



The "avatars" of *Triloculina laevigata* ORBIGNY, 1826, generic and specific attribution

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Abstract: The purpose of this study is to clarify the problem posed by *Triloculina laevigata* ORBIGNY, 1826, *nom. nud.*, described and figured by FORNASINI in 1905. An other species, also called *Triloculina laevigata* was created by BORNEMANN in 1855 and ORBIGNY's specific name became invalid. This invalidity was only recently assessed and numerous authors still use the original assignation. Consequently, it seems necessary to erect a new name. After listing the various names, revising the subgenus and genera attributed to *Triloculina laevigata*, and comparing fossil and recent specimens, the name: *Affinetrina alcidi* LÉVY *et al.*, 1992a, is confirmed.

Key-words:

- Foraminifera ;
- systematics;
- *Triloculina laevigata* ORBIGNY, 1826;
- subgenus *Quinqueloculina* (*Pseudotriloculina*) CHERIF, 1970;
- genus *Affinetrina* LUCZKOWSKA, 1972;
- genus *Sinuloculina* LUCZKOWSKA, 1972

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Résumé : *Les "avatars" de Triloculina laevigata ORBIGNY, 1826, attribution générique et spécifique.*- Ce travail a pour but de clarifier le problème posé par *Triloculina laevigata* ORBIGNY, 1826, *nom. nud.*, figurée et décrite par FORNASINI en 1905. Mais cette validation devient un homonyme secondaire, en raison de la description par BORNEMANN en 1855 d'une autre *Triloculina laevigata*. Cette invalidation n'a été reconnue que tardivement et plusieurs auteurs récents utilisent encore l'appellation originelle. Après la révision du sous-genre et des genres attribués à *Triloculina laevigata* et la comparaison entre les formes fossiles et actuelles, l'appellation *Affinetrina alcidi* LÉVY *et al.*, 1992a, est confirmée.

Mots-clefs :

- Foraminifères ;
- systématique ;
- *Triloculina laevigata* ORBIGNY, 1826 ;
- sous-genre *Quinqueloculina* (*Pseudotriloculina*) CHERIF, 1970 ;
- genre *Affinetrina* LUCZKOWSKA, 1972 ;
- genre *Sinuloculina* LUCZKOWSKA, 1972

1. Introduction

In 1826, ORBIGNY proposed a species name: *Triloculina laevigata* in the "Tableau méthodique de la classe des Céphalopodes (n° 15, p. 300)" with only this location: "Habite la Méditerranée". This species was illustrated in the "Planches inédites" with 3 drawings (both sides and aperture with a long and bifid tooth) and the legend: "fossile à Valognes (W France), Éocène". His collection housed in the Muséum National d'Histoire Naturelle (MNHN) and includes a slide (MNHN.F.FO631) containing only 3 damaged specimens from Mediterranean. But the name "*laevigata*" remained invalid since it is without a

description and figures. In 1905, FORNASINI gave a good illustration but in his description, he figured a round aperture. Anyway, *T. laevigata* remains an homonym of BORNEMANN's species, described in 1855 and called *Triloculina laevigata*, but that is in fact a *Miliolinella*. Moreover, TERQUEM (1878, 1882) made a bad interpretation of ORBIGNY's species, describing it with a round aperture. So, the subsequent authors have described 2 different species according to ORBIGNY (see §2.1) or TERQUEM (see §2.2). In 1970, CHERIF erected a new subgenus *Quinqueloculina* (*Pseudotriloculina*) *laevigata* for ORBIGNY's species. This subgenus became a genus: *Pseudotriloculina* in LOEBLICH

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and TAPPAN, 1987, with a non valid type-species name! The result was a total imbroglio.

It seemed significant to study the synonymy established by LOEBLICH and TAPPAN (1987) between *Quinqueloculina* (*Pseudotriloculina*) CHERIF, 1970, and *Sinuloculina* LUCZKOWSKA, 1972, and also the genus *Affinetrina* LUCZKOWSKA, 1972, since *T. laevigata* has been referred to these 3 genera. LUCZKOWSKA (1972) worked substantially on the Miliolidae of the Miocene of Poland; she has outstandingly studied the internal structure and measured the angles between chambers during their ontogeny.

The aim of the present work is to bring out the various opinions of the authors, discuss the different generic attributions of ORBIGNY's species, and confirm the identity of the fossil and Recent specimens.

2. Historical background: Authors having cited the species

The main characters used by the authors is the shape of the aperture and of the tooth. These differences allow one to distinguish the two groups of authors: the first one chose the elongate aperture and tooth according to ORBIGNY (see §2.1, the second one chose the round aperture and short tooth according to TERQUEM (see §2.2).

2.1) the elongate aperture and tooth according to ORBIGNY

1826 – *Triloculina laevigata* d'ORBIGNY, nom. nud.

1893 – *Triloculina laevigata* d'ORBIGNY, SCHLUMBERGER (Pl. 1, figs. 45-47)

SCHLUMBERGER sees Mediterranean specimens. He shows 3 pictures of external morphology and 2 sections of A and B organisms (p. 206, Figs. 9-10). His species is unquestionably that of ORBIGNY: elongated aperture with a long tooth. He gives a short description of it.

1905 – *Triloculina laevigata* d'ORBIGNY, FORNASINI (Pl. 1, fig. 10)

FORNASINI worked on the unpublished plates of ORBIGNY. He reproduces ORBIGNY's drawings, clarifies the location of the species and its age, and gives a description: "*T. testa oblonga, laevigata, antice truncata, postice et circiter rotundata, oculis elongatis, leniter arcuatis inflatis, suturis angustis, apertura rotundata, dente apice bifurcata instructa*". This publication describes and figures *T. laevigata* for the first time, giving the original drawing and a description (not quite accurate since the aperture is not round, but elongated).

1927–1928 – *Triloculina laevigata* d'ORBIGNY, CUSHMAN

CUSHMAN (1927, p. 32; 1928, p. 181), working on the classification of foraminifers, reproduced the figures of SCHLUMBERGER (1893): the external view (3 sides) and the section of A form. No comments are made.

1947 – *Triloculina laevigata* d'ORBIGNY, LYS and SIGAL

They draw up some forms concerning the non-published plates of ORBIGNY. Their 'index card' (no. 977) reproduces the original drawing of *T. laevigata*. The provenance is: "Méditerranée, Belle-Île, et l'Océan Atlantique et Valognes (Manche), Castel-Arquato (Italie)". They indicate that the type of the MNHN specimens comes from Mediterranean. Unfortunately their work was not published.

1952 – *Triloculina laevigata* d'ORBIGNY, BOGDANOVICH

This author figures two drawings of FORNASINI (1905, Fig. 10 and 10a) and SCHLUMBERGER's section (1893).

1958 – *Triloculina laevigata* d'ORBIGNY, J. and Y. LE CALVEZ (Pl. 6, figs. 63-64)

They point out the presence of the species in the Bay of Villefranche, Mediterranean (their Fig. 62 shows a round aperture!). They consider that TERQUEM has misinterpreted *T. laevigata* and that his figures are not accurate.

1969 – *Quinqueloculina laevigata* (d'ORBIGNY), BOGDANOVICH

The author studied the internal structure of some Triloculines (see further).

1970 – *Triloculina lecalvezae* KAASSCHIETER, Y. LE CALVEZ (Pl. 1, fig. 3)

Y. LE CALVEZ figures *T. lecalvezae* (p. 51-52, Pl. 7, fig. 1) in the Eocene of the Parisian Basin (Chaussy), but it is not KAASSCHIETER's species. Her specimen has an elongated aperture, a long and bifid tooth, and is identical to ORBIGNY's specimen from Valognes. She reports it in several Eocene localities of Parisian Basin (among them the Eocene "falunière" of Grignon, Yvelines, western Parisian Basin) where the present author found specimens (see Pl. 1, figs. 8-9), as well as in the Oligocene. The figures of Y. LE CALVEZ are the first since FORNASINI (1905) that exactly shows the Eocene species of ORBIGNY, in spite of which she refers them to TERQUEM (1878), although earlier (J. et Y. LE CALVEZ, 1958) she considered that TERQUEM had misinterpreted *T. laevigata* (see below).

1970 – *Quinqueloculina* (*Pseudotriloculina*) *laevigata* (d'ORBIGNY), CHERIF (Pl. 9, fig. 2; Pl. 21, fig. 2, fide SCHLUMBERGER)

When studying the Miliolacea from the western coast of Naxos, CHERIF erected the subgenus *Quinqueloculina* (*Pseudotriloculina*) with *T. laevigata* ORBIGNY fide SCHLUMBERGER (1893) as type-species. His figures do not differ from SCHLUMBERGER and it is likely the same species. Diagnosis of the sub-genus and relative comments will be treated further.

1973 – *Quinqueloculina* (*Pseudotriloculina*) *laevigata* (d'ORBIGNY), CHERIF (Pl. 10, fig. 6; Pl. 14, fig. 4, 10; Pl. 5, fig. 10)



CHERIF repeated the description of the sub-genus with some new figures, but without any modification.

1986 – *Triloculina laevigata* d'ORBIGNY, CABIOCH *et al.* (Pl. 3, fig. 3)

These authors point out and figure *T. laevigata* in the Quaternary of fringing reefs in Southern New-Caledonia, but they give TERQUEM reference.

1992a – *Affinetrina alcidi* nom. nov. pro *Triloculina laevigata* d'ORBIGNY, 1826, LÉVY *et al.* (Pl. 4, figs. 5-6)

When studying the Mediterranean foraminifers of the Cretan shore and mainly specimens of Miliolacea with quinqueloculine and triloculine arrangement of the chambers, the present author and her coauthors have described (p. 123-124, Pl. 3, figs. 3-4) *Affinetrina alcidi* and placed into its synonymy *Triloculina laevigata* in ORBIGNY (1826), SCHLUMBERGER (1893), FORNASINI (1905), *Triloculina lecalvezae* in Y. LE CALVEZ (1970), and *Quinqueloculina (Pseudotriloculina) laevigata* in CHERIF (1970, 1973).

1992b – *Affinetrina alcidi* LÉVY *et al.* (p. 121, Pl. 2, figs. 9-10)

1995 – *Affinetrina alcidi* LÉVY *et al.*, LÉVY *et al.*

The species occurs in the Recent deposits of the archipelago Fernando de Noronha, north Brasil.

2.2) the round aperture and short tooth according to TERQUEM

1878 – *Triloculina laevigata* d'ORBIGNY, TERQUEM (Figs. 20a-21b)

TERQUEM considers he has found again *T. laevigata* in the Pliocene of Rhodes island. It cannot be the same species because the aperture of TERQUEM is round whereas that of ORBIGNY is elongated.

1882 – *Triloculina laevigata* d'ORBIGNY, TERQUEM (Pl. 17, figs. 22-23)

TERQUEM identified ORBIGNY's species again in the Eocene of Paris region. It is the same as his species from Rhodes.

1961 – *Triloculina lecalvezae* KAASSCHIETER nom. nov. pro *Triloculina laevigata*, 1826, nom. nud.

KAASSCHIETER was probably the first to recognize invalidity of ORBIGNY's species. Consequently, he introduced a new species name that dedicated to Y. LE CALVEZ. Unfortunately, the specimen he chose is different from ORBIGNY's one because the aperture is round. He put into the synonymy the original ORBIGNY's species, figured by FORNASINI (1905), as well as that of TERQUEM (1878). He did not describe his species. KAASSCHIETER's specimen (Lutetian of Damery, Parisian Basin) is a different species.

1972 – *Sinuloculina laevigata* (d'ORBIGNY, 1878), LUCZKOWSKA (p. 365, no figure)

This genus will be examined further. It is obvious that LUCZKOWSKA chose TERQUEM reference, as it is indicated by the date of validity of the species.

1987 – *Pseudotriloculina lecalvezae* (KAASSCHIETER), LOEBLICH and TAPPAN (p. 342-343, Pl. 352, figs. 13-14)

In their treatise, LOEBLICH and TAPPAN raised to genus the CHERIF's subgenus *Pseudotriloculina* but, doing so, they made an error: they said that the subgenus was *Triloculina (Pseudotriloculina)* instead of *Quinqueloculina (Pseudotriloculina)*. They chose to validate ORBIGNY's species *Triloculina lecalvezae* KAASSCHIETER with TERQUEM figures from the Pliocene of Rhodes island, which are different (see supra) from ORBIGNY's species. They put into the synonymy *Pseudotriloculina* and *Sinuloculina* LUCZKOWSKA, 1972. This problem will be treated further.

Table 1 summarizes the various assignments of *Triloculina laevigata* ORBIGNY, 1826.

Table 1: The various assignments of *Triloculina laevigata* ORBIGNY, 1826.

| <i>Triloculina laevigata</i> ORBIGNY, 1826, nom. nud. | |
|--|---|
| Citations and illustrations. Eocene-Oligocene Valognes (Manche), Paris Basin | |
| <i>Triloculina laevigata</i> ORBIGNY.- FORNASINI, 1905 invalid, junior synonym of <i>Triloculina laevigata</i> BORNEMANN, 1855 | |
| <i>Triloculina lecalvezae</i> KAASSCHIETER.- Y. LE CALVEZ, 1970 species name invalid | |
| <i>Affinetrina alcidi</i> LÉVY <i>et al.</i> - POIGNANT, the present work | |
| Wrong assignments Not ORBIGNY's species | Citations in various areas and epochs |
| <i>Triloculina laevigata</i> ORBIGNY.- TERQUEM, 1878 Pliocene, Rhodes Island | <i>Triloculina laevigata</i> ORBIGNY.- SCHLUMBERGER, 1893 Mediterranean |
| <i>Triloculina lecalvezae</i> KAASSCHIETER, 1961 Eocene, Paris Basin | <i>Triloculina laevigata</i> ORBIGNY.- CUSHMAN, 1927, 1928 SCHLUMBERGER's figures |
| <i>Pseudotriloculina lecalvezae</i> (KAASSCHIETER, 1961) LOEBLICH & TAPPAN, 1987 Pliocene, Rhodes Island | <i>Triloculina laevigata</i> ORBIGNY.- LYS and SIGAL, 1947 Pliocene (Castel-Arquato), Mediterranean |
| | <i>Triloculina laevigata</i> pro parte ORBIGNY.- J. et Y. LE CALVEZ, 1958 Mediterranean |
| | <i>Triloculina lecalvezae</i> KAASSCHIETER.- Y. LE CALVEZ, 1970 Paris Basin |
| | <i>Quinqueloculina (Pseudotriloculina)</i> <i>laevigata</i> ORBIGNY.- CHERIF, 1970, 1973 Mediterranean |
| | <i>Triloculina laevigata</i> ORBIGNY.- CABIOCH <i>et al.</i> , 1986 Quaternary, New-Caledonia |
| | <i>Affinetrina alcidi</i> LÉVY <i>et al.</i> , 1992a, 1992b, 1995 Mediterranean |
| | <i>Affinetrina alcidi</i> LÉVY <i>et al.</i> , 1992a.- POIGNANT, the present work Mediterranean |



3. The different genera assigned to the species "*Triloculina laevigata* d'ORBIGNY, 1826" in FORNASINI, 1905

In the literature the species is found with 5 assignments to genera and subgenus: *Triloculina*, *Quinqueloculina* (*Pseudotriloculina*), *Sinuloculina*, *Affinetrina*, *Pseudotriloculina*. We will see that every diagnosis, except FORNASINI's one, takes into account the internal structure that is essential for a reliable determination.

BOGDANOVICH (1952) described the internal structures of *Triloculina*. He showed a figure (p. 12, Fig. 5) of *T. laevigata* from SCHLUMBERGER with a quinqueloculine structure and 3 chambers visible.

In 1969, he writes (p. 352-353): "However, cases where the number of chambers seen outside the tests of many quinqueloculine species decreases to 4 and even 3 are quite common. This phenomenon is caused by a rapid decrease of thickness of chambers as the test grows, and thus by their involution. As a result, the last three chambers cover the earlier ones – the fifth and also not seldom the fourth chambers (...)". The author proposed to name this structure as "cryptoquinqueloculine" and to regard it as a modification of the true quinqueloculine structure of the Miliolidae.

LUCZKOWSKA (1972) made an extremely interesting work on the Miliolidae of the Polish Miocene, later accompanied by an abundant illustration in 1974. Effectively, she made numerous sections and measured the angles between chambers during the ontogeny in particular for the genera *Triloculina* and two new genera that she erected: *Affinetrina* and *Sinuloculina*. Her measurements of angles particularly concerns the B generation. Among others, she used 2 terms corresponding to 2 types of coiling:

Kryptoquinqueloculine (p. 353): "outer triloculine chamber arrangement, but with two previous internal chambers completing the last three in the quinqueloculine arrangement".

Pseudotriloculine (p. 357): "Internal structure kryptoquinqueloculine at least in the microspheric generation and triloculine or irregularly triloculine in the mature stage of micro, mega I et mega II generations. This mode of irregular triloculine chamber addition is named "pseudotriloculine" and is represented by two angles $>130^\circ$ and one angle $< 90^\circ$ measured between three last chambers of the last whorl.

Genera *Triloculina* and *Quinqueloculina*

According to LOEBLICH and TAPPAN (1987), *Triloculina* is initially cryptoquinqueloculine at least in microspheric generation (Pl. 3, fig. 2, from SCHLUMBERGER, 1893), with 3 chambers visible externally (Pl. 2, figs. 1-2). *Quinqueloculina* has earlier chambers in quinqueloculine arrangement (Pl. 3, fig. 1), with 5 chambers visible externally.

Subgenus *Quinqueloculina* (*Pseudotriloculina*) CHERIF (Pl. 1, fig. 5)

1970 – *Quinqueloculina* (*Pseudotriloculina*) CHERIF, vol. 142, no. 1, p. 112.

Type species: *Triloculina laevigata* ORBIGNY, 1826, emend SCHLUMBERGER, 1893.

Original diagnosis: "Gehäuse frei, Kammerordnung quinqueloculin, Äquatorial-Windung involut, von aussen 3 Kammern sichtbar. Wand porzellanartig, hochglänzend. Mündung mit oder ohne Hals, mit oder ohne Lippe, einfacher oder bifider Zahn.

Beziehungen: *Quinqueloculina* (*Pseudotriloculina*) n. subgen., unterscheidet von *Triloculina* d'ORBIGNY durch ihre quinqueloculine Kammeranordnung. Sie unterscheidet sich von *Quinqueloculina* (*Quinqueloculina*) d'ORBIGNY durch ihre involute Äquatorialwindung, die nur 3 Kammern von außen sehen läßt."

CHERIF (1973) repeated the diagnosis of his sub-genus without any modifications and added a few figures.

CHERIF distinguished *Pseudotriloculina* from *Triloculina* ORBIGNY (*T. trigonula* type) by the quinqueloculine coiling of the first genus, which is incorrect since LOEBLICH and TAPPAN (1987) mention a quinqueloculine coiling in *Triloculina*, at least in microspheric forms. Moreover, CHERIF's section of *Triloculina* does not show the initial quinqueloculine coiling (this work: Pl. 3, fig. 5 C). CHERIF wanted to name the particular structure he saw in *Triloculina laevigata* ORBIGNY (see his description) and consequently created the subgenus called *Quinqueloculina* (*Pseudotriloculina*). This structure was called "cryptoquinqueloculine" by BOGDANOVICH, 1969 (see supra).

CHERIF (1970) found the species in the Mediterranean (Naxos coasts, Greece); consequently, he determined his species according to SCHLUMBERGER (1893) whose specimens came from the Mediterranean. He quoted FORNASINI but not TERQUEM (1878). He knew the work of KAASSCHIETER



(1961) but he did not take into account the new name of *T. laevigata*, probably because KAASSCHIEFER's figure does not concern the ORBIGNY's species (see supra). In his synonymy, apart FORNASINI, he only mentions authors having observed the species in Recent environments, *i.e.*, MARTINOTTI (1920) and WIESNER (1923).

Genus *Affinetrina* LUCZKOWSKA

(Pl. 1, figs. 4, 6; Pl. 2, figs. 8-9, 11-12;
Pl. 4, figs. 5-6)

1972 – *Affinetrina* n.gen. – LUCZKOWSKA, p. 368, Pl. 13, figs. 4-5.

Type species: *Triloculina planciana* ORBIGNY, 1839

Diagnosis: "Test with an internal structure as in *Triloculina*, but with an high slit-like aperture nearly filled with a long, slender tooth, slightly enlarged at the end; three chambers visible externally".

Affinetrina mainly differs from *Triloculina* in having an elongated aperture and a long tooth. The genus was recognized by LOEBLICH and TAPPAN (1987, p. 337), who report LUCZKOWSKA's diagnosis.

In fact, the section of the micro generation of *Affinetrina planciana* given by LUCZKOWSKA is more complex. It shows a kryptoquinqueloculine initial part and a pseudotriloculine mature stage (see Fig. 11, p. 358).

LÉVY *et al.* (1992a, 1992b) put *Triloculina laevigata* fide ORBIGNY in SCHLUMBERGER (1893), FORNASINI (1905), Y. LE CALVEZ (1970), CHERIF (1970), in the genus *Affinetrina*.

Genus *Sinuloculina* LUCZKOWSKA

(Pl. 2, figs. 3-7, 10)

1972 – *Sinuloculina* n.gen. – LUCZKOWSKA, p. 370, Pl. 12, figs. 4-5.

Type species: *Biloculina cyclostoma* REUSS, 1850

Diagnosis: "Test initially with kryptoquinqueloculine chamber arrangement, later chambers added in planes of coiling increasing irregularly to 180° or more, so that alternating chambers form the sinusoid curve in sections; three proloculus sizes are distinguished; chambers without floor, broadly overlapping the preceding chamber and giving externally triloculine or biloculine appearance, aperture large, rounded or oval, usually bordered with a thick rim, filled with a thick, bifid tooth, protruding over the aperture edge".

The type species only shows 2 chambers in external view.

LUCZKOWSKA referred several species to her new genus like *Triloculina consobrina* ORBIGNY (see section, Pl. 3, fig. 1). Of course, LUCZKOWSKA did not know CHERIF's study.

4. The synonymy

Pseudotriloculina-Sinuloculina in LOEBLICH and TAPPAN (1987) – Differences between both genera – Validity of the genus *Pseudotriloculina* – Specific assignment of *Triloculina laevigata*

The diagnosis of the sub-genus *Quinqueloculina* (*Pseudotriloculina*) CHERIF, which was erected as a genus by LOEBLICH et TAPPAN, is essentially that of LUCZKOWSKA's genus, as far as the internal structure is concerned.

LOEBLICH and TAPPAN figure the genus *Pseudotriloculina* (Pl. 352) with REUSS species: *Biloculina cyclostoma*, type species of *Sinuloculina* LUCZKOWSKA, but this species only shows 2 external chambers, which is not mentioned in CHERIF's diagnosis. Moreover, they also illustrate *Pseudotriloculina lecalvezae* with TERQUEM's figures, showing a rounded aperture and without elongated and protruding tooth, in contradiction with SCHLUMBERGER (1893), FORNASINI (1905), CHERIF (1970), and Y. LE CALVEZ (1970).

LOEBLICH and TAPPAN recognize the "pseudotriloculine" structure described by LUCZKOWSKA and the genus *Pseudotriloculina* of CHERIF the type-species of which displays a kryptoquinqueloculine and a pseudotriloculine mature stage structure according to LUCZKOWSKA (see below).

We draw attention that something important is lacking in CHERIF's diagnosis; his description of the external morphology is almost totally insignificant: "Mündung mit oder ohne Hals, mit oder ohne Lippe, einfacher oder bifider Zahn". In contrast LUCZKOWSKA's diagnosis of *Sinuloculina* is much more significant: "aperture large, rounded, usually bordered with a thick rim, filled with a thick, bifid tooth, protruding over the aperture edge".

The external morphology has important since it allows one to observe from the outside the number of chambers on each side, the presence or lack of a peristome, and the shape of the aperture and tooth. For example, *Triloculina* has a sub-triangular to triangular outside in oral view (Pl. 2, figs. 1-2) and *Sinuloculina* an oval one (Pl. 2, figs. 4-5, 7); the aperture can be rounded, oval, elongated (Pl. 2, figs. 1-3, 6, 10); the tooth can be thick, thin, short, elongated, bifid, even ring-shaped (Pl. 2, figs. 1-3, 6, 10). The genus *Sinuloculina* allows one to identify it more often, without making a section; moreover, its type species possesses only 2 visible chambers.

On the other hand, LOEBLICH and TAPPAN (1987) admit the genus *Affinetrina* LUCZKOWSKA, 1972, which shows an elongate aperture and a long and bifid tooth, protruding over the apertural rim (see supra).



Finally, the present author adheres to the opinion she previously held with her coauthors (LÉVY *et al.*, 1992a, 1992b) placing "*Triloculina laevigata*" ORBIGNY (fide SCHLUMBERGER), provided with a slit-like aperture and an elongate tooth, in the genus *Affinetrina*. The section of *Triloculina laevigata* is identical to the one of *T. planciana* ORBIGNY, 1839, type species of the genus *Affinetrina*. For LUCZKOWSKA (1972, p. 358, Fig. 11c), *A. planciana* has a kryptoquineloculine section, then pseudotriloculine, *i.e.*, between the 3 chambers of the last coil: 2 angles $> 130^\circ$ and 1 $< 90^\circ$. The section of *Triloculina planciana* in LUCZKOWSKA (Pl. 4, fig. 1) is quite similar with SCHLUMBERGER's sections for *T. laevigata* (Pl. 4, figs. 3-4).

Consequently, a question must be considered: what are the implications for the genus *Pseudotriloculina* if it loses its type-species, *i.e.*, *Pseudotriloculina laevigata*, that possesses the external and internal characters of the genus *Affinetrina*? In any case, the present author decided to stop using it.

As for the specific assignment of *Triloculina laevigata*, neither *laevigata* ORBIGNY can be used, having been invalidated by BORNEMANN, nor *lecalvezae* KAASSCHIETER, because KAASSCHIETER's figure has a rounded aperture. Only "*alcidi*" (LÉVY *et al.*, 1992a), which was erected for a Recent species and put into synonymy with "*Triloculina laevigata*" sensu ORBIGNY, is left.

5. The fossil form and the Recent one: only one and same species?

Finally, is the Recent form the same as the fossil one ?

Firstly, ORBIGNY who described the species in the Eocene also reports it from the Recent. The fossil form has been found in the Eocene and Oligocene in the following localities:

Eocene: Valognes (département de la Manche): ORBIGNY type locality^[*]; many exposures (Lower, Middle, Upper Eocene) from the Paris Basin reported by Y. LE CALVEZ (1970), among them the Eocene "falunière" of Grignon (Yvelines, western Paris Basin);

Oligocene: France, Paris Basin: Sannoisian, Rupelian (Stampian), Auvers-Saint-Georges in particular: Jeurre level (Y. LE CALVEZ, 1970); Belgium: Upper Tongrian of Galgenberg (Y. LE CALVEZ, 1970).

In the Eocene-Oligocene, it seems to have only been observed in the Franco-Belgian Basin and Eocene of Manche; it has never been recorded in Aquitaine or from sediments of Miocene age. LYS and SIGAL (1947) found it in sediments of Pliocene age at Castel-Gandolfo (Italy, Emilia).

However, the Recent form is quite widespread. ORBIGNY (unpublished plates) indicated it at Belle-Île, Atlantic Ocean, Mediterranean, and the type specimen, stored at the MNHN, comes from the Mediterranean. SCHLUMBERGER (1893) studied it in the Mediterranean Sea and a mount of the SCHLUMBERGER collection, *i.e.*, a microfossil slide, with 16 specimens coming from Marseille (bryozoa zone) has been observed at the MNHN. Two mounts of the J. and Y. LE CALVEZ Mediterranean collection (no. 191-192) have also been observed; they contain several well preserved specimens of *T. laevigata*.

CHERIF (1970, 1973) studied it in Greece whereas the present author and her coauthors were investigating in Crete (LÉVY *et al.*, 1992a, 1992b). In both cases, the Recent form was placed in the synonymy with the fossil form. CABIOCH *et al.* (1986) observed and figured it in the Quaternary of fringing reef of New-Caledonia, but they take the TERQUEM reference. It was also found in the Fernando de Noronha archipel (Northeastern Brasil) by LÉVY *et al.* (1995).

The present author studied both forms but, as it has been said above, the fossil specimens are rare compared to the Recent ones, even if Y. LE CALVEZ found it in many exposures of the Paris Basin (see above). As far as the external morphology is concerned, no noteworthy differences can be seen; the specimens observed in the Eocene of Grignon: those by Y. LE CALVEZ one (1970) and the ones in the present work are identical to the Mediterranean or NeW Caledonian forms of the mentioned authors. In addition, the Eocene specimen of ORBIGNY, figured by FORNASINI, shows no special features except for its typical tooth.

Therefore, it is difficult to distinguish the two different species since ORBIGNY saw one species only. REVETS (1994) writes: "d'ORBIGNY was a naturalist of high repute as the result of his careful observations and his keen eye for detail". *Affinetrina alcidi* is perhaps rare to very rare in Eocene-Oligocene and Miocene and Pliocene too and abundant in Recent.

In conclusion, there would very probably exist only one and the same species: *Affinetrina alcidi* LÉVY *et al.*, 1992a.

[*] The present author could examine the original sample of ORBIGNY (stored at the MNHN) but she only found a few badly preserved specimens.



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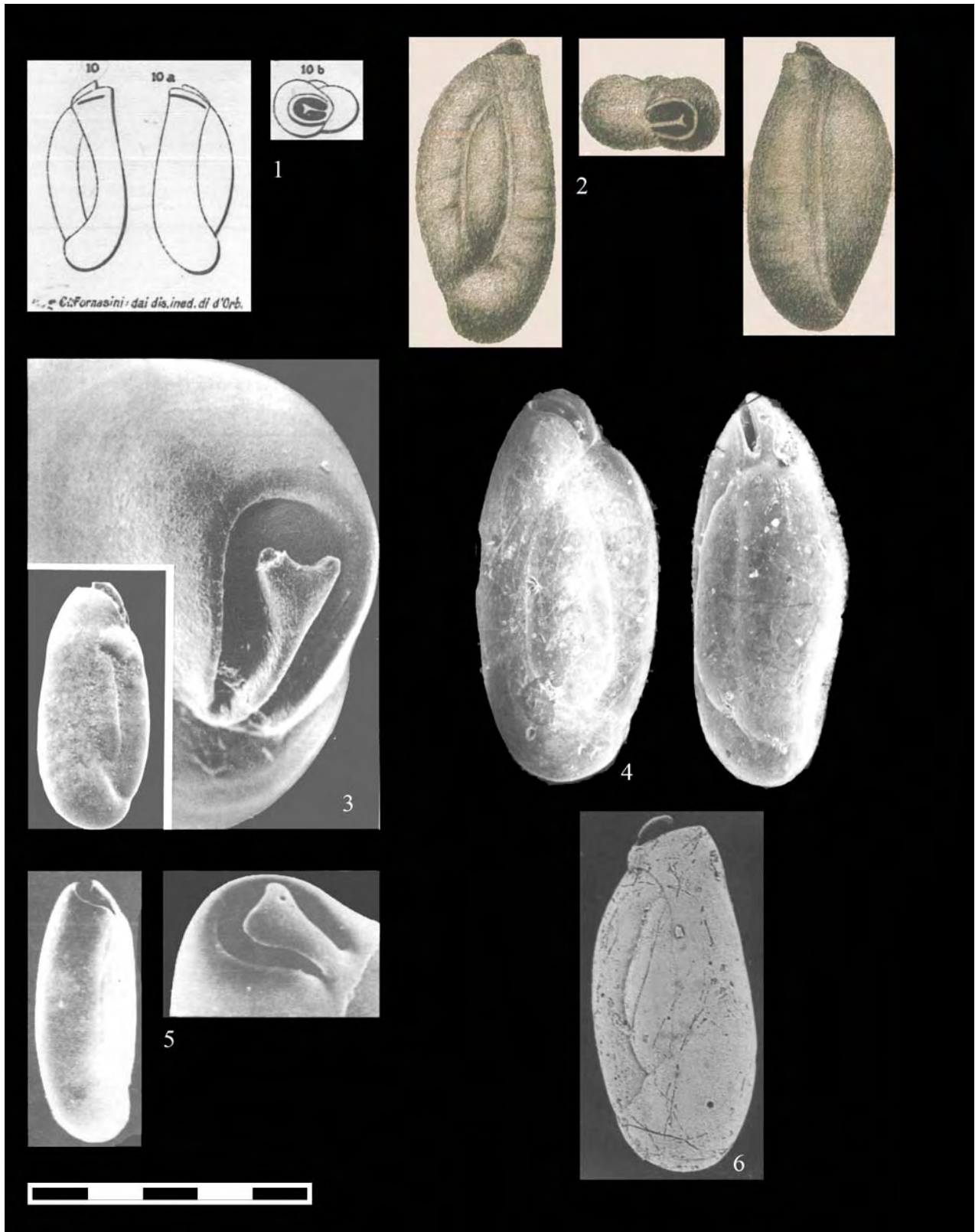


Plate 1: **1.** *Triloculina laevigata* ORBIGNY. Unpublished ORBIGNY's drawing in FORNASINI, 1905. Eocene, Valognes (Manche). X no mentioned. **2.** *Triloculina laevigata* ORBIGNY, in SCHLUMBERGER, 1893, Pl. 1, figs. 45-47, X 40. **3.** *Triloculina lecalvezae* KAASSCHIETER, in Y. LE CALVEZ, 1970, Pl. 7, fig. 1. Eocene, Chaussy (Paris Basin). Side view: X 30, apertural view: X 140. **4, 6.** *Affinetrina alcidi* LÉVY *et al.*, Eocene, "falunière" of Grignon (Yvelines, Paris Basin). X 50. **5.** *Triloculina laevigata* ORBIGNY, in CHERIF, 1970, Pl. 9, fig. 2a,b. Recent, Naxos. Side view: X 50; apertural view: X 200. Graphical scale = 5 cm.

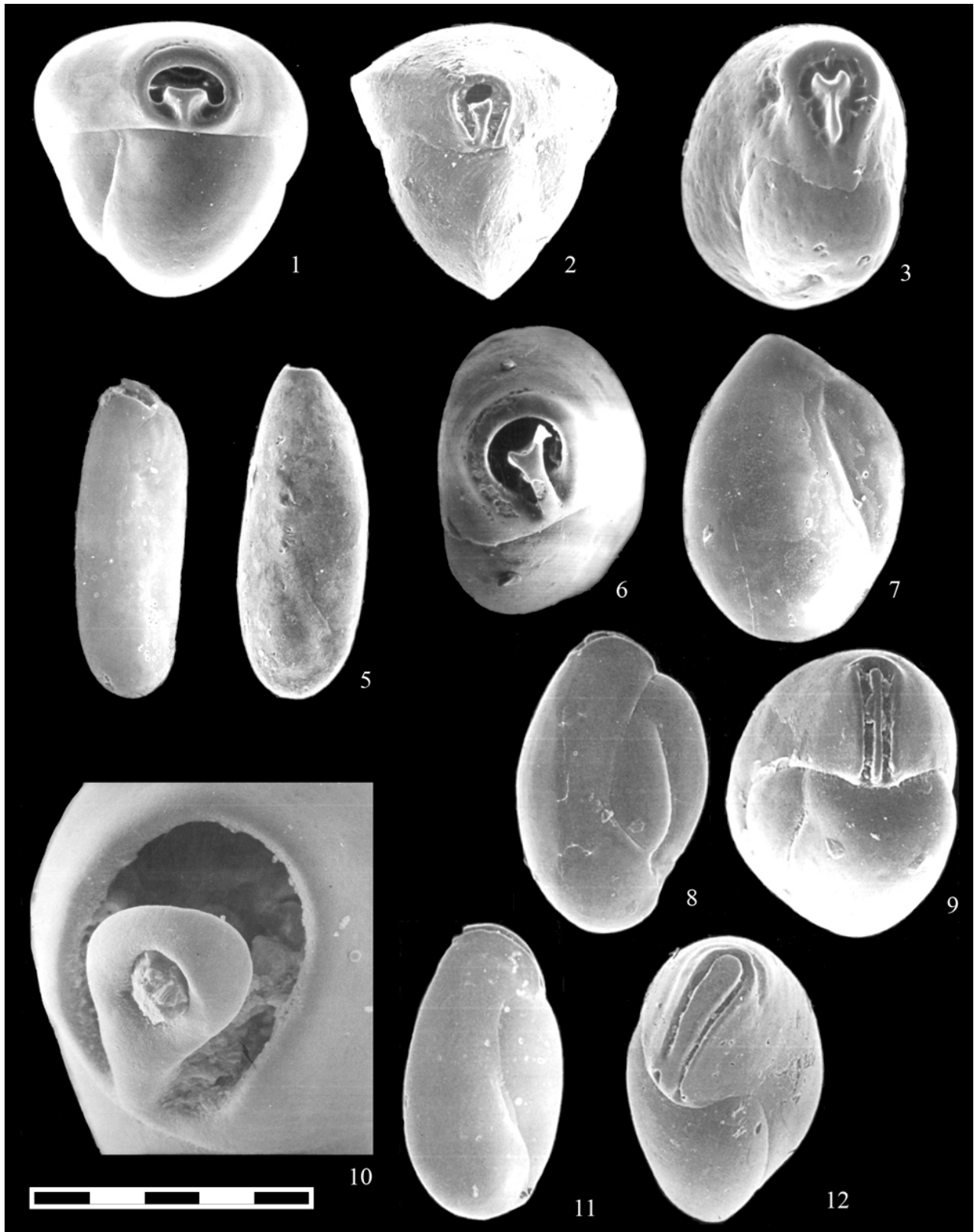


Plate 2: 1. *Triloculina trigonula* (LAMARCK). Recent, Sicily. X 80. 2. *Triloculina gibba* ORBIGNY. Recent, Cyprus. X 80. 3, 7. *Sinuloculina cyclostoma* (REUSS). Recent, Sicily, Cagliari. X 65. 4, 10. *Sinuloculina williamsoni* (TERQUEM). Recent, English Channel. 4: X 60; 10: X 300 (ring-shaped tooth). 5-6. *Sinuloculina consobrina* (ORBIGNY). Recent, Crete. 5: X 65; 6: X 95. 8-9. *Affinetrina bermudezi* (Acosta). Recent, Tel Aviv, Israel. 8: X 70; 9: X 100. 11-12. *Affinetrina eburnea* (ORBIGNY). Recent, Cyprus. 11: Side view: X 80; 12: X 120 (Figures 3, 6, 7, 8, 9, 11, 12, excerpts from LEVY *et al.*, 1992a). Graphical scale = 5 cm.

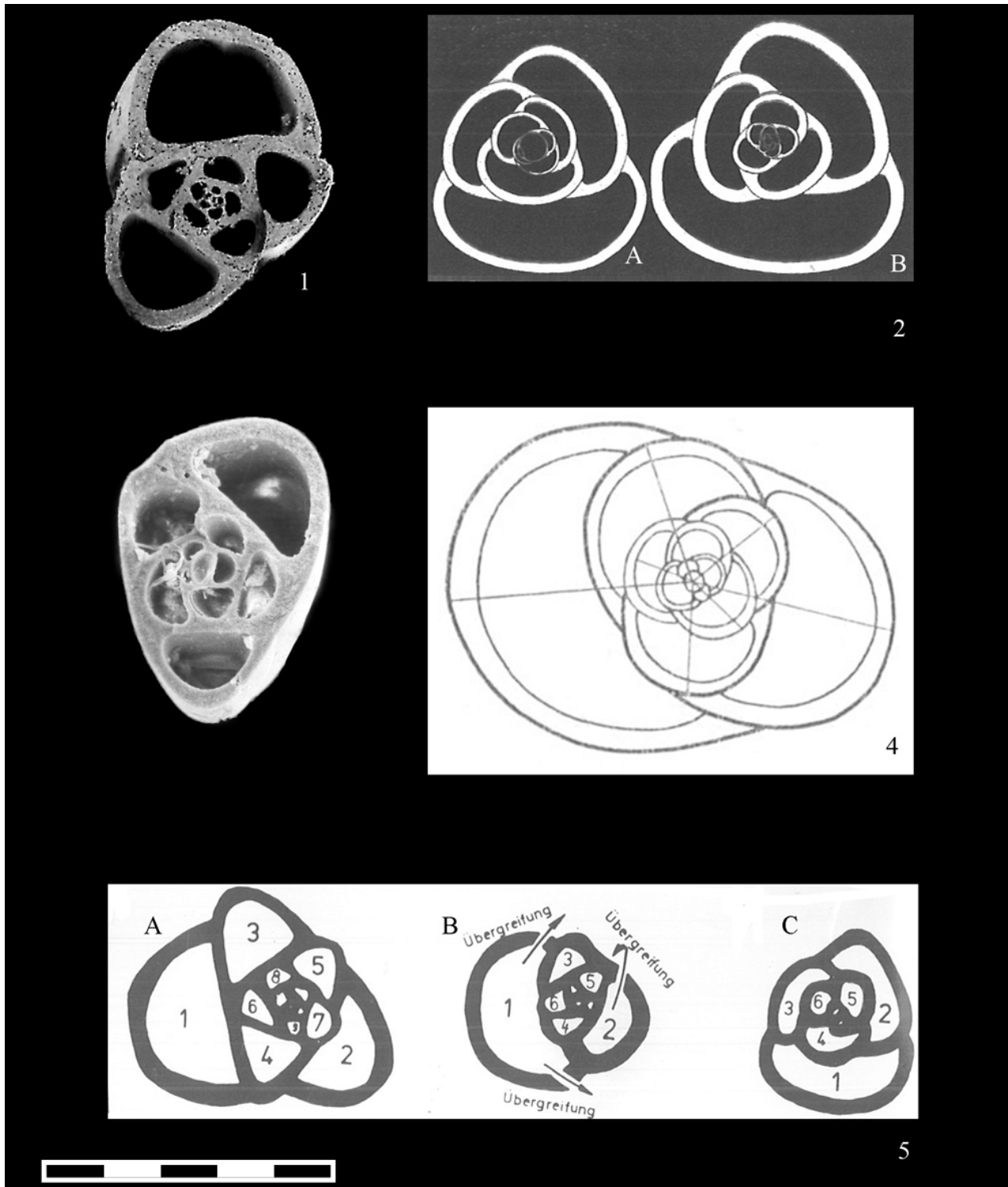


Plate 3: 1. *Quinqueloculina boueana* ORBIGNY. Section of a microspheric form. Aquitanian, Le Plantat, Northern Aquitaine. X 225. 2. *Triloculina schreiberiana* ORBIGNY. A: Section of a megalospheric form; B: section of a microspheric form, in SCHLUMBERGER, 1893, p. 204, Fig. 5, A form; Fig. 6: B form. Recent, Mediterranean. X 66. 3. *Sinuloculina consobrina* (ORBIGNY), section of a megalospheric form. Burdigalian, Pont-Pourquey, Northern Aquitaine. X 200. 4. *Sinuloculina cyclostoma* (REUSS). Section of a microspheric form, in LUCZKOWSKA, 1972, p. 358, Fig. 11a. Miocene, Weglinek, Poland. X 1300. 5. A - Section of *Quinqueloculina*; B - Section of *Pseudotriloculina* (the last coiling has 3 chambers because the youngest chamber hides the 4th chamber); C - Section of *Triloculina*, in CHERIF, 1970, Pl. VI, figs. 5-7. Recent Mediterranean. X no mentioned (Figure 3 excerpt from LÉVY *et al.*, 1991). Graphical scale = 5 cm.

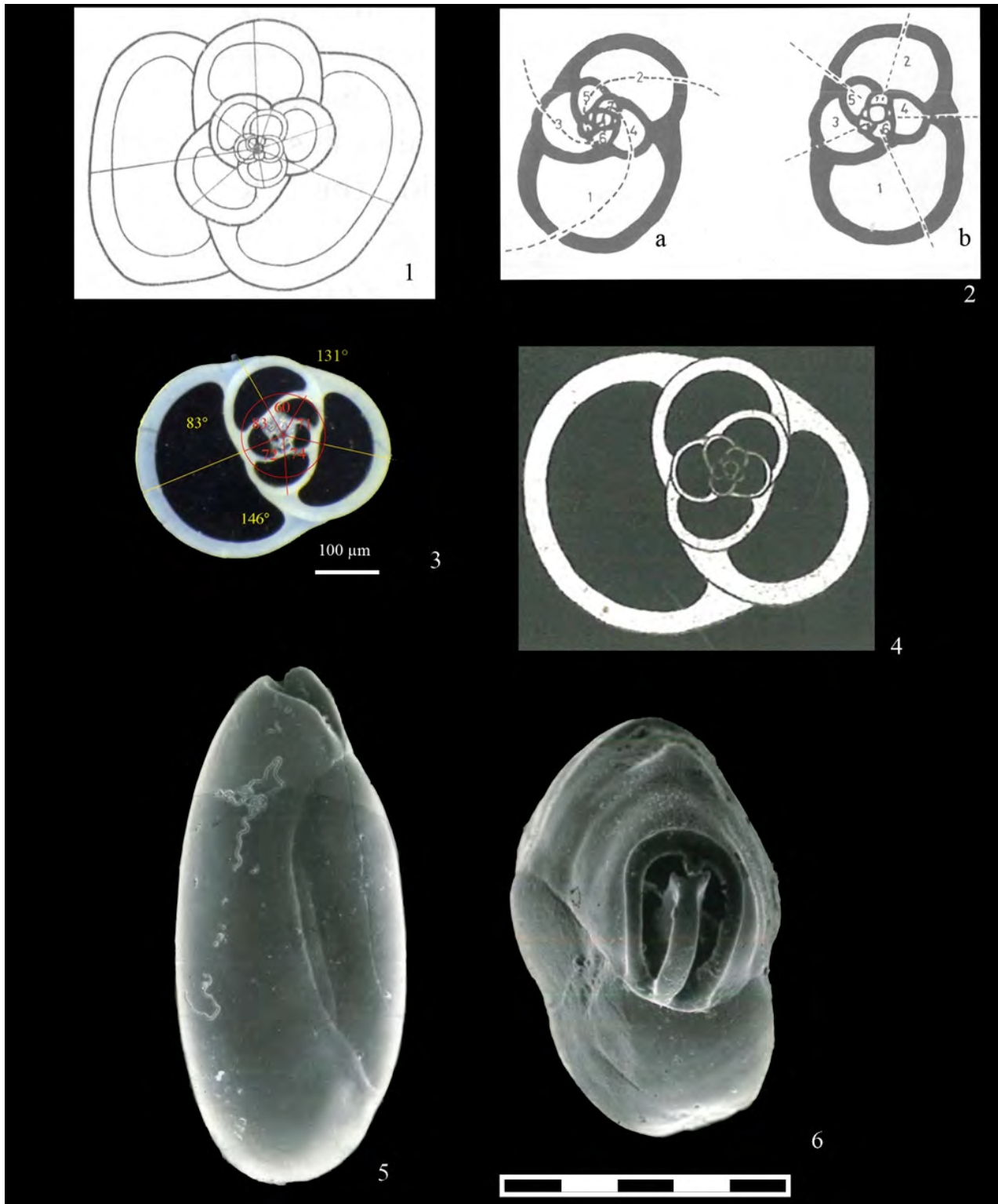


Plate 4: 1. *Affinetrina planiana* (ORBIGNY). Section of a microspheric form, in LUCZKOWSKA, 1972, p. 358, Fig. 11c. Miocene, Gliwice st., Poland. X 800. 2. *Triloculina laevigata* ORBIGNY. a: b form; b: a form. Sections in CHERIF, 1970, Pl. VII, X no mentioned. 3. *Triloculina laevigata* ORBIGNY, section of SCHLUMBERGER (MNHN) with addition of angular measures. Recent, Mediterranean. 4. *Triloculina laevigata* ORBIGNY. Section of a microspheric form, in SCHLUMBERGER, p. 206, Fig. 10, X 100. 5-6. *Affinetrina alcidi* LÉVY *et al.* 5: side view, X 30; 6: apertural view, X 40. Recent, Crete (Figures 5-6, excerpt from LÉVY *et al.*, 1992b). Graphical scale = 5 cm.