

Decapod fauna from the Cenomanian stratotype

During the 19th century, the stratotypic Cenomanian, *i.e.* the Sarthe department in France, around the town of Le Mans, provided local collectors such as J. Triger and E. Guéranger (Breton, 1996) a large amount of well preserved fossils. Among them, decapods in particular were collected from the so-called “Couche à Crustacés” in the “carrière de la Butte de Gazonfier” within the town of Le Mans. The “Couche à Crustacés” is located in the first lowest meters of the Sables du Perche Formation, Middle-Upper Cenomanian, Jukesbrownei-Guerangeri biozones. This quarry (section *in* Guinot & Breton, 2006) has been disused since the early 20th century. Other formations in the stratotype area provided decapods: Lower Cenomanian, Marnes de Ballon Formation, Carcitanensis and base of Saxbii biozones; Sables & Grès de Lamnay Formation, around Lamnay and St. Maixent, limit of the Mantelli and Dixoni biozones. Owing to their equal richness in crustaceans, Triger (*in* de Hennezel, 1858) erroneously correlated the Marnes de Ballon with the Couche à Crustacés in the Sables du Perche; in the museum collections, the two origins are often mixed. For the geological context and history, see Guinot & Breton (2006); for the stratigraphical correlations, see Juignet (1974, 1980).

Because the Butte quarry is now disused, fresh decapod material is rare, and most of the specimens noted here come from museum collections: Muséum d’Histoire naturelle, Le Havre (MHNH); Muséum d’Histoire naturelle Le Mans (register numbers MHN LM 2003-1-XXXX abbreviated here LMXXXX); Muséum national d’Histoire naturelle, Paris, Domaine des Sciences de la Terre (MNHN); Laboratoire de Géologie, Université de Caen (LGUC); Université Lyon I (FSL); Université de Paris VI (UPMC).

Principal publications concerning the study of these Cenomanian decapods include works of A. Milne Edwards (1861, 1862a, 1862b, 1882), A. Milne Edwards & Brocchi (1879), Brocchi (1887), Van Straelen (1936), and Guinot & Breton (2006).

The most frequently encountered macruran is *Hoploparia trigeri* (Van Straelen 1936) of which we here designate as the lectotype the specimen figured as “topotype” by Van Straelen (1936, pl. 3, fig. 4) [LM3760] from La Butte quarry. Other specimens are: LM3799A and MNHN A25925 (Fig. 1) with elongated chelipedes (first known occurrence of associated chelae), LM3801 juvenile, LM3785 has an irregular bopyriform swelling, UPMC unregistered [from La Butte quarry], MNHN A25926, [from St-Mars-sous-Ballon].

The palinurid *Linuparus dentatus* Van Straelen, 1936 [*non* 1931] is far less frequent. The 1931 paper

of Van Straelen has not been found, either in the Van Straelen’s library in the MNHN, Paris, or in Bruxelles (J.-M. Bragard, pers. comm.) and it is not quoted in his bibliographic list (Corin, 1965): the citation of this 1931 paper is supposed to be erroneous, thus we retain the date, 1936, for this species. We designate as lectotype the specimen figured by Van Straelen (1936, pl. I, fig. 2) [MNHN R03384]. A plaster cast of the lectotype [LM3781] and fragmentary specimens [LM3789].

Callianassa cenomaniensis A. Milne Edwards, 1861. We have not been able to find the specimen(s) drawn by A. Milne Edwards (1861, pl. 14, fig. 5, 5A), therefore we designate as lectotype the specimen figured here Fig. 2 [MNHN R03548], which fits well the original description. It is labelled “1902-3” like other specimens studied by A. Milne Edwards and it comes from the type locality: St-Mars-sous-Ballon, Lower Cenomanian. The matrix, a fine glauconitic limestone with one *Orbitolina concava* (Lamarck 1816) proves it comes from the Marnes de Ballon Formation. This species is fairly abundant throughout the stratotypic Cenomanian and there are numerous specimens in MHN LM, MNHN, FSL, mainly from Marnes de Ballon, but also from Sables du Perche Formation.

Porcellana antiqua A. Milne Edwards, 1882 is considered as a *nomen dubium* because the original description is based on a single specimen, not illustrated, which has not been found.

Pagurus sp.? [MNHN B16584B]. A small hermit crab is preserved in the aperture of an unidentified, diagenetically compressed gastropod shell. It displays fragmentary appendages: the incomplete punctuated right chela seems to be larger than the left one (Fig. 3). Such preservation is rare (Jagt *et al.*, 2006; Todd & Collins, 2005). Labelled “Crustacé de la Sarthe communiqué par M. Triger 1902-3. Crétacé sup”, it probably comes from the Carrière de la Butte, but not from the Couche à Crustacés. The matrix, a grey soft clay with ferruginous staining, and the type of fossilization with a complete decalcification evoke the “Lentilles à Echinodermes”, 10 meters or so below the Couche à Crustacés, within the Sables & Grès du Mans Formation (Breton, 1996; Guinot & Breton, 2006: fig. 1).

Caloxanthus formosus A. Milne Edwards, 1862. There are a few specimens, of both carapaces and chelipeds. No ventral side is known. [LM3792 (carapace); LM3796, 3797 (chelipeds); MNHN R03351 (carapace), B16572 (carapace and associated chelipeds)].

Trachynotocarcinus sulcatus (Bell, 1863). One incomplete small carapace [MNHN B16571], Upper Cenomanian, Saint-Calais (Sarthe).

Raninella trigeri A. Milne Edwards, 1862. Type species of the genus *Raninella*, by original designation. Although this species, and the following one are both named by A. Milne Edwards (1862b), and adequately distinguished in barely two lines, this sufficiently constitutes a definition of both taxa in respect to art. 12.1 of ICZN. “this, though jejune, is just adequate to make the name available” (Wright & Collins, 1972). We designate as the lectotype the specimen MNHN B16565, figured by Brocchi (1877, pl. 29, figs. 1, 2). Paralectotype MNHN R0394 figured by Brocchi (1877, pl. 29, fig. 3). Other specimens and casts of type material in MHN LM. Their matrix shows that all specimens come from the Carrière de la Butte, Couche à Crustacés.

Raninella elongata A. Milne Edwards, 1862. The differences with *R. trigeri* are well explained by Brocchi (1877). *Raninella elongata* is always smaller than *R. trigeri*, and we have not seen any intermediate sized *Raninella* in the collections we visited. Thus we do not agree with Van Straelen (1936) who stated that *R. elongata* and *R. trigeri* are synonymous, the former being a juvenile of the latter. Type series in MNHN, formerly B16575 with 5 specimens from Sables du Perche Fm, La Butte quarry and 4 specimens from Marnes de Ballon Fm, with a single label “Crustacés des Grès verts du Mans A. Milne Edwards 1902-3”. Among them, we designate as lectotype MNHN A25922 the specimen figured by Brocchi (1877, pl. 29, figs. 4, 5), La Butte quarry. Paralectotypes are: MNHN A25923, figured pl. 29, fig. 5 bis, Ballon; 3 specimens MNHN B16575, La Butte; 4 specimens MNHN A25924, Ballon; other paralectotypes: 2 specimens labelled “*Raninella Trigeri* A. M. Edw. Cénomaniens Le Mans Sarthe 1902-3”, B16564, La Butte quarry. Other specimens LM3788.

Raninidae gen. nov., sp. nov. from the Lower Cenomanian Sables & Grès de Lamnay Fm, St-Maixent (Sarthe), two specimens that will be described and named later: Collins & Breton (in progress).

Cenomanocarcinus inflatus Van Straelen, 1936. Figured as *Necrocarcinus inflatus* (*nomen nudum*: ICZN 13.1.1) by Boule & Piveteau (1935), fig. 670. We designate as lectotype the specimen figured by Van Straelen (1936, pl. IV, fig. 8) [MNHN J08587 ex coll. Hébert, labelled “La Butte de Gazonfier au Mans”]. Other material: MNHN R05504 (paralectotype), MNHN B16588a: anterior fragment of the carapace, with associated left cheliped (Fig. 4), LM3780, 3805, 3806, a juvenile with produced epibranchial, posterolaterally directed, spines which, in combination with the triple row of tubercles, gives it a calappid-like appearance (Fig. 5). These spines are broken in all

other specimens, giving them a more rounded outline.

Necrocarcinus labeschii (Deslongchamps, 1835). One specimen (carapace length 19mm; width: 24mm), Sables du Perche Formation, Le Mans [LM3808, coll. Guéranger]. Two small cephalothoraces [one at least presumably from Sables du Perche Fm], ca 12 x 12mm [LM3807] are labelled “*Necrocarcinus minutus* M. Edw.”. *Necrocarcinus minutus* is a *nomen nudum* in Guillier (1886). These two specimens seem to be juveniles of *N. labeschii* (Fig. 6).

Lithophylax trigeri A. Milne Edwards & Brocchi, 1879. Lectotype MNHN A25835 selected among the type series by Guinot & Breton (2006). For a complete description, see Guinot & Breton (2006). This small crab, which has a stridulating apparatus and was coprophagic (Breton, 2006), is by far the most abundant decapod from the stratotypic Cenomanian: many specimens in MNHN, MHN LM, MHNH, LGUC, Muséum de Rouen: coll. Fortin 31217, Natural History Museum in Bruxelles (B), and the Natural History Museum (UK).

Xanthosia sp.? One specimen, without any indication of origin, but within the Guéranger collection [LM3798] may come from the Sables du Perche Formation.

The decapod fauna from the Cenomanian stratotype is varied, and contains apparently endemic species. Among the 14 taxa quoted here, 10 were found in the Carrière de la Butte, Sables du Perche Formation, Couche à Crustacés. But *Lithophylax trigeri* is also found in the Cenomanian from the Aude department, south France (Van Bakel, Artal, Breton, Guinot & Vizcaïno, in progress). *Trachynotocarcinus sulcatus* is also known from England (Wright & Collins, 1972) and from Normandy (Breton, unpublished). *Caloxanthus formosus* is also found in Normandy (Breton, unpublished) and in the south of France (Van Straelen, 1938). *Callianassa cenomaniensis* was collected in Normandy, and *Raninella trigeri* and *Cenomanocarcinus inflatus* were found in the south of France (Van Straelen, 1936, 1938). *Necrocarcinus labeschii* is widespread in England and France (Wright & Collins, 1972). The other species seem to be restricted to Le Mans area, but they are indeed the rarest.

The apparent endemism among stratotypic Cenomanian decapod fauna is undoubtedly due to the peculiar palaeoenvironmental and taphonomic conditions which led to the “Couches à Crustacés” *Konservat-Lagerstätte*. As in the case of recently discovered *Lithophylax trigeri* outside the type area mentioned above, subsequent collecting could well produce a wider distribution of “pseudo-endemic” species.



Fig. 1 - *Hoploparia trigeri* (Van Straelen, 1936). MNHN A25925. Middle - Upper Cenomanian, Sables du Perche Formation, "Couches à Crustacés" beds, La Butte quarry, Le Mans (Sarthe, France). Mould with right cheliped. Scale bar: 1 cm.

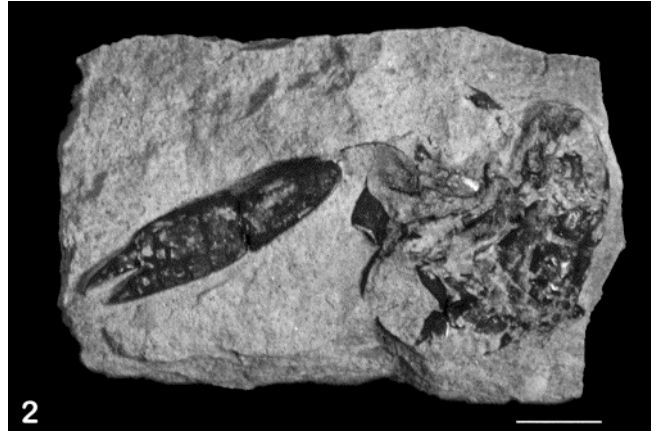


Fig. 2 - *Callianassa cenomaniensis* A. Milne Edwards, 1861. Lectotype, MNHN R03548. Lower Cenomanian, Marnes de Ballon Formation, Saint-Mars-sous-Ballon (Sarthe, France). Scale bar: 1 cm.

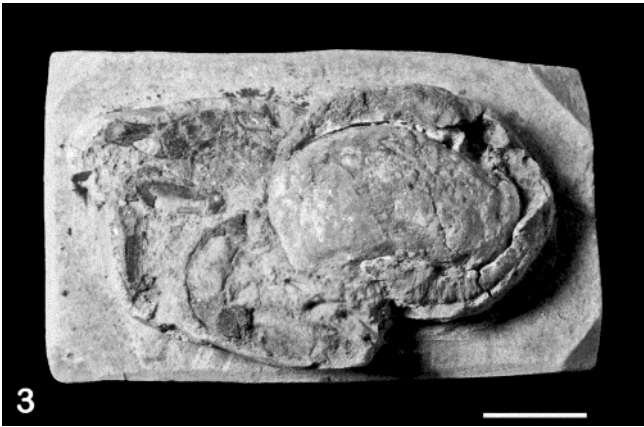


Fig. 3 - *Pagurus* sp.? MNHN B16584B. Probably Middle - Upper Cenomanian, Sables & Grès du Mans Formation, "Couches à Echinodermes" beds, La Butte quarry, Le Mans (Sarthe, France). Scale bar: 5 mm.

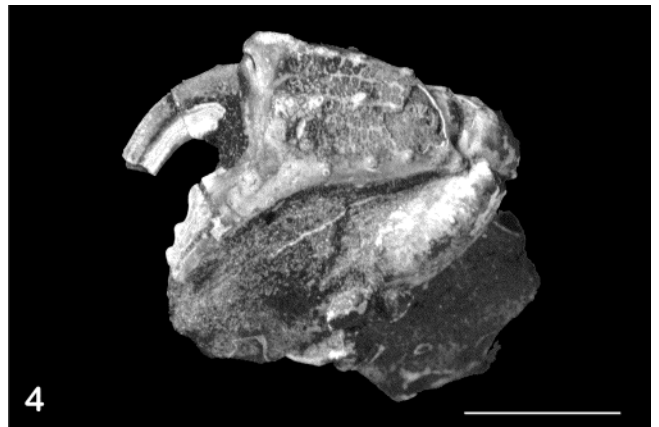


Fig. 4 - *Cenomanocarcinus inflatus* Van Straelen, 1936. Paralectotype, MNHN B16588a. Probably Middle - Upper Cenomanian, Sables du Perche Formation, "Couches à Crustacés" beds, La Butte quarry, Le Mans (Sarthe, France). Cheliped. Scale bar: 1 cm.

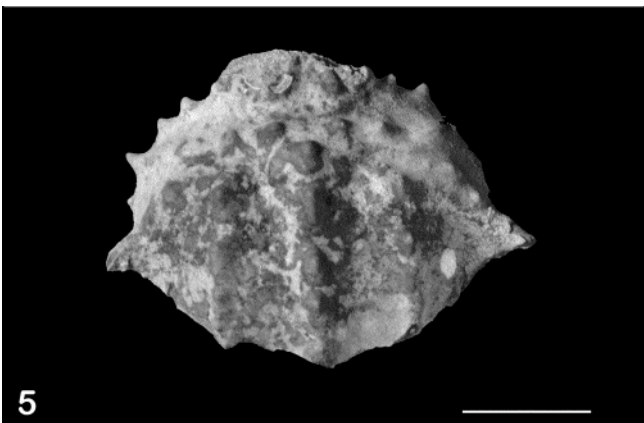


Fig. 5 - *Cenomanocarcinus inflatus* Van Straelen, 1936. LM 3806, coll. Guéranger. Middle - Upper Cenomanian, Sables du Perche Formation, "Couches à Crustacés" beds, La Butte quarry, Le Mans (Sarthe, France). Carapace of a young individual with pronounced epibranchial spines. Scale bar: 1 cm.

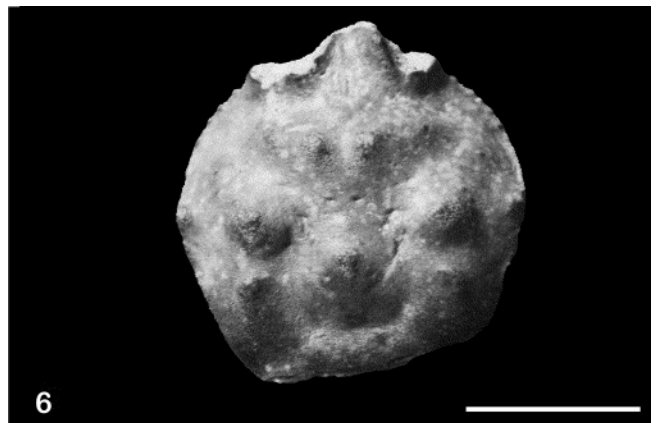


Fig. 6 - *Necrocarcinus labeschii* (Deslongchamps, 1835). LM 3807, coll. Guéranger, labelled as "*Necrocarcinus minutus* M. Edw." [nomen nudum in Guillier (1886)]. Probably Lower Cenomanian, Marnes de Ballon Formation, Ballon (Sarthe, France). Carapace of a very young individual. Scale bar: 5 mm.

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