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
Desmarets, 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
Plenicer, 1961. In this case also by right of priority the valid species is Neocaprina gigantea
(Gemmellaro, 1865). About the species catalogued as Caprinella sharpei 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
Desmarets, 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
caprínidos.

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 Gemmellaro, 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 (Plenicer, 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 caprínicos, Caprina, Caprinella, Neocaprina, Cenomaniense, 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...
gulaire, pourvue en dehors d’une expansion en aile toute per-
forée, ainsi que le reste, par un ensemble de très nombreux 
tubes capillaires égaux, compris entre les deux parois interne 
et externe. Intérieur déprimé, 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 Ichthyosar-
colites 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 vice versa. Sharpe (1850), considering the division 
of the caprinellas into Caprinula and Caprinella made by d’Or-
bigny to be unnatural, fused them in the single genus Ca-
prinula 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 oper-
a a fusion but he included in the genus Caprina all the 
caprinids, the caprinulids, the caprinellids and part of the 
caproninids of d’Orbigny.

Gemmellaro (1865) stated that there was a great system-
atic 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 Paeremo, 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, pro-
pvided 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 ovalar, marginal valves which, 
starting from the apexes, open only at their edge".

Douville (1887) considered that the genera Caprinella 
d’Orbigny, 1847, and Ichthyosarcolites Desmarest, 1812, 
were synonymous, and so he thought the genus Ichthyosar-
colites was valid, because of priority, and put the genus Ca-
prinella in synonymy with the latter.

Kühn (1932) also, in his Fossilium Catalogus, thought 
the genus Ichthyosarcolites was valid. This validity is con-
firmed in the last general review of the rudist by Dechaseaux 

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 (Gem-
mellaro). The other species that were mentioned at the begin-
nning 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 syno-
nyms so that his species described under the genus Caprinella 
are catalogued in Caprinula, it will be well to make a compara-
tive 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 contexture fibreuse, très-
inéquivalve. Valve inférieure très-longue, conique, fixée aux 
corps sous-marins par l’extrémité de son crochet, et s’élargis-
sant ensuite en cornet, marquée extérieurement d’un sillon 
longitudinal. Entre les parois internes et externes se trouve une 
érie de canaux arrondis ou anguleux, les un grands près du 
bord interne, les autres petits entre les premiers et la paroi 
externe qui perforent partout, en long, l’épaisseur de la co-
quille. 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 boisi, plate 540) 
his distinction from the genus Caprinella d’Orbigny (=Ich-
thyosarcolites), 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 syno-
nym 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 1. Figure 1—Caprina bayeri (Gemmellaro, 1865) ex Caprinella cupi-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 schlosseri Boehm, 1891 ex Caprinella bayeri Gemmellaro, 1865. Left valve. Teeth B and B' are visible. Upper Cenomanian, natural size. Figure 3—Caprina bayeri (Gemmellaro, 1865) ex Caprinella cupi-equi Gemmellaro, 1865. Complete specimen illustrated by Gemmellaro (1865, pl. 3, fig. 1). Upper Cenomanian, x 0.8. Figures 4, 6—Caprina bayeri (Gemmellaro, 1865) ex Caprinella bayeri 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 bayeri (Gemmellaro, 1865) ex Caprinella bayeri Gemmellaro, 1865. Left valve with robust 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 subobval 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 subquadrangular 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 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 about 110°; 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 capriniads; 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 (Gemmillaro, 1865) ex Caprinella gigantea Gemmillaro, 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 (Gemmillaro, 1865) ex Caprinella caput-equi Gemmillaro, 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 Gemmillaro, 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 polyfurate. 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 accommodates 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 polyfurate 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, p. 2, fig. 6), with the name *Caprinella capit-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 polyfurate 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—Schistia 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 subquadranular 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 carinalcule 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 megarythms.

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.

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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 megarythms, 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-equoi* 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-equoi* 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-equoi*, *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 *Ichthyosarcollites*.

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 numbers 83 and number 88 catalogued as *Caprinella caput-equoi* 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-equoi* 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-equoi* 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-equoi* 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 21c/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 *Ichthyosarcollites bicornutus* (Gemmellaro, 1865).

SYSTEMATIC APPENDIX

Class Bivalvia Linne, 1758
Order Hippiuritoida 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-equii 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-equii 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) Polsak, 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 polyfuscarate laminae are clearly visible.

Genus Neocaprina Plenicer, 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 Plenicer, p. 44, fig. 4.
1963 Neocaprina gigantea Plenicer, Plenicer, p. 567, pl. 3, fig. 5.
1964 Neocaprina gigantea Plenicer, Behlilovic, p. 44, pl. 7, fig. 5.
322, fig. 4, pl. 1, fig. 1.
1967 Neocaprina gigantea Plenicer, Polsak, p. 46, text-fig. 9,
12, 13; pl. 14, figs. 1-2; pl. 15, figs. 1-2; pl. 16, fig. 1.
1971 Neocaprina gigantea Plenicer, Sirna in Carbone et al., p.
141, text-fig. 7.
1982 Neocaprina gigantea Plenicer, Sirna, p. 81, text-fig. 3; pl. 1, fig. a.
1990 Neocaprina gigantea Plenicer, Sirna in Accoirdi et al., p. 27.

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