Upper Cretaceous Corals from Cuba

By

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February 17, 1941

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Ithaca, New York
U. S. A.
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INTRODUCTION

The scleractinian corals described here consist of two small collections made several years ago from Upper Cretaceous rocks at three localities (see outline map) in Cuba by Norman Weisbord and Roy E. Dickerson, by whom they were kindly offered to the writer for description. They proved to be particularly interesting because they are the first corals of this age to be described from this area and also because of their close relationships with the now fairly well-known and distinctive Upper Cretaceous coral fauna of Jamaica. The writer appreciates the opportunity of studying these corals and hopes that future collecting in Cuba will add to this small contribution.

SYSTEMATIC DESCRIPTIONS

Family ASTROCCENIDÆ

Genus ASTROCCENIA Milne Edwards and Haine, 1848

Astroccenia dickersoni, n. sp. Plate 2, fig. 4

Description.—Encrusting; corallites polygonal; calices closely fused, with single beaded walls or separated by shallow grooves, averaging 2.75 mm. in diameter, ranging from 2.0 to 3.0 mm. Septa scarcely exert, upper margins beaded, in three hexameral cycles (24 septa). The septa of the first two cycles extend to the columella; those of the third are rudimentary. The septa of the second cycle are slightly thinner and less prominent than those of the first. Basal and marginal epitheca present. Columella small and styliform.

1 The presence of corals has been noted in the Big Boulder Bed member of the Habana formation (U. Cretaceous-Maestrichtian) in Havana Province by R. H. Palmer (Jour. Geol., xlii, 1934, p. 131).
The holotype is a small colony from 3 to 8 mm. thick encrusting both sides and the edge of a molluscan shell fragment.

**Specimen.**—Paleontological Research Institution.

**Occurrence.**—Ravine one kilometer west of Central Perseverancia, Santa Clara Province (Dickerson).

**Remarks.**—Only two other species of this genus are now known to occur in the Caribbean Upper Cretaceous: *A. sp. cf. A. ramosa* E. and H. Gerth, an octameral form from the Seroe Teintje limestone of Curacao, and *Astroconia* sp. Gerth from the same locality and also octameral. There are no species of the genus known from the Upper Cretaceous of eastern North America, and from the hexameral species of the European Upper Cretaceous the new Cuban form is distinguished by the larger corallites and by the union of the septa of the first two cycles with the columella. Three hexameral species were described from the Upper Cretaceous of southern India by Stolizckx: *A. punila* (Arriaoor group), *A. revusiana* (Ootatoor group), and *A. retifera* (Ootatoor group). Only the last has any resemblance to *A. dickersonii*, but has the third septal cycle well developed instead of rudimentary.

**Family AGARICIDÆ**

**Genus TROCHOSERIS** Milne Edwards and Haime, 1849

*Trochoseris catadupensis* Vaughan, 1899


**Description.**—Solitary, trochoid, expanding rapidly from the base of attachment, calice broad and shallow with elongate fossa and nearly equal in thickness, numerous, with upper margins higher cycles, united by regularly disposed synapticulae throughout their extent and by their inner ends. Columella very small.


**Specimens.**—Paleontological Research Institution.

**Occurrence.**—Cuba: with an Upper Cretaceous (Campanian) rudistid fauna in a field about 350 meters west of Central Jesus Maria, about 20 kilometers southwest of Matanzas, Matanzas Province (6 specimens) (Weisbord).

Jamaica: Upper Cretaceous (Campanian) rudistid limestone near Catadupa.

**Remarks.**—A striking thing about this species is the large number of septa compared with the size of the corallum—from 7 to 8 more or less complete cycles.

One specimen shows the *Cyathoseres* condition, with four centers, the result of circumoral budding close to the original center.

**Family HAPLARÈÉIDÆ**

**Genus HAPLARÈÉA** Milaschewitsch, 1876

*Haplarèa* ? discrepans, n. sp.

**Description.**—Solitary, elongate-cornute, usually slightly compressed, probably free in ephelic stages, exterior apparently covered by a thin, easily-eroded epitheca. Wall mostly parathal (dissepimental), partly synapticulothecal, imperfectate except near the calice. Costæ thin, united by thin exotheca. Calice usually elongate but circular in some specimens, shallow. Septa numerous, thin and laminar, arranged in at least 5 complete cycles (96) and usually with some part of the sixth, irregularly perforate throughout their extent, not filling up basally to any extent, those of the higher cycles usually uniting by their inner ends to those of the preceding cycles. Upper margins of septa probably beaded. Endotheca vesicular, extensive basally but present only near the wall in upper parts of the corallum. Synapticulae simple, irregular...
larly distributed, fairly abundant in the mural and columellar regions. Columella feeble, usually elongate, formed by a few detached inner septal trabeculae.

**Dimensions.**

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Diameter</th>
<th>Septa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holotype</td>
<td>46 mm.</td>
<td>28 x 33 mm.</td>
<td>ca. 120</td>
</tr>
<tr>
<td>Paratype</td>
<td>27</td>
<td>20 x 30</td>
<td>ca. 100</td>
</tr>
<tr>
<td>Paratype</td>
<td>33</td>
<td>21</td>
<td>ca. 100</td>
</tr>
</tbody>
</table>

**Specimens.**—Holotype and 7 paratypes, Paleontological Research Institution.

**Occurrence.**—Ravine one kilometer west of Central Perseverance, Santa Clara Province (Dickerson).

**Remarks.**—The generic position of this new form is perplexing. The irregularly porous septa indicate a position in the Haplaraeidae, but the cornutiform shape of the corallum is not like that of either of the two solitary Haplaraeidae genera, *Haplaraea* Milaschewitsch and *Physoseries* Vaughan. Instead, it is more like that of *Epistrephophyllum* Milaschewitsch, a solitary calamophylliid, but the septa are much more porous than in any of the agaricid corals. The endothecal dissepiments are not so extensively developed as in *Physoseries* and the septa are more porous than in that genus. All the structures correspond to those of *Haplaraea* except for the form of the corallum, which is normally cylindrical with a broad basal attachment in *Haplaraea* and cornutiform and eventually free in the new species. It is doubtful whether this difference justifies generic separation from *Haplaraea*.

All the specimens are considerably worn, hence the presence or absence of an epitheca cannot be ascertained, nor can the beaded upper septal margins be seen. The septa are thinner than usual trabeculae, giving the appearance of the thick, compound trabeculae characteristic of the Haplaraeidae and related families. It is probable that the trabeculae are compound, but this uncertainty, together with the cornutiform corallum, makes the reference to *Haplaraea* tentative. The corall may prove to be nearer *Epistrephophyllum*.

**Family LEPTOPHYLLIDÆ**

**Genus LEPTOPHYLLIA** Reuss, 1854

*Leptophyllia sanchez-roigii*, n. sp.

**Description.**—Solitary, low, tubinate, fixed by a small spreading base. Corallite wall nonpithcate, synapticulothecal, nearly imperforate, externally costate with beaded costae corresponding to all septa. Calice with deep, elongate fossette and highly exert septa. Septa composed of small compound trabeculae, regularly porous especially internally and near the calice, those of higher cycles more so than those of the lower ones, united by simple synapticulae in the columellar and mural regions. Number of septa in holotype, about 192 (6 complete cycles); in paratype about 100 (5 complete cycles and part of sixth). Columella small elongate, deep in the fossette, papilllose. Dissepiments very feeble, observed only in the vicinity of the wall.

**Dimensions.**

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holotype</td>
<td>20 mm.</td>
<td>44 x 48 mm.</td>
</tr>
<tr>
<td>Paratype</td>
<td>21</td>
<td>33 x 37</td>
</tr>
</tbody>
</table>

**Specimens.**—Holotype and 2 paratypes, Paleontological Research Institution.

**Occurrence.**—Ravine one kilometer west of Central Perseverance, Santa Clara Province (Dickerson).

**Remarks.**—This species is readily distinguished from *L. agassizi* Vaughan from the Upper Cretaceous of Jamaica by its much larger size, different form, proportionally fewer and much thicker septa, and from *Trochoseris catadupensis* by the fewer but thicker septa. The columella is unusually well developed for this genus, whereas the synapticulae are relatively few.

**Family CYCLOLITIDÆ**

**Genus PARACYCLOSERIS** Wells, 1894

*Paracyclosoritis elizabethae* Wells, 1894

*Paracyclosoritis elizabethae* Wells, 1934, Proc. U. S. Nat. Mus., lxxxi, p. 86, pl. 3, figs. 5-10; pl. 5, figs. 1, 2.

**Specimens.**—Paleontological Research Institution.

Occurrence.—Cuba: ravine one kilometer west of Central Perseverancia, Santa Clara Province (3 specimens of *forma robustum*, 7 of *forma turbinatum*, and 25 of *forma typicum*) (Dickerson); near Esperanza, about 10 kilometers east of Madruga, Havana Province (3 specimens of *forma robustum*) (Weisbord).

Jamaica: Upper Cretaceous (Campanian) rudistid limestone near Catadupa (type locality).

Mexico: Upper Cretaceous (Cardeñas beds), San Luis Potosi.

Remarks.—Thirty-eight specimens referable to this species have been examined, 35 from the Santa Clara locality, and 3 from the Esperanza locality. Some of them show considerable individual variation from the two type specimens described by the writer from Jamaica in 1934, and now three growth-forms can be distinguished: *forma typicum*, *forma robustum*, and *forma turbinatum*. The typical discoidal specimens, 25 in number, all from Central Perseverancia, are all smaller than the Jamaican types, but show no other differences. The dimensions of a few follow:

<table>
<thead>
<tr>
<th>Jamaican type</th>
<th>Height</th>
<th>Calicular Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;</td>
<td>10 mm.</td>
<td>18.5 mm.</td>
</tr>
<tr>
<td>&quot;</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>&quot;</td>
<td>4</td>
<td>19</td>
</tr>
</tbody>
</table>

*Forma robustum.*—Distinguished by the cylindrical form with a broad, somewhat convex base (Plate 2, figs. 5c, 5d). This form was derived from typical individuals which continued upward growth after peripheral growth had slowed down or ceased. Six specimens of this form were found. The dimensions of 3 well-preserved ones follow:

<table>
<thead>
<tr>
<th>Santa Clara</th>
<th>Height</th>
<th>Basal Diameter</th>
<th>Calicular Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Havana</td>
<td>16 mm.</td>
<td>18 mm.</td>
<td>20 mm.</td>
</tr>
<tr>
<td>&quot;</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>&quot;</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

*Forma turbinatum.*—Seven specimens of this form, all from 2, fig. 5c), as compared with the discoidal to patellate typical form, expanding rapidly, but less so than in the latter, from a small basal attachment, the axis of growth being slightly curved.

Dimensions of three specimens:

<table>
<thead>
<tr>
<th>Height</th>
<th>Calicular Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm.</td>
<td>18 mm.</td>
</tr>
<tr>
<td>14</td>
<td>15 x 16.5</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

Family **PORIDÆ**

Genus **GONIOPORA** de Blainville, 1830

**Goniopora reussiana** (Duncan), 1865


**Goniopora reussiana** Wells, 1934, Proc. U. S. Nat. Mus. lxxi, p. 90, pl. 4, fig. 18; pl. 5, figs. 4, 5.

Specimens.—Paleontological Research Institution.

Occurrence.—Cuba: Ravine one kilometer west of Central Perseverancia, Santa Clara Province (3 specimens) (Dickerson); near Esperanza, about 10 kilometers east of Madruga, Havana Province (2 specimens) (Weisbord).

Jamaica: “Upper Clarendon District” (Duncan’s type); Upper Cretaceous limestone, Cambridge-Catatupa R.R. cut.

Remarks.—Five Cuban specimens of this species were examined, all having the septa and calicular structures of typical *G. reussiana*. Three are nodular in growth-form, one is massive-encrusting, and one is subcolumniform (figured). Typical *G. reussiana*, judging from the two or three known specimens from Jamaica, has a ramose corallum, and the Cuban specimens may represent a variety or growth-form. Until more specimens are at hand to show the amount of variation of growth-form within the species, and such variation is often very great in the poritid corals, they are left in that species.

Family **FAVIDÆ**

Genus **MONTASTREA** de Blainville, 1830

**Montastrea cubana**, n. sp.

Description.—Corallum plocoid, nodular or subhemispherical, up to 5 cm. in diameter with a height of 25 cm. Corallites cylindrical, averaging 6 mm. in diameter, calices projecting slightly, united by short, thin costæ, some of which may be confluent across
the intercorallite spaces which average 1.5 mm., and by thin, sub-
tabular exotheca. Corallite walls thin, septothecal. Septa thin, 
24 in number, arranged in three regular cycles, laterally sparsely 
spineose, probably dentate lightly on their upper margins. Those 
of the first two cycles are subsequal and extend about two-thirds 
the distance from the wall to the axis of the corallite where their 
inner edges may bend to one side and unite to form an irregular 
ring or tube above the level of the top of the columella. In many 
corallites this tubelike structure is absent and the first two cycles 
extend to the center where they unite to form a feeble columella. 
In some corallites the columella appears to be absent entirely. The 
12 septa of the third cycle are about one-half as long as those of 
the first two cycles. The endotheca is thin and cellular.

Specimens.—Holotype and 2 paratypes, Paleontological Re-
search Institution.

Occurrence.—Ravine one kilometer west of Central Perseve-
rancia, Santa Clara Province (Dickerson).

Remarks.—This species is distinguished by the lightness of all 
structures and by the frequent development of an “inner wall” 
from the septal extremities. This structure is formed by the 
bent inner ends of the septa and not by dissepiements as in the 
case of the aulos of rugose corals. In many corallites it is not 
present and the septa extend to the center of the corallite to form 
a columella. A suggestion of a similar condition can be found in 
some specimens of the living M. annularis.

The only species with which this need be compared is M. schin-
dewolfi Wells (erroneously made the type of a new genus, Pro-
diploastrea, by the writer, and now considered by him a synonym 
of Montastrea), from the Upper Cretaceous rudistid limestone of 
Jamaica. M. schindewolfi has the same light structures and 
growth-form, but the average size of the corallites is only 3.5 mm. 
and the number of septa frequently in excess of 24 (up to 32); 
the columella is feeble and straggly.

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Family CARYOPHYLLIDÆ

Genus TROCHOCYATHUS Milne Edwards and Haime, 1848

Trochocyathus sp. cf. T. mississippiensis Wells

xxviii, p. 216, pl. 14, figs. 22, 23.

Description.—Solitary, bowl-shaped, free, with circular calice. 
Septa in 4 complete cycles, uniting regularly, with pali apparently 
before all but the last cycle. Columella small, papillose. Ex-
terior of corallum unknown.

Dimensions.—

<table>
<thead>
<tr>
<th>Height</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mm.</td>
<td>9.0 mm.</td>
</tr>
<tr>
<td>2.5</td>
<td>7.0</td>
</tr>
<tr>
<td>2.5</td>
<td>7.0</td>
</tr>
<tr>
<td>2.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Specimens.—Paleontological Research Institution.

Occurrence.—Ravine one kilometer west of Central Perseve-
rancia Santa Clara Province (4 specimens) (Dickerson).

Remarks.—All the specimens are internal moulds, and positive 
identification is not possible, but the only species now known from 
America with which they can be compared is T. mississippiensis 
from the Exogyra ponderosa zone (Campanian) of Mississippi, 
referred to above. The only notable difference is that the Cuban 
specimens are much broader in proportion to their height, but 
this may be partially due to the difference in mode of preservation.
Explanation of Plate 1 (42).

Figure    Page
1. *Trochoseris catadupensis* Vaughan
   Matanzas Province: 1, 1a, calicular and lateral aspects, ×1; 1b, calicular aspect of another specimen, ×1; 1c, portion of calice of another specimen, ×2.

   Senta Clara Province: 2, lateral aspect of holotype, ×1; 2a, horizontal section of several septa, ×2.

   Senta Clara Province, holotype: 3, 3a, calicular and lateral aspects, ×1; 3b, horizontal section of septa midway between calice and base, ×2; 3c, polished section midway between calice and base, ×1.
EXPLANATION OF PLATE 2 (43)

Figure

1. Paracycloseris elizabethæ Wells
   - Forma typicum, Santa Clara Province: 1, 1a, calices of two specimens, ×1; 1b, horizontal thin section, ×2.4.
   - Forma robustum, Havana Province: 1e, 1d, lateral and basal aspects, ×1.
   - Forma turbinatum, Santa Clara Province: 1e, lateral aspect, ×1.

2. Goniopora russiana (Duncan)
   - Santa Clara Province: 2, lateral aspect of columniform corallum, ×1; 2a, transverse thin section (white is the corallite skeleton), ×6.

3. Montastrea cubana, n. sp.
   - Holotype, Santa Clara Province: 3, lateral aspect of corallum, ×1; 3a, horizontal section of three corallites, ×1.5.

4. Astroconia dickersoni, n. sp.
   - Holotype, Santa Clara Province: 4, cellular surface, ×1; 4a, calices, ×3.