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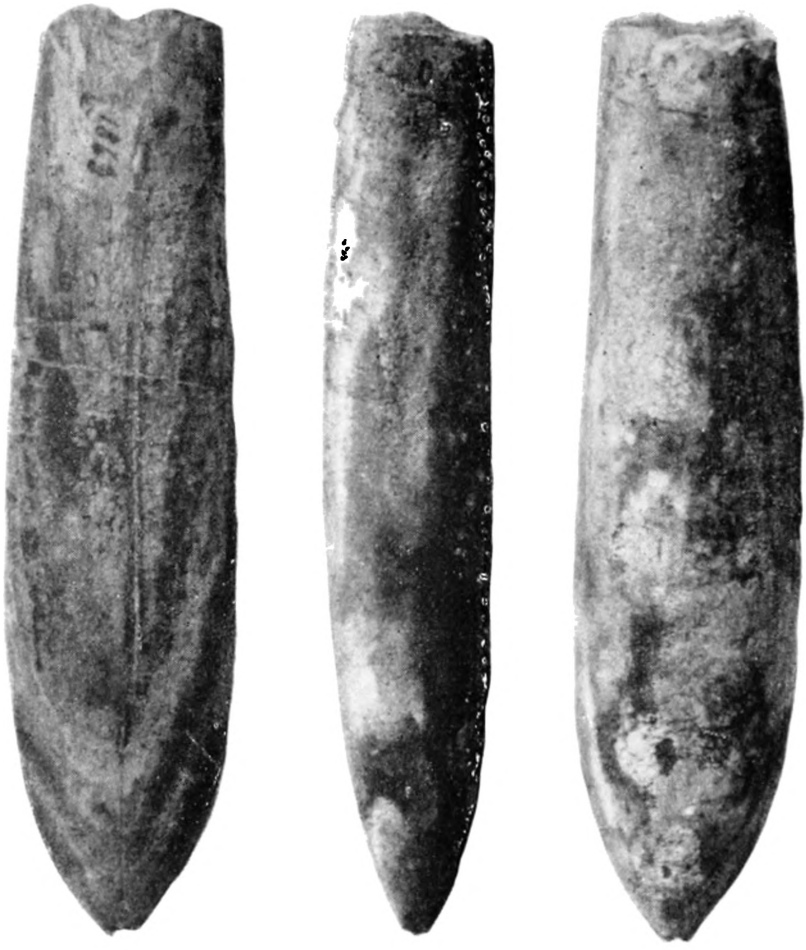

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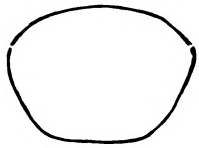

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Actinocamax Grossouvrei. Chalk (*Micraster cor-anguinum*-zone). Fimber, Yorkshire. In the Collection of Mr. J. R. Mortimer, Driffield, Yorkshire. Natural size.

FIG. 1. Ventral aspect.
FIG. 2. Left lateral aspect.
FIG. 3. Dorsal aspect.
FIG. 4. Transverse section at alveolar end.

NOTE ON A RARE FORM OF *ACTINOCAMAX* (*A. GROSSOUVREI*) FROM THE CHALK OF YORKSHIRE.

(PLATE XVI.)

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THE interesting fossil which forms the subject of the present note belongs to Mr. J. R. Mortimer, of Driffield, Yorkshire, to whom I am greatly indebted for the loan of the specimen. My thanks are also due to Mr. Sherborn for calling my attention to it. Mr. Mortimer says the fossil was collected in 1863 close to Fimber, in Yorkshire, from the flinty chalk. This flinty chalk is assigned to the base of the *Micraster cor-anguinum* zone by Dr. Rowe,* who records from it, besides other fossils, three examples of *Actinocamax granulatus* and an undoubted specimen of *Actinocamax verus*.

The fossil under consideration is undoubtedly referable to the species which M. Janet† described in 1891 as *Actinocamax Grossouvrei*. The following is a summary of M. Janet's description, which was based upon three specimens, from the Cretaceous rocks of France, exhibiting different stages of growth.

The guard at an advanced stage of development is rather massive and much depressed, having, when viewed from a ventral aspect, its point of greatest width at about three-fourths of its length from the alveolar end; from the point of greatest width it tapers gradually and regularly up to the alveolar extremity, whilst in the opposite direction it tapers much more rapidly and forms an ovoidal point.

In the very young stages of development the transverse section is, as shown by fractures of the guard, quite circular, but with growth this section assumes a more and more flattened form. A medium-sized specimen presents in a ventral aspect a long and fusiform outline; its point of greatest width is situated, as in an example at a more advanced stage of development, at about three-fourths of its length from the alveolar extremity, but from this point it decreases much more rapidly than in the older individual up to the level of the ovisac,‡ where

* Proc. Geol. Assoc., vol. xviii., part 4, Feb. 1904, pp. 251, 252.

† Bull. Soc. géol. France, sér. 3, tom. xix., No. 9, Nov. 1891, pp. 716-719, pl. xiv., figs. 1, 2, 3, and text-figs. 2 and 3.

‡ The ovisac is the small globular body at the apex of the phragmocone, and is therefore situated at the bottom of the alveolar cavity.

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it has its least diameter; from this level up to the border of the alveolus it enlarges slightly.

None of M. Janet's specimens showed the ventral fissure quite clearly. They exhibited only a slight indentation of the border of the alveolus prolonged or not by a very slight and very short groove.

The dorso-lateral grooves are not very deep, but wide and distinct, and extend over more than three-fourths of the length of the guard.

The alveolus was preserved in only two of M. Janet's specimens. In one it was moderately deep, and its surface rendered irregular by radiating ridges; in the other it was very smooth, without radiating striæ or concentric ridges, only very slightly excavated, and with a small but distinct pit in the centre.

The surface of the guard is smooth and without any granulation, 'but,' says M. Janet, 'the superficial layers have been peeled off especially at the lower part of the ventral surface, so that near the extremity there is seen to appear the very oblique section of the concentric layers nearest the apical axis. The base of a coral which remains attached to one of our specimens proves that this alteration is not recent, and is due without doubt to the fact that in this part of the guard, as in the neighbourhood of the alveolus, calcification was less than in other parts.'

'This alteration,' continues M. Janet, 'has caused to disappear, if however it ever existed, the mucronated point so clear in *Belemnitella mucronata*, *Actinocamax granulatus*, and *Actinocamax subventricosus*.'

Mr. Mortimer's specimen (Pl. XVI., figs. 1-4) agrees very closely with M. Janet's largest example. For the sake of comparison, the dimensions of these two specimens are given in the following table; the English specimen is obviously, however, more incomplete anteriorly than the French example, because it presents no indication of the alveolus, and appears therefore to be somewhat shorter, although the other dimensions are almost the same.

	Dimensions of Yorkshire specimen.	Dimensions of M. Janet's largest example.
Length in millimètres	92	97?
Ventro-dorsal diameter at the most inflated part	15	16
Transverse diameter at the most inflated part ...	22	20
Ventro-dorsal diameter at the narrowest part, *i.e.*, at the anterior end	14	14
Transverse diameter at the narrowest part, *i.e.*, at the anterior end	18	17

The Yorkshire fossil is much depressed, especially its posterior half, and is slightly curved towards the dorsal surface (see fig. 2), just as is shown in the lateral aspect of M. Janet's example (*loc. cit.*, Pl. XIV., fig. 1*c*). Its anterior end is imperfect, and shows no trace of the alveolus. Its broad and not very deep dorso-lateral grooves are well shown (see figs. 2 and 3), extending over fully three-fourths of its length. Its surface, where not eroded, is quite smooth, and its ventral portion exhibits the exfoliation of the superficial concentric layers, as mentioned by M. Janet in his largest specimen. In M. Janet's specimen, however, this exfoliation, doubtless resulting as that author points out from the imperfect calcification of these layers, was most marked at the *lower* part of the ventral surface, but in the present example it does not extend so far back as the posterior extremity of the guard, and is due to the imperfect calcification of almost the whole of the ventral portion of the superficial layers. The calcified portions of these layers cover, therefore, only the dorsal surface, the sides, and the posterior part of the guard like successive sheaths, which are open over the greater part of the ventral surface. (Two of these sheaths are plainly visible in fig. 1.) Possibly the present specimen had not reached such an advanced stage of development as M. Janet's largest example.

The posterior part of M. Janet's examples was not sufficiently well preserved to show if the guard possessed a mucronated point, but though the point of the Yorkshire specimen is not quite perfect, there is enough to show that the guard, as Grossouvre * has already pointed out, was mucronated (see specially fig. 3) as in *Belemnitella mucronata* Schlotheim, *sp.*,† *Actinocamax quadratus* Blainville, *sp.*,‡ and *Actinocamax subventricosus* Wahlenberg *sp.*§

As M. Janet observes *Actinocamax Grossouvrei* most closely resembles *Actinocamax subventricosus*, Wahlenberg, *sp.*

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* Bull. Soc. géol. France, sér. 3, vol. xxvii., No. 2, June, 1899, p. 129.

† Taschenbuch für Mineralogie, tom. vii., 1813, p. 111. See also C. Schlüter, Palaeontographica, Bd. xxiv., p. 80, pl. lv., figs. 1-12.

‡ Mém. sur les Belemnites, 1827, p. 62, pl. i., fig. 8. See also C. Schlüter, Palaeontographica, Bd. xxiv., p. 77, pl. liv., figs. 1-13; pl. liii., figs. 20-25.

§ Petrificata Telluris Suecana (Nova Acta Reg. Soc. Scient. Upsal., vol. viii., 1821), p. 80. See also C. Schlüter, Palaeontographica, Bd. xxiv., p. 75, pl. liii., figs. 1-9.

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[=*Actinocamax mammillatus* Nilsson, *sp.**], but it differs from that species in having the section of greatest diameter lower than in *A. subventricosus*, in being more depressed, in having a shallower alveolus, in having the transverse section of the alveolar end somewhat trapezoidal instead of subtriangular, and in several other minor characters.

M. Janet's largest specimen was found in the neighbourhood of Beauvais (Oise), France, in the Marsupite chalk; the second, a younger and more elongated form, was obtained from the magnesian chalk at Margny-lès-Compiègne (Oise), France; whilst the third, a still younger and more elongated form than the second, was collected at Beauvais at the same horizon as the largest specimen, together with *Actinocamax verus* and *Marsupites ornatus*.

In the paper to which reference has already been made, M. Janet† founded the species *Actinocamax Toucasi* upon a single specimen, which differed from *Actinocamax Grossouvrei* in being relatively much smaller at the alveolar end and much wider at its most inflated part, but M. Grossouvre‡ has since pointed out that *A. Grossouvrei* and *A. Toucasi* are not distinct species, but extreme forms of the same type connected by a series of intermediate forms.

In France, then, the species occurs in the Upper Santonian and the Lower Campanian.||

Actinocamax Grossouvrei is a widely distributed species; it occurs in the north of France, in the north of Germany, and in Scania, but everywhere it appears to be very rare. M. Grossouvre,§ however, states that in the Pyrenean region, judging from the numerous fragments which have been found, it would appear to be relatively abundant. Wherever the species is found it occurs on the same horizon as *Actinocamax granulatus* and *Actinocamax verus*. It is interesting therefore to note that in Yorkshire also it is associated with the same two species of *Actinocamax*.

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* Petrificata Suecana, 1827, p. 10, pl. ii., fig. 2. See also J. C. Moberg, Cephalopoderna i Sveriges Kritsystem, pt. 2 (Sverig. Geol. Undersök., Afhandl., Ser. C., No. 73, 1885), p. 53, pl. v., fig. 27; pl. vi., figs. 1-12.

† Bull. Soc. géol. France, sér. 3, vol. xix., No. 9, Nov., 1891, pp. 719, 720, pl. xiv., figs. 4*a*, *b*, *c*, and text-fig. 1.

‡ Bull. Soc. géol. France, sér. 3, vol. xxvii., No. 2, June, 1899, pp. 129, 130.

§ *Ibid.*, p. 133.

|| See A. de Grossouvre, 'Recherches sur la craie supérieure,' pt. i., fasc. 2, 1901, pp. 796-801.