

Additions to the Eocene fish fauna of Belgium. 4. *Archaeomanta*, a new genus from the Belgian and North African Palaeogene.

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Abstract: Two Belgian Eocene localities, Egem (Flanders, Sables de Mons-en-Pévèle) and Schepdael (Brabant, Sables de Wemmel) have yielded some distinctive small elasmobranch teeth. By comparison with modern material they are referable to *Mobulidae sensu lato* or *Ceratopteridae sensu stricto*. The teeth illustrated by ARAMBOURG (1952) from Moroccan phosphatic deposits represent another species of the same genus for which is proposed the name *Archaeomanta*.

Resume: Deux localités eocenes de Belgique, Egem (Flandres, Sables de Mons-en-Pévèle) et Schepdael (Brabant, Sables de Wemmel) ont livré quelques petites dents attribuables à des élasmobranches très spécialisés. Par comparaison directe avec des espèces modernes, il ressort que ces dents peuvent être attribuées à des *Mobulidae sensu lato*, ou mieux à des *Ceratopteridae sensu stricto*. Les dents figurées par Arambourg (1952), et provenant des phosphates du Maroc, représentent une autre espèce de ce nouveau genre de batoides que nous baptiserons *Archaeomanta*.

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Introduction. Over the last few years excavations have been conducted at a number of Belgian Eocene localities. Two of these have yielded a very rich and diverse fauna, which will be described at a later date. In this material we have discovered a number of small and enigmatic remains, very similar to those illustrated by ARAMBOURG (1952, pl. 28, figs. 67-69) and interpreted as the teeth of an undetermined selachian. We agree with ARAMBOURG that these small teeth are not dermal denticles because they all possess a distinct root groove; such a structure is too advanced for the relatively simple vascularisation and innervation of dermal denticles. It is obvious from the very strange morphology of these teeth that they can only belong to a very specialized group of elasmobranchs in which the dentition seems to have lost an important part of its principal function.

LOCALISATION AND LITHOLOGICAL SECTIONS

SCHEPDAEL (87E 8bis: Belgian Geological Survey Notation)

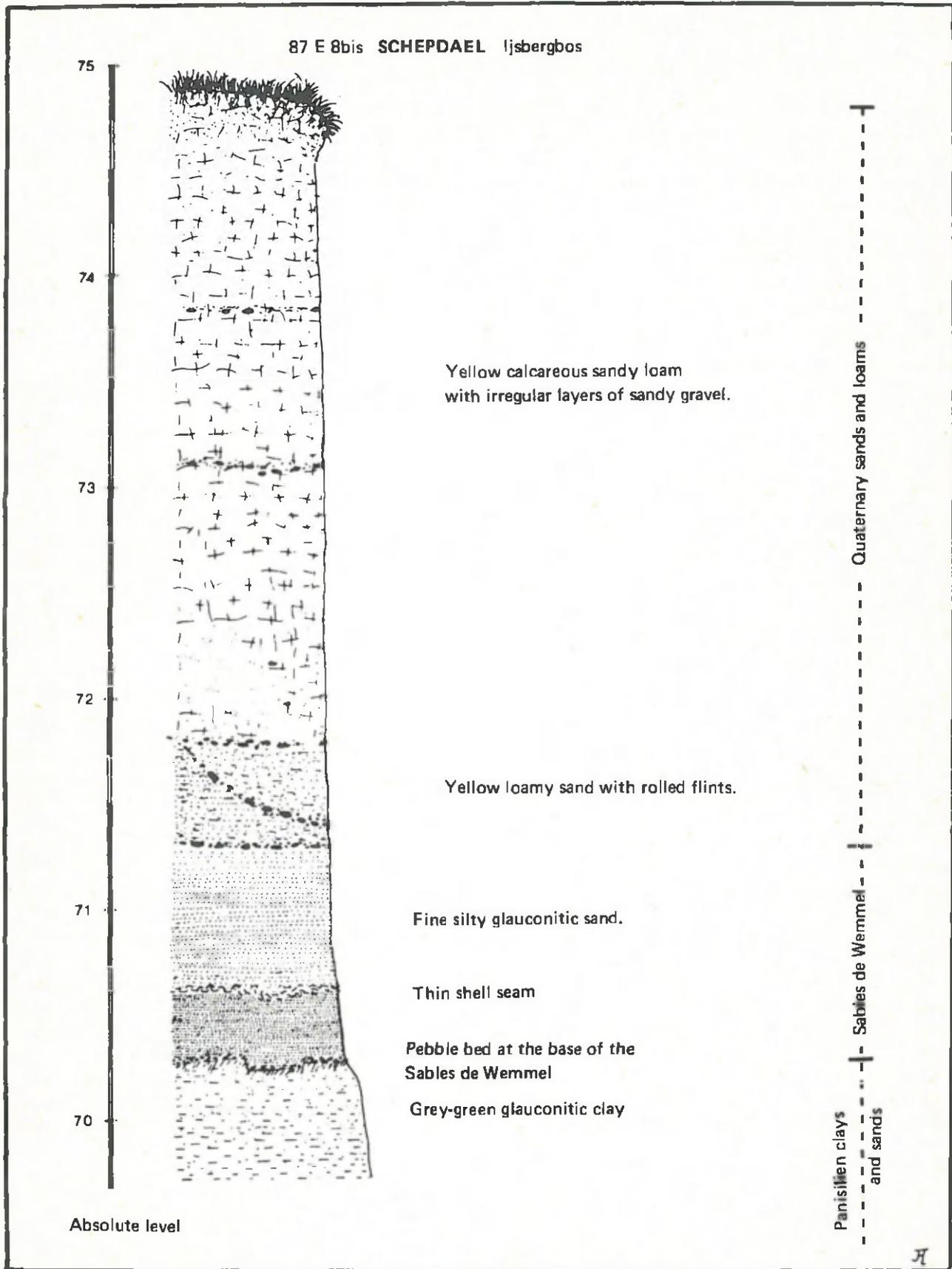
Stabilisation of the sides of the railway cutting at Ijsbergbos, Schepdael, 15 km. WNW of Brussels, made it possible to explore the section previously described from a borehole by HALET in 1901 (87E8). Our section is located about 50 m. NE of this old boring and is referred to as 87E 8bis. The base of the Sables de Wemmel varies between 70-71 metres (absolute level \pm O.D.) as a result of minor fault systems.

Observations. The base of the Sables de Wemmel at Schepdael is very irregular, consisting of a complex system of micro-graben and microhorsts, with a vertical throw in the order of 10 cms. The general dip is very slight and is predominately north. The lower 30 cms. of the Sables de Wemmel are in fact a fine gravel with scattered shelly accumulations, containing an impoverished mollusc fauna and *Ditrupe*, *Nummulites wemmeliensis* and the coral *Eupsammia burtinana*. The concentration of elasmobranch teeth is relatively important, about 80% are derived from the Sables de Lede, but the remaining 20% can be considered as penecontemporaneous with the sedimentation and are very well preserved. *Xenodolamia eocaena* Woodward is fairly common in comparison with other Belgian Eocene localities. The sediment contains occasional decimetric flints, derived, weathered and pitted, some small derived and rolled centimetric black flints and numerous very small white, pink and greenish quartz grains. Two mammal teeth were also discovered during washing and sifting of the sediments. The general conditions of the environment, the restricted molluscan fauna, the local abundance of *Ditrupe*, the relatively small size of the elasmobranch teeth (gerontic specimens are uncommon in the well-preserved fauna), suggest that the continental area was not very far away and that waters could be slightly brackish, or marine but with intermittent influences of brackish waters.

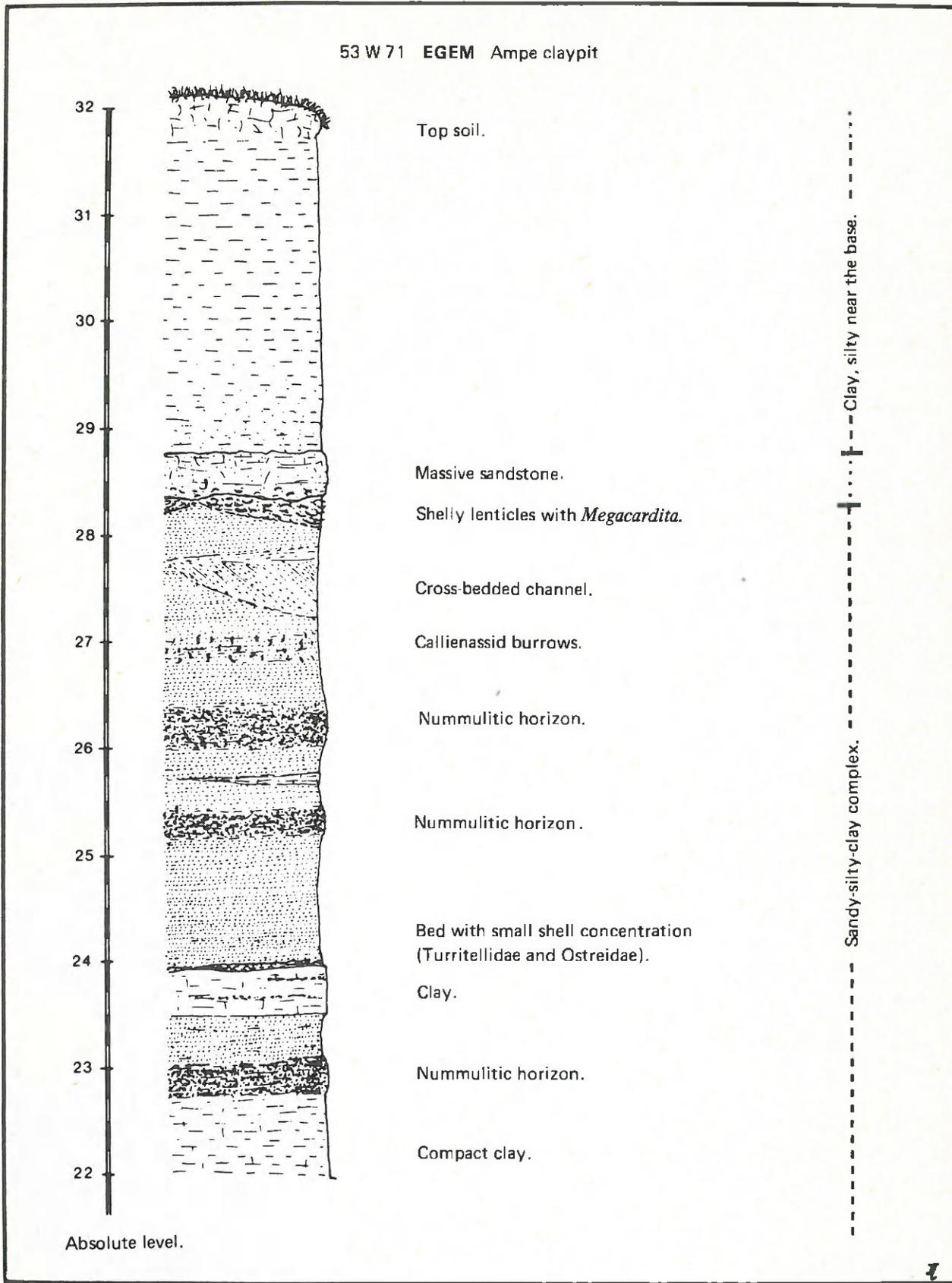
EGEM (53 W 71)

Recent works to deepen the Ampe Claypit at Egem, 25 kms. south-east of Brugge, Western Flanders, permitted us to investigate the Sables de Mons-en-Pévèle. Many fossiliferous horizons with exceptionally well-preserved material have been discovered and extensively sampled.

The nummulite horizons are the poorest in fish remains, but the *Megacardita*, *Ostreidae* and *Turritellidae* horizons are, in contrast, fairly rich. 95% of the elasmobranch teeth are perfectly preserved. The relatively high concentration of wood fragments, and the rapid vertical and lateral changes of facies are strongly suggestive of a fairly shallow water environment. Oblique and cross stratifications are common and it is possible to find local concentrations of crustacean burrows. The 5% element of derived elasmobranch remains are similar to those from the Sables de Forest (CASIER 1946).



Text-fig. 1. Lithological section 87 E 8bis, Schepdael, Ijsbergbos (Brabant, Belgium)



Text-fig. 2. Lithological section 53 W 71, Egem, Ampe Claypit (Western Flanders, Belgium)

Systematic Palaeontology

| | |
|-------------|-----------------------------|
| Subclass | ELASMOBRANCHII |
| Superorder | BATOIDEA |
| Order | MYLIOBATIFORMES |
| Superfamily | MOBULOIDEA |
| Family | CERATOPTERIDAE Whitley 1936 |

Systematic remarks. The classification followed is based on that of COMPAGNO (1975:26). However, it seems more appropriate to separate the *Manta* group from the *Mobula* group and distinguish it as a separate family: the Ceratopteridae. The distal position of the mouth, the loss of the upper dentition and the root reduction of the lower residual teeth to a single cushion with a complete, but relatively superficial and frequently reduced, median root groove (evolved holaulocorhizoid structure), are positive features to validate the familial distinction. *Indomanta* Whitley 1936 requires more detailed studies. If it is valid, it could be a survivor of the transitional forms between the true Mobulidae and Ceratopteridae.

Genus *Archaeomanta* nov.

Generic diagnosis: Mantidae-like batoids of presumed great size. The teeth are the only known remains. They are several millimetres in size and possess one single laterally compressed and inwardly bent cusp. The top of the crown is never flattened nor striated as in modern Ceratopteridae.

Derivatio nominis: Ancient *Manta*-like batoid.

Type species: *Archaeomanta melenhorsti* n.sp.

Range in Belgian Eocene: Ypresian to Auversian.

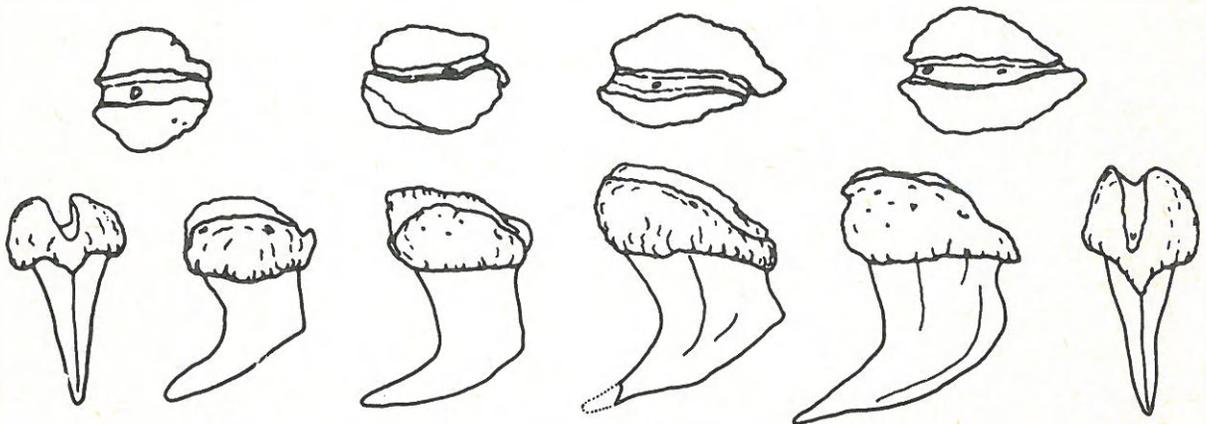
Other species: *Archaeomanta priemi* n.sp. from the North African Palaeogene: Montian to Ypresian.

***Archaeomanta melenhorsti* n.sp.**

(Pl. 1, fig. 1; text-fig. 3)

Specific diagnosis: *Archaeomanta* with relatively elongated and narrow teeth. The cusp is strongly bent inwards. The root (or cushion root) always possesses a very distinct and complete median groove. The top of the crown is always a single laterally compressed tip.

Derivatio nominis: Melenhorst. In honour of Mrs. Lyse Crochard née Melenhorst.



Text-fig. 3. *Archaeomanta melenhorsti* sp. nov., four different teeth, 3a and 3d with basilar, external and lateral views, 3b and 3c with basilar and lateral views. *Megacardita* horizon, Egem. x 11

Occurrence: Schepdael, Ijsbergbos, Sables de Wemmel, 16 teeth. Coll. C.G.H. No. 87E8bis-1 to 8bis-16. Egem, Ampe Claypit, Sables de Mons-en-Pevele, 12 teeth. Coll. C.G.H. *, No. 53W71-3 to 71-14.

Holotype: Specimen 53 W 71-3, Pl. 1, fig. 1, Egem, Ampe Claypit, Sables de Mons-en-Pevele, *Megacardita planicosta* horizon (= *Venericor planicosta* (Lamarck)).

Description: The laterally compressed crown is strongly inwardly bent forming a slight external prominence. Fairly distinct lateral keels can exist. The root is subcircular to elliptical or slightly irregular in shape. In the median root groove the central foramen is wide and fairly prominent. These teeth do not exceed 3.5 mm. in height.

Discussion: These teeth are the first fossil records of the Ceratopteridae in Europe. They seem fairly rare and represent less than 1/1000 part of the elasmobranch tooth content of the two Belgian localities, and less than 1/10,000 part of the elasmobranch faunal assemblage, considering the large number of teeth in Ceratopteridae. Their occurrence in the Belgian Eocene is sporadic, probably because this species preferred more open sea.

Archaeomanta priemi n.sp.

(Pl. 1, fig. 2; text-fig. 4)

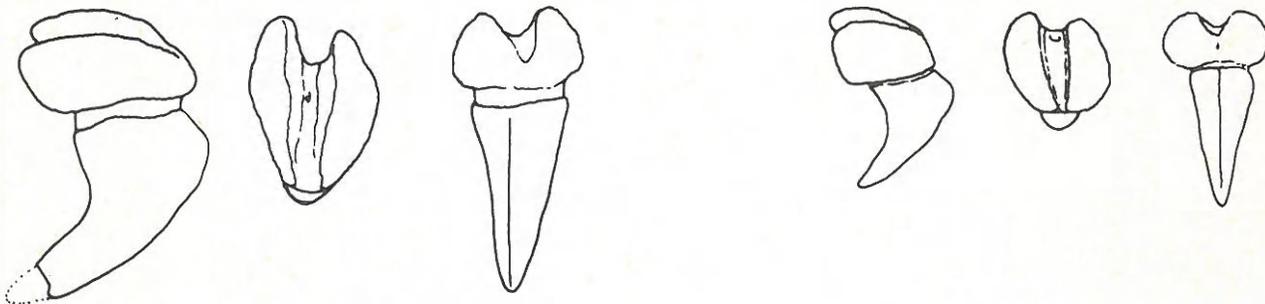
1909 "dents de Rajidae indetermine" PRIEM F. p. 320, fig. 27-29.

1952 "dents de selaciens indetermines" ARAMBOURG C. p. 226, pl. 28, fig. 67-69.

Diagnosis: *Archaeomanta* with relatively broad and inwardly bent crown, subcircular in section. Root regular in shape with shallow median root groove.

Derivatio nominis: In honour of F. Priem.

Material: Sidi Daoui, Ouled Abdoun, Morocco; Montian strata: 18 teeth, Thanetian strata: 100 teeth, Ypresian strata: more than 200 teeth C.G.H. Collection.



Text-fig. 4. *Archaeomanta priemi* sp. nov., two teeth, lateral, basilar and external views. Thanetian, Sidi Daoui, Morocco. x 11

Holotype: Specimen illustrated pl. 1., fig. 2, Sidi Daoui, Ouled Abdoun, Morocco, Thanetian strata, C.G.H. Collection.

Description: The crown is short, broad, with a subcircular section and inwardly bent. The root is regular with a wide, shallow median groove. The size of the teeth increases from a maximum of 3.2 mm. in the Montian to 4.6 mm. in the Ypresian (*sensu* ARAMBOURG 1952:24).

Comparisons: The crown of *A. melenhorsti* is elongated when compared with recent *Manta* and *A. priemi*. Its cusp is straighter than *Manta* but more bent than *A. priemi*. The cusp section which is compressed and elliptical in *A. melenhorsti* is broader and subcircular in *A. priemi*. The median root groove in *A. priemi* is wider, shallower and more superficial.

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CONCLUSIONS

The two described species *A. melenhorsti* and *A. priemi*, are the first fossil records of true Ceratopteridae. Their teeth are small, but enter into the size range of those of the modern Ceratopteridae. It is significant that the reductions of size and function of the dentition seem very similar to those of modern *Manta*, and that once this shape and structure were acquired, the population expanded. The history of the group is certainly very long, and the early stages remain unknown. In spite of very careful recent collecting, the Upper Cretaceous of North Africa and Western Europe (C.G.H. 1968–1977) has never yielded older representatives of this group. This group seems also to be absent from Western African Cretaceous and Palaeogene (DARTEVELLE and CASIER 1943–1959), indicating that the ancestors of the Ceratopteridae inhabited other waters. The fact that *Archaeomanta* penetrated earlier into North Africa (Palaeocene) than into Western Europe (Eocene) is probably due to a lack of direct marine connections during the Palaeocene, but could also suggest that the origin of the group is more eastern, perhaps Indo-pacific Mesogean waters.



Text-fig. 5. Teeth of *Manta birostris* (Donndorff) 1798. Female 4.30 m. in length, 4.70 m. in width.

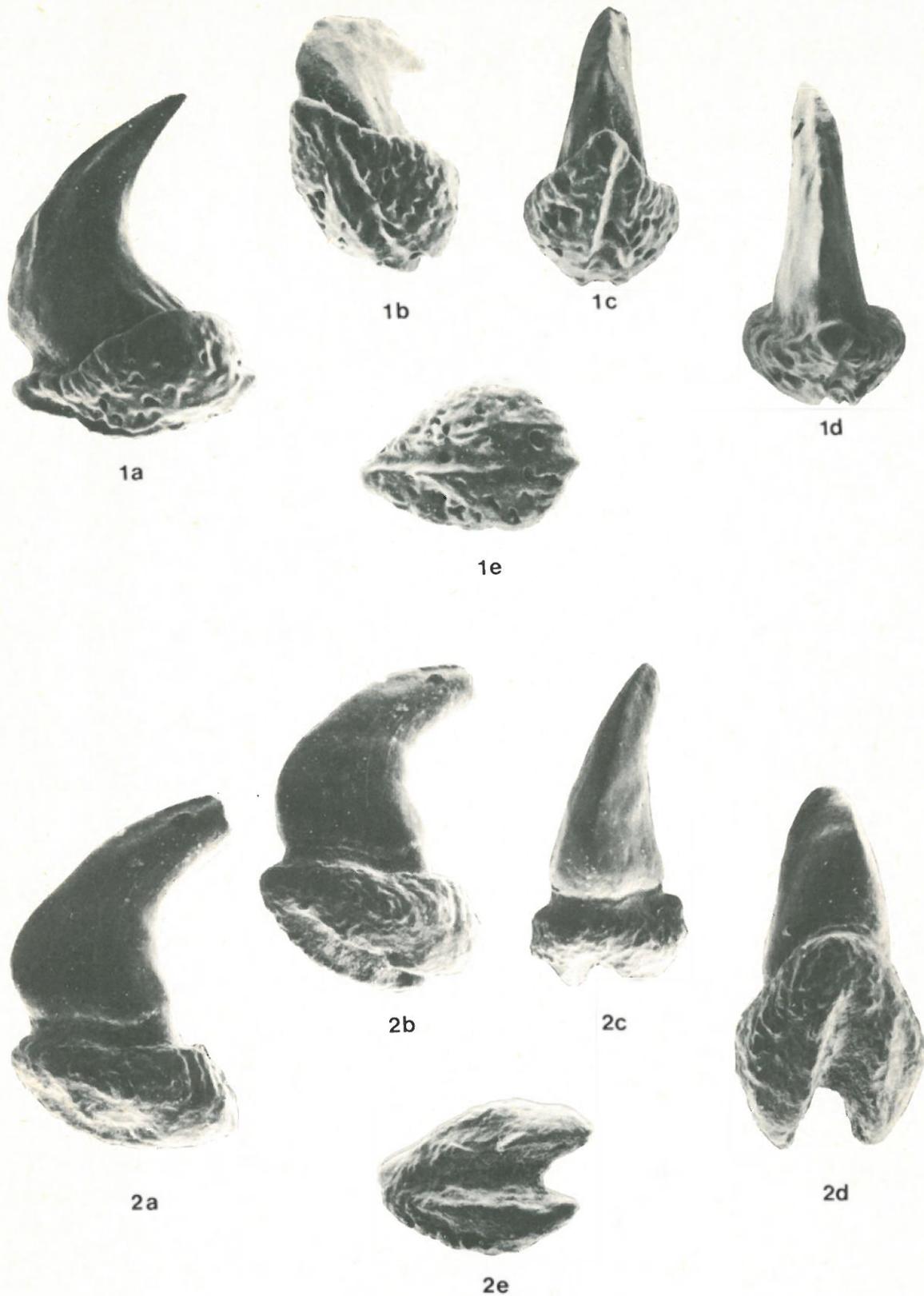
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REFERENCES

- | | | |
|-------------------------------|------|--|
| ARAMBOURG, C. | 1952 | Les vertèbres fossiles des Phosphates (Maroc – Algérie-Tunisie). No. 92, 372 p., 46 pl. |
| CASIER, E. | 1946 | La fauna ichthyologique de l'Yprésien de la Belgique. Mem. No. 104, 267 pp., 19 fig., 6 pl. <i>Mem. Mus. r. Hist. nat. Belg.</i> |
| COMPAGNO, L. | 1973 | Interrelationships of living elasmobranchs in Greenwood, Miles and Patterson (Eds.). <i>Interrelationships of fishes</i> Linnean Soc. <i>J. Linn. Soc.</i> 53: 15-61. |
| DARTEVELLE, E. and CASIER, E. | 1943 | Les poissons fossiles du Bas-Congo et des régions voisines. 1e partie. <i>Ann. Mus. Congo. belge</i> , Bruxelles 2: 1-200, pls. 1-16. |
| | 1949 | Les poissons fossiles du Bas-Congo et des régions voisines. 2e partie. <i>Ann. Mus. Congo. belge</i> , Bruxelles 2: 201-256, pls. 17-22. |
| | 1959 | Les poissons fossiles du Bas-Congo et des régions voisines. 3e partie. <i>Ann. Mus. Congo. belge</i> , Bruxelles 2: 257-568, pls. 23-39. |
| PRIEM, F. | 1909 | Note sur des poissons fossiles des Phosphates de Tunisie et d'Algérie. <i>Bull. Soc. Geol. Fr.</i> , 4, T.9, 315-324. |



- Plate 1. 1. *Archaeomanta melenhorsti* n.sp. Holotype. Coll. C.G.H. No. 53W 71-3. Sables de Mons en Pevele Egem, Belgium.
 1a, lateral view; 1b, oblique view of external profile; 1c, external view, slightly oblique; 1d, external view; 1e, basilar view. All x 20.
2. *Archaeomanta priemi* n.sp. Holotype. Coll. C.G.H. Thanetian of Sidi Daoui, Ouled Abdoun, Morocco.
 2a, lateral view; 2b, lateral slightly oblique view; 2c, external view; 2d, external oblique basilar view; 2e, basilar view. All x 20.

