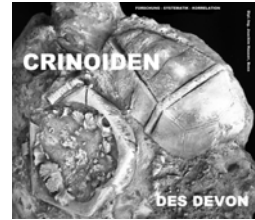


***Verneuilicrinus landetai* n.gen. et n.sp. (Crinoidea, Inadunata)
from the Aguión Formation (Upper Emsian)
of Xivares (Asturias, northern Spain)**

Dipl.-Ing. Joachim HAUSER, Von-Sandt-Street 95, Germany 53225 Bonn,
E-Mail: crinoiden-aus-dem-devon@arcor.de; Internet: www.devon-crinoiden.de
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1 Introduction (by Joachim Hauser)

The outcrop of Aguión Formation in the northern cliffs of the beach of Xibares (Cabo de Peñas, Asturias), is mentioned in HAUSER & LANDETA, 2007, when they described the new taxons *Gasterocoma xibarensis* and *Pithocrinus miluasi* HAUSER & LANDETA, 2008. Apart from the crinoid fauna, the red marls contain a diversity of blastoids, brachiopods, bryozoans, etc. During a field trip in 2012 the author found in a red-marl rock laying at feet of the cliff a calyx of a new crinoid in a very good condition. It belongs to a new genus (*Verneuilicrinus* n.gen.) which is described in this paper.



†**Figure 1:** Locus typicus (Xivares) of *Verneuilicrinus landetai*; the holotyp was found one of the red-marly rocks falling year by year from the cliff

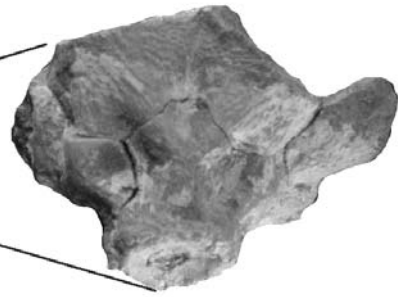
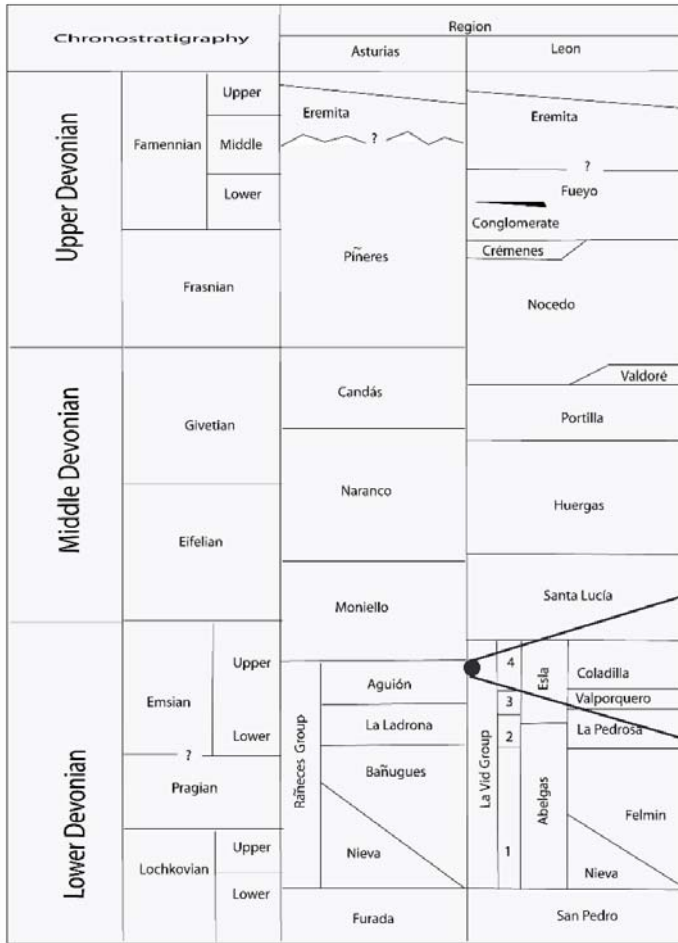
Kurzfassung: Von der asturischen Küste nahe der Ortschaft Xivares wird ein neuer Vertreter der Dendrocrinidae beschrieben: *Verneuilicrinus* n.gen. Es zeichnet sich gegenüber der bisher bekannten Dendrocrinidae durch das fehlende Radialanale RA aus. Dieses Taxon liegt mit den Vertretern *Verneuilicrinus landetai* n.sp. aus der Aguión Formation, Oberes Emsium, Unterdevon von Asturien und den Taxa *Verneuilicrinus thymos* (KAMMER, 2001) und *Verneuilicrinus ibericus* (KAMMER, 2001) aus der oberen La Vid Formation (Valporquero Set) des kantabrischen Gebirges (Provinz León) vor.

Abstract: A new representative of the Dendrocrinidae (*Verneuilicrinus* n.gen) is described from Xivares (Asturias, northern Spain). The significant difference to the known taxon (*Cosmocrinus-Barycrinus-Bothryocrinus-Situlacrinus*-lineage) is the single large X by missing the RA. Following species belong to the new taxon: *Verneuilicrinus landetai* n.sp. found in the upper part of the Aguión Formation, Upper Emsium, Lower Devonian (province Asturias) and the species *Verneuilicrinus thymos* (KAMMER, 2001) and *Verneuilicrinus ibericus* (KAMMER, 2001) from the upper part of La Vid Formation, Valporquero Set (Cantabrian Mountains, province León).

Resumen: Procedente del afloramiento de Xibares, (Asturias, Norte de España), se describe un nuevo Dendrocrinidae, (*Verneuilicrinus* n.gen). La diferencia más significativa del nuevo taxón sobre los similares, (*Cosmocrinus-Barycrinus-Bothryocrinus-Situlacrinus*), es la pérdida de la placa RX que es sustituida por una gran X. Las siguientes especies pertenecen al nuevo género: *Verneuilicrinus landetai* n.sp., de la parte superior de la Formación Aguión (Emsiense superior), así como *Verneuilicrinus thymos* (KAMMER, 2001), y *Verneuilicrinus ibericus* (KAMMER, 2001), de la Formación La Vid en Valporquero, (León, Norte de España).

Schlüsselwörter: Crinoiden, Inadunata, Dendrocrinidae, Systematik, Emsium, Unterdevon, Asturien, Nordspanien

Key-Words: Crinoids, Inadunata, Dendrocrinidae, systematics, Emsian, Lower Devonian, Asturias, Northern Spain



↑ Text-figure 2: Chronostratigraphy of the north-spanish Devonian (Asturias und León) after GARCIA-ALCALDE, J.L., CARLS, P., ALONSO, M.U.P., LÓPEZ, J.S., SOTO, F., TRUOLS-MASSONI, M. & VALENZUELA-RIOS, J.I. (2002): p. 69, fig. 6.2; the ● show the stratigraphical position of the locus typicus (Xivares)

2 **Geology** (by Fernando Gómez LANDETA)

One sketch of the geology of Xibares is presented in HAUSER & LANDETA, 2007:46-51, we repeat it here. The outcrop is more or less covered by debris falling year by year from the cliff (see text-fig. 1).

Member			
Moniello Form.	3	+/- 20 m.	massiv limestone with corals
		25 m.	sequence of grey limestone with grey marl
		10 m.	grey marl
	7 m.	grey limestone	
Aguión Form.	2	12 m.	red marl
		8 m.	red marl with shale of bryozoan and crinoids
	1	15 m.	red marl (more or less covert)

Fault with Permian-Konglomerate



↑ **Figure 3:** Stratigraphy of the locus typicus at Xivares near Gijón after HAUSER & LANDETA, 2007:46-51; the “crinoid-set” is marked yellow

The macro-fauna is very diverse (see fig. 3). Especially the brachiopods but also crinoid-stems are common in the red marls (e.g. HAUSER & LANDETA, 2009:23-28).

Macro-Fauna	
3	Crinoids <i>Orthocrinus</i> sp. Brachiopods <i>Plebejochonetes moniellensis</i> <i>Euryspirifer paradoxus</i> <i>Stropedonta</i> sp. <i>Orthocrinus</i> sp.
2	<i>Spinella subspeciosa</i>
1	Crinoids <i>Trybliocrinus flatheanus</i> (stems and roots) <i>Stammocrinus intrastigmatus</i> <i>Pithocrinus miluasi</i> <i>Verneuilicrinus landetai</i> <i>Storthingocrinus</i> aff. <i>S. haugi</i> <i>Pradocrinus</i> sp. Brachiopods <i>Anathyris ferronensis</i> <i>Pentremitidea pailleti</i> <i>Isotrypa</i> sp.

↑ **Figure 4:** Macro-Fauna of the locus typicus near the hamlet of Xivares after HAUSER & LANDETA, 2007:46-51

3 Systematics (by Joachim HAUSER)

- Classe Crinoidea J. S. MILLER, 1821
- Subclasse Inadunata WACHSMUTH & SPRINGER, 1885
- Order Disparida MOORE & LAUDON, 1943
- Suborder Dendrocrinina BATHER, 1899
- Superfamily Dendrocrinacea WACHSMUTH & SPRINGER, 1886
- Family Dendrocrinidae WACHSMUTH & SPRINGER, 1886
- Genus *Verneuilicrinus* n.gen.

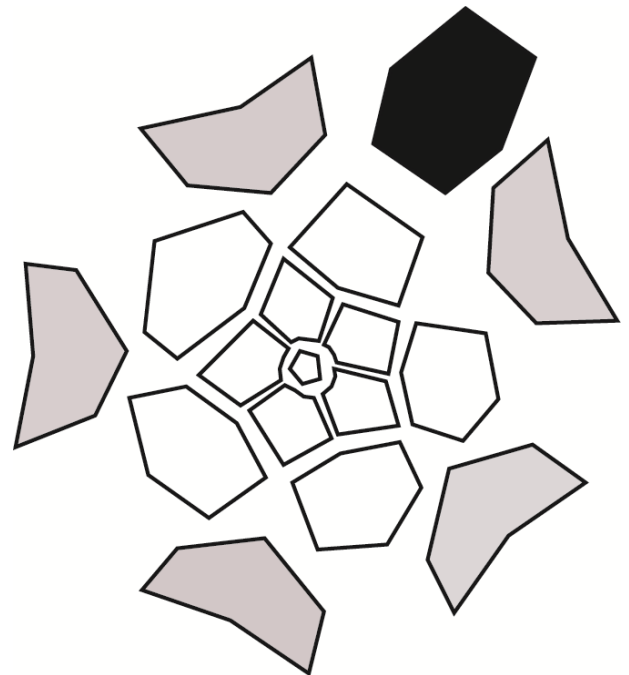
→ **Figure 5:** Plate diagram of *Verneuilicrinus* n.gen.; black = anal X, grey = radialia



Stratigraphical range Lower Devonian (Upper Emsian)

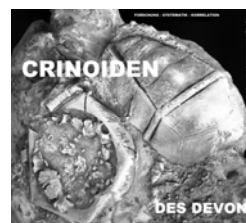
Related species:

- Verneuilicrinus thymos* (KAMMER, 2001)
- Verneuilicrinus ibericus* (KAMMER, 2001)
- Verneuilicrinus landetai* n.sp.



← **Figure 6:** *Verneuilicrinus ibericus* (KAMMER, 2001) after a photo of BREIMER, 1962: pl. 15, fig. 10; CD-view; X = anal; the stripled part of anal X is much higher than RR

KAMMER, 2001 re-described two new species on the basis of BREIMER’s crinoids stored in the Nationaal Natuurhistorisches Museum Naturalis, Leiden, Netherland. Both species belong clearly to the new genus by showing the single large anal X.

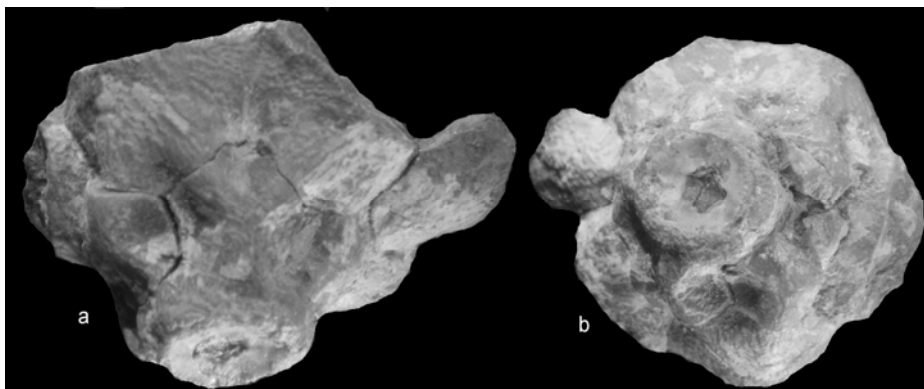


Derivatio nominis of the genus: After the great geologist and paleontologist Philippe Édouard Poulletier de VERNEUIL (*1805– †1873), one of the firsts investigators of the geology of Spain in general and of the Devonian in particular.

Diagnosis of the genus: In form and structure of the calyce a typical representative of the *Cosmocrinus*-lineage with only a single large and high (much higher than radials) anal X and without a radianal RA.

→ **Figur 7 a-b:** Holotyp of *Verneulicrinus landetai* n.sp.

KAMMER, 2001:385 adopts the few that the RA can be “overgrown by surrounding plates” and “the absence of a radianal is judged to be of no phylogenetic significance.” This is not the opinion of the author. The position and design of the RA is an important criteria in the morphology of the new taxon *Verneulicrinus* found restricted in the Lower Devonian layers of northern Spain.



Type-species: *Verneulicrinus landetai* n.sp.

Derivatio nominis: The new species is named after my friend, Fernando Gómez LANDETA, Oviedo, who discovered the outcrop for crinoids.

→ **Figure 8 [1a-1b]:** *Cosmocrinus schultzei* (HAARMANN, 1922) after draws of SCHMIDT, 1941, pl. 24, figs. 1a-1b

→ **Figure 9 [5a-5b]:** *Cosmocrinus consolidatus* (W.E. SCHMIDT, 1941) after draws of SCHMIDT, 1941, pl. 19, figs. 5a-5b

Verneulicrinus landetai n.sp.
Figure 7a-7b

Holotyp: The specimen would be stored in the collection of the Departamento de Paleontología de la Universidad de Oviedo (Asturias, España).

Locus typicus: North part of the beach of Xivares near the cliff Pozo de los Muiles 6 km. NW of Gijón, Asturias, northern Spain.

Stratum typicum: Aguión Formation, Upper Emsian, Lower Devonian.

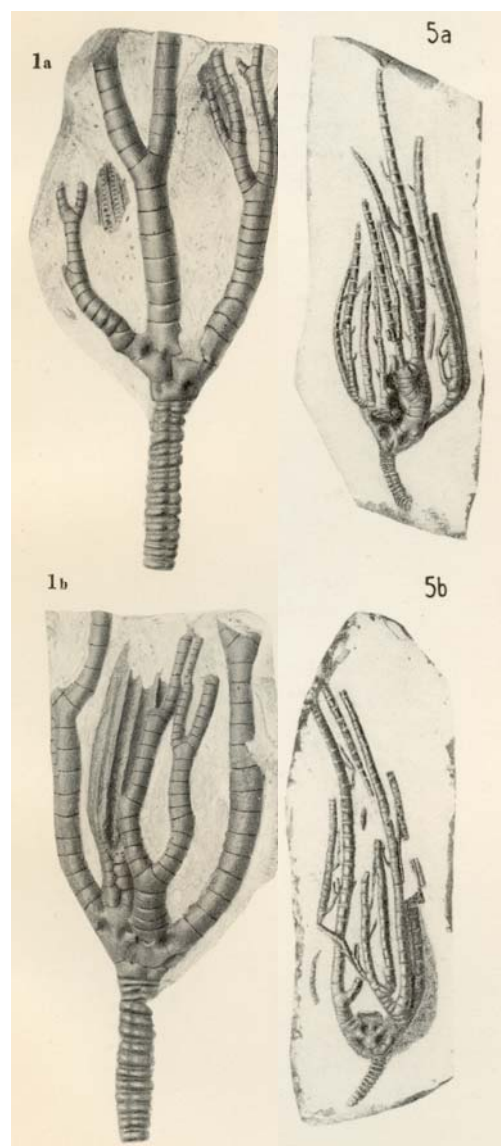
Material: Only the holotyp in text-fig.6a-b from the locus typicus.

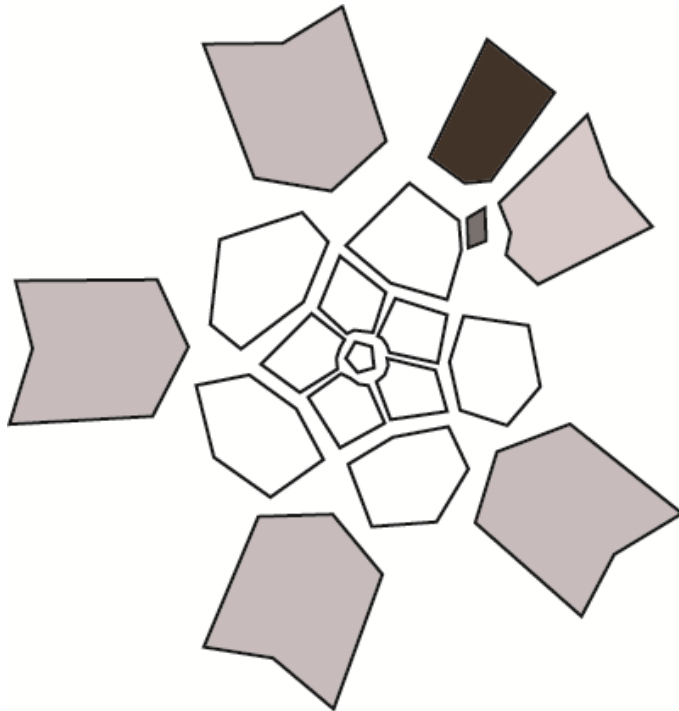
Diagnosis: Calyce low bowl-shaped cup, with low good visible infrabasals and large radials, radials approximately 45° from horizontal. Only large rhombic anal X (+/- double in size than radials) and without RA-plate.

Description: Cup low bowl-shaped, composed by convex basalia and radialia much wider than high. All plates of medium thickness included the small plates of the infrabasal. The basal-plates are clearly visible in side view. The plates form in cross view concentric edges running from the middle of the radial-facets to the center of the basals. Radial facets U-/"horse-shoe"-shaped without channel. Stem and lumen (in medium size) are pentagonal. CD-section with only one large +/- rhombic-formed anal X.

Dimensions: Diameter_{max.} = 1,5 cm, height: 1 cm.

Discussion: Most described species of the *Cosmocrinus*-lineage (discussion to *Costalocrinus* vs. *Cosmocrinus* see HAUSER & LANDETA, 2011:45) show a more or less four-sided RA. The most close related species to the new taxon is *Cosmocrinus dilatatus* from the Middle Devonian (Givetian) of the Eifel-hills (Rhenish Slate Mountains). This species differ from *V. landetai* at the extreme edges and the very low IB (see figs. 11-13).

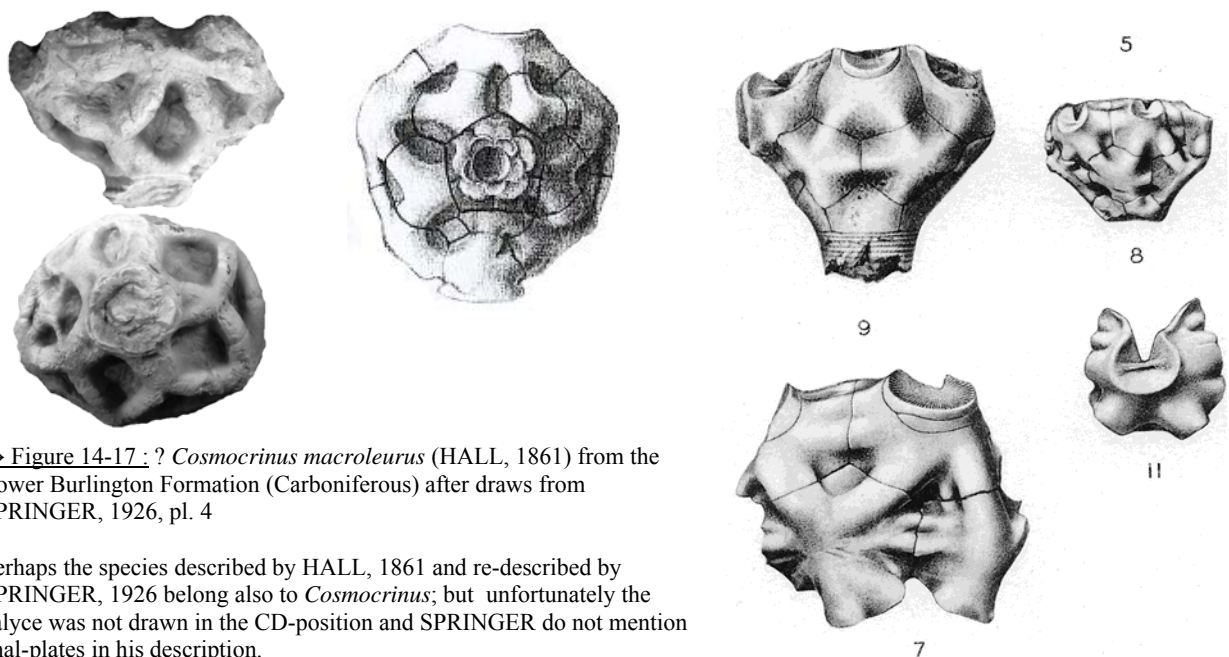




↑ **Figure 10:** Plate diagram of the genus *Cosmocrinus-Barycrinus-Bothryocrinus-Situlacrinus*-lineage; black = anal X, soft-grey = radialia, deep-grey = radialanal; the diagram show the anal X in combination with the four-sided radialanal in all this taxons

The species *C. schultzei* (HAARMANN, 1922) and *C. consolidates* (W.E. SCHMIDT, 1941) from the Lower Devonian of Germany belong clearly to the genus *Cosmocrinus* by showing the typical four-sided RA (see fig. 8 [1b]). The same calyce-characteristics are recognizable at holotyp of *Cosmocrinus dilatatus* (SCHULTZE, 1866).

↓ **Text-figures 11-13:** Holotyp of *Cosmocrinus dilatatus* original-draft of SCHULTZE, 1866: pl. 5, fig. 5b (aboral).

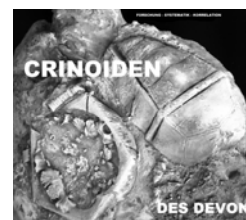


→ **Figure 14-17:** ? *Cosmocrinus macroleurus* (HALL, 1861) from the Lower Burlington Formation (Carboniferous) after draws from SPRINGER, 1926, pl. 4

Perhaps the species described by HALL, 1861 and re-described by SPRINGER, 1926 belong also to *Cosmocrinus*; but unfortunately the calyx was not drawn in the CD-position and SPRINGER do not mention anal-plates in his description.

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↑ **Text-Figur 18:** *Verneulicrinus ibericus* (KAMMER, 2001). Two crowns with stems and parts of the arms from Ciñera-section

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