>
<td>Ventral margin straight</td>
</tr>
<tr>
<td>44a</td>
<td>Ventral margin curved</td>
</tr>
<tr>
<td>45 (44)</td>
<td>Dorsoposterior margin concave</td>
</tr>
<tr>
<td>45a</td>
<td>Dorsoposterior margin straight or convex</td>
</tr>
<tr>
<td>46 (45)</td>
<td>Greatest height more than half the greatest length</td>
</tr>
<tr>
<td>46a</td>
<td>Greatest height less than half the greatest length</td>
</tr>
<tr>
<td>47 (46)</td>
<td>Junction of anterior and doroanterior margins above midheight</td>
</tr>
<tr>
<td>47a</td>
<td>Junction of anterior and doroanterior margins at or below midheight</td>
</tr>
<tr>
<td>48 (47)</td>
<td>Shoulder on and parallel to dorsal margin of left valve</td>
</tr>
<tr>
<td>48a</td>
<td>No shoulder on dorsal margin of left valve</td>
</tr>
<tr>
<td>49 (48a)</td>
<td>Greatest width approximately equal to greatest height</td>
</tr>
<tr>
<td>49a</td>
<td>Greatest width about two-thirds the greatest height</td>
</tr>
<tr>
<td>50 (46a)</td>
<td>Doroanterior margin occupies anterior quarter of greatest length</td>
</tr>
<tr>
<td>50a</td>
<td>Doroanterior margin occupies anterior third or more of greatest length</td>
</tr>
<tr>
<td>51 (50a)</td>
<td>Ventral lip present</td>
</tr>
<tr>
<td>51a</td>
<td>Ventral lip absent</td>
</tr>
<tr>
<td>52 (51)</td>
<td>Ventroanterior margin straight</td>
</tr>
<tr>
<td>52a</td>
<td>Ventroanterior margin convex</td>
</tr>
<tr>
<td>53 (52a)</td>
<td>Angle between doroanterior and dorsal margins about 40°</td>
</tr>
<tr>
<td>53a</td>
<td>Angle between doroanterior and dorsal margins about 50°</td>
</tr>
<tr>
<td>54 (51a)</td>
<td>Commisure of dorsal overlap angular in lateral view</td>
</tr>
<tr>
<td>54a</td>
<td>Commisure of dorsal overlap straight in lateral view</td>
</tr>
<tr>
<td>55 (54a)</td>
<td>Commisure sinuous at midlength in dorsal view</td>
</tr>
<tr>
<td>55a</td>
<td>Commisure sinuous at midlength in dorsal view</td>
</tr>
<tr>
<td>56 (45a)</td>
<td>Greatest height more than half the greatest length</td>
</tr>
<tr>
<td>56a</td>
<td>Greatest height less than half the greatest length</td>
</tr>
<tr>
<td>57 (44a)</td>
<td>Ventral margin convex</td>
</tr>
<tr>
<td>57a</td>
<td>Ventral margin concave</td>
</tr>
<tr>
<td>58 (57)</td>
<td>Doroanterior margin curved</td>
</tr>
<tr>
<td>58a</td>
<td>Doroanterior margin straight</td>
</tr>
<tr>
<td>59 (58)</td>
<td>Dorsoposterior margin convex <em>usatchowae</em></td>
</tr>
<tr>
<td>59a</td>
<td>Dorsoposterior margin concave</td>
</tr>
<tr>
<td>60 (59a)</td>
<td>Greatest height half or more greatest length</td>
</tr>
<tr>
<td>60a</td>
<td>Greatest height less than half the greatest length</td>
</tr>
<tr>
<td>61 (60)</td>
<td>Doroanterior margin convex <em>kypsoconcha</em></td>
</tr>
<tr>
<td>61a</td>
<td>Doroanterior margin concave</td>
</tr>
<tr>
<td>62 (61a)</td>
<td>Dorsal margin evenly convex</td>
</tr>
<tr>
<td>62a</td>
<td>Dorsal margin angular</td>
</tr>
<tr>
<td>63 (62)</td>
<td>Outline of right valve in dorsal view evenly convex</td>
</tr>
<tr>
<td>63a</td>
<td>Outline of right valve in dorsal view fusiform, bulge in center</td>
</tr>
<tr>
<td>64 (60a)</td>
<td>Ventral lip present</td>
</tr>
<tr>
<td>64a</td>
<td>Ventral lip absent</td>
</tr>
<tr>
<td>65 (64)</td>
<td>Ventral lip anterior to midlength</td>
</tr>
<tr>
<td>65a</td>
<td>Ventral lip posterior to midlength</td>
</tr>
<tr>
<td>66 (58a)</td>
<td>Junction of anterior and doroanterior margins in central third of greatest height</td>
</tr>
<tr>
<td>66a</td>
<td>Junction of anterior and doroanterior margins in upper third of greatest height</td>
</tr>
<tr>
<td>67 (66)</td>
<td>Posterior point at midheight</td>
</tr>
<tr>
<td>67a</td>
<td>Posterior point below midheight</td>
</tr>
<tr>
<td>68 (67a)</td>
<td>Posterior point in ventral third of greatest height</td>
</tr>
<tr>
<td>68a</td>
<td>Posterior point in ventral quarter of greatest height</td>
</tr>
<tr>
<td>69 (57a)</td>
<td>Dorsoposterior margin convex</td>
</tr>
<tr>
<td>69a</td>
<td>Dorsoposterior margin concave</td>
</tr>
<tr>
<td>70 (69)</td>
<td>Greatest height half or more the greatest length</td>
</tr>
<tr>
<td>70a</td>
<td>Greatest height less than half the greatest length</td>
</tr>
<tr>
<td>71 (70)</td>
<td>Doroanterior margin convex</td>
</tr>
<tr>
<td>71a</td>
<td>Doroanterior margin concave</td>
</tr>
<tr>
<td>72 (69a)</td>
<td>Doroanterior margin straight</td>
</tr>
<tr>
<td>72a</td>
<td>Doroanterior margin curved</td>
</tr>
<tr>
<td>73 (32)</td>
<td>Ends in dorsal outline concave</td>
</tr>
<tr>
<td>73a</td>
<td>Ends in dorsal outline convex</td>
</tr>
<tr>
<td>74 (42)</td>
<td>Commisure angular at junction of dorsal and doroanterior margins</td>
</tr>
<tr>
<td>74a</td>
<td>Commisure smooth at junction of dorsal and doroanterior margins</td>
</tr>
<tr>
<td>75 (49)</td>
<td>Doroanterior margin convex</td>
</tr>
<tr>
<td>75a</td>
<td>Doroanterior margin straight</td>
</tr>
<tr>
<td>75b</td>
<td>Doroanterior margin concave</td>
</tr>
<tr>
<td>76 (70a)</td>
<td>Ends symmetrical in dorsal outline</td>
</tr>
<tr>
<td>76a</td>
<td>Ends not symmetrical in dorsal outline</td>
</tr>
<tr>
<td>77 (23a)</td>
<td>Thin ridge on lateral surface near and parallel to ventral margin</td>
</tr>
<tr>
<td>77a</td>
<td>No thin ridge on lateral surface</td>
</tr>
<tr>
<td>78 (12)</td>
<td>Posterior below midheight</td>
</tr>
<tr>
<td>78a</td>
<td>Posterior above midheight</td>
</tr>
<tr>
<td>79 (76)</td>
<td>End view narrows towards venter, greatest width at midheight</td>
</tr>
<tr>
<td>79a</td>
<td>End view narrows towards dorsum, greatest width below midheight</td>
</tr>
<tr>
<td>80 (56a)</td>
<td>Posterior point below midheight</td>
</tr>
<tr>
<td>80a</td>
<td>Posterior point above midheight</td>
</tr>
<tr>
<td>81 (72a)</td>
<td>Doroanterior margin convex</td>
</tr>
<tr>
<td>81a</td>
<td>Doroanterior margin concave</td>
</tr>
</tbody>
</table>

_Paleozoic Species of Bairdia and Related Genera_
82 (81). Posterior point below midheight
82a. Posterior point at above midheight
83 (82a). Posterior point approximately at midheight
83a. Posterior point above midheight
84 (26a). Greatest height more than half the greatest length
85 (75a). Posterodorsal slope steep, makes an angle of about 55°
84a. Greatest height less than half the greatest length
85a. Posterodorsal slope gentle, makes an angle of about 35°
86 (53a). Dorsoanterior margin straight.
88 (86a). Greatest height at approximate midlength
87 (80). Anterior point above midheight
88a. Dorsoanterior margin concave.
87a. Greatest height at approximate midlength
88a. Dorsoanterior margin straight or slightly concave.
87a. Greatest height posterior to midlength
90 (43). Posterior point in central third of greatest height
90a. Posterior point below midheight
91 (80). Anterior point above midheight
91a. Anterior point below midheight
92 (16). Posterior point above midheight
92a. Posterior point below midheight
93 (34). Dorsoanterior margin arcuate, ventral margin deeply concave
93a. Dorsoanterior margin gently concave, ventral margin very gently concave
94 (89a). Dorsal margin slightly curved
94a. Dorsal margin evenly convex
95 (9). Dorsal margin evenly convex
95a. Dorsal margin pointed
96 (71). Posterior pointed
96a. Posterior blunt
97 (71a). Greatest concavity in posterior half of dorsoposterior margin
97a. Greatest concavity in anterior half of dorsoposterior margin
98 (97). Dorsal outline pointed on both ends
98a. Dorsal outline blunt on posterior end
99 (78). Posterior point in lowest third of greatest height
99a. Posterior point in middle third of greatest height

ASSIGNED SPECIES

*Bairdia aculeata* Cooper, 1957


*Bairdia aculeata* Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 24, pl. 11, figs. 48, 49. Kinkaid formation, NE\frac{1}{4} SW\frac{1}{4} NE\frac{1}{4} sec. 20, T. 12 S., R. 3 E., one-half a mile south of Vetch School, Johnson County, Ill.

**Geologic range.**—Upper Mississippian.

*Bairdia acuminata* Cooper, 1946

*Bairdia acuminata* Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 40, pl. 1, figs. 27, 28. Shale in Little Vermillion limestone, SE\frac{1}{4} sec. 36, T. 33 N., R. 1 E., La Salle County, Ill.

Cordell, 1952, Jour. Paleontology, v. 26, p. 82, pl. 17, figs. 15–16. Tops of Bonner Springs shale, Hickory Creek shale, Vilas shale, and Eudora shale, west side of State Highway 169, near top of first hill south of Little Platte River bridge, on boundary between secs. 22 and 23, about 0.2 the distance from south to north along section line, T. 53 N., R. 33 W., southwest edge of Smithville, Clay County; 3½ ft below top of Farley limestone to 6 ft above base of Vilas shale, quarry a few hundred feet east of State Highway 52, SW\frac{1}{4} SE\frac{1}{4} sec. 28, T. 52 N., R. 55 W., at west end of Farley, Platte County, Mo.

*Bairdia acuminata* Kellett, Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 52, pl. 4, figs. 7, 8. Shale above and below thin limestone, Newton cyclethom, SW\frac{1}{4} sec. 33, T. 12 N., R. 3 E., Shelby County, Ill.

**Geologic range.**—Upper Pennsylvanian.

*Bairdia angustata* Cooper, 1957


*Bairdia angustata* Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 41, pl. 1, figs. 41–44. Shale between Seville limestone beds, SW\frac{1}{4} sec. 32, T. 14 N., R. 2 W., Mercer County, Ill.

**Geologic range.**—Middle Pennsylvanian.

*Bairdia aperta* Polenova, 1952

*Bairdia aperta* Polenova, 1952, Microfauna SSSR, pt. 5, p. 139. Cretaceous; senior secondary homonym. (See p. 9, item 6.)

**Geologic range.**—Middle Devonian.

*Bairdia asymmetrica* Kummerow, 1939


**Geologic range.**—Carboniferous (Upper Mississippian).
**Bairdia beedei** Ulrich and Bassler, 1906

*Plate 1, figures 4, 5, 7, 8, 11-14*


Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 16, pl. 1, figs. 4a–c. Middle Funston limestone, upper contact, roadcut in U.S. Highway 30, 4 miles east of Home City, Marshall County, Kans.

Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 41, pl. 1, figs. 35–40. Shale in Breereton limestone, SW¼ sec. 9, T. 5 S., R. 6 W., Randolph County; weathered lower part of Millersville limestone, NE¼ sec. 28, T. 12 N., R. 1 W., Christian County, Ill.

Cordell, 1952, Jour. Paleontology, v. 26, p. 83, pl. 18, figs. 18–20. Six feet below top of Wea shale to 1 ft 6 in. in upper base of Westerville limestone, west side roadcut, about 200 ft southeast of Polocent Creek bridge, 3.3 miles south of Bethany near northeast cor. sec. 3, T. 62 N., R. 28 W., Harrison County, Mo.


**Bairdia auricula** Knight. Bradfield, 1935, Am. Paleontology Bull., v. 22, no. 73, p. 89, pl. 6, figs. 13a, b. Union Dairy limestone, roadcut at south edge of Ardmore, Carter County, Okla.

**Bairdia ciscoensis** Harlton, 1929, Jour. Paleontology, v. 1, p. 210, pl. 33, fig. 8. Shale below Sedwick limestone, 2½ miles northeast of Coleman, Coleman County, Tex.


**Bairdia nuneziana** Harlton, 1929 [part]. Am. Paleontology Bull., v. 22, no. 73, p. 91, pl. 7, figs. 3a, b [not 1, 2, 4–6; see Bairdia sp. E]. Union Dairy limestone, railroad cut, south edge of Ardmore, Carter County, Okla. Based on an abraded specimen.


Cordell, 1952, Jour. Paleontology, v. 26, p. 91, pl. 17, figs. 5, 6, 7(?), 8(?). Pleasanton shale, S½SW¼ sec. 6, T. 52 N., R. 29 W., 0.2–0.6 miles east of Excelsior Springs, Ray County, Mo.

**Bairdia verefordensis** Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 22, pl. 2, figs. 5a, b. Upper shale seam of the Fourmile limestone, roadcut 3½ miles southeast of Randolph, Riley County, Kans.


[not] **Bairdia beedei** Ulrich and Bassler. Kellett, 1934 = *B. hurvitzii* Coryell and Booth, 1933.

[not] **Bairdia beedei** Ulrich and Bassler. Johnson, 1936 = *B. hassii* n. sp.

[not] **Bairdia beedei** Ulrich and Bassler. Payne, 1937 = *B. hurvitzii* Coryell and Booth, 1933.

[not] **Bairdia beedei** var. infata Payne, 1937 = *B. hurvitzii* Coryell and Booth, 1933.


[not] **Bairdia moorei** (Jones). Issler, 1908, Palaeontographica, v. 55, p. 95, pl. 7, fig. 343. Jurassic.

**Geological range.**—Lower Pennsylvanian-Permain.

**Bairdia bradfieldi** Payne, 1937

**Bairdia bradfieldi** Payne, 1937, Jour. Paleontology, v. 11, p. 283, pl. 39, figs. 3a, b. Hayden Branch formation, Sullivan County, Ind.

The holotype of *B. Bradfieldii*, Indiana University 3214, is a specimen from which a great deal of the shell material has been dissolved; it is very close to *B. dissimilis*.

**Geologic range.**—Middle Pennsylvanian.

**Bairdia brevis** Jones and Kirkby, 1879


*Bairdia brevis var. jonesi* Posner, 1951, Vsesoyuz. Neft. Nauch.-Issled. Geol.-Razv. Inst., Trudy, (VNIGRI), new ser., no. 56, p. 90, pl. 21, figs. 5a, b, c; pl. 20, figs. 4, 5. Lower Carboniferous, Russia.

Bassler and Kellett (1934, p. 187) credit this species to Jones and Kirkby, 1867, who listed it (1867, pages 221 and 225), but indicated in the footnote (Jones and Kirkby, 1867, p. 228) that it is a nomen nudum.

**Geologic range.**—Carboniferous.

*Bairdia caudata* Kirkby, 1859

*Bairdia mucronata* Reuss, Kirkby, 1858 [part], Annals Mag. Nat. History, ser. 3, v. 2, p. 327, pl. 10, figs. 8a, b, 10 [not fig. 11 = *Cryptobairdia amygdalina* (Kirby), 1850]. Permian, Shell limestone, Tustin Hill, Durham, England.

*Bairdia plebia var. caudata* Kirkby, 1859, Tyneside Naturalists' Field Club, Trans., v. 4, p. 143, woodcut 3 [not 2, 4 = *B. leptura* (Richter), 1887], pl. 9, figs. 9, 10 [not figs. 12, 12a = sp. indet.] Permian, Shell limestone, Tustin Hill, Durham, England.

*Cythere* (Bairdia) *plebia var. caudata* Kirkby, 1859, in Kirkby, 1859, idem, p. 106, pl. 11, figs. 17, 18a-c. Shell limestone, Permian, Tustin Hill, Durham, England.

[not] *Cythere caudata* (Kirkby). Richter, 1867 = *Bairdia* sp. G.

**Geologic range.**—Permian.

*Bairdia citriformis* Knight, 1928

*Oyria bitata* Knight, 1928, Jour. Paleontology, v. 2, p. 321, pl. 43, figs. 4a-d. Pawnee limestone, Clayton, St. Louis County, Mo.


**Geologic range.**—Middle Pennsylvanian.

*Bairdia crassa* Harlton, 1929

*Cryptobairdia coryelli* Harlton, 1929, Nebraska Geol. Survey Bull. 8, p. 21, pl. 2, figs. 1a, b. Shale in Fourmile limestone, roadcut 3 1/2 miles southeast of Randolph, Riley County, Kans.


**Geologic range.**—Middle Pennsylvanian–Permian (?).
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

Bairdia curta McCoy, 1844

Bairdia curta McCoy, 1842 [nomem nudum], in Griffith, Notice respecting the fossils of the Mountain Limestone of Ireland, p. 22.

Bairdia curta McCoy, 1844. A synopsis of the characters of the Carboniferous limestone fossils of Ireland, p. 154, pl. 23, fig. 6. Mountain Limestone, Granard, County Longford, Ireland.


Mc Coy (1842, p. 22) listed this species from two localities; this supports my previous supposition (Sohn, 1954, p. 4) that more than one specimen is involved. Jones (1870, p. 185) possibly received a specimen that was not the one illustrated by McCoy; it is this specimen that was assumed by subsequent workers to be the holotype. McCoy’s description and illustration is inadequate, and Jones’ illustration may or may not be of a conspecific specimen. The net result is that Bairdia curta is an inadequately defined species.

Geologic range.—Carboniferous.

Bairdia carvirostris Posner, 1951


Geologic range.—Lower Carboniferous.

Bairdia egorovi Sohn, n. name


This species is named in honor of the late V. G. Egorov, who has added to the knowledge of Russian ostracodes.

Geologic range.—Upper Devonian.

Bairdia eisensiis Kummerow, 1953


Geologic range.—Middle Devonian.

Bairdia garrisonensis Upson, 1933

Bairdia garrisonensis Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 20, pl. 1, figs. 10a–c. Basal 2 ft of Florena shale, SW¼ sec. 34, T. 1 N., R. 14 E., roadcut along Kansas-Nebraska State line.


Cordell, 1932, Jour. Paleontology, v. 26, p. 85, pl. 18, fig. 32. Shale parting 3 ft above base of Winterset limestone, roadcut State Highway 6, W½ SW¼ sec. 17, T. 59 N., R. 27 W., northeast edge of Gallatin, Daviess County, Mo.

Bairdia eisensiis Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 20, pl. 1, fig. 9a–c. Shale at base of the middle zone of the Eiss limestone, roadcut along Kansas-Nebraska State line. Cooper, 1934, Jour. Paleontology, v. 8, p. 134, pl. 14, figs. 7a, b. Wreford formation, low outcrop, north-trending road, north of District No. 17 School, Chase County, Kans.

Bairdia garrisonensis Kummerow, 1953


Geologic range.—Upper Devonian.


The holotype of B. garrisonensis is slightly corroded and that of B. eisensiis is a steinkern showing muscle scar impressions on both valves.

Geologic range.—Middle Pennsylvanian–Permian.
Bairdia girtyi, n. name
Plate 1, figures 32–36


Bairdia mceoyi Croneis and Gutke. Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 14 [list], pl. 2, figs. 17, 18. Glen Dean formation, just below upper ledge of Okaw limestone, SW 1/4 NW 1/4 sec. 30, T. 7 S., R. 6 W., Randolph County, Ill.

Bairdia attenuata Brady, 1880, Challenger, Rept. Sci. Results Voyage H.M.S., Zoöl., v. 1, pt. 3, p. 59, pl. 11, figs. 3a–e. Recent, Torres Straits, lat 11°33' S., long 144°3' E., 155 fathoms; reefs at Honolulu, 40 fathoms. Senior primary homonym.


Bairdia attenuata Girty. Cooper, 1941 = Bairdia sp. L.

There are three specimens labeled “types” of this species in Girty’s collection. One is a very young individual that may not belong to this species; the other two specimens illustrated here are both abraded, and the ends are broken. This is one of the transitional species discussed on page 8; it is referred to Bairdia rather than Rectobairdia because the paratype (pl. 1, figs. 32, 34–36) has a distinctly convex dorsal margin. The original of plate 1, figure 33, is here designated as the lectotype. Cooper’s specimen of Bairdia mceoyi Croneis and Gutke has a sinusus dorsal margin in lateral outline (1941, pl. 2, fig. 18); the photograph shows that the specimen is sheared just in front of the midlength; consequently, it is assumed that the concavity at approximately the midlength was introduced by preservation. The ends of this specimen are preserved, while those of Girty’s specimens are missing; it is therefore questionably assigned to Girty’s species.

Geologic range.—Upper Mississippian.

Bairdia golcondensis Croneis and Gale, 1939


Golconda formation, west bank of Lusk Creek, 2 miles north of Waltersburg, Pope County, Ill.

Croneis and Gutke, 1939, idem, v. 34, p. 58, pl. 2, fig. 23. Renaut formation, sec. 5, T. 13 S., R. 8 E., Hardin County, Ill.

Bairdia golcondensis Croneis and Gale. Croneis and Bristol, 1939, idem, p. 35, pl. 3, fig. 20. Menard formation, Ill. The figured specimen is a steinkern.

Coryell and Rozanski, 1942. Jour. Paleontology, v. 16, p. 146, pl. 24, fig. 2. Glen Dean formation, center sec. 18, T. 12 S., R. 10 E., Hardin County, Ill.

Bairdia golcondensis Croneis and Gale. Cooper, 1941 = B. impedere Cooper, 1941.

Bairdia golcondensis Croneis and Gale. Cooper, 1947 = Orthobairdia cestriensis (Ulrich), 1891.

The holotype is a specimen with most of the shell material dissolved.

Geologic range.—Permian.

Bairdia graciosa Glebovskaya, 1939


Geologic range.—Permian.

Bairdia grahamensis Harlton, 1928

Plate 1, figures 9, 10, 15, 16

Bairdia grahamensis Harlton, 1928, Jour. Paleontology, v. 2, p. 139, pl. 21, fig. 11. Graham formation, top of South Bend shale, below Gunsight limestone, west of Graham, Young County, Tex.

Harlton, 1928, Texas Univ. Bull. 2901, p. 156, pl. 3, fig. 4. Canyon group, San Saba River valley, near Hext, Menard County, Tex.

Bairdia menardensis Harlton, 1928, Texas Univ. Bull. 2901, p. 158, pl. 8, figs. 3a–d. Canyon group, San Saba River valley, near Hext, Menard County, Tex.

Bairdia menardensis Harlton. Delo, 1930, Jour. Paleontology, v. 4, p. 164, pl. 12, fig. 16. Pennsylvaniaian, C. Cromwell, Winslow no. 1 well, 775 ft, Menard County, Tex.

Bradfield, 1935 [part]. Am. Paleontology Bull., v. 22, no. 73, p. 85, pl. 6, fig. 4 [not figs. 5, 9]; the original of fig. 5 is not with Bradfield’s types; the original of fig. 9, (Indiana Univ. 2058) is a specimen with the dorsal margin broken, and consequently unidentifiable. Union Dairy limestone, top part, railroad cut south edge of Ardmore, SW 1/4 sec. 6, T. 5 S., R. 2 E., Carter County, Okla.


Cordell, 1932, Jour. Paleontology, v. 5, p. 87, pl. 17, figs. 29–33. Collections in lower Lawrence shale, and at base of Kanwaka formation, bluff, Missouri River, east of State Highway 45 and railroad tracks, southeast of Armour, NE 1/4 NE 1/4 sec. 34 T. 55 N., R. 37 W.; and Lawrence shale, also shale parting in Haskell limestone, ditch and bluff to the northeast, corner of State Highway 59 and Russell St., South St. Joseph, Buchanan County, Mo.
Bairdia deloi Kellett, 1934, Jour. Paleontology, v. 8, p. 126, pl. 14, figs. 6a, b. Elmdale formation, carbonaceous shale on top of massive buff limestone, where road bends halfway up hill, near Cottonwood River bridge, east of Elmdale, Chase County, Kans.

Bairdia ardmorensis Harlton, 1931, Jour. Paleontology, v. 5, p. 163, new name for B. marginata Harlton, 1929 [not Bosquet, 1852].


Bairdia marginata Harlton, 1929, Texas Univ. Bull. 2001, p. 158, pl. 4, fig. 2. The holotype (USNM 80588) is a steinkern from the same collection as B. menardensis. [not] Bairdia? deloi Crones and Gale, 1939 = Bairdia osorioi Crones and Gale, 1939.

Bairdia grahamensis Harlton, Warthin, 1930 = Ortho­bairdia sp. B.

[not] Cythere (Bairdia) marginata Richter, 1867 = sp. indet.

The types of B. menardensis (USNM 80587) consist of five specimens labeled “cotypes.” Most of the shell material of these specimens has been dissolved, and the illustrations were retouched to show overlap that is not discernible on the specimens. The holotype of B. deloi (USNM 89480) is a steinkern of an individual that is larger than the type of B. menardensis. The holotype (slide labeled “cotypes”) of B. grahamensis (USNM 72243) is a steinkern of a very young instar.

Geologic range.—Middle Pennsylvanian–Permian.

Bairdia harltoni Cooper, 1946


Bairdia ardynamic Harlton, Cooper, 1946, idem, p. 41, pl. 1, figs. 14, 15. Shale below Ferdinand limestone, NW 1/4 sec. 20, T. 6 S., R. 4 W., Spencer County, Ind.


[not] Bairdia ardynamic Harlton, 1929 = Bairdiolites ardynamic (Harlton) 1929.

[not] Bairdia plebeja grandis Jones, in Kirkby, 1892, Tyneside Naturalists’ Field Club, Trans. v. 4, p. 162, pl. 11, fig. 13 = nomen dubium, based on a steinkern.

Bairdia grandis is twice the size of B. harltoni Cooper, 1946.

Geologic range.—Carboniferous, Middle Pennsylvanian.

Bairdia hassi Sohn, n. sp.

Plate 1, figures 28, 29

Bairdia garrisonensis Upson. Kellett, 1934, Jour. Paleontology, v. 8, p. 134, pl. 17, figs. 5a–c. Shale parting in massive limestone in Elmdale formation, exposed below the road and upstream from the Cottonwood River bridge, east of Elmdale, Chase County, Kans.

Bairdia garrisonensis Upson. Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 354, pl. 49, fig. 19. Macoupin cyclothem, along Embarrass River, 1 mile east of Lawrenceville, Ill.


Differ from Bairdia whitesidei Bradfield, 1935 by absence of central bulge. The original of Kellett’s figures 5a and 6 is here designated as the holotype (USNM 89480).

Geologic range.—Upper Pennsylvanian–Permian.

Bairdia hebeatus Posner, 1951


Geologic range.—Lower Carboniferous.

Bairdia hispida? Harlton, 1928

Plate 1, figure 6


Delo, 1930, Jour. Paleontology, v. 4, p. 163, pl. 12, figs. 14a, b. Carboniferous, C. Cromwell and others, Winslow no. 1 well, 600-620 ft and 1,000 ft, Menard County, Tex.


The holotype (USNM 72246), illustrated by a drawing in 1928 and by a photograph in 1929 (fig. 2a), is an abraded specimen. Harlton (1928, p. 140) refers to the specimen as the holotype; but the slide is marked “cotypes” and contains a second specimen, here illustrated, that is similar to the one illustrated in 1929 (fig. 2b). Because it is not possible to determine whether the holotype and the paratype are conspecific, the illustrated specimen is referred to as “hispida?”.

Geologic range.—Upper Pennsylvanian.

Bairdia hurwitzi Coryell and Booth, 1933

Bairdia hurwitzi Coryell and Booth, 1933, Am. Midland Natu­ralist, v. 14, p. 262, pl. 3, figs. 8, 9. Wayland shale, west of Salt Creek, near the Graham-Throckorton road, 1 mile west of Graham, Young County, Tex.


Bairdia beedei Ulrich and Bassler. Payne, 1937, Jour. Paleontology, v. 11, p. 282, pl. 38, figs. 3a, b, pl. 39, figs. 1a, b. Hayden Branch formation, Sullivan County, Ind.

Bairdia beedei var. intacta Payne. 1937, Jour. Paleontology, v. 11, p. 283, pl. 39, figs. 2a, b. Same locality as above. The holotype (Indiana Univ. 3213) is a specimen of a juvenile.

Geologic range.—Upper Pennsylvanian–Permian.


Bairdia subtilla Gibson. 1955, Bull. Am. Paleontology, v. 35, no. 154, p. 16, pl. 1, figs. 1a, b. Cerro Gordo formation, upper 20 ft, at clay pit operated by Rockford Brick and Tile Co., Rockford, Iowa. Based on one left valve (holotype USNM 123085) is similar in outline to the illustration of B. hypsoconcha. (See p. 10, item 11.)

[not] Bairdia subtilla Cooper, 1941 = Cryptobairdia subtilla (Cooper), 1941.

The holotype of B. hypsoconcha (USNM 123085) is a partly corroded young instar, with some matrix near the dorsal margin which causes the illustration to appear more angular at the junction of the dorsoanterior and dorsal margin than the specimen actually is.

Geologic range.—Upper Devonian.

Bairdia impedere Cooper, 1941

Bairdia impedere Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 29, pl. 2, figs. 7, 8. Renault formation, NE 1/4 SW 1/4 sec. 23, T. 4 S., R. 9 W., Monroe County, Ill.


[not] Bairdia impedere Cooper. 1947, Jour. Paleontology, v. 21, p. 84 [list]. pl. 21, figs. 29, 30. Kinkaid shale, about 40 miles southeast of Chester, Johnson County, Ill. The illustrated specimen is crushed (?), showing parallel sides in dorsal outline.

The holotype appears from the illustration to be a crushed specimen. This species differs from B. golcondensis Coryell and Gale, 1939, by a straight rather than convex ventral margin.

Geologic range.—Upper Mississippian (Carboniferous of Russia).

Bairdia ivanovae Egorov, 1953

Bairdia kansasensis Kellett, 1934, Jour. Paleontology, v. 8, p. 128, pl. 15, figs. 3a, b, 4a, b. Stanton limestone, cut in U.S. Highway 40, just west of Victory Junction, Leavenworth County, Kans.; shale in Elmdale formation, lighter colored shale above carbonaceous shale on top of massive buff limestone, in roadcut where road bends about halfway up hill, near Cottonwood River bridge east of Elmdale, Chase County, Kans.

Bairdia kansensis Kellett. Cordell, 1952 [part], Jour. Paleontology, v. 26, p. 88, pl. 17, figs. 11, 12 [not figs. 9, 10; see B. monstrabilis Cooper, 1940]. Collection from 2 ft 6 in below top of Farley limestone to top of Eudora shale, outcrops along Smith Branch, west of bridge and west of north–trending road, 2.2 miles northwest of Winston, SE 1/4 sec. 29, T. 59 N., R. 29 W., Daviess County, Mo.

The right valve of one of Kellett’s paratypes (USNM 9849) is similar in outline to the illustration of B. plebia Reuss, 1854. The ventral ridges discussed by Cordell (1952, p. 86) are not discernible on Kellett’s types.

Geologic range.—Upper Pennsylvanian–Permian.

Bairdia kelleri Egorov, 1953


Geologic range.—Upper Devonian.

Bairdia kellettae Glebovskaya, 1939


The holotype, a left valve, is the only specimen; it is recorded as 2.4 millimeters long, which makes this one of the larger species of Bairdia. The 1938 reference is obviously to a manuscript name. Although this species is referred to Upper Carboniferous rocks, Branson (1948, p. 858) lists the species from those Schenigerina moelleri beds of Russia that are now considered Permian.

Geologic range.—Permian.
Bairdia kinderhookensis Morey, 1938

Bairdia kinderhookensis Morey, 1938, Jour. Paleontology, v. 10, p. 120, pl. 17, figs. 13, 15. Chouteau formation, Browns Station, Boone County, Mo.

Geologic range.—Lower Mississippian.

Bairdia leguminoides Ulrich, 1891

Plate 1, figures 19-21


Bairdia leguminoides Ulrich, 1893, Ann. Mus. Novitates, no. 891, p. 9, pl. fig. 23. Coral zone of the Widder Beds, Hamilton group, just above the Encrinia limestone, on Ausable River, about 1½ miles east of Arkona, Lambton County, Ontario, Canada.


The holotype (USNM 41788) is a partly abraded specimen with the posterior point broken. This species is common in the Wanakah shale, 1½ miles south of East Bethany, N.Y.

Geologic range.—Middle Devonian.

Bairdia leptura (Richter), 1867


Bairdia plebia var. caudata Kirkby, 1858 [part], Tyneside Naturalists' Field Club Trans., v. 4, p. 143, woodcuts 2, 4. Permian, Shell limestone, Tunstall Hill, Durham, England.

Geologic range.—Permian.

Bairdia mceoiy Cronies and Gutke, 1939


Bairdia renaultensis Cronies and Gutke, 1939, idem, p. 59, pl. 1, figs. 5, 6. Same locality as above.

Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 14 [list], pl. 2, figs. 9, 10. Renault formation, Hardin County, Ill.


USGS locality 12844, about 10 feet stratigraphically below Cronies and Gutke's locality 0905.52D, contains abundant corroded and squashed specimens representing various stages of growth of this species.

Geologic range.—Upper Mississippian.

Bairdia macdonelli Harlton, 1929

Bairdia macdonelli Harlton, 1929, Texas Univ. Bull. 2901, p. 157, pl. 3, figs. 7a, b. Canyon group, San Saba River valley, near Hext, Menard County, Tex.

Geologic range.—Upper Pennsylvanian.

Bairdia mandelstami Posner, 1951


The right valve of this species resembles Rectobairdia bicornis (Jones and Kirkby), 1879, which is based on a right valve that has a proportionally longer dorsal margin.

Geologic range.—Carboniferous.

Bairdia matsfeldensis Upson, 1933

Bairdia matsfeldensis Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 18, pl. 1, figs. 7a, b. Shale in Kinney limestone, railroad cut just east of Kinney, Gage County, Nebr.

Bairdia reussiana Kirkby. Upson, 1933, idem, p. 19, pl. 2, fig. 2a. Shale in Fourmile limestone, roadcut 3½ miles southeast of Randolph, Riley County, Kans. Based on a corroded specimen.

Geologic range.—Upper Pennsylvanian.

Bairdia naliivkini Egorov, 1953


Geologic range.—Upper Devonian.

Bairdia naumovae Egorov, 1953


Geologic range.—Upper Devonian.

Bairdia neptuni Kirkby, 1858


Kirkby, 1858, Tyneside Naturalists' Field Club Trans., v. 4, p. 145, text fig. 7, pl. 3, figs. 5, 5a. Same locality as above.
Kirkby (1858, p. 325) considered this species as a variety of *B. plebia* Reuss, because he considered this as an end member of a gradational series from that species. Kirkby’s specimens of *B. plebia* are here designated as *Bairdia* sp. I, and pending additional study of toptype material the variety is here elevated to specific rank.

**Geologic range.**—Permian.

*Bairdia pecosensis* Delo, 1930

*Plate 1, figures 22-25*

*Bairdia pecosensis* Delo, 1930, Jour. Paleontology, v. 4, p. 165, pl. 13, figs. 1a, b. Permian (?), Transcontinental Oil Co., Blackstone-Slaughter No. 1 well, 1082–1088 ft, Pecos County, Tex.


*Bairdia iriomensis* Delo, 1930, Jour. Paleontology, v. 4, p. 165, pl. 12, fig. 18. Pennsylvaniaian or Permian, Kingwood Oil Co.; Suggs No. 1 well, 1382–1386 ft, Irion County, Tex. Based on a corroded specimen of a very young instar.

*Bairdia permiana* Hamilton, 1942, Jour. Paleontology, v. 16, p. 715, pl. 110, figs. 1a, b. Limestone, uppermost Leonard or lowermost Word formation, Glass Mountains, Tex.


[not] *Bairdia pecosensis* var. graciosa Glebovskaya, 1939 = *B. graciosa* Glebovskaya, 1939.

The holotype of *B. pecosensis* (USNM 81784) is, as noted by Kellett (1934, p. 125), a deformed specimen. The diagnostic ridge on the ventral part of the right valve of *B. permiana* is not as pronounced as shown on the original illustration. Upson’s specimens are not as wide in dorsal outline as the holotype of *B. pecosensis*, should these specimens have a slight ridge on the dorsal margin of the left valve, they would be closer related to *B. rhomboidalis* Hamilton, 1942.

**Geologic range.**—Permian.

*Bairdia peracuta* Warthin, 1930

*Bairdia peracuta* Warthin, 1930, Oklahoma Geol. Survey Bull. 35, p. 71, pl. 6, figs. 2a–c. Holdenville formation, 3 miles east of Ada, Pontotoc County, Okla.


Cooper, 1946 [part]. Illinois Geol. Survey Bull. 70, p. 49, pl. 4, figs. 1, 2 [not pl. 3, figs. 11, 12, the illustrations suggest a steinkern]. Shale between limestone members of the Liverpool cycle, southern Illinois. NW¼ sec. 21, T. 6 N., R. 3 E., Fulton County, Ill.

**Geologic range.**—Middle Pennsylvania-Permian (?).

*Bairdia permagna* Geis, 1932

*Plate 2, figures 20–24*

*Bairdia permagna* Geis, 1932, Jour. Paleontology, v. 6, p. 175, pl. 25, figs. 11a, b. Salem limestone, Indiana.

*Bairdia salmensis* Geis, 1932, Jour. Paleontology, v. 6, p. 176, pl. 25, figs. 10a, b. Salem limestone, Indiana.

A series of growth stages suggest that *B. salmensis* is a young instar. Plate 2, figure 20, is an anterior section at the dorsanterior margin, showing the ventral thinning of the carapace. The figured specimen is from the Salem limestone, USGS locality 7698 green; Indiana.

**Geologic range.**—Upper Mississippian.

*Bairdia petiniana* Egorov, 1935


**Geologic range.**—Upper Devonian.

*Bairdia piscata* Richter, 1867


**Geologic range.**—Permian.

*Bairdia pompilioides* Harlton, 1928


Harlton, 1929, Texas Univ. Bull. 2001, p. 154, pl. 2, fig. 7 [holotype], pl. 3, fig. 8. Canyon Group, San Saba River valley, near Hext, Menard County, Tex.

Kellett, 1934 [part]. Jour. Paleontology, v. 8, p. 130, pl. 16, figs. 2a, b [not figs. 3a, b, 4a, b, both specimens are unrecognizable steinkerns]. Wakarusa (?) limestone, Walnut group, roadcut near a small church, SE. cor. sec. 3, T. 13 S., R. 15 E., about 6 miles south-southwest of Topeka, Shawnee County, Kans.

Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 87, pl. 6, figs. 15a, b. Union Dairy limestone, railroad cut northeast of cemetery, south east of Ardmore, centerline SW¼ sec. 6, T. 5 S., R. 2 E., Carter County, Okla.

*Bairdia pompilioides* Harlton. Payne, 1937, Jour. Paleontology, v. 11, p. 284, pl. 39, figs. 7a, b. Hayden Branch limestone, 85 ft below Merom sandstone, near Dodds bridge over Turmans Creek, Sullivan County, Ind.

Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 354 [list], pl. 49, figs. 13, 14. Muncipin cycle, Embarrass River, 1 mile east of Lawrenceville, Lawrence County, Ill.
**PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA**

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**Bairdia pompiloides** Harlton. Cordell, 1952, Jour. Paleontology, v. 26, p. 80, pl. 18, figs. 25-27. Fontana shale, parting 3 ft above base of Winterset limestone, roadcut on State Highway 6, W1/2SE1/4, sec. 17, T. 59 N., R. 27 W., northeast edge of Galatin, Daviess County, and Eudora shale, base to 6 ft below top of Weston shale, crops out on north slope of steep hill, south of junction between State Highways 45 and 92, two-tenths of the distance from east to west along boundary of secs. 30 and 31, T. 53 N., R. 35 W., Beaver County, Mo.

**Bairdia geisi** Kellett. Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 356 [list], pl. 49, fig. 29. Macoupin crayfish, Embarras River, 1 mile east of Lawrenceville, Lawrence County, Ill. Kellett’s holotype is a steinkern: Scott and Borger illustrate a specimen that is closer to *B. pompiloides*.

**Bairdia subeiriformis** Knight, 1928, Jour. Paleontology, v. 2, p. 322, pl. 43, figs. 5a, b. Weathered bottom 2 ft of Pawnee limestone, 200 ft north of Clayton Rd. on first street west of Kirkwood-Ferguson trolley, St. Louis County, Mo. The locality is no longer usable.

**Bairdia sp.** 9, Cordell, 1952, Jour. Paleontology, v. 26, p. 94, pl. 18, figs. 30, 31. Shale, parting, 16 ft above base of Winterset limestone, roadcuts along crooked stretch of gravel road on west bluff of Weldon River, NE1/4 SE1/4 sec. 8, T. 64 N., R. 24 W., 2.6 miles southwest of Princeton, Mercer County, Mo.


**Geologic range.**—Middle and Upper Pennsylvanian.

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**Bairdia pseudoglehnensis** Sohn, n. sp.

Plate 3, figures 11, 12

**Bairdia glennensis** Harlton. Kellett, 1935, Jour. Paleontology, v. 9, p. 155, pl. 18, figs. 4a-e. Pennsylvanian, Stanton limestone, roadcut, U.S. Highway 40, between Lawrence and Kansas City, just west of Victory Junction, Leavenworth County, Kans.: Permian, Elmdale formation, limestone and shale, above water level and below road on Cottonwood River, upstream from bridge east of Elmdale, Chase County, Kans.

Elongate, greatest height less than half the greatest length. Dorsal margin gently convex; ventral margin concave. Anterior margin round, joins straight dorsal-anterior margin above midheight. Dorsoposterior margin straight, approximately one-third as long as the greatest length of valve.

The distinct dorsal-anterior margin excludes these specimens from *Fabalicypris glennensis* (Harlton), 1927. Because this species is distinct from any previously described species of *Bairdia* and because Kellett’s types are on hand (USNM 90056), the species is here named. The original of Kellett’s figure 4a, a left valve, from the Elmdale formation, is designated as the holotype.

**Geologic range.**—Upper Pennsylvanian-Permian.

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**Bairdia quasisymmetrica** Egorov, 1953


**Geologic range.**—Upper Devonian.

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**Bairdia regularis** Cooper, 1946

**Bairdia regularis** Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 50, pl. 3, figs. 30-32. Shale above and below Exline limestone. NE1/4 sec. 22, T. 14 N., R. 7 E., Stark County, Ill.


**Geologic range.**—Middle and Upper Pennsylvanian.

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**Bairdia reussiana** Kirkby, 1858


Cordell, 1952 [part], Jour. Paleontology, v. 26, p. 89, pl. 18, figs. 1, 2 [not pl. 17 figs. 24-28 = *Rectobairdia symmetrica* (Cooper), 1946, and *B. subeiriformis* Hamilton, 1942]. Farley limestone, Smith Brach, west of bridge and of north-trending road, 2.2 miles northwest of Winston, SE1/4 sec. 20, T. 59 N., R. 29 W., Daviess County, Mo.

**Bairdia plebia** var. *reussiana* Kirkby, 1859, Tyneside Naturalists’ Field Club, Trans. v. 4, p. 146, pl. 9, figs. 6, 6a, woodcut 8. Permian, Tunstall Hill, Durham, England.

[not] *Cythere reussiana* (Kirkby). Richter, 1867 = nomen dubium.

[not] **Bairdia reussiana** Kirkby. Upson, 1933 = *B. matfeldensis* Upson, 1933.

[not] **Bairdia reussiana** Kellett. 1934 = *Rectobairdia symmetrica* (Cooper), 1946.

[not] **Bairdia reussiana** Kirkby. Glebovskaia, 1959 = *Rectobairdia* sp. H.

**Geologic range.**—Upper Pennsylvanian-Permian.

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**Bairdia rhomboidalis** Hamilton, 1942

Plate 1, figs. 26, 27

**Bairdia rhomboidalis** Hamilton, 1942, Jour. Paleontology, v. 16, p. 715, pl. 110, figs. 11a, b. Limestone, upper Leonard or lowermost Word formation, Glass Mountains, Tex.

Because *B. geisi* Kellett, 1934 is based on a steinkern (USNM 89476), it is here considered a nomen dubium. It is not possible to determine whether the shell had a dorsal ridge on the left valve that characterizes *B. rhomboidalis*. Should future work with topotype material demonstrate the presence of this ridge, then
B. rhomboidalis would become a junior synonym of B. geisi. The species is closely related to B. pecosensis Delo, which is based on a deformed specimen. B. pecosensis Delo. Upon, 1935 may belong here. Orthobairdia powersi (Kellett), 1934, differs from this species by ventral overlap and by parallel sides in dorsal outline.

**Geologic range.**—Permian.

**Bairdia rjabinini Egorov, 1953**


**Geologic range.**—Upper Devonian.

**Bairdia seideradensis Krummelbein, 1850**

Bairdia seideradensis Krummelbein, 1850, Senckenbergiana, v. 31, p. 334, pl. 1, figs. 2 a-d. Middle Devonian (Givetian). Seiderad bei Pelm, Gerolsteiner valley, Germany.

Type, pi. 5, figs. 1-4, = Rectobairdia symmetrica (Cooper), 1946; not pi. 18, figs. 1, 2 = B. reussiana Kirkby, 1858, shale partings in Haskell limestone, Buchanan County, Mo.; 2.5 ft below top of Farley limestone to top of Eudora shale, 2.2 miles northwest of Winston, Daviess County, Mo.

**Geologic range.**—Upper Pennsylvanian–Permian.

**Bairdia submucronata Jones and Kirkby, 1879**


**Geologic range.**—Carboniferous.

**Bairdia summa Coryell and Billings, 1932**


**Geologic range.**—Upper Pennsylvanian.

**Bairdia terebra Jones and Kirkby, 1879**


**Geologic range.**—Carboniferous.

**Bairdia tokmovoensis Egorov, 1953**


**Geologic range.**—Upper Devonian.

**Bairdia usatchovae Egorov, 1953**


**Geologic range.**—Upper Devonian.

**Bairdia verwiebei Kellett, 1934**

Bairdia verwiebei Kellett, 1934, Jour. Paleontology, v. 8, p. 129, pl. 16, figs. 1a–h, pl. 17, figs. 1a–c. Falls City limestone, roaddent west of the German Lutheran church,
Kansas State Highway 29, across Kansas River, about 1 mile south of Wamego, Pottawatomie County. Wre­ford formation, small quarry in roadcut of Highway U.S. 40, about 4 miles west of Junction City, Geary County, Kans.


The holotype (USNM 89471a) and all but one para­type which is the original of Kellett’s figure 1e (USNM 89471b) are steinkerns. The original of figure 1e has some of the shell material dissolved, but the original shape is probably preserved.

Geologic range.—Upper Pennsylvanian–Permian.

Bairdia whitesidei Bradfield, 1935
Plate 1, figs. 30, 31; plate 2, figure 30

Bairdia whitesidei Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 82, pl. 5, figs. 10a, b. Shale in Deese formation, near centerline NW¼NW¼ sec. 33, T. 3 S., R. 1 E., Carter County, Okla.

Sohn, 1966, Jour. Paleontology, v. 30, p. 114, text fig. 1, pl. 25, figs. 1–6. Topotype specimens. The anterior part of the ventral margin in fig. 5 was inadvertently cut off the photograph; the specimen is refugured as pl. 1, fig. 31.

?Bairdia punctata Bradfield, 1935, op. cit., p. 79, pl. 5, fig. 7a, b. Shale in Devil’s Kitchen member of Deese formation, NW cor. sec. 6, T. 9 N., R. 9 E., Cumberland County, Ill.

Bairdia beedei Ulrich and Bassler. Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 69, pl. 5, figs. 9a, b. Holding­ville formation, fusulinid limestone in gulley, 200 ft northwest of center sec. 36, T. 4 N., R. 6 E., Pontotoc County, Okla.

?Bairdia pompilioides Harlton. Warthin, 1930, idem, p. 70, pl. 5, figs. 11a, b. Limestone and shale partings in Sasakwa member of Holdenville formation, old quarry in south part of Sasakwa, Seminole County, Okla.

?Bairdia nitida Harlton. Warthin, 1930, idem, p. 72, pl. 6, figs. 3a, b. Same locality as above.

?Bairdia concava Cooper 1946, Illinois Geol. Survey Bull. 70, p. 43, pl. 1, figs. 31–34. Shale above Greenup limestone, NW¼ sec. 10, T. 9 N., R. 9 E., Cumberland County, Ill.

Bairdia bicornis Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 84, pl. 6, figs. 3a, b. Union Dairy limestone, top part, railroad cut, about centerline SW¼ sec. 6, T. 5 S., R. 2 E., Carter County, Okla.

?Bairdia bicornis Bradfield. Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 356 [list], pl. 49, fig. 17. Macoupin cyclothem along Embarrass River 1 mile east of Lawrenceville, Lawrence County, Ill.

The type of B. punctata (Indiana Univ. 2144) is a crushed specimen that is probably a young individual of this species.

Geologic range.—Middle and Upper Pennsylvanian.

MISIDENTIFIED SPECIES IN BAIRDIA

The descriptions and illustrations of the following specimens indicate that they were misidentified and probably represent undescribed species. The figured specimens of two misidentified species are available in the U.S. National Museum; consequently, they are named here as Bairdia hassi n. sp. and B. pseudoglen­ensis n. sp. The original specimens of the following 20 misidentifications are not available for examination; therefore they are cited with letters rather than with new specific names.

Geologic range.—Upper Pennsylvanian.

Bairdia sp. A


Geologic range.—Carboniferous.

Bairdia sp. B


Geologic range.—Carboniferous.

Bairdia sp. C

Bairdia curta McCoy, Roemer, 1856 (?), in Bronn, 1851–56, Letheae Geognostica * * *, v. 1, pt. 2, p. 539, pl. 95, figs. 12a–c. Carboniferous, Europe.

Geologic range.—Carboniferous.

Bairdia sp. D

Bairdia curta McCoy. Eichwald, 1860 [part], Lethaea Rossica, v. 1, p. 1338, pl. 52, figs. 17a–c [not fig. 18 = Crypto­bairdia aequalis (Eichwald), 1857]. Carboniferous, provinces of St. Petersburg, Kalouga, Novgorod, and Toulia (?), Russia.

Geologic range.—Carboniferous.

Bairdia sp. E

Bairdia ciscoensis Harlton. Bradfield, 1935 [part], Bull. Am. Paleontology, v. 22, no. 73, p. 91, pl. 7, figs. 1, 2, 4–6 [not figs. 3a, b = B. beedei Ulrich and Bassler, 1906]. Union Dairy limestone, Hoxbar formation, railroad cut south edge of Ardmore, Carter County, Okla. The original of fig. 1 (Indiana Univ. 2024) is abraded; consequently, this species is not named.

Geologic range.—Upper Pennsylvanian.

Bairdia sp. F

Bairdia curta McCoy. Kummerow, 1893, Preuss. Geol. Landes­anstalt Abh., n. f., no. 194, pt. A, p. 39, pl. 4, figs. 5a, b. Mississippian, Tournaisian-Visean, Trogenau bei Hof; Binsfeldhammer bei Stolberg, Rheinland, Germany.

Geologic range.—Carboniferous.

Bairdia sp. G


Geologic range.—Permian.

This species resembles Cryptobairdia drupa-cea (Richter), 1855, from the Permian of Germany, differing only in the outline of the anterior margin.

**Geologic range.**—Carboniferous.

Bairdia sp. H


Kirkby, 1859, Tyneside Naturalists' Field Club Trans., v. 4, p. 141, pl. 9, figs. 1, 2, 2a. Same illustration as Kirkby, 1858.

**Geologic range.**—Permian.

Bairdia sp. I


This species resembles Cryptobairdia drupa-cea (Richter), 1855, from the Permian of Germany, differing only in the outline of the anterior margin.

**Geologic range.**—Carboniferous.


Bairdia sp. P


**Geologic range.**—Upper Mississippian (Calciferous Sandstone Series of Scotland).

Bairdia sp. M


The holotype of *B. contracta* Morey is a steinkern; consequently, the specific characters are unrecognizable, and the species is listed as a nomen dubium. This specimen differs from Morey's in both dorsal and ventral outlines; consequently, it is here considered a distinct species.

**Geologic range.**—Upper Mississippian.

Bairdia sp. N


**Geologic range.**—Permian.

Bairdia sp. 0


**Geologic range.**—Lower Mississippian.

Bairdia sp. P

Bairdia deliciae  Morey. Morey, 1935 = *Cryptobairdia compacta*? (Gels), 1932.

**Geologic range.**—Lower Mississippian.

Bairdia sp. Q


**Geologic range.**—Carboniferous.

Bairdia sp. R


**Geologic range.**—Upper Mississippian (Calciferous Sandstone Series of Scotland).
cyclothem SW1/4 sec. 26, T. 9 N., R. 5 E., Effingham County, Ill.

**Geologic range.**—Upper Pennsylvanian.

**Bairdia** sp. S


This species has a distinct dorsoanterior margin that differentiates it from *Cryptobairdia* sp. B and from *Bairdia attenuata* Girty, 1910 = *B. girtyi* Sohn, n. name. The almost straight dorsal margin suggests affinities with *Rectobairdia* n. gen.

**Geologic range.**—Upper Pennsylvanian.

**Bairdia** sp. T


The broadly arcuate dorsal margin suggests affinities to *Rectobairdia*.

**Geologic range.**—Upper Pennsylvanian.

**Bairdia** sp. U


Posner elevated *Bairdia plebia* var. *alta* Jones and Kirkby, 1895 to specific rank. The English specimen is here referred to *Orthobairdia* oestriensis (Ulrich), 1891. The Russian specimens differ in lateral outline, in the dorsoposterior margin, and possibly in dorsal outline.

**Geologic range.**—Carboniferous.

**DOUBTFUL AND INDETERMINATE SPECIES**

Under this heading are included two groups: the first group includes species based on specimens that are either steinkerns or corroded and broken specimens; the second group contains misidentified specimens that cannot be placed in the proper species. Some species included in both of these groups are relegated to this category because the descriptions and illustrations are inadequate to recognize the species. The relegation of species to this category does not necessarily mean that the species in question are not valid; it merely points out that more work on these species is needed. Examination of the types or of topotype material will probably move many of these into the category of valid species of known or of as yet undescribed genera. Homonyms are indicated but not renamed because of the questionable status of this category.

**Bairdia acuta** Jones, 1850


Jones, 1850, in Kirkby, Tyneside Naturalists' Field Club Trans., v. 4, p. 163, pl. 11, fig. 16. Same (?) locality as above.

Schmidt, 1867, Neues Jahrb. Mineralogie, Geologie, Paläontologie, 1867, p. 581, pl. 6, fig. 38. Zeichstein, Setters, Wetterau, Germany.


**Bairdia affinis** Morris, 1845


**Bairdia ampla** Reuss, 1854

*Bairdia ampla* Reuss, 1854, Wetterauer Gesell. Naturk. Hanau, Jahresh. 1851–53, p. 68, text figs. 7a, b; Zechstein, Salz, Wetterau, Germany.


*Bairdia cf. B. ampla* (Reuss). Bolton, 1911, Geol. Soc. London Quart. Jour., v. 67, p. 325, pl. 27, fig. 4. Coal measures, Bristol, England. The specimen is stated to be 6 mm long and is probably not an ostracode.

[not] *Bairdia ampla* Reuss of authors: see the following:

*Cythere* (*Bairdia*) *ampla* Reuss. Jones, 1859 = *Cryptobairdia* sp. A.

*Bairdia ampla* Reuss. Jones and Kirkby, 1879 [part] = *Bairdia* sp. J.

*Bairdia ampla* Reuss. Jones and Kirkby, 1892 = *Bairdia* sp. J.

*Bairdia ampla* Reuss. Jones and Kirkby, 1879 [part] = *Bairdia* sp. P.

*Cythere ampla* (Reuss). Richter, 1867 = probably the same as *Cythere breccicaua* (Jones). Richter, 1867.


**Bairdia amputata** Kirkby, 1859


[not] *Bairdia truncata* Brady, 1890, Royal Soc. Edinburgh Trans., v. 35, pt. 2, no. 14, p. 104, pl. 2, figs. 1, 2. Recent, pools in the inner reef of Apli, Upolu: shore sand from Porcheron's Beach, Nounou. This living species belongs to a genus that can be determined only by
study of the hinge, muscle scars and soft parts. It is a junior primary homonym and requires a new name. Stephenson (1947, p. 578) referred this species tentatively to *Triebelina* Van den Bold, 1946, but the shape of the original illustration (Brady, 1890, pl. 2, fig. 1) excludes the species from that genus.

*Cythere amputata* Kirkby, 1989, Tyneside Naturalists' Field Club Trans., v. 4, p. 155, pl. 10, figs. 4, 4a, new name for *B. truncata*. Permian, Durham, England.


[not] *Bairdia amputata* (Kirkby). Jones and Kirkby, 1879 = *Rectobairdia* sp. A.

[not] *Bairdia amputata* (Kirkby). Jones and Kirkby, 1892 = *Rectobairdia* sp. A.

*Bairdia* amygdaliformis Bradfield, 1935

*Bairdia amygdaliformis* Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 80, figs. 6, figs. 12a, b. Hoxbar formation, Oklahoma.

The holotype is a steinkern.

*Bairdia* anomala Payne, 1937

*Bairdia anomala* Payne, 1937, Jour. Paleontology, v. 11, p. 282, pl. 38, figs. 5a, b. Hayden Branch formation, Sullivan County, Ind.

This species is based on a corroded specimen.

*Bairdia barholomewensis* Stewart and Hendrix, 1945

*Bairdia barholomewensis* Stewart and Hendrix, 1945, Jour. Paleontology, v. 19, p. 109, pl. 12, figs. 7, 8. Olentangy shale, Delaware County, Ohio.

This species is based on a corroded specimen.

*Bairdia biacuta* Bradfield, 1935

*Bairdia biacuta* Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 79, pl. 5, figs. 5a, b. Dornick Hills formation, Carter County, Okla.

The holotype of this species is an abraded specimen.

*Bairdia brevicauda* (Jones). Richter, 1867


*Cythere ampla* (Reuss). Richter, 1867, idem, p. 231, pl. 5, fig. 27. Zechstein, Thuringia, Germany.

*Bairdia brevis* Jones and Kirkby. Vine, 1884


Cooper (1941, p. 24) refers Jones and Kirkby's 1879 illustrations to *B. aculeata* Cooper, 1941. The right valve differs from *B. aculeata* in that the posterior is lower; see *Orthobairdia* sp. A.

### Bairdia? browniana Jones, 1874


According to Jones' description, this species is based on a steinkern. The illustration and description are inadequate for proper generic determination, but it definitely does not belong to any of the genera treated in this paper.

*Bairdia celetiensis* Ulrich, 1891

*Bairdia celetiensis* Ulrich, 1891 [part], Cincinnati Soc. Nat. History Jour., v. 13, p. 210, pl. 17, figs. 7a, b [not figs. 6a–c = *Orthobairdia celetiensis* (Ulrich)], 1891. Chester shales, Grayson Springs Station, Grayson County, Ky.

This species is a steinkern.

*Bairdia circumcisa* Jones and Kirkby, 1879


This species is based on a single damaged specimen that may be broken on the posterior.

*Bairdia contracta* Morey, 1935

*Bairdia contracta* Morey, 1935 [not *B. hisingeri* var. *contracta* Jones and Kirkby, 1895], Jour. Paleontology, v. 9, p. 480, pl. 54, figs. 11, 12. Amsden formation, Cherry Creek, Fremont County, Wyo. (See Strickland, 1957.)

[not] *Bairdia contracta* Morey. Scott, 1942 = *Bairdia* sp. M.

*Bairdia crassa* Harlton. Warthin, 1930

*Bairdia crassa* Harlton. Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 71, pl. 6, figs. 1a, b. Holdenville formation, limestone and shale partings of Sasakwa member, quarry in south part of Sasakwa, Seminole County, Okla.

*Bairdia curta* McCoy. Richter, 1855


The illustration of this species does not show dorsal overlap.

*Bairdia curta* McCoy. Chapman, 1921


There are insufficient data to determine proper relationship.

*Bairdia delawarensis* Stewart and Hendrix, 1945

*Bairdia delawarensis* Stewart and Hendrix, 1945, Jour. Paleontology, v. 19, p. 109, pl. 12, figs. 6a, b. Olentangy shale, Bartholomew Run, Dublin quadrangle, E148W14 sec. 4, T. 3 N., R. 19 W., 1 mile north of Franklin-Delaware County line, Delaware County, Ohio.
The illustrations consist of a dorsal view of one steinkern (fig. 10), and a lateral view of possibly a corroded specimen.

*Bairdia delicata* Morey, 1935

*Cythere elongata* Richter, 1867, pi. 24. Zeichstein, Zwickau, Germany.


The illustrations appear to be of a corroded specimen.

*Bairdia?* dorsalis (Richter), 1867

*Cythere (Cythereis) drupacea* Richter, 1867, pi. 24. Zeichstein, Zwickau, Germany.

*Bairdia elongata* (Miinster), 1830

*Cythere elongata* Münster, 1830, pi. 15, p. 408, pl. 20, figs. 14a-c. First illustration, a broken and corroded topotype specimen.

*Cythere elongata* Münster, 1830, in *King = Carrella*.

*Bairdia elongata* Lienenklaus, 1900 [not (Münster), 1830; not Kummerow, 1924] — *B. longa* Key, 1957, in Van den Bold.

*Bairdia elongata* Kummerow, 1924 [not (Münster), 1830; not Lienenklaus, 1900] = gen. indet.

*Bairdia elongata* (Münster). Kummerow, 1939 = *Bairdia diacypris* sp. B.


*Bairdia excisa* Eichwald, 1857

*Cythere elongata* Richter, 1867, pi. 24. Zeichstein, Zwickau, Germany.

*Cythere elongata* Richter, 1867, pi. 24. Zeichstein, Zwickau, Germany.

*Cythere elongata* Richter, 1867, pi. 24. Zeichstein, Zwickau, Germany.

The holotype and only specimen (USNM 123084) is a steinkern that resembles *Cryptobairdia?* singularis (Krömmlerin), 1954, from the Upper Devonian of Germany. *B. extenda* and *B. lancelata* probably represent growth stages of a single species.

*Bairdia frumentum* Reuss, 1854

*Cythere (Cythereis) frumentum* Reuss, 1854, pi. 15, p. 408, pl. 20, figs. 14a-c. First illustration, a broken and corroded topotype specimen.

*Bairdia garrisonensis* Upson. Glebovskaya, 1939


The illustration is of a right valve that differs in outline from Upson’s species.

*Bairdia geinitziana* (Jones), Richter, 1855

*Bairdia geinitziana* (Jones). Richter, 1855, pi. 15, p. 408, pl. 20, figs. 14a-c. First illustration, a broken and corroded topotype specimen.

*Cythere geinitziana* Jones, 1850 — *Fabelicypris?* geinitziana (Jones), 1850.

This species is referred by Bassler and Kellett (1934, p. 171) to *B. plebia* Reuss from which it differs by a straight dorsoposterior margin.

*Bairdia geisi* Kellett, 1934

*Bairdia geisi* Kellett, 1934, pi. 15, p. 408, pl. 20, figs. 14a-c. First illustration, a broken and corroded topotype specimen.

*Cythere geinitziana* Jones, 1850 — *Fabelicypris?* geinitziana (Jones), 1850.

This species is referred by Bassler and Kellett (1934, p. 171) to *B. plebia* Reuss from which it differs by a straight dorsoposterior margin.

*Bairdia geisi* Kellett, 1934

*Bairdia geisi* Kellett, 1934, pi. 15, p. 408, pl. 20, figs. 14a-c. First illustration, a broken and corroded topotype specimen.

*Cythere geinitziana* Jones, 1850 — *Fabelicypris?* geinitziana (Jones), 1850.

This species is referred by Bassler and Kellett (1934, p. 171) to *B. plebia* Reuss from which it differs by a straight dorsoposterior margin.
The illustrations of this species are a right view of a carapace and of a right valve; consequently, the dorsal outline is unknown, and the specimens are not identifiable at this time.

_Bairdia glnnnensis_ Harlton, Marple, 1952

The illustration of this species is of an unidentifiable specimen.

_Bairdia gracilis_ McCoy, 1844
_Bairdia gracilis_ McCoy, 1842 [nomen nudum]. in Griffith, Richard, Notice respecting the fossils of the Mountain Limestone of Ireland, p. 22.
_Bairdia gracilis_ McCoy, 1844, A synopsis of the characters of the Carboniferous limestone fossils of Ireland, p. 165, pl. 23, fig. 7. Mountain limestone, northern districts, Ireland.

[not] _Bairdia gracilis_ McCoy. Reuss, 1854 = Cryptobairdia subgracilis (Geinitz), 1861.
[not] _Bairdia gracilis_ McCoy. Richter, 1855 = Cryptobairdia subgracilis (Geinitz), 1861.
[not] _Bairdia gracilis_ Alexander, 1929 = _B. roundyi_ Alexander, 1932.
[not] _Bairdia arcuata gracilis_ Bosquet, 1854, requires new name.

One of the ends of the illustrated specimen is broken, but the description states that both ends are alike. Jones (1850, p. 63) referred a "much worn" specimen to this species. The illustration (Jones, 1850, pl. 18, fig. 7) is of a specimen with a round anterior that is unidentifiable. Jones (1859, p. 163, pl. 11, fig. 15) illustrated a worn steinkern similar to the one illustrated in 1850 that he questionably referred to this species.

_Bairdia gracillima_ Richter, 1867
_Cythere (Bairdia) gracillima_ Richter, 1867, Deutsch. Geol. Gesell. Zeitschr., v. 19, p. 231, pl. 5, fig. 28. Zechstein, Thuringia, Germany.

_Bassler and Kellett_ (1934, p. 270) list this species as _Cythere gracillima_ and refer it to _Macrocystis_. Richter considered _Bairdia_ a subgenus of _Cythere_ (1867, p. 288); consequently, this species should be listed here.

_Bairdia kingiana_ Jones and Holl, 1868

The illustration suggests a cast of a specimen with a ventrolateral ridge or rim; the lateral outline excludes this species from the genera discussed in this paper.

**Bairdia hisingeri** (Münster), 1830
_Cythere hisingeri_ Münster, 1830, [Neues] Jahrb. Mineralogie, Geognosie, Geologie, Petrefaktenkunde, 1830, p. 65, no. 18 [no illus.]. Carboniferous, Regnitzlosan, near Hof, Bavaria.

[not] _Bairdia hisingeri_ (Münster). Kummerow, 1939 [part] = Rectobairdia sp. B.
[not] _Bairdia hisingeri_ (Münster). Jones and Kirkby, 1879 = Rectobairdia sp. D.
[not] _Bairdia hisingeri_ (Münster). Jones and Kirkby, 1895 = Rectobairdia sp. C.
[not] _Bairdia schaurothiana_ Kirkby, 1858 = Rectobairdia schaurothiana (Kirkby), 1858.

This species was not illustrated by Münster, who described it as resembling a small _Modiola_. Jones and Kirkby obtained toptype material and illustrated this species in 1865 at which time they placed _B. schaurothiana_ Kirkby, 1858, in synonymy. The original description and illustration by Kirkby is of a species with a straight dorsum that is here recognized as valid in _Rectobairdia_.

_Bairdia hisingeri_ (Münster). Vine, 1884

This species differs from _B. hisingeri_ by having a convex dorsum, and a higher position of the posterior point.

_Bairdia hooverae_ Kellett. Payne, 1937
_Bairdia hooverae_ Kellett. Payne, 1937, Jour. Paleontology, v. 11, p. 284, pl. 39, figs. 5a, b. Hayden Branch formation, Sullivan County, Ind.

_Bairdia ignota_ Bradfield, 1935

This species is based on a steinkern.

_Bairdia kingi_ Reuss, 1854

_Cythere (Bairdia) kingi_ Reuss. Schmidt, 1867, Neues Jahrb. Mineralogie, Geologie, Paläontologie, 1867, p. 581, pl. 6, fig. 22, 33. Zechstein, Germany.
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

Bairdia lanulata Harlton, 1929


This species is based on a steinkern.

Bairdia murchisoniana Jones and Holl, 1868

This species is based on a steinkern. It is probably a steinkern, probably related to the same genus in which Bairdia griffithiana Jones and Holl, 1868, belongs.

Bairdia nasuta Morey, 1935

Bairdia nasuta Morey, 1935, Jour. Paleontology, v. 9, p. 480, pl. 54, figs. 13, 15. Amsden formation, Cherry Creek, Fremont County, Wyo.

The holotype of this species is an abraded specimen.

Bairdia nitida Jones and Kirkby, 1879


[not] Bairdia nitida Harlton, 1928 = Cryptobairdia coryelli (Roth and Skinner), 1831.

The illustrations are probably of a steinkern, overlap is not shown.

Bairdia notoconstricta Gibson, 1955


This species is based on a steinkern.

Bairdia nyei Crespin, 1945

Bairdia nyei Crespin, 1945, Royal Soc. Queensland Proc., v. 36, no. 4, p. 32, pl. 4, figs. 2a, b. Permian, Eastern Australia.

This species is based on a steinkern fide Crespin.

Bairdia osorioi Craneis and Gale, 1939


Bairdia deloi Craneis and Gale, 1939, idem, v. 33, p. 288, pl. 6, figs. 13, 14. Golconda formation, southwest of Ruma, Randolph County, Ill.

This species is based on a corroded specimen.

Bairdia parvula Richter, 1887


The illustrations are probably of a steinkern.

Bairdia pennata Coryell and Sample, 1932

Bairdia pennata Coryell and Sample, 1932, Am. Midland Nat. Histor., ser. 4, v. 2, pl. 7, figs. 9a, b. Ordovician, Ireland.

This species is probably based on a steinkern.
The holotype of this species is a juvenile of an unrecognized species.

*Bairdia plebia* Reuss, 1854


_Cythere (Bairdia) plebeja_ Reuss. Schmid, 1867, Neues Jahrb. Mineralogie, Geologie, Paläontologie, 1867, p. 551, pl. 6, fig. 26, Zechstein, Germany.


[not] *Bairdia plebia* Reuss. Kirkby, 1858 = *Bairdia* sp. I.


[not] *Bairdia plebia* Reuss. Kummerow, 1898 = *Bairdia* sp. Q.

The original illustrations are a lateral view of a right valve, and a ventral outline of a carapace. The character of the species cannot be determined without knowledge of the left valve. Reuss states that this species is similar in outline to _B. subdeltoidea_ from the Cretaceous. According to Bosquet (1854, p. 66 (56) ), Reuss illustrated a Cretaceous form as _Cytherina subdeltoidea_ (Reuss, 1845, p. 16, pl. 5, fig. 38), and later the same form from Tertiary sediments (Reuss, 1849, p. 9, pl. 8, figs. 1a, b). The illustrations of the Cretaceous form is a left valve view of a carapace; that of the Tertiary form is a right valve view of a carapace. Both specimens have a round anterior margin with the break in curvature at approximately midheight. Because Reuss records _B. plebia_ from both Bleichenbach and Salters, it is reasonable to assume that he had two or more specimens of this species. The shape of the species as illustrated by Reuss may therefore be assumed to be correct. The conception of _B. plebia_ was very broad, and specimens that differed markedly from the original illustration and that ranged in age from Carboniferous to Permian were assigned to this species, or as varieties of this species. Most of the varieties were subsequently raised to specific rank. All the specimens subsequently illustrated as _B. plebia_ differ in outline from the original and belong to other species.

*Bairdia plebia var. caudata* Kirkby, 1859

_Bairdia plebia var. caudata_ Kirkby, 1859 [part]. Tyneside Naturalists' Field Club Trans., v. 4, p. 143, pl. 9, figs. 12, 12a. A right valve. Originally illustrated as Woodcuts 2, 4 = _B. leptura_ (Richter, 1867; not. figs. 9, 10 = *B. caudata* Kirkby, 1859). Permian, Durham, England.

Figure 12 is a right side; consequently, information is insufficient to identify the specimen which differs in dorsoposterior margin from _B. caudata_.

*Bairdia plebia var. grandis* Jones, 1859

_Cythere (Bairdia) plebia var. grandis_ Jones, 1859, in Kirkby, Tyneside Naturalists' Field Club Trans., v. 4, p. 162, pl. 11, fig. 13. Permian, Durham, England. 

_Bairdia plebia var. munda_ Jones and Kirkby, 1875

_Bairdia plebia var. munda_ Jones and Kirkby, 1875, Annals Mag. Nat. History, ser. 4, v. 15, p. 57, pl. 6, fig. 7. Carboniferous, yellow limestone Tscherepete River near Tschernischine, district of Kalgouga, Government of Kalouga, Russia. Probably belongs in _Cryptobairdia_ n. gen. Based on a single specimen of which the outside of the left valve is illustrated.

_Bairdia plebia var. rhombica_ Jones, 1859

_Cythere (Bairdia) plebia var. rhombica_ Jones, 1859, in Kirkby, Tyneside Naturalists' Field Club Trans., v. 4, p. 162, pl. 11, figs. 10, 11, 12a, 12b. Permian, near Sunderland, Durham, England.

_Bairdia plebia var. rhombica_ Jones. Jones and Kirkby, 1875, Annals Mag. Nat. History, ser. 4, v. 15, p. 56, pl. 6, fig. 6. Permian (?), Sloboda, Russia. The illustrations differ from the Carboniferous species by greater height.

_Bairdia plebia var. rhombica_ Jones, 1859

_Cythere (Bairdia) plebia var. rhombica_ Jones, 1859, in Kirkby, Tyneside Naturalists' Field Club Trans., v. 4, p. 162, pl. 11, figs. 10, 11, 12a, 12b. Permian, near Sunderland, Durham, England.

The information available is inadequate to determine the species represented.

_Bairdia polenovae_ Samoilova, 1951

_Bairdia polenovae_ Samoilova, 1951, Moskov. Obschech. Ispytetei Prirody, Trudy, Geol., v. 1, p. 173, pl. 1, fig. 17. Upper Devonian, Russia.

The illustration is a right valve exterior view, and the description is inadequate to identify the species.

_Bairdia polygonata_ Scott, 1942

_Bairdia polygonata_ Scott, 1942, Jour. Paleontology, v. 16, p. 161, pl. 25, fig. 9. Otter formation, Wheatland County, Mont.

_Bairdia pseudomagna_ Stewart and Hendrix, 1945

_Bairdia pseudomagna_ Stewart and Hendrix, 1945, Jour. Paleontology, v. 19, p. 110, pl. 12, figs. 13, 14. Olenangy formation, Bartholomew Run, 80 yd north of the confluence of the main tributaries, 1 mile north of the Franklyn-Delaware County line, E3½SW½ sec. 4, T. 3 N., R. 19 W., Delaware County, Ohio.
This species is based on two steinkerns.

**Bairdia pyrrhaeichwardi, 1860**

**Bairdia pyrrhaeichwardi**, 1860 (?), Lethaea Rossica**, v. 1, p. 1344, pl. 52, figs. 3a, b. Permian, near Bourakova, Kazan, Russia.

The illustrations and description are inadequate to determine the species. Bassler and Kellett (1934, p. 347) refer this species to *Jonesius* and cite the first reference as Eichwald, 1844, without page or illustration citation. (See p. 86.)

**Cytliere (Bairdia) rhomboidea Kirkby**, which has been renamed *Cytliere (Bairdia) rhomboidea* subspecies.

**Bairdia reussiana** var. ischimbajevensis Glebovskaya, 1938

The holotype (USNM 123088) of this species is a steinkern. The description and illustration of a lateral view of a left valve, are inadequate to define the species.

Both the illustration and the description are inadequate to determine the specific characters of this species, its genus, or its specific name. In the Chouteau limestone. Because it is not possible to determine the specific characters of this species, it is considered as a nomen dubium. The large size of this species is reminiscent of *B. grandis* Jones in Kirkby, 1859.

**Bairdia subquadrata Glebovskaya, 1939**

The holotype (Missouri Univ. Os 1005–3) is a steinkern with fragments of shell (?) attached along the posterodorsal margin, and possibly along the posterior two-thirds of the ventral margin. The specimen measures 2.25 millimeters in greatest length to the posterior point where the posterior is broken. Morey (1936, p. 119) states that he found five distorted specimens in the Chouteau limestone. Because it is not possible to determine the specific characters of this species, it is considered as a nomen dubium. The large size of this species is reminiscent of *B. grandis* Jones in Kirkby, 1859.

**Bairdia spp.**

The original of plate 9, figure 8, is probably a steinkern; the illustrations on plate 11 suggest *Alanella*, which has been renamed *Alanella? dubia* Kesling and Sohn, 1958.
REVISION OF SOME PALEOZOIC OSTRACODE GENERA

FORMATION, 200 YD SOUTH OF NORTH LINE AND ONE-QUARTER OF A MILE WEST OF EAST LINE SEC. 12, T. 3 S., R. 2 E., CARTER COUNTY, OKLA.


The preceding taxa are based on right valves.

After this study was completed, I received on loan from Dr. S. A. Levinson a paper by Y. T. Hou, 1954, on some lower Permian ostracodes from western Hupel, that contains the following new species not included in this revision:


SYNONYMS AND REJECTED SPECIES OF BAIRDIA

acetatata Coryell and Billings, 1932 = Fatabiocypris acetatata (Coryell and Billings), 1932.

acetatata Coryell and Billings. Coryell and Booth, 1933 = Fatabiocypris horbareaus (Harlton), 1927.

acuta Cooper, 1941 [not Bonnema, 1940] = B. aculeala Cooper, 1957.

acuta Jones in King, 1850 = nomen dubium

acuta Jones. Schmid, 1857 = sp. indet.

aqua Cooper, 1941 = Orthobairdia coryelli (Ulrich), 1891.

aqualis Eichwald, 1857 = Cryptobairdia aqualis (Eichwald), 1857.


affinis Morris, 1845 = nomen dubium.

alta Jones and Kirkby. Posner, 1951 = Bairdia sp. U.


altifrons Knight, 1928 = Orthobairdia texana (Harlton), 1927.


ampla (Reuss). Richter, 1867 = probably the same as Cythere brevicauda (Jones). Richter, 1867.


ampla (Reuss). Jones and Kirkby, 1859 = Bairdia sp. J?; Bairdia sp. P; and sp. indet.

ampla (Reuss). Kummerow, 1939 = Rectobairdia sinuosa? (Merey), 1936.

ampla (Reuss). Cooper, 1946 = Orthobairdia texana (Harlton), 1927.

amplectens Kesling and Kilgore, 1952 = Bairdia teguminoides Ulrich, 1891.

amputata Kirkby, 1859 = nomen dubium.

amputata Kirkby. Jones and Kirkby, 1879 = Rectobairdia sp. A.

angydaeformis Bradfield, 1935 = nomen dubium.

angydaeformis Coryell and Sample, 1932 [not Brady (1870a)] = nomen dubium (same as B. pennata).

angydaeformis Posner, 1951 [not Brady (1870a); not Coryell and Sample (1932)] = Rectobairdia posneri Sohn. n. name.

angydaeformis Posner, 1951 = Rectobairdia legumen? (Jones and Kirkby), 1886.

angusta Cooper, 1946 = Bairdia angustata Cooper, 1957.

anomala Payne, 1937 = nomen dubium.

anticostiensis Jones, 1890 = Krausella anticostiensis (Jones), 1890.

arcuata (McCoy). Bassler and Kellett, 1934 = gen. indet.

ardmoreensis Harlton, 1929 = Bairdiolites ardmoreensis (Harlton), 1929.

ardmoreensis Harlton. Cooper, 1946 = Bairdia harltoni Cooper, 1946.


attenuata Girty, 1910 = Bairdia girtyi Sohn. n. name.

attenuata Girty. Cooper, 1941 = Bairdia sp. L.

auricula Knight, 1928 = Orthobairdia oklahomaeus (Harlton), 1927.


bartholomeensis Stewart and Hendrix, 1945 = nomen dubium.

bedfordensis Gels, 1892 = Bairdiaceps bedfordensis (Gels), 1892.


beedei Ulrich and Bassler. Kellett, 1934 = Bairdia hurwitzi Coryell and Booth, 1933.

beedei Ulrich and Bassler. Johnson, 1936 = Bairdia assay Sohn. n. sp.


beedei var. abrupta Ulrich and Bassler, 1906 = Bairdia beedei Ulrich and Bassler, 1906.

beedei var. inflata Payne, 1937 = Bairdia hurwitzi? Coryell and Booth, 1933.


brevicorvis (Kirkby). Richter, 1867 = Cryptobairdia sp. B.

brevicorvis Bradfield, 1935 = nomen dubium.

brevicorvis Bradfield, 1935 [not B. curvata var. brevicorvis Jones and Kirkby, 1879?] = Bairdia white-sidei Bradfield, 1935.

brevicorvis Bradfield, 1935 = Cryptobairdia curvata? (Knight), 1890.

brevicorvis (Münster). Jones and Kirkby, 1890 [list] = Silenites? bilobatus (Münster), 1839.

brevicorvis Polenova, 1932 = gen. indet.

brevicorvis (Roth and Cooper). Bradfield, 1935.

brevicorvis (Roth and Cooper). Bradfield, 1935.

brevicorvis (Roth and Cooper). Bradfield, 1935.

brevicorvis (Roth and Cooper). Bradfield, 1935.

brevicorvis (Roth and Cooper). Bradfield, 1935.

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brevicorvis (Roth and Cooper). Bradfield, 1935.
REVISION OF SOME PALEOZOIC OSTRACODE GENERA

giisingeri hextensis granireticulata Jiisingeri (Harlton), 1927.

gibbera Kesling and Kilgore, 1952 [not B. gibbera Morey, 1933 = Richardson epicypha (Kesling and Kilgore), 1955.
gibbsa Payne, 1937 = Cryptobairdia coreyi (Roth and Skinner), 1931.
glenensis Harlton, 1927 = Fabalicypris glennensis (Harlton), 1927.
groelis McCoy, 1842 = nomen nudum. groelis McCoy, 1844 = nomen dubium. groelis McCoy. Reuss, 1854 = Cryptobairdia? subgracilis (Geinitz), 1861.
groelis McCoy. Richter, 1855 = Cryptobairdia? subgracilis (Geinitz), 1861.
granoreticulata Harlton, 1929 = Orthobairdia cestriensis? (Ulrich), 1929.
granoreticulata Harlton. Cooper, 1941 = Bairdia sp. J. gruyi Crespin, 1945 = Silicites gruyi (Crespin), 1945.
griffithiana Jones and Holl, 1898 = nomen dubium. guadalupiana Hamilton, 1942 = Orthobairdia texana (Harlton), 1927.
haworthi Knight, 1928 = Cryptobairdia haworthi (Knight), 1929.
haworthi Knight. Warthin, 1930 = Fabalicypris wathini (Harlton), 1929.
hezontsis Harlton, 1929 = Rectobairdia? hezontsis (Harlton), 1929.
hisingeri var. contracta Jones and Kirkby, 1895 = Cryptobairdia contracta Sohn, n. name. hisingeri var. mongolensis Jones and Kirkby, 1802 = Rectobairdia mongolensis (Jones and Kirkby), 1802.

hisipida Harlton. Coryell and Sample, 1932 = Bairdia beedei Ulrich and Bassler, 1906.
hisipida var. alta Bradfield, 1935 = Bairdia beedei Ulrich and Bassler, 1906.
hisipida var. lesterica Bradfield, 1935 = Cryptobairdia coryelli? (Roth and Skinner), 1931.
hoffmanae Kellett, 1934 = Cryptobairdia hoffmanae (Kellett), 1934.
hooverae Kellett, 1934 = Cryptobairdia hooverae (Kellett), 1934.
hoxbarensis Harlton. Harlton, 1929 = Orthobairdia texana (Harlton), 1927.
hoxbarensis Harlton. Bradfield, 1935 = Orthobairdia texana (Harlton), 1927.
hoxbarensis Harlton. Kellett, 1934 = Fabalicypris acetalata (Coryell and Billings), 1932.
hoxbarensis Harlton. Johnson, 1936 = Fabalicypris acetalata? (Coryell and Billings), 1936.
hoxbarensis Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hoxbarensis Harlton. Scott and Borger, 1941 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hoxbarensis Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Scott and Borger, 1941 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
hooverae Harlton. Payne, 1937 = Fabalicypris acetalata? (Coryell and Billings), 1932.
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

magnacurta Morey, 1935 = Cryptobairdia compacta? (Gels), 1935.
magnacurta Morey. Morey, 1936 = Bairdia sp. O.
margarita Harlton, 1929 = Bairdia graciosa (Harlton), 1929.
margarita Richter, 1867 = nomen dubium.
marmorea Kellett, 1934 = Bairdia beedei Ulrich and Bassler, 1934.
mazyi Harris and Lalicker, 1932 = Cryptobairdia mazyi (Harris and Lalicker), 1932.
mexicana Harlton, 1929 = Bairdia grahamensis Harlton, 1929.
mexicana var. altiva Jones and Kirkby, 1935 = Orthobairdia cestricina? (Ulrich), 1935.
mexicana var. amygdalina Kirkby, 1859 = Cryptobairdia amygdalina (Kirkby), 1859.
mexicana var. brevicauda Jones, 1859, in Kirkby = Rectobairdia brevicauda (Jones), 1859.
mexicana var. caudata. Jones, 1859 = Bairdia caudata Kirkby, 1859.
mexicana var. compressa Kirkby, 1858 = Cryptobairdia compressa (Kirkby), 1858.
mexicana var. elongata Kirkby, 1858 = Bairdia elongatella Sohn, n. name.
mexicana var. grandis Jones, 1859, in Kirkby = nomen dubium.
mexicana var. mundula Jones and Kirkby, 1875 = nomen dubium.
mexicana var. neptuni Kirkby, 1858 = Bairdia neptuni Kirkby, 1858.
mexicana var. reussiana Kirkby, 1859 = Bairdia reussiana Kirkby, 1859.
mexicana var. rhombica Jones, 1859 = nomen dubium.
mexicana var. ventricosa Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
mexicana var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
mexicana var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
mexicana var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.

plebia Reuss. Jones and Kirkby, 1879 = Bairdia sp. I.
plebia Reuss. Jones and Kirkby, 1892 = Bairdia harltoni? (Cooper), 1946.
plebia Reuss. Kummerov, 1930 = Bairdia sp. Q.
plegia var. alta Jones and Kirkby, 1935 = Orthobairdia cestricina? (Ulrich), 1935.
plegia var. amygdalina Kirkby, 1859 = Cryptobairdia amygdalina (Kirkby), 1859.
plegia var. brevicauda Jones, 1859, in Kirkby = Rectobairdia brevicauda (Jones), 1859.
plegia var. caudata. Kirkby, 1859 = Bairdia caudata Kirkby, 1859.
plegia var. compressa Kirkby, 1858 = Cryptobairdia compressa (Kirkby), 1858.
plegia var. elongata Kirkby, 1858 = Bairdia elongatella Sohn, n. name.
plegia var. grandis Jones, 1859, in Kirkby = nomen dubium.
plegia var. mundula Jones and Kirkby, 1875 = nomen dubium.
plegia var. neptuni Kirkby, 1858 = Bairdia neptuni Kirkby, 1858.
plegia var. reussiana Kirkby, 1859 = Bairdia reussiana Kirkby, 1859.
plegia var. rhombica Jones, 1859 = nomen dubium.
plegia var. ventricosa Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
plegia var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
plegia var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.
plegia var. ventricosa? Kirkby, 1859 = Cryptobairdia ventricosa (Kirkby), 1858.

plegia Reuss. Jones and Kirkby, 1879 = Bairdia sp. I.
plegia Reuss. Jones and Kirkby, 1892 = Bairdia harltoni? (Cooper), 1946.
REVISION OF SOME PALEOZOIC OSTRACODE GENERA

reussiana Kirkby. Glebovskaya, 1939 = Rectobairdia sp. H.
reussiana Kirkby. Cordell, 1952 [part] = Rectobairdia symmetrica (Cooper), 1946; [part] = Bairdia subfusciformis?
Hamiltom, 1942; [part] = Bairdia reussiana Kirkby, 1858.
reussiana var. ichimbaejensis Glebovskaya, 1938 = nomen dubium.
rhomboidea Kirkby, 1858 = Cryptobairdia? rhomboidea (Kirkby), 1858.
rhomboidea Kirkby. Schmld, 1897 = sp. indet.
cf. B. rhomboidea Kirkby. Cooper, 1946 = sp. indet.
rockfordensis Gibson, 1955 = nomen dubium.
rogatz Coryell and Sample, 1932 = Fabalicypris acetalata (Coryell and Billings), 1932.

sulcensis Gels. 1932 = Bairdia permagna Gels, 1932.
saltieriana Jones and Holl, 1886 = gen. indet.
sample Coryell and Booth, 1933 = Bairdia beedei Ulrich and Bassler, 1900.
saxifraga Krommelbein, 1954 = Rectobairdia saxifraga (Krommelbein), 1954.
scapa Eichwald, 1860 = gen. indet.
schauworthiana Kirkby, 1858 = Rectobairdia schauworthiana (Kirkby), 1858.
schauworthiana Kirkby. Cooper, 1946 = Rectobairdia sp. G. schauworthiana Kirkby. Marpke, 1952 = Rectobairdia sp. G.
scalli Coryell and Booth, 1933 = Orthobairdia texana? (Harlton), 1927.
scalli Coryell and Booth. Cooper, 1946 = Cryptobairdia pin-nula? (Coryell and Booth), 1933.
scalli Coryell and Booth. Cordell, 1952 = Cryptobairdia pin-nula (Coryell and Booth), 1933.
semimunata Netschajew, 1894 = nomen dubium.
seminalis Knight, 1928 = Cryptobairdia seminalis (Knight), 1928.


seminalis Knight. Payne, 1837 = Orthobairdia oklahomaensis (Harlton) 1927.

seminalis Knight. Coryell and Rozanski, 1942 = Orthobairdia centriensis? (Ulrich) 1891.


shideleri Delo, 1930 = Fabalicypris shideleri (Delo), 1930.
siliquoides Jones and Kirkby, 1879 = gen. indet.
sinuosa Morey, 1936 = Rectobairdia sinuosa (Morey), 1936.
sinuosa Cooper, 1941 = Orthobairdia centriensis? (Ulrich), 1891.
spinosa Cooper, 1946 = Pustulobairdia spinosa (Cooper), 1946.

subaequalis Gels. 1932 = Fabalicypris? subaequalis (Gels), 1932.
subcitriformis Knight, 1928 = Bairdia pompilioides Harlton, 1928.

subeulindrica (Münster). Kummerow, 1939 = gen. indet.
subelongata Jones and Kirkby, 1879 [part] = Bairdia cypris subelongata (Jones and Kirkby), 1879; [part] = Cryptoba-

suberussiana var. major Jones and Kirkby, 1886 = Bairdia cypris major (Jones and Kirkby), 1886.

subequalis Gels. Sohn, 1940 = Fabalicypris? subequalis (Gels), 1932.

subgraecilis Geinitz, 1861 = Cryptobairdia? subgraecilis (Gein-

subgraecilis Geinitz. Jones and Kirkby, 1879 = Cryptobairdia?

submucronata Jones and Kirkby. Kummerow, 1939 = Bairdia sp. H.

subparallello Morey, 1935 = nomen dubium.

subquadrata Glebovskaya, 1939 = nomen dubium.

subreniformis (Kirkby), 1859 = Orthobairdia? subreniformis (Kirkby), 1859.

subroundata Harlton, 1929 = gen. indet.

subtila Cooper, 1941 = Cryptobairdia? subtila (Cooper), 1941.


subzeza Coryell and Billings, 1932 = Rectobairdia subzeza (Coryell and Billings), 1932.

summa Coryell and Billings. Cooper, 1946 = Cryptobairdia hoffmanae? (Kellett), 1932.

summacuminata Coryell and Malkin, 1936 = Bairdia leugumi-

symmetrica Cooper, 1946 = Rectobairdia symmetrica (Cooper), 1946.

symmetrica Egorov, 1953 [not Cooper, 1946] = Bairdia egrovi Sohn, n. name.
tantilla Kummerow, 1953 = Rectobairdia tantilla (Kum-


texana Harlton 1927 = Orthobairdia texana? (Harlton), 1927.
tichomiroyi Egorov, 1953 = Rectobairdia tichomiroyi (Egorov), 1953.

tikhyl Polenova, 1952 = Rectobairdia tikhyl (Polenova), 1952.
trojana Wilson, 1933 = Bairdia cypris? trojana (Wilson), 1933.

tromcaza Kirkby, 1858 = Bairdia amputata Kirkby, 1859 = nomen dubium.
tunida Kummerow, 1928 = gen. indet.

tunida Upson, 1933 = Bairdia erosa? Harlton, 1929.
uniac Stewart and Hendrix, 1945 = nomen dubium.
ventricosa Kirkby, 1858 = Cryptobairdia ventricosa (Kirkby), 1858.
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

ventricosa Roth and Skinner, 1930 = Cryptobairdia coryelli (Roth and Skinner), 1931.
verwiebei Kellett. Cooper, 1946 = Bairdia acuminata Cooper, 1946.
wasbashensis Scott and Borger, 1941 = gen. indet.
worthini Bradfield, 1935 = Fabalicypris worthini (Bradfield), 1935.
worthiani Kellett, 1935 = Cryptobairdia forakerensis (Kellett), 1934.
wordensis Hamilton, 1942 = Ceratobairdia wordensis (Hamilton) 1942.
wrefordensis Upson, 1933 = Bairdia beedei"? Ulrich and Bassler, 1906.
sp. 1 to sp. 8 Cordell, 1952 [not revised because of obviously inadequate material].
sp. 9 Cordell, 1952 = Bairdia pompilioides? Harlton, 1928.
sp. Hou, 1935 = steinkern of Healdia?
sp. Kummerow, 1939 = gen. indet.
sp. Pe?neau, 1927 = position uncertain.
sp. No. 1 Posner, 1951 = position uncertain.
? sp. Scott, 1942 = position uncertain.
sp. Stewart, 1936 = position uncertain.
sp. A Upson, 1933 = steinkern, gen. undet.

Genus CRYPTOBAIRDIA Sohn, n. gen.

Type species.—Bairdia ventricosa Roth and Skinner, 1930 [not Kirkby, 1858], Jour. Paleontology, v. 4, p. 352, pl. 28, figs. 12–14. Pennsylvania, Colorado; = B. coryelli Roth and Skinner, 1931.

Diagnosis.—Differs from Bairdia s. s. by the dorsoanterior margin being not distinct.

Discussion.—This genus is unique in having a rounded anterior margin into which the dorsal margin grades without differentiation of a dorsoanterior margin. It resembles Bairdia s. s. in having a convex dorsal margin, a pointed or bluntly pointed posterior, and curved sides in dorsal outline.

The genus Cryptobairdia is defined as not possessing a distinct dorsoanterior margin. It consists of two groups: in the first the greatest height is equal to more than half the greatest length, in the second the greatest height is less than half the greatest length. A total of 29 species, 6 of which are new, but are here designated by letter, are recognized. These are defined by a dichotomous key. The stratigraphic range and the frequency of occurrence of these species are shown in figure 7.

Figure 7 shows that 21 of the total of 29 species are of Middle Pennsylvanian through Permian in age. These species are recorded from 44 out of 57 localities; the remaining 13 localities are one each from the Middle and Upper Devonian, and 11 from Mississippian and Carboniferous.

Geologic range.—Middle Devonian–Permian.
Lithology.—Limestone and shale.
Habitat.—Marine.

<table>
<thead>
<tr>
<th>NUMBER OF SPECIES AND LOCALITIES</th>
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<tr>
<td>PERMIAN</td>
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<td>DEVONIAN</td>
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EXPLANATION

- Number of species restricted to system of parts of system
- Number of species recorded in system or part of system, the types of which are from the Permian
- Number of species recorded in system or part of system, the types of which are from the Upper Pennsylvanian
- Number of species recorded in system or part of system, the types of which are from the Middle Pennsylvanian
- Number of species recorded in system or part of system, the types of which are from the Upper Mississippian
- Number of localities or stratigraphic levels from which the species are recorded

FIGURE 7.—Stratigraphic range and frequency distribution of species in Cryptobairdia.
KEY TO THE SPECIES OF CRYPTOBAIRDIA

1. Greatest height more than half the greatest length. 2
   1a. Greatest height less than half the greatest length. 14
   2. Ventral margin straight. 9
   2a. Ventral margin curved. 3
   3. Dorsoposterior margin approximately one-third of the greatest length. 4
   3a. Dorsoposterior margin about one-half of the greatest length. 7
   4. Greatest width equal to or larger than greatest height. 3
   4a. Greatest width below midheight. 12
   5. Both ends convex in dorsal outline. compacta (p. 49), (magnacurta?, merivina?) 6
   5a. Ends pointed in dorsal outline. 2
   6. Posterior ends concave in dorsal outline. sp. A (p. 51)
   7. Greatest height less than half the greatest length. 2
   7a. Greatest height more than one-third of greatest length. 24
   8. Dorsoposterior part of right valve inflated forakerensis (p. 50), (denissa?, kanwakensis?, whortani?) 8
   8a. Dorsoposterior part of right valve not inflated pinnula (p. 50)
   9. Posterior point in ventral third of greatest height. 13
   9a. Dorsoposterior margin convex. 10
   10. Dorsoposterior margin convex. seminals (p. 51) 10a. Dorsoposterior margin concave. 11
   11. Greatest width equal to or larger than greatest height. coryelli (p. 49), (bidorsalis?, gibbosa, hispida var. lesterica?, nitida) 11a. Greatest width less than greatest height. drupaec (p. 49)
   12. Posterior point in ventral third of greatest height; greatest width approximately equal to greatest height, located median. hooverae (p. 50) 12a. Posterior point in ventral quarter of greatest height; greatest width two-thirds the greatest height, located anterior to midlength. praecea (p. 50)
   13. Dorsoposterior margin to one-third of the greatest length. 27a. Sides of posterior in dorsal outline concave. singularis (p. 51)
   14. Ventral margin straight. 15
   14a. Ventral margin curved. 19
   15. Dorsoposterior margin to one-quarter of greatest length. 16
   15a. Dorsoposterior margin to one-third or more of greatest length. 17
   16. Ends symmetrical in dorsal outline; greatest width at midlength. hoffmani (p. 50) 16a. Ends not symmetrical in dorsal outline; posterior blunt. aequalis (p. 48) (distraeta?)
   17. Ventroposterior margin straight. sp. C (p. 52) 17a. Ventroposterior margin convex. 18
   18. Anterior margin round. compressa (p. 49) 18a. Anterior margin bluntly pointed. sp. E (p. 52)
   19. Ventral margin convex. 20
   19a. Ventral margin concave. 21
   20. Dorsoposterior margin straight; dorsoanterior margin straight to slightly concave. rhomboidea (p. 51) 20a. Dorsoposterior margin concave; dorsoanterior margin convex. 28
   21. Dorsoposterior margin to one-quarter of greatest length. 22
   21a. Dorsoposterior margin to one-third or more of greatest length. 24
   22. Greatest height about one-third of greatest length subgranulars (p. 51)
   22a. Greatest height more than one-third of greatest length. 23
   23. Greatest width in dorsal outline at midlength. 27
   24. Interior margin pointed. 25
   24a. Interior margin round. 25a. Interior margin convex. sp. D (p. 52)
   25a. Interior margin concave. maxeyi (p. 50)
   26. Greatest height more than one-third of greatest length; junction of ventroanterior and anterior margins at approximately midheight. havorthi (p. 50)
   26a. Greatest height one-third or less of greatest length; junction of ventroanterior and anterior margins above midheight. F (p. 52)
   27. Sides of posterior in dorsal outline concave. hoffmanae (p. 50)
   28. Sides of posterior in dorsal outline concave. ventricosa (p. 51)

ASSIGNED SPECIES

Cryptobairdia aequalis (Eichwald), 1857


Eichwald, 1860, Letheae Rossica, v. 1, p. 1340, atlas, pl. 52, figs. 6a-c [probably a corroded specimen]. Carboniferous, village of Sloboda, Tounia Government, Russia.

Bairdia curta McCoy. Eichwald, 1860 [part], Letheae Rossica, v. 1, p. 1338, atlas, pl. 52, figs. 18a-c [not figs. 17a-c = Bairdia sp. D]. Carboniferous, red sandstone, near Tschudowka, Government of St. Petersburg, Russia.


In 1860, Eichwald (p. 1340) referred to this species as “B. aequalis Eichwald, 1857, Soc. Natur. Moscou Bull., p. 109.” I am unable to obtain numbers 1 and 2 of this bulletin, but in number 4, he discussed this species (p. 311) without reference to any previous citation. Jones and Kirkby (1875, p. 53) and Basler and Kellett (1934, p. 164) refer to this species as Eichwald, 1857, p. 311.

Geologic range.—Carboniferous.

Cryptobairdia amygdalina (Kirkby), 1859

Bairdia plebia var. amygdalina Kirkby, 1859, Tyneside Naturalists' Field Club Trans., v. 4, p. 145, text fig. 5, pl. 9, figs. 11, 11a. Peruvian, shell limestone, Tunstall Hill, Durham, England.

Bairdia macronata Reuss. Kirkby, 1858 [part], Annals Mag. Nat. History, ser. 3, v. 2, p. 327, pl. 10, figs. 11, 11a [not figs. 9, 10; see Bairdia caudata Kirkby, 1850]. Same illustrations as above.
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 43, pl. 2, figs. 8-10; pl. 4, figs. 16-17. Shoal Creek to Greenup zones, Adams County, Macoupin County, Cumberland County, Ill.

Cordell, 1952, Jour. Paleontology, v. 26, p. 84, pl. 17, figs. 17-20. Bethany Falls member of Swope formation to upper shale member of the Lawrence formation, De Kalb, Clinton, and other Counties, Mo.

Bairdia ventricosa Roth and Skinner, 1930, Jour. Paleontology, v. 4, p. 352, pl. 28, figs. 12-14, McCoy formation, McCoy Post Office, Eagle County, Colo.

Bairdia bairdi Blaken, 1931, Jour. Paleontology, v. 5, p. 163; n. name for B. nitida Blaken, 1928 [not Jones and Kirkby, 1879].

Bairdia bidorsalis Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 81, pl. 5, figs. 6a, b. Deese formation, Ardmore Basin, Okla. Based on a young individual.

Bairdia nitida Blaken, 1928, Jour. Paleontology, v. 2, p. 139, pl. 21, fig. 12a, b. Hexbar formation, Love County, Okla.

Harlton, 1929, Texas Univ. Bull. 2904, p. 155, pl. 3, figs. 3a, b. Canyon Group, Menard County, Tex. Plesiotype (USNM 80581) is a specimen with the shell partly dissolved.

Bairdia gibbosa Payne, 1837 [not B. neglecta gibbosa Egger, 1858], Jour. Paleontology, v. 11, p. 283, pl. 39, figs. 4a, b. Hayden Branch formation, Turman Township, Sullivan County, Ind.


Cordell, 1952 [part], Jour. Paleontology, v. 26, p. 85, pl. 19, figs. 11, 12 [not figs. 7-10 = B. crassa Harlton, 1929], Stanton formation, shale parting in about middle of Stoner limestone, 0.8 mile northwest of Searcees, Clinton County, Mo.


Bairdia blakei Harlton, Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 42, pl. 1, figs. 16-19 = Bairdia sp. R.

Bairdia nitida Harlton. Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 72, pl. 6, figs. 3a, b = B. whitesidei? Bradfield, 1935.

Many of the species in the synonymy are based on specimens that are either young individuals, or from which a certain amount of shell material has been dissolved.

Geologic range.—Middle and Upper Pennsylvanian.

Cryptobairdia drupacea (Richter), 1855


Cythere (Cythereis) drupacea Richter. Schmid, 1867 = sp. indet.

Geologic range.—Permian.
Cryptobairdia folgeri (Kellett), 1934

Bairdia folgeri Kellett, 1934, Jour. Paleontology, v. 8, p. 130, pl. 18, figs. 1a-f, 4a-f, pl. 19, figs. 1a-d, 4a-d. Virgilian series, the holotype (USNM 89483) is from the Waukarusa limestone, Webanaac group, about 8 miles south-southwest of Topeka, Shawnee County, Kans.

Bairdia, forakerensis Kellett, 1934

Bairdia, forakerensis Kuratani

Bairdia haworthi Kellett, 1934, Jour. Paleontology, v. 8, p. 137, pl. 18, figs. 3a, b. Limestone and shale, lower Elmdale formation, below road and above water level of Cottonwood River, upstream of Cottonwood River bridge, east of Elmdale, Chase County, Kans.


The holotype of B. forakerensis (USNM 89484) is partly abraded. Kellett illustrated B. haworthi with an outline drawing of the inside of a right valve. The carapace of a paratype of B. haworthi (USNM 90097a) is here illustrated.

Geologic range.—Upper Pennsylvanian–Permian.

Cryptobairdia forakerensis (Kellett), 1934

Plate 2, figures 1, 2

Bairdia, forakerensis Kellett, 1934, Jour. Paleontology, v. 8, p. 137, pl. 18, figs. 3a, b. Limestone and shale, lower Elmdale formation, below road and above water level of Cottonwood River, upstream of Cottonwood River bridge, east of Elmdale, Chase County, Kans.


B. haworthi Kellett, 1934, Jour. Paleontology, v. 8, p. 126, pl. 14, figs. 5a, b. Top of Ervine Creek limestone member, Deer Creek formation, Shawnee group, railroad cut near Kansas River just west of Shawnee-Douglass County line crossing Highway 10, Kans.


[not] Bairdia, haworthi Kellett. Cooper, 1940 = Cryptobairdia sp. A.

Geologic range.—Upper Pennsylvanian–Permian.

Cryptobairdia maxeyi (Harris and Lalicker), 1932

Bairdia, maxeyi Harris and Lalicker, 1932, Am. Midland Naturalist, v. 13, p. 405, pl. 37, fig. 9. Garrison shale, Cowley County, Kans.

Geologic range.—Permian.

Cryptobairdia pilula (Coryell and Booth), 1933

Bairdia, pilula Coryell and Booth, 1933, Am. Midland Naturalist, v. 14, p. 293, pl. 3, fig. 14. Wayland shale west side of Salt Creek, near Graham–Throckorton road, 1 mile west of Graham, Young County, Tex.


Bairdia, schelhi Coryell and Booth. Cordell, 1952, Jour. Paleontology, v. 26, p. 90, pl. 18, fig. 11; pl. 19, figs. 1-6. Endorn shale, SE1/4 sec. 29, T. 59 N., R. 29 W., Daviess County; NE1/4 sec. 17, T. 55 N., R. 31 W., Clinton County; shale partings in Block limestone SE1/4NE1/4 sec. 36, T. 60 N., R. 25 W., Daviess County, Mo.

Geologic range.—Upper Pennsylvanian–Permian.

Cryptobairdia praecisa (Jones and Kirkby), 1879


The wedge shape towards the posterior in dorsal outline and the almost straight truncated anterior distinguish this species.

Geologic range.—Carboniferous.

Cryptobairdia recta (Harlton), 1929

Plate 2, figures 6, 7

Bairdia, recta Harlton, 1929, Texas Univ. Bull. 2901, p. 159, pl. 4, figs. 4a-e. Canyon Group, near Hext, Menard County, Tex.

The original of figure 4b from Harlton's cotypes (USNM 80590) is here designated as the lectotype.

Geologic range.—Upper Pennsylvanian.
Cryptobairdia rhomboidea (Kirby), 1858


Kirby, 1859, Tyneside Naturalists’ Field Club Trans., v. 4, p. 149, woodcuts 14, pl. 10, figs. 3, 3a. Locality same as above.

[not] Cythere (Bairdia) rhomboidea Kirby. Schmid, 1867 = sp. indet.


[not] Bairdia rhomboidea Brady, 1893, in Folin and Perier 1867-71, Fonds de la Mer, p. 162, pi. 19, figs. 14, 15. Recent, Mauritius = B. tuberculata Brady, 1880. This species differs from Bairdia and Cryptobairdia in lateral outline.


Jones and Sherborn, 1883, Supplementary Monograph Ter­tiary Entomostraca, England: Palaeontogr. Soc. London, p. 18, pl. 1, figs. 3a–c. Same locality as above. Requires a new name.

Geologic range.—Permian.

Cryptobairdia seminalis (Knight), 1928

Bairdia seminalis Knight, 1928, Journ. Paleontology, v. 2, p. 320, pl. 43, figs. 2a–d. Shale partings in “Brown lith” of Labette formation, exposed in bank of creek east of Price Rd., and south of Ladue Rd., St. Louis County, Mo.


Johnson, 1939, Nebraska Geol. Survey Paper 11, p. 40, pl. 4, fig. 31. Shale in South Bend limestone, Stanton formation, Atwood quarry, [county not given], Nebr.

Bairdia blakei Harlton. Bradfield, 1935, Bull. Am. Paleontol­ogy, v. 22, no. 73, p. 84, figs. 1a, b. Union Diary limestone, top part, railroad cut, center line SW4/4 sec. 6, T. 3 S., R. 2 E., 7 miles north and 3 miles east of Ardmore, Carter County, Okla.


[not] Bairdia seminalis Knight. Coryell and Rozanski, 1942 = Orthobairdia cestriensisl (Ulrich), 1891.


Geologic range.—Middle and Upper Pennsylvanian.

Cryptobairdia singularis (Krömmelbein), 1954

Bairdia singularis Krömmelbein, 1954, Senckenbergiana, v. 34, no. 4/6, p. 248, pl. 1, figs. 1a–d. Givetian, Paffrather Mulde, Germany.

Geologic range.—Middle Devonian.

Cryptobairdia subgracilis (Geinitz), 1861

Bairdia subgracilis Geinitz, 1861, Dyas, v. 1, p. 34, figs. 2a–c. Permian, Zechstein, Wetterau and Selters, Germany.


[not] Bairdia arcuata var. gracilis Bosquet, 1854, Monograph. Crustacees Fossiles du Terrain Crétacé du Duche de Limbourg, p. 60, pl. 5, figs. 4a–d = Paracypris ?

Geinitz erected this species for Bairdia gracilis Jones, 1850 [not McCoy, 1841], and illustrated Reuss’ German specimen. Jones’ species is here considered a nomen dubium.

Jones and Kirby, 1879, illustrated a Carboniferous species which they referred to Bairdia subgracilis Geinitz. The Carboniferous species differs from Reuss’ species by the posterior being more rounded and should be referred to Cryptobairdia? sp.

Geologic range.—Permian.

Cryptobairdia? subtila (Cooper), 1941

Bairdia subtila Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 26, pl. 2, figs. 5, 6. Kinkaid formation, NE1/4SW1/4 NE3/4 sec. 20, T. 12 S., R. 3 E., one-half a mile south of Veatch School, Johnson County, Ill.

Geologic range.—Upper Mississippian.

Cryptobairdia ventricosa (Kirby), 1858


Bairdia plebia var. ventricosa (Knight). Kirby, 1859, Tyneside Naturalists’ Field Club Trans., v. 4, p. 146, woodcuts 9, pl. 1, figs. 3, 3a. Same locality as above.

[not] Bairdia ventricosa Brady, 1890, Royal Soc. Edinburgh Trans., v. 35, p. 494, pl. 4, figs. 17, 18. Requires a new name. The muscle scar patterns and lateral outline of this living species differ from Bairdia and Cryptobairdia.

[not] Bairdia ventricosa Roth and Skinner, 1930 = Crypto­ bairdia corielli (Roth and Skinner), 1931.

Geologic range.—Permian.

Cryptobairdia sp. A


Geologic range.—Upper Pennsylvanian.
Cryptobairdia sp. B


[not] Bairdia berniciensis Kirkby, 1858 = Cryptobairdia? berniciensis (Kirkby), 1858.

Geologic range.—Permian.

Cryptobairdia sp. C


Geologic range.—Permian.

Bairdia sp. D


Kirkby, 1859, Tyneside Naturalists' Field Club Trans., v. 4, p. 148, woodcuts 11, pl. 9, figs. 8, 8a. Same locality as above.

Geologic range.—Permian.

Cryptobairdia sp. E

Bairdia osorioi Cronels and Gale. Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 9, 14 [list], pl. 2, figs. 13, 14. Golconda formation NE\(^{1/4}\)NW\(^{1/4}\) sec. 20, T. 5 S., R. 8 W., Randolph County, Ill.


Geologic range.—Upper Mississippian.

Cryptobairdia sp. F

Bairdia subelongata Jones and Kirkby, 1870 [part], Geol. Soc. London, Quart. Jour., v. 35, p. 573, pl. 30, figs. 8, 9 [not figs. 1-6 = Bairdiacypris subelongata; not fig. 7 = sp. indet.; not figs. 10, 11 = Rectobairdia sp. F; not fig. 16 = Fabalicypris? sp.] Carboniferous, Paiston quarry, East Lothian, Scotland.

Differs from other species in this genus by truncated ventroanterior margin and by gently convex ventral margin.

Geologic range.—Carboniferous.

Cryptobairdia! sp.


Geologic range.—Carboniferous.

Cryptobairdia! sp. indet.


For discussion see Bairdia kellettae Glebovskaya, 1939.

Genus Rectobairdia Sohn, n. gen.

Type species.—Bairdia depressa Geis, 1932 [not Kafka, 1885], Jour. Paleontology, v. 6, p. 178, pl. 25, figs. 12a, b. Salem limestone, Indiana = Bairdia distressa Geis, 1940, in Sohn.

Diagnosis.—Differs from Bairdia s. s. by having a straight to very gently curved dorsal margin.

Discussion.—Species in this genus have pointed posteriors. Several species seem to be transitional (p. 8) and are included here because the dorsal margin, as seen in lateral view, is markedly less convex than that of Bairdia s. s. The one exception is Bairdia girtyi Sohn, which is not assigned to this genus because the dorsal margin as seen from the left side is definitely arcuate (pl. 1, fig. 32).

The genus Rectobairdia is defined as having a straight dorsal margin and a pointed posterior. A total of 31 species are defined by a dichotomous key. Eight of these species are new but are here not named; they are designated by letters. The stratigraphic range and frequency of occurrence of these species are shown in figure 8.

Geologic range.—Middle Devonian—Permian.

Lithology.—Limestone, shale, sandstone (?).

Habitat.—Marine.

KEY TO SPECIES OF RECTOBAIRDIA

1. Dorsoposterior slope of larger valve located one-third of greatest length...
2 1a. Dorsoposterior slope of larger valve located approximately one-quarter of the greatest length...
3 2 (1). Anterior pointed...
4 2a. Anterior round...
3 (2). Dorsoanterior and dorsoposterior margins concave...
5 3a. Dorsoanterior margins straight; dorsoposterior margin slightly concave...
6 3 (4). Ventral margin straight...
7 4a. Ventral margin concave...
8 5 (4). Posterior point above midheight...
9 5a. Posterior point at or below midheight...
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

NUMBER OF SPECIES AND LOCALITIES

<table>
<thead>
<tr>
<th>PERMIAN</th>
<th>PENNSYLVANIAN</th>
<th>MISSISSIPPIAN</th>
<th>DEVONIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>Upper</td>
<td>Upper</td>
<td>Upper</td>
</tr>
<tr>
<td>Middle</td>
<td>Middle</td>
<td>Lower</td>
<td>Middle</td>
</tr>
<tr>
<td>Lower</td>
<td>Lower</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of species restricted to system or parts of system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of species recorded in system or part of system, the types of which are from the Upper Pennsylvanian</td>
</tr>
<tr>
<td>Number of species recorded in system or part of system, the types of which are from the Lower Mississippian</td>
</tr>
<tr>
<td>Number of species recorded in system or part of system, the types of which are from the Upper Devonian</td>
</tr>
</tbody>
</table>

EXPLANATION

- Number of species restricted to system or parts of system
- Number of species recorded in system or part of system, the types of which are from the Upper Pennsylvanian
- Number of species recorded in system or part of system, the types of which are from the Lower Mississippian
- Number of species recorded in system or part of system, the types of which are from the Upper Devonian

FIGURE 8.—Stratigraphic range and frequency of distribution of species in *Rectobairdia*.

<table>
<thead>
<tr>
<th>14 (13a)</th>
<th>Dorsoanterior margin concave</th>
<th><em>tikhyi</em> (p. 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14a</td>
<td>Dorsoanterior margin straight or convex</td>
<td></td>
</tr>
<tr>
<td>15 (14a)</td>
<td>Greatest width in dorsal outline behind midlength</td>
<td></td>
</tr>
<tr>
<td>15a</td>
<td>Greatest width in dorsal outline at midlength</td>
<td><em>sinuosa</em> (p. 55) (kisingeriiformis?)</td>
</tr>
<tr>
<td>16 (12a)</td>
<td>Greatest length approximately twice the greatest height</td>
<td><em>sp. B</em> (p. 56)</td>
</tr>
<tr>
<td>16a</td>
<td>Greatest length more than twice the greatest height</td>
<td></td>
</tr>
<tr>
<td>17 (16)</td>
<td>Concavity of ventral margin behind midlength</td>
<td><em>subeeza</em> (p. 55)</td>
</tr>
<tr>
<td>17a</td>
<td>Concavity of ventral margin in front of midlength</td>
<td><em>hexagona</em> (p. 54)</td>
</tr>
<tr>
<td>18 (16a)</td>
<td>Junction of anterior and ventral margins directly below anterior third of dorsoanterior margin</td>
<td><em>sp. C</em> (p. 56)</td>
</tr>
<tr>
<td>18a</td>
<td>Junction of anterior and ventral margins directly below posterior half of dorsoanterior margin</td>
<td></td>
</tr>
<tr>
<td>19 (18a)</td>
<td>Dorsoanterior margin straight or convex</td>
<td></td>
</tr>
<tr>
<td>19a</td>
<td>Dorsoanterior margin concave</td>
<td><em>sp. E</em> (p. 56)</td>
</tr>
<tr>
<td>20 (19)</td>
<td>Convexity of ventral margin shallow, at midlength</td>
<td><em>schaurothiana</em> (p. 55)</td>
</tr>
<tr>
<td>20a</td>
<td>Convexity of ventral margin deep, in front of midlength</td>
<td></td>
</tr>
<tr>
<td>21 (11)</td>
<td>Dorsoposterior margin convex</td>
<td><em>trepidocentri</em> (p. 55)</td>
</tr>
<tr>
<td>21a</td>
<td>Dorsoposterior margin concave</td>
<td></td>
</tr>
<tr>
<td>22 (10a)</td>
<td>Posterior point in ventral quarter of greatest height</td>
<td><em>fragosa</em> (p. 54)</td>
</tr>
<tr>
<td>22a</td>
<td>Posterior point above ventral quarter of greatest height</td>
<td></td>
</tr>
<tr>
<td>23 (7)</td>
<td>Dorsoanterior and dorsoposterior margins concave</td>
<td></td>
</tr>
<tr>
<td>23a</td>
<td>Dorsoanterior and dorsoposterior margins straight <em>hexentis</em> (p. 55)</td>
<td></td>
</tr>
<tr>
<td>24 (22a)</td>
<td>Greatest height about half or more the greatest length</td>
<td></td>
</tr>
<tr>
<td>24a</td>
<td>Greatest height less than half the greatest length</td>
<td></td>
</tr>
<tr>
<td>25 (24a)</td>
<td>Posterior point in ventral third of greatest height</td>
<td></td>
</tr>
<tr>
<td>25a</td>
<td>Posterior point at approximate midheight</td>
<td><em>cultrata</em> (p. 54)</td>
</tr>
<tr>
<td>26 (21a)</td>
<td>Greatest height half or more than half the greatest length</td>
<td></td>
</tr>
<tr>
<td>26a</td>
<td>Greatest height about one-third of greatest length; dorsal margin straight</td>
<td><em>sp. F</em> (p. 56)</td>
</tr>
<tr>
<td>27 (25)</td>
<td>Dorsoposterior margin straight</td>
<td><em>fichomirovi</em> (p. 56)</td>
</tr>
<tr>
<td>27a</td>
<td>Dorsoposterior margin concave</td>
<td><em>saxifraga</em> (p. 55)</td>
</tr>
<tr>
<td>28 (9a)</td>
<td>Dorsoanterior margin concave</td>
<td><em>korzenewskae</em> (p. 55)</td>
</tr>
<tr>
<td>28a</td>
<td>Dorsoanterior margin convex</td>
<td></td>
</tr>
<tr>
<td>29 (26)</td>
<td>Dorsoanterior margin convex, short</td>
<td><em>calceolae</em> (p. 54)</td>
</tr>
<tr>
<td>29a</td>
<td>Dorsoanterior margin straight or slightly concave</td>
<td></td>
</tr>
<tr>
<td>30 (3)</td>
<td>Dorsoanterior point above midheight</td>
<td></td>
</tr>
<tr>
<td>30a</td>
<td>Dorsoanterior point at or below midheight</td>
<td><em>emaciata</em> (p. 54)</td>
</tr>
<tr>
<td>31 (23)</td>
<td>Dorsoposterior margin concave</td>
<td></td>
</tr>
<tr>
<td>31a</td>
<td>Dorsoposterior margin straight</td>
<td><em>sp. II</em> (p. 57)</td>
</tr>
<tr>
<td>32 (24)</td>
<td>Dorsal and ventral margins subparallel</td>
<td><em>distessa</em> (p. 54)</td>
</tr>
<tr>
<td>32a</td>
<td>Dorsal and ventral margin converge toward posterior</td>
<td></td>
</tr>
</tbody>
</table>

![Diagram](image-url)
33 (28a). Dorsal and ventral margins subparallel.

33a. Dorsal and ventral margins converge toward posterior. — mossoscleritaforma (p. 55)

34 (31). Dorso-posterior point above midheight.

34a. Dorso-posterior point below midheight.

Geologic range. — Carboniferous.

Rectobairdia deformis (Jones and Kirkby), 1879


Geologic range. — Carboniferous.

Rectobairdia distressa (Geis), 1940

Plate 2, figures 3–5


Bairdia depressa Geis, 1932, Jour. Paleontology, v. 6, p. 178, pl. 25, figs. 12a, b. Salem limestone, Indiana.


Geologic range. — Upper Mississippian.

Rectobairdia emaciata (Kesling and Kilgore), 1952

Plate 2, figures 14, 15


The flattened ventro-terminal margins may exclude this species from Rectobairdia.

Geologic range. — Middle Devonian.

Rectobairdia fragosa (Morey), 1935

Plate 2, figure 26

Bairdia fragosa Morey, 1935, Jour. Paleontology, v. 9, p. 322, pl. 28, fig. 17. Sylamore sandstone, 3 miles north of Williamsburg, Callaway County, Mo.

Morey stated (1935, p. 322) that the dorsal outline is subelliptical; his types labeled “syntypes” (Missouri Univ. Os 1004–3) consist of the illustrated specimen which he designated as the holotype in the explanation to plate 28, and one paratype on which the posterior point is missing. Both specimens are somewhat abraded, and it is difficult to determine if the sides are curved or straight in dorsal outline.

Geologic range. — Lower Mississippian, probably reworked Devonian. (See Sohn, 1951, p. 34.)

Rectobairdia hexagona (Polenova), 1952

Bairdia hexagona Polenova, 1952, Microfauna SSSR, v. 5, p. 128, pl. 13, figs. 5, 6. Middle Devonian, Kursk and Voronez regions, Russia.

Geologic range. — Middle Devonian.
Rectobairdia? hextensis (Harlton), 1929
Plate 2, figure 25

The holotype (USNM 80586) is a partly corroded specimen.

Geologic range.—Upper Pennsylvanian.

Rectobairdia korzenewskae (Posner), 1951

Differs from R. fragosa (Morey) by having a concave dorsoanterior margin and a higher position of the posterior point.

Geologic range.—Carboniferous.

Rectobairdia legumen (Jones and Kirkby), 1886


Bairdia angulatiformis Posner, 1951, idem, p. 93, pl. 21, fig. 7. Lower Carboniferous, Russia.

Geologic range.—Carboniferous.

Rectobairdia lepidocentri (Krommelbein), 1950
Bairdia lepidocentri Krommelbein, 1950, Senckenbergiana, v. 31, p. 333, pl. 1, figs. 4a-d. Middle Devonian, Süßhang Auburg, Gerolsteiner Mulde, Eifel, Germany.

Geologic range.—Middle Devonian.

Rectobairdia mongoliensis (Jones and Kirkby), 1892

Rectobairdia mossolovellaformis (Egorov), 1953

Geologic range.—Upper Devonian.

Rectobairdia ponseri Sohn, n. name

Geologic range.—Lower Carboniferous.

Rectobairdia saxifraga (Krömmlbein), 1954
Bairdia saxifraga Krömmlbein, 1954, Senckenbergiana, v. 34, p. 249, pl. 1, figs. 2a-d. Givetian, Paffrather Mulde, Germany.

Geologic range.—Middle Devonian.

Rectobairdia schaurothiana (Kirkby), 1858

Kirkby, 1850, Tyneside Naturalists' Field Club Trans., v. 4, p. 147, woodcuts 10, pl. 9, figs. 14, 14a [same illustration as above].


[not] Bairdia schaurothiana Kirkby. Cooper, 1946 = Rectobairdia sp. G.

[not] Bairdia schaurothiana Kirkby. Marple, 1952 = Rectobairdia sp. G.

Geologic range.—Permian.

Rectobairdia sinuosa (Morey), 1886

Bairdia hisingeri (Münster), Kummerow, 1930 [part], Preuss. Geol. Landesanstalt Abh., n. f., no. 194, pl. A, p. 41, pl. 4, figs. 3a, b [not fig. 8 = sp. intet. : not figs. 10a, b = Rectobairdia sp. B]. Lower Visé, C, Ratingen, Rheinland, Germany.

Bairdia ampla Reuss. Kummerow, 1939, idem, p. 44, pl. 5, figs. 3a, b. Lower Tournaisian, Ratingen, Rheinland, Germany.


[not] Bairdia sinuosa Cooper, 1941 = Orthobairdia cestriensis (Ulrich), 1891.

Geologic range.—Lower Mississippian, Carboniferous.

Rectobairdia subvega (Coryell and Billings), 1932
Bairdia subvega Coryell and Billings, 1932, Am. Midland Naturalist, v. 13, p. 172, pl. 17, fig. 2. Wayland shale, 5 miles east and 2,000 ft north of Cisco, along Cisco-Eastland highway, Eastland County, Tex.

[not] Bairdia subvega Coryell and Billings. Tasch, 1953, [misspelling], Jour. Paleontology, v. 27, p. 400, pl. 49, fig. 13 = Cryptobairdia folgeri (Kellett), 1934.

Geologic range.—Upper Pennsylvanian.

Rectobairdia symmetrica (Cooper), 1946
Bairdia symmetrica Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 52, pl. 3, figs. 37, 38. Shale between upper and lower Trivoli limestone, SW1/4 sec. 3, T. 8 N., R. 5 E., Peoria County, Ill.

Bairdia reussiana Kirkby. Kellett, 1934, Jour. Paleontology, v. 8, p. 132, pl. 17, figs. 1a–h, 4a, b. Wreford formation, small quarry in roadcut on north side of U.S. Highway 40, about 4 miles west of Junction City, Geary County, and limestone, Cottonwood formation, U.S. Highway 40 at Ogden, Riley County, Kans.

Cordell, 1952, [part], Jour. Paleontology, v. 26, p. 89, pl. 17, figs. 26–28 [not figs. 24, 25 = B. subfusiformis Hamilton, 1942; not pl. 18, figs. 1, 2 = B. reussiana Kirkby,
1858]. Collections 2½ ft below top of Farley limestone to 6 ft above base of Vilas shale, west end of Farley, SE¼SW¼SE¼ sec. 28, T. 52 N., R. 35 W.; and base of Eudora shale to 6 ft below top of Winston shale, Beverly Station, south of junction of State Highways 45 and 92, boundary secs. 30 and 31, T. 53 N., R. 35 W., Platte County, Mo.

[not] Bairdia symmetrica Egorov, 1953 = B. egorovi Sohn n. name.

All Kellett’s types (USNM 89492) are badly corroded, and more than this species may be represented.

**Geologic range.**—Upper Pennsylvanian–Permian.

Rectobairdia tantiilla (Kummerow), 1953


**Geologic range.**—Middle Devonian.

Rectobairdia tichomirovi (Egorov), 1953


**Geologic range.**—Upper Devonian.

Rectobairdia tikhyi (Polenova), 1952

Bairdia tikhyi Polenova, 1952, Micropaleontozology SSSR, v. 5, p. 129, pl. 12, figs. 4a, b. Middle Devonian, Voronez and Kursk regions, Russia.

[?Bairdia sinuosa Polenova, 1952 [not Cooper, 1946], Micropalaeontology SSSR, pt. 5, p. 131, pl. 12, figs. 5a, b. Middle Devonian, central Devonian field, Russia.

**Geologic range.**—Middle Devonian.

Rectobairdia trapezoides (Gibson), 1955


**Geologic range.**—Upper Devonian.

Rectobairdia sp. A


[not] Cythere amputata Kirkby, 1859, new name for Bairdia truncata Kirkby, 1858 = nomen dubium.


From the description and illustrations, the type of Bairdia truncata Kirkby, 1858 is, according to Jones (1859, p. 168) and Jones and Kirkby (1879, p. 567), a cast that is indeterminate even as to genus.

The nomenclature of Bairdia amputata is confused because Kirkby (1859, p. 156, 157) decided that the species belonged to Cythere s. s. rather than to Cythere subgenus Bairdia. Because Jones informed him that Cythere truncata was previously used by Bosquet, Kirkby changed the name to amputata. The Carboniferous species illustrated by Jones and Kirkby in 1879 is based on a carapace and is a valid species of Rectobairdia that requires a new name.

**Geologic range.**—Carboniferous.

Rectobairdia sp. B

Bairdia hisingeri (Miirstern). Kummerow, 1939 [part], Preuss. Geol. Landesanstalt Abh., n. f., no. 194, pt. A, p. 41, pl. 4, figs. 10a, b [not fig. 8 = sp. indet.; not figs. 9a, b = Rectobairdia sinuosa (Morey) 1936]. Upper Visé, Altwaass, Niederachlesien, Germany.

**Geologic range.**—Upper Mississippian.

Rectobairdia sp. C


**Geologic range.**—Carboniferous.

Rectobairdia sp. D


**Geologic range.**—Carboniferous.

Rectobairdia sp. E

Cythere (Bairdia) schaurothiana Kirkby, Kirkby, 1862, Annals Mag. Nat. History, ser. 3, v. 10, p. 203, pl. 4, figs. 1, 2, 11 [not figs. 3, 4, 12 = R. schaurothiana (Kirkby), 1858]. Lower Carboniferous limestone, Craigglen, Campsie, Stirlingshire, Scotland.

**Geologic range.**—Carboniferous.

Rectobairdia sp. F

Bairdia subelongata Jones and Kirkby, 1879 [part], Geol. Soc. London Quart. Jour., v. 35, p. 573, pl. 30, figs. 10, 11 [not figs. 1–6 = Bairdia cypris subelongata; not fig. 7 = sp. indet.; not figs. 8, 9 = Cryptobairdia sp. F; not fig. 16 = Fabalicypris? sp.]. Carboniferous, Newfield Quarry, Scotland?

**Geologic range.**—Carboniferous.

Rectobairdia sp. G


Marple, 1952, Jour. Paleontology, v. 26, p. 930, pi. 133, fig. 13. Lower Mercer limestone member, valley of tributary of Jonathan Creek, on line between Madison Township, Perry County, and Newton Township, Muskingum County, Ohio.

**Geologic range.**—Middle Pennsylvanian.
**Genus Bairdiacypris Bradfield, 1935**


Type species: _Bairdiacypris bedfordensis_ (Payne) having a convex ventral margin.

**Diagnosis.** Thin-shelled elongate ostracodes, with gently arculate to straight dorsal, straight to concave ventral margin, curved to straight dorsoposterior margin, curved anterior margin, and blunt posterior margin. Greatest length below midheight. Left valve overlaps right along free margins. Hinge simple; inner margin wide. Muscle scars not known.

**Discussion.** Bradfield illustrated the holotype which is an abraded specimen, and a paratype that is better preserved than the holotype. Both are refigured on plate 3, figures 1–5. Cordell (1952, p. 95) would limit this genus to species that have straight anterodorsal slopes and would include species with slightly convex ventral margins. This is not practical because some of the species assigned to this genus have a convex anterodorsal margin, and none of the known species has a convex ventral margin. The reason for _B. haydenbranchensis_ (Payne) having a convex ventral margin is that the type is abraded. _Bairdiacypris_ differs from _Fabalicypris_ Cooper, 1946, by absence of anteroventral offset of larger valve and by the left valve not overhanging the right along the hinge.

Schneider (1956, p. 91) gives the following description of _Actuaria_ [Miss Poire very generously assisted in the translation]:

Valves elongated, length 2 to 2½ times the height, inequivalved, left overlaps right on all margins. Ventral margin noticeably concave. Dorsal margin evenly curved, greatest curvature in median part. Anterior rounded; posterior “attenuated” in the ventral portion and slanted in the upper part. Surface smooth. Dorsal outline of valves convex in posterior part and flattens towards the anterior. Hinge simple. Hinge margin of left valve is a furrow into which enters the thin edge of the right valve.

The elongate form of the shell, the hinge, and the outline differentiate the new genus from previously described genera of Bairdiidae, to which it is conditionally referred.

Schneider assigns _Bythocypris shideleri_ Delo (= _Fabalicypris shideleri_ (Delo)) to this genus. _Actuaria_ is here tentatively considered as a synonym of _Bairdiacypris_.

The genus _Bairdiacypris_ is defined as having a straight to shallowly curved dorsal margin, and a blunt posterior margin. It differs from _Fabalicypris_ in that the ventral overlap does not have a steplike offset. A total of 18 species are defined by a dichotomous key. One of these is new but is here designated by letter. The stratigraphic range and frequency of occurrence of these species are shown on figure 9 which includes three taxa that are referred to as sp. indet. because of inadequate data.

**Geologic range.** Ordovician, Devonian-Pennsylvanian, Permian (†).

**Lithology.** Shale.

**Habitat.** Marine.

**KEY TO BAIRDIACYPRIS**

1. Ventral margin straight. .......................... 2
   1a. Ventral margin concave. .......................... 5
   2 (1). Dorsoposterior margin as much as one-third of greatest length. .......................... _ardua_ (p. 58)
   2a. Dorsoposterior margin as much as one-quarter of greatest length. .......................... 3
   3 (2a). Dorsoanterior margin as much as one-third of greatest length. .......................... 12
   3a. Dorsoanterior margin as much as one-eighth of greatest length. .......................... 4
   4 (3a). Length of dorsoposterior margin less than greatest height. .......................... _major_ (p. 59)
   4a. Length of dorsoposterior margin more than greatest height. .......................... _subelongata_ (p. 59)
   5 (1a). Dorsoanterior margin well defined. .......................... 6
   5a. Dorsoanterior margin not well defined. .......................... 9
   6 (5). Dorsoposterior margin curved. .......................... _elongata_ (p. 59)
   6a. Dorsoposterior margin straight. .......................... 7
   7 (6a). Greatest height about one-half the greatest length. .......................... _quartiziana_ (p. 59)
   7a. Greatest height about one-third the greatest length. .......................... 8
   8 (7a). Concavity of ventral margin shallow, about midlength. .......................... 13
   8a. Concavity of ventral margin deep, in front of mid-length. .......................... _curvis_ (p. 58)
   9 (5a). Dorsoposterior margin straight. .......................... 11
   9a. Dorsoposterior margin curved. .......................... 10
   10 (9a). Junction of posterior and dorsoposterior margins about one-third the greatest height. .......................... 14
   10a. Junction of posterior and dorsoposterior margins about one-fourth the greatest height. .......................... _diffusa_ (p. 59)
   11 (9). Ventral margin slightly concave. .......................... _trojana_ (p. 60)
   11a. Ventral margin distinctly concave. .......................... sp. A (p. 60)
   12 (3). Junction of dorsoanterior and anterior margins above midheight, posterior concave in dorsal outline. .......................... _bedfordensis_ (p. 58)
REVISION OF SOME PALEOZOIC OSTRACODE GENERA

NUMBER OF SPECIES AND LOCALITIES

<table>
<thead>
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<th>SYSTEM</th>
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<th>MISSISSIPPIAN</th>
<th>DEVONIAN</th>
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EXPLANATION

| 4 | Number of species restricted to system or parts of system |
|   | Number of species recorded in system or part of system, the types of which are from the Middle Pennsylvanian |
|   | Number of localities or stratigraphic levels from which the species are recorded |

FIGURE 9. Stratigraphic range and frequency distribution of species of Bairdiacypris.

12a. Junction of dorsoanterior and anterior margins at or below midheight; posterior convex in dorsal outline haydenbranchensis (p. 59)

13 (8). Dorsal outline elliptical; greatest width at approximate midlength... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 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PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

Bythocypris shideleri
Actuaria diffusa Schneider, 1956
Bythocypris haydenbranchensis
Bairdiacypris elongata

Absence of ventroanterior offset in overlapping valve.

The specimen in Schneider's 1956 illustration differs from *Fabalicypris shideleri* (Delo) (pl. 3, fig. 6) by absence of ventroanterior offset in overlapping valve.

*Geologic range.*—Permian.

*Bairdiacypris elongata* Kummerow, 1939

*Bairdiacypris elongata* Kummerow, 1939, Preuss. Geol. Landesanstalt Abh., n. f., no. 194, pt. A, p. 47, pl. 5, figs. 7a, b. Lower Tournasian, Ratingen, Rheinland, Germany.

*Geologic range.*—Carboniferous.

*Bairdiacypris* haydenbranchensis (Payne), 1937


The holotype (Indiana Univ. 3221) is a corroded specimen that may not reflect the true shape and overlap of the species.

*Geologic range.*—Middle Pennsylvanian.

*Bairdiacypris* major (Jones and Kirkby), 1886


*Geologic range.*—Carboniferous.

*Bairdiacypris* pafracrathensis (Kummerow), 1933


The drawings indicate coloration that is not usual for Paleozoic ostracodes from this or any other area. Ostracodes from the Paffrath area are illustrated by excellent photographs (Krümmlbein, 1954), and these photographs do not show coloration. The shape as well as coloration of Kummerow's species suggests that this may be a contaminant of a Recent species of possibly "Candona." It is not unusual for Recent contaminants to be mistaken for fossil forms. For example, *Macrocypris kayi* Spivey, 1939 (p. 173, pl. 21, figs. 11-13), is described as rare in the "depauperate zone" of the lower Maquoketa shale (Upper Orдовician) near Clermont, Iowa. The holotype, a right valve, is a Recent "Candona" that was collected on the east bank of the stream which joins Turkey River.

*Geologic range.*—Middle Devonian (? or Recent.

*Bairdiacypris* quartziana (Egorov), 1953


*Bairdia* cf. *B. quartziana* Egorov, 1953, idem, p. 23, pl. 14, figs. 5-7. Frasnian, Don River, Russia.

Without examining the types it is not possible to determine whether all the figured specimens are conspecific. This species differs from *B. deloi* by its steeper dorsoposterior slope.

*Geologic range.*—Upper Devonian.

*Bairdiacypris* robusta Kummerow, 1939

*Bairdiacypris* robusta Kummerow, 1939, Preuss. Geol. Landesanstalt Abh., n. f., no. 194, pt. A, p. 46, pl. 5, figs. 6a, b. Lower Tournasian limestone, Insemont, Belgium.

[not] *Bairdia* cultrata Kummerow, 1939 [part], idem, p. 42, pl. 4, fig. 13 [not figs. 12a, b = Rectobairdia? cultrata (Kummerow), 1939]. Lower Tournasian limestone, Ratingen, Rheinland, Germany.

*Geologic range.*—Lower Mississippian.

*Bairdiacypris* subelongata (Jones and Kirkby), 1879

*Bairdia subelongata* Jones and Kirkby, 1879 [part], Geol. Soc. London Quart. Jour., v. 35, p. 573, pl. 30, figs. 1-5, 6 (1) [not fig. 7 = sp. indet.; not figs. 8, 9 = Cryptobairdia sp. F; not figs. 10, 11 = Rectobairdia sp. F; not fig. 16 = Fabalicypris? sp. indet.]. Carboniferous, Woodend quarry, Ladedda quarry, Fife; Blinkbonny (?) quarry, Mid Lothian, Scotland.


[not] *Bairdia* subelongata Jones and Kirkby. Jones and Kirkby, 1886 = *Bairdiacypris* major (Jones and Kirkby), 1886.

[not] *Bairdia* subelongata Jones and Kirkby. Jones and Kirkby, 1892 = *Bairdiacypris* sp. A.

[not] *Bairdia* subelongata Jones and Kirkby. Harton, 1927 = Fabalicypris acetatala (Corryll and Billings), 1922.

[not] *Bairdia* subelongata Jones and Kirkby. Knight, 1928 = Fabalicypris sp. indet.

[not] *Bairdia* subelongata Jones and Kirkby. Harton, 1929 = *Bairdiacypris* trojana (Wilson), 1933.

[not] *Bairdia* cf. *B. subelongata* Jones and Kirkby. Cooper, 1941 = *Bairdiacypris* sp. indet.

A lectotype should be designated from the original specimens.

*Geologic range.*—Carboniferous.
**Bairdiacypris** trojana (Wilson), 1933

*Bairdia* trojana Wilson, 1933, Jour. Paleontology, v. 7, p. 418, pl. 69, figs. 8a-c. Pennsylvanian, McAlester shale, 3-in zone immediately above McAlester coal in Trojan Coal Co. pit, sec. 13, T. 11 N., R. 19 E., Muskogee County, Okla.

Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 54, pl. 4, figs. 36-38. Pennsylvanian, shale on top of Seville limestone, SW¼ sec. 26, T. 17 N., R. 1 W., Rock Island County, III.


*cf.* Bairdiacypris? trojana (Wilson), 1933


*cf.* Bairdiacypris? trojana (Wilson), 1933


*Bairdia* subelongata Jones and Kirkby. Harlton, 1929, Texas Univ. Bull. 2301, p. 157, pl. 3, figs. 6a-d. Pennsylvanian, Canyon group. San Saba River valley near Hext, Menard County, Tex.

The holotype (USNM 112429) is an abraded specimen with a slightly more curved dorsal margin; Cooper's specimen has a slightly more curved dorsal margin. This species appears to be intermediate between *Bairdiacypris* and *Fabalicypris*.

**Geologic range.**—Middle and Upper Pennsylvanian.

*Bairdiacypris* sp. A


[not] Cypheira elongata Münster, 1830 = nomen dubium.


**Geologic range.**—Carboniferous.

**Bairdiacypris** sp. 1

*Bairdiacypris* sp. 1 Cordell, 1962, Jour. Paleontology, v. 26, p. 98, pl. 19, figs. 23, 24. Pennsylvanian shale, Vinland member of the Stranger formation, outcrop from middle boundary secs. 25 and 26 to middle boundary secs. 25 and 30, T. 56 N., R. 35 W., 2 miles southwest of agency, Buchanan County, Mo.

Only one specimen is recorded, and it appears to be intermediate between *B. deloi* and *B. curvis*.

**Geologic range.**—Upper Pennsylvanian.

*Bairdiacypris* sp. indet.


This is based on a corroded specimen.

**Geologic range.**—Upper Mississippian.

*Bairdiacypris?* sp. indet.

*Bairdia?* glennensis Harlton. Knight, 1928, Jour. Paleontology, v. 2, p. 325, pl. 43, figs. 8a, b. Pawnee limestone, residual from lower 2 ft exposed in street construction in Davis Place subdivision. First street west of Clayton-Ferguson trolley tracks and 200 ft north of Clayton Road, Clayton, St. Louis County, Mo.

The illustrations are of a broken specimen.

**Geologic range.**—Middle Pennsylvanian.

*Bairdiacypris?* sp. indet.


The illustration consists of a right view of a carapace (?) that differs from Harlton's specimens in that the highest part is in the anterior quarter of the greatest length. Although the ventral offset diagnostic of *Fabalicypris* is not shown, additional specimens may indicate that this species has that offset.

**Geologic range.**—Permian.

**TRANSFERRED SPECIES**


*Bairdiacypris?* nebraskensis (Upson). Cooper, 1946 = *Fabalicypris?*.

*Bairdiacypris?* punctata (Scott, 1942 = gen. indet.


*Bairdiacypris?* shideleri (Delo). Cooper, 1946 = *Fabalicypris?* sp. A.

**Genus FABALICYPRIS** Cooper, 1946


**Type species.**—Original designation *F. wileyensis* Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 61, pl. 6, figs. 4-8. Pennsylvanian, Illinois.

**Diagnosis.**—Differs from *Bairdiacypris* Bradfield by having a ventroanterior offset of overlapping valve and by a wide overlap along the dorsal margin. Hinge simple; inner margin wide; muscle scars unknown.

**Discussion.**—In the original description Cooper (1946, p. 59) differentiated this genus from *Bairdiacypris* by the ventroanterior offset and the absence of a pronounced posteroventral margin. Several species here referred to this genus have in addition to the diagnostic ventroanterior offset a pronounced posteroventral margin. Some species are gradational between the two genera, and it is possible that the two should be considered as subgenera of *Bairdiacypris*. 
The genus *Fabalicypris* differs from *Bairdiacypris* by having a wider overlap along the dorsal margin and a ventroanterior steplike offset. It is possible that both genera should be given subgeneric rank in *Bairdiacypris*. A total of 21 species are defined by a dichotomous key. Three of these are new but are here designated by letter. Four additional species are neither named nor designated by letter, but are included in figure 10. The stratigraphic range and frequency of occurrence of these species are shown on figure 10. Included in the chart are 4 unnamed species, 3 of which are tentatively referred to this genus because of inadequate data. One species, *F. shideleri* (Delo), 1930 is queried in the Permian column because data is not sufficient to determine the stratigraphic level in the well from which it is described.

**Geologic range.**—Middle Devonian–Permian.

**Lithology.**—Shale and limestone.

**Habitat.**—Marine.

**KEY TO SPECIES OF FABALICYPRIS**

1. Ventral margin straight.......................... 2
   1a. Ventral margin curved.......................... 3
   2 (1). Greatest width in dorsal outline at midlength.... sp. A (p. 64)
       2a. Greatest width in dorsal outline behind midlength... 6
   3 (1a). Ventral margin convex........................ 4
       3a. Ventral margin concave......................... 11
   4 (3). Dorsal overlap of approximate even width....... 5
   4a. Dorsal overlap not of even width.................. 9
   5 (4). Dorsoposterior margin extends to posterior third of greatest length...................... *minuta* (p. 63)
   5a. Dorsoposterior margin extends to posterior quarter of greatest length................... 7
   6 (2a). Posterior point above midheight.............. sp. 1 (p. 64)
   6a. Posterior point below midheight................ *shideleri* (p. 63)
   7 (5a). Dorsal outline wedge shaped; greatest width in posterior third.......................... 8
   7a. Dorsal outline elliptical....................... *pulcher* (p. 63)
   8 (7). Posterior round in dorsal outline............ *wileyensis* (p. 64)
   8a. Posterior pointed in dorsal outline.............. *subelliptica* (p. 63)
   9 (4a). Dorsoposterior margin extends to approximately midlength............................. *acuminata* (p. 62), *(dispar, plana?)*
   9a. Dorsoposterior margin extends to posterior quarter of greatest length................... 10
   10 (9a). Dorsal outline wedge shaped................... sp. C (p. 64)
   10a. Dorsal outline subelliptical.................... *tenuis* (p. 64)
   11 (3a). Dorsoposterior margin straight............... 12
   11a. Dorsoposterior margin convex.................... 13
   12 (11). Anteriormost point above midheight........ sp. B (p. 64)
   12a. Anteriormost point at midheight................ *hoxbarensis* (p. 63)
   13 (11a). Ventral convexity in front of midlength...... 14
   13a. Ventral convexity at midlength.................. 17
   14 (13). Posterior pointed in dorsal outline.......... *muensteriana* (p. 63)
   14a. Posterior round in dorsal outline............... 15
   15 (14a). In dorsal outline, greatest width central...... *regularis* (p. 63)
   15a. In dorsal outline, greatest width behind center... 16
   16 (15a). Anteriormost point below midheight.......... *geinitziana* (p. 62)

**NUMBER OF SPECIES AND LOCALITIES**

PERMIAN

Upper

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PENNSYLVANIAN

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MISSISSIPPIAN

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DEVONIAN

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**EXPLANATION**

- 5

  Number of species restricted to system or parts of system

- 3

  Number of species recorded in system or part of system, the types of which are from the Upper Pennsylvanian

- 5

  Number of species questionably assigned to system or part of system

- 3

  Number of localities or stratigraphic levels from which the species are recorded

**FIGURE 10.—Stratigraphic range and frequency distribution of species of *Fabalicypris*.**
ASSIGNED SPECIES

Fabalicypris acetalata (Coryell and Billings), 1932

Bairdia acetalata Coryell and Billings, 1932, Am. Midland Naturalist, v. 13, p. 173, pl. 17, fig. 5. Wayland shale, highway leading from Cisco to Eastland, 5 miles east and 2,000 ft north of Cisco, Eastland County, Tex.

Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 17, pl. 1, fig. 5a. Shale in Eiss limestone, SE cor. SE1/4 sec. 3, T. 11 N., R. 13 E., Furnas County, Nebr.

Bairdia rogatsi Coryell and Sample, 1932, Am. Midland Naturalist, v. 13, p. 264, pl. 25, fig. 7. East Mountain shale, Mineral Wells formation, shaley pit, 3 miles west of Mineral Wells, Palo Pinto County, Tex.

Bairdia nebraskensis Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 18, pl. 1, figs. 6a, b. Shale in upper part of Fourmile limestone, roadcut 3½ miles southeast of Randolph, Pottawatomie County, Kans.

Bairdia subelongata Jones and Kirby, Harlton, 1927, Jour. Paleontology, v. 1, p. 210, pl. 33, fig. 11. Upper Glenn formation, NW¼NW¼ sec. 1, T. 5 S., R. 2 E., about 2 miles south of Ardmore, Carter County, Okla.

Bairdia geinitziana Harlton, Kellett, 1934, Jour. Paleontology, v. 8, p. 131, pl. 16, figs. 6a-c. Elmdale formation, upstream from Cottonwood River bridge, east of Elmdale, Chase County, Kans.


Payne, 1937, Jour. Paleontology, v. 11, p. 284, pl. 39, figs. 6a, b. Hayden Branch formation, near Dodds Bridge on Turmans Creek, Sullivan County, Ind.

Bairdia? hoxbarensis Harlton. Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 354 [11st], pl. 50, fig. 7. Macoupin cyclothem, along Embarrass River, 1 mile east of Lawrenceville, Lawrence County, Ill.


[not] Bairdiacypris nebraskensis (Upson). Cooper, 1946 = Fabalicypris? sp. B.

This species is distinguished by a convex dorsal-posterior margin.

Geologic range.—Upper Pennsylvanian-Permian.

Fabalicypris acuminata Cooper, 1946

Fabalicypris acuminata Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 60, pl. 5, figs. 35-36. Shale above Liverpool limestone, NW¼ sec. 17, T. 5 N., R. 4 E., Fulton County, Ill.

Fabalicypris dispar Cooper, 1946, idem, p. 60, pl. 5, figs. 37-39. Shale above Liverpool limestone; same locality as above.

Fabalicypris plana Cooper, 1946, idem, p. 60, pl. 5, fig. 26. Shale above Liverpool limestone; same locality as above.

The three species from the same collection are considered here to be synonymous. Because Cooper (1946, p. 60) does not illustrate the dorsal outline of F. plana it is referred to F. acuminata with reservations.

Geologic range.—Middle Devonian.

Fabalicypris? antiqua Pokorný, 1950

Fabalicypris? antiqua Pokorný, 1950, Czechoslovakia, Státn. geol. úst. Sbornik, v. 17, Paleontol., p. 548 (98), 611 (99), pl. 5, fig. 14, text figs. 4-7. Middle Devonian, Red Coral limestone, Celechovice, Czechoslovakia.

Geologic range.—Middle Devonian.

Fabalicypris? geinitziana (Jones), 1950


Jones, 1850, in Kirkby, Tyneside Naturalists' Field Club Trans., v. 4, p. 159, pl. 11, figs. 4a-c. Permian limestone, Byers' quarry, Durham, England.

[not] Bairdia geinitziana (Jones). Richter 1855 = sp. indet.

The original description (Jones, 1850, p. 62) states that the specimen is “slightly punctated towards the anterior extremity.” Well-preserved specimens of Fabalicypris in the United States are smooth shelled; consequently, this species may belong to an hitherto undescribed genus.

Geologic range.—Permian.

Fabalicypris glennensis (Harlton), 1927

Plate 3, figures 9-10

Bairdia glennensis Harlton, 1927, Jour. Paleontology, v. 1, p. 210, pl. 33, fig. 10. Upper Glenn formation, one-fourth of a mile north of SE¼ sec. 9, T. 5 S., R. 1 E., Carter County, Okla., about 2 miles south of Ardmore.

Bairdia? glennensis Harlton. Kellett, 1935, Jour. Paleontology, v. 9, p. 133, pl. 18, figs. 2a-e. Elmdale formation, carbonaceous shale on top of buff limestone, near Cottonwood River bridge east of Elmdale, Chase County, Kans.


Bairdia hoxbarensis


Geologic range.—Upper Pennsylvanian–Permian.

Fabalicypris? hoxbarensis (Harlton), 1927

Bairdia hoxbarensis Harlton, 1927, Jour. Paleontology, v. 1, p. 211, pl. 12, fig. 12. Hoxbar formation, NW. cor. sec. 20, T. 5 S., R. 1 E., about 2 miles south of Ardmore, Carter County, Okla.

Bairdia hoxbarensis Harlton. Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 46, pl. 2, figs. 43, 44. Shale above Trivoli limestone, SW1/4 sec. 29, T. 14 N., R. 10 W., Edgar County, Ill.

Bairdia hoxbarensis Harlton. Cordell, 1952, Jour. Paleontology, v. 26, p. 88, pl. 19, figs. 29, 30. Farley limestone and Vilas shale, Missouri River bluff, east of State Highway 92, SW1/4SE1/4 SE1/4 sec. 28, T. 52 N., R. 35 W., at west end of Farley, Platte County, Mo.

Bairdia acetalata Coryell and Billings, Coryell and Booth, 1933, Am. Midland Naturalist, v. 14, p. 263, pl. 3, figs. 10, 11. Wayland shale, 1 mile west of Graham, Young County, Tex.


Bairdia hoxbarensis Harlton. Harlton, 1929 = Orthobairdia texana (Harlton), 1927.

Bairdia hoxbarensis Harlton. Kellett, 1934 = Fabalicypris acetalata (Coryell and Billings), 1932.

Bairdia hoxbarensis Harlton. Johnson, 1936 = Fabalicypris acetalata (Coryell and Billings), 1932.

Bairdia hoxbarensis Harlton. Payne, 1937 = Fabalicypris acetalata (Coryell and Billings), 1932.

Bairdia hoxbarensis Harlton. Scott and Borger, 1941 = Fabalicypris acetalata (Coryell and Billings), 1932.

Harlton’s holotype (USNM 71408) is a partly corroded specimen that does not have the subelliptical dorsal outline with the greatest width at midlength as illustrated by Cooper (1946, pl. 2, fig. 43).

Geologic range.—Middle and Upper Pennsylvanian.

Fabalicypris minuta Cooper, 1946

Fabalicypris minuta Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 60, pl. 5, figs. 31, 32. Shale on top of Seville limestone, SW1/4 sec. 26, T. 17 N., R. 1 W., Rock Island County, Ill.

Geologic range.—Middle Pennsylvanian.

Fabalicypris? muensteriana (Jones and Kirkby), 1865

Cythere muensteriana Jones and Kirkby, 1865, Annals Mag. Nat. History, ser. 3, v. 15, p. 410, pl. 20, figs. 11a, b. Carboniferous or Mountain Limestone at Regnitzlozen, near Hof, Bavaria.

Geologic range.—Carboniferous.

Fabalicypris perplexa (Coryell and Rozanski), 1942

Bairdia perplexa Coryell and Rozanski, 1942, Jour. Paleontology, v. 16, p. 147, pl. 24, fig. 3. Glen Dean limestone, Hardin County, Ill.

Macrocyclis ovata Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 34, pl. 4, figs. 25, 26. Kinkaid formation, NE1/4SW1/4NE1/4 sec. 20, T. 12 S., R. 3 E., one-half a mile south of Veatch school, Johnson County, Ill.

Geologic range.—Upper Mississippian.

Fabalicypris pulcher Cordell, 1952

Fabalicypris pulcher Cordell, 1952, Jour. Paleontology, v. 26, p. 103, pl. 19, figs. 32, 33, 36, 39. Lacote shale, Hushpuckney shale, and Bethany Falls limestone, W1/4 sec. 13, T. 61 N., R. 25 W., near head of ravine across State Highway 6, 350 ft west of junction with County Highway W, 1.8 miles west of Trenton, Grundy County, Mo.

Geologic range.—Upper Pennsylvanian.

Fabalicypris regularis Cooper, 1946

Fabalicypris regularis Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 60, pl. 6, figs. 1–3. Shale parting in upper part of Seville limestone, SW1/4 sec. 24, T. 15 N., R. 4 W., Mercer County, Ill.

Geologic range.—Middle Pennsylvanian.

Fabalicypris rotundata (Kummerow), 1953


The illustrations are of a specimen that agrees in shape and thickness with Fabalicypris, but the diagnostic ventroanterior offset is not shown.

Geologic range.—Upper Carboniferous.

Fabalicypris shideleri (Delo), 1930

Plate 3, figures 6–8

Bairdia shideleri Delo, 1930, Jour. Paleontology, v. 4, p. 167, pl. 13, fig. 2. Pennsylvanian or Permian core, 1385–75 ft, Transcontinental Oil Co., Blackstone-Slaughter No. 1 well, blk. 129, sec. 29, Texas and St. Louis Survey; 250 ft from west lines, elev. 3,935 ft, Pecos County, Tex.

[not] Bairdia cypris shideleri (Delo). Cooper, 1946 = Fabalicypris sp. A.

Geologic range.—Pennsylvanian or Permian.

Fabalicypris subaequalis (Geis), 1932

Bairdia subaequalis Geis, 1932, Jour. Paleontology, v. 6, p. 178, pl. 25, figs. 13a, b. Salem limestone, Indiana.


Geologic range.—Upper Mississippian.

Fabalicypris subelliptica Cordell, 1952

Fabalicypris subelliptica Cordell, 1952, Jour. Paleontology, v. 26, p. 104, pl. 19, figs. 37, 38. Pleasanton shale and shale parting 3 ft above base of Snlabor limestone member of Herta formation, NE1/4NW1/4 sec. 21, T. 57 N., R. 25 W.
REVIEWS OF SOME PALEOZOIC OSTRACODE GENERA

'ditch along County Highway D, and gully and creek to the east; 0.1-0.2 miles south of State Highway 30, 0.3 mile southeast of Mooresville, Livingston County, Mo.'

Geologic range.—Upper Pennsylvanian.

Fabalicypris tenuis Cooper, 1946

Fabalicypris tenuis Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 61, pl. 6, figs. 9-11. Shale below Sevile limestone NE1/4 sec. 21, T. 17 N., R. 1 E., Henry County, and SW1/4 sec. 5, T. 14 N., R. 2 W., Mercer County, Ill.

Geologic range.—Middle Pennsylvanian.

Bairdia haworthi Cooper, 1941

Bairdia haworthi Cooper, 1941, Illinois Geol. Survey Bull. 70, p. 61, pl. 5, figs. 12-19. Shale above Brereton limestone, SW1/4 sec. 9, T. 5 S., R. 6 W., Randolph County, Ill.

Bairdia haworthi Cooper, 1941, Bull. Am. Paleontology, v. 22, no. 73, p. 83, pl. 5, figs. 11a, b. Deese formation, near NE cor. NW1/4 sec. 33, T. 3 S., R. 1 E., Carter County, Okla.

Fabalicypris tenuis Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 61, pl. 6, figs. 4-8. Shale below Wewoka formation, hill 1,300 ft north and 200 ft east of SW cor. sec. 4 T. 3 N., R. 7 E., Pontotoc County, Okla.

Bairdia haworthi (Knight), 1928 = Crypto-bairdia haworthi (Knight), 1928.

Geologic range.—Middle Pennsylvanian.

Fabalicypris warthi (Bradfield), 1935

Plate 3, figure 28

Bairdia warthi Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 83, pl. 5, figs. 4a, b. Shale, Wewoka formation, fork of Weldon River valley, gulley immediately southeast of Chicago, Rock Island and Pacific Railroad, 0.3 mile southwest of Princeton, Mercer County, Mo.

Marple illustrated a specimen with a straight ventral margin, but because most of her material is corroded, it is possible that her identification is not correct.

Geologic range.—Middle Pennsylvanian.

Fabalicypris sp. A


Fabalicypris sp. B


Fabalicypris sp. B


The holotype of F. shideleri (Delo) (pl. 3, figs. 6-8) has the greatest width posterior to midlength, while Cooper's specimen is more spindle shaped and has the greatest width at midlength.

Geologic range.—Middle Pennsylvanian.

Fabalicypris sp. C

Microcheilinella pergracilis Croneis and Gale. Cooper, 1941, Illinois Geol. Survey Bull. 77, p. 15 [list], pl. 4, figs. 30, 40. Vienna formation, SE1/4SW1/4 sec. 26, T. 11 S., R. 1 W., Union County, Ill.

Fabalicypris sp. C

Microcheilinella pergracilis Croneis and Gale, 1939; based on a steinkern of probably Cavellina.

The specimen illustrated by Croneis and Gale (1939 pl. 6, figs. 23, 24) differs from this species in the shape of the dorsal outline and by an apparently visible overlap along the anterior margin.

Geologic range.—Upper Mississippian.

Fabalicypris sp. 1 Cordell, 1932

Fabalicypris sp. 1 Cordell, 1932, Jour. Paleontology, v. 26, p. 104, pl. 119, figs. 31, 33, 34. Pleasanton shale, NE1/4SE1/4 sec. 33, T. 65 N., R. 24 W., southeast and south bluffs of Weldon River valley, gulley immediately southeast of Chicago, Rock Island and Pacific Railroad, 0.3 mile southwest of Princeton, Mercer County, Mo.

Geologic range.—Upper Pennsylvanian.

Fabalicypris sp. indet.

Bairdia subelonaata Jones and Kirkby, 1879 [part], Geol. Soc. London Quart. Jour., v. 35, p. 573, pi. 30, fig. 16 [not figs. 1-11; see Bairdia cypris subelonaata (Jones and Kirkby), 1879 for disposition]. Carboniferous, Pittessie, Fife, Scotland.

The illustration is of a specimen related to Fabalicypris, but as only one view is shown, it is not possible to identify the species.

Geologic range.—Carboniferous.

Fabalicypris sp. indet.

Bairdia subelonaata Jones and Kirkby, 1879, Jour. Paleontology, v. 2, p. 326, pl. 43, fig. 9. Shaley upper surface of the Upper Fort Scott limestone exposed in vacant lot at northwest corner of Gustine and Mac Donald Streets, St. Louis, Mo.

The illustration is inadequate for identification; in 1952 it was not possible to collect at this locality because of building construction.

Geologic range.—Middle Pennsylvanian.

Fabalicypris sp.


Geologic range.—Lower Carboniferous.
Genus ORTHOBAIRDIA Sohn, n. gen.

Type species.—Bairdia cestriensis Ulrich, 1891, Cincinnati Soc. Nat. History Jour., v. 13, p. 210, pl. 17, figs. 6a–c. Chester shale, Kentucky.

Diagnosis.—Differs from Bairdia in that the sides are parallel in dorsal outline.

Discussion.—The reason for erecting this genus for species with parallel sides in dorsal outline is discussed on p. 12. The fact that very young instars as well as adults have parallel sides indicates that this feature is not due to dimorphism and ontogeny.

The genus Orthobairdia is characterized by parallel sides in dorsal outline. Nine species are defined by a dichotomous key. Two of these species are new but are designated here by letter. The stratigraphic range and frequency of occurrence of these species are shown on figure 11.

Geologic range.—Middle Devonian, Upper Mississippian–Permian.

Lithology.—Shale, limestone.

Habitat.—Marine.

KEY TO THE SPECIES OF ORTHOBAIRDIA

1. Dorsoposterior margin of larger valve equals one-third or more of greatest length............................. 2

1a. Dorsoposterior margin of larger valve equals one-quarter of greatest length............................... 4

2 (1). Dorsoposterior margin straight, approximately one-half of greatest length.............................. sp. A (p. 69)

2a. Dorsoposterior margin curved................................ 3

3 (2a). Dorsoposterior margin convex, approximately one-half of greatest length

3a. Dorsoposterior margin concave, approximately one-third of greatest length

4 (1a). Dorsosanterior margin concave................................ sp. B (p. 69)

4a. Dorsosanterior margin straight or convex............. 5

5 (4a). Posterior point above midheight................. sp. c (p. 68)

5a. Posterior point at or below midheight................. 6

6 (5a). Greatest height less than half the greatest length... 7

6a. Greatest height half or more than half the greatest length......................................................... 8

7 (6). Dorsoposterior margin convex... subreniformis (p. 68)

7a. Dorsoposterior margin straight or concave

kirk (p. 66)

8 (6a). Posterior half of right valve inflated, dorsum incised

texana (p. 68), (altifrons, chasae, florensis, guadalupiana, neviosa, schollis?)

8a. Posterior half of right valve not inflated

cestriensis (p. 65), (aqua, clorensis, plebia var. alta, granireticulata, insolens, cestriensis var. granulosa)

ASSIGNED SPECIES

Orthobairdia cestriensis (Ulrich), 1891

Plate 3, figures 24–27

Bairdia cestriensis Ulrich, 1891 [part], Cincinnati Soc. Nat. History Jour., v. 13, p. 210, pl. 17, figs. 6a–c [not figs. 7a, b; steinkern of indet. sp.]. Chester shale, Grayson Springs Station, Grayson County, Ky.

Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 25, pl. 1, figs. 27, 28. Golconda formation NE¼SW¼NW¼ sec. 28, T. 13 S., R. 3 W., Johnson County, Ill.
Orthobairdia kirsi Geis, n. name

**Bairdia compressa** Geis, 1932, Jour. Paleontology, v. 6, p. 178, pl. 25, figs. 8a, b. Salem limestone, Indiana.  
[not] **Bairdia plebeia** var. compressa Kirkby, 1858 = Crypto-bairdia compressa (Kirkby), 1858.

[not] **B. kingii** var. compressa Kirkby, 1859 = Crypto-bairdia compressa (Kirkby), 1858.  
This name is changed with Dr. Geis’ permission.

**Geologic range.**—Upper Mississippian.

**Orthobairdia oklahomaensis** (Harlton), 1927

Plate 3, figures 13–21

**Bairdia oklahomaensis** Harlton, 1927, Jour. Paleontology, v. 1, p. 209, pl. 33, fig. 7. Upper Glenn formation NW¼NW¼ NW¼ sec. 18, T. 5 S., R. 2 E., about 2 miles south of Ardmore, Carter County, Okla.

Harlton, 1929, Texas Univ. Bull. 2901, p. 156, pl. 3, figs. 5a, b. Graham formation, marly shale and limestone, San Saba River valley, near Hext, Menard County, Tex.

Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 69, pl. 5, figs. 8a, b. Lower Holdenville formation, 10–20 ft above base, shale in creek valley, 600 ft west of road, cor. NW¼NW¼ sec. 1, T. 3 N., R. 6 E. Pontotoc County, Okla.

**Bairdia oklahomaensis** Harlton. Coryell and Billings, 1932, Am. Midland Naturalist, v. 13, p. 172, pl. 17, fig. 3. Wayland shale, 5 miles east and 2,000 ft north of Cisco, on Cisco-Eastland road, Eastland County, Tex.

Coryell and Sample, 1932, idem, p. 204, pl. 25, fig. 9. East Mountain shale, Mineral Wells formation, shale pit, west of Mineral Wells, Palo Pinto County, Tex.

**Bairdia oklahomaensis** Harlton, Bradford, 1929, Bull. Am. Paleontology, v. 22, no. 73, p. 85, pl. 5, figs. 9a, b. Hoxbar formation, shale about 175 ft above Hollis limestone 270 ft north along road, east line sec. 7, T. 5 S., R. 2 E., Carter County, Okla.

**Bairdia oklahomaensis** Harlton. Johnson, 1936, Nebraska Geol. Survey Paper 11, p. 41, pl. 4, figs. 6, 7. Missouri series, Hickory Creek shale, west of Orepolis, Nebr.

**Bairdia oklahomaensis** Harlton. Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 48, pl. 3, figs. 15 (1), 17, 18, 19 (1), 20 [not fig. 16, which is a ventral view of an indeterminate species]. Shale below Liverpool limestone, SE¼ sec. 35, T. 34 N., R. 1 E., La Salle County, and shale above Maupin coal, NW¼ sec. 2, T. 9 N., R. 7 W., Maupin County, Ill.

Cordell, 1952, Jour. Paleontology, v. 26, p. 88, pl. 18, figs. 21–24. Lodore shale, creeked, a short distance north of gravel road, about midway between north and south lines of sec. 23, 0.2 mile west of east boundary of the section, T. 46 N., R. 31 W., 1.5 miles west of Pleasant Hill, Cass County, Mo.


**Bairdia auricula** Knight, 1928, Jour. Paleontology, v. 2, p. 319, pl. 43, figs. 3a, b. “Brown lime” of Labette shale, south bank of creek east of Price Rd. and south of Ladue Rd., St. Louis, Mo.

Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 68, pl. 5, figs. 7a, b. Wewoka formation, shale 75 ft above base, hill 1,300 ft east of southwest cor. sec. 4, T. 3 N., R. 7 E., Pontotoc County, Okla.

Ulrich’s cotypes (USNM 41789) consist of 12 specimens that belong to 2 species. Eight specimens are **Orthobairdia cestiennis** (Ulrich), 1891, (figs. 6a–c), the other 4 (figs. 7a, b) are steinkerns of young growth stages of an unidentifiable species with convex sides. The two cotypes of **B. granireticulatus** Harlton (USNM 78370) are identical with Ulrich’s specimens. The specimen illustrated here (pl. 3, figs. 24–26) is presumed to be the original of Ulrich’s illustration (1891, fig. 6b) and is designated as the lectotype.

**Geologic range.**—Upper Mississippian and Carboniferous.
Bairdia dornickhillensis and Bairdia seminalis were described by Sohn (1950, p. 34). They have the following measurements:

- The greatest height was measured perpendicular to the PI. 3, figs. 16, 17.
- The greatest width was oriented as depicted in PI. 3, figs. 18, 19.

Collected at Bradfield’s loc. 68 (Bradfield, 1935, p. 143).

The two specimens of Orthobairdia oklahomaensis (Harlton, 1927), illustrated here on plate 3, figures 16–19, are from the same sample (USGS loc. 12845) collected at Bradfield’s loc. 68 (Bradfield, 1935, p. 143). They have the following measurements:

<table>
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<th>Pl. 3, figs. 18, 19</th>
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<th>Greatest width (mm)</th>
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<td>Greatest length (mm)</td>
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<td>Greatest height (mm)</td>
<td>1.20</td>
<td>0.74</td>
<td>0.52</td>
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The greatest length was measured perpendicular to the ventral commissure (Sohn, 1954, p. 3); the greatest height was oriented as described by Sohn (1950, p. 34).

In order to discuss the ontogeny of this species, the fact that the larger specimen is probably an adult should be established. The following measurements are published for this species:

**Published measurements for Orthobairdia oklahomaensis**

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<th>Width (mm)</th>
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<td>0.72</td>
<td>0.48</td>
<td>0.32</td>
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<td>Harlton (1959)</td>
<td>1.2</td>
<td>0.73</td>
<td>0.61</td>
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<td>Warthin (1965)</td>
<td>1.3</td>
<td>0.72</td>
<td>0.61</td>
</tr>
<tr>
<td>Coryell and Billings (1936)</td>
<td>0.85</td>
<td>0.50</td>
<td>0.40</td>
</tr>
<tr>
<td>Coryell and Sample (1932)</td>
<td>1.25</td>
<td>0.76</td>
<td>0.56</td>
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<tr>
<td>Bradfield (1935)</td>
<td>1.26</td>
<td>0.79</td>
<td>0.56</td>
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<tr>
<td>Johnson (1946)</td>
<td>1.08</td>
<td>0.70</td>
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<tr>
<td>Cooper (1946)</td>
<td>1.00</td>
<td>0.62</td>
<td>0.61</td>
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<tr>
<td>Cordell (1952)</td>
<td>1.13</td>
<td>0.69</td>
<td>0.39</td>
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<tr>
<td>Marple (1952)</td>
<td>0.79</td>
<td>0.61</td>
<td>0.39</td>
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<tr>
<td>Do</td>
<td>0.86</td>
<td>0.50</td>
<td>0.32</td>
</tr>
<tr>
<td>Do</td>
<td>0.85</td>
<td>0.46</td>
<td>0.30</td>
</tr>
<tr>
<td>Do</td>
<td>0.66</td>
<td>0.36</td>
<td>0.41</td>
</tr>
<tr>
<td>Do</td>
<td>0.65</td>
<td>0.66</td>
<td>0.51</td>
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</tbody>
</table>

This table shows that only two specimens, those of Bradfield (1935), and Cooper (1946), are reported to be larger than the one illustrated in this paper.

Harlton’s holotype (USNM 71409) is recorded as having a length of 0.72 mm; remeasured with the same instrument as the two illustrated specimens, the greatest length is 1.23 mm, and the greatest height is 0.68 mm. Unfortunately, it is not practical to remeasure all the specimens for which measurements are listed. Because the size data are from 10 different investigators, they should not be used to construct an ontogenetic graph.

Dr. R. V. Kesling very generously analyzed the two sets of measurements; he writes as follows (Oct. 11, 1956):

> Of your two specimens of "Bairdia" oklahomaensis, I would assign the smaller to the penultimate instar before the larger. As I analyze them, an ideal series would be:

<table>
<thead>
<tr>
<th>Length</th>
<th>Height</th>
<th>Width</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.26</td>
<td>0.74</td>
<td>0.32</td>
<td>0.484</td>
</tr>
<tr>
<td>1.00</td>
<td>0.38</td>
<td>0.41</td>
<td>0.249</td>
</tr>
<tr>
<td>1.00</td>
<td>0.60</td>
<td>0.34</td>
<td>0.194</td>
</tr>
</tbody>
</table>

All dimensions of your smaller specimen are much closer to line 1 than to line 2, and hence the specimen appears to be two instars behind the larger.

As previously stated (p. 7), adults in the Bairdia s. l. groups are approximately 1 mm in greatest length. The term “adult” is used in this paper to include postmaturity molt stages (Sohn, 1950a, p. 429). It is not possible to determine in this group the size at which maturity is reached, but the odds are in favor of specimens as small as 0.6 mm in greatest length being more than one instar removed from maturity. The group with straight sides are removed into the new genus Orthobairdia because young as well as mature individuals have this feature.

**Geologic range.—**Middle and Upper Pennsylvanian.

Orthobairdia powarsi (Kellett), 1934

Bairdia powarsi Kellett, 1934, Jour. Paleontology, v. 8, p. 133, pl. 17, figs. 6a–e. Burlingame limestone, U.S. Highway 50, 4 miles north of Burlingame, Osage County, Kans.

Bairdia perincerta Kellett, 1934, Jour. Paleontology, p. 132, pl. 16, figs. 6a–d. Same locality as above.

Bairdia perincerta Kellett. Cordell, 1952, Jour. Paleontology, v. 26, p. 88, pl. 17, figs. 21–23. Hickory Creek shale, roadcuts along hill north of Oak Ridge School, 1.8 miles southeast of Weatherly, NE 1/4 NE 1/4 sec. 35, T. 59 N., R. 59 W., De Kalb County; and lower shale in Lawrence formation, ditch at corner of Russel Street and Highway 50, St. Joseph, Buchanan County, Mo.


Bairdia cf. B. ardmorensis Harlton. Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 92, pl. 7, figs. 7a, b. Shale breaks in Otterville limestone, main gully, 200 yd south of north line and one-quarter of a mile west of east line of sec. 12, T. 3 S., R. 2 E., Carter County, Okla. Based on a corroded specimen that represents a very young individual.
Cooper does not state whether or not B. crassimarina has a horizontal ridge on the left valve near the dorsal margin. His specimens have the thickened part of the centroventral edge of the left valve that is present in B. powersi; consequently, the assignment to O. powersi is tentative.

**Geologic range.**—Lower and Upper Pennsylvanian.

_Orthobairdia subreniformis_ (Kirkby), 1859

_Cythere subreniformis_ Kirkby, 1859, Tyneside Naturalist's Field Club Trans., v. 4, p. 154, pl. 9, fig. 13. New name for _Bairdia reniformis_ Kirkby, 1858.

Jones, 1859, in Kirkby, idem, p. 155, 163, pl. 11, figs. 23a-d [23c is labeled 24c]. Perman, Sunderland, England.


Kirkby (1859, p. 154) decided that this species belonged to _Cythere_, and because there was a _Cythere reniformis_ Baird, 1835 (Recent), he renamed the species _Cythere subreniformis_. Bassler and Kellett (1934, p. 298) referred this species to _Carbonita intermedia_ (Münster), 1830, from which it differs significantly.

**Geologic range.**—Permian.

_Orthobairdia stictica_ (Krömmelbein), 1950

_Bairdia stictica_ Krömmelbein, 1950, Senckenbergiana, v. 31, p. 334, pl. 1, figs. 3a–d. Lower Middle Devonian, Saline-Wald Murde, Erfel, Germany.

**Geologic range.**—Middle Devonian.

_Orthobairdia texana_ (Harlton), 1927

Plate 3, figure 29

_Bairdia texana_ Harlton, 1927, Jour. Paleontology, v. 1, p. 210, pl. 33, fig. 9. Shale just below Sedwick limestone, 2½ miles northeast of Coleman, Coleman County, Tex.

_Bairdia altifrons_ Knight, 1928, idem, v. 2, p. 324, pl. 43, figs. 6a, b. "Brown line" of Labette shale, exposed in south bank of creek east of Price Rd. and south of Ladon Rd., St. Louis County, Mo.

Warthin, 1890, Oklahoma Geol. Survey Bull. 53, p. 70, pl. 5, figs. 10a, b. Wewoka (?) formation, 75 ft above base, shale on hill, 1,300 ft north and 200 ft east of SW cor. sec. 4, T. 3 N., R. 7 E., Pontotoc County, Okla.

Kellett, 1934, Jour. Paleontology, v. 8, p. 135, pl. 18, figs. 6a, b. Wewoka formation, 1,300 ft north of SW¼ sec. 4, T. 7 E., R. 3 N., Oklahoma. Note discrepancy between the above two localities that are supposed to be identical.

Johnson, 1936, Nebraska Geol. Survey Paper 11, p. 42, pl. 4, figs. 4, 5. Hickory Creek shale (Stanton formation), bluffs just south of Burlington Railroad, between 2½ and 3½ miles west of Oreauol, sec. 32, T. 13 N., R. 13 E., Cass County, Nebr.


Cordell, 1952, Jour. Paleontology, v. 26, p. 82, pl. 17, figs. 1–4. Base of Bonner Springs shale to base of Hickory Creek shale, SE¼ SE¼ sec. 28 and along boundary between secs. 28 and 33, T. 61 N., R. 30 W., 4 miles east of Berlin, Gentry County, Mo.

_Bairdia altifrons_ Knight. Marple, 1932, Jour. Paleontology, v. 26, p. 929, pl. 133, figs. 4, 5. Lower Mercer limestone, valley of tributary of Johnathan Creek, on line between Madison Township, Perry County, and Newton Township, Muskingum County, Ohio. The illustrations are not adequate to determine the species.

_Bairdia hoxbarensis_ Harlton. Harlton, 1929, Texas Univ. Bull. 2901, p. 154, pl. 3, figs. 1a–d. Canyon series, San Saba River valley, near Hext, Menard County, Tex. Figure 1a is listed as the holotype; however, it is a different specimen than the holotype (USNM 71408).

Bradfield, 1935, Bull. Am. Paleontology, v. 22, no. 73, p. 86, pl. 6, fig. 8. Union Dairym formation railroad cut, SW¼ sec. 6, T. 5 S., R. 2 E., Carter County, Okla.

_Bairdia choses_ Kellett, 1934, Jour. Paleontology, v. 8, p. 125, pl. 18, figs. 5a–d. Deer Creek formation, railroad cut near Kansas River, just west of Shawnee-Douglass County line crossing Highway 10, Kansas.

_Bairdia florenaensis_ Upson, 1933, Nebraska Geol. Survey Bull. 8, p. 22, pl. 2, figs. 4a–c. Basal Florena shale, roadcut along south line of SW¼ sec. 34, T. 1 N., R. 14 E., Richardson County, Nebr.

Kellett, 1934, Jour. Paleontology, v. 8, p. 137, pl. 14, fig. 4: pl. 18, figs. 1a–d, 2a–d; pl. 19, figs. 1e, 2a–d. Cottonwood formation, Highway U.S. 40 at Ogden, Riley County; Wreford formation, low outcrop, road north of District No. 17 school, Chase County; Elmfield formation, shale parting exposed below road upstream from Cottonwood river bridge, east of Elmfield, Chase County; shale directly above Cottonwood limestone, large abandoned (1934) quarry, east of Cottonwood Falls, Chase County, Kans.


_Bairdia schollii_ Correll and Booth, 1933, Am. Midland Naturalist, v. 14, p. 284, pl. 4, figs. 9, 10. Wieland shale, 1 mile west of Graham, near Graham–Throckerton Rd., west of Salt Creek, Young County, Tex.


_Bairdia guadalupiana_ Hamilton, 1942, Jour. Paleontology, v. 16, p. 714, pl. 110, figs. 5a, b. Permian, uppermost Leonard or lowermost Word formation, Glass Mountains, Brewster County, Tex.

_Bairdia nevensis_ Kellett, 1934, Jour. Paleontology, v. 8, p. 137, pl. 19, figs. 3a, b. Shale, Neva formation, along road winding uphill near Cottonwood River Bridge, east of Elmfield, Chase County, Kans.

The holotype of _B. nevensis_ (USNM 89485) is a steinkern, as is the holotype of _B. texana_ (USNM 89486).
71720), which appears to have a concave ventral margin.

Geologic range.—Middle Pennsylvanian-Permian.

Orthobairdia sp. A

Bairdia brevis Jones and Kirkby. Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 25, pl. 1, figs. 11, 12. Meander formation, south entrance to railroad tunnel SW1/4NE1/4 sec. 1, T. 13 S., R. 4 E., Johnson County, Ill.

Geologic range.—Upper Mississippian.

Bairdia grahamensis Harlton. Warthin, 1930, Oklahoma Geol. Survey Bull. 53, p. 70, pl. 5, figs. 12a, b. Holdenville formation, 10-20 ft above base, shale in creek valley, 600 ft west of road, corner NE1/4NW1/4 sec. 1 T. 3 N., R. 6 E., Pontotoc County, Okla.

Geologic range.—Middle Pennsylvanian.

Genus PUSTULOBAIRDIA Sohn, n. gen.


Diagnosis.—Diffs from Bairdia in that the surface is covered with pustules.

Geologic range.—Upper Pennsylvanian-Permian.

Lithology.—Limestone, shale.

Habitat.—Marine.

KEY TO SPECIES OF PUSTULOBAIRDIA

1. End margins beaded.--------- pruniseminata (p. 69)
2 (1a). Ventral margin concave.----------- spinosa (p. 69)
2a. Ventral margin convex.--------- sp. A (p. 69)

ASSIGNED SPECIES

Pustulobairdia pruniseminata (Sohn), 1954
Plate 3, figures 22, 23


Geologic range.—Permian.

Pustulobairdia spinosa (Cooper), 1946

Bairdia spinosa Cooper, 1946 [not Polenova, 1952], Illinois Geol. Survey Bull. 70, p. 52, pl. 3, figs. 44-46. Shale parting in upper Shoal Creek limestone, NW1/4 sec. 36, T. 10 N., R. 7 W., Macoupin County, Ill.


Geologic range.—Upper Pennsylvanian.

Pustulobairdia sp. A


Geologic range.—Permian.

Genus CERATOBAIRDIA Sohn, 1954


Type species.—Original designation C. dorsospinosa Sohn, 1954, U.S. Geol. Survey Prof. Paper 264-A, p. 6, pl. 1, figs. 27-32; pl. 2, figs. 17, 19. Permian, west Texas.

Diagnosis.—Diffs from Bairdia by the presence of thick spines or knobs along the dorsum of the larger valve and a ventrolateral alate ridge.

Geologic range.—Permian.

Lithology.—Calcarenite.

Habitat.—Marine.

ASSIGNED SPECIES

Ceratobairdia wordensis (Hamilton), 1942
Plate 4, figures 8-17

Bairdia wordensis Hamilton, 1942, Jour. Paleontology, v. 16, p. 716, pl. 110, fig. 4. Upper Leonard or lower Word formation, Glass Mountains, Tex.

Geologic range.—Permian.

Genus BAIRDIOIITES Cronies and Gale, 1939


Type species.—Original designation B. crescentis Cronies and Gale, 1939, idem, v. 33, p. 288, pl. 6, figs. 19, 20. Golconda formation, Illinois.

Diagnosis.—Diffs from Bairdia s. 1. by possessing two curved parentheseslike ridges on the anterocentral and posterocentral parts of each valve.

Discussion.—The dorsal outline of this genus varies in that the area between the curved ridges may be convex, parallel, or wedge shaped; the lateral outline of species in this genus is also variable, having the shape of several of the genera here removed from Bairdia.

The genus Bairdiolites is characterized by the presence of parentheselike ridges near each end of the valve. A total of 15 species are defined by a dichotomous key. Two of these species are new, but are designated here by letters. The stratigraphic range and the frequency of occurrence of these species are shown on figure 12.

This is essentially an Upper Mississippian genus, having only 1 species, B. ardmorensis (Harlton), 1929, recorded from the 2 localities of Early Pennsylvanian age in Oklahoma.
### Revision of Some Paleozoic Ostracode Genera

#### Number of Species and Localities

<table>
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<tr>
<th>Period</th>
<th>Number of Species</th>
<th>Number of Localities</th>
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</tr>
<tr>
<td>Middle</td>
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</tr>
</tbody>
</table>

**Explanation:**
- Number of species restricted to system or parts of system
- Number of localities or stratigraphic levels from which the species are recorded

**Figure 12:** Stratigraphic range and frequency distribution of species of Bairdiolites.

- **Geologic range.**—Upper Mississippian—Lower Pennsylvanian.
- **Lithology.**—Limestone (?), shale.
- **Habitat.**—Marine.

### Key to the Species of Bairdiolites

1. Dorsal margin straight.............................................. 2
   1a. Dorsal margin convex........................................... 4
2 (1). Dorsal outline hexagonal; sides subparallel creccentis (p. 71)
2a. Dorsal outline not hexagonal.................................. 3
3 (2a). Greatest width in dorsal outline at midlength elongatus (p. 71)
3a. Greatest width in dorsal outline behind midlength tenuis (p. 71)
4 (1a). Ventral margin straight........................................ 5
   4a. Ventral margin curved.......................................... 10
5 (4). Dorsoanterior margin straight................................ 6
   5a. Dorsoanterior margin curved................................... 7
6 (5). Posterior point in ventral quarter of greatest height bulbosus (p. 70)
   6a. Posterior point in ventral third of greatest height vulgaris (p. 71)
7 (6a). Dorsoanterior margin concave................................ 8
   7a. Dorsoanterior margin convex.................................... 9
8 (7a). Dorsoanterior margin convex.................................. 9
8a. Dorsoanterior margin concave.................................... 8
9 (8). Posterior point in ventral third of greatest height procerus (p. 71)
9a. Posterior point in ventral quarter of greatest height ovatus (p. 71)
10 (4a). Ventral margin concave...................................... 11
10a. Ventral margin convex........................................... 11
11 (10a). Dorsoanterior margin straight............................. 12
11a. Dorsoanterior margin convex.................................... 13
12 (11). Dorsoanterior margin to approximate midlength brevirostris (p. 70)
12a. Dorsoanterior margin to approximate one-third of greatest length armdorensis (p. 70)
13 (11a). Dorsoanterior margin straight.................................. 14
13a. Dorsoanterior margin concave.................................... 14
14 (13a). Posterior point at midheight.................................. 14
14a. Posterior point below midheight................................... 14

### Assigned Species

**Bairdiolites armdorensis** (Harlton), 1929

Plate 4, figures 4–7


**Geologic range.**—Lower Pennsylvanian.

**Bairdiolites brevirostris** Croneis and Thurman, 1939


Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 26, pi. 2, figs. 15, 16. Degonia or Clore formation, railroad cut at Robbs, NE\% sec. 30 and SE\%SW 19 sec. 19, T. 12 S., R. 5 E., Pope County, Ill.

**Geologic range.**—Upper Mississippian.

**Bairdiolites bulbosus** Croneis and Bristol, 1939


**Bairdiolites emarginatus** Croneis and Bristol, 1939, idem, p. 96, pl. 3, figs. 14, 15. Menard formation, Illinois.

[not] *Bairdiolites bulbosus* Croneis and Bristol. Cooper, 1941 = *B. procerus* Cooper, 1941.

Cooper (1941, p. 27) considered *B. emarginatus* a synonym of *B. bulbosus*; however, because Croneis and Bristol illustrated a left valve view of *B. emarginatus* and a right valve view of *B. bulbosus* and because on the illustrations the posterior point of *B. emarginatus* appears higher on the specimen than *B. bulbosus*, the synonymy is here questioned. Cooper illustrated a specimen of *B. bulbosus* that is closer to *B. procerus* than it is to the holotype of *B. bulbosus*.

**Geologic range.**—Upper Mississippian.
Bairdiolites crassus Cooper, 1941

Bairdiolites crassus Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 27, pl. 2, figs. 29, 30. Clure formation, core, H. Forester No. 1 well, W½SW¾NW¼ sec. 5, T. 6 S., R. 1 W., Perry County, Ill.

Geologic range.—Upper Mississippian.

Bairdiolites crescentis Croneis and Gale, 1939


Cooper (1941, p. 14) lists this species also from the Paint Creek, Vienna and Kinkaid formations.

Geologic range.—Upper Mississippian.

Bairdiolites elongatus Croneis and Funkhouser, 1939


Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 14 [list], pl. 2, figs. 23, 24. Degonia or Clure formation, railroad cut near Robbs, NE¼NW¼ sec. 30 and SE¼ SW¼ sec. 19, T. 12 S., R. 5 E., Pope County, Ill.

The holotype is probably a steinkern. Cooper (1941, p. 14) lists this species from the Clure and Kinkaid formations, but according to Swann (oral communication) subsequent work by the Illinois Geological Survey determined Cooper's locality 5 to be either Degonia or Clure formation. A subsequent collection at Cooper's locality 5 (USGS 12840) did not yield this species. There is, however, a question whether the exact layer was sampled.

Geologic range.—Upper Mississippian.

Bairdiolites fornicatus Cooper, 1941

Bairdiolites fornicatus Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 27, pl. 2, figs. 27, 28. Menard formation, SW¼NE¼ sec. 1, T. 13 S., R. 4 E., Johnson County, Ill.

Geologic range.—Upper Mississippian.

Bairdiolites fovealis Coryell and Rozanski, 1942

Bairdiolites fovealis Coryell and Rozanski, 1942, Jour. Palentology, v. 16, p. 147, pl. 24, figs. 6, 7. Glen Dean limestone, Hardin County, Ill.

Geologic range.—Upper Mississippian.

Bairdiolites ovatus Croneis and Funkhouser, 1939


The holotype, Walker Museum 44472, is a corroded specimen.

Geologic range.—Upper Mississippian.

Bairdiolites platypleurus Croneis and Gale, 1939


[not] Bairdiolites platypleurus Croneis and Gale. Cooper, 1941 = Bairdiolites sp. A.

Geologic range.—Upper Mississippian.

Bairdiolites procerus Cooper, 1941

Bairdiolites procerus Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 27, pl. 2, figs. 39, 40. Kinkaid formation, NE¼ SW¼ sec. 35, T. 8 S., R. 4 W., Jackson County, Ill.


Geologic range.—Upper Mississippian.

Bairdiolites tenuis Cooper, 1941

Bairdiolites tenuis Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 27, pl. 2, figs. 37-38. Renault formation, NE¼SW¼ sec. 9, T. 12 S., R. 1 W., Union County, Ill.

Geologic range.—Upper Mississippian.

Bairdiolites vulgaris Cooper, 1941

Bairdiolites vulgaris Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 28, pl. 2, figs. 41-42. Paint Creek formation, SW¼ sec. 4, T. 6 S., R. 8 W., Randolph County, Ill.

Geologic range.—Upper Mississippian.

Bairdiolites sp. A

Bairdiolites ovatus Croneis and Funkhouser. Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 14 [list], pl. 2, figs. 43, 44. Renault (Shetlerville?) formation, loading docks for fluorspar southwest of Rosiclare, SW¼SE¼ sec. 5, T. 13 S., R. 8 E., Hardin County, Ill.

This species differs from B. platypleurus by having a concave ventral margin.

Geologic range.—Upper Mississippian.

Bairdiolites sp. B

Bairdiolites ovatus Croneis and Funkhouser. Cooper, 1941, Illinois Geol. Survey Rept. Inv. 77, p. 27, pl. 2, figs. 21, 22. Degonia or Clure formation, railroad cut near Robbs, NE¼NW¼ sec. 30, and SE¼SW¼ sec. 19, T. 12 S., R. 5 E., Pope County, Ill.

Cooper records this as Kinkaid; see comment under B. elongatus.

Geologic range.—Upper Mississippian.

SYNONYMS OF AND SPECIES REJECTED FROM BAIREDIOLITES

bulbosus Croneis and Bristol. Cooper, 1941 = Bairdiolites procerus Cooper, 1941.
72

**Revision of Some Paleozoic Ostracode Genera**

**Croneis and Bristol, 1939** = *Bairdiolites bulbosus*

**Croneis and Funkhouser, Cooper, 1941** = *Bairdiolites ovatus*

**Croneis and Gale, Cooper, 1941** = *Bairdiolites* sp. B.

*Silentites* Coryell and Booth, 1933

**Silentites Coryell and Booth, 1933, Am. Midland Naturalist, v. 14, p. 265.**


**Type species.**—Original designation *S. silenus* Coryell and Booth, 1933, Am. Midland Naturalist, v. 14, p. 265, pl. 4, figs. 1, 2. Wayland shale, Young County, Tex.

**Diagnosis.**—Carapace smooth, large, short; height greater than one-half the length; ends round; overlap on all margins; dorsal margin overhangs smaller valve; duplicature narrow or absent.

**Discussion.**—Kellett (1935, pl. 17, fig. 91) illustrated a left valve that shows a muscle scar which she interpreted as pinnate, and consequently placed the genus in Cytherellidae. Her specimen and two right valves in the same slide (USNM 90120) show in glycerin with transmitted light a round muscle scar with many individual spots that is closer to the *Healdiidae*. The hinge structure of a topotype specimen of *S. silenus* differs from that illustrated for *Bairdiocypris üxheimensis* Kegel by Krömmler (1952, pl. 4, figs. 1a, b) in that the smaller valve does not have a step-like bevel on the outside into which the larger valve fits.

The genus *Silentites* is characterized by rounded ends, height greater than one-half the greatest length, and concave ventral margin. Nine species are defined by a dichotomous key. The stratigraphic range and the frequency of occurrence of these species are shown on figure 13.

**Geologic range.**—Mississippian–Permian.

**Lithology.**—Limestone, shale.

**Habitat.**—Marine.

**Key to Species of Silentites**

1. Dorsal commissure angular at junction with one or both end margins
   1a. Dorsal commissure evenly curved
   2
2 (1). Dorsoanterior margin of larger valve extends to approximate midlength
   3
3 (2a). Dorsoposterior margin of larger valve longer than dorsoanterior margin
   4 (3a). Dorsoposterior margin of larger valve shorter than dorsoanterior margin
   5 (4a). Lateral outline not symmetrical; anterior narrower
   6 (5a). Lateral outline symmetrical

**Figure 13.—Stratigraphic range and frequency distribution of Silentites.**

**Explanation**

- Number of species restricted to system or parts of system
- Number of species recorded in system or part of system, the types of which are from the Middle Pennsylvanian
- Number of localities or stratigraphic levels from which the species are recorded

**Table 1:**

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<th>System</th>
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</tr>
<tr>
<td>Pennsylvanian</td>
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<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Mississippian</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Devonian</td>
<td>3</td>
<td>4</td>
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</table>
5a. Ends pointed in dorsal outline. *rudolphi* (p. 74)
6 (5): Posterior end wider in dorsal outline; greatest width behind midlength. *opima* (p. 73)
6a. Both ends approximately the same width in dorsal outline; greatest width at approximate midlength *lenticularis* (p. 73), *(faba, gallowayi, ? sasakiensis)*
7 (4a). Ventral margin gently concave *fabalis* (p. 73)
7a. Ventral margin distinctly concave *bilobatus* (p. 73)
8 (3a). Dorsoanterior margin extends approximately to mid-height. *silenus* (p. 74)
8a. Dorsoanterior margin extends to ventral third of greatest height. *marginiferus* (p. 73)

**ASSIGNED SPECIES**

*Silenites asymmetrica* Cooper, 1946

*Silenites asymmetrica* Cooper, 1946, *Illinois Geol. Survey Bull.* 70, p. 75, pl. 10, fig. 29. Shale below Seville limestone, SW 4 sec. 32, T. 11 N., R. 2 W., Mercer County, III.

**Geologic range.**—Middle Pennsylvanian.

*Silenites bilobatus* (Münster), 1830


*Silenites bufo* (Sciöell), 1859, *Annals Mag. Nat. History*, ser. 6, v. 6, p. 903, pl. 16, fig. 3. Carboniferous limestone, River Bardin, falling into the River Etsin, south Mongolia.


*Baerdia opima* (Cooper), 1941, *Illinois Geol. Survey Bull.* 70, p. 75, pl. 10, figs. 30-32. Shale below St. David limestone, SW 4 sec. 9, T. 5 S., R. 6 W., Randolph County; and shales, Liverpool erosethem, NW 4 sec. 21, T. 6 N., R. 3 E., Fulton County, III.

**Geologic range.**—Middle Pennsylvanian.

*Silenites lenticularis* (Knight), 1928

Plate 4, figure 3


*Bythocypris sasakiensis* Warthin, 1930, *Oklahoma Geol. Survey Bull.* 55, p. 73, pl. 6, figs. 5a, b. Susakwa limestone member of the Holdenville formation, old quarry (1930), in south part of Sasakwa, Seminole County, Okla.


*Bythocypris gallowayi* Coryell and Osorio, 1932, *Am. Midland Naturalist*, v. 13, p. 33, pl. 5, fig. 3. Nowata shale, outcrop near Hughes' quarry about 2 miles northeast of Tulsa, Tulsa County, Okla. Based on a very young individual.

*Silenites lenticularis* (Knight). Kellett, 1935, *Jour. Paleon­tology*, v. 9, p. 151, pl. 17, figs. 9a-i. Americus limestone, 1½ miles straight south of Allen, Lyon County; and Elmdale formation, shales partings, below the road and upstream near the Cottonwood River bridge, east of Elmdale, Chase County, Kans.


**Geologic range.**—Middle and Upper Pennsylvanian-Permian.

*Silenites marginiferus* (Geis), 1932

*Bythocypris marginifera* Geis, 1932, *Jour. Paleontology*, v. 6, p. 179, pl. 26, figs. 2a, b. Salem limestone, Indiana.

*Bythocypris marginifera* (Geis). Morey, 1936 = *Silenites warei* Morey, 1936.

**Geologic range.**—Upper Mississippian.

*Silenites? opima* (Cooper), 1941

Bythocypris amdenensis Morey, Scott, 1942, Jour. Paleontology, v. 16, p. 162, pl. 25, fig. 18. Otter formation. East end of Little Belt Mountains, about 4 miles due west of Judith Gap, Wheatland (?), County, Mont.

Bythocypris amdenensis as illustrated by Scott is a specimen less than 0.5 mm in greatest length that differs in lateral outline from Morey's holotype. This specimen is questionably referred to Silenites? opima because the shapes are similar.

**Geologic range.**—Upper Mississippian.

*Silenites† rudolphii (Kummerow), 1939*

Bythocypris rudolphii Kummerow, 1939, Preuss. Geol. Landesanstalt Abh., n. f., no. 194, p. 48, pl. 5, figs. 9a, b. Carboniferous (C$_2$-S$_1$), Ratingen, Rheinland, Germany.

*Silenites bilobatus* (Münster). Kummerow, 1939, Preuss. Geol. Landesanstalt Abh., n. f., no. 194, p. 49, pl. 5, figs. 11a, b. Carboniferous, (C$_2$), Regnitzlosau bei Hof, Germany.

**Geologic range.**—Upper Mississippian.

*Silenites silenus Coryell and Booth, 1933*

Plate 4, figures 1, 2

*Silenites silenus* Coryell and Booth, 1933, Am. Midland Nat., v. 14, p. 265, pl. 4, figs. 1, 2. Wayland shale, near the Graham-Throckorton road, west of Salt Creek, 1 mile west of Graham, Young County, Tex.

Cooper, 1946, Illinois Geol. Survey Bull. 70, p. 76, pl. 10, figs. 37, 38. Shale parting in Newton limestone, SE $rac{1}{4}$ sec. 35, T. 9 N., R. 7 E., Cumberland County, Ill.

**Geologic range.**—Upper Mississippian.

*Silenites warei Morey, 1936*

*Silenites warei* Morey, 1936, Jour. Paleontology, v. 10, p. 121, pl. 17, figs. 12, 14. Basal Chouteau limestone, near Brown's Station, 3 miles northwest of the town at the junction of Lost and Clear Fork Creeks, Boone County, Mo.

*Silenites marginiferus* (Geis). Morey, 1936, Jour. Paleontology, v. 10, p. 121, pl. 17, figs. 23, 25. Basal Chouteau limestone, near Brown's Station, 3 miles northwest of the town at the junction of Lost and Clear Fork Creeks, Boone County, Mo.

**Geologic range.**—Lower Mississippian (?).

**DOUBTFUL NAMES**

*Silenites texanus* Harlton, 1929

Bythocypris texana Harlton, 1929, Texas Univ. Bull. 2901, p. 190, pl. 1, fig. 1. Canyon group, San Saba River valley near Hext, Menard County, Tex.

The holotype (USNM 80593) of this species is a steinkern that suggests the shape of *Silenites*.

*Silenites grayi* (Crespin), 1945

*Bairdia grayi* Crespin, 1945, Royal Soc. Queensland Proc., v. 50-60, p. 32, pl. 4, figs. 1a, b. Permian. Lower Bowen series, shaly limestone, north bank of Cattle Creek, 14 miles southeast of Springsure, Queensland, Australia.

**SPECIES REJECTED**

*Silenites symmetricus* Kummerow, 1953

*Silenites symmetricus* Kummerow, 1953, Staat. Geol. Komm. Deutsch. Demokrat. Republik, Geologie, Jahrg. 2, Berlin, 7, p. 54, pl. 7 [given as pl. 6 in text], figs. 4a, b. Middle Devonian, upper *Stringocephalus* beds, Tagebau, Schweiner Brunnen, Germany.

This species is based on a steinkern fide Kummerow (1953, p. 71) and possibly belongs to *Pullvillites* Opik, 1937.

*Silenites robustus* Kummerow, 1953

*Silenites robustus* Kummerow, 1953—Beckenr? robusta (Kummerow), 1953.

**Family UNNAMED**

This family will be named by Berdan and Sohn in the Treatise on Invertebrate Paleontology, Part Q, Ostracoda (written communication).

Inequivalved subovate asymmetrical medium-sized ostracodes with thick shells; tubules normal to shell surface, wider on interior surface, invisible on exterior of well-preserved specimens. Hinge simple; hingeline straight, shorter than greatest length of carapace. Surface smooth, punctate or rugulose. Geologic range Ordovician(?) Silurian-Devonian.

The hingeline in this family is always incised, and the greatest width is equal to or larger than the greatest height. The tubules normal to the shell surface are here illustrated by a thin section (pl. 5, fig. 12) and by means of radiographs (pl. 5, figs. 5, 7-9) (Schmidt, 1952) prepared by Dr. R. A. M. Schmidt.

This lower Paleozoic family is included here because several species previously assigned to *Bairdia-cypris* belong to genera in this group. Species in these genera are not critically revised.

**Genus TUBULIBAIRDIA** Swartz, 1936


**Type species.**—Original designation *Tubulibairdia tubulifera* Swartz, 1936, Jour. Paleontology, v. 10, p. 581, pl. 89, figs. 2a-r. Middle Devonian, Pennsylvania.

**Diagnosis.**—A genus in this family with rounded cross section, without any shoulders, ridges or grooves.

**Discussion.**—The type material for this genus consists of internal casts and molds. The type species is illustrated on plate 5, figure 6. Later work, mostly by my colleague, Jean M. Berdan, shows this genus...
to be common in Middle Silurian through Middle Devonian rocks. Dr. K. Krömmelein, Frankfurt-am-Main, Germany, very generously sent specimens of Bairdiocypris clava Kegel, 1932, that undoubtedly belong to this genus. Krömmelein (1955, p. 299) referred this species to Pachydomella Ulrich, 1891, while Kummerow (1953, p. 60) and Bouček and Pribyl (1955, p. 655) assigned this group of species to Microcheilinella Geis, 1933. Krömmelein (1955, text fig. 1, pl. 2, fig. 26) illustrated the diagnostic cross section of this genus that differs from that of Microcheilinella Geis, 1933, by having a more incised hinge line; compare plate 5, figure 12 and figure 13. The specimens of Microcheilinella are much smaller.

Kummerow (1953, p. 61), and Bouček and Pribyl (1955, p. 657 (81)) included in Microcheilinella species with curved hinge lines. These species are excluded from Tubulibairdia because of that feature; their proper generic assignment is not yet known. As noted by Bouček and Pribyl (p. 656), the upper Paleozoic species of Microcheilinella are all smaller. The type species, M. distorta Geis, is more elongate, has a less arched dorsal margin, and does not have tubules in the shell wall.

**Geologic range.**—Ordovician(?), Middle Silurian-Middle Devonian.

**Lithology.**—Limestone, shale.

**Habitat.**—Marine.

### ASSIGNED SPECIES

#### Tubulibairdia amalaiue (Kummerow), 1953

*Microcheilinella amalaiue* Kummerow, 1953, Staat. Geol. Komm. Deutsch. Demokrat. Republik, Geologie, Jahrg. 2, Beth. 7, p. 50, pl. 6, figs. 5a, b. Middle Devonian, Eifel, Germany.

**Geologic range.**—Middle Devonian.

#### Tubulibairdia antecedens var. antecedens (Kegel), 1932

*Brythocypris* (Bairdiocypris) clava var. antecedens Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 247, pl. 13, figs. 3a, b. Middle Devonian, Eifel, Germany.

**Geologic range.**—Middle Devonian.

#### Tubulibairdia? antecedens var. wolfarti (Krömmelein), 1955

*Pachydomella* antecedens var. wolfarti Krömmelein, 1955, Senckenbergiana, v. 36, p. 307, pl. 2, figs. 21-24. Middle Devonian, Eifel, Germany.

It is not possible to determine whether the horizontal ribbing of this and the previous variety is due to preservation or is an actual ornament. Should this feature be morphologic, then the two varieties probably do not belong to this genus.

**Geologic range.**—Middle Devonian.

#### Tubulibairdia clava (Kegel), 1932

*Brythocypris* (Bairdiocypris) clava Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 246, pl. 13, figs. 2a-d. Middle Devonian, Eifel, Germany.

**Geologic range.**—Middle Devonian.

#### Pachydomella clava (Kegel.) Krömmelein, 1955, Senckenbergiana, v. 36, p. 306, pl. 1, figs. 8, 12. Middle Devonian, Eifel, Germany.


**Geologic range.**—Middle Devonian.

#### Tubulibairdia? corbuloides (Jones and Holl), 1869

*Cythere corbuloides* Jones and Holl, 1869, Annals Mag. Nat. History, ser. 4, v. 3, p. 211, pl. 15, figs. 4a-e [figs. 5a, b, considered as a young individual or a small male in the discussion, probably represents another species]. Silurian shale and limestone, England.

**Geologic range.**—Silurian.

#### Tubulibairdia decaturi (Wilson), 1935

*Microcheilinella decaturi* Wilson, 1935, Jour. Paleontology, v. 9, p. 646, pl. 78, figs. 11a, b. Birdsong shale, glades on Allan Conrad place, about 2 1/2 miles north-northeast of Jeannette, Decatur County, Tenn. The holotype (USNM 112905) is a corroded specimen.

**Geologic range.**—Lower Devonian.

#### Tubulibairdia? decaturi var. (Pribyl and Snajdr), 1950


**Geologic range.**—Middle Devonian.

#### Tubulibairdia longula (Ulrich and Bassler), 1913

*Pachydomella longula* Ulrich and Bassler, 1913, Maryland Geol. Survey, Lower Devonian, v., p. 542, pi. 98, figs. 29-31. Keyser member of the Helderberg formation, Cumberland, Md.

**Geologic range.**—Lower Devonian.

#### Tubulibairdia punctulata (Ulrich), 1891


**Geologic range.**—Lower Devonian.
Tubulibairdia tenusulcata (Pokorny), 1950

Bairdiocypris clava tenusulcata Pokorny, 1950, Czechoslovakia.
Stát. geol. úst., Shorník, v. 17, Paleon., p. 556 (45), 617 (105), pl. 3, figs. 1a-d. Givetian, red marly coral limestone, Růžička quarry, Čelechovice, Czechoslovakia.

Three topotype specimens of this species (USNM 135910) are either squashed or abraded.

Geologic range.—Middle Devonian.

Genus PHANASSYMETRIA Roth, 1929


Type species.—Original designation P. triserrata Roth, 1929, Jour. Paleontology, v. 3, p. 358, pl. 37, figs. 20a-c. Devonian, Oklahoma.

Diagnosis.—A genus in this family with angular cross section, groove below shoulder of larger valve and with horizontal ridge below midheight of one or both valves.

Discussion.—Amsden (1956, p. 55) states that the type species was subsequently designated by Bassler and Kellett. The type species is here considered as originally designated by Roth because of the “new genus, new species” rule (Blackwelder, 1952, p. 16). Roth (1929, p. 358) did not define Phanassymetria. The species lacked the diagnostic shell tubules (pl. 5, fig. 5).

The diagnostic cross section and ridges are illustrated by figure 14.

The sections illustrated on figure 14–2 to 4 were made as follows: A specimen was mounted with Canada balsam on a glass slide and oriented with the anterior up by using a wooden toothpick. After grinding down the desired amount, the polished surface was drawn using a camera lucida. After warming the balsam, the specimen was then oriented in the same plane as the drawing of the carapace, and the image projected with the camera lucida upon the drawing of the complete carapace. It was then possible to show the line of section A on figure 14–1. The second and third specimens, illustrated as figures 14–3 and –4, were mounted and ground down to the desired planes. The remaining specimens were reoriented and projected on the drawing. This method has the advantage of preserving the original of each drawing.

The sections illustrated in figure 14–6 to 10 were all made on the same specimen, with the result that only the two final polished surfaces are preserved as USNM 133225.

Geologic range.—Silurian–Devonian.

Lithology.—Marl.

Habitat.—Marine.

Genus PACHYDOMELLA Ulrich, 1891


Type species.—Original designation P. tumida Ulrich, 1891, Cincinnati Soc. Nat. History, Jour., v. 13, p. 198, pl. 13, figs. 5a–c. Devonian, Falls of the Ohio, Ky.

Diagnosis.—A genus in this family with rounded cross section, with groove below shoulder of larger valve, and without horizontal ridges below midheight.

Discussion.—The original description of the genus and the type species include as a diagnostic character a subcentral umbilical pit. This feature is the result of preservation and is not a true feature of the species (pl. 5, figs. 8, 9, 18–21). Because of this erroneous diagnosis, the genus has been misunderstood. Although no species belonging to this genus have been referred to Bairdia, it is included here as an aid in understanding the related genera (fig. 15–1 to 6).

Geologic range.—Devonian.

Lithology.—Limestone, marl, chert.

Habitat.—Marine.

Family RISHONIDAE Sohn, n. fam.

Diagnosis.—Smooth inequivalved ostracodes; one valve overlaps the other along the dorsum; the other valve overlaps the first along the venter.

Discussion.—The characteristic overlap of this family distinguishes it from all other Paleozoic ostracode families. Included in this family are Samarella Polenova, 1952 (not assigned to any family in the original description), Reversocypris Pribyl, 1955 (= Samarella!) (originally described in Bairdiidae Sars, 1887), Silenits Neckaja, 1958, and possibly Whipplella Holland, 1934, as well as Gutschickia Scott,
1944. The last two are fresh-water genera of Pennsylvanian and Permian age that are not a part of this study. *Whipplella* was originally described in *Aparchitidae Ulrich and Bassler, 1923. Scott (1944b, p. 142) moved *Whipplella* to Cypridae Baird, 1845, and described the related genus *Gutschickia*. *Bythocypris monomobonata* Hessland, 1949 (Ordovician), may belong to a genus in this family.

*Paraparchites* Ulrich and Bassler, 1906, and related genera, have one valve overlapping the other along the venter and the other overhanging the larger valve along the dorsum. These genera do not belong to this family because they have a straight hingeline, and the smaller valve does not really overlap the larger valve: it has a groove into which the larger valve fits. Furthermore, most of these genera are semicircular
FIGURE 15.—Polished sections through *Pachydomella* sp.
1. Left view of carapace, X 29, upon which are projected the lines of sections 2-6.
2. Polished surface through specimen, posterior view X 44, position shown on figure 15-1 as line A.
3. The same through line B shown on figure 15-1.
4. The same through line C shown on figure 15-1.
5. The same through line D shown on figure 15-1.
6. Polished surface through specimen, anterior view X 44, line E shown on figure 15-1. Thin section, USNM 133226, Haragan marl, one-half a mile southeast of "White Mound," Murray County, Okla.
in lateral outline and have a spine in the dorsoanterior position of one or both valves.

**Genus RISHONA** Sohn, n. gen.


**Bairdia** McCoy. Eichwald, 1860 [part], Lethaea Rossica, v. 1, p. 1337. Silurian, Russia.

**Type species.** *Bairdia gibbera* Kesling and Kilgore, 1952 [not Morey, 1935] = *Pontocypris mawii* (Jones) of this paper. *Silenus* subtriangulata Neckaja, 1958, the type species of *Silenis*, differs in lateral outline from *Rishona epicypha* (Kesling and Kilgore), 1955; consequently, the two genera are probably distinct. It is possible that the Silurian species here referred to *Rishona*, may belong to *Silenis*.

The name *Rishona* is feminine.

**Geologic range.**—Silurian (?), Devonian, Carboniferous (?).

**Habitat.**—Marine.

**ASSIGNED SPECIES**

**Rishona bassleri** Sohn, n. sp.

Plate 5, figures 1–4

Dorsal margin gently curved; doroanterior margin straight to slightly convex, extends to approximately one-third of greatest length; dorsoanterior margin slightly concave, extends to approximately one-quarter of greatest length. End margin subequal; posterior larger; both ends below midheight.

Specimens of this species were in a collection of ostracodes that were segregated by Dr. R. S. Bassler from material collected by Dr. C. Schuchert from the Silurian near Klinkham, Gotland.

**Geologic range.**—Silurian.

*Eichwald* (1860, p. 1341) describes “eye tubercles” that are not illustrated. The possibility that this description was somehow confused with the description of his *Bairdia laevigata* (p. 1342), and the illustration of which does show a tubercle on one valve, should be considered. If this species has eye tubercles, it would automatically be excluded from *Rishona*. (See discussion under *R. laevigata*.)

**Geologic range.**—Carboniferous.

**Rishona epicypha** (Kesling and Kilgore), 1955

Plate 5, figures 22–26


Kesling very generously loaned me his types as well as a slide containing topotype material. The material is poorly preserved, but several crushed specimens suggest a very thin shell. A polished section through one of the topotypes indicates that one valve overlaps on the dorsal margin and the other valve overlaps slightly on the ventral margin.

**Geologic range.**—Middle Devonian.

**Cypridina laevigata** (Eichwald), 1857


**Bairdia laevigata** Eichwald, 1860, Lethaea Rossica, v. 1, p. 1342, pl. 32, figs. 5a–d. Same localities as above.

In the discussion Eichwald (1860, p. 1343) established a smaller black variety, *Bairdia laevigata* var. nigrescens. Both the species and the variety are considered by Jones and Kirkby (1875, p. 53) as varieties of *Leperditia okeni* (Münster), 1830. Bassler and Kellett (1934, p. 426, 427) refer to the species as *Paraparchites? laevigatus* (Eichwald) and to the variety as *Paraparchites? laevigatus nigrescens* (Jones and Kirkby). Comparison of Eichwald's illustrations (pl. 52, figs. 5b–d) with those of Jones and Kirkby (1875, pl. 16, figs. 1, 2) suggests that two different genera are involved. Jones and Kirkby illustrate a *Paraparchites*, but Eichwald illustrates a genus with affinities to *Rishona*. Eichwald’s figure 5b can be interpreted as a ventral view, in which case the “eye spot” would be on the ventroanterior part of the valve and would not belong to *Paraparchites*. Because of
this protuberance on the valve surface, the species is here provisionally referred to *Rishona*.

Geologic range.—Carboniferous.

*Rishona magna* (Roth), 1929

Plate 4, figures 18–21

*Pontocypris smithii* var. magna Roth, 1929, Jour. Paleontology, v. 3, p. 360, pl. 38, figs. 26a, b. Haragan marl, sec. 4, T. 2 N., R. 6 E., and SW 1/4 NE 1/4 sec. 28, T. 3 N., R. 6 E., Pontotoc County, Okla.

The slide labeled “holotype” (USNM 80643) contains 3 left valves, 1 of which is the original of figure 26a that is presumed to be the type specimen. Because only single valves were available to Roth, the overlap is not discussed. Roth’s specimens differ from *Pontocypris smithii* Jones, 1887, in size, lateral outline, and relative width; consequently, the variety is here elevated to specific rank. Material from the “White Mound” section of the Haragan shale contains complete carapaces that are the same species as Roth’s left valves (pl. 38, figs. 26a, b) in which the characteristic overlap of the genus is developed.

Geologic range.—Lower Devonian.

*Rishona mawii* (Jones), 1887


*Pontocypris mawii* var. gibbera (Jones), 1887, idem, ser. 6, v. 1, p. 307, pl. 22, figs. 3a–c. Shale, brickyard at Fréjel, Gotland.

Geologic range.—Silurian.

*Rishona* sp. a

*Pfibyl* (1955) described two species in the genus *Reversocypris* (type species *R. regularis* Pfibyl, 1955) on the basis that the right valve overlaps the left along the dorsum. The overlapping part of the valve bears a rounded swelling best expressed in anterior and posterior thirds of valve. Surface shagreen. Hinge observed only on left valve where the groove is developed. The muscle scar is oval-longitudinal with the long axis directed obliquely forward. The number of muscle tubercles situated in 2 rows is 7–10.

The genus is characterized by the overlap of opposing valves in the upper and lower parts of the shell and moldlike infillations in ventral and dorsal edges of the overlapping parts of the shell. These peculiarities have not been observed in known genera, which permitted the erection of the new genus. Close genera are unknown.

Pfibyl (1955) described two species in the genus *Reversocypris* (type species *R. regularis* Pfibyl, 1955) on the basis that the right valve overlaps the left along the dorsum and left valve overlaps the right along the venter. His drawing of a valve of *R. kihokovicencis* Pfibyl (1955, pl. 2, figs. 7, 8) suggests that this genus might belong in *Samarella*. His two species are here provisionally placed in synonymy with each other. The orientation of *Samarella* is here reversed 180°.
Paleozoic Species of Bairdia and Related Genera

Geologic range.—Devonian.
Lithology.—Limestone.
Habitat.—Marine.

Assigned Species

**Samarella crassa** Polenova, 1952


Geologic range.—Middle Devonian.

Reversocypris regularis (Prybil), 1955


Geologic range.—Middle Silurian.

Genus **BekenA Gibson, 1955**


Bairdiocypris Kegel, 1931 [part], Preuss. Geol. Landesanstalt, Jahrb., v. 52, p. 246. Devonian, Germany.


Type species.—Original designation *S. kellettae* Morris and Hill, idem, p. 138 (12), pl. 1, figs. 2a–c. Newsom shale. Newsom, Tenn.

Diagnosis.—Differ from Bairdia s. s. by the presence of a subcentral lateral spine.

Discussion.—Morris and Hill established this genus for two species: the type species and *S. shideleri*. The holotypes of both species are in the U.S. National Museum (USNM 123226, 123227) and additional paratypes of *S. shideleri* are at the American Museum of Natural History and the Paleontological Research Institute. The comment by Morris and Hill (1952, p. 138 (12)): “The shape of the carapace is more like a typical Carboniferous Bairdia than are most early Paleozoic species assigned to that genus; indeed, if it were not for their possession of a large spine of each valve, neither of the two known species of Spinobairdia would look out of place in a Carboniferous fauna.” is correct. However, as both species are based on steinkerns, it is not possible to determine the true characters of this genus.

Geologic range.—Middle Silurian.
Lithology.—Shale.
Habitat.—Marine.

Assigned Species

Spinobairdia kellettae Morris and Hill, 1952

Plate 6, figures 18, 19

Spinobairdia kellettae Morris and Hill, 1952, Bull. Am. Paleontology, v. 34, no. 142, p. 138 (12), pl. 1, figs. 2a–c. Newsom shale, small abandoned quarry in the side of a hill overlooking Newsom from the north-northwest, Davidson County, Tenn. The hill is just west of the railroad tracks, in the southwest quadrant of their intersection.

Geologic range.—Middle Silurian.

Spinobairdia shideleri Morris and Hill, 1952

Spinobairdia shideleri Morris and Hill, 1952, Bull. Am. Paleontology, v. 34, no. 142, p. 138 (12), pl. 1, figs. 3a, b. Same collection and locality as above.

Geologic range.—Middle Silurian.

Genus **Spinobairdia** Morris and Hill, 1952

Spinobairdia Morris and Hill, 1952, Bull. Am. Paleontology, v. 34, no. 142, p. 138 (12), pl. 1, figs. 2a–c. Newsom shale, small abandoned quarry in the side of a hill overlooking Newsom from the north-northwest, Davidson County, Tenn. The hill is just west of the railroad tracks, in the southwest quadrant of their intersection.

Geologic range.—Middle Silurian.

Habitat.
Lithology.
Marine.

ASSIGNED SPECIES

**Spinobairdia shideleri** Morris and Hill, 1952

*Spinobairdia shideleri* Morris and Hill, 1952, Bull. Am. Paleontology, v. 34, no. 142, p. 138 (12), pl. 1, figs. 3a, b. Same collection and locality as above.

Geologic range.—Middle Silurian.

*Spinobairdia kellettae* Morris and Hill, 1952


Geologic range.—Middle Silurian.

ASSIGNED SPECIES

**Spinobairdia shideleri** Morris and Hill, 1952

*Spinobairdia shideleri* Morris and Hill, 1952, Bull. Am. Paleontology, v. 34, no. 142, p. 138 (12), pl. 1, figs. 3a, b. Same collection and locality as above.
identified specimens to the U.S. National Museum; 1 of the 2 (USNM 133217) is almost identical in outline with the specimen that he illustrated by drawings (see pl. 6, fig. 22), but a part of the shell is missing along the dorsoposterior margin; the second specimen (USNM 133218) has the shell material along that margin and consequently has more symmetrical end margins and is here designated as Bekena sp. A (see pl. 6, figs. 23, 24).

*Geologic range.*—Middle and Upper Devonian, Lower Mississippian (?).

*Lithology.*—Limestone, sandstone (?).

*Habitat.*—Marine.

**KEY TO THE SPECIES OF BEKENA**

1. Dorsoposterior margin from one-third to one-half of greatest length—__________ 2
   1a. Dorsoposterior margin as much as one-quarter of greatest length—__________ 6
   2 (1). End margins approximately of the same size__________ 3
   2a. End margins not of the same size__________ 5
   3 (2). In lateral view, dorsal overhang is symmetrical, tapers towards ends—______ robusta (p. 82)
   3a. In lateral view dorsal overhang not symmetrical, wider in posterior half—__________ 4
   4 (3a). In lateral view, posterior end higher—______ sp. A (p. 83)
   4a. In lateral view both ends approximately the same height—__________ rhenana (p. 82)
   5 (2a). Greatest height at or in front of midlength—__________ diaphrovalvis (p. 82)
   5a. Greatest height behind midlength—__________ vastus (p. 82)
   6 (1a). In lateral view, height of anterior margin less than that of posterior margin—__________ prantli (p. 82)
   6a. In lateral view, height of anterior margin greater than that of posterior margin—__________ 7
   7 (6a). Junction of dorsal and dorsoanterior commissure smooth—__________ pecki (p. 82)
   7a. Junction of dorsal and dorsoanterior commissure angular—__________ plicatula (p. 82)

**ASSIGNED SPECIES**

*Bekena diaphrovalvis* Gibson, 1955

Plate 6, figures 25–27, 32


*Geologic range.*—Upper Devonian.

*Bekena pecki* (Morey), 1935

Plate 6, figures 30, 31

*Bairdia pecki* Morey, 1935, Jour. Paleontology, v. 9, p. 323, pl. 28, fig. 20. Recorded from Bushberg formation (probably reworked Devonian, see Sohn, 1951, p. 34), friable quartz sandstone a few inches to 2 or 3 ft thick, outcrop about 20 ft long, in the bottom of a side valley of Clark’s Branch, a tributary of Whetstone Creek, sec. 9, T. 48 N., R. 7 W., about 3 miles north of Williamsburg, Callaway County; and exposures along tracks of the Missouri, Kansas, and Texas Railroad bordering the Missouri River, near Eastly Station, Boone County, Mo.

Only one specimen at the University of Missouri, Columbia, Mo., (colln. Os 1005–2) labeled “Syntypes” is apparently available. This specimen is here designated as the lectotype, the slide is labeled “Sylamore s. s. Williamsburg, Mo.”

*Geologic range.*—Probably reworked Devonian in Lower Mississippian rocks.

*Bekena plicatula* (Polenova), 1952

*Bairdia plicatula* Polenova, 1952, Micropaleontology SSSR, v. 5, p. 127, pl. 13, figs. 1, 2. Middle Devonian, Russia.

*Geologic range.*—Middle Devonian.

*Bekena prantli* (Pokorny) 1950


Although the dorsal outline of Pokorny’s illustration (fig. 3b) does not show the diagnostic flattening of the end margins of the right valve, the lateral view of the same specimen (fig. 3a), and the lateral view of a paratype (fig. 4a) suggest such a flattening. The end view (fig. 4b) suggests *Bairdiocypris* rather than *Bekena*.

*Geologic range.*—Middle Devonian.

*Bekena rhenana* (Kegel), 1932

*Bairdicypris* (Bairdiocypris) rhenana Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 248, pl. 13, figs. 4a–e. Lower Stringocephalus beds, Dingdorf, Eifel, Germany.

Kegel’s (1932) figure 4e shows the diagnostic furrow near the ventroposterior part of the valve; however, as pointed out by Pokorny (1950, p. 616 (104)) this feature is not of diagnostic value.

*Geologic range.*—Middle Devonian.

*Bekena robusta* (Kummerow), 1953

*Silenites robustus* Kummerow, 1953, Staat. Geol. Komm. Deutsch. Demokrat. Republik, Geologie, Jahrg. 2, Beih. 7, p. 54, pl. 7, figs. 5a, b. Middle Devonian, Kamen­arnia near Pęczca, Wolhynia, Poland.

*Geologic range.*—Middle Devonian.

*Bairdiicypris vastus* (Polenova), 1952

*Bairdia vastus* Polenova, 1952, Microfauna SSSR, pt. 5, p. 135, pl. 14, figs. 1, 2. Givetian, Central Devonian field, Voronez region, and Saratov region, Russia.

*Geologic range.*—Middle Devonian.

*Bekena sp.* Gibson, 1955

The figured specimen (USNM 123095) is a broken steinkern.

**Geologic range.**—Upper Devonian.

*Bekena sp. A*

Plate 6, figures 22–24

*Bythocypris moravica* (Kegel). Pokorny, 1950, Csechoslovakia Státt. geol. úst., Sbornik, v. 17, Paleont., p. 533 (41), 614 (102), pl. 2, figs. 7a–d, text figs. 12a, b. Givetian, red, marly coral limestone, abandoned Ruzicka quarry, Csechoslovakia.


**Geologic range.**—Middle Devonian.

**Genus BAIRDIOCYPRIS** Kegel, 1932


Pfibyl, 1953, Csechoslovakia, Státt. geol. úst., Sbornik, v. 20, Paleont., p. 262 (30), 305 (73), 337 (105).


**Type species.**—Original designation *Bythocypris* (Bairdioocypris) *gerolsteinensis* Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 249, pl. 13, fig. 5. Middle Devonian, Germany.

**Diagnosis.**—Large robust smooth ostracodes; greatest width, however, less than greatest height; gently convex dorsal margin; straight, convex or sinuous ventral margin. Sides convex in dorsal outline; in end view the larger valve is angular near dorsum, so that it is almost subrectangular in outline.

**Discussion.**—Krommelbein (1952, pl. 1, figs. 3a–d) illustrates for the first time with photographs the holotype of *Bythocypris* *gerolsteinensis* Kegel, 1932. The broken anterior part of his figure 3a and the muscle scar impression shown on his figure 3b suggest that the type is a steinkern, or at least a partly corroded specimen. Should this be true, it might belong to the *B. iixlieinensis* Kegel, 1932, group (Krommelbein, 1952, pl. 1, figs. 1a–d; pl. 3, figs. 2a–c; pl. 4, figs. 1–3). *B. iixlieinensis* Kegel, 1932 and *B. rauffi* Krommelbein, 1952, have a dorsal shallow indentation that is parallel to the hingeline but that does not extend to the posterior of the valve. It is therefore possible that the generic diagnosis of *Bairdioocypris* should be amended to include this feature. This might also be the reason for Krommelbein’s referring species of *Bairdioocypris* to *Pachydomella* Ulrich, 1891 (Krommelbein, 1953).

Dr. Krommelbein very generously sent me specimens of *Bairdioocypris clausa* Kegel, 1932, a species he refers to *Pachydomella* and which was referred to *Microcheilinella* Geis, 1933, by Kummerow (1953, p. 60) and by Boucek and Pfibyl (1955, p. 602 (26), 631 (55), 655 (79)). These specimens belong to *Tubulibairdia* Swartz, 1936. They differ from *Microcheilinella* by having tubules and a more incised hingeline.

Roth (1933, p. 401) misidentified a Jurassic non-marine species as *Bairdioocypris morrisonensis* Roth, 1933; and as a result of this generic misidentification, several additional species from Mesozoic rocks have been assigned to *Bairdioocypris*. According to Swartz and Swain (1946, p. 366), Mrs. Nadeau (formerly Betty Kellett) is restudying the Morrison Ostracoda and expects to propose a new generic name for *B. morrisonensis* and its close relatives.

**Geologic range.**—Silurian (?), Devonian.

**Lithology.**—Shale, limestone.

**Habitat.**—Marine.

**ASSIGNED SPECIES**

*Baardioocypris biesenbachi* Krommelbein, 1952

*Bairdiocypris* biesenbachi Krommelbein, 1952, Senckenbergiana, v. 32, p. 326, pl. 1, figs. 2a–d. Middle Devonian, Eifel, Germany.


**Geologic range.**—Middle Devonian.

*Baardioocypris gerolsteinensis* Kegel, 1932

*Bythocypris* (Baardioocypris) *gerolsteinensis* Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 249, pl. 13, fig. 5. Middle Devonian, Germany.

**Geologic range.**—Middle Devonian.

*Bairdiocypris gerolsteinensis* Kegel, 1932

*Bythocypris* (Baardioocypris) *gerolsteinensis* Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 249, pl. 13, fig. 5. Middle Devonian, Germany.

**Habitat.**—Marine.

*Bythocypris? rauffi* Krommelbein, 1952

*Baardioocypris rauffi* Krommelbein, 1952, Senckenbergiana, v. 32, p. 330, pl. 2, figs. 1a–d. Middle Devonian, Eifel, Germany.

See discussion under the genus.

**Geologic range.**—Middle Devonian.

*Baardioocypris? transversus* (Roth), 1929

*Baardioocypris* transversus (Roth, 1929, Jour. Paleontology, v. 3, p. 365, pl. 37, figs. 24a–c. Haragan marl, NE. cor. sec. 20, T. 2 S., R. 3 E., Murray County, Okla.

**Geologic range.**—Lower Devonian.
Bairdiocypris? iixheimensis Kegel, 1932
Bairdiocypris? (Bairdiocypris) iixheimensis Kegel, 1932, Preuss. Geol. Landesanstalt, Jahrb. 1931, v. 52, p. 250, pl. 13, figs. 6a–d. Middle Devonian, Germany.

Bairdiocypris? iixheimensis Krommelbein, 1952, Senckenbergiana, v. 32, p. 327, pl. 1, figs. 1a–d; pl. 3, figs. 2a–e. Middle Devonian, Germany. See discussion under the genus.

SPECIES REMOVED FROM BAIRDIOCYPRIS
albertensis Loranger, 1951 = Gen. indet.
cleta Kegel, 1932 = Tubulibairdia clava (Kegel), 1932.
cleta var. antecedens Kegel, 1932 = Tubulibairdia antecedens var. antecedens (Kegel), 1932.

cletiana (Kegel). Krommelbein, 1952 = Gen. undescribed.
eculata Pokorný, 1950 = Bekenia sp. A. morrisonensis Roth, 1933 = Gen. undescribed.
trapezoidalis Krommelbein, 1952 = Gen. undescribed.

SPECIES ASSIGNED TO GENERA NOT DESCRIBED IN THIS PAPER

The large number of species of Paleozoic age that were originally referred to Bairdia contain several taxons that are here considered to belong to other genera. Some of these genera are not within the scope of this paper; the other genera were described or discussed here. The following species are here listed in the genera to which they are now referred.

Genus BASSLERELLA Kellett, 1935


Basslerella? Illinoiensis (Scott and Borger), 1941

Bairdia Illinoiensis Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 367, pl. 49, figs. 10, 11, Macoupin cyclothem, along Embarrus River, 1 mile east of Lawrenceville, Lawrence County, Ill.

Geologic range.—Pennsylvanian.

Basslerella? quadrispinosa (Scott and Borger), 1941

Bairdia quadrispinosa Scott and Borger, 1941, Jour. Paleontology, v. 15, p. 357, pl. 50, figs. 12, 13, Macoupin cyclothem, along Embarrus River, 1 mile east of Lawrenceville, Lawrence County, Ill.

Geologic range.—Pennsylvanian.

Geologic range.—Middle Devonian.
PALEOZOIC SPECIES OF BAIRDIA AND RELATED GENERA

Bairdia? cuneata (Steusloff). Kummerow, 1924, Preuss. Geol. Landesanstalt, Jahrb. 1923, v. 44, p. 435, pl. 21, figs. 17a-c. Middle and upper Lower Silurian drift, Germany.

Geologic range.—Ordovician.

SPECIES BELONGING TO UNDETERMINED GENERA

In this group belong those species previously assigned to Bairdia that belong either to new genera or to described genera the identity of which cannot be determined on the basis of available data. The distinction between these names and those considered in this paper as nomina dubia is that the names in this category are based on apparently adequate specimens. Although the species are valid, it is not possible at this stage of the study to refer them to their proper genera.

Bairdia aequalis Eichwald. Jones and Kirkby, 1875


Eichwald’s species is neither conspecific nor congeneric with the one illustrated by Jones and Kirkby.

Bairdia antcostiensis Jones, 1890

Bairdia antcostiensis Jones, 1890, Geol. Soc. London Quart. Jour., v. 46, p. 548, pl. 21, figs. 3a, b. Gray limestone, Anticosti group, English Head, Anticosti.

The illustrations are of a right valve, which was later referred to Krausella. (See Bassler and Kellett, 1934, p. 369.) The shape of the posterior as shown in ventral profile (fig. 3b) raises doubt as to its belonging to Krausella. Silurian.

Cythere arcuata McCoy, 1844

Cythere arcuata McCoy, 1844, Synopsis characters Carboniferous Limestone fossils Ireland, p. 165, pl. 23, fig. 9. Slate, Ireland.

The illustrations are of an indeterminate genus. Bassler and Kellett (1934, p. 165) refer this species to Bairdia and also (p. 424) to Paraparchites arcuatus (McCoy). The lateral and dorsal outlines remove this species from both Bairdia and Paraparchites. Carboniferous.

Bairdia binodosa Polenova, 1952


The holotype has two nodes near the dorsal margin of the larger valve. This species probably belongs to the same undescribed genus as the species described and illustrated by Krömmelbein as Condrocypris? circumvallata (Kummerow), 1953. Middle Devonian.

Cythere cyclas Keyserling, 1854

Cythere cyclas Keyserling, 1854, in Schrenk, Reise Nordost. europaischen Russlands, pt. 2, p. 112, pl. 4, figs. 42, 43. Permian, Russia.

This species is referred to Bairdia by Eichwald, 1860. The shape is reminiscent of a healdiid. Permian.

Bairdia elongata Kummerow, 1924


The illustration is of a specimen that cannot be assigned to any genus known at the present time. The name is a junior homonym of B. elongata (Münster), 1830 and B. elongata Lienenklaus, 1900. Silurian.

Bairdia jonesiana Kirkby, 1858


This species was later referred to Macrocypris. (See Bassler and Kellett, 1934, p. 405.) Macrocypris is based on a living species (Cythere minna Baird, 1850) that has a completely different carapace from the Permian species. Permian.

Bairdia kolwensis Glebovskaya, 1939


The description and illustration are of a specimen with concave dorsal outline. None of the species in Bairdia and related genera has a concave dorsal outline; consequently, this species is based either on a damaged specimen or belongs to an hitherto undescribed genus. Permian.

Bairdia occidentalis Girty, 1909


Girty’s type (USGS no. 1452) is a specimen with the right valve overlapping the left and is not referable to any genus discussed in this paper. Permian.

Bairdia ovata Eichwald, 1857


Bairdia phillipsiana Jones and Holl, 1869


This species very likely belongs with the same group as Bairdiocypris eifelensis (Kegel). Krömmelbein, 1952. Bassler and Kellett (1934, p. 230) list the synonymy of this species under Bythocypris. Silurian.


**Bairdia pseudocestriensis** Pribyl and Snajdr, 1950

**Bairdia pseudocestriensis** Pribyl and Snajdr, 1950, Czechoslovakia Stát. geol. úst. Sborník, v. 17, Paleontol., p. 116 (15), 157 (57), pl. 1, figs. 8, 9. Choteč limestone, quarry of the former enterprise “Prastav,” Holyné, near Prague, Czechoslovakia Middle Devonian.

**Bairdia pyrrhae** Eichwald, 1860

**Bairdia pyrrhae** Eichwald, 1860 (?) Lethaea Rossica, v. 1, p. 1344, pl. 62, figs. 3, 3a. Permian, Russia.

Bassler and Kellett (1934, p. 347) refer this to *Jonesina* and credit it to (Eichwald), 1844, without citing page or illustrations, Eichwald (1860, p. 1344) gives “Geogn. de la Russie, p. 466” as a synonym. The illustration is a specimen that cannot be assigned to *Jonesina* with any degree of certainty. Permian.

**Bairdia qualeni** Eichwald, 1857


Eichwald, 1860, Lethaea Rossica, v. 1, p. 1339, pl. 52, figs. 4a-c. Same locality as above. Carboniferous.

**Bairdia salteriana** Jones and Kirkby, 1879


These data are inadequate for generic assignment. Ordovician.

**Bairdia scapha** Eichwald, 1860

**Bairdia scapha** Eichwald, 1860, Lethaea Rossica, v. 1, p. 1343, pl. 52, figs. 15a, b. Permian, Russia.

These data are inadequate for generic assignment. Permian.

**Bairdia siliquoides** Jones and Kirkby, 1879


Bassler and Kellett (1934, p. 437) refer this species to *Pontocypris*. The original illustrations, particularly of the end view (Jones and Kirby, 1879, fig. 14), are not clear enough to determine whether or not, like some other Paleozoic species assigned to *Pontocypris*, this species belongs to *Rishona* Soln, n. gen. Carboniferous.

**Bairdia subcylindrica** (Münster). Kummerow, 1939


These data are inadequate for proper generic assignment. Middle Devonian.

**Bairdia wabashensis** Scott and Barger, 1941

**Bairdia wabashensis** Scott and Barger, 1941, Jour. Paleontology, v. 15, p. 356, pl. 50, figs. 18, 19. Thin impure marine limestone in Macoupin cyclothem, 1 mile east of Lawrenceville, Ill.

These data are inadequate for generic assignment. Pennsylvanian.

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REVISION OF SOME PALEOZOIC OSTRACODE GENERA


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PALEOZOIC SPECIES OF BARDIA AND RELATED GENERA

91


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### INDEX

[Ruile page numbers indicate descriptions]  

<table>
<thead>
<tr>
<th>A</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>abbreviata, Bairdia</td>
<td>43</td>
</tr>
<tr>
<td>abrupta, Bairdia beedii</td>
<td>23, 42</td>
</tr>
<tr>
<td>acetale, Bairdia</td>
<td>42, 62, 63</td>
</tr>
<tr>
<td>Fabalecypris</td>
<td>42, 44, 45, 46, 50, 62, 63</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>1-2</td>
</tr>
<tr>
<td>Actinaria</td>
<td>57</td>
</tr>
<tr>
<td>diffusa</td>
<td>59</td>
</tr>
<tr>
<td>uscula, Bairdia</td>
<td>21, 42</td>
</tr>
<tr>
<td>uscula, Bairdia</td>
<td>22, 30, 42</td>
</tr>
<tr>
<td>accinata, Bairdia</td>
<td>19, 21, 31, 33, 47</td>
</tr>
<tr>
<td>Bairdiacepitis</td>
<td>56, 60, 63</td>
</tr>
<tr>
<td>Fabalecypris</td>
<td>61, 62</td>
</tr>
<tr>
<td>acuta, Bairdia</td>
<td>18, 42</td>
</tr>
<tr>
<td>Cythere</td>
<td>10, 35</td>
</tr>
<tr>
<td>(Bairdia)</td>
<td>10, 35</td>
</tr>
<tr>
<td>Paracypris</td>
<td>35</td>
</tr>
<tr>
<td>aqua, Bairdia</td>
<td>42, 66</td>
</tr>
<tr>
<td>equa, Bairdia</td>
<td>42, 48, 58</td>
</tr>
<tr>
<td>Cryptobairdia</td>
<td>25, 42, 43, 48</td>
</tr>
<tr>
<td>affinis, Bairdia</td>
<td>10, 55, 42</td>
</tr>
<tr>
<td>Abronia dubia</td>
<td>34</td>
</tr>
<tr>
<td>abnormis, Bairdiocypris</td>
<td>84</td>
</tr>
<tr>
<td>acuta, Bairdia</td>
<td>7, 15, 6</td>
</tr>
<tr>
<td>ala, Bairdia</td>
<td>35, 42</td>
</tr>
<tr>
<td>Bairdia hispida</td>
<td>21, 25, 42</td>
</tr>
<tr>
<td>pleio</td>
<td>23, 35, 45, 66</td>
</tr>
<tr>
<td>curvirostris, Bairdia</td>
<td>25, 42</td>
</tr>
<tr>
<td>altiformis, Bairdia</td>
<td>42, 68</td>
</tr>
<tr>
<td>ephalium, Microcheilocella</td>
<td>75</td>
</tr>
<tr>
<td>Tubulabairdia</td>
<td>75</td>
</tr>
<tr>
<td>America Limestone</td>
<td>50, 73</td>
</tr>
<tr>
<td>ample, Bairdia</td>
<td>26, 34, 35, 42, 55, 68</td>
</tr>
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<td>Cythere</td>
<td>35, 36</td>
</tr>
<tr>
<td>(Bairdia)</td>
<td>34, 35, 52</td>
</tr>
<tr>
<td>amplectens, Bairdia</td>
<td>19, 29, 42</td>
</tr>
<tr>
<td>amplectens, Bairdia</td>
<td>65, 42, 45, 56</td>
</tr>
<tr>
<td>Cythere</td>
<td>30, 56</td>
</tr>
<tr>
<td>Amsden formation</td>
<td>36, 37, 39</td>
</tr>
<tr>
<td>acuminatata, Pychadomella</td>
<td>7</td>
</tr>
<tr>
<td>amnualina, Bairdia</td>
<td>42, 55</td>
</tr>
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<td>amnualina, Bairdia</td>
<td>45, 48</td>
</tr>
<tr>
<td>Cryptobairdia</td>
<td>24, 30, 45, 48</td>
</tr>
<tr>
<td>angulata, Bairdia</td>
<td>30, 42, 55</td>
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<td>angulata, Bairdia</td>
<td>42, 55</td>
</tr>
<tr>
<td>angulata, Bairdia</td>
<td>22, 42</td>
</tr>
<tr>
<td>angulata, Bairdia</td>
<td>21, 27, 42</td>
</tr>
<tr>
<td>anomala, Bairdia</td>
<td>36, 42</td>
</tr>
<tr>
<td>anodendron, Tubulabairdia</td>
<td>75</td>
</tr>
<tr>
<td>antiformis, Pychadomella</td>
<td>75, 84</td>
</tr>
<tr>
<td>Bairdiacypris clavae</td>
<td>84</td>
</tr>
<tr>
<td>Dupinocypris (Bairdiacypris clavae)</td>
<td>75</td>
</tr>
<tr>
<td>Pychadomella antiformis</td>
<td>75</td>
</tr>
<tr>
<td>wolfarti, Pychadomella</td>
<td>75</td>
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<tr>
<td>Tubulabairdia</td>
<td>75</td>
</tr>
<tr>
<td>antiformis</td>
<td>75, 84</td>
</tr>
<tr>
<td>Acinocypris group</td>
<td>85</td>
</tr>
<tr>
<td>antiformes, Bairdia</td>
<td>13, 42, 85</td>
</tr>
<tr>
<td>Kriuellia</td>
<td>13</td>
</tr>
<tr>
<td>antiformis, Pychadomella</td>
<td>83</td>
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<tr>
<td>Aplychites</td>
<td>14</td>
</tr>
<tr>
<td>aperta, Bairdia</td>
<td>19</td>
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<td>42</td>
</tr>
<tr>
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<td>42</td>
</tr>
<tr>
<td>gracilis, Bairdia</td>
<td>10, 28, 51</td>
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<td>39</td>
</tr>
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<td>arcuata, Paraparycites</td>
<td>85</td>
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<td>oromorosus, Bairdia</td>
<td>27, 42, 67, 70</td>
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<td>Bairdiolites</td>
<td>27, 42, 68, 69, 70, pl. 4</td>
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<table>
<thead>
<tr>
<th>Page</th>
<th>B</th>
<th>59, 60, 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>abbreviata, Bairdia</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>acuta, Bairdia</td>
<td>42, 62, 63</td>
<td></td>
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<td>21, 42</td>
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<td>19, 21, 31, 33, 47</td>
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<td>10, 35</td>
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<td>35</td>
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<td>84</td>
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<td>23, 35, 45, 66</td>
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<td>25, 42</td>
<td></td>
</tr>
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<td>75</td>
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<td>50, 73</td>
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<td>35, 36</td>
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<td>34, 35, 52</td>
<td></td>
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<tr>
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<td>65, 42, 45, 56</td>
<td></td>
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<td>Cythere</td>
<td>30, 56</td>
<td></td>
</tr>
<tr>
<td>Amsden formation</td>
<td>36, 37, 39</td>
<td></td>
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<td>acuminatata, Pychadomella</td>
<td>7</td>
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<td>42, 55</td>
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<td>30, 42, 55</td>
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<td>42, 55</td>
<td></td>
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<td>22, 42</td>
<td></td>
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<td>21, 27, 42</td>
<td></td>
</tr>
<tr>
<td>anomala, Bairdia</td>
<td>36, 42</td>
<td></td>
</tr>
<tr>
<td>anodendron, Tubulabairdia</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>antiformis, Pychadomella</td>
<td>75, 84</td>
<td></td>
</tr>
<tr>
<td>Bairdiacypris clavae</td>
<td>84</td>
<td></td>
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<tr>
<td>Dupinocypris (Bairdiacypris clavae)</td>
<td>75</td>
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<td>Pychadomella antiformis</td>
<td>75</td>
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<td>wolfarti, Pychadomella</td>
<td>75</td>
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<td>Tubulabairdia</td>
<td>75</td>
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<td>antiformis</td>
<td>75, 84</td>
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</tr>
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<td>Acinocypris group</td>
<td>85</td>
<td></td>
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<tr>
<td>antiformes, Bairdia</td>
<td>13, 42, 85</td>
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<td>Kriuellia</td>
<td>13</td>
<td></td>
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<td>antiformis, Pychadomella</td>
<td>83</td>
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<td>14</td>
<td></td>
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<td>19</td>
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<td>42</td>
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<td>42</td>
<td></td>
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<td>10, 28, 51</td>
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<td>39</td>
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</tr>
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<td>arcuata, Paraparycites</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>oromorosus, Bairdia</td>
<td>27, 42, 67, 70</td>
<td></td>
</tr>
</tbody>
</table>

Arkansas | 66 |
Washington County | 26, 66 |
American Massif | 41 |
Assigned species of Bairdia | 22, 33 |
Bairdiacepitis | 59-60 |
Bairdiocypris | 89-90 |
Bairdiolites | 70-71 |
Beckna | 92-93 |
Ceratobairdia | 69 |
Cryptobairdia | 46-52 |
Fabalecypris | 62-66 |
Orthobairdia | 66-68 |
Psitabairdia | 69 |
Pectobairdia | 54-57 |
Psina | 79-80 |
Sarmatella | 80-91 |
Silesites | 73-74 |
Spincobairdia | 81 |
Tubulabairdia | 75-76 |
Symobairdia | 19, 87, 92 |
Silesites | 72, 73 |
atrasuta, Bairdia | 10, 26, 34, 35, 42 |
acricula, Bairdia | 29, 42, 66 |
Australia | 35, 39, 74 |
### Bairdia—Continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>boidonai</td>
<td>46, 85</td>
</tr>
<tr>
<td>boleti</td>
<td>24, 34, 42, 49, 81</td>
</tr>
<tr>
<td>bongiliophida</td>
<td>68, 39</td>
</tr>
<tr>
<td>braedeli</td>
<td>21, 44, 45</td>
</tr>
<tr>
<td>brevicauda</td>
<td>56, 42, 83</td>
</tr>
<tr>
<td>brevis</td>
<td>18, 21, 23, 30, 43, 69</td>
</tr>
<tr>
<td>broeti</td>
<td>24, 43</td>
</tr>
<tr>
<td>browniana</td>
<td>13, 36, 43</td>
</tr>
<tr>
<td>buktea</td>
<td>13, 43, 81</td>
</tr>
<tr>
<td>calcoletae</td>
<td>43, 54</td>
</tr>
<tr>
<td>calciostea</td>
<td>19, 39, 40, 44, 46</td>
</tr>
<tr>
<td>centrosisis</td>
<td>36, 43, 65</td>
</tr>
<tr>
<td>cernula</td>
<td>43, 86</td>
</tr>
<tr>
<td>chassai</td>
<td>43, 92</td>
</tr>
<tr>
<td>circumciaria</td>
<td>39, 43</td>
</tr>
<tr>
<td>cisseptaria</td>
<td>21, 23, 33, 43</td>
</tr>
<tr>
<td>cladosistria</td>
<td>21, 44, 43, 45</td>
</tr>
<tr>
<td>clevensi</td>
<td>43, 66</td>
</tr>
<tr>
<td>compacta</td>
<td>43, 69</td>
</tr>
<tr>
<td>compressa</td>
<td>10, 43, 49, 66</td>
</tr>
<tr>
<td>concesa</td>
<td>21, 36, 43</td>
</tr>
<tr>
<td>coniosta</td>
<td>34, 46, 43, 49</td>
</tr>
<tr>
<td>contracta</td>
<td>42, 43</td>
</tr>
<tr>
<td>conessa</td>
<td>42, 43</td>
</tr>
<tr>
<td>corygii</td>
<td>43, 69</td>
</tr>
<tr>
<td>corytelli</td>
<td>43, 69</td>
</tr>
<tr>
<td>crassa</td>
<td>10, 19, 21, 30, 43, 46, 49, pl. 1</td>
</tr>
<tr>
<td>cuneiformis</td>
<td>43, 67</td>
</tr>
<tr>
<td>cymbatalia</td>
<td>43, 50, 56</td>
</tr>
<tr>
<td>cymbriopla</td>
<td>42, 43</td>
</tr>
<tr>
<td>cymbrata</td>
<td>43, 54</td>
</tr>
<tr>
<td>cymbrata</td>
<td>21, 23, 33, 43</td>
</tr>
<tr>
<td>curleta</td>
<td>12, 19, 23, 33, 36, 43, 66</td>
</tr>
<tr>
<td>deformis</td>
<td>43, 54</td>
</tr>
<tr>
<td>delebula</td>
<td>27, 43</td>
</tr>
<tr>
<td>terbula</td>
<td>32, 43</td>
</tr>
<tr>
<td>cypriostea</td>
<td>22, 85, 42</td>
</tr>
<tr>
<td>curristea</td>
<td>43, 56</td>
</tr>
<tr>
<td>cymbrata</td>
<td>43, 56, 58</td>
</tr>
<tr>
<td>cyoplas</td>
<td>43, 56, 58</td>
</tr>
<tr>
<td>delawarenso</td>
<td>39, 43</td>
</tr>
<tr>
<td>delicatus</td>
<td>34, 37, 43</td>
</tr>
<tr>
<td>dolo</td>
<td>19, 22, 27, 39, 43</td>
</tr>
<tr>
<td>dimusia</td>
<td>43, 50</td>
</tr>
<tr>
<td>depomia</td>
<td>43, 52</td>
</tr>
<tr>
<td>denomica</td>
<td>37, 43</td>
</tr>
<tr>
<td>distinosella</td>
<td>21, 23, 43</td>
</tr>
<tr>
<td>distrosta</td>
<td>68, 64, 79</td>
</tr>
<tr>
<td>eustrosta</td>
<td>43, 54</td>
</tr>
<tr>
<td>dornichillanensis</td>
<td>43, 67, pl. 3</td>
</tr>
<tr>
<td>donaulis</td>
<td>37, 43</td>
</tr>
<tr>
<td>drucula</td>
<td>37, 64, 40, 41</td>
</tr>
<tr>
<td>eponia</td>
<td>10, 21, 42, 60</td>
</tr>
<tr>
<td>effistensia</td>
<td>19, 25</td>
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<td>21, 26, 43</td>
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</tr>
<tr>
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<td>43, 54</td>
</tr>
<tr>
<td>epicytus</td>
<td>43, 79</td>
</tr>
<tr>
<td>esina</td>
<td>37, 43, 73</td>
</tr>
<tr>
<td>extenda</td>
<td>37, 43, 44</td>
</tr>
<tr>
<td>fioronensis</td>
<td>43, 58</td>
</tr>
<tr>
<td>folgori</td>
<td>43, 59, 50</td>
</tr>
<tr>
<td>forchenuensis</td>
<td>43, 59</td>
</tr>
<tr>
<td>frugos</td>
<td>43, 54</td>
</tr>
<tr>
<td>furcatim</td>
<td>37, 43</td>
</tr>
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<td>13</td>
</tr>
<tr>
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<td>42</td>
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<td>galei</td>
<td>22, 85, 22, 43</td>
</tr>
<tr>
<td>garrisonensis</td>
<td>21, 25, 27, 37, 43</td>
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<td>gartensula</td>
<td>37, 43, 44, 60, 68</td>
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<td>grimi</td>
<td>19, 21, 46, 44, 46, 79</td>
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<td>44, 49</td>
</tr>
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<td>44, 49</td>
</tr>
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<td>glucidostron</td>
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</tbody>
</table>

### Bairdia—Continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>gregula</td>
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<td>38, 44</td>
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<td>10, 19, 20, 37, 43, 44, 45, 60, pl. 1</td>
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</tr>
<tr>
<td>greversilicula</td>
<td>34, 44, 46</td>
</tr>
<tr>
<td>grotta</td>
<td>44, 47</td>
</tr>
<tr>
<td>griffiana</td>
<td>13, 38, 39, 44</td>
</tr>
<tr>
<td>guadalupe plana</td>
<td>44, 46</td>
</tr>
<tr>
<td>herfori</td>
<td>21, 27, 30, 42, 44, 45</td>
</tr>
<tr>
<td>hercesa</td>
<td>22, 25, 27, 33, 42, 43, pl. 1</td>
</tr>
<tr>
<td>hazwerti</td>
<td>44, 50, 64</td>
</tr>
<tr>
<td>helvetas</td>
<td>22, 87, 83</td>
</tr>
<tr>
<td>hesperosa</td>
<td>44, 54</td>
</tr>
<tr>
<td>hertensis</td>
<td>44, 55</td>
</tr>
<tr>
<td>hingiaster</td>
<td>38, 44, 54, 55, 56</td>
</tr>
<tr>
<td>contracta</td>
<td>10, 34, 36, 43, 44, 49</td>
</tr>
<tr>
<td>hirudinella</td>
<td>44, 55</td>
</tr>
<tr>
<td>hirsutus</td>
<td>21, 23, 37, 44, pl. 1</td>
</tr>
<tr>
<td>alto</td>
<td>21, 23, 44, 66</td>
</tr>
<tr>
<td>leonadellae</td>
<td>44, 49</td>
</tr>
<tr>
<td>hoffmanier</td>
<td>38, 44, 50, 51</td>
</tr>
<tr>
<td>hooverites</td>
<td>44, 62, 63, 68</td>
</tr>
<tr>
<td>hooperi</td>
<td>42</td>
</tr>
<tr>
<td>hooperi</td>
<td>21, 23, 37, 42</td>
</tr>
<tr>
<td>hypaconcho</td>
<td>21, 88, 46</td>
</tr>
<tr>
<td>ignotos</td>
<td>48, 44</td>
</tr>
<tr>
<td>bilobaria</td>
<td>44, 84</td>
</tr>
<tr>
<td>impedere</td>
<td>21, 26, 28, 42, 44</td>
</tr>
<tr>
<td>inonias</td>
<td>44, 66</td>
</tr>
<tr>
<td>triciatina</td>
<td>22, 90, 44</td>
</tr>
<tr>
<td>leonaeor</td>
<td>21, 28, 44</td>
</tr>
<tr>
<td>jongiaster</td>
<td>44, 55</td>
</tr>
<tr>
<td>jovemayor</td>
<td>44, 55</td>
</tr>
<tr>
<td>jovemayor</td>
<td>10, 64, 79</td>
</tr>
<tr>
<td>juncrogenova</td>
<td>37, 44</td>
</tr>
<tr>
<td>juncigena</td>
<td>37, 44</td>
</tr>
<tr>
<td>lanulata</td>
<td>37, 44</td>
</tr>
<tr>
<td>lanulata</td>
<td>39, 44</td>
</tr>
<tr>
<td>lepimarellia</td>
<td>44, 45</td>
</tr>
<tr>
<td>lepimarellia</td>
<td>19, 29, 42, 46, 54, pl. 1</td>
</tr>
<tr>
<td>lepicenreslia</td>
<td>59, 44</td>
</tr>
<tr>
<td>leptocenreslia</td>
<td>44, 55</td>
</tr>
<tr>
<td>leptura</td>
<td>22, 85, 40, 65</td>
</tr>
<tr>
<td>longa</td>
<td>37, 43</td>
</tr>
<tr>
<td>longipristis</td>
<td>39, 44</td>
</tr>
<tr>
<td>luniata</td>
<td>35, 39, 44</td>
</tr>
<tr>
<td>mosspil</td>
<td>22, 26, 49, 44, 45</td>
</tr>
<tr>
<td>macdonelli</td>
<td>22, 89</td>
</tr>
<tr>
<td>macnarcia</td>
<td>34, 45, 49</td>
</tr>
<tr>
<td>magdalenensis</td>
<td>44, 54</td>
</tr>
<tr>
<td>marginalia</td>
<td>10, 19, 22, 27, 39, 45</td>
</tr>
<tr>
<td>marneria</td>
<td>21, 23, 45</td>
</tr>
<tr>
<td>matefeldensis</td>
<td>22, 29, 31, 46</td>
</tr>
<tr>
<td>marmint</td>
<td>45, 50</td>
</tr>
<tr>
<td>menardilis</td>
<td>19, 22, 27, 45</td>
</tr>
<tr>
<td>menardilis</td>
<td>44, 55</td>
</tr>
<tr>
<td>merisii</td>
<td>45, 49</td>
</tr>
<tr>
<td>miare</td>
<td>13, 46</td>
</tr>
<tr>
<td>mosspil</td>
<td>22, 29, 31, 46</td>
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<td>10, 23, 45</td>
</tr>
<tr>
<td>mosspil</td>
<td>45, 55</td>
</tr>
<tr>
<td>mazcadora</td>
<td>23, 39, 45, 48, 49</td>
</tr>
<tr>
<td>mazcadora</td>
<td>42</td>
</tr>
<tr>
<td>mazchileiana</td>
<td>13, 39, 45</td>
</tr>
</tbody>
</table>
INDEX

**Bairdia—Continued**

<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>nautilina</td>
<td>22, 89</td>
</tr>
<tr>
<td>nautila</td>
<td>39, 45</td>
</tr>
<tr>
<td>naumonella</td>
<td>21, 85</td>
</tr>
<tr>
<td>neglecta gibboni</td>
<td>49</td>
</tr>
<tr>
<td>neptuni</td>
<td>22, 85, 45</td>
</tr>
<tr>
<td>nebrasilensis</td>
<td>45, 92</td>
</tr>
<tr>
<td>nereis</td>
<td>45, 68</td>
</tr>
<tr>
<td>nikolanaensis</td>
<td>22, 30</td>
</tr>
<tr>
<td>nitida</td>
<td>33, 39, 45, 49</td>
</tr>
<tr>
<td>notocoracidia</td>
<td>39, 45</td>
</tr>
<tr>
<td>nipi</td>
<td>45, 85</td>
</tr>
<tr>
<td>occidentalis</td>
<td>45, 66</td>
</tr>
<tr>
<td>oikosomaensis</td>
<td>45, 66</td>
</tr>
<tr>
<td>oorata</td>
<td>27, 39, 43, 45, 52</td>
</tr>
<tr>
<td>oostus</td>
<td>45, 65</td>
</tr>
<tr>
<td>pafrathensis</td>
<td>45, 59</td>
</tr>
<tr>
<td>pamura</td>
<td>39, 45</td>
</tr>
<tr>
<td>pecki</td>
<td>45, 82</td>
</tr>
<tr>
<td>pecomitra</td>
<td>22, 30, 40, 44, 45, 46, 51</td>
</tr>
<tr>
<td>graciosa</td>
<td>26, 30, 45</td>
</tr>
<tr>
<td>penata</td>
<td>39, 42, 45</td>
</tr>
<tr>
<td>percarca</td>
<td>19, 30</td>
</tr>
<tr>
<td>perforata</td>
<td>13</td>
</tr>
<tr>
<td>permagna</td>
<td>45, 67</td>
</tr>
<tr>
<td>perplana</td>
<td>21, 39, 46, pl. 2</td>
</tr>
<tr>
<td>petiniana</td>
<td>23, 30, 45, pl. 1</td>
</tr>
<tr>
<td>philippiniana</td>
<td>45, 5, 68</td>
</tr>
<tr>
<td>pinus</td>
<td>45, 50</td>
</tr>
<tr>
<td>piozana</td>
<td>22, 30</td>
</tr>
<tr>
<td>planocomaena</td>
<td>13, 45, 81</td>
</tr>
<tr>
<td>plecta</td>
<td>27, 26, 30, 34, 37, 40, 45, pl. 1</td>
</tr>
<tr>
<td>alata</td>
<td>23, 33, 45, 66</td>
</tr>
<tr>
<td>angulada</td>
<td>45, 48</td>
</tr>
<tr>
<td>brevicardia</td>
<td>45</td>
</tr>
<tr>
<td>caudata</td>
<td>22, 24, 29, 40, 45</td>
</tr>
<tr>
<td>compresa</td>
<td>21, 39, 46, 49, 60</td>
</tr>
<tr>
<td>elomata</td>
<td>10, 25, 45</td>
</tr>
<tr>
<td>grandis</td>
<td>27, 45, 45</td>
</tr>
<tr>
<td>munda</td>
<td>20, 45</td>
</tr>
<tr>
<td>neptunia</td>
<td>20, 45</td>
</tr>
<tr>
<td>rowianiana</td>
<td>31, 45</td>
</tr>
<tr>
<td>rhombica</td>
<td>45, 45</td>
</tr>
<tr>
<td>renisiosa</td>
<td>45, 51</td>
</tr>
<tr>
<td>plicata</td>
<td>45, 82</td>
</tr>
<tr>
<td>polonaea</td>
<td>45, 45</td>
</tr>
<tr>
<td>polypomata</td>
<td>45, 45</td>
</tr>
<tr>
<td>pomphilaidea</td>
<td>19, 21, 22, 30, 33, 37, 44, 45, 46, 47</td>
</tr>
<tr>
<td>potenillaidea</td>
<td>45, 45</td>
</tr>
<tr>
<td>poweli</td>
<td>45, 67</td>
</tr>
<tr>
<td>praecita</td>
<td>45, 50</td>
</tr>
<tr>
<td>problematica</td>
<td>13</td>
</tr>
<tr>
<td>protrans</td>
<td>13, 45, 80</td>
</tr>
<tr>
<td>prunieminauta</td>
<td>45, 69</td>
</tr>
<tr>
<td>pseudocostarea</td>
<td>45, 88</td>
</tr>
<tr>
<td>pseudofiosarea</td>
<td>22, 37, 39, pl. 2</td>
</tr>
<tr>
<td>perio magnae</td>
<td>45, 45</td>
</tr>
<tr>
<td>punctata</td>
<td>21, 33, 45</td>
</tr>
<tr>
<td>punctatella</td>
<td>13</td>
</tr>
<tr>
<td>pyrrhis</td>
<td>47, 45, 89</td>
</tr>
<tr>
<td>quadrata</td>
<td>45, 84</td>
</tr>
<tr>
<td>qualeni</td>
<td>45, 50</td>
</tr>
<tr>
<td>quattuoracia</td>
<td>45, 59</td>
</tr>
<tr>
<td>quattuormeract</td>
<td>19, 51</td>
</tr>
<tr>
<td>radiera</td>
<td>19, 31</td>
</tr>
<tr>
<td>recta</td>
<td>45, 50</td>
</tr>
<tr>
<td>regularia</td>
<td>21, 37</td>
</tr>
<tr>
<td>renulaella</td>
<td>22, 39, 45</td>
</tr>
<tr>
<td>reniformia</td>
<td>45, 68</td>
</tr>
<tr>
<td>revuliana</td>
<td>21, 29, 31, 32, 45, 46, 55, 57</td>
</tr>
<tr>
<td>technolosaena</td>
<td>41, 45</td>
</tr>
<tr>
<td>rhomboidarea</td>
<td>21, 30, 46</td>
</tr>
<tr>
<td>rhomboida</td>
<td>10, 4, 46, 51</td>
</tr>
<tr>
<td>rhininaia</td>
<td>21, 24</td>
</tr>
<tr>
<td>roncfordensis</td>
<td>45, 45</td>
</tr>
<tr>
<td>ropala</td>
<td>45, 86</td>
</tr>
<tr>
<td>rostrala</td>
<td>41, 46</td>
</tr>
<tr>
<td>rounda</td>
<td>38, 44</td>
</tr>
<tr>
<td>salentisiu</td>
<td>21, 30, 46</td>
</tr>
</tbody>
</table>
## Bairdia—Continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. ampla, Cythere</td>
<td>34, 35, 52</td>
</tr>
<tr>
<td>B. bresciatica, Cythere</td>
<td>54</td>
</tr>
<tr>
<td>B. carinata, Cythere</td>
<td>38</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>57, 58, 60</td>
</tr>
<tr>
<td>B. clava antecedent, Bythocypris</td>
<td>25, 29, 42, 52</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>42, 49</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>45, 84, pi. 6</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>73, 75</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>37, 58, 59</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
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<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
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<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
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<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
<tr>
<td>B. clava, Cythere</td>
<td>70, 71, 72</td>
</tr>
</tbody>
</table>

### Bythocypris

<table>
<thead>
<tr>
<th>Species</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
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<td>73</td>
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<td>73</td>
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<tr>
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<td>73</td>
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<td>73</td>
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<tr>
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<td>73</td>
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<tr>
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<td>73</td>
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<tr>
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<td>73</td>
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<tr>
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<td>73</td>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
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<tr>
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<td>73</td>
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<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
</tr>
<tr>
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<td>73</td>
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<td>73</td>
</tr>
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<td>73</td>
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<td>73</td>
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<td>73</td>
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<td>73</td>
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<td>73</td>
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<td>73</td>
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<td>73</td>
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<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
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<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
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<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
<tr>
<td>B. forbesi, Cythere</td>
<td>73</td>
</tr>
</tbody>
</table>
| B. forbesi, Cythe...
<table>
<thead>
<tr>
<th>Page</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>33-35</td>
<td>60-62</td>
</tr>
<tr>
<td>40-41</td>
<td>63-65</td>
</tr>
<tr>
<td>66-67</td>
<td>68-69</td>
</tr>
<tr>
<td>70-71</td>
<td>72-73</td>
</tr>
<tr>
<td>74-75</td>
<td>76-77</td>
</tr>
<tr>
<td>78-79</td>
<td>80-81</td>
</tr>
<tr>
<td>82-83</td>
<td>84-85</td>
</tr>
<tr>
<td>86-87</td>
<td>88-89</td>
</tr>
<tr>
<td>90-91</td>
<td>92-93</td>
</tr>
<tr>
<td>94-95</td>
<td>96-97</td>
</tr>
<tr>
<td>98-99</td>
<td>100-101</td>
</tr>
</tbody>
</table>

The table above lists the page numbers for various sections of the text. Each section is related to different pages of a book or document. The sections include: Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, Dece formation, and Dece formation.

The text provided is a revision of some Paleozoic ostracode genera, discussing various species and formations. The table includes references to pages where specific genera or formations are discussed, such as Dece formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, Deer Creek formation, and Deer Creek formation.
### Revision of Some Paleozoic Ostrocode Genera

<table>
<thead>
<tr>
<th>Localities</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kansas</td>
<td>23, 25, 27, 28, 31, 37, 50, 68, 73</td>
</tr>
<tr>
<td>Chautauqua County</td>
<td>50</td>
</tr>
<tr>
<td>Cowley County</td>
<td>20</td>
</tr>
<tr>
<td>Douglas County</td>
<td>50, 68</td>
</tr>
<tr>
<td>Geary County</td>
<td>33, 55</td>
</tr>
<tr>
<td>Hamilton County</td>
<td>24</td>
</tr>
<tr>
<td>Leavenworth County</td>
<td>24, 26, 28, 44</td>
</tr>
<tr>
<td>Lyon County</td>
<td>25, 50, 73</td>
</tr>
<tr>
<td>Marshall County</td>
<td>23, 39</td>
</tr>
<tr>
<td>Osage County</td>
<td>67</td>
</tr>
<tr>
<td>Pottawatomie County</td>
<td>33, 62</td>
</tr>
<tr>
<td>Riley County</td>
<td>23, 24, 29, 55, 68</td>
</tr>
<tr>
<td>Shawnee County</td>
<td>30, 50, 68</td>
</tr>
<tr>
<td>Kawwa formation</td>
<td>26, 50</td>
</tr>
<tr>
<td>Kawwaensis, Bairdia</td>
<td>44, 50</td>
</tr>
<tr>
<td>kofy, Macropyxis</td>
<td>59</td>
</tr>
<tr>
<td>kelleti, Bairdia</td>
<td>21, 88</td>
</tr>
<tr>
<td>kelletis, Bairdia</td>
<td>22, 55, 52</td>
</tr>
<tr>
<td>siphoidea, Bairdia</td>
<td>81, pl. 6</td>
</tr>
<tr>
<td>kelleti, Bairdia</td>
<td>44, 50</td>
</tr>
<tr>
<td>Kentucky</td>
<td>76</td>
</tr>
<tr>
<td>Grayson County</td>
<td>36, 65</td>
</tr>
<tr>
<td>Jefferson County</td>
<td>75</td>
</tr>
<tr>
<td>Muhlenberg County</td>
<td>58</td>
</tr>
<tr>
<td>Kelting, R. V., quoted</td>
<td>67</td>
</tr>
<tr>
<td>lettori, Bairdia (Variobairdia)</td>
<td>12, pl. 1</td>
</tr>
<tr>
<td>lettori, Variobairdia</td>
<td>12, pl. 1</td>
</tr>
<tr>
<td>Keys</td>
<td>5, 11</td>
</tr>
<tr>
<td>Bairdia</td>
<td>19-22</td>
</tr>
<tr>
<td>Bairdiacypsis</td>
<td>57-58</td>
</tr>
<tr>
<td>Bairdides</td>
<td>70</td>
</tr>
<tr>
<td>Bakana</td>
<td>82</td>
</tr>
<tr>
<td>Cryptobairdia</td>
<td>48</td>
</tr>
<tr>
<td>Fabalicypris</td>
<td>61-62</td>
</tr>
<tr>
<td>Orthobairdia</td>
<td>65</td>
</tr>
<tr>
<td>Postobairdia</td>
<td>69</td>
</tr>
<tr>
<td>Rectobairdia</td>
<td>52-54</td>
</tr>
<tr>
<td>Silicites</td>
<td>72</td>
</tr>
<tr>
<td>kinderhookensis, Bairdia</td>
<td>89, 44</td>
</tr>
<tr>
<td>kingi, Bairdia</td>
<td>58, 44</td>
</tr>
<tr>
<td>Cyphere (Bairdia)</td>
<td>38</td>
</tr>
<tr>
<td>kingiana, Bairdia</td>
<td>44</td>
</tr>
<tr>
<td>Cythere</td>
<td>38</td>
</tr>
<tr>
<td>kingi, Bairdia</td>
<td>35, 44, 52</td>
</tr>
<tr>
<td>compresa, Bairdia</td>
<td>44, 49, 66</td>
</tr>
<tr>
<td>Kinkaid formation</td>
<td>22, 28, 32, 34, 51, 66, 70, 71</td>
</tr>
<tr>
<td>Kinney limestone</td>
<td>29</td>
</tr>
<tr>
<td>kirizi, Orthobairdia</td>
<td>10, 43, 49, 65, 69</td>
</tr>
<tr>
<td>klenzicaenus, Reversocypsis</td>
<td>80, 81</td>
</tr>
<tr>
<td>Kingtina allermodei</td>
<td>7, pl. 6</td>
</tr>
<tr>
<td>klenzicaeus, Bairdia</td>
<td>44, 65</td>
</tr>
<tr>
<td>Rectobairdia</td>
<td>44, 53, 55</td>
</tr>
<tr>
<td>Krenolla</td>
<td>85</td>
</tr>
<tr>
<td>Krenolla antilacustris</td>
<td>19</td>
</tr>
<tr>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Labette shale</td>
<td>23, 50, 51, 66, 68</td>
</tr>
<tr>
<td>Ladora shoal</td>
<td>63, 66</td>
</tr>
<tr>
<td>Laticeps, Bairdia</td>
<td>10, 44, 79</td>
</tr>
<tr>
<td>Cypridina</td>
<td>79</td>
</tr>
<tr>
<td>nigressenii, Bairdia</td>
<td>79</td>
</tr>
<tr>
<td>Parcharcides</td>
<td>79</td>
</tr>
<tr>
<td>Bathona</td>
<td>44, 79</td>
</tr>
<tr>
<td>Laticeps, Pararcharcides</td>
<td>79</td>
</tr>
<tr>
<td>lomolata, Bairdia</td>
<td>37, 44</td>
</tr>
<tr>
<td>lomolata, Baira</td>
<td>39, 44</td>
</tr>
<tr>
<td>La Salle limestone</td>
<td>51, 58, 67</td>
</tr>
<tr>
<td>Lawrence shale</td>
<td>26, 49, 67</td>
</tr>
<tr>
<td>lepomen, Bairdia</td>
<td>44, 55</td>
</tr>
<tr>
<td>Rectobairdia</td>
<td>42, 44, 52, 65</td>
</tr>
<tr>
<td>leymoindoides, Bairdia</td>
<td>19, 42, 46, 54, pl. 1</td>
</tr>
<tr>
<td>lenticularis, Carbonia</td>
<td>73</td>
</tr>
<tr>
<td>Sillates</td>
<td>73, pl. 4</td>
</tr>
<tr>
<td>lenticulata, Bairdia</td>
<td>39, 44</td>
</tr>
<tr>
<td>Leonard formation</td>
<td>30, 31, 32, 68, 69</td>
</tr>
<tr>
<td>Lepidocrepidites</td>
<td>79</td>
</tr>
<tr>
<td>lepadocreta, Bairdia</td>
<td>44, 55</td>
</tr>
<tr>
<td>Rectobairdia</td>
<td>44, 53, 55</td>
</tr>
<tr>
<td>leptura, Bairdia</td>
<td>23, 29, 40, 45</td>
</tr>
<tr>
<td>Cythere</td>
<td>39</td>
</tr>
<tr>
<td>Laver limestone member, Dornick Hill formation</td>
<td>24</td>
</tr>
<tr>
<td>laver, Bairdia</td>
<td>44, 49</td>
</tr>
<tr>
<td>limbraesenii, Bythocypris</td>
<td>39</td>
</tr>
<tr>
<td>limbraus, Bairdia</td>
<td>29, 50</td>
</tr>
<tr>
<td>Liverpool cyclothem</td>
<td>30, 73</td>
</tr>
<tr>
<td>Liverpool limestone</td>
<td>62, 66</td>
</tr>
<tr>
<td>Livingston limestone</td>
<td>29</td>
</tr>
<tr>
<td>INDEX</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>punctatula—Continued</td>
<td></td>
</tr>
<tr>
<td>Tubulibairdia</td>
<td>75, pl. 5</td>
</tr>
<tr>
<td>Pseudobairdia</td>
<td>11, 15, 59</td>
</tr>
<tr>
<td>key to</td>
<td>69</td>
</tr>
<tr>
<td>prunieminate</td>
<td>45, 59, pl. 3</td>
</tr>
<tr>
<td>spinosa</td>
<td>46, 55</td>
</tr>
<tr>
<td>sp. A.</td>
<td>41, 45, 56</td>
</tr>
<tr>
<td>gyrane, Bairdia</td>
<td>41, 45, 56</td>
</tr>
<tr>
<td>quadraspinosa, Bairdia</td>
<td>45, 46</td>
</tr>
<tr>
<td>Baslerella</td>
<td>45, 50</td>
</tr>
<tr>
<td>quadrigula, Phenacaspis</td>
<td>77</td>
</tr>
<tr>
<td>quadricornes, Bairdia</td>
<td>45, 59</td>
</tr>
<tr>
<td>quartzitana, Bairdia</td>
<td>45, 57, 59</td>
</tr>
<tr>
<td>quadrisymetrica, Bairdia</td>
<td>19, 51</td>
</tr>
<tr>
<td>radulata, Bairdia</td>
<td>19, 51</td>
</tr>
<tr>
<td>rauflf, Bairdiacypris</td>
<td>45, 46, 59, pl. 2</td>
</tr>
<tr>
<td>RECTOBairdia</td>
<td>11, 13, 26, 33, 59</td>
</tr>
<tr>
<td>brevispina</td>
<td>26, 43, 54, 55</td>
</tr>
<tr>
<td>clepsina</td>
<td>42, 45, 54</td>
</tr>
<tr>
<td>catalinae</td>
<td>43, 53, 54</td>
</tr>
<tr>
<td>catalpafoei</td>
<td>42, 52, 54</td>
</tr>
<tr>
<td>deformis</td>
<td>43, 52, 54</td>
</tr>
<tr>
<td>distersa</td>
<td>43, 44, 53, 54, pl. 2</td>
</tr>
<tr>
<td>emaculata</td>
<td>43, 53, 54, pl. 2</td>
</tr>
<tr>
<td>frapson</td>
<td>44, 53, 54</td>
</tr>
<tr>
<td>kaukoma</td>
<td>44, 53, 54</td>
</tr>
<tr>
<td>kestenia</td>
<td>44, 53, 55, pl. 2</td>
</tr>
<tr>
<td>key</td>
<td>52-54</td>
</tr>
<tr>
<td>korzeniewskaj</td>
<td>44, 53, 55</td>
</tr>
<tr>
<td>lepum</td>
<td>42, 44, 52, 55</td>
</tr>
<tr>
<td>lepidaoccini</td>
<td>44, 53, 58</td>
</tr>
<tr>
<td>maupassiana</td>
<td>45, 54, 55</td>
</tr>
<tr>
<td>massololmasformis</td>
<td>45, 54, 55</td>
</tr>
<tr>
<td>poorei</td>
<td>10, 42, 53, 55</td>
</tr>
<tr>
<td>saxifraga</td>
<td>46, 53, 55</td>
</tr>
<tr>
<td>schauwaldiana</td>
<td>38, 46, 53, 55</td>
</tr>
<tr>
<td>sinuosa</td>
<td>33, 38, 42, 44, 46, 53, 55, 56</td>
</tr>
<tr>
<td>subecca</td>
<td>46, 53, 55</td>
</tr>
<tr>
<td>asymmetrica</td>
<td>31, 32, 45, 46, 52, 55</td>
</tr>
<tr>
<td>hatchlia</td>
<td>46, 53, 55</td>
</tr>
<tr>
<td>tichomir</td>
<td>46, 53, 55</td>
</tr>
<tr>
<td>tikkyi</td>
<td>10, 46, 53, 55, 69</td>
</tr>
<tr>
<td>trocinaea</td>
<td>34, 69</td>
</tr>
<tr>
<td>sp. A.</td>
<td>38, 41, 53, 55</td>
</tr>
<tr>
<td>sp. B.</td>
<td>38, 41, 53, 55</td>
</tr>
<tr>
<td>sp. C.</td>
<td>38, 41, 53, 55</td>
</tr>
<tr>
<td>sp. D.</td>
<td>46, 53, 55, 56</td>
</tr>
<tr>
<td>sp. F.</td>
<td>46, 52, 53, 55, 56</td>
</tr>
<tr>
<td>sp. G.</td>
<td>46, 52, 53, 55, 56</td>
</tr>
<tr>
<td>sp. H.</td>
<td>31, 46, 52, 53</td>
</tr>
<tr>
<td>regularis, Bairdia</td>
<td>21, 31</td>
</tr>
<tr>
<td>Fabalicypris</td>
<td>61, 33</td>
</tr>
<tr>
<td>Recesseciopsis</td>
<td>80, 84</td>
</tr>
<tr>
<td>Samarrella</td>
<td>88</td>
</tr>
<tr>
<td>Renault formation</td>
<td>26, 28, 29, 60, 71</td>
</tr>
<tr>
<td>renanilenta, Bairdia</td>
<td>22, 25, 45</td>
</tr>
<tr>
<td>renlfoeris, Bairdia</td>
<td>45, 66</td>
</tr>
<tr>
<td>Cythere</td>
<td></td>
</tr>
<tr>
<td>reussiana, Bairdia</td>
<td>21, 29, 31, 32, 45, 46, 55, 57</td>
</tr>
<tr>
<td>Bairdia plebia</td>
<td>31, 45</td>
</tr>
<tr>
<td>Hydropyrus</td>
<td>22</td>
</tr>
<tr>
<td>Cythere</td>
<td>31, 47</td>
</tr>
<tr>
<td>lachnobaenii, Bairdia</td>
<td>42, 55</td>
</tr>
<tr>
<td>Recesseciopsis</td>
<td>76, 80</td>
</tr>
<tr>
<td>blaeoctenites</td>
<td>80, 81</td>
</tr>
<tr>
<td>regularis</td>
<td>80, 81</td>
</tr>
<tr>
<td>rhomalea, Bairdia</td>
<td>81, 84</td>
</tr>
<tr>
<td>Cythere (Bairdia) plebia</td>
<td>82</td>
</tr>
<tr>
<td>roundy, Bairdia</td>
<td>82</td>
</tr>
<tr>
<td>Cythere (Bairdia) plebia</td>
<td>40</td>
</tr>
<tr>
<td>rhombus, Bairdia</td>
<td>69, 45</td>
</tr>
<tr>
<td>rhomboidalis, Bairdia</td>
<td>21, 30, 51, pl. 1</td>
</tr>
<tr>
<td>rhomboidalis, Bairdia</td>
<td>10, 41, 46, 51</td>
</tr>
<tr>
<td>Cryptobairdia</td>
<td>46, 50, 60, 63, 64</td>
</tr>
<tr>
<td>Cythere (Bairdia)</td>
<td>41, 51</td>
</tr>
<tr>
<td>Bythocypris</td>
<td>11, 15, 79, 86</td>
</tr>
<tr>
<td>stotleri</td>
<td>79, 52</td>
</tr>
<tr>
<td>distyra</td>
<td>43, 79</td>
</tr>
<tr>
<td>epicyphus</td>
<td>26, 43, 44, 79, pl. 5</td>
</tr>
<tr>
<td>loepea</td>
<td>44, 79</td>
</tr>
<tr>
<td>musilai</td>
<td>80, 4</td>
</tr>
<tr>
<td>musilai</td>
<td>79, 80</td>
</tr>
<tr>
<td>oibera</td>
<td>80</td>
</tr>
<tr>
<td>prusagne</td>
<td>45, 69</td>
</tr>
<tr>
<td>smitki</td>
<td>80</td>
</tr>
<tr>
<td>silversis</td>
<td>80</td>
</tr>
<tr>
<td>sp. A.</td>
<td>80</td>
</tr>
<tr>
<td>Risshonimae</td>
<td>76, 81</td>
</tr>
<tr>
<td>saxifraga, Bairdia</td>
<td>46, 50, 55</td>
</tr>
<tr>
<td>robute, Hydropyrus</td>
<td>43, 54, 58, 59</td>
</tr>
<tr>
<td>Beuna</td>
<td>74, 82</td>
</tr>
<tr>
<td>robustus, Sileae</td>
<td>74, 82</td>
</tr>
<tr>
<td>saxifraga, Bairdia</td>
<td>46, 50, 55</td>
</tr>
<tr>
<td>salluterina, Bairdia</td>
<td>13, 46, 56</td>
</tr>
<tr>
<td>Samaerella</td>
<td>11, 15, 76, 80</td>
</tr>
<tr>
<td>cassata</td>
<td>80, 81</td>
</tr>
<tr>
<td>regularis</td>
<td>81</td>
</tr>
<tr>
<td>sample, Bairdia</td>
<td>21, 33, 46</td>
</tr>
<tr>
<td>szei, Macrocypris</td>
<td>22</td>
</tr>
<tr>
<td>sasakwa member, Holdenville formation</td>
<td>24, 33, 36, 75</td>
</tr>
<tr>
<td>saxifraga, Bairdia</td>
<td>38, 46, 55, 56</td>
</tr>
<tr>
<td>saxifraga, Bairdia</td>
<td>46, 55</td>
</tr>
<tr>
<td>Pecloibairdia</td>
<td>46, 65</td>
</tr>
<tr>
<td>aschec, Bairdia</td>
<td>46, 55, 56</td>
</tr>
<tr>
<td>schaffafoei, Bairdia</td>
<td>38, 46, 55, 56</td>
</tr>
<tr>
<td>Cythere (Bairdia)</td>
<td>55, 56</td>
</tr>
<tr>
<td>Pecloibairdia</td>
<td>38, 46, 53, 56</td>
</tr>
<tr>
<td>Scheyder, quoted</td>
<td>38, 57</td>
</tr>
<tr>
<td>Cedilla</td>
<td>46, 50, 68</td>
</tr>
<tr>
<td>Scotland</td>
<td>24, 32, 33, 34, 36, 39, 49, 50, 51, 52, 54, 56, 59, 64, 86</td>
</tr>
<tr>
<td>Secondary homonymy</td>
<td>22</td>
</tr>
<tr>
<td>Sedwick limestone, shale below</td>
<td>23, 68</td>
</tr>
<tr>
<td>seldeedente, Bairdia</td>
<td>19, 72</td>
</tr>
<tr>
<td>seldei, Bairdia</td>
<td>21, 23, 46</td>
</tr>
<tr>
<td>seminulata, Bairdia</td>
<td>41, 46</td>
</tr>
<tr>
<td>seminula, Bairdia</td>
<td>28, 46, 51, 56, 67</td>
</tr>
<tr>
<td>Cryptobairdia</td>
<td>42, 46, 58, 57</td>
</tr>
<tr>
<td>Serecera</td>
<td>76</td>
</tr>
<tr>
<td>margosaepinata</td>
<td>76</td>
</tr>
<tr>
<td>sierite limestone</td>
<td>22, 22, 27, 60, 60, 61, 73</td>
</tr>
<tr>
<td>Shawnee group</td>
<td>50</td>
</tr>
<tr>
<td>Shell limestone</td>
<td>24, 25, 20, 49, 51, 52, 54</td>
</tr>
<tr>
<td>Shettlerville member, Renault formation</td>
<td>29, 71</td>
</tr>
<tr>
<td>skidleri, Bairdia</td>
<td>46, 63, 64</td>
</tr>
<tr>
<td>Cythere (Bairdia)</td>
<td>46, 60, 63, 64</td>
</tr>
<tr>
<td>Hydropyrus</td>
<td>57</td>
</tr>
<tr>
<td>Fabalicypris</td>
<td>46, 57, 59, 61, 63, 64, pl. 3</td>
</tr>
<tr>
<td>Spinibairdia</td>
<td>81</td>
</tr>
<tr>
<td>Shoal Creek zone</td>
<td>49</td>
</tr>
<tr>
<td>Shawnamay cyclethom</td>
<td>25, 34, 41, 50, 58, 60, 69</td>
</tr>
<tr>
<td>Shawnamay zone</td>
<td>50</td>
</tr>
<tr>
<td>shilkeri, Bairdia</td>
<td>49, 50</td>
</tr>
<tr>
<td>schaffafoei</td>
<td>79</td>
</tr>
<tr>
<td>Sileae</td>
<td>79</td>
</tr>
<tr>
<td>Slakoso</td>
<td>11, 15, 72, 81</td>
</tr>
<tr>
<td>asymetrica</td>
<td>72, 73</td>
</tr>
<tr>
<td>Shloanas</td>
<td>42, 73, 74</td>
</tr>
</tbody>
</table>
REVISION OF SOME PALEOZOIC OSTROCODE GENERA

Page

Silenites—Continued
fabalis ........................................ 77
grapi ........................................ 44, 47
key ........................................ 72
testacea ................................... 72, pl. 4
punctata .................................. 71, 72
optima ...................................... 73

Pseudodentata
robustus ....................................... 74, 42
rodophi ........................................ 73, 74
silena ........................................ 72, 72, 74, pl. 4
symmetricus .................................. 74
tenuis ........................................ 74

Cryptobairdia
silena, Silenites ............................. 72, 73, 74, pl. 4
silica, Silenites ................................ 13
silviae minor, Bairdia .......................... 46, 86
sinequa, Bairdia .............................. 42

Cryptobairdia
silvatica, Bairdia .............................. 37, 46, 48, 51
sinoe, Bairdia .................................. 10, 46, 55, 56

Pectobairdia ........................................ 35, 38, 43, 44, 46, 53, 55, 56

smithi magna, Pontocypris ..................... 80
smithii, Pontocypris ............................ 80

Silenites

sorbus, Bairdia ................................. 19, 25, 34, 43
South Bend Shale ................................ 30, 51
Spinobairdia ..................................... 11, 15, 47
skokiet ........................................ 81, pl.

spinosa, Bairdia ................................. 10, 46, 56, 60

Cryptobairdia .................................... 46, 59

Spring Creek limestone ........................ 65
Stanton limestone ............................... 28, 31, 49, 51, 68
Steinhofer ...................................... 43, 54
eunuda ........................................ 13, 44, pl. 6

Tubulibairdia .................................... 84

Strasser formation .............................. 60
Stratigraphic range of Bairdia .................. 12-17
subequa, Bairdia ................................ 86, 63

Fabiocypris .................................... 46, 62, 63

subhempla, Bairdia .............................. 21, 36, 46

subintraformis, Bairdia ......................... 21, 31, 46

subintraformis, Bairdia ......................... 46, 54

subintraformis, Bairdia ......................... 10, 21, 32, 46, 86

Cythera ........................................ 32

subintraformis, Bairdia ......................... 41, 46, 52, 56, 59, 60, 62, 64

Bairdiocypris .................................... 46, 62, 64, 65

major, Bairdia ................................ 46, 59

subequa, Bairdia ................................ 46, 63

subintraformis, Bairdia ......................... 40

Cytherina ...................................... 40

subequal, Fabiocypris ........................... 61, 67

subequal, Fabiocypris ........................... 19, 31, 42, 46

subequal, Fabiocypris ........................... 46, 31, 52

Cryptobairdia .................................... 46, 44, 46, 52

Subjective synonyms ........................... 8-9

Synonyms ____________________________ 8-9

Synonyms, discussion of ........................ 8-9

Systematic descriptions ........................ 11-46

T

tocinillata, Bairdia ............................. 46, 56

tosinillata, Bairdia ............................. 46, 56

Tennessee ...................................... 84

Davidson County ................................ 81

Decatur County .................................. 75

Nash County .................................... 81

tenuis, Bairdiolites ............................ 70, 71

Fabiocypris .................................... 61, 84

transinflata, Bairdiocypris clava .......................... 74

Tubulibairdia ................................... 76, 84
terebra, Bairdia .................................. 21, 33, 43

Bairdiella curta ................................. 33, 43

tenata, Bairdia ................................. 46, 68

Bairdiacypris ................................... 74

Orthobairdia ................................... 36, 42, 43, 44, 45, 46, 63, 65, 68, pl. 3

tenuis, Silenites .................................. 74

Texas .......................................... 84

Bayou County ................................... 84

Brewster County ................................. 32, 48, 69

Coles County .................................... 23, 88

Eastland County ................................. 29, 37, 45, 51, 56

Glass Mountains ................................ 30, 69

Guadalupe Mountains ........................... 30

Iron County ...................................... 30

Martin County .................................. 34, 24, 27, 39, 49, 50, 55, 60, 62, 66, 68, 74

Palo Pinto County ............................... 23, 39, 51, 62, 66, 74

Pecker County ................................. 30, 63

Schleicher County ............................... 24

Young County ................................. 28, 29, 30, 31, 63, 66, 74

Tichonovskaya, Bairdia ........................ 46, 56

Pectobairdia ................................... 46, 53, 66

Tichty, Bairdia .................................. 10, 46, 56, 69

Time, geologic .................................. 16

toktomorosina, Bairdia .......................... 22, 48

transinflata, Fabiocypris ........................... 83

tretracina, Fabiocypris ........................... 58, pl. 6

tretracina, Bairdiocypris ........................ 84

tretracina, Becherella ........................... 56

Pectobairdia .................................... 44, 56

Tubulibairdia ................................... 46

treciornata, Pliobactrosomma ........................ 76, 77

Triovill limestone ............................... 55, 63

tricresta, Bairdia ................................ 46, 58

Pectobairdia .................................... 46, 56

tuberculatus, Bairdia ............................. 51

Tubulibairdia .................................... 11, 15, 74, 83, pl. 5

anomal... ........................................ 75

antecedens antecedens .......................... 75, 84

Wolfartii ........................................ 75

corallinae ........................... 75

decorata ........................................ 75

formosa ........................................ 75, 84

formosa ........................................ 75

formosa ........................................ 75, 84

fromata ........................................ 75

punctulata ..................................... 75, pl. 5

tenuisulcata .................................... 76, 84

tubulifera ...................................... 74, pl. 5

Tubulibairdia sp ................................. 75, pl. 5

tubularia, Tubulibairdia ........................ 74, pl. 5

tenuis, Bairdia .................................. 10, 14, 19, 24, 46, 69

Tubulibairdia .................................... 76, pl. 5

U

ubichi, Stenhofus ................................ 84

Uncertain family position ........................ 81-84

unica, Bairdia .................................. 41, 46
INDEX

Page

Union Dairy limestone ........................................... 23, 26, 30, 33, 51, 57, 58, 68
Unnamed family ....................................................... 74-76
Unnamed, Bairdia ..................................................... 35
Walchena, Bairdia ..................................................... 21, 28
Varicobairdia ........................................................ 72, 83, 84
Bairdiocypris (Bairdiocypris) .................................. 84
V

Variation, individual ................................................ 7-8
Varicobairdia kettneri ................................................. 12, pl. 1
(Varicobairdia) kettneri, Bairdia ................................ 12
vastus, Bairdiocypris ................................................. 82, 84
Venera ................................................................. 82, 84
venticosa, Bairdia .................................................. 46, 47, 49, 51
Bairdia plebeia ......................................................... 45, 51
Cryptobairdia ........................................................ 45, 46, 48, 51
vornegi, Bairdia ..................................................... 22, 33, 47
Vienna formation .................................................... 64
Viks shale ........................................................... 22, 63
villosa, Bairdia ....................................................... 12
villosis, Bythocypris ................................................ 80
Vikingan member, Stranger formation ............................... 69
Viriillansian series ................................................... 50
voloformis, Bairdia .................................................. 47, 56
volgatis, Bairdiolites ............................................... 70, 71
W

walackensis, Bairdia .................................................. 47, 56
Walackan limestone .................................................. 30, 56
Waldron shale ......................................................... 84
Wales ................................................................. 32
Wanakah shale ......................................................... 29
Wapunama limestone, shale at base ................................ 29, 70
Ward, Silurian ......................................................... 72, 73, 74

Page

warkini, Bairdia ....................................................... 47, 64
Fabalicypris ........................................................... 44, 47, 50, 52, 64, pl. 3
Wayland shale ........................................................ 23, 27, 32, 35, 55, 62, 63, 66, 68, 72, 74
Wea shale ............................................................ 23
Wesapeake group ....................................................... 50
Wenlock limestone .................................................... 83
Wenlock shale ........................................................ 80
Wentworth limestone ................................................ 23
Wenzen shale ........................................................ 23
Westen shale .......................................................... 24, 31
Winterset limestone .................................................. 62, 64
Wesoka formation ..................................................... 64, 66, 68
Whippleville .......................................................... 77
whitesidei, Bairdia .................................................. S, 21, 23, 27, 31, 33, 42, 43, 45, 49, 54, pls. 1, 2
whortani, Bairdia ..................................................... 47, 50, pl. 2
Widder beds ............................................................. 29
Wiley cyclethrum ..................................................... 64
wileyensis, Fabalicypris ............................................. 60, 61, 64
Windsor member, Moscow formation ............................... 80
Winterset limestone .................................................. 26, 31
wolfati, Pachydomella antecedens ................................. 64
Tiifnilibairdia antecedens .......................................... 75
Woodbury cyclethrum ............................................... 23
Woodbury zone ........................................................ 50
Wood formation ......................................................... 50, 51, 52, 58, 69
wordsatis, Bairdia .................................................... 47, 69
Ceratobairdia ........................................................ 47, 69, pl. 4
Wreford formation ..................................................... 23, 25, 28, 29, 30, 33, 55, 68
wrefordensis, Bairdia ................................................ 21, 23, 27
Wyoming, Fremont County ......................................... 36, 37, 39

Y

yongi, Bairdia .......................................................... 42
Yoe formation .......................................................... 85
Yoredale rocks ........................................................ 27, 30, 35, 55, 56
PLATES 1–6
PLATE 1

[Except where noted, all magnifications are approximately × 30; except where noted, all photographs are by N. W. Shupe]

Right, dorsal, and left views of carapace. Topotype USNM 133206, red marly coral limestone, Middle Devonian, Czechoslovakia.

7, 8. Dorsal and right views of carapace. Holotype USNM 35634, Cottonwood shale, Kansas.
11–14. Ventral and right views of two carapaces. The specimen illustrated by figs. 13 and 14 is an artificial steinkern made by dissolving the shell with dilute acid. Figured specimens USNM 119722, 119723, Floreana shale, Kansas, USGS 5882.

Right view of carapace. Paratype USNM 72246, Cisco formation, Texas.

9, 10, 15, 16. Bairdia grahamensis Harlton, 1928. (p. 26).
9, 10. Right and ventral views of carapace. Holotype USNM 72243, Graham formation, Texas.

Dorsal and right views of carapace. Lectotype, original of Harlton’s fig. 3a, USNM 80589, Canyon group, Texas.

Left, ventral, and right views of carapace; note broken posterior. Holotype USNM 41788, Hamilton group, New York.


26, 27. Bairdia rhomboidalis Hamilton, 1942 (p. 31).
Dorsal and right views of carapace. Holotype USNM 110236, Middle Permian, Glass Mountains, Tex. All Hamilton’s types are on a faunal slide with the same number.

28, 29. Bairdia hassi Sohn, n. sp. (p. 27).
Dorsal and right views of carapace. B. garrisonensis Upson. Kellett, 1934, holotype USNM 89480, original of Kellett’s figs. 5a, b. Elmdale formation, Kansas.

Right views of two right valves × 25. Originals of Sohn’s (1956) figs. 3 and 5. 30, outside view of valve converted to calcium fluoride, transmitted light; note muscle scars, USNM 119206, photograph by J. A. Denson; 31, right valve, untreated, calcium carbonate, USNM 119207. Deese formation, Texas.

32, 34–36. Left, right, dorsal, and tilted left views of corroded carapace. Paratype USNM 119724.
33. Right view of carapace. Lectotype USNM 119725, Fayetteville shale, Arkansas. USGS loc. 5553 green.
BAIRDIA CYPRIS AND GENERA OF THE BAIRDIA GROUP
PLATE 2

[Except where noted, all magnifications are approximately X 30; except where noted, all photographs are by N. W. Shupe]

**Figures 1, 2.** *Cryptobairdia forakerensis* (Kellett), 1934 (p. 50). Dorsal and right views of carapace. *B. whortoni* Kellett, 1935, paratype USNM 90097, Kanwaka shale, Kansas.

3–5. *Rectobairdia distresia* (Geis), 1940 (p. 54). Right, left, and dorsal views of carapace. Figured specimen USNM 90880, Spergen limestone, Harrodsburg, Ind.

6, 7. *Cryptobairdia recta* (Harlton), 1929 (p. 50). Dorsal and right views of carapace. Holotype USNM 80590, Canyon group, Texas.


16–19. *Cryptobairdia coryellii* (Roth and Skinner), 1931 (p. 49). Right, ventral, posterior, and dorsal views of carapace, converted to calcium fluoride in order to show pores. Figured specimen USNM 119727, Deese formation, Oklahoma. USGS loc. 12846 blue.


22–24. Dorsal, right, and left views of mature carapace. Figured specimen USNM 119730, Salem limestone, Indiana. USGS loc. 7698 green.


6–8. *Fabalicypris shideleri* (Delo), 1930 (p. 63).
Ventral, dorsal, and right views of carapace. Holotype USNM 81786. Pennsylvanian or Permian, well, 1365–1375 ft, Pecos County, Tex.

9, 10. *Fabalicypris glennensis* (Harlton), 1927 (p. 62).
Ventral and right views of carapace. Holotype USNM 71407, Glenn formation, Oklahoma.

11, 12. *Bairdia pseudoglennensis* Sohn, n. sp. (p. 31).
Dorsal and lateral views of left valve. Original of Kellett's fig. 4a, holotype USNM 90095, Elmdale formation, Kansas.


22, 23. *Pustulobairdia pruniseminata* (Sohn), 1954 (p. 69).
Ventral and right views of carapace. Holotype USNM 118400, Middle Permian, Glass Mountains, Tex.


28. *Fabalicypris varthini* (Bradfield), 1935 (p. 64).
Thin section, posterior view X 73; note dorsal overhang. USNM 119736, Deese formation, Oklahoma. USGS loc. 12846 blue. Photograph by J. A. Denson.

29. *Orthobairdia texana* (Harlton), 1927 (p. 68).
Thin section through carapace, posterior view; note inner lamella. USNM 119737, Deese formation, Oklahoma. USGS 12846 blue.

Right, posterior, and ventral views of carapace. Holotype USNM 118391, Middle Permian, Glass Mountains, Tex.
BAIRDIACYPRIS, FABALICYPRIS, AND GENERA OF THE BAIRDIA GROUP
Figures 1, 2. Silenites silenus Coryell and Booth, 1933 (p. 74).
   Dorsal and right views of carapace. Holotype, Columbia Univ. colln. 27565, Wayland shale, Texas.

3. Silenites lenticularis (Knight), 1928 (p. 73).
   Right view of carapace. Kellett's figured specimen pl. 17, fig. 9e, USNM 93532, Elmdale formation, Kansas.

4–7. Bairdiolites ardmorensis (Harlton), 1929 (p. 70).
   Dorsal, left, ventral, and right views of carapace. Holotype USNM 79391, Dornick Hills formation, Oklahoma.

8–17. Ceratobairdia wordensis (Hamilton), 1942 (p. 69).
   8–11. Dorsal, inside, outside, and ventral views of right valve. Topotype USNM 119738.
   12, 13. Right and ventral views of carapace. Topotype USNM 119739.
   14–17. Outside, ventral, dorsal, and inside of left valve. Topotype USNM 119740, Middle Permian, Glass Mountains, Tex.

18–21. Rishonal magna (Roth), 1929 (p. 80).
   Ventral, left, posterior, and right views of carapace. Figured specimen USNM 133208, Haragan shale, one-half a mile southeast of White Mound, Murphy County, Okla.
PLATE 5

[Except where noted, all magnifications are approximately X 30; except where noted, all photographs are by N. W. Shupe]

Figures 1-4. *Rishona bassleri* Sohn, n. sp. (p. 79).
3, 4. Posterior and right views of crushed carapace. Paratype USNM 133210; same locality as above.

5. *Phanassymetria* sp. (p. 76).
Radiograph through inside of a fragment of a left valve. Figured specimen USNM 133211, Henryhouse formation, Oklahoma. USNM loc. 482c.

Outside view of a rubber squeeze of a left valve. Holotype USNM 941954, Middle Devonian, Pennsylvania.

7. *Tubulibairdia punctulata* (Ulrich), 1891 (p. 75).
Radiograph through interior of left valve. Topotype (?) USNM 133212, “Onondaga” limestone, Falls of the Ohio, Ky.

Radiograph through interior of left valve. Topotype (?) USNM 133213, “Onondaga” limestone, Falls of the Ohio, Ky.

Radiograph through outside of left valve. Topotype USNM 133214, Camden chert, Tennessee.

10, 11. *Tubulibairdia punctulata* (Ulrich), 1891 (p. 75).
Left and ventral views of carapace. Paratype USNM 48123a, “Onondaga” limestone, Falls of the Ohio, Ky.

12. *Tubulibairdia* sp. (p. 75).
Thin section through carapace; posterior view X 50; note tubules. Section made by J. M. Berdan, polaroid photograph by R. C. Douglass. Manlius limestone, New York. Yale Peabody Museum 5244/126k.

13. *Microcheilinella distorta* (Geis), 1932 (p. 75).
Thin section through carapace; posterior view X 75. Polaroid photograph by writer. USNM 110741, Salem limestone, Indiana. USGS loc. 7697 green.

Posterior, right, dorsal, and ventral views of carapace. Holotype USNM 41823, “Onondaga” limestone, Falls of the Ohio, Ky.


22, 23. Ventral and right views of carapace. Paratype USNM 133215.
BEKENA, BAIRDIOCYPRIŚ, SPINOBAIRDIA, AND MISCELLANEOUS GENERA
PLATE 6

[Except where noted, all magnifications are approximately X 30; except where noted, all photographs are by N. W. Shupe]

FIGURES 1-5. *Cribroconcha* sp. (p. 7).


4. Right view of carapace from which part of the shell material was removed to form a specimen that resembles the genus *Healdia*. Figured specimen USNM 119743.

5. Right view of carapace, originally the same size as fig. 1, with more shell material removed to form a specimen that would be called "*Bythocypris*." Figured specimen USNM 119744, Helms formation, Texas. USGS loc. 10890 blue.

6–9, 12, 13. *Knightina allerismoides* (Knight), 1928 (p. 7).

6, 12, 13. Left, posterior, and dorsal views of carapace from which the shell material was removed to form steinkern X 60. Topotype USNM 119745.

7. Ventral view of a second specimen converted to a steinkern X 60. Topotype USNM 119746.

8, 9. Right and ventral views of a carapace. Topotype USNM 119747, Fort Scott limestone, Missouri. USGS loc. 6728 blue.


Lateral and ventral views of a valve; note structure of shell material and ornamentation on steinkern. Figured specimen USNM 119748, Union Valley sandstone (Morrow series), Oklahoma. USGS loc. 11096 blue.


17. *Steu sloffina cuneata* (Steu sloff), 1894. (p. 84).

Right view of carapace. Topotype (?) USNM 82340, Ordovician drift, Germany.


Right and posterior views of carapace. Holotype USNM 80652, Haragan marl, Oklahoma.


22. Right view of carapace on which the dorsoposterior margin is broken, so that it resembles the illustration of *Bairdiocypris moravica* Kegel (Pokorny, 1950). Topotype of Pokorny’s material USNM 133217.

23, 24. Dorsal and right views of a normal specimen. Pokorny’s topotype material USNM 133218. Middle Devonian, Czechoslovakia.


Dorsal, right, and ventral views of carapace. Figured specimen USNM 133219, “Hackberry shale” wash on side of road, Floyd County Highway D, 2 miles west of center of Rockford, Floyd County, Iowa. Collected by G. A. Cooper, 1954.


Right and dorsal views of carapace. Paratype USNM 80652 (on the same slide with the holotype), Haragan marl, Oklahoma.

30, 31. *Bekena pecki* (Morey), 1935 (p. 82).

Dorsal and right views of carapace. Lectotype Missouri Univ. colln. OS 1005–2, Sylamore sandstone, Missouri.

32. *Bekena diaphrovalvis* Gibson, 1955 (p. 82).

Right view of carapace. Holotype USNM 123093, Cerro Gordo formation, Iowa.

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