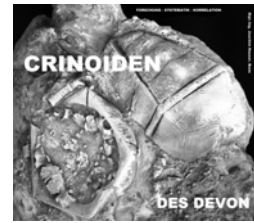
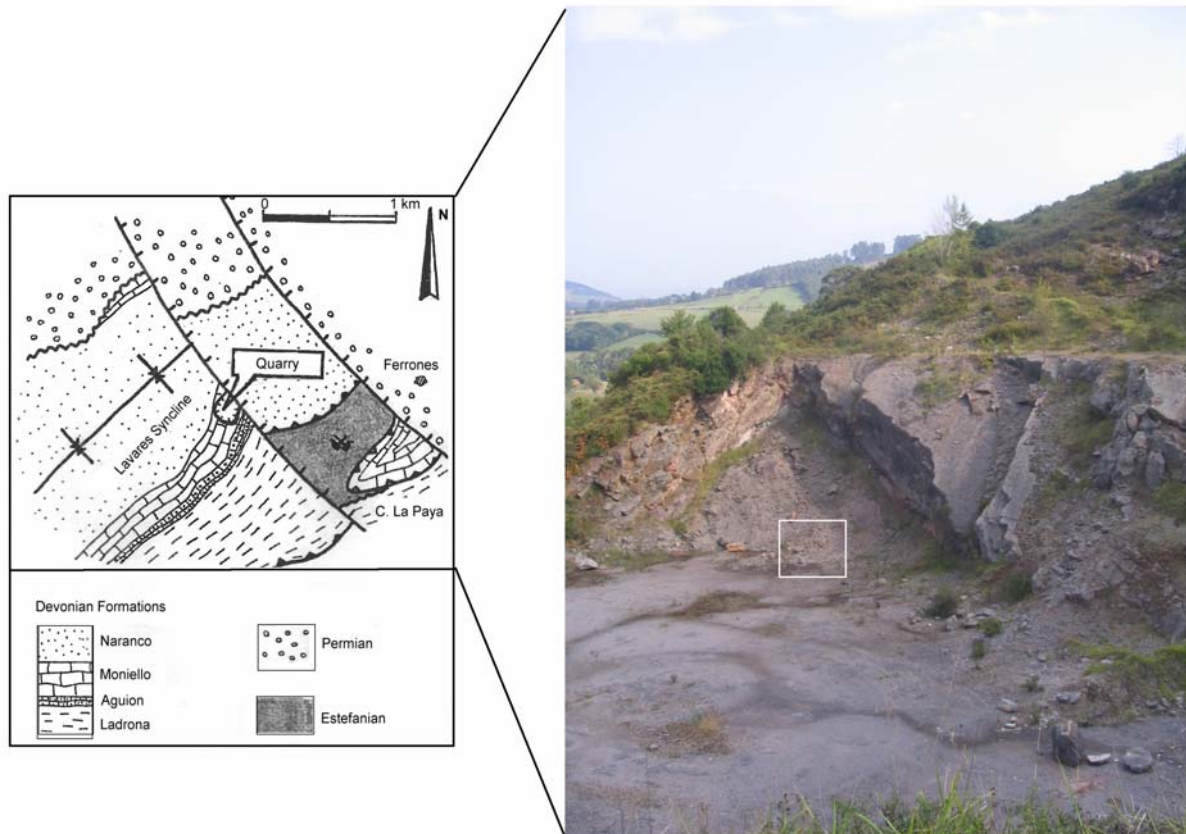


***Pithocrinus knorri* n.sp. (Crinoidea, Camerata)**
from the Lower member of the Moniello Formation (Upper Emsian)
of the famous outcrop-region Ferroñes (Asturias, Northern Spain)
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1 Introduction (by Fernando Gómez LANDETA)

The quarry of FUENCALIENTE, (known also as cantera DIASTA), is situated in the low agricultural hills of the central area of Asturias region, 13 km. north of the city of Oviedo, its capital. Next to it lays the locality of FERROÑES, famous because in it there are Devonian fossiliferous rocks over the exploited coal measures. The possibility of existence of Devonian coal here as well as in other points arised great polemic between the pioneers of Spain geology in the middle XIX siècle, so Ferroñes became a hot study point by the old “savants” with many descriptions of new brachiopods coming from there, (see ALCALDE et.al.1976). Despite the short distance (1,2 km.) to this classic locality we do not have notice of descriptions of fauna in the well exposed beds of the quarry, so it is a great pleasure to make known our findings there, specially the new crinoid. The quarrying activities now being forever suspended since it has status of protected area (one colony of ravens nesting there), makes the possibility of new findings small.

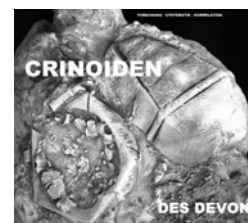


↑ **Figure 1 (left):** Geological sketch of the area surrounding the FUENCALIENTE quarry, and Ferroñes hamlet (central area of Asturias, northern Spain); (right): Floor of the abandoned FUENCALIENTE quarry locus typicus of *Pithocrinus knorri* n.sp.; the □ shows the exact position of finding the calyx. The cultivated field in the left background (C. La Paya), is the place of the first findings and descriptions of Devonian fauna in Asturias.

2 Geology

The quarry is emplaced in the shoulder of one of the NW-SE faults who limit the graben of S. Justo filled in a NE direction with horizontal Permo-Mesozoic beds. To the SW of this fault family outcrops the folded Paleozoic, [see Figur 1(left)]. In this last area, the Moniello Formation forms part of the SE branch of the LAVARES syncline, in which the lower (Formations: Ladróna, Aguion and Moniello), and the Middle Devonian (Formation: Naranco), with a general dip of 50° SE, conform a normal, non faulted succession.

Outcropping in the quarry lowest bank and constituting the floor of one slided block delimited by vertical joints, [see Figure 1 (right)], appears one isolated grey-black, argillaceous marl, 0,8-1 m. thick. It is at the feet of this bed that the lose calyx of *Pithocrinus knorri*, was found. There is a clear analogy between this bed and the marl levels present in the near section of Les Areñes (MENDEZ-BEDIA, 1976). There, they are situated 45-55 m. over the base (levels M-1156 to M-1158), of the lower

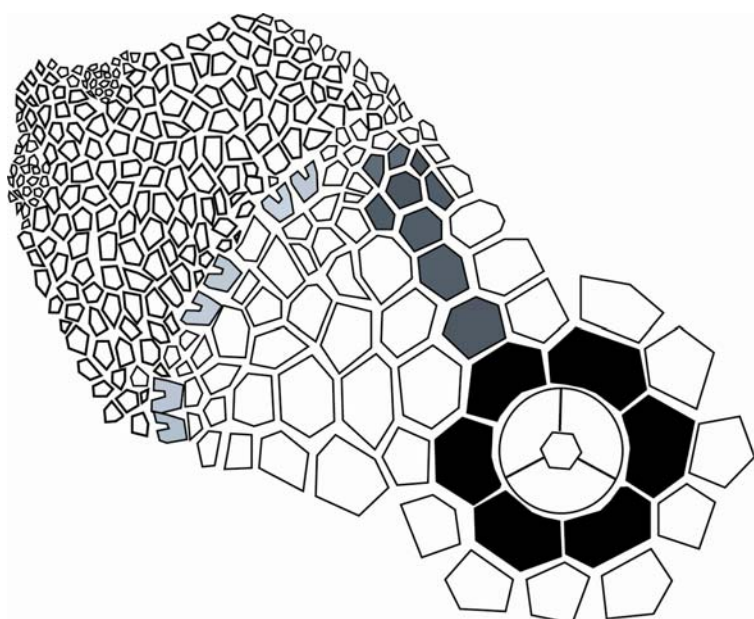


member which has a clear reefal character. The middle member composed of massive limestones with syngenetic dolomitization and birds-eyes, pointing to a lagonal sedimentation, is magnificent exposed over the marl in the quarry front with a minimum visible thickness of 80-100 m.

Kurzfassung: Von der Basis der Moniello Formation (Oberes Emsium, Unterdevon) wird aus der klassischen Fundregion rund um die Ortschaft Ferroñes (Asturien, Nordspanien) ein Vertreter der Pithocriniten (*Pithocrinus knorri*) beschrieben. *Pithocrinus knorri* ist ein wichtiges Bindeglied zwischen dem bisher jüngsten Vertreter der Pithocriniten *Pithocrinus miluasi* HAUSER, 2008 und den stratigraphisch älteren *Pithocrinus waliszewskii* (OEHLERT, 1896).

Abstract: A new representative of the Pithocriniten (*Pithocrinus knorri*) is described from the classical finding region around the small village Ferroñes (Asturias, northern Spain) of the lower member of the Moniello Formation (Upper Emsian, Lower Devonian). *Pithocrinus knorri* is an important connection between the representative latest known *Pithocrinus miluasi* HAUSER, 2008 and the stratigraphical older species *Pithocrinus waliszewskii* (OEHLERT, 1896).

Resumen: Se describe un nuevo representante del género *Pithocrinus* (*Pithocrinus knorri*), de la región de Ferroñes (Asturias, Norte de España), el cual fué encontrado en un intervalo margoso del miembro inferior de la Formación Moniello (Emsiense superior - Eifeliense inferior). *Pithocrinus knorri* establece una conexión entre la primera especie del género (*P. miluasi* HAUSER, 2008), perteneciente a la Formación Aguion y los últimos representantes que aparecen en el miembro superior de Moniello (*P. waliszewskii* OEHLERT, 1896, *P. ovatus*, *P. spinosus*, BREIMER, 1962).



Schlüsselwörter: *Pithocrinus*, Systematik, Unterdevon, Oberes Emsium, Nord-Spanien, Asturien, Ferroñes.

Key-Words: *Pithocrinus*, systematics, Lower Devonian, Upper Emsian, northern Spain, Asturias, Ferroñes.

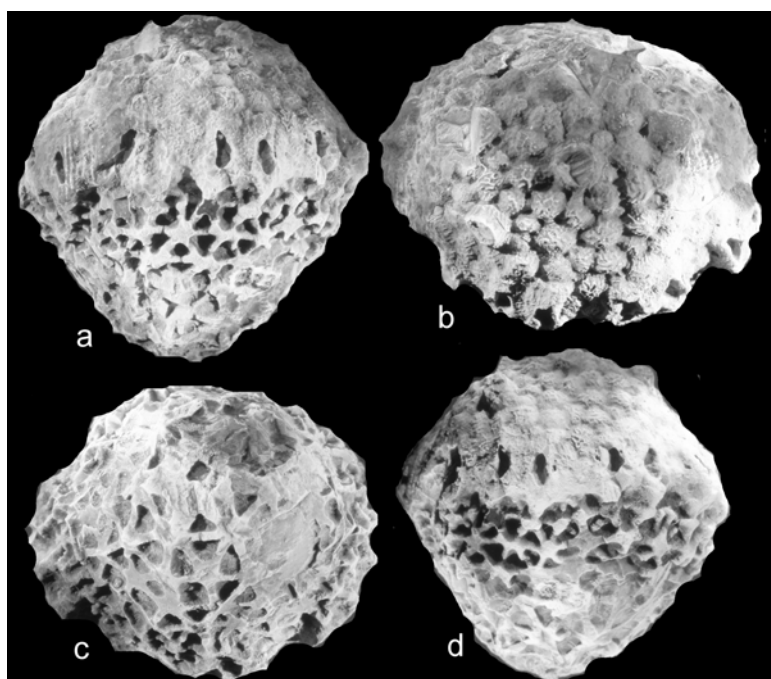
3 Systematics (by Joachim HAUSER)

Classe Crinoidea J. S. MILLER, 1821
Subclasse Camerata WACHSMUTH & SPRINGER, 1885

Order Monobathrida MOORE & LAUDON, 1943
Suborder Compsocrinina UBAGHS, 1978
Superfamily Periechocrinacea BRONN, 1849
Family Periechocrinidae BRONN, 1849
Genus *Pithocrinus* KIRK, 1945

Stratigraphical range: Upper Emsian (Lower Devonian) – Lower Givetian (Middle Devonian)

↑ **Figure 2:** Diagram of *Pithocrinus* after HAUSER, 2008:24, fig. 2; black = Radialia; dark-grey = anal-plates (CD section); bright-grey = base of the brachia.

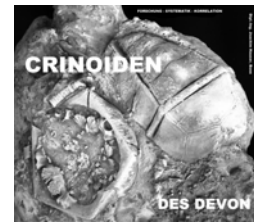


Geographical range: *Pithocrinus* was found in the Lower Givetian (Traverse Group) of the Michigan basin (Alkali Quarry), North-America, from northern Spain in the boarder Emsian / Eifelian, Santa Lucia Formation of the Cantabrian Mountains (Ciñera, Quejo, Grandoso), the Emsian (Aguión Formation) of the Asturian coastline (Arnao, Xivares) and of the Asturian region Ferroñes at the lower member of the Moniello Formation.

Type-species: *Pithocrinus cooperi* KIRK, 1945

← **Figur 3 a-d:** Holotyp of *Pithocrinus knorri* n. sp.; Fig. a = calyce AE-section ; Fig. b = tegmen, Fig. c: aboral, Fig. d = CD-section.

Derivatio nominis: The new species is dedicated to its discoverer, ERNESTO KNORR ALONSO, from El Valle, Asturias, who made the specimen available to us for study and posterior safe deposit.



Pithocrinus knorri n.sp.
Figure 3a-d

Holotyp: The specimen registered as DPO 127815 in the collection of the Departamento de Paleontología de la Universidad de Oviedo (Asturias, España).

Locus typicus: Abandoned FUENCALIENTE quarry near Ferroñes (Asturias, Northern Spain).

Stratum typicum: Lower member of the Moniello Formation, Upper Emsian, Lower Devonian.

Material: The holotyp only.

Diagnosis: A dorsal cup with the structure of *Pithocrinus*, characterized by a bowl-shaped calyx with cross ribs passing from the centerline of the plates and a elevated tegmen with spinose processes.

Description: The dorsal cup is bowl shaped, the height of tegmen being slightly more than one third of the height of the whole theca. The typical arrangement of the biserial radial arms as described first by OEHLERT, 1896 and emended by BREIMER, 1962:57-59, left no doubt of its attribution to the genera *Pithocrinus*. The calyx is ornamented by ribs who converge in the center of each plate and in the same number than the plate sides cross them finishing in the medium point of their length welding in continuity with the same process in the adjacent plates, probably in its point of convergence in the center-plate the ribs where crown by a spine. Although slightly crushed in their apical parts this ribs can be described as very robust and height (when complete of almost two millimetres). The base is weathered. The high tegmen is characterized by vermiculate five and six sided plates of one and half millimetres of medium dimension, it is depressed in the ambulacral areas in continuity with the inter-radial processes of the theca, next to the culmination some of the plates show spinose processes. The anal opening, although almost central, is slightly inclined in the direction of the anal series.

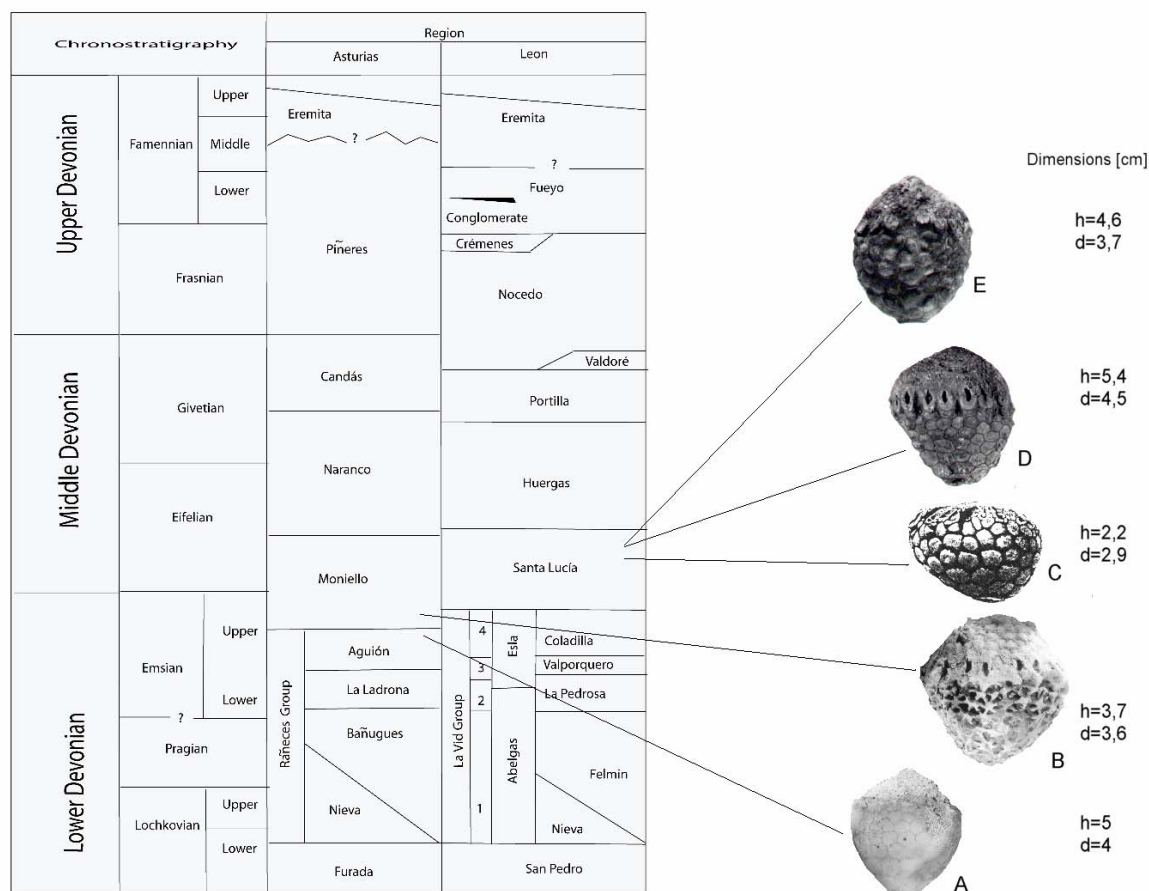
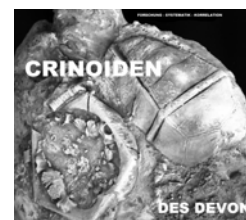
Beschreibung: Die Dorsalkapsel ohne Scheitel ist stark trichterförmig, das stark gewölbte Tegmen verleiht dem Kelch umgekehrt birnenförmige Gestalt. Die Tafelgrenzen im distalen Bereich des Kelches - von der Basis bis zu den Armansätzen - sind erhaltungsbedingt und durch dichte Überdeckung sternförmig ausgebildeter Leisten - nur vereinzelt sichtbar. Durch die erkennbaren morphologischen Merkmale der Crinoide, wie insbesondere die typische Anordnung der fünf biserialen Armansätze, steht eine Zuordnung zu den Pithocriniten nicht in Frage. Im Kontrast hierzu steht die Erhaltung des Scheitels, dessen Tafelstrukturen deutlich differenzierbar sind. Er besteht aus kleinen, unregelmäßigen, mit einem feinen Relief versehenen oder tuberkelförmig ausgebildeten fünf- und sechsseitigen Tafeln. Einige Tafeln verfügten wohl vormals über einen (?) stachelartigen Fortsatz. Die Enddarmöffnung befindet sich als fast kreisrunder Durchbruch fast am höchsten Punkt des konvex ballonförmig gewölbten Scheitels. Das dominierende Merkmal von *Pithocrinus knorri* sind die sehr stark ausgeprägten, dünnen tafelübergreifenden Leisten, die sich zu einem sternförmigen Muster anordnen. Besonders deutlich ausgeprägt sind auch die erkerförmig überhängenden Armansätze. Wegen der schlechten Erhaltung der Kelchbasis lassen sich keine morphologischen Aussagen treffen.

Relations: The species discrimination of the genera *Pithocrinus* is based mainly on the calyx-ornamentation and the plate organisation of the tegmen. With this in account the new species *P. knorri* can only be compared with *P. waliszewskii* (OEHLERT, 1896). Unfortunately our attempts to track the Paris specimen (stored in the École Nationale Supérieure des Mines) where unsuccessful so we base our assumptions in the original description of BREIMER who had access to the original OEHLERT material. BREIMER, 1962:57 wrote: "It is rather difficult to trace the real diagnostic pattern of this species since only one specimen is known. Unfortunately it is a weathered one. For the moment only those characters in which the holotyp distinctly differs from all other species can be mentioned. These are: its special ornamentation of **fine ribs passing from plate to plate**, accompanied by a fine vermiculate plate surface; its flattened posterior interradius; its **very low tegmen** without subspinose processes but with distinct interambulacral depression; its rather slender anal tube."

Pithocrinus knorri is also in some part of the calyce crushed, but in contrast to *P. waliszewskii* it has no fine ribs: star-shaped ribs dominating the surface of the calyce (also in the crushed parts). And the tegmen of *P. knorri* shown a convex form without distinct interambulacral depression. Further the form of the crinoid: *P. waliszewskii* is more or less spherically, *P. knorri* shows a bowl-shaped calyce. So it is very clear that *P. knorri* different in more than one character from *P. waliszewskii*.

From the stratigraphical point of few *P. knorri* is an important connection between the older *P. miluasi* and the stratigraphical younger one *P. waliszewskii* (see figure 4).

Dimensions: See figure 4.

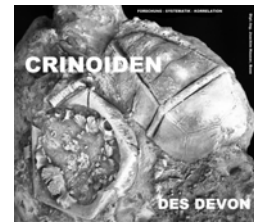


↑ Figure 4 : (left) Chronostratigraphy of the Spanish Devonian (Asturias and León) after GARCIA-ALCALDE, J.L., CARLS, P., ALONSO, M.U.P., LÓPEZ, J.S., SOTO, F., TRUOLS-MASSONI, M. & VALENZUELA-RIOS, J.I. (2002): p. 69, fig. 6.2.; (right) stratigraphical range of *Pithocrinus* in the Devonian of Northern Spain (Asturias und León)
Symbols of fig. 4: **A** = *Pithocrinus miluasi* HAUSER, 2008 (Aguión Formation, Upper Emsian); **B** = *Pithocrinus knorri* n.sp., Lower member of the Moniello Formation; **C** = *Pithocrinus waliszewskii* (OEHLERT, 1896); **D** = *Pithocrinus spinosus* (Santa Lucia Formation, boarder Emsian / Eifelian); **E** = *Pithocrinus ovatus* BREIMER, 1962 (Santa Lucia Formation, Upper Emsian).

Supplement-fauna (by Fernando Gómez LANDETA): The marl bed is full of fossil debris, conspicuous among them are corals and staggering quantities of the rhynchonellid *Iberirhynchia santalucensis*. Among the fauna we founded:

- Brachiopods: *Alatiformia* sp., *Fibulistrophia fibula*, *Iberirhynchia santalucensis*
- Corals: Favositids, Thamnophorids
- Crinoids: *Sphaerocrinus* sp., *Pithocrinus knorri* n.sp.
- Trilobites: *Malladaia* sp.

The age of this fauna is clearly Upper Emsian. More difficult given the low classification status achieved, is to attribute it to either the lower or the upper fossiliferous members of the Formation. So, *Alatiformia* has two species in the Cantabrian Devonian, one (*A. prejaekeli*), who reaches the lower member of Moniello, the other (*A. alatiformis*), cantoned in the upper member. *Fibulistrophia fibula* has been founded in Aguión Formation and with more doubts in the base of Moniello. *Iberirhynchia santalucensis*, spans the whole Moniello interval. The *Sphaerocrinus* founded (one hexagonal basal) has differences, being the number of growth crests clearly bigger, with the one founded in the upper member (*Sphaerocrinus wolfgangschmidti* HAUSER & LANDETA, 2007), it has also not resemblance in this character with the Eifel ones (*S. geometricus* GOLDFUSS, 1831). With respect to the trilobite *Malladaia* (one cephalon), we could not discriminate between *M. truyolsi* of the lower and *M. luciae* of the upper member. Never the less and despite this doubts the resemblance points more to the lower than to the upper member of Moniello attribution, who is reinforced given the general structure of the area as already explained.



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