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Holectypoid echinoids from Cenomanian and Turonian strata in the Mons basin (Belgium)

2. Conulus

(with some taxonomic remarks on *C. globosus* and *C. globulus*)

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Abstract

Holectypoid echinoids belonging to the genus *Conulus*, from the Cenomanian Tourtia-deposits of Belgium are systematically revised. SMISER's (1935) identification of some of the species concerned proves to be erroneous.

Key-words: Echinoidea - Cretaceous - Belgium.

Résumé

Des spécimens d'holectypoïdes appartenant au genre *Conulus* et provenant du Tourtia cénomanien de Belgique, sont révisés au point de vue systématique. L'identification spécifique des spécimens concernés, effectuée par SMISER (1935), est parfois erronée.

Mots-clefs: Echinoidea - Crétacé - Belgique.

Introduction

This is the second in a short series of papers, systematically revising the holectypoid echinoids from strata of mid-Cretaceous age in Belgium and adjacent areas. For litho- and biostratigraphical details on these deposits, I refer to ROBASZYNSKI (1979). Fossils from Belgium, belonging to the genus *Conulus* were already described in the 19th century. How the number of named taxa has grown from the work of d'ARCHIAC (1846) to that of SMISER (1935) has been described in my previous note (GEYS, 1993).

Tests of echinoids, belonging to the genus *Conulus*, have been described by WAGNER & DURHAM (1966) as being hemispherical to highly conical, with flat adoral side. The ambulacra include some demiplates. Pore pairs are arranged in a single straight series; the apical system is ethmophract (with four perforate genital plates); the peristome is slightly elongate along the III-5 axis; the periproct is ovate and inframarginal; tubercles are small, numerous and uniformly distributed over all the plates.

From this short description, it is apparent that fossils of *Conulus* are more or less featureless, hemispherical objects, showing preciously few diagnostic features. This virtually leaves us with merely overall shape and size, to distinguish different species.

The collections of the K.B.I.N. include 51 specimens of *Conulus*, from the Cenomanian Tourtia-deposits in the vicinity of Tournai (prov. Hainaut, Belgium). The same specimens have previously been studied by SMISER (1935), who subdivided them into four groups, which he identified as:

Conulus nucula A. GRAS
Conulus subrotundus MANTELL
Conulus subsphaeroidalis d'ARCHIAC
Conulus laevis AGASSIZ

Surveying existing literature on *Conulus*, I soon realised that its specific nomenclature is subject to an almost Babylonian confusion of tongues. In an attempt to untangle at least part of this systematic maze, I measured nine parameters, in all the specimens at my disposal. I did the same for a number of specimens, described and figured in literature, using the published figures. The following measurements have been taken:

- H = height of the test;
- D = ambital diameter of the test, along axis III-5;
- W = ambital diameter, perpendicular to axis III-5;
- h = distance between adoral surface and ambital plane;
- P = diameter of the peristome along axis III-5;
- A = diameter of the periproct along axis III-5;
- a = diameter of the periproct perpendicular to axis III-5;
- S = distance between facing rims of peristome and periproct;
- s = distance between rim III of peristome and rim III of test.

In addition to these dimensions, which I measured with callipers, I calculated some proportions between them: H/D, H/W, W/D, h/H, P/D, A/D, a/A, S/D and s/D.

Using Student's t-test, I was able to distinguish three populations, which differ significantly in several of these parameters and proportions. These populations do not coincide with three of the four "species", pointed out by SMISER (1935). Hence, SMISER's view is urgently in need of revision and correction.

I will try to demonstrate that these populations correspond to three closely related species:

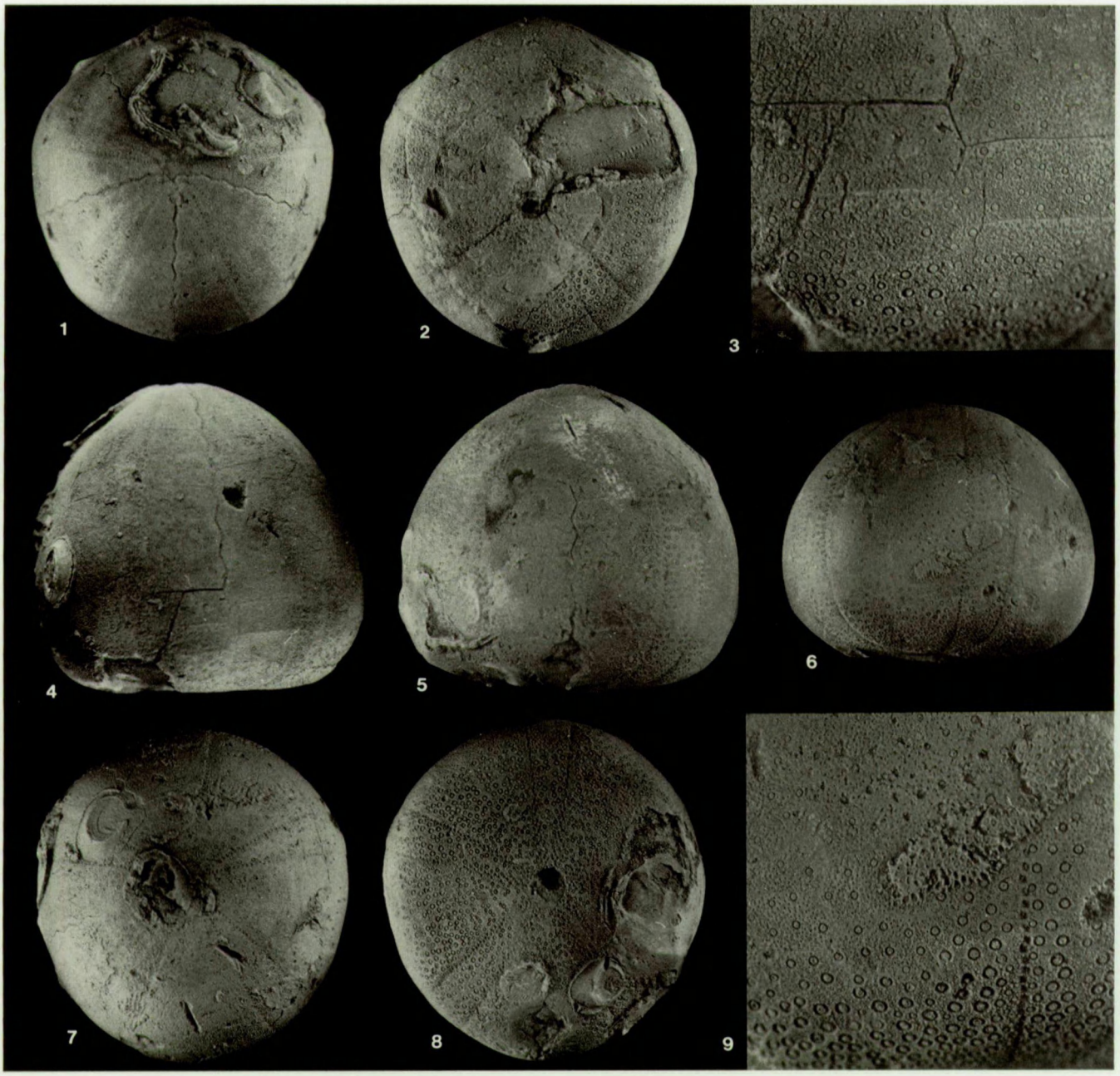

PLATE 1

Figs. 1-4 — *Conulus subrotundus* MANTELL, 1822. IST-9130. Tournai Tourtia (Cenomanian) at Tournai (prov. Hainaut, Belgium).
1, adapical view, x 1,4.
2, adoral view, x 1,4.
3, tuberculation on ambitus, x 3,7.
4, lateral view, frontal to interambulacrum 5, x 1,4.

Figs. 5-9 — *Conulus subrotundus* MANTELL, 1822. IST-9129. Tournai Tourtia (Cenomanian) at Tournai (prov. Hainaut, Belgium).
5, lateral view, frontal to interambulacrum 5, x 1,4
6, lateral view, perpendicular to the plane III-5, x 1,4.
7, adapical view, x 1,4.
8, adoral view, x 1,4.
9, detail of 6, showing tuberculation, x 4.

Conulus subrotundus MANTELL, 1822
Conulus mixtus (DEFRANCE, 1820)
Conulus rhodomagensis (AGASSIZ, 1839)

Conulus castaneus (BRONGNIART, 1822) is frequently confused with *Conulus rhodomagensis* (AGASSIZ, 1839). Although the species is not represented among the specimens from the Tournai Tourtia in the K.B.I.N.-collections, at my disposal, it may be useful to discuss it herein. In synonymy lists, the conventional signs used by DHONDT (1972) are adopted.

Systematic part

Class Echinoidea
Order Holectypoida DUNCAN, 1889
Suborder Echinoneina CLARK, 1925
Family CONULIDAE LAMBERT, 1911
Genus *Conulus* LESKE, 1778

Type species: *Echinites albogalerus* LESKE, 1778; subsequently designated by WAGNER & DURHAM, 1966.

Conulus subrotundus MANTELL, 1822
Pl. 1, Figs. 1 - 9.

* . 1822 *Conulus subrotundus*, MANTELL, p. 191, pl. 17, fig. 15, 18.
. 1836 *Galerites subrotunda*, AGASSIZ, p. 19.
. 1837 *Galerites subrotunda*, DESMOULINS, p. 256.
. 1839 *Galerites subrotunda*, AGASSIZ, p. 7.
. 1840 *Galerites subrotunda*, MILNE EDWARDS in LAMARCK, p. 313.
1840 *Galerites subrotundus*, AGASSIZ, p. 7.
. 1842 *Galerites subrotunda*, DESOR, p. 18, pl. 11, fig. 11-14.
. 1843 *Galerites subrotunda*, MORRIS, p. 53.
* . 1846 *Galerites subsphaeroidalis*, d'ARCHIAC, p. 208, pl. 13, fig. 2.
* ? 1847 *Galerites Leskei*, AGASSIZ & DESOR, p. 149 (T87)
. 1847 *Galerites subrotunda*, AGASSIZ & DESOR, p. 148.
. 1847 *Galerites subsphaeroidalis*, AGASSIZ & DESOR, p. 149.
1848 *Galerites subrotunda*, BRONN, p. 523.
1848 *Galerites subsphaeroidalis*, BRONN, p. 523.
1849 *Galerites subsphaeroidalis*, BRONN, p. 195.
1849 *Galerites subrotundus*, BRONN, p .1850 *Galerites subsphaeroidalis*, d'ORBIGNY, p. 178.
* . 1850 *Galerites subtruncatus*, d'ORBIGNY, p. 272.
. 1850 *Galerites subrotundus*, FORBES in DIXON, p. 340
1854 *Galerites subrotundus*, MORRIS, p. 80.
. 1855 *Galerites subrotundus*, DESOR, p. 183.
. 1855 *Galerites subsphaeroidalis*, DESOR, p. 184.
. 1860 *Echinoconus subrotundus*, d'ORBIGNY, p. 517-519, pl. 997, fig. 8-12.
. 1862 *Echinoconus subrotundus*, COTTEAU & TRIGER, p. 376.
(1866) *Galerites subsphoeroidalis*, CORNET & BRIART, p. 181.
(1868) *Galerites subsphaeroidalis*, DEWALQUE, p. 393.
. 1873 *Echinoconus subrotundus*, WRIGHT, p. 219-221, pl. 52, fig. 1a-f; pl. 53, fig. 2a-f, fig. 3.
. 1874 *Echinoconus subrotundus*, COTTEAU, p. 648.
. 1876 *Echinoconus subrotundus*, COTTEAU, p. 323-328, pl. 72, fig. 1-5.
(1881) *Galerites subsphaeroidalis*, MOURLON, p. 89.
1911 *Conulus subrotundus*, LAMBERT, p. 78.
. 1914 *Conulus subrotundus*, LAMBERT & THIERY, p. 284.
1928 *Galerites subrotundus*, LAMBERT & JEANNET, p. 169.
1928 *Galerites subsphaeroidalis*, LAMBERT & JEANNET, p. 200
? 1928 *Galerites Leskei*, LAMBERT & JEANNET, p. 200.
v . 1935 *Conulus subsphaeroidalis*, SMISER, p. 40, pl. 3, fig. 8a-d.
v . 1935 *Conulus subrotundus*, SMISER, p. 39, pl. 3, fig. 7a-d.
. 1957 *Conulus subsphaeroidalis*, CHIRIAC, p. 68-69, pl. 2, fig. 4a-c.
. 1957 *Conulus subrotundus*, CHIRIAC, p. 69-71, pl. 3, fig. 1a-c, fig. 2a-c.
. 1958 *Conulus subrotundus*, POPIEL-BARCZYK, p. 75, pl. 1, fig. 1-12.
. 1958 *Conulus subrotundus* var. *subglobosa*, POPIEL-BARCZYK, p. 52, pl. 1, fig. 1-4.
. 1958 *Conulus subrotundus* var. *conoideus*, POPIEL-BARCZYK, p. 53, pl. 2, fig. 5-8.
1970 *Galerites subrotunda*, BLASZKIEWICZ e.a., p. 158.
1972 *Conulus subrotundus*, MOSKVIN & ENDELMAN, p. 7.
. 1974 *Conulus subrotundus*, SAVCHINSKAYA, p. 313, pl. 97, fig. 1-3.
1974 *Conulus zubrotundus* var. *conoidea*, SAVCHINSKAYA, p. 313., pl.97, fig. 4-8.
. 1974 *Conulus subrotundus*, MARCINOWSKI, p. 146, 148, 149, 164, pl. 29, fig. 3.
. 1979 *Conulus subrotundus*, GONGADZE, pp. 63-65, pl. 3, fig. 1a-e.
? 1979 *Echinoconus subrotundus*, FOURNIER, p. 46 (pro parte).
. 1980 *Conulus subrotundus*, FISCHER, p. 268, pl. 134, fig. 1-3.
. 1987 *Conulus subrotundus*, OWEN & SMITH, p. 227.
. 1988 *Conulus subrotundus*, SMITH, PAUL, GALE & DONOVAN, p. 112-115, pl. 19, fig. 3-4.
. 1989 *Conulus subrotundus subrotundus*, MĄCZYNSKA in MALINOWSKA, p. 302, 304, pl. 190, fig. 1a-d.
. 1989 *Conulus subrotundus subglobosus*, MĄCZYNSKA in MALINOWSKA, p. 302, 305, pl. 190, fig. 2a-d.
. 1989 *Conulus subrotundus conoideus*, MĄCZYNSKA in MALINOWSKA, p. 302-305, pl. 190, fig. 3a-d.
non 1979 *Echinoconus subrotundus*, FOURNIER, p. 46 (= *C. albogalerus*).

LOCI TYPICI:
C. subrotundus: Mount Caburn, near Lewes, Sussex, England.
C. subsphaeroidalis: Tournai, prov. Hainaut, Belgium.
C. leskei: not specified.
C. subtruncatus: Isle of Wight, England.

STRATI TYPICI:
C. subrotundus: "Upper Chalk".

C. subsphaeroidalis: Tournai Tourtia, Cenomanian.
C. leskei: "Craie blanche"?
C. subtruncatus: not mentioned by d'ORBIGNY (1850); "Craie blanche", according to DESOR (1842).

OTHER OCCURRENCES OUTSIDE THE MONS BASIN:
France. Turonian of Seine-Maritime, Loir-et-Cher (d'ORBIGNY, 1860), Sarthe (COTTEAU & TRIGER, 1862), Drôme (FOURNIER, 1979), Yonne (DESOR, 1855), Aude (LAMBERT, 1911); Cenomanian of Pas-de-Calais (DESOR, 1855).
Great Britain. Turonian of Sussex (MANTELL, 1822), Devon (SMITH, PAUL, GALE & DONOVAN, 1988), Kent (WRIGHT, 1873), Norfolk (MORRIS, 1854).
Poland. Turonian of the Krakow area (POPIEL-BARCZYK, 1958; BŁASZKIEWICZ e.a., 1970); Upper-Cenomanian of Krakow-area (MARCINOWSKI, 1974).
Romania. Turonian of the Dobrogea (CHIRIAC, 1957).
Russia. Turonian of Volsk, near Saratov (SAVCHINSKAYA, 1974).
The Ukraine. Turonian of the Donbass and Crimea (SAVCHINSKAYA, 1974).
Kazachstan. Turonian of Mangyshlak and Emba (MOSKVIN & ENDELMAN, 1972).
Georgia. Turonian of Kaukasus (GONGADZE, 1979).
Turkmenia. Turonian of Kopetdag (SAVCHINSKAYA, 1974).

SPECIMENS STUDIED:
Tournai Tourtia at Tournai (prov. Hainaut, Belgium): 17 specimens (among which IST-9129 and IST-0130).
Tournai Tourtia at Chercq (prov. Hainaut, Belgium): 3 specimens.
Tournai Tourtia at Montignies-sur-Roc (prov. Hainaut, Belgium): 2 specimens.

TYPE SPECIMENS IN THE K.B.I.N.- COLLECTIONS:
IST-9129: figured by SMISER (1935), pl. 3, fig. 7/A-D, as *Conulus subrotundus* MANTELL.
IST-9130: figured by SMISER (1935), pl. 3, fig. 8/a-d, as *Conulus subsphaeroidalis* d'ARCHIAC.

DIMENSIONS (in mm)
Table 1

	H	D	W	h	P	A	a	S	s
mean	27,7	32,7	30,1	10,4	4,0	6,1	4,2	9,8	13,7
extr.	35,0	41,0	36,5	13,0	4,7	8,3	5,0	12,0	18,8
extr.	20,4	26,1	24,1	7,0	3,2	5,0	3,5	7,7	10,0

Table 2

	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
mean	0,85	0,92	0,92	0,38	0,12	0,19	0,71	0,30	0,42
extr.	0,93	0,99	0,95	0,43	0,15	0,21	0,76	0,42	0,57
extr.	0,78	0,83	0,89	0,31	0,11	0,16	0,64	0,25	0,34

DESCRIPTION:
Fairly large *Conulus* with subpentagonal, dome-shaped test. The adoral surface is flat. Seen in profile, the sides of the adapical surface are steep and convex, gradually sloping up towards a smoothly ellipsoidal apex.

The peristome is small and oval, its long axis has a I-3 orientation. The periproct also is oval, with a vertical long axis. Its position is marginal, subambital.

The apical system is compact, tetrabasal and positioned on top of the adapical side. The madreporite is large and in contact with the three other genital plates. Besides a genital pore, it bears numerous hydropores. Four fairly large, circular genital pores are present. Ocular plates are smaller and perforated.

Ambulacra are rather narrow and correspond to arcs of 20°. Poriferous zones are straight, unsunken, non-petaloid and simple throughout. Pores are very small, elliptic or kidney-shaped. They are arranged in oblique pore-pairs, with exceedingly narrow interporous partitions. Ambulacral plates form triads, consisting of a large and a small primary plate, besides a demiplate. The primaries bear one, two or sometimes three tubercles each; the demiplates are devoid of tubercles. These tubercles are irregularly distributed over the surface of the test. They form neither vertical series, nor horizontal rows. Tuberculation is much denser on the adoral side than adapically. Scrobicules are very small, but better developed and more sunken on the adoral than on the adapical side.

Interambulacra are a little more than twice as wide as ambulacra and correspond to arcs of 52°. There are five or six ambulacral pore-pairs adjacent to each interambulacral plate. In a specimen of 35 mm, a vertical series consists of 10 or 11 plates between the apex and the ambitus. Sutures are visible as fine, dirt-filled grooves. These sutures are less clearly visible on the adoral side, so that the number of adoral interambulacral plates can hardly be counted. Up to 20 small, crenulate and perforate tubercles are present on each ambital plate. Their number diminishes towards the apex and towards the peristome. Tubercles are widely scattered adapically, but they are very numerous and closely together adorally. Scrobicules are circular, poorly developed adapically, but deeply sunken and sometimes confluent adorally. There is no horizontal or vertical regularity in their arrangement. Sometimes, oblique rows may be discerned. Miliary surfaces are wide adapically, but very narrow adorally. Scattered tiny granules are present adapically; miliary granulation is coarser and denser on the adoral side.

The adapical side of the test is more or less smooth, while the adoral surface is much more corrugated, due to differences in ornamentation, granulation and tuberculation.

DIAGNOSIS:
Table 3

	mean value	extreme values
H/D-ratio	0,85	0,78-0,92
H/W-ratio	0,92	0,83-0,99
W/D-ratio	0,92	0,89-0,95

DISCUSSION:
From Cenomanian "Tourtia"-deposits of Belgium, no fewer than four species of *Conulus* have been reported by SMISER (1935): *C. nucula*, *C. subrotundus*, *C. subsphaeroidalis* and *C. laevis*. This author recognised them to be "exceedingly similar". As a matter of fact, the differences between the specimens of *Conulus* from the Tourtia are so small and subtle, that serious doubt arises about the existence of so many species.

In an attempt to clarify the situation and find objective, significant differences between the populations of *C. subrotundus* and *C. subsphaeroidalis*, distinguished by SMISER (1935), I measured 9 dimensions on all the specimens at my disposal, as described in the introductory section. Differences between the means, obtained in this way were tested on their significance, using Student's t-test.

C. subrotundus MANTELL 1822 has been based on a poorly preserved flint-cast from the Upper Chalk (presumably Turonian) near Lewes, Sussex, England. The original description of the species is sketchy and its illustration is of poor quality. Better descriptions and illustrations were subsequently given by d'ORBIGNY (1854), who studied specimens from the "Sénonien" near Rouen and Fécamp, Seine-Maritime, France, which are much better preserved than MANTELL's type. Meanwhile, specimens from the Cenomanian Tourtia-deposits in Belgium were coined *Galerites subsphaeroidalis* by d'ARCHIAC (1846). This species was placed in the genus *Pyrina* by d'ORBIGNY (1856). *Pyrina* was however considered an invalid name by WAGNER & DURHAM (1966), who distributed its species between *Conulus* and *Globator*. Showing an inframarginal periproct and a large, flat adoral surface, *C. subsphaeroidalis* clearly belongs to *Conulus*. d'ORBIGNY (1856) also provided a good description and a fine illustration of the latter species. The great similarity between *C. subrotundus* and *C. subsphaeroidalis* is however completely overlooked. In my opinion, they are one and the same.

SMISER (1935) had even less reason to distinguish between *C. subsphaeroidalis* and *C. subrotundus* from the Tournai Tourtia. Statistical analysis did not bring to light any significant difference between specimens labelled by SMISER in one way or the other (see Table 4).

Table 4.

	H	D	W	h	P	A	a	S	s
(1)	29,2	33,7	31,1	10,8	4,2	6,4	4,4	10,0	14,2
(2)	26,6	31,7	29,3	10,3	3,9	5,6	4,0	9,5	13,3
t	1,8	1,4	1,4	0,7	1,3	1,5	1,2	1,0	1,0
	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
(1)	0,87	0,94	0,92	0,37	0,12	0,19	0,71	0,30	0,42
(2)	0,83	0,90	0,92	0,39	0,12	**0,19**	0,71	0,30	0,42
t	1,8	1,9	—	0,2	—	—	—	—	—

(1): *C. subrotundus*; (2): *C. subsphaeroidalis*

All values of t being very low, it is clear that "*C. subrotundus*" and "*C. subsphaeroidalis*" sensu SMISER (1935) belong to the same population. Being synonyms, *C. subrotundus* has priority.

The holotype, selected by d'ARCHIAC (1846) for *C. subsphaeroidalis* is merely a specimen of *C. subrotundus*, with a convex adoral surface.
As soon as 1849, the existence of *C. subsphaeroidalis* as a separate species, was doubted by BRONN (1849).

The near identity of *C. subrotundus* and *C. subsphaeroidalis* was also noticed by COTTEAU (1874) and shortly thereafter by COTTEAU (1876), who rejected d'ARCHIAC's name as a junior synonym of MANTELL's. Nevertheless, COTTEAU probably erred, when he stated that the Belgian specimens used by d'ARCHIAC were collected from the Turonian Dièves sediments, and not from the Cenomanian Tourtia. No specimens from the Dièves are present in the collections of the K.B.I.N. in Brussels. The Tourtia on the contrary, contains numerous *C. subrotundus*, as is demonstrated by specimens in the same collections.

DESOR (1855) considered *C. subsphaeroidalis* from the Tournai Tourtia to be conspecific with *C. globulus* d'ARCHIAC, 1842. Yet, both species being very dissimilar in shape, this does not seem to be justified. The status of *C. globulus* will be discussed further on.

To judge by the published photograph, some of the specimens labelled *C. subrotundus*, in the Natural History Museum in Grenoble (FOURNIER, 1979), are misidentified. The specimens from "Sénonien" localities probably belong to *C. albogalerus* LESKE 1778.

POPIEL-BARCZYK (1958) distinguished two varieties of *C. subrotundus*, which she called *subglobosa* and *conoidea*. On close analysis, measurements and parameters given by POPIEL-BARCZYK all are within the range of variation of the Belgian specimens. In my opinion, there is no reason to distinguish these varieties.

Referring to LESKE (1778), who figured a *Conulus* of unknown origin, AGASSIZ & DESOR (1847) erected *Galerites leskei* as a separate species. LESKE's specimen was considered a juvenile of *C. subrotundus* by DESOR (1855). The conspecificity of *G. leskei* and *C. subrotundus* was confirmed by LAMBERT & JEANNET (1928). *Galerites leskei* being based on a poorly preserved flint cast of unknown origin and not having access to LESKE's book, I am unable to confirm or deny its status as a separate species.

Referring to papers of AGASSIZ & DESOR (1847) and of DESOR (1842), MANTELL's species was pointlessly renamed *Galerites subtruncatus* by d'ORBIGNY (1850). Four years later the latter author recognised his error (d'ORBIGNY, 1854). The younger name has never been used again.

Conulus mixtus (DEFRANCE, 1820)
Pl. 2, Figs. 1-4.

* 1820 *Galerites mixtus*, DEFRANCE, p. 87.

. 1848 *Galerites mixtus*, BRONN, p. 523.
. 1849 *Galerites mixtus*, BRONN, p. 195.
. 1860 *Echinoconus mixtus*, d'ORBIGNY, p. 506-507, pl. 991.
? 1875 *Galerites castanea*, QUENSTEDT, p. 408.
? 1876 *Echinoconus tumidus*, COTTEAU, PERON & GAUTHIER, p. 82, pl. 7, fig. 5.
? 1878 *Echinoconus Thomasi*, COTTEAU, PERON & GAUTHIER, p. 162.
* 1878 *Galerites ellipticus*, ZARECZNY, p. 237, pl. 7, fig. 2.
. 1914 *Conulus mixtus*, LAMBERT & THIERY, p. 284.
. 1930 *Conulus mixtus*, PASSENDORFER, p. 576.
? 1932 *Conulus tumidus*, LAMBERT, p. 158.
. 1935 *Conulus nucula*, SMISER, p. 39, pl. 3, fig. 6a-d.
. 1957 *Conulus nucula*, CHIRIAC, p. 65-66, pl. 2, fig. 1.
. 1958 *Conulus ellipticus*, POPIEL-BARCZYK, p. 55-57, p. 76, pl. 3, fig. 1-10.
* 1958 *Conulus ellipticus* var. *rostratus*, POPIEL-BARCZYK, p. 58, p. 77, pl. 4, fig. 1-4.
. 1958 *Conulus castaneus* var. *rhotomagensis*, POPIEL-BARCZYK, p. 59-61, p. 77, pl. 4, fig. 9-10, pl. 5, fig. 1-4.
1968 *Conulus castaneus* var. *rhotomagensis*, HYNDA, p. 206-207.
. 1970 *Conulus castaneus* var. *rhotomagensis*, BLASZKIEWICZ e.a., p. 157.
. 1970 *Conulus ellipticus*, BLASZKIEWICZ e.a., p. 157.
. 1970 *Conulus ellipticus* var. *rostratus*, BLASZKIEWICZ e.a., p. 157.
. 1970 *Conulus mixtus*, BLASZKIEWICZ e.a., p. 157.
. 1974 *Conulus nucula*, SAVCHINSKAYA, p. 314, pl. 95, fig. 12-19.
. 1974 *Conulus ellipticus*, MARCINOWSKI, p. 147, 148, 149, 164, pl. 29, fig. 2a-b.
. 1978 *Conulus castaneus* var. *rhotomagensis*, KIER & LAWSON, p. 51.
? 1979 *Galerites mixtus*, FOURNIER, p. 41.
. 1989 *Conulus ellipticus ellipticus*, MĄCZYNSKA in MALINOWSKA, p. 305.
. 1989 *Conulus ellipticus rostratus*, MĄCZYNSKA in MALINOWSKA, p. 305.

LOCI TYPICI:
C. mixtus: St.Paul-Trois-Châteaux, dept. Drôme, France.
C. ellipticus: Krakow-area, Poland.
C. ellipticus var. *rostratus*: Glanow, near Krakow, Poland.

STRATUM TYPICUM:
C. mixtus: Albian (?).
C. ellipticus: *Inoceramus labiatus*-Zone, Turonian.
C. ellipticus var. *rostratus*: *Inoceramus labiatus*-Zone, Turonian.

OTHER OCCURRENCES OUTSIDE THE MONS BASIN:
France. Albian of depts. Var, Isère, Drôme (d'ORBIGNY, 1860).
Poland. Albian of Tatra Mountains (PASSENDORFER, 1930); Turonian of Krakow (POPIEL-BARCZYK, 1958) and Czestochowa-area (MARCINOWSKI, 1974); Cenomanian of Krakow-area (MARCINOWSKI, 1974).
Romania. Turonian of southern Dobrogea (CHIRIAC, 1957).
The Ukraine. Cenomanian and Turonian of Podolia (HYNDA, 1968); Cenomanian of Donbass-area (SAVCHINSKAYA, 1974).
Algeria. Albian of Bou Thaleb (COTTEAU, PERON & GAUTHIER, 1876); Cenomanian of Berouaguiah (COTTEAU, PERON & GAUTHIER, 1878).

SPECIMENS STUDIED:
Tournai Tourtia at Tournai (prov. Hainaut, Belgium): 8 specimens (among which IST-9128).
Tournai Tourtia at Chercq (prov. Hainaut, Belgium): 2 specimens.

TYPE-SPECIMENS IN THE K.B.I.N.- COLLECTIONS:
IST-9128: figured by SMISER (1935), pl. 3, fig. 6/a-d, as *Conulus nucula* A. GRAS.

DIMENSIONS (in mm)

Table 5

	H	D	W	h	P	A	a	S	s
mean	23,5	29,3	27,5	9,7	3,5	5,7	3,9	8,9	13,1
extr.	31,0	41,0	36,0	12,0	6,5	7,7	5,0	14,7	15,0
extr.	17,1	20,6	20,0	8,0	2,6	4,4	3,8	7,9	9,0

Table 6

	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
mean	0,80	0,86	0,94	0,42	0,12	0,20	0,69	0,32	0,45
extr.	0,83	0,89	0,97	0,47	0,16	0,21	0,86	0,38	0,47
extr.	0,77	0,82	0,88	0,34	0,09	0,18	0,60	0,29	0,29

DESCRIPTION:
Medium-sized *Conulus*, with a dome-shaped test and an irregularly pentagonal outline. The central part of the adoral surface is flat, curving gradually upwards towards the ambitus and from there further towards a smoothly ellipsoidal apex.

The peristome is small and slightly elliptical. Its long axis has a I-3 orientation. Also the periproct is elliptical in outline, its long axis in vertical orientation.Upper and lower borders of the periproct are slightly acute. Its position is marginal, subambital.

None of the specimens at my disposal clearly shows the characteristics of the apical system. It is small, situated right on top of the apical surface and tetrabasal. Differences with the apical system of *C. subrotundatus* seem to be small and subtle. The genital pores might be smaller than in the latter species.

Ambulacra correspond in width to arcs of about 8°, which means that they are a little less narrow than those of *C. subrotundus*. Poriferous zones show the structure, typical to all *Conulus*: straight, not sunken, non-petaloid and simple throughout. Pores are very small and arranged in oblique pairs, with a narrow partition. Their shape

could not be determined in the specimens at my disposal. Ambulacral plates form triads, consisting of two trapezoidal primary plates and a demiplate. Each primary plate is provided with one or two tubercles, which are perforate, but not crenulate. The tubercles are irregularly distributed, so that vertical series can hardly be discerned. Tuberculation is much denser and scrobicules are better developed on the adoral surface, than elsewere.

Interambulacra are much wider than ambulacra and correspond to arcs of 54°. Hence, they are almost seven times wider than ambulacra. Adjacent to each IA-plate are five or six ambulacral plates and pore-pairs. In spe-

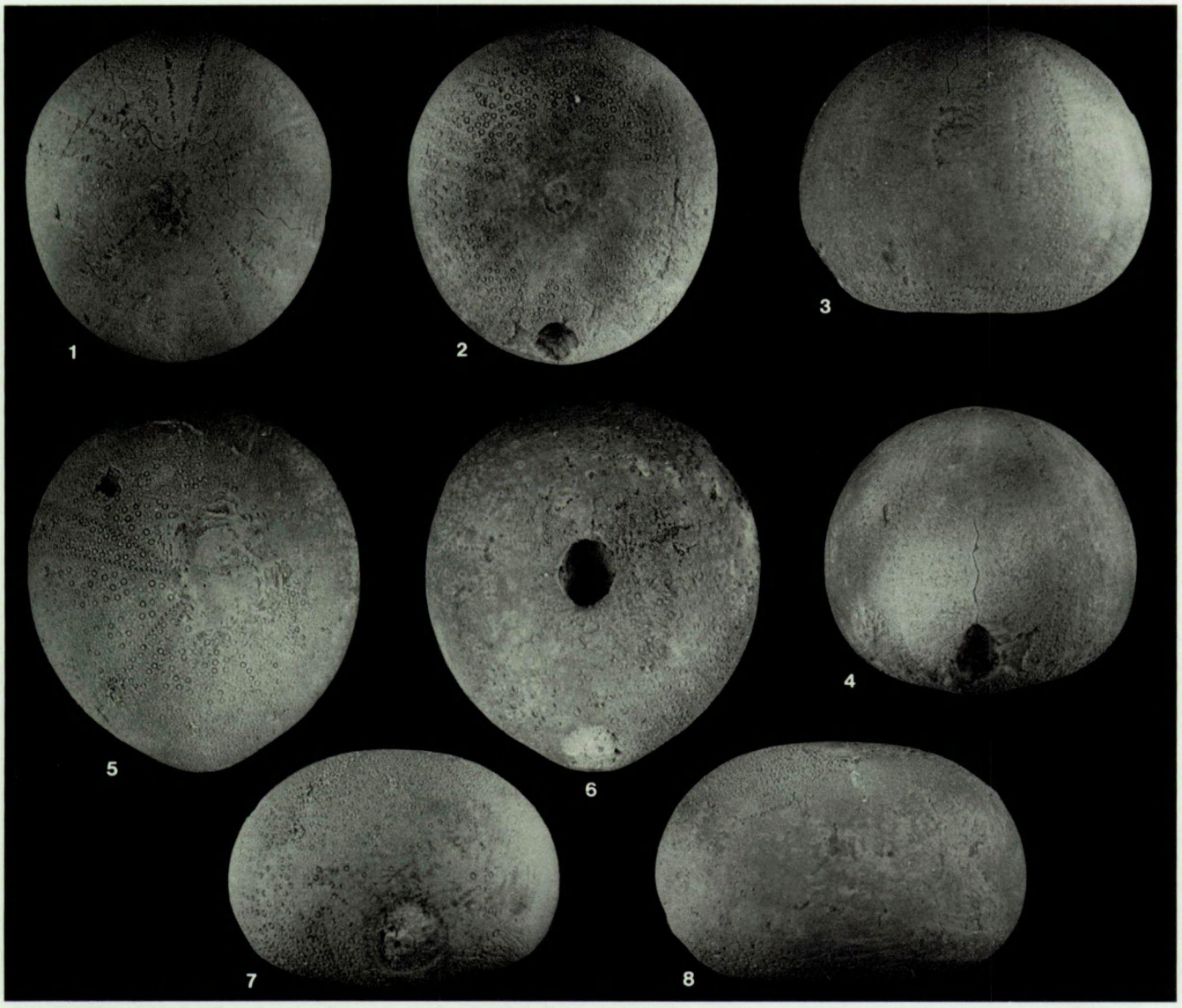

PLATE 2

Figs. 1-4 — *Conulus mixtus* (DEFRANCE, 1820); IST-9128. Tournai Tourtia (Cenomanian) at Tournai (prov. Hainaut, Belgium).
1. adapical view, x 1,85.
2. adoral view, x 1,85.
3. lateral view, perpendicular to the plane III-5, x 1,85.
4. lateral view, frontal to interambulacrum 5, x 1,85.

Figs. 5-8 — *Conulus rhodomagensis* (AGASSIZ, 1839). IST-9131. Tournai Tourtia (Cenomanian) at Calonnes (prov. Hainaut, Belgium).
5, adapical view, x 2,5.
6, adoral view, x 2;5.
7, lateral view, frontal to interambulacrum 5, x 2,5.
8, lateral view, perpendicular to the plane III-5, x 2,5.

cimens measuring 28 mm in diameter, a vertical series of IA-plates from apex to ambitus, consists of 8 plates. The adapical sutures are visible as narrow, dirt-filled grooves. Adorally, the plates are so closely fused, that no sutures can be seen. Every IA-plate is provided with a large number of small crenulate and perforate tubercles. The density increases below the ambitus. Adorally, scrobiculles are better developed and sometimes confluent. Miliary surfaces are well developed adapically. They are covered by a very fine and dense granulation, in which every granule is surrounded by a shallow depression.

DIAGNOSIS:
Table 7

	mean value	extreme values
H/D-ratio	0,80	0,76-0,83
H/W-ratio	0,86	0,82-0,89
W/D-ratio	0,94	0,77-0,97

DISCUSSION:
The specimens under discussion were labelled "*Conulus nucula*" by SMISER (1935). However, "*Conulus*" *nucula* d'ORBIGNY, 1856, as figured by its original author, is much more globose, with the periproct in a more marginal position on the ambitus, than in the specimens from Belgium. In fact, the species is not a *Conulus* at all, but belongs to the genus *Globator*. Hence, SMISER's identification must be erroneous. On the other hand, the same specimens can be included in the species *Conulus mixtus*, originally described by DEFRANCE (1820) from strata of presumably Albian age, in the Drôme department, France.

In the same way as described above for the taxon *C. subrotundus* and *C. subsphaeroidalis*, as claimed by SMISER (1935), I also compared the specimens labelled *C. nucula* with those mentioned above. The results are given in the table below.

Table 8

	H	D	W	h	P	A	a	S	s
(1)	27,77	32,68	30,13	10,45	4,05	6,07	4,19	9,80	13,75
(2)	23,50	29,35	27,53	9,75	3,50	5,70	3,92	8,92	13,06
t	3,06	2,53	2,10	0,84	1,97	0,71	0,94	1,34	1,38
	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
(1)	0,85	0,92	0,92	0,38	0,12	0,19	0,71	0,30	0,42
(2)	0,80	0,86	0,94	0,42	0,12	0,20	0,69	0,32	0,45
t	2,38	3,39	2,29	2,20	—	1,20	0,47	1,05	1,93

(1): *C. subrotundus*; (2): *C. mixtus*

We clearly see that significant differences between both populations exist in height, length, width and to a lesser extent in periproctal size. *C. subrotundus* has a larger overall size than *C. mixtus*. The tests of both species also differ significantly in shape. *C. subrotundus* is markedly higher in proportion to the size of its ambital cross-section, than *C. mixtus*. The ambital cross-section and the adoral surface are more elliptical in the former, than in the latter species. With a little less confidence, we can also state that the peristome is situated closer to the anterior end (III) in *C. subrotundus* than in the other species. Hence, *C. subrotundus* and *C. mixtus* clearly are two separate species.

C. ellipticus, described by ZARECZNY (1878) from the Turonian of southern Poland, falls well within the range of variability of *C. mixtus* and may thus be considered a junior synonym of the latter.

Conulus rhodomagensis (AGASSIZ, 1839)
Pl. 2, Figs. 5-8.

* . 1839 *Galerites Rhodomagensis*, AGASSIZ, p. 78.
. 1839 *Galerites Castanea*, AGASSIZ, p. 77-78, pl. 12, fig. 7-9.
. 1840 *Galerites Rothomagensis*, AGASSIZ, p. 7.
. 1840 *Galerites Castanea*, AGASSIZ, p. 7 (pro parte).
. 1842 *Galerites Castanea*, DESOR, p. 23, pl. 4, fig. 12-16.
. 1843 *Galerites rothomagensis*, SISMONDA, p. 51.
? 1843 *Galerites castanea*, SISMONDA, p. 50-51 (pro parte).
. 1847 *Galerites castanea*, AGASSIZ & DESOR, p. 149 (pro parte).
. 1848 *Galerites castanea*, BRONN, p. 522 (pro parte).
. 1849 *Galerites castanea*, BRONN, p. 195 (pro parte).
. 1850 *Galerites castanea*, d'ORBIGNY, p. 142 (pro parte).
. 1855 *Conulus Castanea*, DESOR, p. 185 (pro parte).
. 1855 *Conulus Rhotomagensis*, DESOR, p. 186.
. 1860 *Echinoconus castanea*, d'ORBIGNY, p. 503-506, pl. 990.
. 1860 *Echinoconus Rhotomagensis*, d'ORBIGNY, p. 509-510, pl. 993.
. 1873 *Echinoconus castanea*, WRIGHT, p. 215-218, pl. 51, fig. 2-3.
. 1874 *Echinoconus rhotomagensis*, COTTEAU, p. 647-648.
1875 *Galerites Rhotomagensis*, QUENSTEDT, p. 409.
1885 *Galerites Rhotomagensis*, QUENSTEDT, p. 887.
. 1914 *Conulus castaneus*, LAMBERT & THIERY, p. 284.
. 1928 *Conulus castaneus*, LAMBERT & JEANNET, p. 125, p. 166 (pro parte).
. 1935 *Conulus laevis*, SMISER, p. 40-41, pl. 4, fig. 1a-d.
. 1955 *Conulus castaneus*, SZÖRENYI, p. 44-45, p. 182-183, pl. 2, fig. 5-7.
* . 1958 *Conulus castanea* var. *plana*, POPIEL-BARCZYK, p. 61-62, p. 77-78, pl. 4, fig. 7, pl. 5, fig. 5-12.
* 1957 *Conulus rhotomagensis* var. *elevatus*, CHIRIAC, p. 66-68, pl. 2, fig. 2-3.
? 1979 *Galerites castanea*, FOURNIER, p. 40-41.
. 1970 *Conulus castaneus* var. *plana*, BLASZKIEWICZ e.a., p. 157.
. 1974 *Conulus castaneus* var. *rhotomagensis*, SAVCHINSKAYA, p. 314, pl. 96, fig. 1-8.
. 1974 *Conulus castaneus* var. *plana*, SAVCHINSKAYA, p. 314, pl. 96, fig. 9-12.

. 1978 *Conulus castaneus* var. *plana*, KIER & LAWSON, p. 51.
1978 *Conulus castaneus* var. *elevatus*, KIER & LAWSON, p. 51.
. 1988 *Conulus castanea castanea*, SMITH, PAUL, GALE & DONOVAN, p. 106-112, pl. 17, figs. 1-3.
. 1988 *Conulus castanea rhotomagensis*, SMITH, PAUL, GALE & DONOVAN, p. 112, pl. 18, figs. 1-3.
. 1989 *Conulus castaneus rhotomagensis*, MĄCZYNSKA in MALINOWSKA, p. 305-306, pl. 191, fig. 3.
. 1989 *Conulus castaneus planus*, MĄCZYNSKA in MALINOWSKA, p. 306, pl. 192, fig. 1.

LOCI TYPICI:
Galerites Rhodomagensis: Rouen, Seine-Maritime, France.
Conulus castaneus var. *plana*: Poreba Dzierzna, Krakow region, Poland (POPIEL-BARCZYK, 1958).
Conulus castaneus var. *elevatus*: Cuza Voda, Dobrogea, Romania (CHIRIAC, 1957).

STRATI TYPICI:
Galerites Rhodomagensis: "Craie de Rouen", Cenomanian.
Conulus castaneus var. *plana*: *Inoceramus labiatus* zone, Turonian (POPIEL-BARCZYK, 1958).
Conulus castaneus var. *elevatus*: Turonian (CHIRIAC, 1957).

OTHER OCCURRENCES OUTSIDE THE MONS BASIN:
France. Albian of depts. Var, Isère, Alpes-Maritimes (d'ORBIGNY, 1860); Cenomanian of depts. Bouches-du-Rhône (d'ORBIGNY, 1860), Alpes-Maritimes (SISMONDA, 1843).
Great Britain. Cenomanian of Dorset, Sussex, Kent (WRIGHT, 1873), Devon (SMITH, PAUL, GALE & DONOVAN, 1988).
Hungary. Cenomanian of Bakony Hills (SZÖRENYI, 1855).
Poland. Turonian of Krakow-area (POPIEL-BARCZYK, 1958).
Romania. Turonian of southern Dobrogea (CHIRIAC, 1957).
The Ukraine. Turonian of Donbass Region (SAVCHINSKAYA, 1974).

SPECIMENS STUDIED:
Tournai Tourtia at Calonnes (prov. Hainaut, Belgium): 3 specimens (among which IST-9131).
Tournai Tourtia at Tournai (prov. Hainaut, Belgium): 4 specimens.
Tournai Tourtia at Barges (prov. Hainaut, Belgium): 2 specimens.
Tournai Tourtia at Chercq (Pont-à-Rieu) (prov. Hainaut, Belgium): 5 specimens.
Tournai Tourtia (probably) from unknown locality: 1 specimen.

TYPE SPECIMENS IN THE K.B.I.N.-COLLECTIONS:
IST-9131: figured by SMISER (1935), pl. 4, fig. 1/a-d, as *Conulus laevis* d'ORBIGNY.

DIMENSIONS:
Table 9

	H	D	W	h	P	A	a	S	s
mean	17,7	27,2	24,8	7,0	4,2	5,6	4,1	8,1	10,8
extr.	21,8	35,0	31,0	9,0	6,0	7,0	5,1	10,5	14,0
extr.	14,0	18,3	17,0	5,0	3,2	3,2	2,5	4,4	7,8

Table 10

	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
mean	0,66	0,72	0,92	0,40	0,17	0,21	0,75	0,29	0,39
extr.	0,77	0,82	0,95	0,47	0,22	0,26	0,85	0,33	0,44
extr.	0,61	0,62	0,89	0,28	0,13	0,17	0,64	0,21	0,35

DESCRIPTION:
Medium sized *Conulus* with rounded and moderately flattened test. The adoral surface is flat; adapically, the test has a low-profile dome shape. The ambitus is slightly subpentagonal to almost perfectly rounded and egg-shaped.

The peristome is small and slightly oval, its long axis being oriented along I-3. It is positioned centrally on the adoral surface and it is not sunken. The periproct is oval, with vertical long axis.

The apical system is compact, tetrabasal and positioned on top of the adapical surface, just as in other species of *Conulus*. The madreporite, genital plate II, is perforated by a large number of hydropores. In the best specimens, circular and fairly large genital pores can be seen on the genital plates. None of the specimens is well enough preserved to permit a more detailed description of the apical system.

Ambulacra are very similar to those in other species of the same genus. They are fairly narrow, corresponding to arcs of 17° to 20°. Poriferous zones are straight, unsunken, non-petaloid and simple throughout. Pores are very small and elliptical in outline. They are arranged in oblique pore-pairs, with very narrow interporous partitions. Ambulacral plates form triads, consisting of two primaries and one demiplate. The primary plates carry two or three perforate and crenulate tubercles; the demiplates are very small and devoid of tubercles. These tubercles are more ore less randomly distributed on the plates. They are certainly not arranged in horizontal of vertical series. Tuberculation is coarser and denser adorally than adapically. On extrascrobicular surfaces, very small secondary tubercles and tiny granules are numerous.

Interambulacra are much wider than ambulacra and correspond to arcs of 49° to 54°. Along the adradial sutures, 6 pore-pairs or two triads of ambulacral plates are adjacent to each IA-plate. On every IA-plate, about 15 small, crenulate and perforate tubercles can be counted.

They are closer together and coarser on the adoral side of the test, below the ambitus. The number of tubercles on the plates diminishes towards the ambitus. Scrobicules are deep and well developed adorally, but much less so adapically. There is no horizontal or vertical regularity in their arrangement. On some plates, oblique rows of tubercles may be distinguished. Miliary surfaces are wide adapically, showing scattered, tiny granules.

DIAGNOSIS:
Table 11

	mean value	extreme values
H/D-ratio	0,60	0,58-0,77
H/W-ratio	0,68	0,62-0,82
W/D-ratio	0,90	0,87-0,95

DISCUSSION:
The specimens belonging to *C. rhodomagensis* have been labelled as *Conulus laevis* by SMISER. In the same way as explained in the preceding paragraphs, I have tried to verify whether it is justified to distinguish them from the population of *C. mixtus*, as defined above. The results are given below, in Table 12.

Table 12

	H	D	W	h	P	A	a	S	s
(1)	17,7	27,2	24,8	7,0	4,2	5,6	4,1	8,1	10,7
(2)	23,5	29,3	27,5	9,7	3,5	5,7	3,9	8,9	13,1
t	4,24	1,05	1,45	4,53	1,08	0,21	0,51	0,84	2,52
	H/D	H/W	W/D	h/H	P/D	A/D	a/A	S/D	s/D
(1)	0,66	0,72	0,92	0,40	0,17	0,21	0,75	0,29	0,39
(2)	0,80	0,86	0,94	0,42	0,12	0,20	0,69	0,32	0,45
t	7,21	6,99	1,82	0,89	3,68	0,87	1,43	1,69	3,51

(1): *C. rhodomagensis*; (2): *C. mixtus*

We can see that specimens from both populations differ significantly in shape. They clearly belong to different species. Whereas the specimens from both species have the same range in size, they differ considerably in shape, *C. rhodomagensis* being much more flattened than *C. mixtus*. Although the differences are very subtle and on the border of significance, the ambital outline of the corona might be a little more elliptical in *C. rhodomagensis* than in *C. mixtus*. The peristome is larger and closer to ambital border III in *C. rhodomagensis* as in *C. mixtus*.

C. rhodomagensis has always been considered a very close relative of *C. castaneus* (BRONGNIART, 1822). Both species are however easily distinguished by their differences in shape. Comparing the type-specimens, figured by AGASSIZ (1839) and by BRONGNIART (1822), *C. rhodomagensis* is obviously less depressed than *C. castaneus*. Yet, both species have frequently been confused. Let us only review some of the more recent cases.

C. castaneus, as defined by SMITH, PAUL, GALE & DONOVAN (1988) in their excellent and authoritative monograph, falls well within the limits of variation of *C. rhodomagensis*. In my opinion, there was no need to distinguish two subspecies, which these authors called resp. *C. castaneus castaneus* and *C. castaneus rhotomagensis*. Nevertheless, they accurately stated that the H/D-ratio is lower in the former than in the latter.

Unnecessary new names, were also introduced by CHIRIAC (1957), POPIEL-BARCZYK (1958) and SAVCHINSKAYA (1974). The specimens belonging to what was called *C. rhotomagensis* var. *elevatus* by CHIRIAC (1957) are indeed *C. rhotomagensis* with exceptionally high tests (HD-ratio 0,71 to 0,72), almost intermediate between *C. rhotomagensis* and *C. mixtus*, but still well within the limits of variation of the former.

POPIEL-BARCZYK (1958) described specimens of *Conulus* from the Turonian of southern Poland, which she attributed to *C. castaneus*. Specimens with elevated tests (H/D 0,75; W/D 0,86) were called *C. castaneus* var. *rhotomagensis*. Being remarkably high and having an unusually oval ambitus, they belong to *C. mixtus* in my opinion. More flattened specimens were classified as *C. castaneus* var. *plana* (H/D 0,65; W/D 0,91). These are in fact typical, true *C. rhodomagensis*.
The names *C. castaneus* var. *rhotomagensis* and *C. castaneus* var. *plana* were subsequently used by SAVCHINSKAYA (1974) for specimens from the Cenomanian and Turonian strata in the Donbass-area (The Ukraine). The former was also mentioned by HYNDA (1968) from strata of the same age in Podolia (The Ukraine). Both authors used the former name for specimens with relatively high tests (H/D 0,72 to 0,76), the latter for more depressed specimens (H/D 0,0,69). In SAVCHINSKAYA's paper, differences in shape between both forms are minor, and well within the observed range of variation of *C. rhodomagensis*. The specimen figured by HYNDA is transitional in shape between *C. rhodomagensis* and *C. mixtus* and could belong to the latter species.

Specimens, described as *C. rhotomagensis*, by MITROVIC-PETROVIC (1966), from the Cenomanian of the Belgrade area, Yugoslavia, are very depressed, beyond the known range of variation of the species under discussion (HD = 0,54). These specimens probably belong to *C. castaneus*.

Conulus castaneus (BRONGNIART, 1822)

* . 1822 *Nucleolites Castanea*, BRONGNIART, p. 100, 399, 614, pl. 9, fig. 14.
* . 1822 *Nucleolites depressa*, BRONGNIART, p. 100, 400, 615, pl. 9, fig. 17.
1825 *Nucleolites castanea*, DEFRANCE, p. 214.
1830 *Nucleolites castanea*, de BLAINVILLE, p. 188.
. 1840 *Galerites Castanea*, AGASSIZ, p. 7 (pro parte).

? 1843 *Galerites castanea*, SISMONDA, p. 50-51 (pro parte).
. 1847 *Galerites castanea*, AGASSIZ & DESOR, p. 149 (pro parte).
. 1848 *Galerites castanea*, BRONN, p. 522 (pro parte).
. 1849 *Galerites castanea*, BRONN, p. 195 (pro parte).
. 1850 *Galerites castanea*, d'ORBIGNY, p. 142 (pro parte).
? 1854 *Galerites castanea*, MORRIS, p. 80.
. 1855 *Conulus Castanea*, DESOR, p. 185 (pro parte).
. 1928 *Conulus castaneus*, LAMBERT & JEANNET, p. 125, p. 166 (pro parte).
1966 *Echinoconus rhotomagensis*, MITROVIC-PETROVIC, p. 141-142, pl. 3, fig. 2.

LOCI TYPICI:
Conulus castaneus: Montagne des Fis, Haute-Savoie, France.
Conulus depressa: Montagne des Fis, Haute-Savoie, France.

STRATI TYPICI:
Conulus castaneus: "Calcaire Noire des Fis", Cenomanian.
Conulus depressa: "Calcaire Noire des Fis", Cenomanian.

OTHER OCCURRENCES:
France. Cenomanian of Haute-Savoie (d'ORBIGNY, 1850).
Yugoslavia. Cenomanian of Belgrade area (MITROVIC-PETROVIC, 1966).

DIAGNOSIS AND DISCUSSION:
The shape of BRONGNIART's type-specimen is given by the following ratios:

H/D = 0,47	H/W = 0,57	W/D = 0,8 3

C. castaneus is an extremely flattened *Conulus* with outspoken oval ambital outline. Although its name has often been used erroneously, the species is relatively rare. It seems to be restricted to the Tethyan Cenomanian, being only known from parts of southern France and Yugoslavia. The presence of true *C. castaneus* in the Cenomanian of Belgium could not be demonstrated. The species is not represented in the collections of the K.B.I.N.

Some remarks on the status of *Conulus globosus* and *C. globulus*

Confusion between *Conulus globosus* and *Conulus globulus* is widespread in palaeontological literature. Moreover, both names have been used inadvertently for *Conulus subrotundus*. As a matter of fact, these names refer to two different species, quite distinct from *C. subrotundus*. Therefore, in an attempt at clarifying their systematic status, the following considerations might be useful.

a) PARKINSON (1811) figured a specimen from the Chalk of Kent (southern England), which he described as follows: "*...this species has the shape of a five-sided cone...*". He identified this echinoid as *Conulus albogalerus*, which is probably correct. Referring to PARKINSON's specimen, DEFRANCE (1820) introduced the name *Galerites globosus*, which he in turn described as follows: "*...corps hémisphérique, à face inférieure étroite et un peu bombée...*". This description does not apply to PARKINSON's text and figure. It is not clear which specimens DEFRANCE actually had in mind.

ROEMER (1841) described a new species from the Lower Cretaceous of Westphalia and from the Pläner of Saxony (Germany), as follows: "*... kugelformig, unten etwas niedergedrückt...*". He proposes the name *Galerites globosus*, without referring to the previous work, done by DEFRANCE. It is not clear whether ROEMER was unaware of the latter's work, when creating a homonym. Anyway, ROEMER's species was renamed by LAMBERT (1911) and is since known as *Echinogalerus hannoniensis*. Its nomenclatorial history has been discussed by SCHULZ (1985).

b) The history of the name "*globulus*" is more complicated. It was first used by KLEIN (1734) for a species, which has subsequently been renamed *Echinites vulgaris*, by LESKE (1778). KLEIN's name being pre-Linnean, LESKE's name is perfectly valid. *Galerites vulgaris* is a species, which has little in common with *Conulus*: it should not preoccupy us any further. Unfortunately, KLEIN's name has subsequently been used by several authors, such as d'ORBIGNY (1856), LAMBERT (1911), RAVN (1927), SZÖRENYI(1955), etc, for specimens of *Conulus*.

The name "*globulus*" was used by DESOR (1842), for an entirely different species of *Conulus*, from the Chalk of England. DESOR's specimens are very similar to those described by ROEMER (1841) as *G. globosus* (cf. a). The similarity between the names might be a coincidence. There is no evidence that DESOR was aware of ROEMER's work. Although DESOR's new species clearly differs in many ways from *C. subrotundus* (alias *C. subsphaeroidalis*), it was considered a synonym of the latter by DESOR (1855). This was obviously a mistake.

The name "*globulus*" (sensu DESOR, 1842) has been subsequently used by MORRIS (1843), AGASSIZ & DESOR (1847), SORIGNET (1850), FORBES in DIXON (1850), MORRIS (1854) and d'ORBIGNY (1850). Because of a supposed homonymy with KLEIN's name, the species was then renamed *Echinoconus desorianus* by d'ORBIGNY (1856). As we already pointed out, KLEIN's name is pre-Linnean and hence invalid, so that d'ORBIGNY's new name is unnecessary and a junior synonym of *C. globulus* DESOR. d'ORBIGNY's new name has rarely been used by sub-

sequent authors. Indeed, WRIGHT (1873), RAVN (1927), SZÖRENYI (1955), BLASZKIEWICZ (1970) etc. wisely stuck to DESOR's name.

c) We can conclude that *C. globulus* DESOR is a species, well different from *C. subrotundus*, but possibly synonymous with *C. globosus* ROEMER, non DEFRANCE. Because of its homonymy with the pre-Linnean name *C. globulus* KLEIN (= *G. vulgaris* LESKE), these species have often been confused. *G. globosus* DEFRANCE is a nomen nullum.

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