

## REVISION OF SOME SPECIES OF CENOMANIAN CAPRINID RUDISTS INSTITUTED BY G. G. GEMMELLARO IN 1865

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### ABSTRACT

Gemmellaro erected in 1865 the species *Caprinella caput-equi*, *C. baylei*, *C. gigantea*, *C. sharpei* and *C. bicarinata*. In 1887 Douvillé suggested that the genera *Caprinella* d'Orbigny 1847 and *Ichthyosarcolites* Desmarest, 1812 were synonyms and should be grouped under *Ichthyosarcolites*. However, only the species *C. bicarinata* should be referred to *Ichthyosarcolites*, whereas all the other species clearly belong to other caprinids.

The revision of the specimens of Gemmellaro housed in the Palaeontological Museum of the Department of Geology and Geodesy of the University of Palermo, allowed the authors to state that *Caprina carinata* (Boehm; 1892) is a synonym of *Caprina baylei* Gemmellaro, 1865. As *Caprina carinata* was erected later than the species of Gemmellaro, it is suggested that *C. baylei* is to be considered the valid species. *Caprina carinata* (Boehm) and also *C. caput-equi* Gemmellaro are regarded as synonyms of *C. baylei*.

The species named by Gemmellaro *Caprinella gigantea* have the characteristics of the genus *Neocaprina* Plenicar, 1961. In this case also by right of priority the valid species is *Neocaprina gigantea* (Gemmellaro, 1865). About the species catalogued as *Caprinella sharpei* by Gemmellaro (1865) is really a *Schiosia* and the valid name is *Schiosia sharpei* (Gemmellaro, 1865).

Key words: Caprinid rudists, *Caprina*, *Caprinella*, *Neocaprina*, Cenomanian, Italy.

### RESUMEN

Gemmellaro erigió en 1865 las especies *Caprinella caput-equi*, *C. baylei*, *C. gigantea*, *C. sharpei* y *C. bicarinata*. En 1887 Douvillé sugirió que los géneros *Caprinella* d'Orbigny, 1847 e *Ichthyosarcolites* Desmarest, 1812, eran sinónimos y deberían agruparse en *Ichthyosarcolites*. Sin embargo, sólo la especie *C. bicarinata* debe ser referida a *Ichthyosarcolites*, en tanto que las otras especies claramente pertenecen a otros caprinidos.

La revisión de los ejemplares de Gemmellaro que están depositados en el Museo de Paleontología del Departamento de Geología y Geodesia de la Universidad de Palermo, permitió reconocer que *Caprina carinata* (Boehm, 1892) es un sinónimo de *Caprina baylei* Gemmellaro, 1865. Como *Caprina carinata* fue erigida después de la especie de Gemellaro, se propone que *C. baylei* sea considerada la especie válida. *Caprina carinata* (Boehm) y también *C. caput-equi* Gemmellaro son considerados sinónimos de *C. baylei*.

La especie denominada por Gemmellaro *Caprinella gigantea* tiene las características del género *Neocaprina* (Plenicar, 1961). En este caso por derecho de prioridad la especie válida es *Neocaprina gigantea* (Gemmellaro, 1865). Respecto a la especie catalogada como *Caprinella sharpei* por Gemmellaro (1865) es realmente una *Schiosia* y el nombre válido es *Schiosia sharpei* (Gemmellaro, 1865).

Palabras clave: Rudistas caprinidos, *Caprina*, *Caprinella*, *Neocaprina*, Cenomaniano, Italia.

### INTRODUCTION

As part of a revision of the rudist fauna studied by Gaetano Giorgio Gemmellaro about the middle of last century and at present deposited in the Palaeontological Museum of the Department of Geology and Geodesy of the University of Palermo, some samples were examined attributed by the author to the genus *Caprinella*. Already some years ago one of us (Sirna, 1982) in a paper about some rudists of the Cenomanian of Monte Pellegrino had pointed out the advisability of reviewing the caprinellas of Gemmellaro, because modern systematic requires a different taxonomic attribution of the species described by this author. The species with which this review is concerned are: *Caprinella caput-equi*, *C. baylei*, *C. gigantea*,

*C. sharpei* and *C. bicarinata*. Several specimens of them were found by Gemmellaro in the surroundings of Palermo, particularly in the locality Valdesi, and the authors have studied their external and internal characteristics by operating transverse sections for this purpose. We have obviously taken into account the author's descriptions and considerations and we have tried to reconstruct the history of the genus *Caprinella*, by examining the rich bibliography. From a comparative examination of the original specimens and from the bibliographical indications we reached the taxonomic conclusions that are the subject of this study.

### HISTORICAL AND TAXONOMICAL CONSIDERATIONS

The genus *Caprinella* was instituted in 1847 by d'Orbigny who gave the following description of it..., "valve inférieure très-grande, spirale, ayant jusqu'à trois tours de spire, fixée aux corps sous-marins sur sa longueur, déprimée, trian-

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gulaire, pourvue en dehors d'une expansion en aile toute perforée, ainsi que le reste, par un ensemble de très nombreux tubes capillaires égaux, compris entre les deux parois interne et externe. Intérieur déprimée, ovale, irrégulier. Valve supérieure identique de forme, mais seulement bien plus court, arquée et conique; elle paraît être unie à l'autre sans charnière." As type of the new genus he proposed the species *Ichthyosarcolites triangularis* Desmarest, 1812 so he considered the genus *Ichthyosarcolites* to be a synonym of *Caprinella* but did not pose any problem of priority. From the description one can also see that the author confused the upper valve with the lower one and viceversa. Sharpe (1850), considering the division of the caprinellas into *Caprinula* and *Caprinella* made by d'Orbigny to be unnatural, fused them in the single genus *Caprinula* d'Orbigny, 1847, therefore considering the genus *Caprinella* to be a synonym of the latter. This fusion was accepted by Woodward (1851-1856). Bayle (1857) also operated a fusion but he included in the genus *Caprina* all the caprinids, the caprinulids, the caprinellids and part of the caprotinids of d'Orbigny.

Gemmellaro (1865) stated that there was a great systematic uncertainty regarding all these forms, so that "...some palaeontologists follow d'Orbigny, others Woodward and many Bayle". He said, however, that having had the possibility to collect more than five hundred specimens in the vicinity of Palermo, he had the opportunity to know the internal structure and the arrangement of the cardinal apparatus of the various genera of the family Caprinidae. He was therefore able to give the following description of the genus *Caprinella*, putting the genus *Caprinula* in synonymy, contrary to what Sharpe (1850) had proposed: "An irregular, inequivalve, adherent shell, provided with growth lines, and a ligamentary groove that extends from one apex to the other going through the cardinal face of the shell. Lower valve with the shape of an elongated funnel, conical, spiral, carinate, adherent by the apex or by one side. Upper valve arcuate, convex or coiled up. Carinal edge more or less arched....The two valves have several orders of large or capillar, more or less round and ovular, marginal canals which, starting from the apexes, open only at their edge".

Douvillé (1887) considered that the genera *Caprinella* d'Orbigny, 1847, and *Ichthyosarcolites* Desmarest, 1812, were synonymous, and so he thought the genus *Ichthyosarcolites* was valid, because of priority, and put the genus *Caprinella* in synonymy with the latter.

Kühn (1932) also, in his Fossilium Catalogus, thought the genus *Ichthyosarcolites* was valid. This validity is confirmed in the last general review of the rudist by Dechaseaux and Coogan in Moore (1969).

However, as has already been mentioned (Sirna, 1982) not all the species attributed by Gemmellaro to the genus *Caprinella* can be included in *Ichthyosarcolites*; in reality only the species which had been named *Caprinella bicarinata* by Gemmellaro becomes *Ichthyosarcolites bicarinatus* (Gemmellaro). The other species that were mentioned at the begin-

ning of this study, namely *Caprinella caput-equi*, *C. baylei*, *C. sharpei*, are to be considered species belonging to the genus *Caprina*. *Caprinella gigantea* is considered species belonging to the genus *Neocaprina*. Since Sharpe (1850) considered, as have been seen, *Caprinella* as synonym of *Caprinula*, and since Woodward (1855) also accepted this interpretation, and since Gemmellaro (1865), although recognising the validity of *Caprinella* on *Caprinula*, in any case considered them synonyms so that his species described under the genus *Caprinella* are catalogued in *Caprinula*, it will be well to make a comparative analysis of these two genera.

When describing the genus *Caprinula* for the first time, d'Orbigny (1847) expressed himself as follows: "...Coquille fixée, testacée, très-épaisse, de texture fibreuse, très-inequivalve. Valve inférieure très-longue, conique, fixée aux corps sous-marins par l'extrémité de son crochet, et s'élargissant ensuite en cornet, marquée extérieurement d'un sillon longitudinal. Entre les parois internes et externes se trouve une série de canaux arrondis ou anguleux, les uns grands près du bord interne, les autres petits entre les premiers et la paroi externe qui perforent partout, en long, l'épaisseur de la coquille. Valve supérieure volumineuse, contournée une spirale oblique, formée d'un à deux tours, lisse en dehors, mais pourvue dans l'intérieur du test de canaux analogues à ceux de l'autre valve...". He therefore pointed out that in the thickness of the shell there is a series of rounded or polygonal canals, the largest of which are near the internal edge, while the others, which are smaller, are between the first canals and the external part of the shell. On the basis of this description and of the only species illustrated by d'Orbigny (*Caprinula boissyi*, plate 540) his distinction from the genus *Caprinella* d'Orbigny (= *Ichthyosarcolites*), in which the canals are all small, round or oval and affect the whole thickness of the shell, is clear.

Also by comparing the genus *Caprina* with the genus *Caprinula*, the substantial differences in the disposition of the canals can be seen. In the genus *Caprina* the laminae that delimit the canals between the internal and external parts of the shell are single or bifurcated or polyfurcated, while in *Caprinula*, as already mentioned, there are polygonal or rounded tubules arranged in various orders.

Since it has been ascertained that *Caprinella* is a synonym of *Ichthyosarcolites* and that the genera *Caprinula* and *Caprina* are valid, we will now examine the original samples that Gemmellaro described as *Caprinella*, in order to see to which of these genera to attribute them.

## DESCRIPTION OF THE MATERIAL

Three specimens are available of left valves indicated by the numbers 78, 77, 77a; specimen of right valve indicated by the authors with the number 76; and an almost complete specimen (illustrated by Gemmellaro) indicated by the number 80; another specimen of right valve indicated by the number 91; a specimen of left valve (illustrated by Gemmellaro) indi-

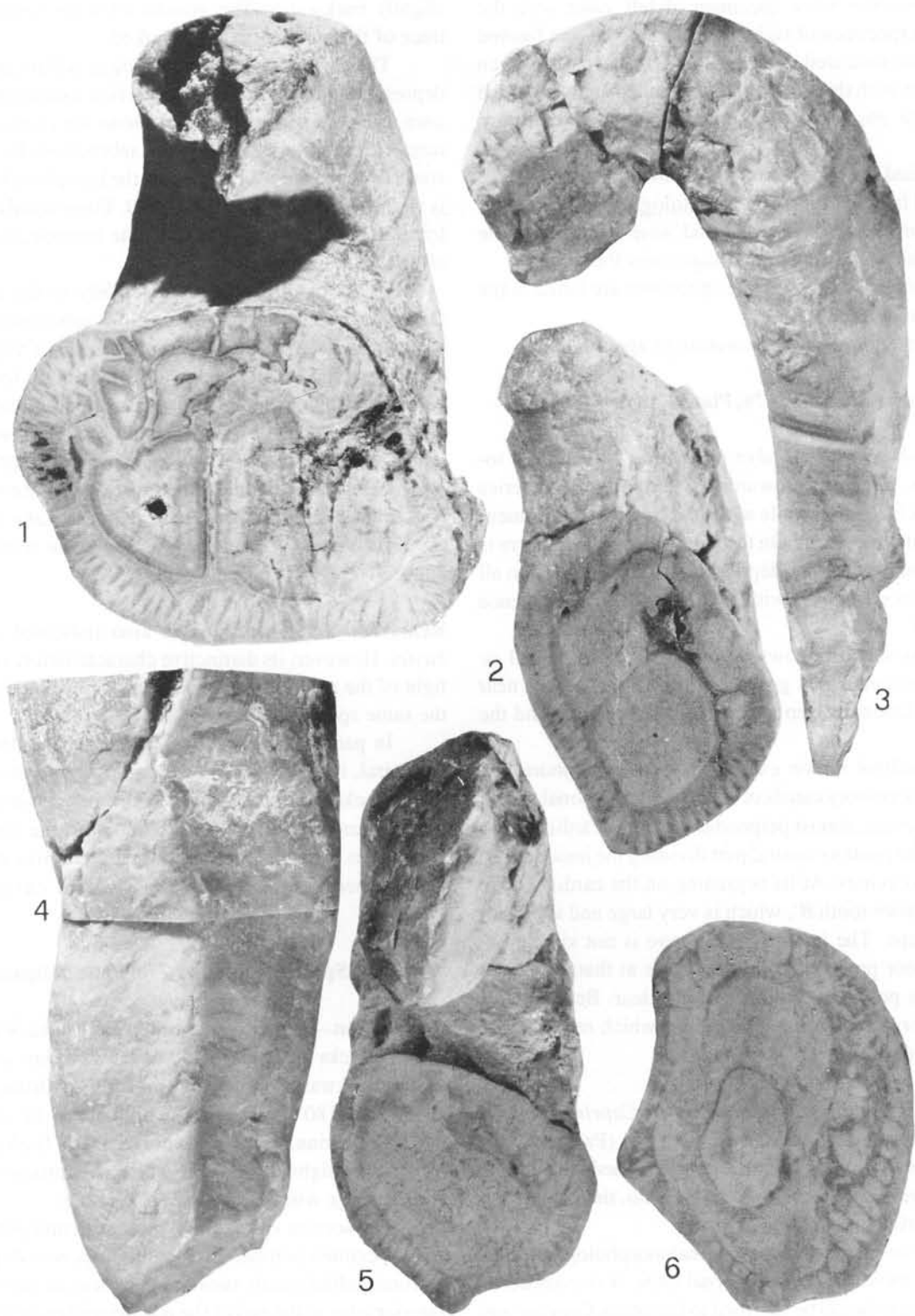


Plate I. Figure 1—*Caprina baylei* (Gemmellaro, 1865) ex *Caprinella caput-equi* Gemmellaro, 1865. Left valve; note the transversal lamina and the bifurcate laminae in the pallial zone and in the carina. Upper Cenomanian, x 0.6. Figure 2—*Caprina schiosensis* Boehm, 1892 ex *Caprinella baylei* Gemmellaro, 1865. Left valve. Teeth *B* and *B'* are visible. Upper Cenomanian, natural size. Figure 3—*Caprina baylei* (Gemmellaro, 1865) ex *Caprinella caput-equi* Gemmellaro, 1865. Complete specimen illustrated by Gemmellaro (1865, pl. 3, fig. 1). Upper Cenomanian, x 0.8. Figures 4, 6—*Caprina baylei* (Gemmellaro, 1865) ex *Caprinella baylei* Gemmellaro, 1865. 4, right valve with its characteristic carina. Upper Cenomanian, x 0.6; 6, cross-section of the same valve partly recrystallized, x 0.9. Figure 5—*Caprina baylei* (Gemmellaro, 1865) ex *Caprinella baylei* Gemmellaro, 1865. Left valve with robuste carina flanked by two marked depressions. Upper Cenomanian, natural size.

cated by the number 83; a specimen of left valve with the number 101; a specimen of right valve (described and figured by Gemmellaro) indicated with number 21/c/101; a specimen of the left valve with the number 88. A detailed analysis of the most important morphological characteristics is therefore given below.

The studied specimens are part of the Gemmellaro collection housed in the "Museo di Paleontologia G. G. Gemmellaro" of the University of Palermo and were collected in the vicinity of Valdesi and Addaura villages near Palermo.

The numbers which mark the specimens are listed in the catalogue of this Museum.

The outcrops are late Cenomanian in age.

#### Specimen number 78, Plate 2, figure 4

**Description**—A coiled left valve presenting closed spire towards the apex, more open towards the commissure. A series of growth lines is hardly visible while the trace of the ligamentary groove is more evident. On the antero-ventral part there is a weak carina not flanked by depressions; the cross-section all along the valves is suboval with a right angle in coincidence with the carina.

The cross-section shows a uniform series of oval or pyriform pallial canals that goes from the anterior edges near the myophore lamina *ma* up to the posterior edge behind the tooth *B*.

In the cardinal region externally to the myophore *ma*, there are large accessory canals of rounded or polygonal shape. A transverse lamina, almost perpendicular to the cardinal edge extends up to the postero-ventral part dividing the inside of the valve into two cavities. At its beginning on the cardinal edge there is the anterior tooth *B'*, which is very large and subquad-rangular in shape. The ligamentary groove is not visible because of the poor preservation of the valve at that point, but the trace of the posterior tooth *B* is quite clear. Between this and the anterior one there is the socket *n* which received the tooth *N* of the right valve.

**Remarks**—This specimen is catalogued as *Caprinula baylei* at the list of the samples of Monte Pellegrino (Palermo) collected by Gemmellaro who, as already mentioned, considered the genus *Caprinula* a synonym of *Caprinella*, the genus used by him to describe his *Caprinella baylei*.

From the description of the external morphological characteristics but above all of the internal ones, it is considered that this specimen should be ascribed to the genus *Caprina* and to the species *Caprina schiosensis* Boehm 1892.

#### Specimen number 77, Plate 1, figure 5

**Description**—A coiled left valve with open, flat spiral. The coiling axis forms with the cardinal edge an angle of about 110°; it lacks the apex, but it denotes the tendency to shift

slightly backwards. The growth lines are hardly visible, the trace of the ligament is well marked.

The carina, which is very robust, is flanked by two wide depressions and gives the cross-section a subtriangular appearance. In cross-section the shell shows the characteristic structure of the caprinids. A series of subrectangular pallial canals starts from the anterior edge near the myophore lamina *ma* and is visible up to the posterior tooth *B*. These canals are delimited by simple, bifurcate and polyfurcate laminae; the latter above all in the carina zone.

In the cardinal region, externally to the anterior myophore *ma*, spacious accessory cavities subcircular in shape are very evident. A transverse lamina forms a slightly oblique angle with the cardinal edge and extends up to the posterior edge, dividing the inside of the valve into two cavities. At one end of it there is the anterior tooth *B'*; the posterior tooth *B* which is smaller and has an elongated oval shape, is immediately behind the ligamentary groove. Between this and the socket anterior tooth there is the dental socket *n* of the tooth of the right valve; it forms an oblique angle with the cardinal edge.

**Remarks**—This specimen is also indicated as *Caprinula baylei*. However, its distinctive characteristics, analysed in the light of the most recent knowledge, show clearly that it is not the same specimen number 78.

In particular, the coiling level and the development of the spiral, the orientation of the transverse lamina and of the dental socket *n*, but mostly the extremely pronounced carina, the subtriangular shape of the section and the laminae that are sometimes bifurcate and polyfurcate, confirm the attribution of our specimen to the species *Caprina carinata* (Boehm, 1892).

#### Specimen number 77a, Plate 1, figure 2

**Description**—It is again a coiled left valve with open, flat spiral. It lacks the apical part, but shows a very slight tendency to shift backwards. Its coiling axis forms with the cardinal edge an angle of 180°; as in practice both are at the same level.

The carina, with a wide curvature, is flanked on the side by a very slight depression while it continues towards the anterior edge with a continuous curvature.

The section shows the typical structure of the caprinids; as in specimen number 78, a continuous row of pyriform and uniform pallial canals runs the thickness of the shell from the anterior edge to the end of the posterior edge, near the ligamentary groove *L*.

A transverse lamina divides the inside of the valve into two cavities; it joins the anterior tooth *B'*, of subsquare shape, to the posterior ventral region. The posterior tooth *B* has an elongated oval shape. A series of spacious rounded shape accessory cavities is present in the anterior region of the cardinal platform.

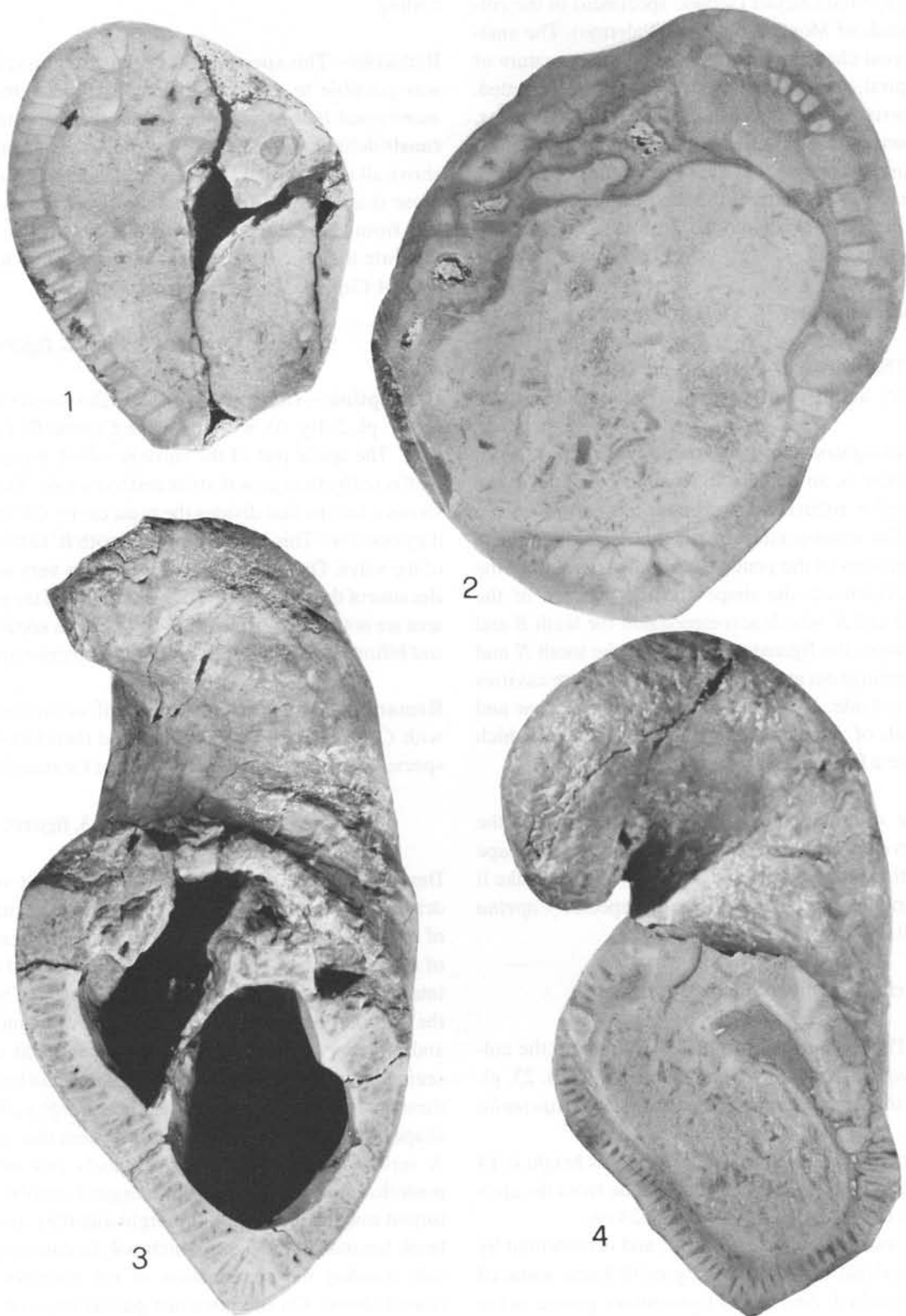


Plate 2. Figures 1, 2—*Neocaprina gigantea* (Gemmellaro, 1865) ex *Caprinella gigantea* Gemmellaro, 1865; 1, left valve with teeth *B-B'*, the transversal lamina, the large subrectangular canals and the compact shell in the anterior area of pallial zone. Upper Cenomanian, x 0.8; 2, right valve, not described in the text, with the subquadrate tooth *N* and the alveoli *b-b'*. Upper Cenomanian, x 0.8. Figure 3—*Caprinella baylei* (Gemmellaro, 1865) ex *Caprinella caput-equi* Gemmellaro, 1865. Left valve with transversal lamina, bifurcate laminae and their characteristic carinae; note teeth *B-B'*. Upper Cenomanian, x 0.6. Figure 4—*Caprina schiosensis* Boehm, 1892 ex *Caprinella baylei* Gemmellaro, 1865. Left valve; note the simple laminae. Upper Cenomanian, x 0.9.

**Remarks**—Like the two preceding ones, this specimen also is catalogued as *Caprinula baylei* (second specimen) in the collection of caprinids of Monte Pellegrino (Palermo). The analysis of the external characteristics points out the curvature of the open, flat spiral, and the carina that is not too accentuated.

The analysis of the internal characteristics however, shows a continuous uniform series of pyriform, pallial canals, separated by simple laminae that are never bifurcate or polyfurcate. From these considerations the conclusion is drawn that the specimen in question should be attributed to *Caprina schiosensis* Boehm, 1892.

#### Specimen number 76, Plate 1, figures 4, 6

**Description**—That is one of the few right valves in the Museum of Palermo, and it was classified by Gemellaro as *Caprinella baylei*.

Conical, elongated shape, of small size, with marked growth lines; there is an evident ligamentary groove in the cardinal area and a robust, very pronounced carina on the opposite side. The cross-section of roughly triangular shape has the characteristics of the genus *Caprina*. In particular, the following are evidenced: the shape and the position of the dental sockets *b* and *b'* which accommodated the teeth *B* and *B'* of the left valve, the ligamentary groove, the tooth *N* and the myophore laminae *ma* and *mp* with large accessory cavities *oma* and *omp*, outside. In the pallial area between *oma* and *omp*, small canals of subrectangular shape can be seen, which are arranged like a fan at the carina.

**Remarks**—The subtriangular shape of the shell due to the considerable development of the carina, but above all the shape and the disposition of the pallial and accessory canals, make it possible to attribute this specimen to the species *Caprina baylei* Gemellaro, 1865.

#### Specimen number 80, Plate 1, figure 3

**Description**—That is the only complete specimen in the collection and it was illustrated by Gemellaro (1865, p. 23, pl. 3, figs. 1-4) in the description of the new species *Caprinella baylei*.

The size of the specimen is small; in fact, its height is 14 cm, while the total length along the ventral side from the apex of the left valve to that of the right valve is 25 cm.

The right valve is conical in shape, and ornamented by very thin longitudinal ribs, and thick growth lines, some of which are very marked. An evident ligamentary groove in the anterior zone and on the opposite side, a robust carina, is flanked by two marked depressions. This carina, which continues with the same characteristics on the left valves, gives the cross-section a subtriangular shape.

Besides the continuation of the carina and of the ligamentary groove the left valve has an ornamentation of thick

and thin growth lines. Its apex, incomplete, indicates a spiral coiling.

**Remarks**—This specimen has been cut transversely so that it was possible to examine the internal characteristics. It was ascertained that besides the carina, there are present suboval canals delimited by laminae, simple, bifurcate and polyfurcate above all in the pallial area. These characteristics together with those that emerged from the analysis of the external surface and from the general shape of the shell make it possible to attribute the specimen to *Caprina carinata*, which is a synonym of *Caprina baylei* Gemellaro.

#### Specimen number 83, Plate 2, figure 3

**Description**—That is the left valve illustrated by Gemellaro (1865, pl. 2, fig. 6), with the name *Caprinella caput-equi*.

The apical part of the valve is coiled; the external surface is affected by faint growth striae and by erosion. The cross-section shows a lamina that divides the main cavity *CV* from the secondary one *n-n'*. This lamina joins the tooth *B'* to the posterior part of the valve. On the ventral side a carina is very well developed. Because of the poor preservation, the canals of the postero-ventral area are not clearly visible, while oval canals separated by simple and bifurcate lamina can be seen in the anterior area.

**Remarks**—This specimen is identical, in structure of the shell, with *Caprina carinata* (Boehm), and therefore like the latter species is synonym of *Caprina baylei* Gemellaro, 1865.

#### Specimen number 91, Plate 3, figures 1, 3

**Description**—It is a fragment of a large right valve of cylindrical-conical shape. The external surface is smooth because of erosion and clearly shows, throughout its length, the trace of the ligamentary groove. On the upper face of the valve, the internal characteristics of the shell are revealed by erosion. On the cardinal edge the narrow, elongated ligamentary groove and a series of narrowly oval small marginal canals can be seen; they are delimited by thin laminae, often bifurcate. Inside these marginal canals there are others, large and of polygonal shape, which occupy all the cardinal area that is rather thick. A series of large subtriangular canals can be seen on the posterior side behind the thin marginal canals; their apex is turned towards the external margin and they are delimited by thick laminae at the base, which polyfurcate towards the outside forming the continuation of the marginal canals mentioned above. On the posterior pallial edge (at least for the present tract) the subtriangular canals become smaller, occupy a smaller shell thickness and are intercalated by thin oval canals. The anterior pallial-dorsal area is rather thick, and it includes in the more internal part the cavity *b'* of the rounded tooth *B'* and in the more external part a series of large canals mostly of subquadrangular shape.



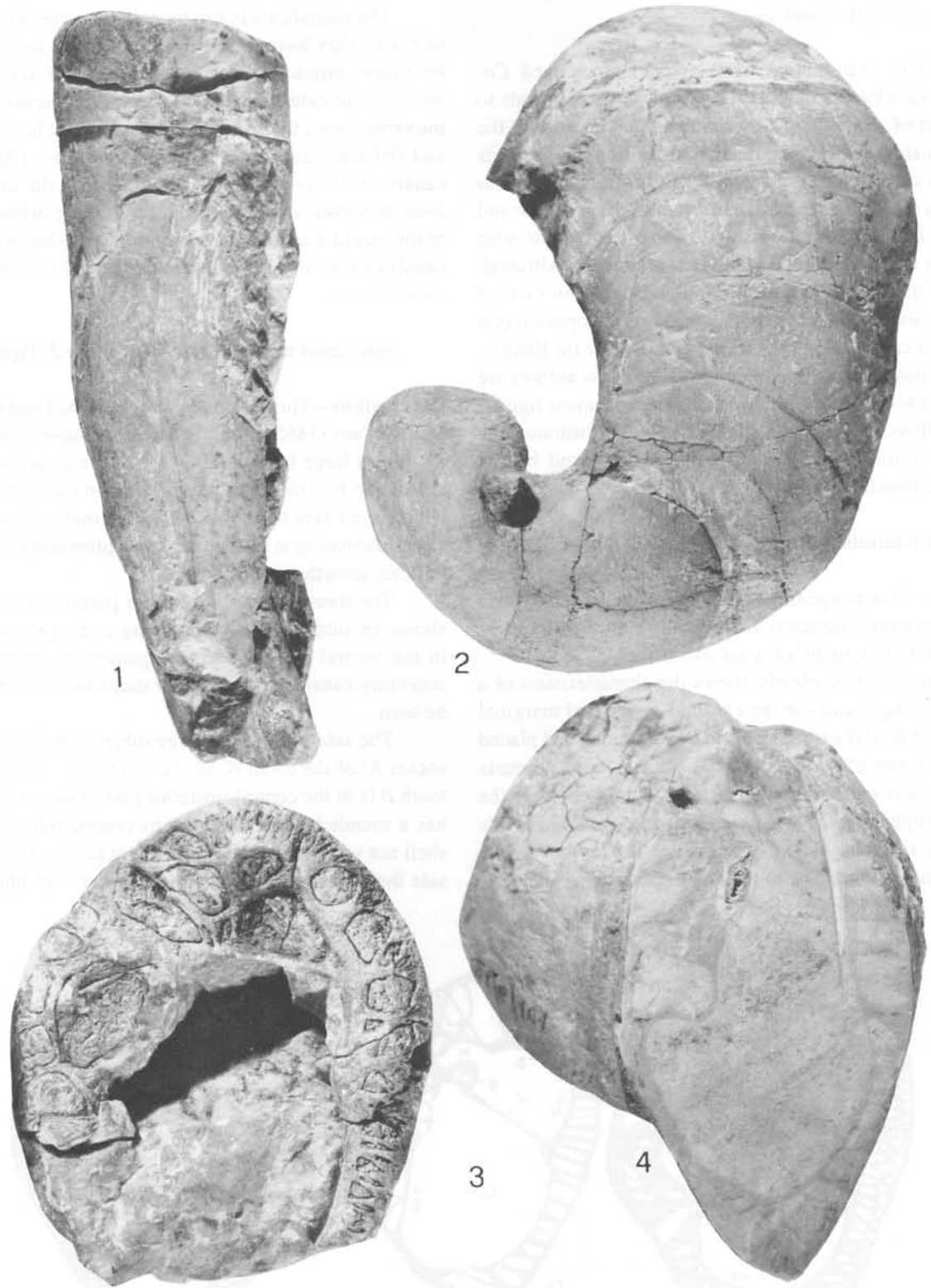


Plate 3. Figures 1, 3—*Schiosia sharpei* (Gemmellaro, 1865) ex *Caprinella sharpei* Gemmellaro, 1865. 1, right valve, illustrated by Gemmellaro (1865, pl. 4, fig. 3). Upper Cenomanian, x 0.5; 3, partial view of the upper part of the same valve with large subtriangular canals and large accessory canals in the cardinal region. Upper Cenomanian, x 0.9. Figures 2, 4—*Neocaprina gigantea* (Gemmellaro, 1865) ex *Caprinella gigantea* Gemmellaro, 1865. 2, lateral view of the left valve with growth striae and commissure with the right valve. Upper Cenomanian, x 0.5; 4, cross-section of the right valve of the same specimen with subquadrangular canals, thin shell, the tooth *N* and the compact shell in the anterior pallial region, x 0.8.

In the centre of the cardinal area there are the quadrate tooth *N* delimited by the pallial cavity *CV*, the accessory canals and the cavity *b* of the tooth *B*.

**Remarks**—The examination of this specimen named *Caprinella sharpei* by Gemmellaro (1865, pl. 4, fig. 3), leads to consider first of all that it is a caprinid and that because of the morphological characteristics and the disposition of the canals it should be attributed to the genus *Schiosia*. In fact, peculiar to this genus are the large ogival canals along the posterior and ventral part of the shell alternating towards the outside with smaller oval canals delimited by bifurcate laminae. Although a portion of the ventral part of the shell is lacking, in view of all the recognisable characteristics, we are of the opinion that the specimen can be attributed to the genus *Schiosia* Boehm, 1892 as *Schiosia sharpei* (Gemmellaro, 1865). The authors are also inclined to attribute to this species the specimen figured by Gemmellaro (1865, pl. 3, fig. 7), which illustrates the transverse section of a fragment of shell attributed by the author to *Caprinella gigantea* n. sp.

#### Specimen number 101, Plate 2, figure 2, Figure 1, b

**Description**—It is a large fragment of left valve arched to form a coil. The external surface is eroded and smooth with only a few traces of faintly undulating growth striae.

The cross-section clearly shows the characteristics of a caprinid, *i.e.*, large canals in the cardinal region and marginal canals in the pallial region. The tooth *B'* is rounded and placed in front of a series of wide accessory canals; a lamina departs from it and ends on the internal surface of the shell near the posterior myophore *mp*. This lamina separates the main cavity *CV* from the secondary one *n-n'*, in which the tooth *N* of the right valve is inserted. The tooth *B*, subquadrate in shape, is

situated in the posterior dorsal part of the cardinal area, opposite to the tooth *B'*.

The pallial canals can be seen very clearly on the posterior side; they have a subrectangular shape and are delimited by simple laminae which, at the points of contact with the internal and external walls of the valve, thicken the shell. In the ventral zone there is a carina in which the laminae are radial and delimit canals of subtriangular shape. Other marginal canals, still subrectangular, are present in the anterior pallial zone; however, a portion of shell is missing in the anterior part of the cardinal area. A portion of compact shell not affected by canals can be seen between the carina and the anterior canalliculate zone.

#### Specimen number 21/c/ 101, Plate 3, figures 2, 4

**Description**—This specimen was described and illustrated by Gemmellaro (1865, pl. 3, figs. 5-8) as *Caprinella gigantea* n. sp. It is a large left valve, in which the commissure and the apical part that indicates a spiral torsion are visible. The shell, which is not very thick, has on the external surface thin growth striae alternating at times, with more pronounced wrinkles that indicate growth megarhythms.

The transverse section of the portion of the right valve shows an antero-posterior crushing and a pronounced carina in the ventral part. A narrow ligamentary groove and large accessory canals with polygonal shape in the cardinal area can be seen.

The anterior side has large subrectangular canals and the socket *b'* of the tooth *B'* of the left valve. The socket of the tooth *B* is in the central-posterior part of the cardinal area and has a rounded shape. The antero-ventral side has a compact shell not very thick, and it is without canals. On the posterior side the canals are large, subrectangular with blunted corners

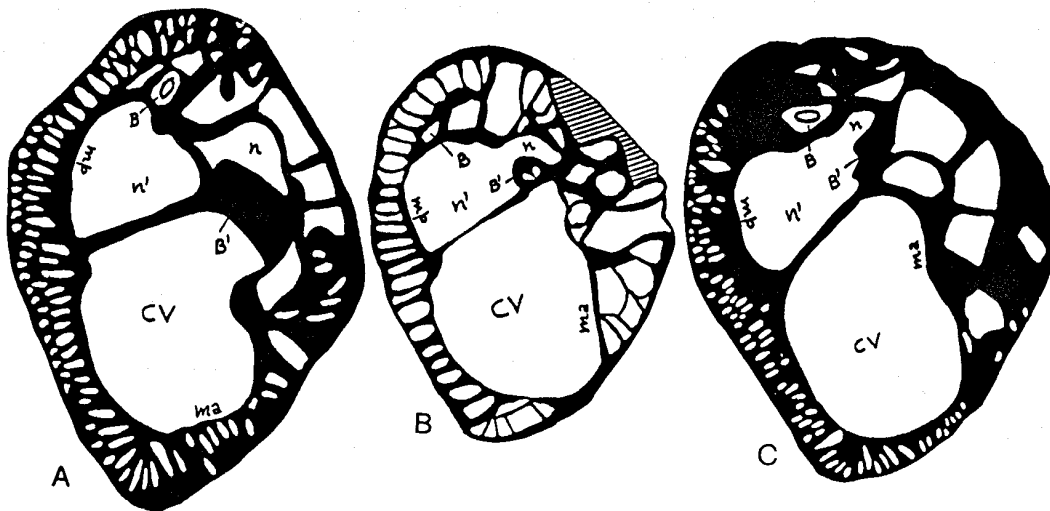


Figure 1. Cross-section of the following species: A, *Caprina baylei* (Gemmellaro, 1865) ex *Caprinella caput-equi* Gemmellaro, 1865; B, *Neocaprina gigantea* (Gemmellaro, 1865) ex *Caprinella gigantea* Gemmellaro, 1865; C, *Caprina baylei* (Gemmellaro, 1865) ex *Caprinella baylei* Gemmellaro, 1865. Specimen not described. *B-B'* = teeth; *ma* = anterior myophore lamina; *mp* = posterior myophore lamina; *CV* = main cavity; *n-n'* = secondary cavities.



and are separated by simple laminae. The ventral area which, as already mentioned, is carinate, has rectangular and subtriangular canals with fan-wise simple laminae.

**Remarks**—From this description and that of specimen 101, it is deduced that the most evident characteristics are represented mainly by the thinness of the shell, in contrast with the large size of the valves, by the large subrectangular pallial canals, by the presence of the carina and above all by the antero-ventral portion of the shell which is compact and without canals. These characteristics, particularly the last one, are typical of *Neocaprina gigantea* Plenicar, 1961.

Considering, therefore, the identity of this last species with the specimens described and illustrated by Gemmellaro (1865) as *Caprinella gigantea*, it follows that the species *Neocaprina gigantea* (Gemmellaro, 1865) is to be considered valid.

#### Specimen number 88, Plate 1, figure 1, Figure 1, a

**Description**—It is an incomplete left valve whose apex is curved to start the torsion. The external surfaces, smooth and affected by partial erosion, show marked growth striae, probably indicating megarhythms, and among them very thin, faintly undulate striae. On the ventral side there is a protruding, acute carine that starts from the apex and runs through all the valve; on one side it is delimited by a faint depression, while on the other it continues with a regular curvature.

The cross-section shows the wide cardinal area affected by large, mostly marginal and subrectangular accessory cavities. A lamina, starting from the subquadrangular tooth *B*, is inserted in the internal part of the posterior wall near the myophore *mp*; it separates the main cavity *CV* from the secondary one *n-n'* in which the tooth *N* of the other valve is inserted. A row of suboval canals, larger towards the internal part, alternating with more external, suboval but considerable smaller ones and delimited by bifurcate laminae is present in the shell portion between the tooth *B* and the myophore *ma*. In the area of the carina the bifurcations are more evident and delimit elliptical canals fan-wise disposed.

**Remarks**—This large fragment of a left valve, called *Caprinella caput-equi* by Gemmellaro (1865, pl. II, fig. 5), has all the characteristics of *Caprina carinata* (Boehm). Moreover, the fig. 9 of pl. II of the same study, in which the oval-shaped canals and bifurcate laminae can be seen, is a further proof that the specimens described by Gemmellaro (1865) as *Caprinella caput-equi* should really be attributed to *Caprina carinata* (Boehm), which is a synonym of *C. baylei* Gemmellaro.

#### TAXONOMICAL CONCLUSIONS

From what has been said the following conclusions emerge:

1—The species that Gemmellaro (1865) described as *Caprinella caput-equi*, *C. baylei*, *C. gigantea*, and *C. sharpei* really belong to different genera from *Caprinella* which, as already mentioned, is considered to be a synonym of *Ichthyosarcolites*.

From detailed analysis of the external and internal morphological characteristics it appears that specimen numbers 77, 76, 80, catalogued and described as *Caprinella baylei* have the characteristics of *Caprina carinata* (Boehm). Also specimens number 83 and number 88 catalogued as *Caprinella caput-equi* belong really to *Caprina carinata*. The left valve specimen, illustrated in Gemmellaro (1865, pl. 4, fig. 2) as *Caprinella sharpei*, at the transverse section has shown really to have the characteristics of *Caprina carinata*; in fact, besides the characteristic carina it also has bifurcate and polyfurcate laminae.

Now, since *Caprinella baylei* and *C. caput-equi* were described and illustrated by Gemmellaro (1865) before *Caprina carinata* (Boehm, 1892), according to the International Code of Zoological Nomenclature, they have priority over Boehm's species. But, as it has already been said in the description of the specimens, *Caprinella caput-equi* and *Caprinella baylei* have identical characteristics as regards both the presence of the carina, and the shape of the canals and of the laminae that delimit them. It can therefore be affirmed that the valid species is *Caprina baylei* (Gemmellaro, 1865) and that *Caprinella caput-equi* Gemmellaro and *Caprina carinata* (Boehm) should be considered as synonyms of the former.

2—Specimen numbers 78 and 77a, catalogued as *Caprinula baylei* but neither described nor illustrated by Gemmellaro, have the characteristics of *Caprina schiosensis* Boehm and so they belong to this species.

3—Specimens number 21/c/101 and 101 named by Gemmellaro *Caprinella gigantea* show, as it has been seen from the descriptions, the canals and the internal characteristics that are typical of the genus *Neocaprina* Plenicar, 1961 and particularly of *Neocaprina gigantea* Plenicar, 1961. In this case also by right of priority the valid species is *Neocaprina gigantea* (Gemmellaro, 1865).

4—Specimen number 91, catalogued with the name of *Caprinella sharpei* and illustrated by Gemmellaro (1865, pl. 4, fig. 3), is really a *Schiosia* and so it should be indicated with the name *Schiosia sharpei* (Gemmellaro, 1865).

5—The species *Caprinella bicarinata* is at present known as *Ichthyosarcolites bicarinatus* (Gemmellaro, 1865).

#### SYSTEMATIC APPENDIX

Class Bivalvia Linné, 1758

Order Hippuritoida Newell, 1965

Family Caprinidae d'Orbigny, 1850

Genus *Caprina* d'Orbigny, 1822

***Caprina baylei* (Gemmellaro), 1865**

- 1865 *Caprinella baylei* Gemmellaro, p. 23, pl. III, figs. 1-4.  
 1865 *Caprinella caput-equi* Gemmellaro, p. 22, pl. II, figs. 5-9; pl. IV, fig. 1.  
 1865 *Caprinella sharpei* Gemmellaro, pl. IV, figs. 2-4.  
 1892 *Schiosia carinata* Boehm, p. 13, pl. IX, figs. 1-2.  
 1888 *Caprina schiosensis* var. *carinata* Boehm, Douvillé.  
 1908 *Caprina carinata* (Boehm) Parona, p. 16, text-figs. 13-19.  
 1926 *Caprina carinata* (Boehm) Parona, p. 41.  
 1934 *Caprina carinata* (Boehm) Kutassy, p. 151 (cum syn.).  
 1934 *Caprinella baylei* Gemmellaro, Kutassy, p. 177.  
 1934 *Caprinella caput-equi* Gemmellaro, Kutassy, p. 178.  
 1938 ?*Caprina* sp. Voorwijk, p. 55, pl. 2, fig. 12.  
 1961 *Caprina carinata* (Boehm) Plenicar, p. 40, text-fig. 6.  
 1967 *Caprina carinata* (Boehm) Polšak, p. 38, pl. 12, figs. 1-2.  
 1971 *Caprina carinata* (Boehm) Sirna in Carbone *et al.*, p. 140, text-fig. 5.  
 1982 *Caprina carinata* (Boehm) Sirna, p. 80.  
 1990 *Caprina carinata* (Boehm) Sirna in Accoirdi *et al.*, p. 27.

As can be seen from the list, the specimens named as *Caprinella sharpei* by Gemmellaro (1865, pl. 4, figs. 2, 4) have also been put in synonymy; this is because at the cross-section of the specimen of fig. 2 the specific characteristics of *Caprina baylei* (Gemmellaro) appeared unequivocal, and this can also be said for fig. 4 in which the characteristic polyfurcate laminae are clearly visible.

Genus *Neocaprina* Plenicar, 1961***Neocaprina gigantea* (Gemmellaro, 1865)**

Plate 2, figures 1-2; Plate 3, figures 2, 4; Figure 1, B

- 1865 *Caprinella gigantea* Gemmellaro, p. 24, pl. 3, figs. 5-8.  
 1961 *Neocaprina gigantea* Plenicar, p. 44, fig. 4.  
 1963 *Neocaprina gigantea* Plenicar, Plenicar, p. 567, pl. 3, fig. 5.  
 1964 *Neocaprina gigantea* Plenicar, Behlilovic, p. 44, pl. 7, fig. 5.  
 1965 *Neocaprina gigantea* Plenicar, Sliskovic and Milan, p. 322, fig. 4, pl. 1, fig. 1.  
 1967 *Neocaprina gigantea* Plenicar, Polšak, p. 46, text-fig. 9, 12, 13; pl. 14, figs. 1-2; pl. 15, figs. 1-2; pl. 16, fig. 1.  
 1971 *Neocaprina gigantea* Plenicar, Sirna in Carbone *et al.*, p. 141, text-fig. 7.  
 1982 *Neocaprina gigantea* Plenicar, Sirna, p. 81, text-fig. 3; pl. 1, fig. a.  
 1990 *Neocaprina gigantea* Plenicar, Sirna in Accoirdi *et al.*, p. 27.

## ACKNOWLEDGMENTS

We wish to thank the Curator of the "G.G. Gemmellaro" Palaeontological Museum of the University of Palermo, Dr. E. Burgio, for his kindness and because he made available for us the original material for study. We thank also Mr. Luciano Spinozzi for the photographic service.

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Manuscript received: February 20, 1995.

Corrected manuscript received: May 31, 1995.

Manuscript accepted: June 12, 1995.