

***Pandocrinites globosum* n.gen. et. n.sp. (Crinoidea, Inadunata)
from the Pando Formation (Westphalian C, Upper Carboniferous)
of the Prioro region of the Cantabrian Mountains
(Province León, Northern Spain)**

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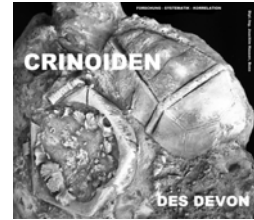
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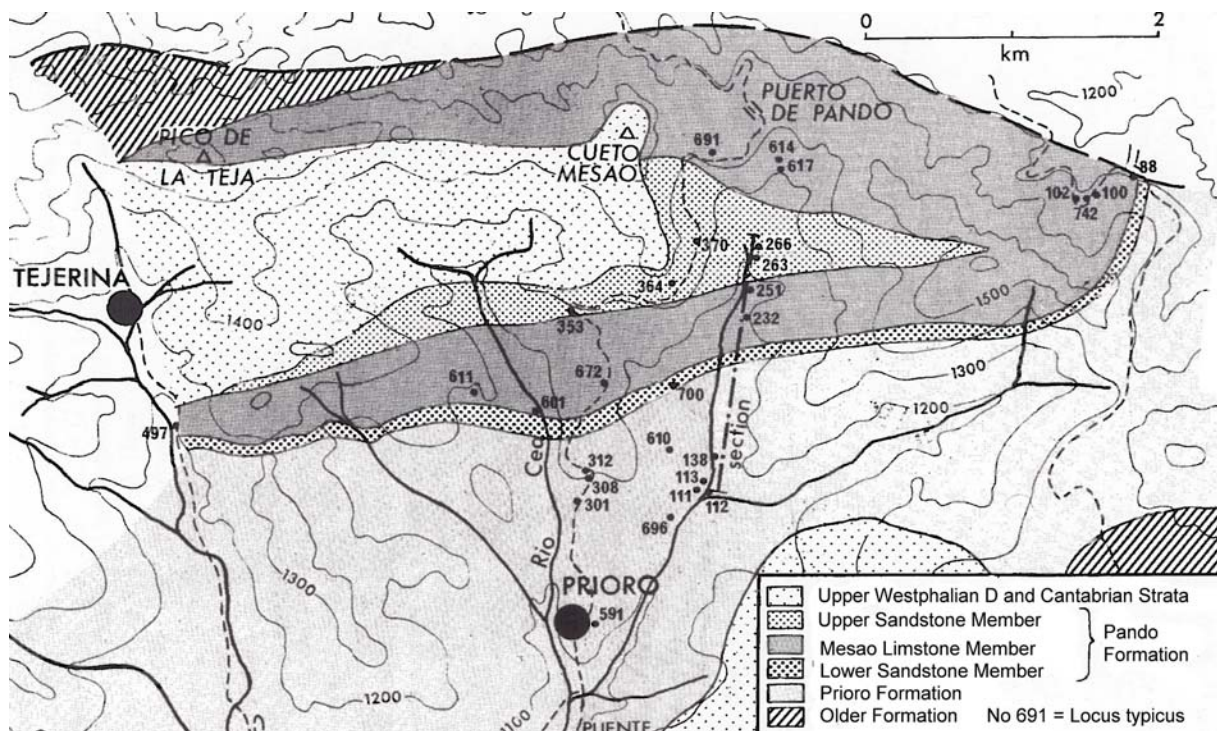
1 Introduction and Geology (by Fernando Gómez LANDETA)

The new crinoid was found in the NE corner of León province next to its junction with Palencia and Santander provinces in the outcrop of Puerto del Pando (Pando mountain pass), some 3 km. to the north of the hamlet of Prioro, slightly E of the scenic Esla valley. The section outcropping there was described in detail by VAN LOON, 1971, from whom we resume a brief description.

The structure of the area forms the core of a synclinal being the base of the sequence the Prioro Formation composed mainly by sandstones and silstones. It passes up to the Pando formation who has a lower sandy member followed by the Mesao member alternating limestones and mudstones, the former being encrinitic or algal in the different beds, the thickness of the member being approximately 200 m. The section finishes in the upper sandstone member of Pando formation with the grain and thickness of the beds increasing in the upper part. All this sequence is covered in discordance by the continental deposits of the Cantabrian (Lower Stephanian) (see text-fig. 2).

The content of fossils in the Mesao Member, corals, brachiopods, pelecipods, gasteropods, trilobites, cephalopods, specially in its mudstones is remarkable, lists and descriptions of part of the fauna are in the aforementioned work. The age, dated by fusulinids is Westphalian C (Podolskian). Crinoids stems and rare thecae are also present, the specimen described on this paper appeared in one mudstone in the middle of the member. They were cited but not studied, as representants of Synericrinidae as well Actinocrinitidae or Amphoracrinidae, (BREIMER in VAN LOON, 1971:232).


The ambient of formation of the Mesao Member can be roughly approximated as prodeltaic passing to upper platform, this assessment based in the regressive delta frontal character of the member over it, the undulant stratification beds in some of the limestones indicating pendent instability, and the abundance of drifted wood remains coming from a delta plain not far away. The fauna appears in general as disarticulated but not eroded, even spines in brachiopods are conserved, it is not in situ but not much removed. It can be speculated that perhaps the crinoids lived over their proper remains, the encrinitic mounds, who probably offered better fixation substrate than the algal mounds.



↑Text-figure 1 show the geological settings in the Pando area after VAN LOON, 1971: 234, Text-fig. 2; the numbers mark some carboniferous outcrops, no. 691 = Locus typicus of *Pandocrinites globosum* n.gen et n.sp.

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Stratigraphical stages				Prioro Region	
Upper Carboniferous	Upper Silesium	Stephanian	Cantabrian	Tejerina Formation	
				Barranquito Formation	
				Ocejo Formation	
	Middle Silesium	Westphalian	D		
			Upper Sand Stone Member		
			Mesao Lime Stone Member		
			B	A	

↑Text-figure 2: Estratigraphical settings of the Prioro region after a chart of VAN LOON, 1971:238, text-fig. 3; right = holotype of *Pandocrinites globosum* n.gen. et n.sp.

2 Carboniferous crinoids in the Cantabrian Zone (Palaeozoic of North Spain)
 (by Fernando Gómez LANDETA)



Despite the ample outcrop, covering perhaps eighty percent of the surface of the zone, roughly half of it in marine facies, and the abundance of fossils, among them, brachiopods, pelecypods, gastropods, trilobites, corals, etc, the crinoids although much lesser abundant than the other groups add till now perhaps not merited all the attention they deserve.

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↑Text-figure 3: Locus typicus of *Pandocrinites* n.gen. The specimen was found in one of the loose blocks falling in winter 2014/15 in the roadside ditch

In fact the only work in the subject worth of it is BREIMER, 1963, who studied them in conjunction, but with much lesser material, with the Devonian ones. The rest of references are SIEVERTS-DORECK, 1951 and HERBIG, 1994, describing one new genera and one new species respectively, and old authors who in XIX and first half of XX siècle did descriptions with nomenclature perhaps in need of revision. To end this references we can mention the many geologists than in describing the carboniferous successions speak in broad terms of ossicles, stems, rests, etc.

Our bibliographic search, pretended not exhaustive, conduct to table 1 about what is described till now.

Kurzfassung: Aus der Pando Formation, Westfalium C, Upper-Karbon der Prioro Region, Kantabrisches Gebirge, Nordspanien wird ein neues inadunates Genus *Pandocrinites* n.gen. mit dem Typus *P. globosum* n.sp. beschrieben. Karbonische Crinoiden sind im Paläozoikum von Nordspanien im Gegensatz zu devonischen Vertretern selten und nur auf wenige Fundpunkte beschränkt. Das in dieser Arbeit beschriebene Taxon und die bisher bekannten karbonischen Crinoiden aus Nordspanien zeigen verwandtschaftliche Merkmale zur Crinoidenfauna von Nordamerika und Schottland.

Abstract: A new inadunate crinoid genus *Pandocrinites* n.gen. with the type-species *Pandocrinites globosum* n.sp. was found in the upper-carboniferous Pando Formation (Westfalium C) is described. The species, a more or less complete crown was found in the Pando region in the NE corner of León province (Northern Spain). This crinoid is one of the rare verified finding of a carboniferous crinoid in this area. The known carboniferous crinoids from the Paläozoic outcrops of northern Spain shown relations to the carboniferous crinoid-fauna of North America and Scotland.

Resumen: Se describe un Nuevo género de la familia inanudate. *Pandocrinites* n.gen, con *P. globosum*, como especie asignada, encontrado en el miembro medio (caliza de Mesao), de la Formacion Pando, del Westfalense C, del afloramiento de Puerto de Pando en el Noreste de León (España). Los crinoideos conocidos hasta ahora en el Carbonifero de la Zona Cantábrica, muestran afinidades con los de Norte America y Escocia.

Schlüsselwörter: Crinoidea, Inadunata, Ober-Karbon, Westfalium C, Nordspanien, Pando Region, Kantabrisches Gebirge, Provinz León

Key-Words: Crinoidea, Inadunata, Upper Carboniferous, Westphalian C, northern Spain, Pando Region, Cantabrian Mountains, León

3 Systematics (by Joachim HAUSER)

Classe Crinoidea J. S. MILLER, 1821
Subclasse Inadunata WACHSMUTH & SPRINGER, 1885
Order Cladida MOORE & LAUDON, 1943
Suborder Poteriocrinina JAEKEL, 1918
Superfamily Scytalocrinacea MOORE & LAUDON, 1943
Family Blothocrinidae MOORE & LAUDON, 1943
Genus *Pandocrinites* n.gen.

Diagnosis of the new genus: Dicyclic-cup medium tall bowl shaped and conical; basal-plates have more or less same height as the radialia; fixing-point of the arms at the radialia horse-shoe shaped, concave form medium deep; basalial and radialia are medium convex; infrabasal tall, well visible in the side view, CD-section with six-sided primanal X₁ and radial-anal RA in normal position. They form the socket of a conical anal-tube with three visible five-sided plates; surface smooth, calyce with deep plate borders; arms isotomous, with two visible branching; stem round with five-sided axial-channel.

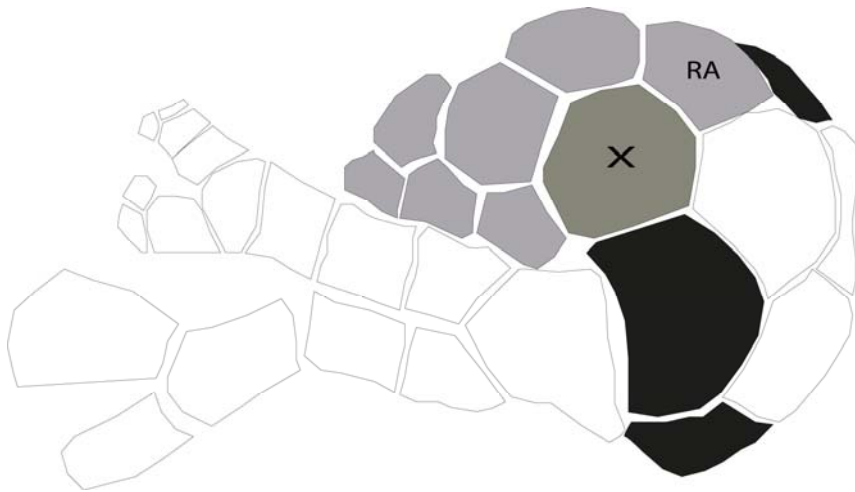
Stratigraphical range Upper Carboniferous (Westphalian C)

Derivatio nominis: The genus is named after the town near the outcrop. The new species is

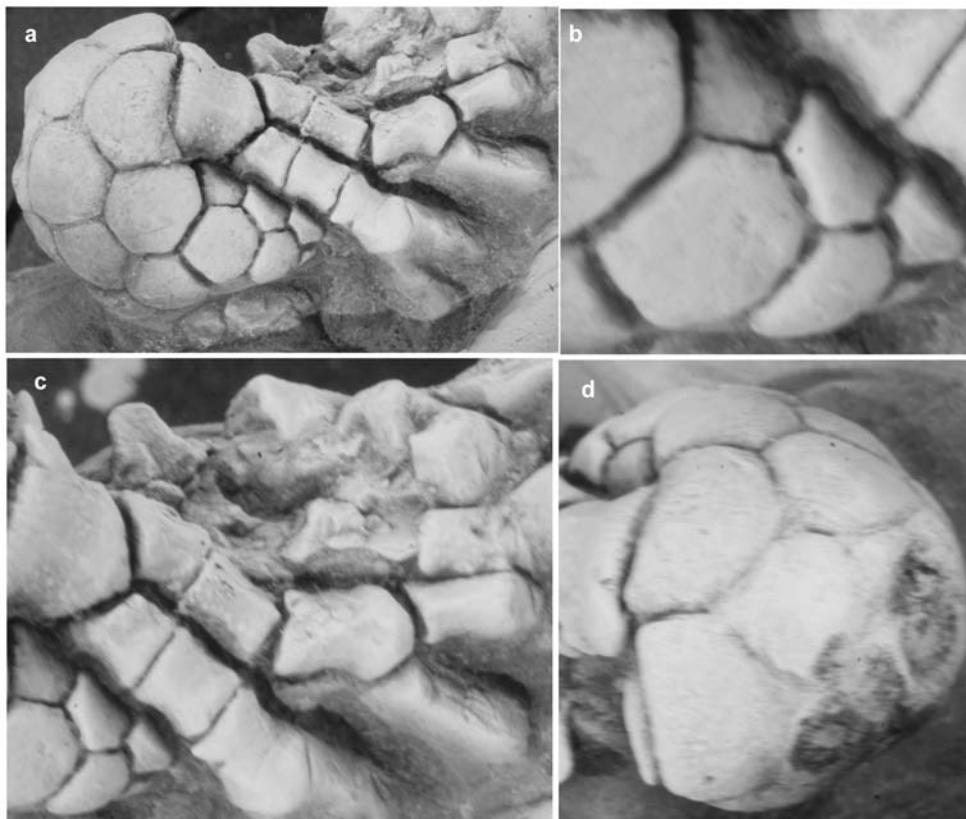
Type-species: *Pandocrinites globosum* n.sp.

↓Text-figure 4: Draft of the holotype of *Pandocrinites globosum* n.sp.; X₁ = Primanal, RA = Radialanal

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↓Text-figures 5 a-d: Holotype of *Pandocrinites globosum* n.sp.
Figure 5a: CD-section-view; Figure 5b: CD-section enlarged
Figure 5c: view of the arm-structure
Figure 5d: enlarged view of the calyce



Pandocrinites globosum n.sp.
Figures 5, 5a-d

Holotype: The holotype (text-figures 5, 5a-d) will be donated to the Department of Palaeontology of Oviedo University (Spain).

Derivation nominis: The species is named of the bowl-shaped form of the theca.

Locus typicus: Pando (Pando mountain pass), 3 km. to the north of the hamlet of Prioro (Cantabrian Mountains, Province León, northern Spain).

Stratum typicum: Pando Formation, Westphalian C, Upper Carboniferous.

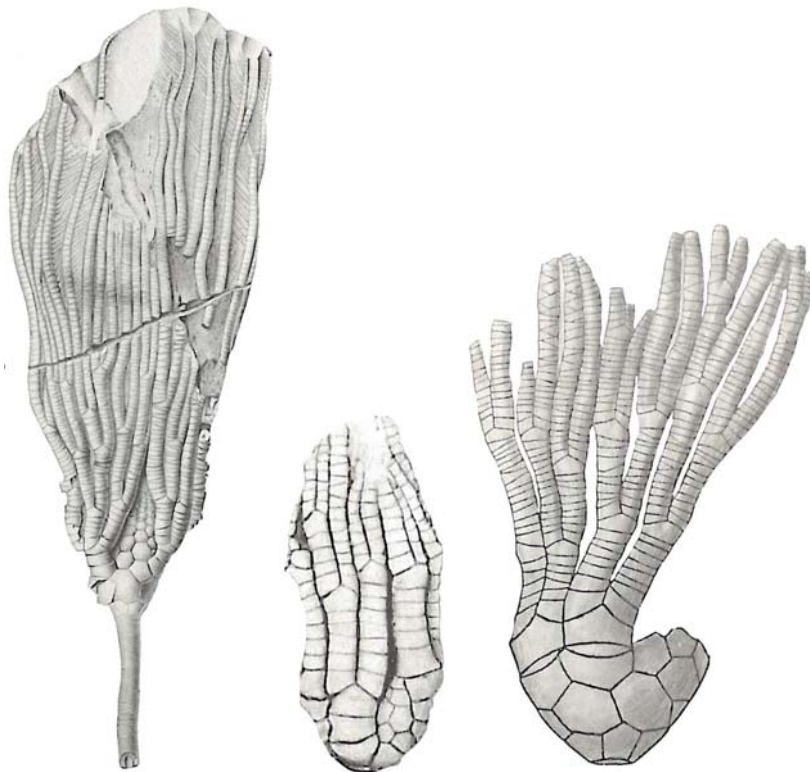
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Material: Only the holotype.

Diagnosis and description of *Pandocrinites globosum*: A more or less complete crown with two brachia and the base of anal-tube (proboscis) embedded in black-blue matrix. Dicyclic-cup medium tall bowl shaped and conical; basal-plates have more or less the same height as the radialia; fixing-point of the arms at the radialia horse-shoe shaped, concave form medium deep; basalial and radialial are medium convex; infrabasal tall, well visible in the side view, CD-section with six-sided primanal and radial-anal in normal position. They form the socket of a conical anal-tube with three visible five-sided plates; surface smooth, calyce with deep plate borders; arms isotomous, with two visible branching; stem round with five-sided axial-channel.

Relations: The next related crinoid-taxons are species from the Carboniferous of various outcrops of North-America and Scotland. Their morphological differences to the new genus are: *Blothocrinus jesupi* from the Mississippian of Iowa has a higher calyce (specially the IB) and the CD-section differs (Primanal X₁ bigger und Radialanal RA smaller) than that of the new taxon. *Stinocrinus granulatus* has more dominant arm structure and the proportion radialial to basalial differs to *Pandocrinites*. *Fifeocrinus tielensis* show a higher Infrabasis than that of *Pandocrinites globosum*.



↑Text-figures 6-8 from left to right: *Blothocrinus jesupi* (WHITFIELD, 1881), Lower Mississippian (Osagian), Burlington Limestone after MOORE et al, 1978:Treatise T 694, Fig. 2a; *Stinocrinus granulatus* (KIRK, 1941), Lower Mississippian (Osagian) after MOORE et al, 1978:T652, Fig. 4a; *Fifeocrinus tielensis* (WRIGHT, 1950), Lower Carboniferous (Visean) after MOORE et al, 1978: T650, Fig. 1

Dimensions: height of the calyce: 0,6 cm, height of the arms_{max.} 1 cm; external diameter of the cup: 1 cm.

Table 1: Carboniferous crinoids in the Cantabrian Zone (by Fernando Gómez LANDETA)

Genera / species	Author	Locality	Formation	Age	affinities
<i>Erisocrinus europaeus</i>	Ba	Sebarga (Asturias)	Sebarga	Stephanian A	-
<i>Poteriocrinus crassus</i>					-
<i>Mespilocrinus granulifer</i>					-
<i>Pimliocrinus</i> spec.	Br	Mudá-Herreruela (Palencia)	Cotorrasso	Westphalian D sup.	M
<i>Iberocrinus multibrachiatus</i>					-
<i>Cromyocrinus</i> cf.					R

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<i>simplex</i> <i>Pradelocrinus</i> sp.					NA
<i>Nunnacrinus</i> <i>stellaris</i> <i>Pimliocrinus</i> <i>latus</i> <i>Aorocrinus</i> spec. <i>Platycrinus</i> aff. <i>Pl. bollandensis</i>	Br	Rabanal de los Caballeros (Palencia)	?	Westphalian D	W E NA W
<i>Pandocrinites</i> <i>globosum</i> n.sp. et n. sp.	Ha & Lan	Puerto del Pando (León)	Pando	Westphalian C	-
<i>Pimliocrinus</i> spec. 1 & spec.2	Br	Pola de Lena (Asturias)	?	Westphalian	-
<i>Platycrinus gran-</i> <i>ulatus</i> ? <i>Mespilocrinus</i> <i>granifer</i> ? <i>Poteriocrinus</i> <i>crassus</i>	Ba	Las Agueras (Asturias)	San Emiliano	Westphalian A	- - -
<i>Cyathocrinites</i> ? <i>Rhodocrinus</i> (stems) <i>Zeacrinus</i> (stems)	A-R	Villabona (Asturias)	San Emiliano	Westphalian A	
<i>Baleaocrinus</i> <i>cantabricus</i>	He	(various Asturias- León)	Genicera	Upper Visean	Bal

Abreviatures: **Author.** Ba – BARROIS, 1882, Br – BREIMER, 1962, A-R – ALMELA-RIOS, He – HERBIG, 1994,
Ha – HAUSER (this paper)

Affinities: M – Morocco, R – Russia, NA – North America, E – England, W – World, Bal -Balearos

Following remarks can be added to this list:

Almost all specimens are described from one or two specimens, all of them isolated crowns with out of tegmen and more or less incomplete or eroded, some even are only stems, from that fact comes the open classifications that predominate in the list. The specimens of BARROIS are lost (BREIMER, 1962:172).

The described fauna is almost all of Westphalian (Moscovian), age. We completed or corrected some of the ages cited in the papers, specially the old ones, profiting of the modern knowledge of the geology of Cantabrian Zone.

The only one who tried to found relations of affinity with other faunas was BREIMER (from him the column in the table). He concludes that the sample is too small to obtain conclusions of value.

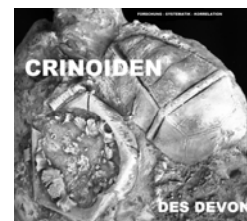
Supplement-fauna: The supplement fauna of the Westphalian C of the Pando region is described in detail by co-authors of VAN LOON, 1971:248ff.

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