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GLIBERTTURRICULA VERVOENENI GEN. ET SP. NOV. (MOLLUSCA, GASTROPODA, TURRIDAE), A COMMON SPECIES FROM RUPELIAN DEPOSITS IN BELGIUM AND POLAND

by

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Glibertturricula vervoeneni gen. et sp. nov., a species hitherto confused with *Fusiturris selysii* (de Koninck, 1838), is described from several Rupelian deposits in Belgium and from Poland. The stratigraphical range comprises the Berg Sands, the Nucula Clay and the Boom Clay Formation (Waasland Clay Member and lower middle part of the Putte Clay Member) in Belgium (typelocality: Kruibeke clay-pit) and the Neustadt-Magdeburger Sand near Szczecin in Poland. The Polish population differs slightly from the Belgian material but is still considered to belong to the same taxon.

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SAMENVATTING

Glibertturricula vervoeneni gen. et sp. nov. (Mollusca, Gastropoda, Turridae), een algemene soort uit afzettingen van Rupelien-ouderdom in België en Polen.

Al meer dan tien jaar geleden maakte de heer Marcel Vervoenen te Aalst (België) ons attent op een gastropode uit de Boom Klei Formatie, ontsloten in de kleigroeve van Kruibeke, die tot op dat moment steeds was aangezien voor een vorm van de algemeen voorkomende *Fusiturris selysii* (De Koninck, 1838). De kennelijk nog onbeschreven soort werd door ons sindsdien aangeduid met de nooit formeel geïntroduceerde naam "*Turris vervoeneni*", waarbij wij het plan hadden een nieuwbeschrijving ervan op te nemen in een algehele revisie van de mollusken uit de Boom Klei Formatie, die dringend noodzakelijk is. Een dergelijke revisie moest echter in een goed lithostratigrafisch kader geplaatst worden. Een degelijke lithostratigrafie van deze afzetting is nu weliswaar beschikbaar, maar de gewenste revisie van de molluskenfauna is dermate veelomvattend, dat die niet op korte termijn zal kunnen worden afgesloten. Daarom wordt in dit artikel de betreffende soort beschreven. Ook is gebleken dat deze soort niet past in één der bestaande genera, zodat ook een nieuw geslacht wordt geïntroduceerd, dat werd genoemd naar de onlangs overleden Dr. M. Glibert.

Glibertturricula vervoeneni wordt uitvoerig morfologisch beschreven en vergeleken met begeleidende soorten. Het stratigrafisch bereik waarin deze soort voorkomt omvat de Zanden van Berg, de Nuculaklei en de Boom Klei Formatie (Klei van Waasland en het onderste middendeel van de Klei van Putte). Uit deze afzettingen is de soort uitsluitend bekend in België. Tamelijk verrassend blijkt dezelfde soort echter ook (in een iets afwijkende vorm) voor te komen in Neustadt-Magdeburger Sande te Siadło Górne bij Szczecin in Polen.

Omdat het onwaarschijnlijk is, dat een tamelijk algemeen voorkomende soort als *G. vervoeneni* niet eerder werd gevonden, hebben wij de belangrijkste literatuur over de verwante vormen (voornamelijk *Fusiturris selysii* en *Orthosurcula regularis*) zorgvuldig doorgenomen. Hierbij is echter niet gebleken dat in deze literatuur de betreffende soort werd beschreven of bedoeld.

INTRODUCTION

It is more than ten years ago now that Mr Marcel Vervoenen, a non-professional paleontologist at Aalst (Belgium), drew our attention to a gastropod occurring in the Belgian Boom Clay Formation that up to that time apparently had been confused with another Oligocene species, viz. *Fusiturris selysii* (de Koninck, 1838). The wide range of variability of this latter species seems to have prevented a closer look at the material available, the polymorphism of which had been stressed by several authors (von Koenen, 1867; Speyer, 1867; Harder, 1913; Glibert, 1957).

Still, once aware of the distinguishing features, the undescribed form is quite characteristic and easy to recognize. Ever since the day Mr Vervoenen demonstrated his material to us we have been referring to this form with the never formally introduced name "*Turris vervoeneni*".

As the knowledge of the Rupelian mollusc fauna of the North Sea Basin was considerably enlarged as a result of active field collecting during the last twenty years a systematic revision is urgently needed. We planned to incorporate a description of "*T. vervoeneni*" in such a revision, which however has to be put into a proper lithostratigraphical framework. Such a lithostratigraphical outline is available now, initiated by van den Bosch, Cadée & Janssen (1975) and Vandenberghe

(1978), elaborated by later authors (van den Bosch, 1984; van den Bosch & Hager, 1984). Nevertheless an overall revision of the mollusc fauna of this interval is a large and still quite remote project, taking several years to be finished.

Therefore we decided to formalize the name "*vervoeneni*" in a separate paper. Accidentally the species introduced here also proved to belong to a new genus. We took this occasion to honour the recently deceased Dr Maxime Glibert of the Institut royal des Sciences naturelles de Belgique at Brussels (Belgium) in the name of this new genus. Dr Glibert was one of the main contributors to the knowledge of the Belgian Tertiary molluscs and his passing away is a severe loss to science. For further details on Dr Glibert's career and publications the reader is referred to Dhont (in press).

DESCRIPTION OF THE NEW GENUS *GLIBERTTURRICULA*

Glibertturricula gen. nov.

Diagnosis - Medium-sized Turriculinae with rather flattened to carinated whorls, almost straight axial sculpture elements and a v-shaped sinus situated above the peripheral carina. Spiral sculpture present. Protoconch high-conical with 4 3/4 whorls covered with a micro-granulation; the last two whorls with radial sculpture.

Discussion - *Glibertturricula* resembles closely the Turrinae genus *Fusiturris* in general outline, sculpture and protoconch features. The location of its sinus, however, distinctly assigns this genus to the Turriculinae.

Within the Turriculinae several genera resemble *Glibertturricula* superficially (Powell, 1966). *Fusiturricula* Woodring, 1928, for instance, has similar sculpture but a differently shaped and ornamented protoconch of 2 3/4 whorls at the most. Also its sinus is adjacent to the adapical suture, which is distinctly higher than in *Glibertturricula.*

Comitas Finlay, 1926 is also very alike by its sculpture and shape but has a protoconch of only two whorls of which the last one is carinated.

Fusimilis Stephenson, 1941 looks very similar at first glance, but it has almost non-carinated whorls and the sinus coincides with the angularity of the whorls.

Derivatio nominis - A form related to *Turricula*, named after the recently deceased Dr Maxime Glibert (see introduction).

Type species - *Glibertturricula vervoeneni* sp. nov. (monotypic).

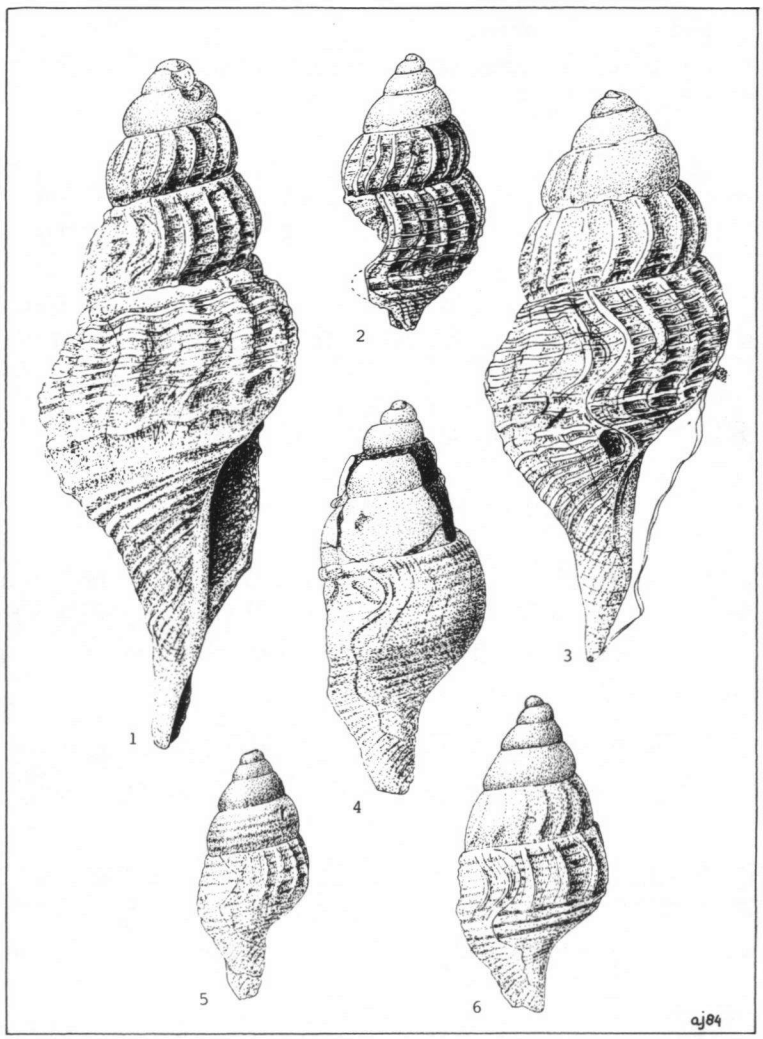
DESCRIPTION OF THE NEW SPECIES *GLIBERTTURRICULA VERVOENENI*

Glibertturricula vervoeneni sp. nov.

Text-figs 1-2; Pl. 1, figs 1-8, Pl. 2, figs 1-6

Synonyms - see discussion.

Locus typicus - Kruibeke, province of Antwerp, Belgium. Clay-pit situated at X = 146.500, Y = 208.500 (map-sheet 15/3-4 Antwerpen-Borgerhout of the 1:25 000 topographical map of Belgium).



Figs 1-2. *Glibertturricula vervoeneni* gen. et sp. nov., paratypes, X 15.
1. Protoconch (nucleus worn) and first teleoconch whorls, coll. RGM 220 978.
2. Protoconch, coll. RGM 221 055.

Fig. 3. *Fusiturris selysii* (de Koninck, 1838), X 15.
Protoconch and first teleoconch whorl, coll. RGM 221 051.

Fig. 4. *Orthosurcula regularis* (de Koninck, 1838), X 15.
Protoconch, coll. M. C. Cadée.

Fig. 5-6. *Fusiturris duchasteli duchasteli* (Nyst, 1836), X 15.
5. Protoconch, small type, coll. RGM 222 123B.
6. Protoconch, larger type, coll. RGM 222 123C.

Figs 1-4 from Kruibeke clay-pit, Belgium (Oligocene, Rupelian, Boom Clay Formation, Putte Clay Member, about septaria levels S5 to S6).
Figs 5-6 from Vliermaal, Mommen sandpit, Belgium (Oligocene, Rupelian, Nucula Clay).

Stratum typicum – Boom Clay Formation, Putte Clay Member, about septaria levels S5 to S6 (about layers 48 to 55, see Vandenberghe, 1978).

Age – Oligocene, Rupelian.

Derivatio nominis - The species is named after Mr Marcel Vervoenen at Aalst, Belgium, who was the first to isolate this species from accompanying resembling forms.

Holotype - Pl. 1, fig 1a-b, coll. RGM 227 578.

Description - Shell medium-sized, fusiform, about three times as high as wide.

Protoconch high-conical, consisting of about 4 3/4 moderately convex whorls. The protoconch is only known from very juvenile specimens, it is never preserved on adult shells. The nucleus is small and, together with the first protoconch whorl, separated from the younger volutions by a distinctly deeper suture line. The first three whorls are unsculptured (apart from the micro-sculpture described below), at the transition from the third to the fourth whorl a radial sculpture appears that gradually increases in strength. This sculpture consists of very narrow opisthocline threadlike riblets (about 20 on the last protoconch whorl), very weak near the adapical suture but stronger towards the abapical one. At a short distance from the lower suture the riblets are slightly thickened at the point where they show a somewhat stronger forward declination, causing a slight basal angulation of the protoconch whorl.

The transition to the protoconch is not very marked and sometimes difficult to detect. The first teleoconch radial riblets are somewhat more curved and a subsutural spiral appears rather suddenly. On the last protoconch whorl some seven vague spirals are present, slightly increasing in strength abapically. The entire protoconch and the first part of the initial teleoconch whorl are covered with an extremely fine and irregular granulation (magnification 50 x).

Teleoconch with about six whorls, slowly and regularly increasing in diameter. Usually the whorls are provided with a more or less distinct carina that may be situated in or below the middle of the whorls. Usually it lies at about one third of the height of the whorls. The adapical part of the whorls is almost flat to distinctly concave, the more so when the carina is situated relatively high. The shell part below the carina is very slightly convex. The height of the body whorl equals two thirds of the entire shell height. The apertura occupies not quite half the height of the shell. The base of the body whorl is gradually constricted, but for a slight convexity at the place of the apertural periphery. The siphonal canal is rather long, unnotched, and almost straight. The inner lip shows traces of resorption of calcareous matter. The apertural margin is broken in all available specimens, but presumably it was sharp with a lateral profile according to the growth-lines. Especially the specimens from the Boom Clay very frequently demonstrate the presence of apertural damage repairs (Pl. 1, figs 2a-b, 3, 4, 5; Pl. 2, fig. 2), which is an indication of decapode (?) or fish (?) predation (G. C. Cadée, 1968, p. 84, fig. 43-24).

The radial sculpture of the teleoconch is a continuation of that on the larval shell, but the initial 2 to 4 riblets are somewhat stronger curved. The number of radial riblets decreases to about 14 per whorl. The ribs are most strongly developed on the carina, where obvious knobs are formed. From the carina the ribs are extended in adapical direction and fade away just below the subsutural spiral. They show a slight opisthocyrt curvature, but considerably less so than the growth-lines. From the carina downwards the ribs fade away gradually, touching the suture at an angle of 60 to almost 90°, depending on the position of the carina.

Spiral sculpture starts with about 7 or 8 spirals, that are already indicated on the last protoconch whorl. Of these spirals the adapical one develops quickly to a subsutural zone with a slight constriction below it. This zone is obvious in the three upper teleoconch whorls but it becomes obsolete on later volutions. The other spirals of the first teleoconch whorl demonstrate an obvious increase in strength

towards the abapical suture, where the two lowermost spirals are also more remote. On later whorls secondary spirals develop and finally the shell is covered with numerous threads, inequally strong, but strongest on the subsutural zone and below the carina. So the weakest spirals lie just above the carina. Below the periphery of the body whorl numerous spirals are present among which the various generations may sometimes be recognized by differences in strength.

Growth-lines are usually well-visible. They touch the upper suture at an angle of about 50 to 60° and run obliquely backwards to a point at about two thirds of the height of the whorls where they turn to an oblique forward direction. They touch the carina at an angle of some 45° and the lower suture at some 60°. So the sinus in the growth-lines is situated adapically from the carina, in very juvenile specimens as well as in shells with a relatively high-situated carina.

Variability - *Glibertturricula vervoeneni* exhibits a rather wide range of variability. The number of radial ribs is rather constant, but the strength of the ribs may change from specimen to specimen, sometimes even within one and the same shell. In the latter case the ribs become weaker towards the aperture and sometimes even disappear almost completely on the body whorl. Also the position and the strength of the carina are variable, as described above. The spiral sculpture may vary in strength and in the number of secondary components, especially so below the carina and on the base of the shell.

Specimens from Siadło Górne (Poland, see "Material") (Pl. 2, figs 5-6) differ from the Belgian populations in having a slightly higher number of less strong radial ribs and on the average a weakly developed carina. These differences however do not justify the erection of a separate taxon (e.g. a subspecies or forma) as there is a distinct overlap in the variability.

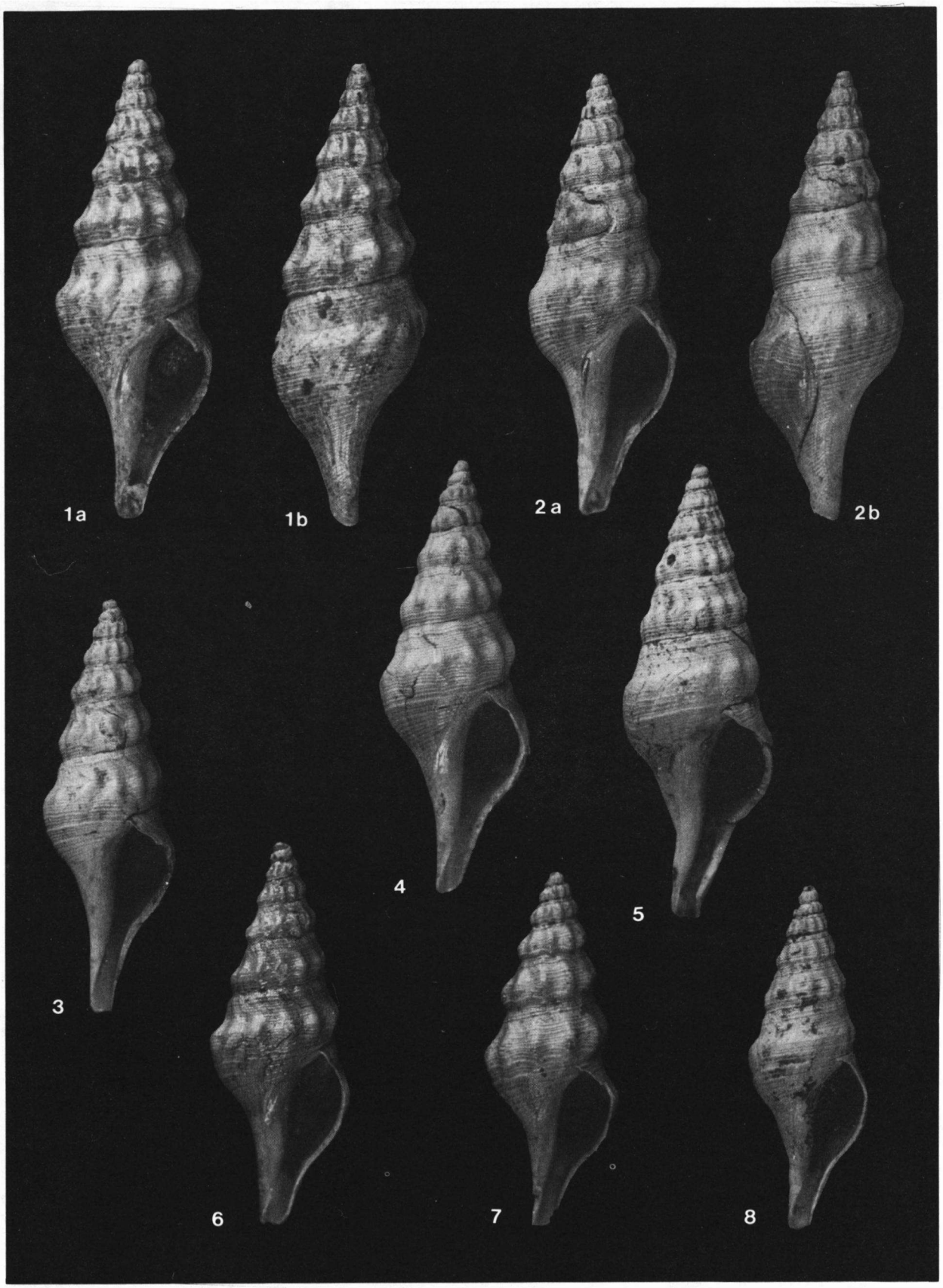
Material - The following paratypes are available:

Kruibeke (Belgium, province of Antwerp), clay-pit (Boom Clay Formation, Putte Clay Member, about septaria levels S5 to S6) - 41 specimens, leg. A. W. Janssen, coll. RGM 221 053; 49 specimens, leg. M. Vervoenen, RGM 220 977; 6 specimens, leg. J. de Ceuster, coll. RGM 227 569; 3 juvenile specimens, leg. A. W. Janssen, coll. RGM 221 055 (text-fig. 2); 1 juvenile specimen, leg. A. W. Janssen, coll. RGM 220 978 (text-fig. 1); 1 specimen, leg. A. W. Janssen, coll. RGM 227 579 (pl. 1, fig. 4); 1 specimen, leg. A. W. Janssen, coll. RGM 227 580 (pl. 1, fig. 3); 1 specimen, leg. A. W. Janssen, coll. RGM 227 581 (pl. 1, fig. 6); 102 specimens, coll. M. C. Cadée; 22 juvenile specimens, coll. M. C. Cadée; 4 specimens, coll. M. C. Cadée (pl. 1, resp. figs. 2a-b, 5, 7 and 8).

EXPLANATION OF PLATE 1

Figs 1-8. *Glibertturricula vervoeneni* gen. et sp. nov., X 3.
1a-b. Holotype, coll. RGM 227 578 (ex 220 997).
2a-b, 5, 7, 8. Paratypes, coll. M. C. Cadée.
3, 4, 6. Paratypes, resp. RGM 227 580, RGM 227 579 and RGM 227 581.

All specimens from Kruibeke (Belgium, province of Antwerp), clay-pit (Oligocene, Rupelian, Boom Clay Formation, Putte Clay Member, about septaria levels S5-S6).


1a
1b
2a
2b
3
4
5
6
7
8

Putte (Belgium, province of Antwerp), clay-pit (Boom Clay Formation, Putte Clay Member, stratotype) - 3 specimens, leg. A. W. Janssen, coll. RGM 227 572; 1 specimen, coll. M. C. Cadée (pl. 2, fig. 2).

Hoboken (Belgium, province of Antwerp), construction-pit for dry dock Cockeril (Boom Clay Formation, Putte Clay Member) - 3 specimens, leg. A. W. Janssen, coll. RGM 227 573; 3 specimens, coll. M. C. Cadée.

Steendorp (Belgium, province of Antwerp), clay-pit (Boom Clay Formation, Waasland Clay Member) - 2 specimens, leg. A. W. Janssen, coll. RGM 227 570.

Stekene (Belgium, province of Antwerp), clay-pit (Boom Clay Formation, Waasland Clay Member) - 1 specimen, leg. A. W. Janssen, coll. RGM 227 571.

Niel (Belgium, province of Antwerp), clay-pit (Boom Clay Formation, Waasland Clay Member) - 1 specimen, leg. M. van den Bosch, coll. RGM 227 582 (pl. 2, fig. 1a-b); 6 specimens, leg. A. W. Janssen, coll. RGM 227 574; 1 specimen, leg. M. van den Bosch, coll. RGM 227 575; 5 specimens, leg. M. Vervoenen, coll. RGM 227 576.

Niel, Boom, Schelle (not separated according to locality) (Belgium, province of Antwerp), clay-pits (Boom Clay Formation, Waasland Clay Member) - 44 specimens, coll. M. C. Cadée.

Vliermaal (Belgium, province of Limburg), Mommen sandpit (Nuculaclay = Kleine Spouwen Clay) - 1 specimen, leg. J. Mommen, coll. RGM 222 193 (Pl. 2, fig. 3).

Berg, Kleine Spouwen, municipality of Bilzen (Belgium, province of Limburg), temporary exposure at Keistraat (Berg Sands, Horizon à Astarte trigonella) - 1 specimen, leg. A. W. Janssen, coll. RGM 227 583 (pl. 2, fig. 4); 1 specimen, coll. M. C. Cadée.

EXPLANATION OF PLATE 2

Figs 1-6. *Glibertturricula vervoeneni* gen. et. sp. nov., paratypes, X 3.

1a-b. Niel (Belgium, province of Antwerp), clay-pit (Oligocene, Rupelian, Boom Clay Formation, Waasland Clay Member), coll. RGM 227 582.

2. Putte (Belgium, province of Antwerp), clay-pit (Oligocene, Rupelian, Boom Clay Formation, Putte Clay Member, stratotype), coll. M. C. Cadée.

3. Vliermaal (Belgium, province of Limburg), Mommen sandpit (Oligocene, Rupelian, Nucula Clay), coll. RGM 222 193.

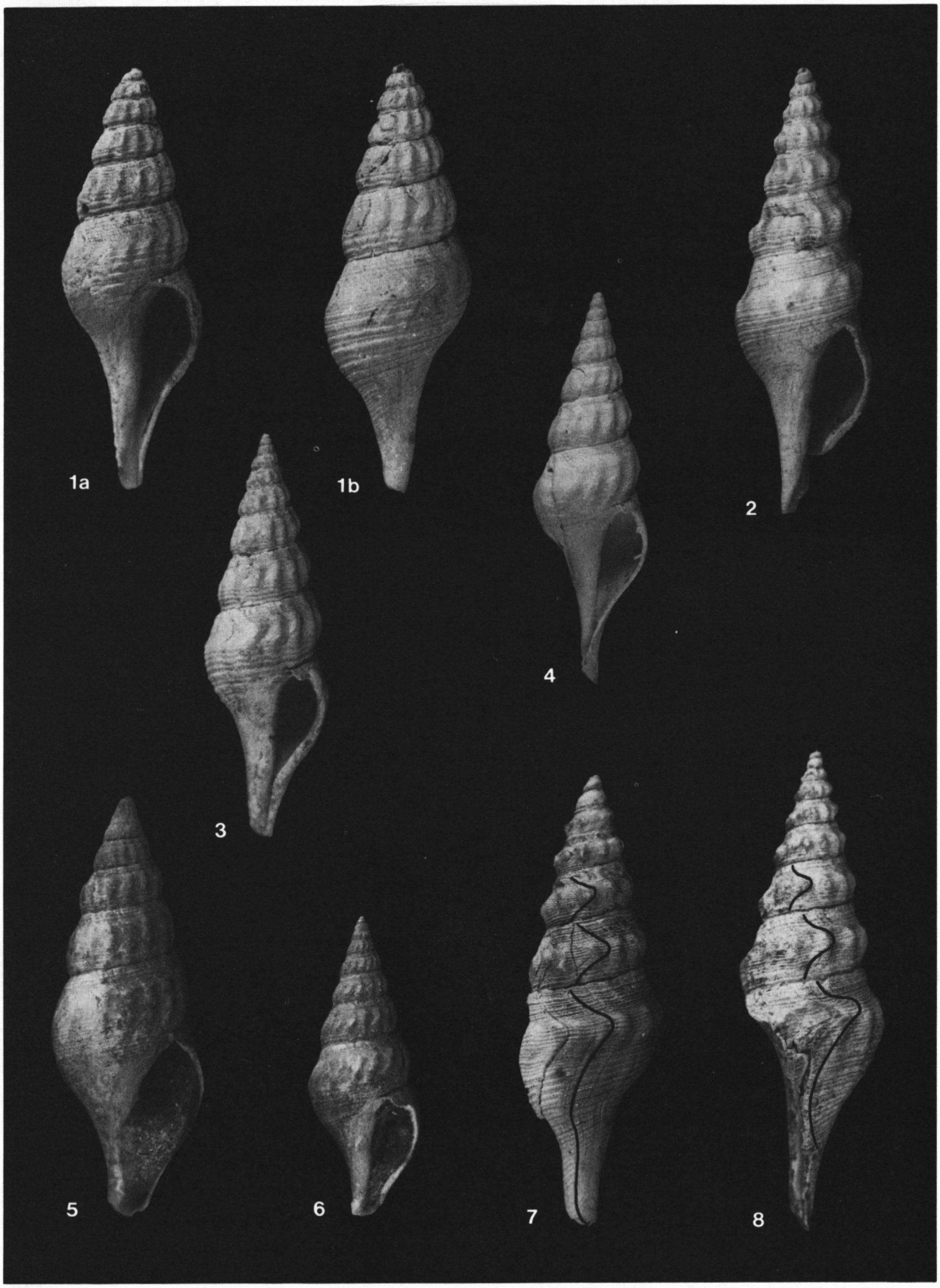
4. Berg, Kleine Spouwen, municipality of Bilzen (Belgium, province of Limburg), temporary exposure (Oligocene, Rupelian, Berg Sands stratotype, Horizon à Astarte trigonella), coll. RGM 227 583.

5-6. Siadło Górne (Poland, wojw. Szczecin), outcrop in western side of former railway-cut (Oligocene, Rupelian, glacially dislocated Neustadt-Magdeburg Sands), coll. RGM 223 408b and c.

Figs 7-8. *Fusiturris selysii* (de Koninck, 1837), X 2.
Kruibeke (Belgium, province of Antwerp), clay-pit (Oligocene, Rupelian, Boom Clay Formation, Putte Clay Member, about septaria levels S5-S6).

7. Specimen with normal position of sinus on the body whorl, coll. RGM 227 584 (ex 221 050).

8. Specimen in which the sinus is situated adapically from the peripheral carina on the body whorl, coll. M. C. Cadée.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Borgloon (Belgium, province of Limburg), roadcut S of the town (Berg Sands, Horizon à Callista kickxi) - 4 specimens, leg. A. W. Janssen, coll. RGM 227 577; 4 specimens, coll. M. C. Cadée.

Siadło Górne (Poland, wojw. Szczecin), western side of former railway-cut (glacially dislocated Neustadt-Magdeburg Sands) - 17 specimens, leg. A. W. Janssen, coll. RGM 223 408a; 1 specimen dto., coll. RGM 223 408b (pl. 2, fig. 5); 1 specimen dto., coll. RGM 223 408c (pl. 2, fig. 6); 27 specimens, 1 fragment, leg. G. Jakubowski, coll. Muzeum Ziemi, Warszawa, reg. nr. MZ VIII 2091.

Paratypes from the type locality (2 specimens each) were placed into the following collections:

- Institut royal des Sciences naturelles de Belgique, Brussels, Belgium.
- M. Vervoenen, Aalst, Belgium.
- British Museum (Natural History), London, England.
- Senckenberg Museum, Frankfurt am Main, F.R.G.
- Zentrales Geologisches Institut, Berlin East, G.D.R.

Discussion - The general outline of this species as well as the development of the sculpture resemble closely those of *Fusiturris selysii*. It is no wonder therefore that it was confused with *selysii*. The differences, though, are clear and constant. The larval shell of *selysii* (text-fig. 3) has a wider apical angle and is therefore less high-conical. Its whorls are more convex, but they don't possess the slight angularity in their abapical parts. In *F. selysii* the carina on the teleoconch whorls is situated in the middle of the whorls or only very slightly below it, never close to the abapical suture. Above the carina the shell-wall is strongly concave, which accentuates the carina, as does the fact that the radial sculpture elements are almost entirely restricted to the carina. If incidentally these radial elements are developed to beyond the carina they are strongly curved according to the shape of the growth-lines. Spiral sculpture in *selysii* is stronger and more ragged. The most obvious difference, however, is the fact that the deepest point of the sinus in the growth-lines coincides with the carina in *selysii*, whereas it is situated adapically from the carina in *vervoeneni*. In some larger specimens of *selysii* the sinus in the growth-lines on the body whorl is also lying above the carina (compare also von Koenen, 1867, p. 90; Speyer, 1867, p. 190, Pl. 20, fig. 2a-b). Such specimens are easily recognizable by their sculpture and by the fact that the sinus of earlier whorls lies on the carina (Pl. 2, figs. 7-8). Finally *G. vervoeneni* reaches only about half the shell height of *F. selysii*.

Incidentally the new species may be confused (especially juvenile specimens) with either *Orthosurcula regularis* (de Koninck, 1838) or *Fusiturris duchasteli* (Nyst, 1836) s. str., the latter species occurring with two different types of larval shells. The differences may be obvious from the adjoining illustrations (text-figs 4-6).

It is very unlikely that a rather commonly occurring, medium-sized shell like *G. vervoeneni* was never collected during the past 150 years, during which serious collecting has taken place in Boom Clay localities in Belgium and other West European countries. Therefore we quite thoroughly examined the available literature, before we decided to introduce this species as a new one. In doing so we could restrict ourselves largely to literature on *F. selysii* and *O. regularis* and some related forms. However, only some very vague remarks were found, in most cases hardly or not attributable to *G. vervoeneni*. These are discussed below.

De Koninck (1838, p. 23, pl. 1, fig. 1) illustrated a specimen that slightly resembles *G. vervoeneni*. It was indicated as *Pleurotoma regularis* var. In his description de Koninck says: "La variété se distingue par sa forme plus élancée, ses stries et ses plies un peu mieux marqués" and also he

indicated that the variety is smaller than the typical form of *regularis*. The description reminds of *G. vervoeneni*, but both description and illustration are insufficient for a final decision.

Haas (1889, p. 27, Pl. 3, fig. 6) represented a form of *selysii* with a sculpture that resembles *G. vervoeneni*. This shell was collected at Itzehoe (F.R.G.). Unfortunately the illustration does not show the growth-lines, so a final attribution to *G. vervoeneni* is not possible.

In his notes concerning *F. selysii* R. Janssen (1979, p. 318) mentioned a form resembling *selysii*, but having its sinus above the carina and some other differences that might very well indicate *G. vervoeneni*. He did, however, not introduce a name for this form.

NOTES ON THE STRATIGRAPHICAL AND GEOGRAPHICAL DISTRIBUTION

Glibertturricula vervoeneni is mainly known from Belgium, where it occurs in the Boom Clay Formation, the Nucula Clay (= Kleine Spouwen Clay) and the Berg Sands, all of Rupelian age. The most important locality is the Kruibeke clay-pit, where the species occurs rather frequently, accompanied by still more common *Fusiturris selysii*. In this section the species is present in a restricted part of the Boom Clay sequence, viz. the levels S5 to S6 (about layers 48 to 55, see Vandenberghe, 1978), may be still slightly higher. Lithostratigraphically this is the lower middle part of the Putte Clay Member. As Boom Clay molluscs occur very scattered in the sediment washing of samples is hardly useful to obtain larger species. Therefore the bulk of the material was collected on slightly weathered excavation fronts in the clay-pit, which makes it difficult to indicate the exact stratigraphical level for each specimen. Most material, however, was collected at the time that the clay-pit was excavated in one level only. Later also a deeper level was exploited, in which the upper part of the Waasland Clay was exposed. In this lower part of the section mollusc material was much less frequent than in the upper excavation front, but *G. vervoeneni* has never been found there, as far as we know.

At Hoboken some specimens were collected from a temporary construction-pit for a Cockeril dry dock. This locality is situated on the river Scheldt, just opposite Kruibeke, so it may be supposed that more or less identical levels were exposed.

At Putte, where four specimens were found, almost the same stratigraphical levels are exposed as in Kruibeke. The specimens were collected from the bottom of the clay-pit, so nothing can be said about the exact stratigraphical origin, but the entire section belongs to the Putte Clay Member (stratotype).

At Niel, Steendorp and Stekene only the Waasland Clay Member is exposed. The levels including S5 and S6 are absent. Stekene include S3 in its upper part, both Niel and Steendorp reach higher, but not to S5. The base of these three sections reaches to beyond S1, so the only reliable conclusion seems to be that *G. vervoeneni* is present in the Waasland Clay as well. It cannot be decided whether or not it occurs only in a restricted part of the sequence.

In the Netherlands the so-called Kotten Member is an equivalent of the upper part of the Waasland Clay Member. Mollusc material from this level was studied by Bosch (1967) and is also present in the RGM collection. Among this material one defective shell (Bosch, 1967, p. 7, Pl. 2, fig. 11), identified *Turris selysi* by Bosch (now stored in the RGM collection) might belong to *G. vervoeneni*, but it is to badly preserved for a certain identification. The "Woold Member" is a Dutch equivalent of the Belgian Putte Clay Member. An important locality in the Netherlands is the clay-pit "De

Vlijt", near Winterswijk, where the uppermost part of this member is exposed. Here *G. vervoeneni* is absent. The same is true for exposures in Belgium where the same higher part of the Putte Clay is exposed, like a clay-pit near Ramsel, the former construction-pit for the Kennedy tunnel at Antwerp and several construction-pits for harbour docks at Beveren.

The species seems to be absent in German equivalents of the Boom Clay Formation as well, although only a restricted quantity of material is available. In the RGM collection some material is kept from the clay-pits at Hermsdorf and Freienwalde (G.D.R.), among which some 50 specimens of *F. selysii*, but this material doesn't include *G. vervoeneni*.

From the Nucula Clay (or Kleine Spouwen Clay) in the Belgian Tongeren area only one specimen is available from the well-known Mommen sandpit at Vliermaal. In this deposit shells with dimensions like *G. vervoeneni* are extremely rare.

From the Berg Sands some specimens were collected at the type locality Berg at Kleine Spouwen (nowadays municipality of Bilzen) and also at Borgloon. The former from the upper shell-bed (Horizon à Astarte trigonella) and the latter from a level comparable with the lower shell-bed (Horizon à Callista kickxi).

The only occurrence outside Belgium rather surprisingly is a locality in NW Poland near Szczecin, named Siadło Górne (Kociszewska-Musiałowa & Kosmowska-Ceranowicz, 1969), situated close to the border with the G.D.R. Fish remains from this locality were described by Gaemers (1981) and van den Bosch (1981). According to Gaemers the sediments belong to the so-called Neustadt-Magdeburg Sand, of Early Rupelian age. This fits the stratigraphical distribution pattern of *G. vervoeneni*. The shells from the Polish locality are slightly aberrant from the Belgian populations as indicated above.

G. vervoeneni seems to be absent in the so-called Bassevelde Sand (coll. RGM, material from a temporary exposure at Ruisbroek, Belgium), which according to Gaemers (1984) is a time-equivalent of the Sands and Marls of Oude Biesen, tentatively indicated by him as "Late Tongrian". Therefore *G. vervoeneni* apparently was introduced in the North Sea Basin during deposition of the Berg Sands and it existed until halfway the deposition of the Putte Clay Member. Younger occurrences are unknown.

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