

***Cordyloblastus giganteum* n.sp. from the Candas-Formation (Givetian)  
of the Cantabrian Mountains (Northern Spain) and stratigraphical remarks of  
*Cordyloblastus* in the Devonian of northern Spain**

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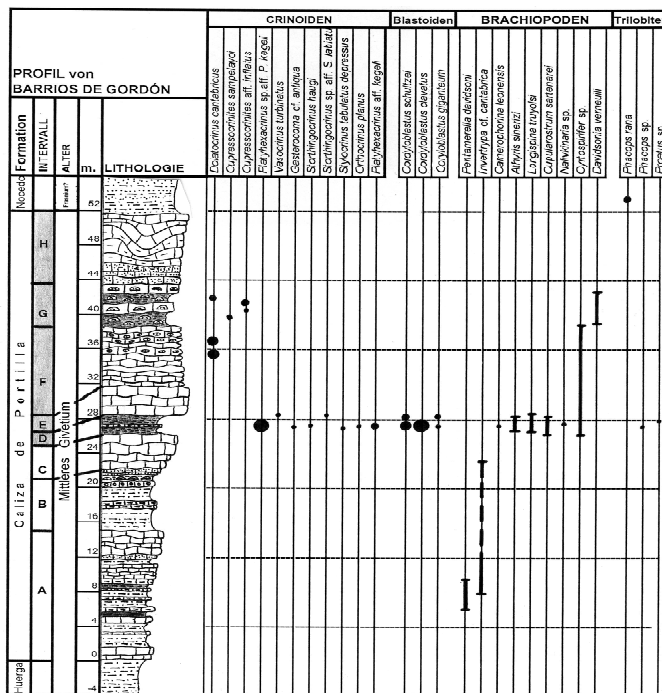
with 8 pages 23 text-figures and 1 plate

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**1 Introduction and geological settings of the Candas-Formation near Pola de Gordon (by Fernando Gómez LANDETA after HAUSER & LANDETA, 2007:19-21)**

The section presented in text-figure 1 is located roughly 500 m. at the south of the village of Barrios de Gordón, along the track to the “Puerto de Alba” (Alba pass), near the creek of “Los Barrios”. The outcrop is a (relative) small East – West hill, formed by the limestones of Portilla Formation, more resistant to erosion than the shale-sandstone formations at its both sides.

**Stratigraphy**



It can be obtained a good section of the formation in different points along the hill. The lower part rest conformably over the depth shales of Huergas formation, being lower 25 m. a shallowing upward succession with branching coral colonies living in a mud environment (A-B), and who culminates in a reefal Packestone (C). After a deepening of the basin (D), the rest of the section is a new regressive, shallowing upward succession (E-F), culminated by a small biostrome (G). The sequence finishes by some metres of recrystallized grainstones (H), in erosive contact with (G), this facies sowing spectacular examples of slumps can be interpreted as a channel who communicates the tidal lagoon to the North with the open basin to the South, cutting trough the small reefal barrier.

← text-figure 1: Stratigraphical column for the section of Barrios de Gordón.

**Paleontology**

The section is very fossiliferous, the brachiopods, corals and trilobites founded and its ranges of existence are shown in text-figure 1, notably fossiliferous

is the small mudstone interval of (D), all the fauna specially the brachiopods have a marked Givetian character. With respect to crinoids, only found in the upper half, a special section will be devoted to them at the end of this part.

**Age**

Tacking as reference the near Huergas de Gordón section, at 2,5 km. to the East over the same outcrop and whose palaeontology was studied by GARCIA-ALCALDE, et al.1979, and comparing the brachiopods founded in both sections, Barrios section can be aged as Middle Givetian. In fact in Huergas the conodonts allow to establish the lower and middle *varcus* sub-zones in all the exposed outcrop of the formation except its last metres already in *hermanni – cristatus* zone. Lithologically their UNIT A of GARCIA-ALCALDE, 1979, et al. can be correlated with terms (A-B-C-D), in Barrios, and their UNIT B, with terms (E-F-G), it is remarkable the difference in the thickness of biostromal upper term in both sections, 13 m in Huergas (terms 18b – 22), and merely 5 m. (G), in Barrios, difference caused by the erosion of the channel we had speak above.

**Palaeoecological reconstruction of the crinoid community in the upper half of Portilla Formation in Barrios de Gordón**

The upper half of the section of Barrios de Gordón is worth of describing in detail for it shows a good example of a crinoidal community in the shelf of Devonian sea of the Cantabrian. Its bathymetry and the facies succession (reference in text-fig. 2), can be approximated as follows:

- Member **D**. Muds indicating maximum relative depth and the more seaward side of sediments.
- Members **E-F**. Packstones, with isolated coralline and brachiopod elements, silicified fauna, absence of slope breccias of fore reef denoting small slope. Open sea.
- Member **G**. Biostromal edifice, (as stated eroded at the top, must had be more potent than now), mudstone intercalated point to protected back areas.

From the detailed work of RAVEN, 1983, in the sedimentology of Portilla Formation, we know that the land ward side of this prograding succession is at the North, towards the internal part of the “Asturian knee”.



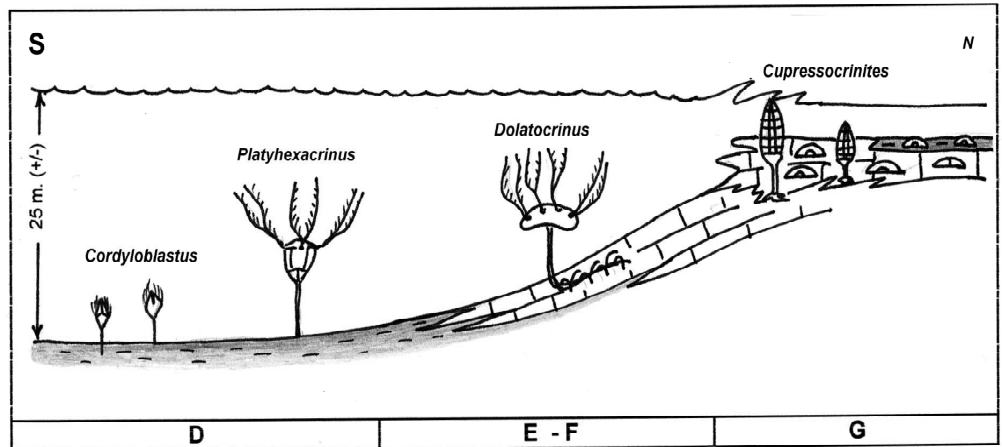
We can reconstruct with a certain degree of security the depth of the sequence. Supposed a depth of 5 metres or so for the top of the coral biostrome and a 20% degree of compaction for the whole sequence, the depth for facies D was more or less, 25 metres. With respect to the degree of autoctonism of the crinoid fauna:

Member **D**. Presence of complete calyces, long segments of stems, brachiopods with both valves, ramose bryozoans, comensal *Platyceras*, all denoting almost in situ preservation.

Members **E-F**. In the same surfaces of strata lay both *Dolatocrinus* calyces and its roots this last elongated in parallel to the surface with carry at both sides, the autoctonous preservation is clear.

Member **G**. The complete calyces and stems of *Cupressocrinites* and the abundance of cemented holdfast in the corals point in the same direction. All this set of elements have been combined in text-figure 2, who is (we believe), self explaining.

→ text-figure 2: Paleoecologic reconstruction of the crinoid community upper part of Portilla Formation near Barrios de Gordón.



**Kurzfassung:** Aus der Portilla Formation (Givetium) des Kantabrischen Gebirges (Provinz León) wir ein neuer Vertreter des Taxon *Cordyloblastus* (*Cordyloblastus giganteum*) beschrieben. Die Arten *Cordyloblastus schultzei*, *Cordyloblastus wachsmuthi*, *Cordyloblastus alejensis* und *Cordyloblastus angulatus* sind im kantabrischen Devon auf die Santa Lucía Formation (Unteres Mittel-Devon) beschränkt, während *Cordyloblastus malladai* und *Cordyloblastus giganteum* bisher nur aus der Portilla Formation (Oberes Mittel-Devon) vorliegen.

**Abstract:** A new species of the fossil blastoid genus *Cordyloblastus* (*Cordyloblastus giganteum*) from the Portilla Formation (Givetian) is described from the Cantabrian Mountains (Northern Spain). The species *Cordyloblastus schultzei*, *Cordyloblastus wachsmuthi*, *Cordyloblastus alejensis*, and *Cordyloblastus angulatus* was found in the Cantabrian Devonian only in the Santa Lucía Formation (Lower Middle Devonian); *Cordyloblastus malladai* and *Cordyloblastus giganteum* are restricted species of the Portilla Formation (Upper Middle Devonian).

**Resumen:** Se describe un nuevo blastoideo del género *Cordyloblastus* (*C. giganteum*), de la Formación Portilla (Givetiense), de las montañas cantábricas. Las especies *Cordyloblastus schultzei*, *Cordyloblastus wachsmuthi*, *Cordyloblastus alejensis* y *Cordyloblastus angulatus*, se encuentran solamente en la Formación Santa Lucía (Devónico medio, inferior), *Cordyloblastus malladai* y *Cordyloblastus giganteum*, son especies acantonadas en la Formación Portilla, (Devónico medio, superior).

**Schlüsselwörter:** Blastoideen, *Cordyloblastus*, Systematik, Mitteldevon, Kantabrisches Gebirge, Nordspanien.

**Key-Words:** Blastoids, *Cordyloblastus*, systematics, Middle Devonian, Cantabrian Mountains, Northern Spain.

### 3 Systematics (by Joachim HAUSER)

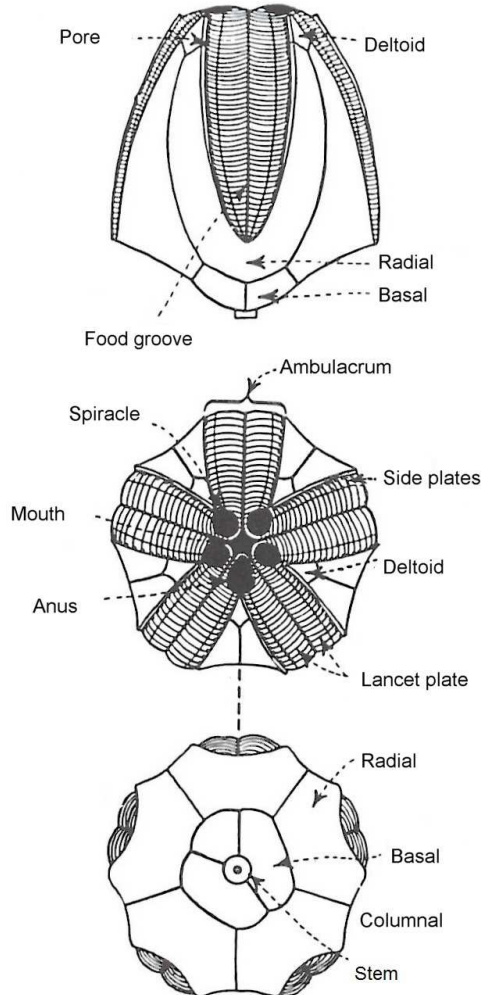
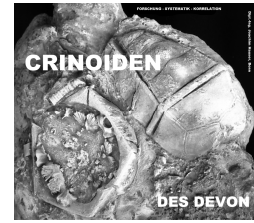
A good explanation of the morphology of the blastoids in general are giving by CLINE in SHIMER & SHROCK, 1994:133:

“Blastoids resemble crinoids in having an ovoidal calyce affixed at the base to a short jointed column, from the centrally located mouth, on the upper surface, are five petaloid ambulacral areas. Rarely preserved but present in life were rows of jointed appendages (pinnules) which bordered and concealed the ambulacral, so that in appearance blastoids were not unlike a brush. Normally a stem was present but it is rarely preserved.

The calyce is typically composed of 13 principal plates, firmly knit, and arranged in three cycles; three basals, five radials, and five deltoids. The relative proportions of the three circlets of plates vary with the genus, but the deltoids are normally the smallest, the radials the largest.

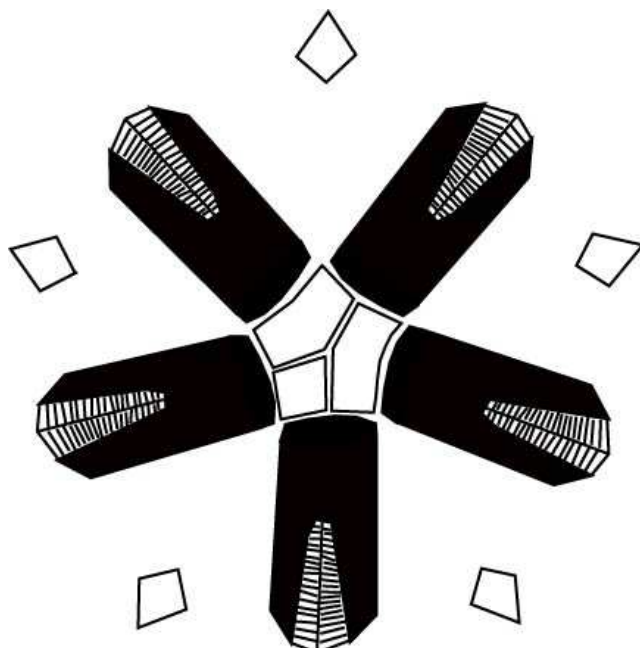
Two basals are pentagonal, the third (azygous basal) is smaller and quadrate and invariably directed toward the right antero-interambulacrum. Resting upon the basal and alternating in position with them are the radials. The upper margin of each radial is notched by a V-shaped sinus which receives the aboral end of an ambulacrum. That part of the radial below the sinus is the body, that part above the sinus constitutes the limbs. Succeeding and alternating in position with the radials are the deltoids, so named because in many species the exposed portion is triangular. The junction of the deltoids and radials is an

adorally or aborally sloping surface whose external expression is the slightly V-shaped radio-deltoid suture. In some genera the deltoids overlap the bevelled upper edges of the radial limbs, in others the radials overlap a considerable portion of the deltoid.”



↑ text-figures 3-4: Morphology of blastoids after draws by SHIMER & SHROCK, 1994: plate 50, figs. 27-29

**Classe** Blastoidea SAY, 1825  
**Order** Spiraculata JAEKEL, 1921  
**Family** Pentremitidae D'ORBIGNY, 1851  
**Genus** *Cordyloblastus* FAY, 1961



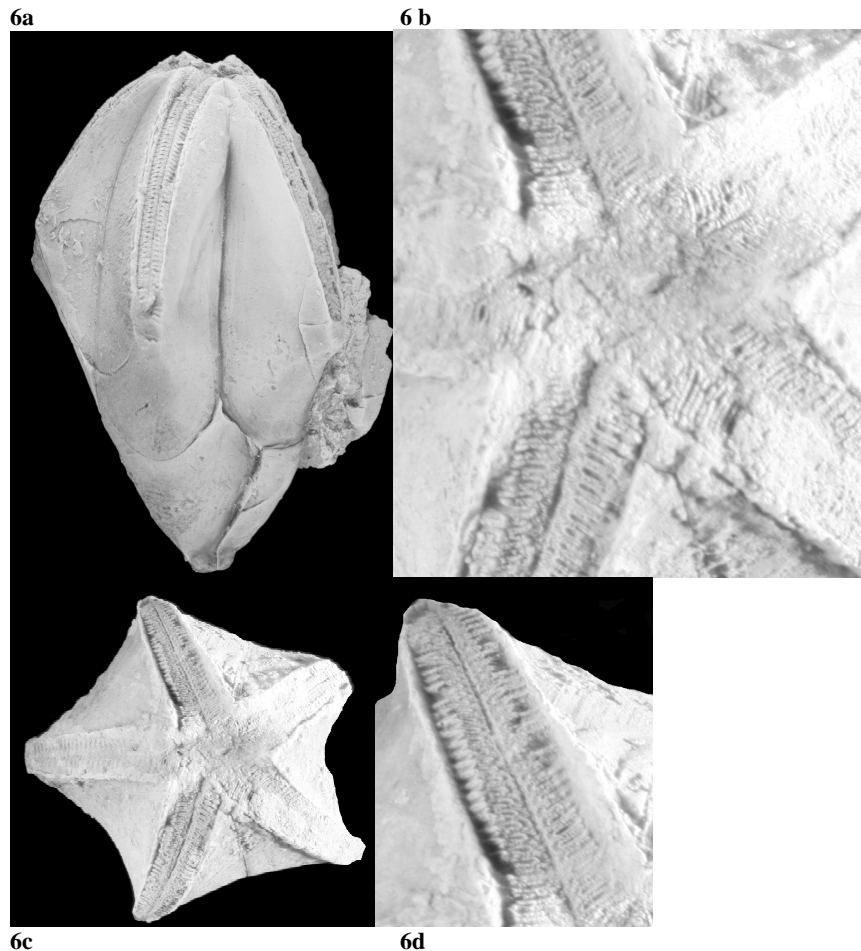
←text-figure 5: Plate-diagram of *Cordyloblastus* (black = radials) after a draw of SHIMER & SHROCK, 1994: plate 50, fig. 30

**Stratigraphical range** This species was only found in the upper part of the Portilla Formation which is Givetian age.

**Type-species:** *Pentremites acutangulus* SCHULTZE, 1866

*Cordyloblastus giganteum* n.sp.  
 Text-Figures 6a-6d  
 v 2007 *Cordyloblastus* sp. HAUSER & LANDETA, S. 74, Taf. 1, fig. 10, 10a

**Holotyp:** The holotyp is stored in a private collection. Several co-types are stored in the collection of Joachim HAUSER, Bonn.



↑text-figures 6a-6d: *Cordyloblastus giganteum* (Holotyp); 6a = side-view of the holotyp; 6c = view of the mouth/anus section; 6b this section x 5 ; 6d = part of the ambulacrum with the fine biserially arranged lance-plates

**Derivatio nominis:** The new species is named after the giant dimensions in the adult-stage of this species.

**Locus typicus:** The locus-typicus is located roughly 500 m. at the south of the village of Barrios de Gordón, along the track to the “Puerto de Alba” (Alba pass), near the creek of “Los Barrios”.

**Stratum typicum:** Upper half of Portilla Formation, Givetian, Middle Devonian.

**Material:** The holotyp and three calyces in different stage of preservation in the collection of Joachim HAUSER.

**Diagnosis:** A long stretched, completely smooth dorsal-cup with long horse-feet-shaped protruding radialia (twice as high than the basalia) and narrowly stripe-shaped ambulacralia which are reduced distal only slightly.

**Diagnose:** Eine länglich gestreckte, vollständig glatte Dorsalkapsel mit erkerförmig hervorstehenden Radialia (doppelt so hoch wie die Basalia) und schmal streifenförmig ausgebildeten Ambulacral-Feldern, die sich distal nur unwesentlich verjüngen.

**Description:** The holotyp is a partially deformed dorsal-cup. The long horse-feet-shaped radialia are more than twice high than the basalia. The narrowly stripe-shaped ambulacral sections become rejuvenated distal only slightly. The lance sections are composed by fine biserially arranged plates. The oral and anus field is covered almost completely. The drop-shaped arm openings are indicated only shadowy. The whole cup surface is completely smooth.

**Beschreibung:** Bei dem Holotyp handelt es sich um eine im Bereich der Basis partiell verschobene Dorsalkapsel. Die erkerförmig hervorstehenden Radialia sind länglich gestreckt und mehr als doppelt so hoch wie die Basalia. Die schmal streifenförmig ausgebildeten Ambulacral-Felder verjüngen sich distal nur unwesentlich. Die Lanzetten-Tafeln sind sehr fein ausgebildet, eng gestaffelt und gleichmäßig biserial angeordnet. Bei einigen vorliegenden Exemplaren ist das Oral-/Anus-Feld fast vollständig überdeckt bzw. die tropfen-förmigen Armöffnungen sind nur schemenhaft angedeutet. Die gesamte Kelchoberfläche ist vollständig glatt.

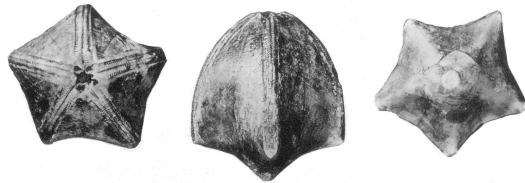
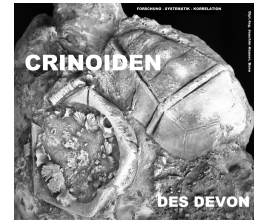
**Dimensions of the Holotyp:** Hight = 4 cm; diameter = 2,4 cm.



**Unterscheidungsmerkmale:** Zu den bisher beschriebenen Vertretern des Taxon *Cordyloblastus* bestehen zum Teil deutlich Unterschiede in Form und Ausprägung der Dorsalkapsel.

The relations basalia to radialia are more or less 1 to 1 and the ambulacralia rejuvenate clearly to the distal point of the calyce.

Bei *Cordyloblastus acutangulus* ist das Verhältnis der Höhe der Basalia zur Radialia fast 1 zu 1 und die Ambulacral-Felder verjüngen sich im Gegensatz zu *Cordyloblastus giganteum* distal deutlich.



← text-figures 7-9: Holotyp of *Cordyloblastus acutangulus* (SCHULTZE, 1866)

→ text-figures 10-11: *Cordyloblastus alejensis* after BREIMER, 1971:45, Fig. 8-9

The ambulacralia of *Cordyloblastus alejensis* differ that of *Cordyloblastus giganteum* by the funnel-shaped form and the short form of them.

*Cordyloblastus alejensis* hat im Gegensatz zu *Cordyloblastus giganteum* eine trichterförmige Gestalt und die Ambulacralia sind wesentlich kürzer.

*Cordyloblastus angulatus* differ to the calyce of *Cordyloblastus giganteum* by the more or less round form.

*Cordyloblastus angulatus* hat im Gegensatz zu *Cordyloblastus giganteum* runde Kelchform.

→ text-figure 12: *Cordyloblastus angulatus* (ETHERIDGE & CARPENTER, 1882) after BREIMER, 1971:51, Fig. 2

*Cordyloblastus malladai* shows stripes which follow the boarder of the plates. The surface of *Cordyloblastus giganteum* is totally smooth.

*Cordyloblastus malladai* zeigt im Gegensatz zu *Cordyloblastus giganteum* ein Muster aus randparallelen streifenförmigen Verzierungen.



← text-figure 13: *Cordyloblastus malladai* (ETHERIDGE & CARPENTER, 1883) after BREIMER, 1971:51, Fig. 3

*Cordyloblastus clavatus* distinguishes from *Cordyloblastus giganteum* by the length and form of the ambulacralia. Von *Cordyloblastus clavatus* unterscheidet sich *Cordyloblastus giganteum* durch die Länge und Ausbildung der Ambulacral-Felder

→ text-figures 14-15: Holotyp of *Cordyloblastus clavatus* (SCHULTZE, 1866)



← text-figure 16: Holotyp of *Cordyloblastus wachsmuthi* BREIMER, 1971 after BREIMER, 1971:51, fig. 5

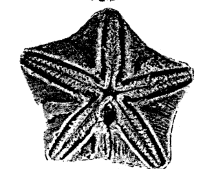
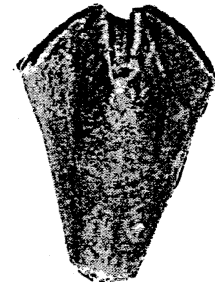
*Cordyloblastus wachsmuthi* differs to *Cordyloblastus giganteum* by the short calyce und the very low basalia.

*Cordyloblastus wachsmuthi* scheint sich in seiner Form stark *Cordyloblastus clavatus* anzunähern. Jedoch ist der Kelch breiter und die Basis wesentlich kürzer als bei dieser Form. Mit *Cordyloblastus giganteum* hat *Cordyloblastus wachsmuthi* keine Ähnlichkeiten bis auf die sehr lang ausgezogenen Ambulacralia.

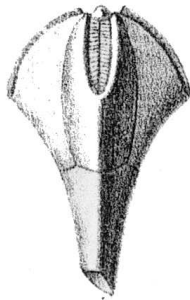
*Cordyloblastus gilbertsoni* is closed related to *Cordyloblastus acutangulus*. The calyce of *Cordyloblastus gilbertsoni* differs in the max. size in the adult stage of this species and dimensions to that of *Cordyloblastus giganteum*.



Deutliche verwandschaftliche Merkmale bestehen zwischen *Cordyloblastus gilbertsoni* und *Cordyloblastus acutangulus*. Von *Cordyloblastus giganteum* unterscheidet sich *Cordyloblastus gilbertsoni* deutlich durch die Kelchform und die maximale erreichbare Kelchgröße im adulten Stadium.



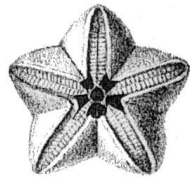
← text-figures 17-19: Paratyp of *Cordyloblastus gilbertsoni* (ETHERIDGE & CARPENTER, 1886)



← text-figures 20-21: Holotyp of *Cordyloblastus eifeliensis* (F.A. ROEMER, 1852-54)

*Cordyloblastus eifeliensis* unterscheidet sich von *Cordyloblastus giganteum* durch schlanke, lang ausgezogene Basis und die kurzen Ambulacralia. Hier nähert sich diese Art *Cordyloblastus malladai* an. Diese Form zeigt aber im Gegensatz zu *Cordyloblastus eifeliensis* feine randparallele Streifen auf der Kelchoberfläche.

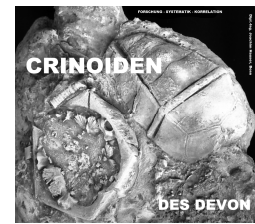
*Cordyloblastus eifeliensis* differs to *Cordyloblastus giganteum* by the slender but long base of the calyce and the short ambulacralia.



→ text-figure 22: *Cordyloblastus lusitanicus* (ETHERIDGE & CARPENTER, 1882)

*Cordyloblastus lusitanicus* unterscheidet sich von *Cordyloblastus giganteum* durch die wesentlich kürzeren Ambulacralia und die verlängerte Basis. In der Tafelzusammensetzung und -ausbildung nähert sich *Cordyloblastus lusitanicus* der von *Cordyloblastus eifeliensis* an.

*Cordyloblastus lusitanicus* differ to *Cordyloblastus giganteum* by the short ambulacralia und long and tender basalia. *Cordyloblastus lusitanicus* is close related to *Cordyloblastus eifeliensis*.



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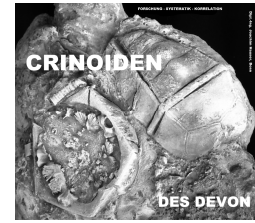
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**Description of Plate 1:**

*Cordyloblastus giganteum* n.sp. in several stages of growth

All species come from the locus-typicus located roughly 500 m. at the south of the village of Barrios de Gordón, along the track to the "Puerto de Alba" (Alba pass), near the creek of "Los Barrios" (Upper half of Portilla Formation, Givetian, Middle Devonian.)

Figure 1: Height = 4 cm; Diameter = 2,4 cm

Figure 2: Height = 2,5 cm; Diameter = 1,7 cm

Figure 3: Height = 2,4 cm; Diameter = 1,6 cm

Figure 4: Height = 2,2 cm; Diameter = 1,5 cm

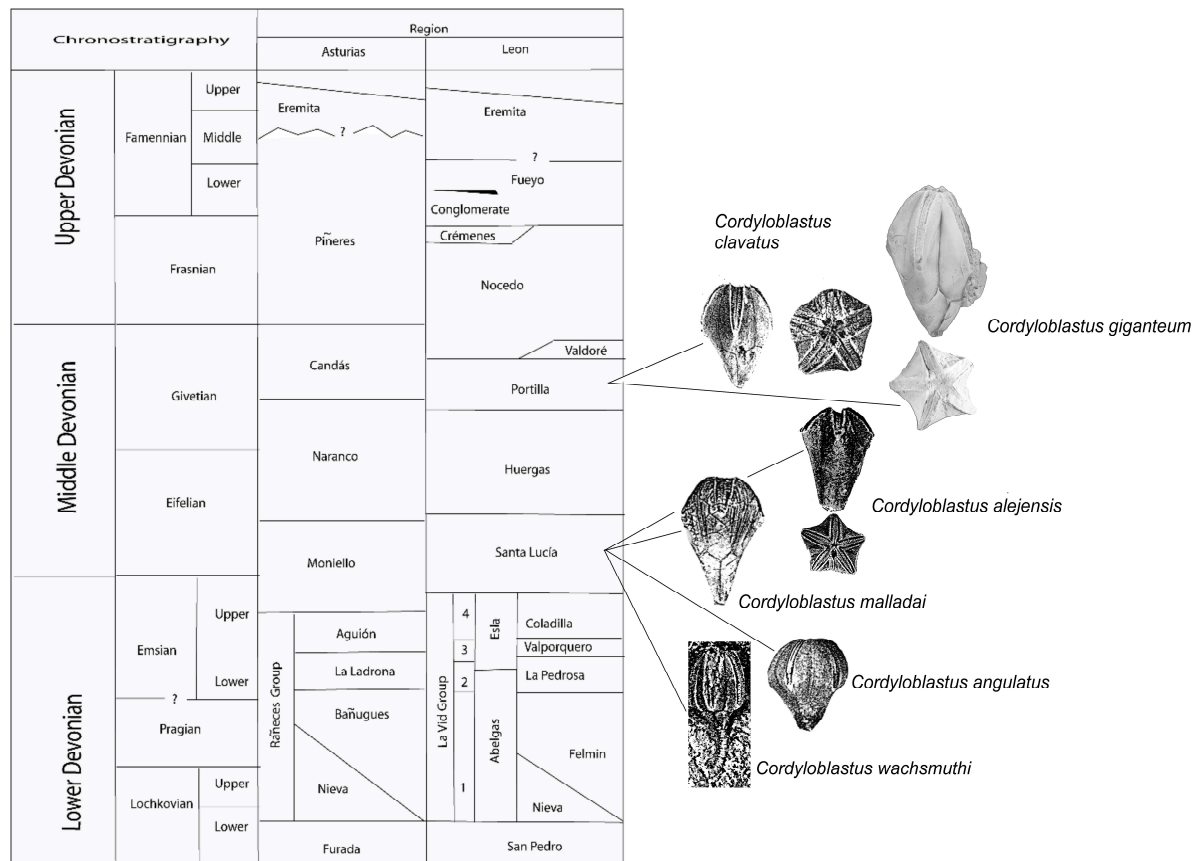
Figure 5: Height = 2 cm; Diameter = 1,1 cm

Figure 6: Height = 1,9 cm; Diameter = 1,2 cm

**Appendix:**

**↓ text-figure 23: Stratigraphische Übersicht über das Vorkommen von *Cordyloblastus* im spanischen Devon**

**Stratigraphical distribution of *Cordyloblastus* in the spanish Devonian**



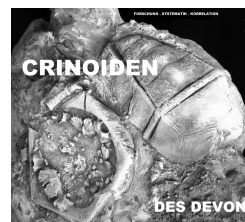


Plate 1  
Tafel 1

