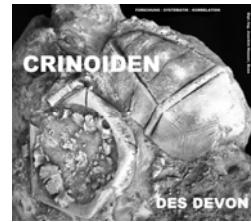


Oehlerticrinus seillouensis LE MENN, 1975, a subjective synonym of *Oehlerticrinus anguliferus* (WHIDBORNE, 1897) and first note of *Oehlerticrinus anguliferus* from the La Ladrona Formation (Lower Emsian) of Bañugues (Asturias, northern Spain)

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1 Introduction (by Joachim Hauser)

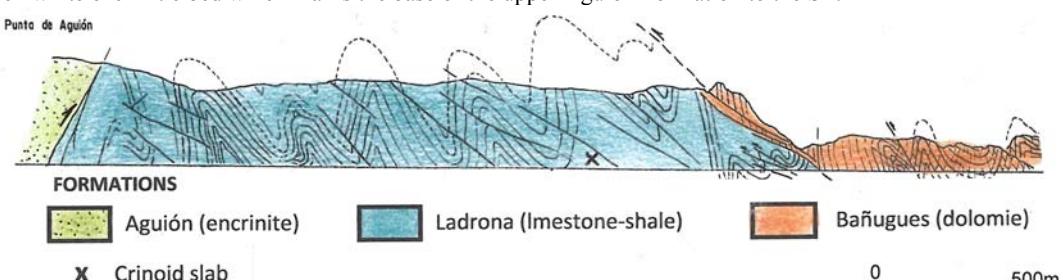
The wild and more or less accessible coast-sections 1 km. SE of the hamlet of Bañugues in the province Asturias is known since the paper by HAUSER, 2009 and HAUSER, 2010 for the occurrence of lower Devonian crinoids. Only a part of the described outcrop below is interesting for macro-fossils. But some of the loose slabs on the beach falling year by year from the cliff shown a nice preservation of crinoids (stem, calyce, and arms) manly the taxa. *Bactrocrinites*, *Oehlerticrinus*, and *Zenkericrinus*. The following paper deals with the taxon *Oehlerticrinus* which is known from several continents (Europe, Africa, and Australia).



↑ Text-figure 1: Photo of sea cliff in the coastal E face of Cabo Peñas (Asturias, Spain); the □ show the outcrop of *Oehlerticrinus anguliferus* one of the loose slabs

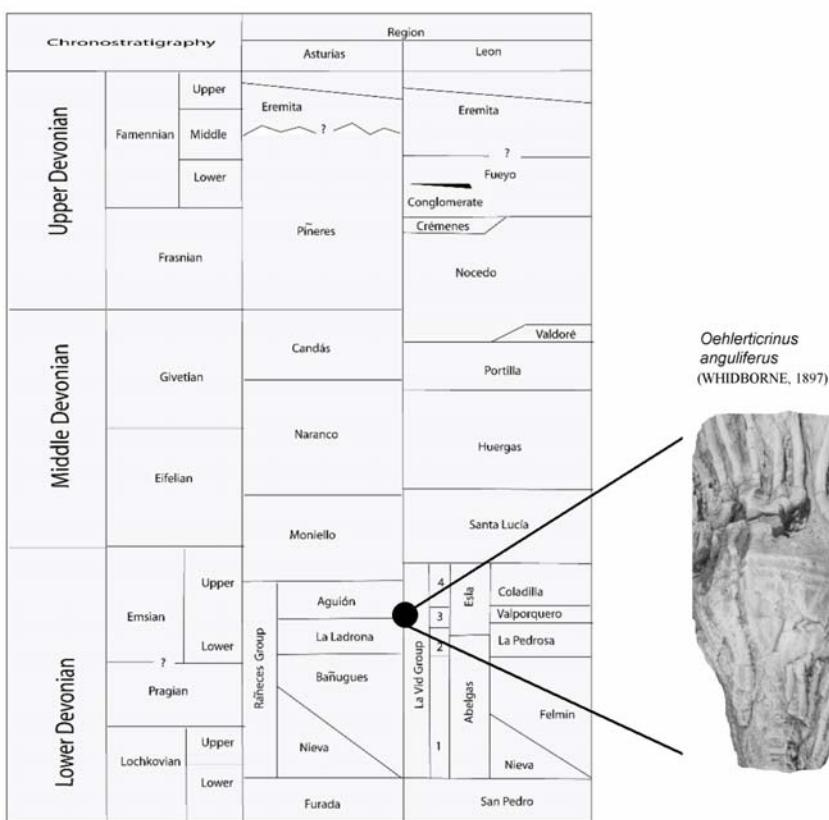
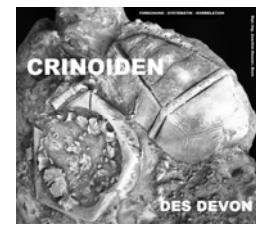
2 Geology (by Fernando Gómez LANDETA)

The *Oehlerticrinus* specimens described in this paper were collected twenty years ago from a loose slab at the feet of a sea cliff in the coastal East face of Cabo Peñas (Asturias, Spain), in the sector outcropping between the SE border of the bay of Bañugues and the Aguión Cape. A section of this outcrop by JULIVERT, 1976, is presented in Figure 1. In it the La Ladrona Formation forms a folded and faulted sequence between the last dolomitic beds of the Lower Bañugues Formation to the NW and a thick white encrinitic bed which marks the base of the upper Aguión Formation to the SE.



↑ Text-figure 2: Geology between Bañugues shore and Aguión point after JULIVERT, 1976: 216, text-fig. 6

The folding does not allow the tracing of a detailed stratigraphy but we roughly can state that the Formation is complete with a lower member with a thickness of 30 or so meters, composed of shale with a limestone intercalation, and a upper alternation of grey, meteorized in surface to beige, limestones 0,1-2 m. thick, with medium gray shales in beds of 0,5-2 m. The number of packages limestone-shale can be 20-30, and the total thickness of this member, the most conspicuous of the outcrop, could reach 50-60 m. Then counting a few meters at the top covered by a reverse fault the total thickness of La Ladrona Formation in this sector can be something between 90-100 m. at variance with 140-150 m. at the stratotype, (GARCIA-ALCALDE, 1992), 17 km. to the SW. Sedimentologically, the limestones are pure clean grainstones composed mainly of disarticulated brachiopod shells with a probably origin in the washing of fines by the action of storm waves over the floor of a epicontinental sea, being the pure shales in between the decanted mud in the periods of quiescence. The abundant fauna apart the broken - transported who constitute the body of the limestones is cantoned at its surfaces and in the few centimetres of transit to the shales whose anoxic environment precludes the life of invertebrates in them. Although, as said, the slab with the crinoids is not "in situ" and despite the tectonic complication we can state that the bed containing them proceeds from the top of the lower third of the limestone-shale member (see Figure 1), roughly 50 m. over the base of La Ladrona Formation, and then at the middle of it. The Palaeontology and age of this sector and focused in the brachiopod fauna is from ARBIZU, 1972, also based in brachiopods by GARCIA-ALCALDE, 1992, in the stratotype. The brachiopod fauna at the approximate level of the crinoids is composed mainly by spiriferids and strophomenids with common Emsian taxa (e.g., *Euryspirifer pellicoi*, *Leptostrophia explanata*), more precision can be obtained from a couple of limestone beds packed full by *Uncinulus pila*. Following GARCIA-ALCALDE, 1996, this form makes its apparition in his brachiopod faunistic interval 9 from the 29 he divides the Cantabrian Devonian, being the age the **lower part of Upper Emsian**, which we then attribute to the crinoid level.



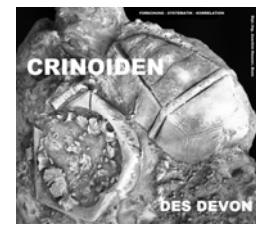
The complete crinoids with arms, calyx and stems, indicate one "in situ" colony growing at the top of the shelly haze in the short time span before the mud killed (and conserved) them, also of interest is that the *Oehlerticrinus* are accompanied in roughly the same quantity by the crinoid *Bactocrinites rauffi* HAUSER, 2010, being the other conspicuous form living in that substrate the coral *Pleurodictyum* sp.

← Text-figure 3: 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.



atus, *O. sculptus*, *O. wachsmuthi*. Sie stammen aus dem Siegenium (Pragium); *O. anguliferus* wurde dort im oberen Siegenium – Unteres Emsium gefunden, während *O. lefretensis* aus dem oberen Emsium stammt. *Oehlerticrinus* sp. liegt aus der Siegen-Stufe der algerischen Sahara vor, während *O. anguliferus* aus dem oberen Siegenium – Unteren Emsium der Pyrenäen (Frankreich) stammt. Weitere Funde (*O. lemenni* und *O. jeani*) sind aus dem unteren Lochkovian des Canning Basin (Australien) bekannt. *Oehlerticrinus* ist aber auch ein Vertreter des Lochkovian des Barrandiums (Czechische Republik).

Abstract: For the first time *Oehlerticrinus* (*O. anguliferus* WHIDBORNE, 1897) is described from the Lower Emsian SE of the hamlet of Bañugues (Asturias, Northern Spain). *Oehlerticrinus seillouensis* LE MENN, 1975 is a subjective synonym of *Oehlerticrinus anguliferus* WHIDBORNE, 1897. *Oehlerticrinus* is known from the following strata and places: Lower Devonian of Armórica, *O. bilineatus*, *O. sculptus*, *O. wachsmuthi*, cantoned in the Siegenian (Pragian), *O. anguliferus*, in Upper Siegenian – Lower Emsian, and *O. lefretensis*, in Upper Emsian. Another form, *O. sp.* was found in the Siegenien of Algeria, and *O. anguliferus*, was also found in the Upper Siegenian – Lower Emsian of the Basques Pyrénées (France). Afterwards the two older species of the genera, *O. lemenni* and *O. jeani*, where described by JELL, 1999, from the Lochkovian of the Canning basin in Australia, and the genera is also cited by PROKOP, 2002, and PROKOP & PETR, 2002, from the Lochkovian of the Barrandian. The range of *Oehlerticrinus* increases: in age till the base Upper Emsian and in space to the Devonian of Asturias (northern Spain).



Resumen: Se describe por primera vez el género *Oehlerticrinus* (*O. anguliferus* (WHIDBORNE, 1897) procedente de la base del Emsiense superior de los acantilados al sureste de la aldea de Bañugues, (Cabo Peñas, Asturias). El género *Oehlerticrinus* se conoce del Devónico inferior del Macizo Armoricano, con *O. bilineatus*, *O. sculptus*, *O. wachsmuthi*, del Preguiense, *O. anguliferus* del Praguense superior - Emsiense inferior y *O. lefretensis* en el Emsiense superior. Otra especie, *Oehlerticrinus* sp. fué encontrada en La Saura (Argelia) y *O. anguliferus* en el Emsiense inferior de los Pirineos vascos. Las dos especies mas antiguas del género, *O. lemmeni* y *O. jeani* fueron descritas por JELL (1999), del Lockoviense de la cuenca Canning (Australia) y también hay citas del género en el Lockoviense de Barrandia, (PROKOP, 2002, PROKOP&PETR, 2002). Con nuestro hallazgo, el rango de *Oehlerticrinus* se extiende en edad al Emsiense superior y en geografía al Devónico cantábrico de España.

Schlüsselwörter: *Oehlerticrinus*, Systematik, Nordspanien, Emsium, Unterdevon.

Key-Words: *Oehlerticrinus*, systematics, Northern Spain, Emsian, Lower Devonian.

3 Systematics (by Joachim HAUSER)

Classe Crinoidea J. S. MILLER, 1821

Subclasse Camerata WACHSMUTH & SPRINGER, 1885

Order Monobathrida MOORE & LAUDON, 1943

Suborder Comsocrinina UBAGHS, 1978

Superfamily Hexacrinitaceae WACHSMUTH & SPRINGER, 1885

Family Hexacrinidae WACHSMUTH & SPRINGER, 1885

Genus *Oehlerticrinus* LE MENN, 1975

→ Text-figure 4: Exploration-diagram of *Oehlerticrinus*

Stratigraphical range
Lower Devonian – Upper Devonian

Type-species: *Hexacrinus wachsmuthi*
OEHLERT, 1882

- Oehlerticrinus anguliferus*
(WHIDBORNE, 1897)
text-figure 1 & plate 1
- 1897 *Platycrinus anguliferus*, WHIDBORNE,
p. 223, pl. 37, figs. 8-11
- 1975 *Oehlerticrinus seillouensis*, LE MENN,
p. 247, pl. 23, fig. 1-4 & 6-7 (?)
- 1985 *Oehlerticrinus seillouensis*, LE MENN,
p. 60-61, pl. 10, fig. 1-3

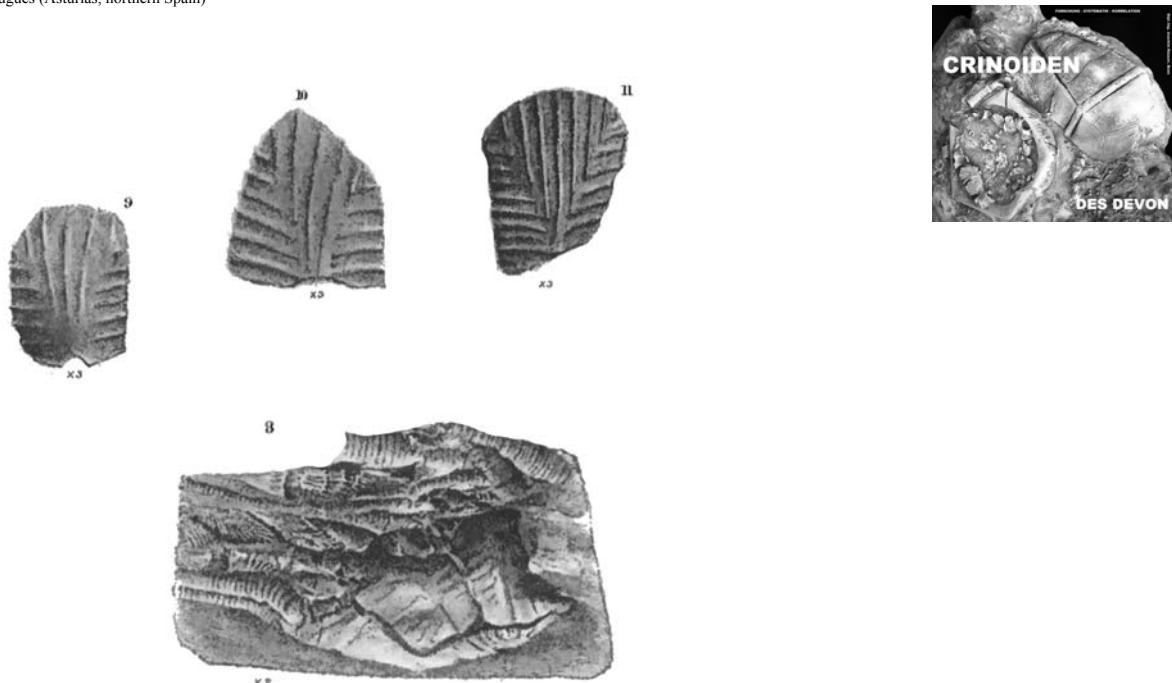
Paratypes: The specimen which shown on plate one who are stored in the private collection of Fernando Gómez LANDETA, Oviedo.

Stratigraphical level in northern Spain: More or less 50 m. over the base of La Ladrona Formation, lower part of Upper Emsian, Lower Devonian.

Material: Two more or less complete specimens with arms and stem and several isolated fragments of *Oehlerticrinus anguliferus*. The species are embeded in matrix.

Diagnosis, relation & description: For a full and detailed description of *Oehlerticrinus anguliferus* see LE MENN, 1885:60-61.





→ Text-figure 5-8: *Platycrinus anguliferus* WHIDBORNE, 1897 from the Pilton Beds, North Devon, UK after draws of WHIDBORNE

LE MENN established the taxon *Oehlerticrinus* only by studying the species of OEHLERT, 1882:pl. 8, fig. 3 without a notice of *Platycrinus anguliferus* WHIDBORNE described from the Marwood and Pilton Beds of North Devon and Somerset (United Kingdom). It is not a point of discussion that *P. anguliferus* is ident. with LE MENN's *Oehlerticrinus seillouensis* (see figs. 5-8).

Oehlerticrinus reminds from the cup construction strongly the taxon *Hexacrinites*. The essential differences between both taxa are the distinctive cirrus along the stem which is also observed at the present material (see pl. 1, fig. 1). These cirrus probably had the function to increase the absolute total surface of the crinoid to extract the oxygen from the presumably rather low oxygen in the Devonian sea. In any case, *Oehlerticrinus* can be classified as a taxon mainly common in the Lower Devonian but also known in the upper Devonian stages (Famennian). It seems probably that the Lower Devonian taxa *Platyhexacrinus*, and *Arthroacantha* are the earliest representatives of *Hexacrinites* which had her main period in the Middle and Upper Devonian (e.g. HAUSER, 1997 and HAUSER, 1999).

Oehlerticrinus erinnert vom Kelchbau stark an *Hexacrinites*. Das wesentliche Unterscheidungsmerkmal zwischen diesen beiden Taxa ist die Ausbildung von ausgeprägten Zirren am Stiel, die auch beim vorliegenden Material deutlich zu beobachten sind. Diese Zirren hatten wohl insbesondere die Funktion, die absolute Gesamtfläche der Crinoide zu vergrößern um aus dem vermutlich recht sauerstoffarmen Meerwasser den nötigen Luftsauerstoff zu extrahieren. Jedenfalls kann *Oehlerticrinus* als eine vorwiegend auf das Unterdevon beschränktes Taxon eingestuft werden. Sicherlich ist *Oehlerticrinus* mit *Platyhexacrinus* und *Arthroacantha* die frühesten echten Vertreter der Hexacriniten, das ihre Blütezeit im Mitteldevon hatte.



↑ Text-figure 9-13: Holotyp of *Oehlerticrinus wachsmuthi* (OEHLERT, 1882) after OEHLERT, 1882, pl. 8, figs. 3

Dimensions: See description of plate 1.

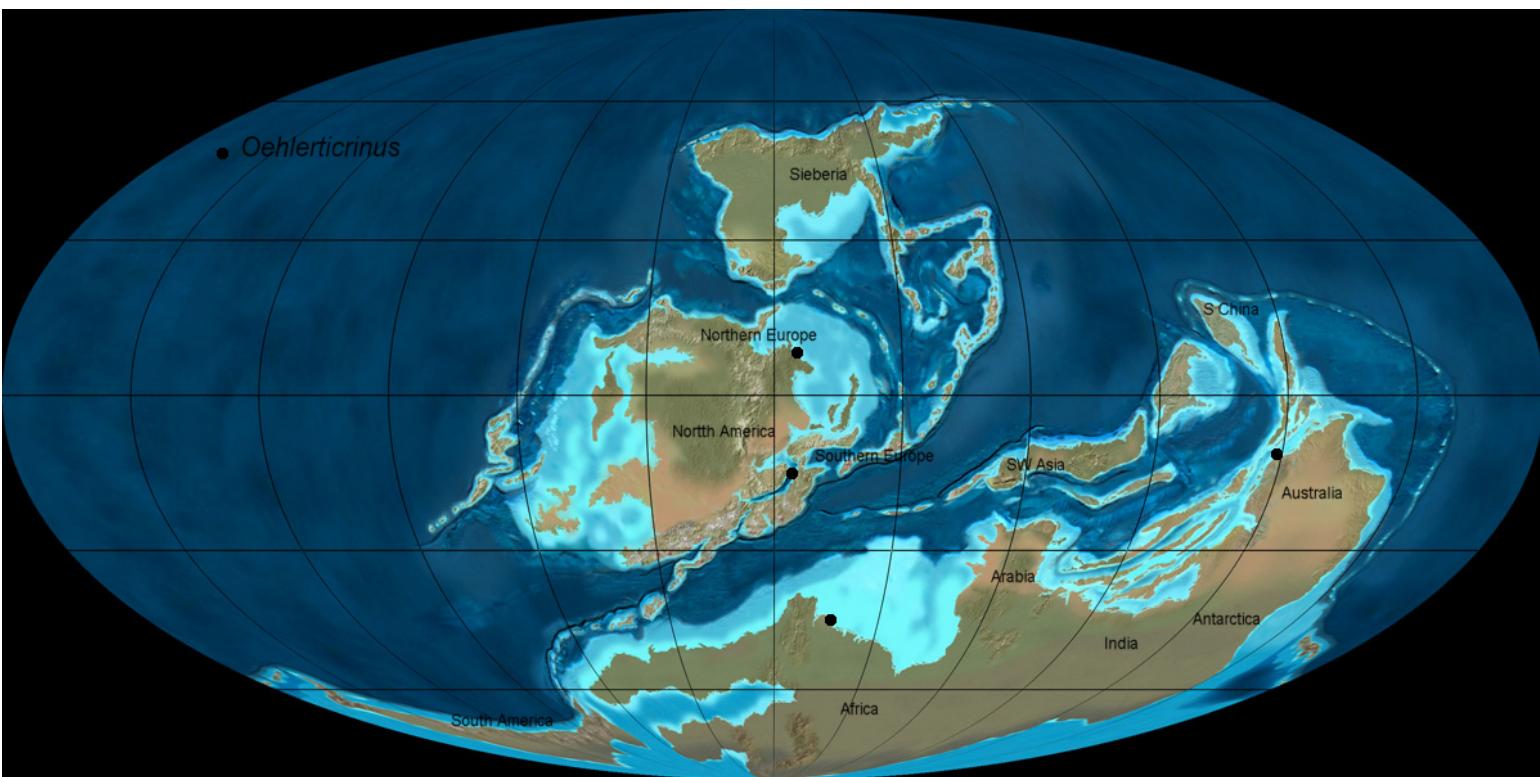
Geography and Age of the genera *Oehlerticrinus* (by Fernando Gomez LANDETA and contributions by Joachim HAUSER)

It is LE MENN (1975), who established the genera *Oehlerticrinus* assigning to it five species. All of them appear in the lower Devonian of Armórica, *O. bilineatus*, *O. sculptus*, *O. wachsmuthi*, cantoned in the Siegenian (Praguian), *O. anguliferus*, in Upper Siegenian – Lower Emsian, and *O. lefretensis*, in Lower Couvinien, (in today scale Upper Emsian). Another form, *O. sp.* was found in the Siegenien of Algeria, and *O. anguliferus*, was also found in the Upper Siegenian – Lower Emsian, of the Basques Pyrénées (France). Afterwards the two older species of the genera, *O. lemenni* and *O. jeani*, where described by JELL, 1999, from the Lochkovian of the Canning basin in Australia, and the genera is also cited by PROKOP, 2002 , and PROKOP & PETR, 2002, from the Lochkovian of the Barrandian. *Oehlerticrinus anguliferus* is also known from the Pilton Shales, belong to Pilton Mudstone Formation, Famennian (Upper Devonian) of northern Devon (U.K.). With our finding the range of the genera increases: in age till the base upper Emsian and in space to the Devonian of Asturias (Spain).



From the Palaeogeographic point of view it is interesting to note that all the areas where the genera has been found (Armórica, Pyrénées, Asturias, North of Argelia, Australia, Perúnica), despite today's dispersion, where cantoned in the lower Devonian in cold high latitudes in the South Hemisfer, either in the North coast of Gondwana proper, either in slabs detached of it, the three first of them included in Hun superterrane, derived from the rest of Gondwana at the start of the Period, and Perúnica (Barrandian), as a isolated island to the West of them.

It is notable that the genera has not been found in the Devonian areas of the south coast of Laurussia, (Renish, Polish, Baltica, etc.), this would agree with the common interpretation that the Rheic Ocean who separated it from Gondwana/Hun/Perúnica, was still of a dimension enough to constitute a faunal barrier in the Lower Devonian, this circumstance at variance with the Middle Devonian onwards when the progressive mix of faunas between the two coast indicated the closing of this ocean. So we see that the data offered by this group of crinoids are in complete agreement with the current interpretation of the Palaeogeography of the Devonian of the Variscian realm.



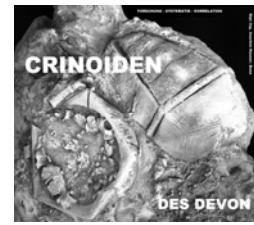
↑ Text-figure 14: Global paleogeography in the Early Devonian after WIKIPEDIA
[http://de.wikipedia.org/wiki/Devon_\(Geologie\)](http://de.wikipedia.org/wiki/Devon_(Geologie)) creator: Ron BLKEY, NAU Geology
www.cptgeosystems.com/mollglobe.html

The ● show the outcrops of *Oehlerticrinus*

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Oehlerticrinus anguliferus (WHIDBORNE, 1897)

Feet of a sea cliff in the coastal E face of Cabo Peñas near Bañugues (Asturias, Spain)

Stratum: ≈50 m. over the base of La Ladrona Formation, lower part of Upper Emsian, Lower Devonian.

All species are stored in the collection of Fernando Gómez LANDETA, Oviedo



Explanation of plate 1

Figure 1: height of the calyce: 1,4 cm, Ø: 1,7 cm; height of the brachia: 2 cm; stem: 2,5 cm

Figure 2: Ø calyce: 2,7 cm; arm-fragments: 2,9 cm

Figure 3: arm-fragments: 4,3 cm, plate: 0,7 cm

Figure 4: length: 7 cm, Ø 0,4 cm

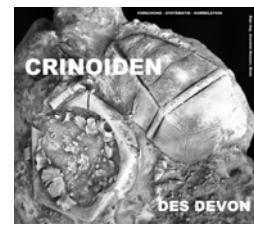


Plate 1

