A DESCRIPTION

OF SOME

LOWER CARBONIFEROUS CRINOIDs

FROM

MISSOURI.

By S. A. Miller.

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Geological Survey
of Missouri.

Bulletin No. 4.

A description of some lower Carboniferous crinoids from Missouri.

By S. A. Miller.
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By S. A. MILLER.

CONTENTS.

<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>Platycrinus Boonvillensis</td>
<td>8</td>
</tr>
<tr>
<td>&quot;allophylus</td>
<td>9</td>
</tr>
<tr>
<td>&quot;occidentallis</td>
<td>10</td>
</tr>
<tr>
<td>&quot;pulecellus</td>
<td>11</td>
</tr>
<tr>
<td>&quot;aequivalis</td>
<td>12</td>
</tr>
<tr>
<td>&quot;Sampsoni</td>
<td>13</td>
</tr>
<tr>
<td>&quot;annosus</td>
<td>14</td>
</tr>
<tr>
<td>&quot;aequivalis</td>
<td>15</td>
</tr>
<tr>
<td>&quot;absentivus</td>
<td>15</td>
</tr>
<tr>
<td>&quot;pentagonus</td>
<td>16</td>
</tr>
<tr>
<td>&quot;sulcatus</td>
<td>16</td>
</tr>
<tr>
<td>&quot;lautus</td>
<td>17</td>
</tr>
<tr>
<td>&quot;concinnus</td>
<td>18</td>
</tr>
<tr>
<td>&quot;ollonila</td>
<td>19</td>
</tr>
<tr>
<td>&quot;amabilis</td>
<td>19</td>
</tr>
<tr>
<td>&quot;rotundus</td>
<td>20</td>
</tr>
<tr>
<td>&quot;Blairi</td>
<td>21</td>
</tr>
<tr>
<td>&quot;Broadhead</td>
<td>21</td>
</tr>
<tr>
<td>&quot;batiola</td>
<td>22</td>
</tr>
</tbody>
</table>

Platycrinus Brittsi                        | 23   |
"carchesium                              | 23   |
"Barycrinus Boonvillensis                | 24   |
"Blairi                                  | 25   |
"Belemnocrinus Sampsoni                  | 26   |
"Dichocrinus Humburgi                    | 26   |
"parvalis                                | 27   |
"Zeacrinus pocillum                      | 28   |
"Cyathocrinus Boonvillensis              | 29   |
"Poteriocrinus Brittsi                   | 30   |
"Cyathocrinus Sampsoni                   | 30   |
"Missouricrinus                          | 31   |
"admo neutron                            | 31   |
"Sybathocrinus Blairi                    | 32   |
"Actinocrinus nodosus                    | 33   |
"Dorycrinus confragosus                  | 34   |
"ammonus                                 | 35   |
"Zeacrinus commaticus                    | 36   |
"Seaphiocrinus Boonvillensis             | 37   |
"constrictus                             | 38   |
"Rhodocrinus parvus                      | 39   |
"Forbesocrinus elegantulus               | 40   |

INTRODUCTION.

Sub-Carboniferous was applied, as a technical name, to the system of rocks above the Devonian and below the Coal Measures

* The term Lower Carboniferous is adopted here by the Survey as a synonym for the term Sub-Carboniferous used by Mr. Miller.

A. W.

(5)
by David D. Owen, in 1838. The lower part of the Sub-Carboniferous system was called the Waverly Sandstone, at that time, and later was called the Waverly group, in Ohio and Indiana, and the Marshall group in Michigan, and the Kinderhook group in Illinois, and the Chouteau group in Missouri. The rocks succeeding the Chouteau group are called the Burlington group, and these are followed by the Keokuk group. These three groups constitute the lower half of the Sub-Carboniferous system, and it is from these rocks that the fossils herein described were collected.

Mr. R. A. Blair and Mr. F. A. Sampson of Sedalia, Missouri, have been ardent collectors and students of Natural History, for many years, and it is to their labor and zeal that we are indebted for the fossils described in this paper. They have made very large collections, and it is quite a noteworthy fact, that all the crinoids which they have found, in the Chouteau group, belong to undescribed species and represent peculiar generic forms.

The fossils from the Chouteau group, were collected from Bank’s quarry, in section 28, township 46, range 21 west, one mile north of Sedalia; Leucke’s quarry, in section 16, township 46, range 20 west, six miles southeast of Sedalia; Beaman’s station, in section 20, township 46, range 20 west, six miles northeast of Sedalia; Pin Hook bridge, in section 36, township 47, range 21 west, seven miles northeast of Sedalia and Cedar Creek Crossing, in section 21, township 45, range 21 west, thirty-three miles north of Sedalia. Leucke quarry and Beaman station are geologically lower than the exposures, at Sedalia, and, at Pin Hook bridge, the valley cuts through the Chouteau group. The fossils from the Burlington group are from the Georgetown cut, in section 17, township 48, range 21 west, three miles northwest of Sedalia, and the Sedalia quarries.

The fossils from the Keokuk group are from the shaly archimedes beds overlying the blue limestone, at Boonville, about half a mile above the railway bridge and ten feet above the track in section 34, township 49 N., range 17 W. These archimedes beds have been generally referred, at this place, to the Warsaw group, which is above the Keokuk. The Warsaw group is not of great thickness and has been classed, by some, as the upper
member of the Keokuk group, and, by others, as the lower member of the St. Louis group. The name is retained, because of an association of small fossils, that seem to characterize it, at distant localities, and without which it could not be determined. A few small Brachiopods occur, at Boonville, closely allied to some of those found at Spargen Hill, Indiana, and at Alton, Illinois, but the species may not be identical, while the crinoids have the aspect of those from the Keokuk group rather than those from the St. Louis group. After careful consideration of the general appearance of the fossil remains, I have decided that these Boonville beds should be referred to the upper part of the Keokuk group, rather than to the Warsaw group. I admit, however, that they may, possibly, be the equivalent of some part of the Warsaw beds, at other places, but I cannot see sufficient reason for so classifying them, in the face of the paleontological evidence afforded by the fossils now at hand. This subject, however, deserves more than the passing notice now taken of it, and can only be finally determined and settled by a further study of the fossils.

The genus Platycrinus has an almost world-wide distribution, where rocks of the Sub-Carboniferous age are exposed; it is also a Silurian and Devonian genus, and it is one of the earliest genera defined; and yet, we are able to describe, from these collections, a quarter as many species as have been hitherto described, or twenty-three new species, and there are fragments, of other new species, too imperfect for definition, beside a few species that occur in rocks of the same age in other localities. The variety of forms is truly wonderful, for every shape and character of this genus found elsewhere seems to be represented in these collections. Other genera are represented by numerous species, some of which are remarkable for their variations from the typical forms, without departing from the formula upon which the genera are constructed; but it will be more instructive, probably, to call attention to peculiarities in the specific descriptions, than to dwell generally upon such matters in advance.

Some species are in Mr. Sampson's collection that were never found by Mr. Blair, and vice versa, and in some cases the new
species is represented by a single specimen. All of Mr. Sampson's specimens sent to the author are returned to him, for his private collection, and hence, when he alone has found the species described, it is referred to simply as collected by him, at the particular locality. The collection of Mr. Blair was presented to the author before the establishment of the Missouri Survey; but where there are duplicates of new species in the collection, a division is made, as desired by him, so that authentic specimens are presented by him to the museum of the Geological Survey, and no doubt a complete representation of all the species defined will soon find a place in the museum. This statement is made here to avoid referring to the collection in which each type is to be found, at the end of each description. Where both Mr. Blair and Mr. Sampson collected the same new species, the first name mentioned, at the end of the description, indicates the one who collected the species illustrated.

**Platycrinus Boonvillensis n. sp.**

*Plate I, Fig. 7, lateral view; Fig. 2, basal and lateral view of a compressed specimen.*

Calyx large, bowl shaped, wider than high; radials longitudinally convex or tumid so as to give a slightly pentagonal outline when seen from above; sutures beveled even more distinctly than shown in the illustrations; surface granular; basals forming a low, expanding, rounded cup, with a pentagonal upper face and a round expanding rim projecting below the point of columnar attachment, and having a deep, wide, columnar socket radiately furrowed. Each basal plate might be compared, in its shape, with the back part of a high heeled shoe having the counter inclined backward. Radials a little wider than long, gradually expanding above, tumid longitudinally, in the central part, most prominent at the articulating facets for the second radials, basal and radial sutures beveled, concave facets on the upper face for the articulation of the second, radials a little more than one-third the width of the plates; plates much
thicker at the facets than at other places and sloping from the facets to the radial sutures, instead of having a horizontal truncation. Vault high, plates tumid, some of them spinous; column very large, round at the base of the calyx, but from scattering plates supposed to be elliptical below; columnar canal small and round, at the upper end.

Collected by R. A. Blair and F. A. Sampson, in the Keokuk group, at Boonville, Missouri.

**Platycrinus allophyllus n. sp.**

*Plate I, Fig. 3, typical form; Fig. 4, a shorter and more robust form and probably a distinct species, but the material at hand does not warrant a separate name for it.*

Calyx abruptly expanded below, cylindrical above the basal expansion and gradually expanding in the upper half; radials tumid in the upper part, so as to give a marked pentagonal outline above; sutures slightly beveled; surface apparently smooth. Basals forming a high cylindrical cup with a thin expanded rim at the bottom; this cup is abruptly truncated below, and sunken at the point of the columnar attachment. First radials longer than wide, gradually expanding above, convex in the central part of each and projecting at the articulating facets, for the second radials, and depressed at the longitudinal sutures; facets for the articulation of the second radials more than one-third the width of the plates, nearly perpendicular or having the face of each directed outward. Second radials short, axillary. The three interradials are of about the same size, stand upright, and the lateral ones project outward as far as the face of the second radials, allowing large arm openings. Vault highly convex and covered with large spiniform plates. Column round, medium size, plates radiately furrowed near the outer edge, so as to show the serrations on the outer face of the column.

The general form of the calyx of this species is quite different from that of any other described species of *Platycrinus*, but I see no reason to doubt that it properly belongs to that genus.
After the illustrations were made I received from Mr. Sampson other specimens, showing the second radials, interradials, and part of the vault which are above described.

Collected by F. A. Sampson, in the Chouteau Limestone at Leucke's quarry six miles southeast of Sedalia, Missouri.

**Platycrinus occidentalis** n. sp.

*Plate I, Fig. 5, basal view, part of the azygous side being broken off; Fig. 6, view of the vault and side.*

Calyx very shallow, the basal plates rising internally as high as the top of the radials; base depressed; sutures in broad angular depressions; surface apparently finely granular. Basals small sunken so as not to be visible in a side view, anchylosed, concave and deeply sunken, in the middle, for the columnar attachment. First radials large, peculiarly prolonged, in the direction of the rays, and at right angles to the height of the calyx, constricted in the middle part and turning the sides and edges up vertically so as to give a basal view a strong stellate outline; bordered by a convex elevation adjoining the basal and radial sutures and having a broad circular concave depression in the middle part, and a narrower one near the prolonged end of each plate; ends of the plates semicircular, each having a small arm furrow on the upper face; regularly serrated upon the outer edges and irregularly furrowed within, for the firmer attachment of the second radials. Interradials three, large, rising vertically from the upturned edges of the first radials; the middle one the larger, heptagonal and having the upper end prolonged between the large vault plates; the lateral ones pentagonal in some of the areas, and hexagonal in others. The middle plate in the azygous area is truncated at the top, by a smaller plate which adjoins the azygous opening, and a small elongated plate is inserted between it and the vault plates on the right, which does not occur in the other areas. The azygous opening is not elevated above the other parts of the vault, but is surrounded by small protuberant plates. The vault is covered with large tumid
PLATYCRINUS PULCELLUS n. sp.

*Plate I, Fig. 7, basal view.*

Calyx very shallow, three times as wide as high, surface completely covered with nodes, sutures beveled, or marked by a strong angular groove. Basals forming a pentagonal disk with the central part depressed for the attachment of the column. First radials low, wider than high, gradually expanding above. Articulating scar for the second radials slightly excavated at the top of each radial and extending down upon the outside, half the length of the plates, forming a semi-elliptical depression. Column evidently small.

This is a very beautiful little species having some resemblance to *P. cavus*, but distinguished by the character of the nodes, by having no plain space surrounding the articulating scars and in having no such elevated ridge surrounding the scars as characterizes the latter species. In *P. cavus* the radials project, at the articulating scars, so as to make the calyx pentagonal; in this species the upper part of the calyx is almost circular.

Collected by R. A. Blair, in the Burlington group, near Sedalia, Missouri. Only a single specimen collected.

PLATYCRINUS AETERNALIS n. sp.

*Plate I, Fig. 8, side view of a specimen with the arms and part of the column.*

Calyx bowl shaped, sub-pentagonal, wider than high, sutures slightly beveled, surface smooth or granular. Basals low, con-
stricted, so as to form a rounded ring extending below the point of the columnar attachment, each upper face for the support of the radials concave. First radials wider than high, gradually expanding above; articulating facets for the second radials about two-thirds the width of the plates and sloping downward and outward in the central part of the plates; upper faces of the plates slope latterly from the articulating facets to the sutures so as to form rather sharp angles. Second radials, small, triangular, axillary and covering only half the articulating facets. First secondary radials rest on one side upon an upper sloping side of a second radial and the other part, upon part of the articulating facet of a first radial, and support a single axillary, second secondary radial, which in turn supports upon its upper sloping sides the free arms. The inner arms in each radial series bifurcate upon the second plate, making six arms in each series, or thirty arms. The arms consist of cuneiform plates as high as the eighth or ninth plate in the outer arms of each series and as high as the fourth or fifth plate on the four inner arms of each series, above which the arms are composed of a double series of interlocking plates. Column sub-elliptical, flattened and twisted up to the base of the calyx.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Missouri. Only a single specimen was found, which is illustrated.

Platycrinus acclivus, n. sp.

Plate I, Fig. 9, view of a slightly compressed specimen, as high as the second radial; Fig. 10, opposite view of the same specimen with plates broken at the top.

Calyx somewhat obconoidal, nearly one-half higher than wide, slightly angular in the direction of the arms, sutures distinct but not beveled, surface apparently smooth, but our specimen may not preserve the true surface ornamentation. Basals form an obconic sub-pentagonal cup a little wider than high, and
truncated below. Radials a little longer than wide, very slightly expanding above and terminating in the central part with an upward prolongation for the articulation of the second radials; the articulating facet is at right angles to the length of the calyx or, having its face upward, it is less than one-third the width of the plate, subcircular in outline, with the exception of a slight truncation and the small concave arm furrow. Column, round, large, central perforation small, plates radiately furrowed near the outer margin.

This species need not be mistaken for any other, because in *P. planus*, and others having any resemblance to it, the angularity of the cup follows the radial sutures and there are deep excavations for the insertion of the second radials.

Collected by R. A. Blair, in the Burlington group, near Sedalia, Missouri. Only a single specimen was found, which is illustrated.

**Platycrinus Sampsoni** n. sp.

*Plate I, Fig. 11, side view.*

Calyx large, deep, one-third higher than wide, not expanding, pentagonal, constricted below the arms. Basals form a very shallow, pentagonal cup. Radials one-third higher than wide, sides nearly parallel, articulating scar for the second radials shallow and a little more than half the width of a plate. This species is founded upon a cast, from the chert in the Burlington group, near Sedalia, Missouri, and, hence, we know nothing of the surface markings. On account of the large size and great proportional length of the calyx it will not be mistaken for any other described species and it is especially distinguished, by its depressed pentagonal basal cup and remarkably long radials with parallel sides and constricted upper ends.

Collected by F. A. Sampson, in whose honor the specific name is proposed.
Platycrinus annosus n. sp.

*Plate I, Fig. 12, side view.*

Calyx small, broadly rounded below, somewhat half globular in shape, except the projections at the arm bases, which give the top a somewhat pentagonal outline. Surface smooth or granular. Basals large, forming a low, rounded, pentagonal disk, having a height scarcely greater than the thickness of the plates; very slight concavity in the central part for the reception of a small column. First radials slightly wider than high, expanding, convex toward the articulating scar. Articulating scar small, semicircular, face directed upward and occupying about one-third the width of a plate; notched in the central part.

Collected in the Chouteau Limestone near Sedalia, Missouri, by F. A. Sampson.

Platycrinus æquitermus n. sp.

*Plate I, Fig. 13, side view.*

Calyx obconoidal, truncated below, rapidly expanding, projecting at the arm bases, diameter at the top one-third greater than the height. Basals forming an expanding cup, the lower part extending in a ring, below the point of the columnar attachment, and the superior faces supporting the first radials being distinctly concave. First radials longer than wide, gradually expanding, convex longitudinally, depressed toward the sutures, and tumid or projecting toward the articulating scars. Articulating facets, forming more than a half circle, nearly perpendicular or having the faces, directed outward and occupying a little more than half the width of the plates; broadly notched in the central part. Column medium size, round, plates radiately furrowed.

Collected in the Chouteau Limestone near Sedalia, Missouri, by F. A. Sampson.
Platycrinus Gorbyi, n. sp.

Plate I, Fig. 14, basal view.

Calyx large, pentagonal, very shallow, three times as wide as high; plates thick, sculptured; sutures beveled. Basals forming a pentagonal disk, bearing large nodes or rudely sculptured toward the outer margin, and sunken, in the central part, for the attachment of a comparatively small column. First radials large, prolonged horizontally, in the direction of the rays or at right angles to the height of the calyx, but not extending so far as they do in *P. occidentalis*; gradually expanding, from the basals following the sutures to the interradials, and curving upward, but projecting almost horizontally, in the central part, and constricted immediately behind the large articulating facets, which perpendicularly truncate the middle third of the plates; surface having two rows of nodes below the constriction, which coalesce on some plates, especially on the one nearest the basals, where they form a convex ridge.

Collected by R. A. Blair, in the Burlington Limestone, at Sedalia, Missouri. Only a single specimen found. The specific name is in honor of Prof. S. S. Gorby, recently elected State geologist of Indiana.

Platycrinus absentivus, n. sp.

Plate I, Fig. 15, side view.

Calyx medium size, urn shaped; plates thin; sutures slightly beveled; surface smooth or possibly finely granular. Basals forming a low cup, rounded upward, from the point of attachment of a very small column, and having a pentagonal top formed by the slightly arcuating sides for the adjoining radials. First radials a little higher than wide, very slightly expanding upward and slightly projecting in a rim, at the articulating facet for the second radials; articulating scar one-third the width of a plate, semi-circular, at right angles, to the height of the calyx, or hav-
ing the face directed upward, and having a small notch on the interior edge; the upper edges slope from the articulating facets to the radial sutures, forming rather sharp angles at the sutures.

Found by Mr. F. A. Sampson, in the Chouteau group, at Leucke's quarry, six miles southeast of Sedalia, Missouri.

**Platycrinus pentagonus, n. sp.**

*Plate II, Fig. 1, side view with arms.*

Calyx pentagonal, bowl-shaped, rounding below to the rim surrounding the column; height and width subequal; surface of our specimen smooth. Basals forming a pentagonal, low, saucer-shaped disk, constricted so as to form a rim around the attaching end of the column. First radials flattened, forming angles at the sutures; height and width subequal, with a concave facet about one-third the width of each plate for the reception of the second radials. Second radials thin, axillary. Arms bifurcate on the second plate, and the two adjoining arms, in each radial series, bifurcate again on the second plate, which gives to the species thirty arms. The arms are long, rather small near the calyx, and composed of a single series of cuneiform plates as high as the fourth plate in the middle arms of each radial series, above which they are composed of a double series of interlocking plates. Pinnules numerous, dense. Interradials of moderate size. Vault unknown. Column round at the calyx.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri. Only a single specimen was found, which is illustrated.

**Platycrinus sulcatus, n. sp.**

*Plate II, Fig. 2, basal view.*

Calyx large, pentagonal, very shallow; base deeply sunken and plates rising internally higher than the top of the first radi-
als, sutures in very wide and deep furrows; surface rudely corrugated. Basals sunken to the bottom of the deep furrows, at the radial sutures, and highly inclined so as to present a hollow cone, when viewed from below; the column was attached to the apex of this cone. First radials directed horizontally, rapidly expanding, highly convex and corrugated, or wrinkled bordering the furrowed sutures and basal plates, and deeply concave in the superior central part, so as to give a pentagonal, stellate outline to the base, when viewed from below, with the rays in line with the sutures, instead of being in line with the second radials, as in other species of this genus. Column of medium size and round at the calyx.

Though only the basals and first radials of this species are known, they are so different from all others, that no one can fail to distinguish the species. It occurs in the limestone layers and probably in the chert layers of the Burlington group in Sedalia, Missouri, where it was collected by R. A. Blair. The evidence of its existence in the chert consists in the fragment of a cavity, but the species is founded on a single specimen which is illustrated.

**Platycrinus lautus, n. sp.**

*Plate II, Fig. 3, side view; Fig. 4, azygous view.*

Calyx medium size, bowl-shaped, width one-half greater than height; plates thick; radials protuberant in the upper central part, depressed toward the radial sutures; sutures slightly beveled; surface finely granular. Basals saucer-shaped; sutures distinctly depressed; columnar cavity concave and basals regularly rounded, from the column to the upper margin, showing, in a lateral view, a little more than the thickness of the plates. First radials a little wider than high, gradually expanding above, protuberant at the articulating facets for the second radials; facets about two-thirds the width of the plates, semi-circular, and directed downward at an angle of about sixty degrees; upper face notched for the arm furrows, and sloping on the sides
to the radial sutures. Second radials very thin, axillary; each shows two openings to the vault, giving the species ten arms. Three plates in each interradial area, the central one large, the lateral ones narrow, all connecting with the plates of the vault. The central, azygous, interradial plate is very large, convex, and supports the plates of the proboscis. Vault depressed, convex, plates tumid some of them spiniform, proboscis large extending from the interradial area on the azygous side to the central part and inclined from the azygous side. Height unknown. Column small.

Collected by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.

**Platycrinus concinnus, n. sp.**

*Plate II, Fig. 3, view opposite the azygous side, with some of the rock on top, covering the vault; Fig. 6, azygous view showing the proboscis partly surrounded with rock.*

Calyx urn-shaped, about as wide as high, slightly angular in the direction of the arms, so as to be sub-pentagonal above; sutures distinct but not beveled; surface apparently smooth, but it may have been finely granular. Basals form a low pentagonal cup, about one-third as high as wide, slightly constricted above the point of the columnar attachment, so as to form a thickening of the plates or rim for the support of the column. Radials expand very slightly above, height and width subequal, low angular ridge in the central part, most prominent at the articulating facets; articulating facets about one-third the width of the plates and the sides slope from them to the radial sutures. Second radials very small, thin, and axillary. First brachials very small. Five openings in the vault from one radial series, and four from another, indicating more than twenty arms in the species. There are three interradials in each area, the middle one is comparatively large and stands upright, the other two are quite small and rest upon the first radials, with the second radials and first brachials, upon one side, and the lower part of the
middle plate upon the other. Upon the azygous side the inter-radials are succeeded by small, polygonal, tumid plates forming a short proboscis. Vault high. Column elliptical.

Collected by R. A. Blair, in the Burlington Group, at Sedalia, Missouri. Only a single specimen found which is illustrated.

**Platycrinus ollicula, n. sp.**

*Plate II, Fig. 7, side view; Fig. 8, basal view.*

Calyx medium size or rather large, tub-shaped, or having a wide flat bottom, slightly constricted at the top of the basals and expanding very gradually above; plates thick; sutures beveled; surface finely granular. Basals form a round thin plate projecting beyond the lower end of the first radials in the form of a rim, as appears in a side view, and have a small central opening for the columnar canal. Radials truncated at the lower end, a little longer than wide, expand very slightly and protrude most at the articulating facets for the second radials; articulating facets about two-thirds the width of the plates, with the faces at an angle to the column of about forty degrees. This is a species widely different from any hitherto described.

Collected by F. A. Sampson, in the Chouteau group, at Pin Hook bridge and at Leucke's quarry, Missouri.

**Platycrinus amabilis, n. sp.**

*Plate II, Fig. 9, side view; Fig. 10, basal view.*

Calyx small, sub-pentagonal, when viewed from above, but round below the articulating facets of the second radials, nearly twice as wide as high; plates thick; sutures beveled; surface granular. Basals form a low pentagonal disk, having a height about equal to the thickness of the plates, concave in the central part, and rounded from the point of the columnar attachment
outward and upward. First radials wider than high, moderately expanding, most convex at the articulating facets for the second, radials; articulating facets more than half the width of the plates, semi-circular, and directed downward at an angle to the plates of about forty-five degrees.

Collected by R. A. Blair, and received by me in association with fossils from the Keokuk group, at Boonville, but the form of the species and the character of the rock convince me, that it was found, in the Burlington group, at Sedalia, and was accidentally mixed with Boonville fossils. Only a single specimen was found, which is illustrated.

**Platycrinus rotundus, n. sp.**

*Plate II, Fig. 11, side view; Fig. 12, basal view.*

Calyx rotund or half spherical; plates thick; sutures beveled; surface covered with nodes which sometimes coalesce. Basals form a low cup, rounded below and pentagonal on top; no depression for the column, but a small ring slightly protrudes, which is caused by the thickening of the plates; surface of the plates covered with nodes, arranged in four or five rows parallel with the pentagonal upper face of the basal cup, or in what may be called pentagonal rings, growing less from the top of the cup until the last one surrounds the end of the column; the nodes sometimes coalesce so as to form ridges. Radials about as high as wide, slightly expanding, most convex at the articulating facets, which occupy about one-third the width of the plates, and are directed at an angle to the plates of about forty-five degrees; the upper faces slope very slightly, if at all, from the articulating facets to the sutures; the surface is covered with nodes arranged in lines parallel with the sutures, very much in the same manner as they are upon the basals and frequently coalesce in the same way. Column of medium size and round, at the point of attachment to the calyx.

Collected by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.
Platycrinus Blairi, n. sp.

Plate II, Fig. 13, side view; Fig. 14, basal view.

Calyx medium size, bowl-shaped, width nearly twice as great as height, most protuberant at the articulating facets; sutures beveled; surface finely granular. Basals forming a low disk, just visible in a side view, pentagonal on top, sunken below, at the point of the columnar attachment and rounded outward and upward from the column to the top. First radials a little wider than high, gradually expanding, most protuberant, at the facets for the second radials; articulating facets a little more than one-third the width of the plates and directed downward almost perpendicularly or nearly parallel with the column; the upper faces of the first radials slope very rapidly from the facets to the sutures, where acute angles are formed. Interradials three, the middle ones large, long and standing upright, the others small. Vault high, convex, and covered with tumid or somewhat spiniform plates. Column small.

Collected, in the Burlington group, at Sedalia, Missouri, by R. A. Blair, who is a member of the State Geological Board, and in whose honor I have proposed the specific name.

Platycrinus Broadheadi, n. sp.

Plate II, Fig. 15, side view.

Calyx small, bowl-shaped, width a little greater than height, radials protuberant in the upper central part, so as to make the top sub-pentagonal; sutures beveled; surface finely granular. Basals forming a low pentagonal cup or disk, convex within the margin, so as to show, in a lateral view, a height about equal to the thickness of the plates; moderately concave in the central part for the columnar attachment and rounded outward and upward to the top; sutures between the basal plates depressed or beveled. First radials about as wide as high, slightly expanding above, becoming highly convex or protuberant at the
facets for the second radials; facets a little more than half the width of the plates, semi-circular in outline, directed downward at an angle to the plates of forty-five degrees; upper faces slightly notched for the arm furrows and sloping on the sides to the radial sutures. Second radials thin and axillary giving the species at least ten arms. Three small plates of nearly equal size in each interradial area, the central one being pointed above and the lateral ones extending beyond it. Vault convex, covered with tumid plates, the central one being the larger and having nine sides. Azygous opening surrounded by small plates that do not rise above the summit. Column small.

Collected by R. A. Blair in the Burlington group, at Sedalia, Missouri. Only a single specimen was found, which is illustrated. The specific name is in honor of Prof. G. C. Broadhead, late State geologist of Missouri and now a member of the State Geological Board.

Platycrinus batiola, n. sp.

_Calx_ bowl-shaped, pentagonal, width a little greater than the height; sutures slightly beveled; surface smooth or granular. Basals forming a low rounded cup, with an elliptical projection below for the attachment to the column, and having a pentagonal upper face; the elliptical projection has a central ridge with concave depressions on each side for the purpose of strengthening the means of fastening the column to the calyx; the columnar canal is quite small. First radials about as wide as long, very slightly expanding, faint trace of angularity, in the middle of the plates, and small projecting rim, at the articulating facets; articulating facets a little more than one-third the width of the plates and directed at an angle to the plates of about forty-five degrees; the angles formed, at the sutures on the upper face, between the articulating facets, quite obtuse.

Collected, by R. A. Blair, in the Burlington group, at Sedalia, Missouri. Only a single specimen was found, which is illustrated.
**Platycrinus Brittsi, n. sp.**

*Plate III, Fig. 3, lateral view; Fig. 4, another view of the same specimen showing the second radials.*

Calyx rather large, bowl-shaped, wider than high; sutures beveled; plates thick; surface granular. Basals forming a low cup, truncated below, with a flattened expanded rim surrounding a large, round columnar facet for the attachment of the column, and pentagonal above; with five concave faces to support the first radials. First radials, width and height about the same, lower face convex, expanding but little above, articulating facets about three-fourths the width of the plates and directed upward, with only a slight inclination. Second radials wide, thin, axillary and concave, on each side of the central dividing elevation. Column round at the calyx, and radiately furrowed, to strengthen the means of attachment; columnar canal small.

Collected by F. A. Sampson, in the Chouteau group, at Pin Hook bridge, Missouri. The specific name is in honor of Dr. J. H. Britts, a member of the State Geological Board of Missouri.

**Platycrinus carchesium, n. sp.**

*Plate III, Fig. 6, side view; Fig. 7, basal view.*

Calyx rather large, urn-shaped, rounded below and subpentagonal above; plates thick; sutures slightly beveled; surface smooth or granular. Basals forming a cup rounded below from a very small column, and pentagonal above, with concave faces for the support of the first radials. First radials about as wide as high, longitudinally convex in the central part, most prominent at the articulating facets, which occupy a little more than one-third the width of the plates, and are directed upward, with a slight inclination; angles at the sutures obtuse.

Collected, by R. A. Blair, in the Burlington group, at Sedalia, Missouri. Only a single specimen found, which is illustrated.
BARYCRINUS BOONVILLEN SIS, n. sp.

Plate III, Fig. 5, side view showing column and arms.

Calyx nearly as high as wide, with deep angular depressions at the longitudinal sutures, giving it a pentagonal outline when viewed from above or below. Surface finely granular. Basals forming a low pentagonal cup, with a sharp angle extending up between the sub-radials and a concave depression at each longitudinal suture, resembling in sculpture that which would be made by a circular chisel scooping out a furrow, commencing on a sub-radial and passing down the longitudinal sutures to the column. This sculpturing, with the sunken longitudinal sutures, gives a stellate outline to the surface of the sub-radials. Sub-radials hexagonal, about as wide as high, longitudinal sutures deeply sunken and central part highly angular, with an angular ridge extending to each of the adjacent radials above and abutting basals below. First radials of unequal size, the lateral ones being twice as wide as high, rounded, pentagonal, truncated nearly the entire width above, so as to present a broad, concave, almost half circular outward sloping facet, for the reception of the brachial pieces; the radial opposite the azygous side being only a little wider than high and having a much less concave upper facet. Brachials two in each ray, wide, rounded, the first one thin, the second one about twice as thick as the first and axillary. Arms apparently ten, rounded externally and giving off branchlets or armlets about every fourth or sixth plate, as in Barycrinus princeps, B. Hoveyi, and other species. No pinnales. Column pentagonal, composed near the head of thicker and thinner plates. Columnar canal large, pentagonal sides concave.

Collected, by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri. Only a single specimen was found, which is illustrated.
Barycrinus Blairi, n. sp.

*Plate III, Fig. 11,* side view of a crushed specimen showing part of the arms; *Fig. 12,* side view of a calyx; *Fig. 13,* azygous view of the same specimen.

Species robust. Calyx wider than high, plates sculptured; depressed between the radials, sutures distinct, angles of the plates sunken. Basals forming a low pentagonal cup, with angles moderately high between the subradials, and a concave depression at each longitudinal suture similar to that in *Barycrinus Boonvillensis,* and having a stellate outline as seen from below. Subradials large, hexagonal, except the one on the azygous side, which is heptagonal, a little wider than high; surface stellate with the highest point in the center and ridges extending to each adjoining plate. First radials of unequal size, wider than high, pentagonal, sculptured, having a ridge extending from the central part to each subradial below, rounded in the upper part, and truncated nearly the entire width above, so as to present a broad concave facet for the reception of the brachials. Brachials two in each ray, wide, rounded, thin, the second one being a little thicker than the first and axillary. Arms coarse, rounded externally, the right arm in the ray opposite the azygous side bifurcates again on the second plate, the other arms, in our specimen, are not preserved so as to show whether or not there are any other bifurcations, but branchlets or armlets are given off at intervals in all the arms. The first azygous plate is rather large and truncates a subradial, the second one is injured in our specimen so that the outline cannot be ascertained. Portions of the vault show that it was covered by numerous minute, almost granular plates. Column pentagonal.

Collected, by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.
Belemnocrinus Sampsoni, n. sp.

*Plate III, Fig. 8, side view, showing part of the arms.*

Calyx elongated, somewhat obconoidal, more than twice as high as wide, constricted at the top of the basals, truncated at the base where it rests upon the column, sutures distinct, surface smooth or finely granular. Basals five, three times as long as wide, very slightly expanding, and forming a sub-cylindrical cup. Radials five, shorter than the basals, rapidly expanding, longitudinally convex, truncated half the width above, for the articulation of the free arms, and sloping from the articulating facets to the sutures. Arms large, round externally, plates long, and the two seen in our specimen bifurcate on the fourth plate and in one of them the second plate in each arm above the bifurcation projects and supports a pinnule. Column obscurely pentagonal, composed of thicker and thinner plates and showing externally the serrations from the radiating furrows on the faces of the plates. The first plate at the head of the column is thicker and stronger than any below.*

Collected, by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.

Dichocrinus Humburgi, n. sp.

*Plate III, Fig. 9, side view of a specimen which is depressed; Fig. 10, view of the azygous side of the same specimen.*

Calyx somewhat obconoidal, truncated below; surface granular. The two basals form a cup a little less than half the length

* It may be proper here to state, that Meek & Worthen erroneously described Belemnocrinus Whitii, as possessing basal and sub-radial plates, and their erroneous illustration was reproduced by me, in North American Geology and Palæontology, page 229. The five small central plates, in their diagram, have no existence whatever, but instead thereof, the ends of the basal plates bear a short foot-like internal projection, which rests upon the first plate of the column, and points of these foot-like projections are prevented from uniting by the perforation for the columnar canal.
of the calyx, which is truncated and concave below; the column has a diameter equal to about half the diameter of the truncation and a narrow circular depression surrounds it; the notch, at the union of the basals, at the top, is hardly discernible on either side. First radials about one-half longer than wide, and expanding very slightly; the upper face of each radial is concave nearly the entire width for the reception of the brachials. Brachials, one in each series, thin and axillary. The arms bifurcate on the second plate, giving to the species twenty arms, which, so far as preserved in our specimen, consists of a single series of plates rounded externally. First azygous plate very little smaller than a first radial and contracted toward the upper end instead of expanding as is usual in this genus.

Collected, by R. A. Blair, in the Keokuk group, at Boonville, Missouri. Only one specimen was found, which is illustrated. The specific name is in honor of H. H. Humburg, an active collector at Boonville, Missouri.

**Dichocrinus parvulus, n. sp.**

*Plate IV, Fig. 7, azygous view; Fig. 8, opposite view of another specimen.*

Species small. Calyx a little higher than wide, somewhat obconoidal; sutures slightly depressed so as to give a little convexity to the plates; surface granular. The two basals form a short obconoidal cup, about twice as wide as high, pointed to the small column below; the notch at the top of the union of the basals on the azygous side a little deeper than it is on the opposite side. First radials about one-half longer than wide, increasing in width toward the upper end, which is truncated so as to show a broad slightly concave facet for the first brachials. One brachial in each ray, which occupies about three-fourths of the width of a radial, height about half the width and bearing upon the steep upper sloping sides the free arms. Arms ten, rounded externally and composed of a single series of thin plates. Pinnules thick and closely packed together on both sides of the arms. First azygous plate a little narrower than a first radial, and very
slightly expanding upward; the succeeding plates form an arch extending over the vault. Column round, at the calyx.

Collected, by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.

**Zeacrinus pocillum, n. sp.**

*Plate IV, Fig. 2, azygous side, the arrangement of the seven plates in the area are not indicated in the figure; Fig. 1, opposite view of same specimen.*

Calyx very low, disk-like, broadly and deeply sunken at the base so that the bottom of the cup is on a line with the top of the calyx; surface granular. Basals forming a pentagonal disk nearly covered by the small column. Subradials small, one-half within the basal cavity, the other half curved upward on the outside, and forming an angular rim. First radials about two and a half times as wide as high, the upper truncated side being the longer one and separated from the brachials by a gaping suture. There are two slightly constricted brachials in each ray, the second one of which is axillary, except in the ray opposite the azygous side, which is truncated on top and followed by five single plates before the bifurcation takes place. There is only one bifurcation of the arms, which gives to the species eighteen arms. The plates are long and slightly cuneiform, the axillary ones being quite tumid. Pinnules long and coarse. Azygous area wide, convex, exposing seven plates, alternately arranged, the first one resting between the upper sides of the subradials and the under sloping side of the first radial on the right, the second one slightly truncating a subradial and in one specimen does not touch it. Column small, round.

Collected by R. A. Blair in the Keokuk group, at Boonville, Cooper county, Missouri.
Cyathocrinus Boonvillensis, n. sp.

Plate IV, Fig. 3, azygous side, showing arms, specimen slightly crushed; Fig. 4, opposite view of a specimen showing part of the column, and stronger surface ornamentation.

Calyx low, bowl-shaped, more than twice as wide as high, base deeply depressed, plates sculptured, sutures between the subradials depressed so as to give the calyx a subpentagonal outline, when viewed from below. Basals forming a pentagonal disk one-half wider than the column, and situate within the basal depression. Subradials large, curving into the basal cavity to meet the basals and bending upward so as to form half the calyx, each one has a central conical point from which small well defined ridges radiate to each adjoining plate. First radials wider than high, with a ridge extending from the brachials to each abutting subradial, and a concave facet more than one-third the width of the plates for the articulation of the brachials. Brachials two, the first one thin, the second longer and having steep upper sloping sides. Arms spread from the second brachials, at an angle of forty-five degrees or more, and throw off arms, from the inner side, that stand upright, some of which bifurcate. Each arm on the left of the azygous plate, in one of our specimens, throws off four arms from the inner side, the first three of which spring from every second plate, the other is more distant, the first one bifurcates three times, the second and third bifurcate twice. The other rays appear to bear the same number of arms, thus making sixty arms in this species. The lower parts of the arms are somewhat angular externally, but higher up they are round and composed of long joints without pinnules. The first azygous plate is hexagonal, truncates a subradial, extends as high as the radials, bears a prominent central ridge and is followed by three plates, one in the central part and the others supported laterally upon it and the primary radials. Column round and composed of thicker and thinner plates.

Collected by R. A. Blair in the Keokuk group, at Boonville, Cooper county, Missouri.
Poteriocrinus Brittsi, n. sp.

Plate IV, Fig. 6, azygous side; Fig. 5, opposite view.

General form sub-cylindrical, when the arms are closed but constricted around the brachials. Calyx obconoidal, height and width subequal; plates rounded, granular, sutures distinct. Basals pentagonal, standing nearly upright, forming a rim around the column, within which the basals are flattened and radially furrowed for the attachment of the column. Subradials hexagonal, rather longer than wide. Primary radials pentagonal, wider than long, upper side truncated the entire width for the support of the brachials and having a gaping suture. Brachials about as long as wide, rounded and constricted in the middle. Three of the first arm plates are twice as long as wide and axillary which gives to the species sixteen arms. The arms are long, flattened on the sides so as to permit them to close tightly together, and composed of long, slightly cuneiform plates. Column round. Azygous area is injured in our specimen and the vault and pinnules are not observed.

Collected, by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri. The only specimen found is illustrated. The specific name is in honor of Dr. J. H. Britts of Clinton, Missouri, a member of the Geological Board of the State.

Cyathocrinus Sampsoni, n. sp.

Plate IV, Fig. 10, azygous view; Fig. 9, opposite view.

Calyx obconoidal, longer on the azygous side than on the others; beveled at the sutures; surface smooth or granular. Basals forming a low pentagonal cup, depressed at the sutures on top so as to give it a zigzag outline; sutures between the basal plates not beveled; truncated at the bottom only the size of the column; columnar cavity of moderate depth. Subradials hexagonal, longer than wide, except the one on the azygous side which is heptagonal, larger than either of the others, and fully
as wide as long, all of them gradually expanding to the lateral angles. First radials, rather longer than wide, lateral sides straight, protuberant at the arm facets, indented for the arm furrows upon the upper margin; articulating facets somewhat circular extending down two-thirds the length of the plates, and occupying nearly the entire width above, and bordered by an elevated rim. Azygous plate sub-quadrate and two-thirds as large as a first radial. Column small, round.

Collected, by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.

**MISSOURICRINUS, n. gen.**

*(Ety, proper name; krinun, a lily.)*

Calyx obconoidal or basin-shaped. Basals five forming a small cup. No subradials; no regular interradials. Primary radials one by five, wider than high, and separated from the brachials by an external gaping suture. Brachials axillary except in the ray opposite the azygous side. Arms resembling those in *Scaphiocrinus*. First azygous interradial rests between two primary radials and truncates a basal plate. Column pentagonal.

The formula of this genus is much like the Lower Silurian *Heterocrinidae* and *Anomalocrinidae*. That is, the genus has five basals, no subradials, no regular interradials, but azygous interradials. The brachials and arms remind one of the *Poteriocrinidae* and the azygous plate of the *Cyathocrinidae*. The affinities are nearest the *Heterocrinidae*; but I think a new family should be formed for it. Type *M. admonitus*.

**MISSOURICRINUS ADMONITUS, n. sp.**

*Plate IV, Fig. 12, azygous view; Fig. 11, opposite view.*

Calyx obconoidal, rapidly expanding, twice as wide as high, slightly longer on the azygous side than on the others; surface
smooth or granular. Basals forming a low cup; plates pentagonal, except the one on the azygous side, which is larger than the others and hexagonal by reason of being truncated on top. Each plate has a shortfoot-like projection internally against which the column abuts. First radials, expanding, pentagonal, twice as wide as long, and truncated the entire width above for the articulation of brachials, and separated externally from them by a gaping suture. Brachials pentagonal, constricted on the sides, and bearing upon the upper sloping faces the free arms, except the one opposite the azygous side, which is quadrangular and bears a single arm. Arms, as shown in our specimen, nine, composed of cuneiform plates alternately projecting on the sides for the support of pinnules. Azygous plate more than twice as long as wide, rests upon the truncated end of a basal plate, between two radials and curves over to meet the plates of the vault. Column pentagonal and having short radiating denticulations within the border of the articulating faces of the plates.

Collected, by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.

**Synbathocrinus Blairi, n. sp.**

*Plate IV, Fig. 15, azygous side with column; Fig. 14, opposite view; Fig. 13, top of calyx.*

Calyx like a small cup, a little wider than high, with sutures depressed, so as to give it a subpentagonal outline. Surface finely granular. Basals low, forming a pentagon with slightly concave sides, and having a rim that projects below the point of the attachment of the column. First radials quadrangular, arcuate below, nearly as wide as high and slightly beveled at the sutures. Brachials smaller than the radials, length and width nearly equal, the two adjoining the azygous plate longer than wide and the others as wide or wider than high, sharply angular longitudinally. The sutures between the radials and brachials are beveled so as to give the top of the calyx a pentagonal outline. The first azygous plate is about two and a half times as
long as wide, rests in a notch between two radials, truncating the one on the right more than the one on the left and extends beyond the brachials to near the middle of the first arm plate. The second plate exposes only a short triangular area. The arms are long, sharply angular longitudinally, with a deep ambulacral furrow within and are composed of thirty-five or forty quadrangular plates. Proboscis about the same size as an arm. Column round.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.

**Actinocrinus nodosus, n. sp.**

*Plate V, Fig. 7,* specimen on a slab, depressed and showing a few vault plates.

Calyx large, obconoidal or somewhat urn-shaped; about as high as wide, ornate; all the plates bear central, abrupt, more or less transverse prominences, that do not slope off toward the sutures, as the nodes do in all other species, known to the author, beside being connected with each other by short angular ridges that give the surface of the plates a somewhat stellate appearance; plates indented at the angles. Basals form a low cup broadly truncated below for a large round column, the plates have a foot-like projection internally to which the column is attached; they are pentagonal, twice as wide from one lateral angle to the other as high; three small ridges extend from three little nodes, at the lower edge of the basals up to three small nodes, on three of the first radials, near the base of the transverse prominences; from the base at the sutures a furrow runs up to the transverse prominence on two of the radials and on the first azygous plate and on each side of these furrows there is a smaller one. First radials large, wider than high, three hexagonal and two heptagonal. Second radials hexagonal, wider than high and about two-thirds as large as the first. Third radials somewhat larger than the second, four of them hexagonal and the one on the left of the azygous side octagonal, and bear upon
their upper lateral sides the secondary radials. Secondary ra-
dials hexagonal, less than half the size of the third radials and
bear upon their upper sloping sides tertiary radials. The calyx
has twenty arm openings. Inter-secondary radials two, one
hexagonal, elongated, truncates the third radial; it is followed
by a narrow plate between the tertiary radials which connects
with the plates of the vault. Regular interradials eight or nine,
the first one as large as the second radials, two smaller ones in
the next range, followed by two in the next and these are fol-
lowed by three or four small plates, in line, before they meet the
plates of the vault. Azygous area much larger and containing
twelve or fourteen plates; the first one is in line with the first
radials and of the same size, there are two in the next range,
three in each of the next two ranges, and above these the number
cannot be accurately determined from our specimen. Vault
highly convex and covered with tumid and spinous plates.
Proboscis unknown. Columnar canal pentagonal.

Collected by R. A. Blair, in the Burlington group, at Sedalia,
Missouri. Only a single specimen was found, which is illustrated.

**Dorycrinus confragosus, n. sp.**

Plate V, Fig. 12, view of the azygous side; Fig. 13, view of the opposite
side.

Calyx bowl-shaped, interradial areas depressed in the upper
part so as to form a sub-pentagonal outline at the arm bases;
sutures depressed; plates thick, convex; surface granular.
Basals very low, truncated, broad, more than six times as wide
as high, deeply excavated for the columnar attachment, showing
the plates form a cone in the interior of the calyx extending
higher than the exterior; plates thick and deeply notched at
the sutures. First radials large, rapidly expanding to the
lateral angles, one-half wider than high, three hexagonal and two
heptagonal, the lower angles of the latter reach almost to the
base of the calyx. Second radials quadrangular, more than
twice as wide as high. Third radials a little larger, pentagonal,
twice as wide as high, and each supports on its upper sloping sides two secondary radials, each of which is more than twice as wide as high, and the second one is axillary and supports upon each of its upper sloping sides, two, wide, thin, tertiary radials. There are twenty arm openings to the body. First regular interradial very large, decagonal, it is followed by two plates, the one on the right being the longer one and reaching high between the tertiary radials. Azygous area large; first plate larger than a first radial, wider than high; it is followed by three large plates, two of which support tertiary radials on the left and the other supports the tertiary radials on the right; the central plate and the one on the right support four plates, the lateral ones being quite small, and these are followed by two or three series of vault plates, which stand nearly perpendicular, before reaching the plates that surround the azygous opening. Vault elevated highly convex, depressed toward the interradial area so as to be somewhat five-lobed, and covered with convex and tumid polygonal plates, that extend out over the base of the arms, the larger and more tumid plates being over the radial lines except the large, subcentral, tumid octagonal plate, that is above and behind the azygous opening.

Collected by F. A. Sampson, in the Burlington group, at Sedalia, Missouri.

**Dorycrinus amenus, n. sp.**

*Plate V, Fig. 6, azygous view; Fig. 5, side view.*

Body small, rotund. Calyx cup-shaped, one half wider than high; vault convex, arms spreading; plates smooth or finely granulous. Basals spreading, four times as wide as high, and having a small rim projecting below the end of the column; columnar cavity round and radiately furrowed. First radials very large, three hexagonal and two pentagonal, wider than high, spreading from the basals up. Second radials small, quadrangular, twice as wide as high, sometimes ankylosed with the third radials. Third radials heptagonal, the superior lateral angles
being slightly truncated by interradial plates; twice as wide as long, and each supporting upon the upper sloping sides two secondary radials; one in each posterior lateral ray being axillary and supporting tertiary radials, making twelve arm openings in the body. Interradial areas depressed, concave, giving the upper part of the calyx a subpentagonal outline. First interradial plate large, octagonal, supporting two rather long plates which unite with the plates of the vault. First azygous plate as large as a first radial, heptagonal, and supports three rather large plates which are followed by a row of five plates, two of which support arm plates and three unite with the smaller plates of the vault, which are followed by one or two series of small plates that surround the azygous opening. Lower part of the azygous opening about on a line with the top of the plates, that cover the arm openings. Vault covered with smooth, polygonal plates, that extend out over the base of the arms and increase in size toward a large subcentral, tumid, heptagonal plate, that is above and behind the azygous opening.

Collected by R. A. Blair, and F. A. Sampson, in the Burlington group, at Sedalia, Missouri. The specimen figured is from Mr. Sampson's collection; Mr. Blair's collection contains only a single inferior specimen.

**Zeacrinus commaticus, n. sp.**

*Plate V, Fig. 10, azygous side; Fig. 11, opposite view.*

Calyx low, basin-shaped, obscurely pentagonal, three times as wide as high, deeply sunken at the base; the angularity of the brachials give a sub-pentagonal outline to the top of the calyx; surface granular. Basal disk one-half larger than the diameter of the column. Subradials abruptly curving down into the basal cavity and bending upward half the height of the calyx.

First radials about twice as wide as high, with a transverse gaping suture between them and the brachials. There are two brachials in the ray opposite the azygous side and one in each of the other rays; they are slightly constricted in the middle part.
The first bifurcation of the arms generally takes place on the sixth plate, but in some arms it takes place on the third, and in others on the tenth plate, hence there is no absolute uniformity in this respect, in different specimens. There are four arms thrown off from each of the inner sides of the main arms, except in the ray opposite the azygous side, which only throws off two; hence, there are forty-six arms in this species. The plates are thin and cuneiform, except the axillary ones, which are thick and prominent, giving the arms a knobby aspect. Pinnules thick, dense, and composed of ten or more pieces. Azygous area convex, exposing seven plates alternately arranged, the first one resting between the upper sides of subradials and the under sloping side of the first radial on the right, and the second one truncating a subradial. The top of the proboscis is enlarged, convex, and covered with tumid and conical almost spinous plates. Column round.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.

Scaphioocrinus Boonvillensis, n. sp.

Plate V, Fig. 1, lateral view, with azygous side on the left; Fig. 2, opposite view.

Calyx low, pentagonal, saucer-shaped; plates thick, deeply sculptured. Basals extending but little beyond the column, subradials about as wide as high, tumid in the central part and having strong ridges radiating to each adjoining plate. Radials twice as wide as high, truncated the greatest width of the plates for the brachials, and having wide, downward sloping, gaping sutures terminating in a ridge on each plate, with two ridges below extending laterally from it to the adjoining subradials. Brachials two in each series, the first quadrangular, more than twice as wide as high, constricted on the sides, leaving a sharp, central, longitudinal ridge and a ridge at the upper and lower margin; sutures gaping. Second brachials axillary and having a longitudinal ridge and one at each of the upper margins and
one at the lower margin. Arms very rough, plates constricted, the first division takes place on the sixth plate and above this there are two arms thrown off from the inner side of each arm, as in Zeacrinus, which gives forty arms to the species. The axillary plates are tumid and sculptured. Pinnules long and coarse. Azygous area large, subovate, plates sculptured, alternately arranged, the first one resting between two upper sides of subradials and the second one truncating a subradial, as is usual in this genus. Proboscis flat and composed of hexagonal plates in longitudinal series, sculptured and highly ornamental. Column small, pentagonal.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.

Scaphiocrinus constictus, n. sp.

Plate V, Fig. 4, azygous view; Fig. 3, opposite side.

Calyx low, pentagonal, cup-shaped; plates thick, sculptured. Basals extending slightly beyond the column. Subradials tumid, sculptured, sutures depressed. Radials two and half times as wide as high; sutures gaping with a projecting rim near the upper margin. Brachials two in each series, the first one quadrangular, more than twice as wide as high, constricted in the middle, the second one axillary, constricted. The first bifurcation takes place on the sixth plate in some arms and the eighth plate in others, and above this there are two arms thrown off on the inner side of each ray, making forty arms in the species. All the arm plates are constricted and flanged at the upper edge. Axillary plates tumid. Pinnules coarse. Azygous area elongate, first plate between upper sloping sides of subradials; second plate truncating a subradial and plates alternately arranged as in other species in this genus. Column pentagonal. This species is distinguished from S. Boonvillensis, by the larger size, nearer equal bifurcation of the arms, greater length to the first bifurcation, and by the sculpturing on the plates of the calyx. Proboscis unknown.
Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.

**Rhodocrinus parvus, n. sp.**

*Plate V, Fig. 8, azygous view; Fig. 9, opposite side.*

This is a small species. Calyx globular, contracted at the base of the arms, a little wider than high; sutures distinct, sunken at the angles; plates sculptured and more or less well defined ridges extend from the central part of each plate to each adjoining one. Basals small, extending but little beyond the column. Subradials hexagonal, the largest plates in the calyx, highly convex in the central part with ridges extending to each adjoining plate. First radials nearly as large as the subradials, heptagonal, highly convex in the central part, with ridges extending to each adjoining plate, the larger one reaching the second radial. Second radials smaller than the first, quadrangular in some cases and hexagonal in others, by reason of a slight truncation of the upper angles by the third range of interradials. Surface ornamentation same as on the other plates. Third radials smaller than the second, axillary, and supporting upon the upper sloping sides a single brachial, which is followed in some rays by four and in others by five arm plates, before a bifurcation takes place. Above this bifurcation there are ten arms, a few plates are single, and then the arms are composed of a double series of plates. Arms, round, externally, and bear numerous strong pinnules compacted together on both sides. Regular interradials eight, the first one truncates a subradial, there are two in the second range, three in the third and two in the fourth which unite with the plates of the vault. Azygous area wider than the regular interradial areas, the first plate larger and above this the plates more numerous. Column round and composed near the head of thicker and thinner plates. Columnar canal small, round.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.
FORBESOCRINUS ELEGANTULUS, n, sp.

Plate V, Fig. 14, azygous side; Fig. 15, opposite view. There should be four primary radials shown in the figure in the front series instead of three.

This is the smallest known species. Calyx pentagonal when viewed from below; surface granular. Basals substantially covered by the column. Four of the subradials are small, subtrigonal in outline, the lateral angles being only slightly truncated, the other one is large, extends as high as the first radials and supports three interradial plates. Primary radials four, in each series, sub-angular longitudinally, the first one is the largest plate in the calyx, wider than long, hexagonal; the second plate is short, wide and hexagonal; the third is very short and quadrangular, the fourth is pentagonal and axillary. Secondary radials three in each series, a little smaller than the primary radials and gradually tapering. Tertiary radials five or six in each series, small; sutures sinuous. The arms are round and again divide, making forty arms in the species. Interradial areas sub-ovate, depressed and occupied by about ten or twelve plates. Azygous area wider than the regular areas and occupied by twenty-four or more plates, three of which rest upon a sub-radial and the one on the right bears a straight series of eight plates or more. Intersecondary areas occupied by five or more plates. Intertertiary plates one or more. Column near the head tapering downward and composed of thin plates which are radiately furrowed near the outer rim.

Collected by R. A. Blair, in the Keokuk group, at Boonville, Cooper county, Missouri.
PLATE I.

Platycrinus Boonvillensis, n. sp. ................. 8

Fig. 1. A lateral view.
Fig. 2. A basal and lateral view of a compressed specimen.

Platycrinus Allophylus, n. sp. ...................... 9

Fig. 3. A typical form.
Fig. 4. A shorter and more robust form, and probably a distinct species.

Platycrinus Occidentalis, n. sp. .................... 10

Fig. 5. A basal view, part of the azygous side being broken off.
Fig. 6. A view of the vault and side.

Platycrinus Pulcellus, n. sp. ....................... 11

Fig. 7. A basal view.

Platycrinus æternalis, n. sp. ......................... 11

Fig. 8. A side view of a specimen with the arms and part of the column

Platycrinus Acclivus, n. sp. ......................... 12

Fig. 9. A view of a slightly compressed specimen, as high as the second radial.
Fig. 10. An opposite view of the same specimen, with plates broken at the top.

Platycrinus Sampsoni, n. sp. ......................... 13

Fig. 11. A side view.

Platycrinus Annosus, n. sp. ........................ 14

Fig. 12. A side view.

Platycrinus æquiternus, n. sp. ...................... 14

Fig. 13. A side view.

Platycrinus Gorbyi, n. sp. .......................... 15

Fig. 14. A basal view.

Platycrinus Absentivus, n. sp. ...................... 15

Fig. 15. A side view.
PLATE II.

Platycrinus pentagonus, n. sp. ................. 16
Fig. 1. A side view with arms.

Platycrinus sulcatus, n. sp. .................. 16
Fig. 2. A basal view.

Platycrinus lautus, n. sp. ..................... 17
Fig. 3. A side view.
Fig. 4. An azygous view.

Platycrinus concinnus, n. sp. .................. 18
Fig. 5. A view opposite the azygous side, with some of the rock on top covering the vault.
Fig. 6. An azygous view showing the proboscis partly surrounded with rock.

Platycrinus ollicula, n. sp. .................... 19
Fig. 7. A side view.
Fig. 8. A basal view.

Platycrinus amabilis, n. sp. .................... 19
Fig. 9. A side view.
Fig. 10. A basal view.

Platycrinus rotundus, n. sp. .................... 20
Fig. 11. A side view.
Fig. 12. A basal view.

Platycrinus Blairi, n. sp. ...................... 21
Fig. 13. A side view.
Fig. 14. A basal view.

Platycrinus Broadheadi, n. sp. ................. 21
Fig. 15. A side view.
PLATE III.

PLATYCRinus Batiola, n. sp. ...................... 22

Fig. 1. A side view.
Fig. 2. A basal view.

PLATYCRinus Brittisi, n. sp. ...................... 23

Fig. 3. A lateral view.
Fig. 4. Another view of the same specimen, showing the second radials.

PLATYCRinus Carchesium, n. sp. ................. 23

Fig. 6. A side view.
Fig. 7. A basal view.

BARYCRinus Boonvillensis, n. sp. .................. 24

Fig. 5. A side view, showing column and arms.

BARYCRinus Blairi, n. sp. ......................... 25

Fig. 11. A side view of a crushed specimen, showing part of the arms.
Fig. 12. A side view of a calyx.
Fig. 13. An azygous view of the same specimen.

BELEMNOCRinus Sampsoni, n. sp. .................. 26

Fig. 8. A side view, showing part of the arms.

DICHOCRinus Humburgi, n. sp. ..................... 26

Fig. 9. A side view of a specimen which is depressed.
Fig. 10. A view of the azygous side of the same specimen.
PLATE IV.

Dichorinus Parvulus, n. sp......................... 27

Fig. 7. An azygous view.
Fig. 8. An opposite view of another specimen.

Zeacrinus Pocillum, n. sp.......................... 28

Fig. 2. An azygous side, the arrangement of the seven plates in the area is not indicated.
Fig. 1. An opposite view of the same specimen.

Cyathocrinus Boonvillensis, n. sp.................. 29

Fig. 3. An azygous side, showing arms, specimen slightly crushed.
Fig. 4. An opposite view of a specimen, showing part of the column and stronger surface ornamentation.

Poteriocrinus Brittsi, n. sp....................... 30

Fig. 6. An azygous side.
Fig. 5. An opposite view.

Cyathocrinus Sampsoni, n. sp..................... 30

Fig. 10. An azygous view.
Fig. 9. An opposite view.

Missouricrinus Admonitus, n. sp................... 31

Fig. 12. An azygous view.
Fig. 11. An opposite view.

Synbathocrinus Blairi, n. sp....................... 32

Fig. 15. An azygous side with column.
Fig. 14. An opposite view.
Fig. 13. The top of the calyx.
PLATE IV.
PLATE V.

ACTINOCRINUS NODOSUS, n. sp. ......................... 33

Fig. 7. A specimen on a slab, depressed and showing a few vault plates.

DORYCRINUS CONFRAGOSUS, n. sp. ..................... 34

Fig. 12. A view of the azygous side.
Fig. 13. A view of the opposite side.

DORYCRINUS AMGENUS, n. sp. ........................... 35

Fig. 6. An azygous view.
Fig. 5. A side view.

ZEACRINUS COMMATICUS, n. sp. ........................ 36

Fig. 10. An azygous side.
Fig. 11. An opposite view.

SCAPHIOCRINUS BOONVILLENIS, n. sp .................. 37

Fig. 1. A lateral view with azygous side on the left.
Fig. 2. An opposite view.

SCAPHIOCRINUS CONSTRUCTUS, n. sp. .................. 38

Fig. 4. An azygous view.
Fig. 3. An opposite side.

RHODOCRINUS PARVUS, n. sp. ............................ 39

Fig. 8. An azygous view.
Fig. 9. An opposite view.

FORBESOCRINUS ELEGANTULUS, n. sp. .................. 40

Fig. 14. An azygous view.
Fig. 15. An opposite view. There should be four primary radials shown in the figure in the front series, instead of three.