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WIESŁAW NOWAK

STOMIOSPHAERINA NOV. GEN. (INCERTAE SEDIS) OF THE UPPER CRETACEOUS IN THE POLISH FLYSCH CARPATHIANS

(Pl. I—IV and 5 Figs.)

Stomiosphaerina nov. gen. (Incertae sedis) z górnej kredy polskich Karpat Fliszowych

(*Tabl. I—IV i 5 fig.*)

Abstract: In the Upper Cretaceous sediments (Turonian — ? Santonian) at Żegocina near Bochnia (Polish Carpathians), some problematic unicellular planktonic microfossils have been found. These microfossils have one aperture and two-layered calcareous test. The test displays structural features of walls both of *Stomiosphaera moluccana* Wanner and *Cadosina fusca* Wanner. Microfossils with such structuraly composition of walls have not been so far mentioned in the literature. In the present paper they are called *Stomiosphaerina* gen. nov., and the following species are distinguished: *Stomiosphaerina biedai* n. sp. and *Stomiosphaerina* sp.

INTRODUCTION

In thin sections of the Upper Cretaceous sediments in Żegocina Zone (the Flysch Carpathians south of Bochnia), at the locality Żegocina (Fig. 1) some unicellular calcareous microfossils were found. These microfossils have two-layered test displaying structural features of walls so far not known in the literature (Fig. 2). The microfossils occur within the so-called Żegocina Marls (Turonian — ? Santonian); after rectification and formalization a name "Member of Hołownia Marls" is proposed (M. Badakowa, J. Liszkowa, W. Nowak, 1973), exposed in Żegociński Creek below the dam, near the local church (Fig. 1).

Their general morphologic habit resembles that of problematic microfossils Stomiosphaeridae Wanner, 1940; emend. Nowak, 1968, and their structural and optical features present a combination of those of *Stomiosphaera moluccana* Wanner and in *Cadosina fusca* Wanner.

Considering that this type of microfossils has not been presented in the literature, the author suggests a new generic name *Stomiosphaerina*

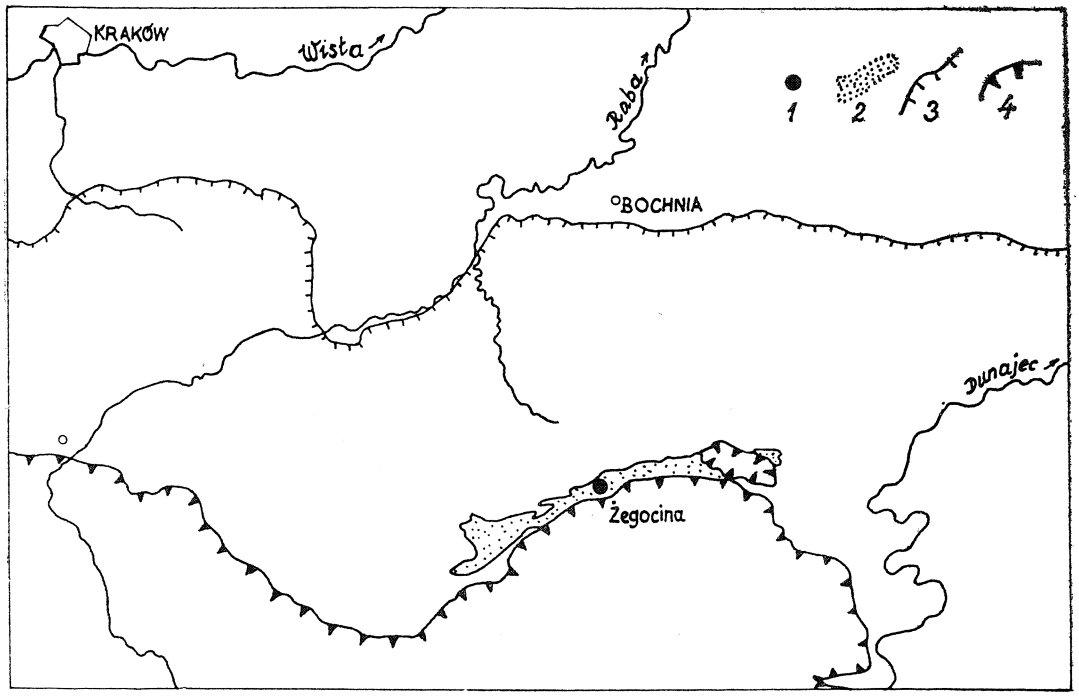

Fig. 1. Localization of findings of *Stomiosphaerina* n. gen. 1 — localities of *Stomiosphaerina* n. gen. at Żegocina; 2 — Żegocina tectonic zone; 3 — overthrust line of the Flysch Carpathians; 4 — overthrust line of the Magura unit

Fig. 1. Lokalizacja znalezisk *Stomiosphaerina* n. gen. 1 — stanowiska *Stomiosphaerina* n. gen. w Żegocinie; 2 — Strefa żegocińska; 3 — linia nasunięcia Karpat fliszowych; 4 — linia nasunięcia jednostki magurskiej

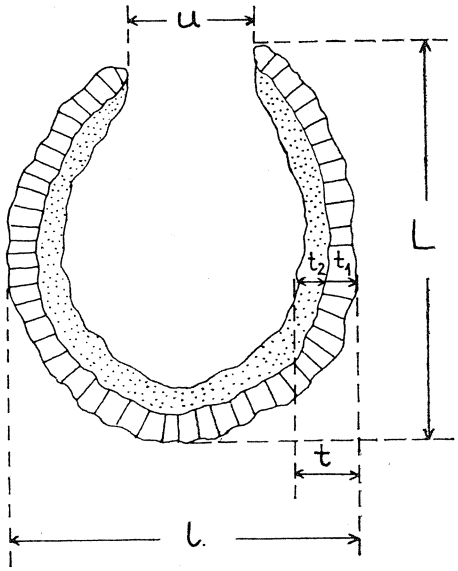

Fig. 2. Schematized drawing of *Stomiosphaerina biedai* n. sp. *L* — length of test; *l* — width of test; *t* — thickness of wall; *t*1 — thickness of outer layer; *t*2 — thickness of inner layer; *u* — width of aperture

Fig. 2. Schematyczny rysunek *Stomiosphaerina biedai* n. sp. *L* — długość skorupki; *l* — szerokość skorupki; *t* — grubość ściany; *t*1 — grubość warstwy zewnętrznej; *t*2 — grubość warstwy wewnętrznej; *u* — szerokość ujścia

gen. nov. Basing on the examination of several dozens specimens and biometrical measurements of 32 specimens, two species, *Stomiosphaerina biedai* n. sp. and *Stomiosphaerina* sp., have been distinguished. The two species differ from one another in morphologic habit.

STOMIOSPHAERINA NOV. GEN.

Genotype: *Stomiosphaerina biedai* n. sp.

To *Stomiosphaerina* nov. gen. belong species with two-layered wall of the test. The outer layer is spherolitic — of *Stomiosphaera moluccana* Wanner type, the inner one is aphanitic — of *Cadosina fusca* Wanner type.

Comparisons: In its general morphologic features and the presence of two-layered wall *Stomiosphaerina* nov. gen. resembles microfossils described under the names: *Parastomiosphaera malmica* (Borza) and *Cadosina semiradiata* Wanner. It differs from the former in the development of the inner layer, from the latter — in the development of the outer layer. In *Stomiosphaerina* the inner layer is aphanitic, in *Parastomiosphaera* it displays fine-fibrous, radially arranged microstructure. In *Cadosina semiradiata* Wan. there is no spherolitic structure despite the presence of radial structure of the outer layer.

Stomiosphaerina biedai n. sp.
(Pl. I—IV)

Holotype: A specimen shown on Pl. I, Figs. 1—2 in the collection of thin sections in Geological Institute, Carpathian Branch, Cracow, locator number: Żegocina-Ż-3/72, position x—10, y—64.

Derivatio nominis: The species is dedicated to Prof. dr Franciszek Bieda, former Head of the Department of Palaeontology, Jagiellonian University, Cracow.

Stratum typicum: Turonian — ? Santonian, "Żegocina Marls".

Locus typicus: Żegocina, Żegociński Potok (Creek), natural outcrop below the dam, near local church (Fig. 1).

Diagnosis: Unicellular microfossil, oval-shaped, with one aperture, calcareous test composed of dark, aphanitic inner layer and white, radially arranged outer layer.

Description: Microfossil with oval-shaped chamber and oval-shaped test when sections are longitudinal and oblique. Elongation $L/l =$ 1.07—1.33. One narrow aperture situated at the pole of the longer axis; its diameter is 1/3—1/4 the width of test. Transversal sections are circular.

Thin wall, more or less uniform in thickness, in some specimens thins

slightly near the aperture. It is composed of two, distinctly separated, layers. Thickness ratio of the outer layer ($t1$) to the inner one ($t2$) varies between 0.75 : 1.0 and 3.0 : 1.0. The outer layer in transmitted light is milky-white. Within this layer some dark, rectilinear and radially arranged little streaks are visible. These streaks may resemble a system of pores perforating the test, known in some foraminifers.

These pores are very likely responsible for the roughliness of the outer surface of the test. When nicols crossed, the outer layer shows spherolitic structure (dark axial cross is visible), and its radial structure appears even more distinctly.

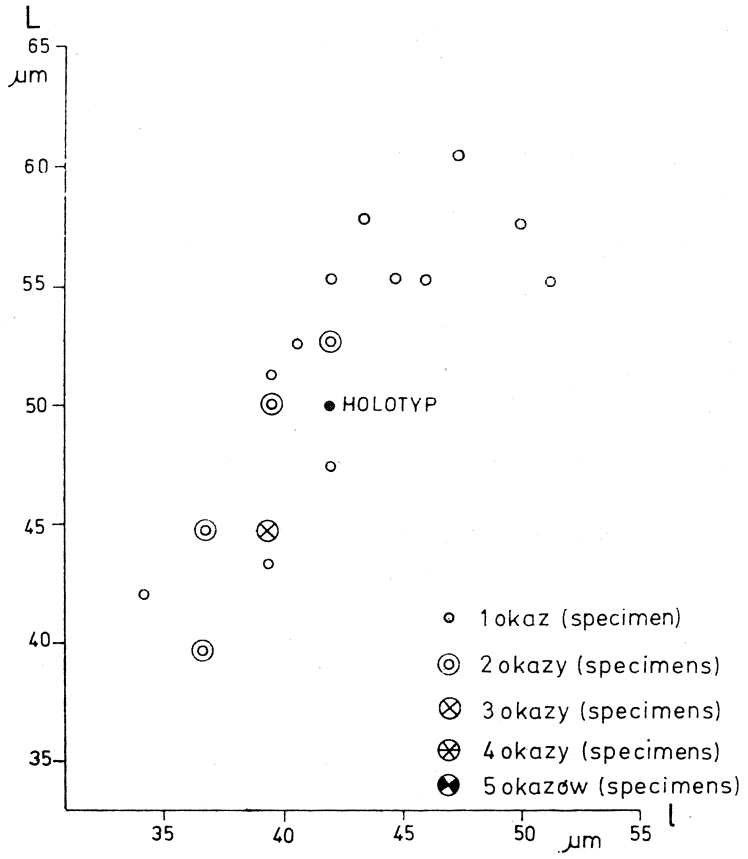

Fig. 3. *Stomiosphaerina biedai* n. sp., diagram showing the relation *L/l*. For symbols see Fig. 2

Fig. 3. Diagram obrazujący stosunek długości skorupki *Stomiosphaerina biedai* n. sp. do jej szerokości. Objaśnienia patrz Fig. 2

The inner layer in transmitted light is yellowish-golden (brownish at small magnifications and displays aphanitic structure). In polarized light spherolitic structure is not visible and the axial cross does not appear. The thickness of the inner layer in contradistinction to that of the outer one varies greatly. Near the aperture the inner layer distinctly thins completely disappearing in some specimens. From the inner side numerous irregularities occur, which give an impression of corroded surfaces.

The length of the test (L) varies between 39.5 and 60.5 µm (in sections with aperture — from 39.5 to 57.8 µm); width (l) is from 34 to 51 µm;

thickness of wall (t) from 5.26 to 9.20 μm; thickness of outer layer ($t1$) from 2.6 to 5.2 μm; thickness of inner layer ($t2$) from 1.3 td 5.26 μm; width of aperture (u): 11.8—15.78 μm.

Dimensions of holotype see Table 1.

Stratigraphic distribution: *Stomiosphaerina biedai* n. sp. occurs at Żegocina, in the so-called Żegocina Marls of the Turonian — ?

Table (Tabela) 1

Dimensions of the Specimens of *Stomioshaerina biedai* n.sp. Wymiary okazów *Stomiosphaerina biedai* n.sp.

Nr	L	l	t	$t1$	$t2$	u	$L : l$	$u : l$
			Small specimen — mały okaz					
1	42·08	34·19	6·58	2·63	3·95	—	1·23	—
			medium specimens — średnie okazy					
2	39·45	36·82	5·26	3·94	1·32	13·15	1·07	0·357
3	—	36·82	6·58	2·63	3·95	—	—	—
4	—	36·82	6·58	2·63	3·95	—	—	—
5	39·45	36·82	7·89	5·26	2·63	—	1·07	—
6	44·71	36·82	6·58	3·29	3·29	—	1·21	—
7	44·71	36·82	7·89	2·63	5·26	—	1·21	—
8	43·39	39·45	6·58	3·29	3·29	—	1·10	—
9	44·71	39·45	5·26	2·63	2·63	—	1·13	—
10	44·71	39·45	6·58	3·95	2·63	—	1·13	—
11	44·71	39·45	7·89	2·63	5·26	—	1·13	—
12	44·71	39·45	7·89	5·26	2·63	—	1·13	—
13	49·97	39·45	7·89	3·29	4·60	—	1·25	—
14	49·97	39·45	7·89	3·94	3·95	—	1·26	—
15	51·28	39·45	7·89	2·63	5·26	—	1·30	—
16	52·60	40·76	7·89	2·63	5·26	—	1·29	—
17	47·34	42·08	5·26	2·63	2·63	—	1·12	—
18	49·97	42·08	7·89	3·94	3·95	15·78	1·18	0·375 Holotyp
19	52·60	42·08	7·89	3·94	3·95	—	1·25	—
20	52·60	42·08	7·89	3·94	3·95	—	1·25	—
21	55·23	42·08	9·21	3·95	5·26	—	1·31	—
22	—	42·08	7·89	2·63	5·26	—	—	—
23	57·86	43·39	7·89	3·94	3·95	—	1·33	—
24	—	44·71	7·89	3·94	3·95	—	—	—
25	—	44·71	7·89	3·94	3·95	—	—	—
26	55·23	44·71	7·89	5·26	2·63	13·15	1·24	0·294
27	—	44·71	7·89	5·26	2·63	—	—	—
			large specimens — duże okazy					
28	55·23	46·02	7·89	3·94	3·95	—	1·20	—
29	60·49	47·34	6·58	2·63	3·95	—	1·28	—
30	—	47·34	7·89	2·63	5·26	—	—	—
31	57·86	49·97	7·89	3·94	3·95	11·83	1·15	0·236
32	55·23	51·28	9·21	3·95	5·26	—	1·07	—

Santonian age (M. Badakowa, J. Liszkowa, W. Nowak, 1973), within an assemblage of globotrucans: *Globotruncana lapparenti lapparenti* Bolli, *G. lapparenti tricarinata* Quereau, *G. lapparenti* cf. *bulloides* (Vogler), pithonels: *Pithonella ovalis* (Kaufmann), *Palinosphaera sphaerica* (Kaufmann), *Stomiosphaerina* sp., radiolarians (Spumellaria) with an admixture of spicules of calcareous and siliceous sponges. Moreover, in shaly intercalations within Żegocina Marls, near the place where *Stomiosphaerina biedai* n.sp. were found, following foraminifers were recorded (determined by J. Liszkowa, M.Sc.): *Globotruncana* ex gr. *lapparenti: G. coronata* Bolli, *G. angusticarinata* (*Gandolfi*), *Ammobaculites problematicus* Neagu, *Tritaxia gaultina* (Morozowa).

Stomiosphaerina sp.
(Pl. II, Figs. 1—2)

Pear-shaped microfossil (the section is probably slightly oblique). It is wider in the upper part, with sharp closure in the lower part (like a caudal process). Wall has uniform thickness about 7.89 μm; length of the test — about 50 μm; width of the test — 40 μm; L/l ratio = 1.26; outer layer to inner layer thickness is ratio about 1 : 1, with some tailing out of the inner layer in the upper part of the test.

One specimen. Occurs together with *Stomiosphaerina biedai* n.sp. and with accompanying assemblage (see above) in the so-called Żegocina Marls (Turonian — ? Santonian), at Żegocina.

Variability of *Stomiosphaerina biedai* n.sp.

An examination of a few dozen specimens of *Stomiosphaerina biedai* n.sp. and biometrical measurements of 32 specimens have permitted to obtain only general characteristics of variability of this species.

According to the width of the test (l), all the specimens examined may be generally subdivided into 3 size-groups:

small specimens $l < 35$ μm
medium specimens $35 < l < 45$ μm
large specimens $l > 45$ μm

Most frequent (20 specimens) are specimens of medium size, 5 belong to large specimens, and 1 specimen is small.

An example of small specimen is shown in Pl. IV, Fig. 2, and its parameters in Table 1, item 23. The lack of an aperture in this specimen indicates that it is an oblique section of relatively long specimen (L = 42.8 μm), with considerable elongation (L/l = 1.23).

The group of medium size is represented by specimens of L = 39.45—57.86 μm, and L/l = 1.07—1.33. This group comprises the holotype (Pl. I, Figs. 1—2). In this group most frequently are represented specimens of L = 44.71 and 39.45 μm, with ratio L/l = 1.13. These specimens do not

display apertures (oblique sections), therefore the value of their elongation is probably greater. An example of a specimen having great value of elongation is shown on Pl. I, Fig. 3. Despite oblique section its value L/l is 1.33. Besides elongated specimens, some specimens with small elongation also occur ($L/l = 1.07$ and 1.18). The latter have an aperture and uniform thickness of the test. Therefore at least two different morphologic varieties can be distinguished: narrow-elliptic, strongly elongated and broad-elliptic, with short test.

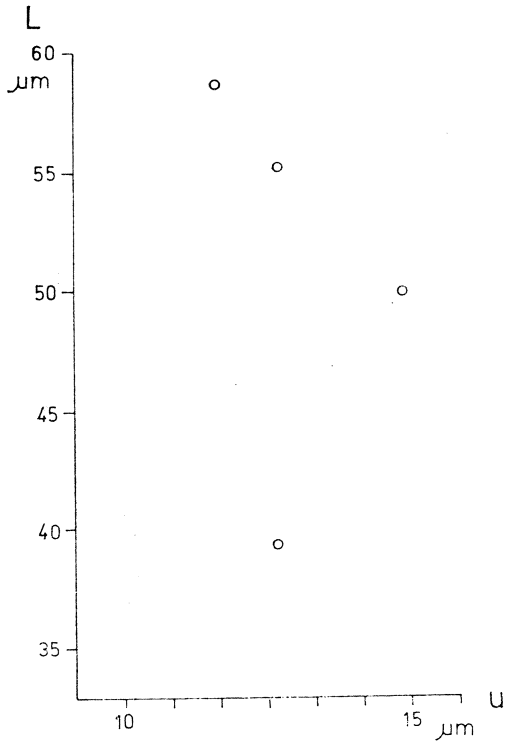

Fig. 4. *Stomiosphaerina biedai* n. sp., diagram showing the relation u/L. For symbols see Fig. 3

Fig. 4. Diagram obrazujący stosunek szerokości ujścia *Stomiosphaerina biedai* n. sp. do długości jej skorupki. Objaśnienia patrz fig. 3

In the group of large specimens value L varies between 55.23 and 60.49 µm, and their L/l = 1.07—1.28. One specimen with aperture, found in this group, displays as intermediate value of elongation (L/l = 1.15). Specimens without apertures, presented on Pl. II, Figs. 3—4, give a general idea of dimensions and morphologic habit of specimens *S. biedai* belonging to this group. Since these are oblique sections, their real size and elongation are considerably greater.

Thickness of wall (t) is from 5.26 to 9.21 µm. Specimens with t = = 7.89 µm predominate. In small specimens t is 5.26 µm, in medium specimens from 5.26 to 9.21 µm, in large ones — from 6.58 to 9.21 µm.

Thickness of the outer layer ($t1$) in small specimen is 3.94 µm; in medium specimens from 2.63 to 5.26; and in large specimens from 2.63; however it does not exceed the value of $t1 = 3.95$ µm.

The greatest thickness of the outer layer, $t1=5.26$, which was recorded in the group of medium-size specimens only, is a very important feature and needs some additional explanation. This was stated in 4 specimens. One of them has the aperture and relatively great elongation ($L/l=1.24$). Another represents transversal section, which is indicated by its regular circular outline. The two remaining specimens are in oblique sections and their $L/l=1.07$ and 1.13. In the two former cases it is impossible to account for the increased thickness of the outer layer (stated in the group of medium-size specimens) by assuming oblique sections of the test.

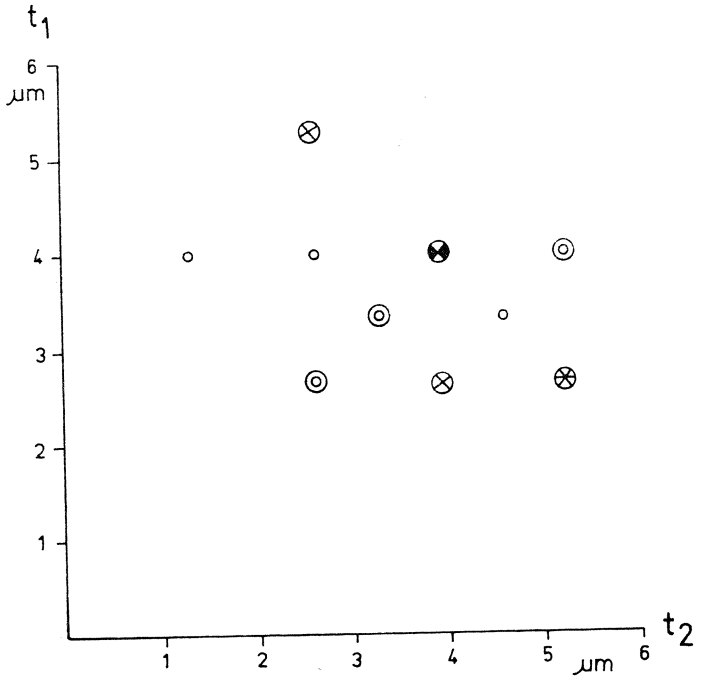

Fig. 5. *Stomiosphaerina biedai* n. sp., diagram showing the relation $t1/t2$. For symbols see Fig. 3

Fig. 5. Diagram obrazujący stosunek grubości warstwy zewnętrznej do warstwy wewnętrznej u *Stomiosphaerina biedai* n. sp. Objaśnienia patrz fig. 3

Thickness of the outer layer ($t2$) in small specimen is $t2=1.32$ µm; in medium specimens from 3.63 to 5.26 µm, and in large specimens varies from 3.95 to 5.26 m. Thickness of the inner layer in 47% of examined specimens is equal to that of the outer layer (medium and large specimens are represented); in 40% the thickness of the inner layer is greater than that of the outer one (all size groups are represented); and in 13% of specimens the inner layer is thinner than the outer one (specimens of medium size only).

The holotype is a specimen of medium size, with the length $L = 49.97$ µm. The same length was stated in two other specimens only; width $l=42.8$ µm — stated in 5 specimens; thickness of the wall $t=7.89$ µm — stated in 60% of specimens; thickness of the outer layer $t1=3.94$ µm —

Table (Tabela) 2

Comparison of dimensions of *Stomiosphaerina biedai* n.sp. and of *Parastomiosphaera malmica* (Borza)
Porównawcza tabela wymiarów *Stomiosphaerina biedai* n.sp. i *Parastomiosphaera malmica* (Borza)

	Stomiosphaerina biedai n.sp.	*Parastomiosphaera malmica* (Borza)
L *	39·5 —60·5 μm	39·0 —62·4 μm
l	34·0 —51·5	35·1 —64·35
L/l	1·07 — 1·33	0·87 — 1·30
t	5·26 — 9·21	5·85 —15·60
t_1	2·65 — 5·26	1·30 — 9·75
t_2	1·32 — 5·26	1·95 —12·35
u	11·8 —17·78	7·8 —15·60
$u : l$	0·236— 0·375	0·1500— 0·400

* Symbols see Fig. 2; objaśnienia patrz fig. 2.

stated in 37% of specimens; thickness of the inner layer $t2=3.95$ μm — stated in 44% of specimens. The same thickness ratio of the outer layer to the inner one, $t1/t2=1/1$, is observed in 47% of specimens.

COMPARISONS

Species with wall composed of two layers: spherolitic and nonspherolitic, are rather uncommon. Only three such species have been described in the literature: *Parastomiosphaera malmica* (B o r z a) 1964, *Cadosinopsis andrusovi* S c h e i b n e r, 1967; and *Pithonella multicava* B o r z a, 1972.

In two of them, i.e. the Upper Jurassic species *Parastomiosphaera malmica* and Upper Senonian *Pithonella multicava*, just as in *Stomiosphaerina biedai* n.sp. the outer layer is spherolitic. In *Cadosinopsis andrusovi* the inner layer is spherolitic. Moreover, this species differs from the two others in the presence of porous aperture.

Species *Pithonella multicava*, though approximate in age (Campanian — Maestrichtian) and having a common feature with *Stomiosphaerina biedai* n.sp. (presence of spherolitic outer layer), displays some basic differences. Its outer layer (spherolitic) does not reveal any radial microstructure. The inner layer, despite a general resemblance to that observed in *Stomiosphaerina biedai*, reveals fine-porous microstructure, particularly well visible in oblique sections of the wall. Moreover, according to K. B o r z a (1972), this species has 2 apertures, greater dimensions ($L=83$—205 μm), and greater elongation.

The Upper Jurassic (Lower Tithonian) species *Parastomiosphaera malmica* (B o r z a), in spite of considerable difference in age, reveals the closest resemblance to *Stomiosphaerina biedai* n.sp. It has radial microstructure of the spherolitic outer layer, one aperture, and very similar dimensions (comp. Table 2). The basic difference, however, is observed in the microstructure of the inner layer, which is non-spherolitic and brownish, like *Stomiosphaerina biedai* n.sp.; in contradistruction to the latter species however, it displays fine-fibrous microstructure, radially arranged, resembling the microstructure of walls of some species from genus *Colomisphaera.*

CONCLUSIONS

Microfossils *Stomiosphaerina* n.gen. (Incertae sedis) represent new, so far unknown group of problematic microorganisms of Cretaceous period. Their systematic classification as well as their relationship to flora or fauna are still unsolved problems. The function of the narrow opening near the pole of the longer axis, occurring in *Stomiosphaerina* n.gen. and in other microorganisms of this type, in literature called "aperture", is a subject still open to discussion, since it is dubious whether it really plays the role of aperture. Microstructurally differentiated layers of wall seem to reflect various biological functions of living organisms and are not the result of recrystallization processes.

Another problem, important from the standpoint of ontogenesis and usefulness of microfossils discussed for biostratigraphy, is a considerable differentiation of dimensions and morphologic habit (elongation) of *Stomiosphaerina biedai* n.sp. This may resemble the differentiation in various groups of organisms, in the periods of their optimum development (hemera).

The occurrence of *Stomiosphaerina* n.gen. in pelagic sediments together with planktonic microorganisms (*Globotruncana, Pithonella, Palinosphaera*) seems to indicate that the former may belong to organisms living in planktonic environment. Their frequency and mode of occurrence in Żegocina Marls resemble the mode of occurrence of other groups of calcareous microplankton, known from sediments of various age. There usually occur abundant rock-forming accumulations of one prevailing type of microfossils on vast areas, frequently belonging to various palaeogeographic provinces. Sediments containing abundant accumulation of these microfossils represent rather short periods of time (they form fairly thin horizons), thus their value for biostratigraphy is considerable.

Geological Institute
Carpathian Branch, Cracow
ul. Skrzatów 1, 31-560 Kraków, Poland

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STRESZCZENIE

Na obszarze Karpat Bocheńskich w miejscowości Żegocina (fig. 1) zostały znalezione w tzw. marglach żegocińskich (po rektyfikacji i formalizacji zaproponowano nazwę „Ogniwo margli z Hołowni" (*f*)) turońsko — ? santońskiego wieku — wapienne mikroskamieniałości planktoniczne z rodziny *Stomiosphaeridae* Wanner, 1940 emend. Nowak, 1968, o nie znanej dotychczas z literatury kombinacji mikrostrukturalnej dwuwarstwowej ściany skorupki (tabl. I—IV).

Ich warstwa zewnętrzna odpowiada typowi mikrostrukturalnemu ściany występującemu u *Stomiosphaera moluccana* Wanner, natomiast zewnętrzna — ma cechy *Cadosina fusca* Wanner. Autor przyjął dla nich nazwę *Stomiosphaerina* n.gen. i wyróżnił wśród nich: *Stomiosphaerina biedai* n.sp. i *Stomiosphaerina* sp.

W literaturze zostały dotychczas opisane tylko 3 gatunki o ścianie złożonej z dwu warstw — o kombinacji budowy sferolitowej i niesferolitowej: *Parastomiosphaera malmica* (Borza) 1964, *Cadosinopsis andrusovi* Scheibner 1967 i *Pithonella multicava* Borza 1972.

U dwu z nich: górnojurajskiego gatunku *Parastomiosphaera malmica*

i u górnosenońskiego *Pithonella multicava*, podobnie jak u *Stomiosphaerina* n.gen. warstwa zewnętrzna jest sferolitowa, natomiast u *Cadosinopsis andrusovi* (również senoński gatunek) sferolitowa jest warstwa wewnętrzna. Gatunek ten ponadto odróżnia od wyżej wymienionych i od *Stomiosphaerina* n.gen. obecność ujścia typu porowego (E. Scheibner, 1967).

Gatunek *Pithonella multicava* pomimo zbliżonego wieku ze *Stomiosphaerina* n.gen. i podobnego sferolitowego wykształcenia warstwy zewnętrznej oraz posiadania niesferolitowej warstwy wewnętrznej — o brunatnawym zabarwieniu, wykazuje szereg istotnych różnic z opisywanymi mikroskamieniałościami. W odróżnieniu od *Stomiosphaerina* n.gen. warstwa zewnętrzna tego gatunku nie wykazuje mikrostruktury promienistej, a wewnętrzna ujawnia mikrostrukturę drobnoporowatą — zwłaszcza dobrze widoczną przy cięciach skośnych. Gatunek ten ponadto — zdaniem K. Borzy (1972) — ma dwa ujścia oraz jak wynika z pracy tego autora, jego wymiary są znacznie większe ($L = 83$—205 mikronów), a elongacja wyższa.

Gatunek *Parastomiosphaera malmica* pomimo znacznej różnicy wiekowej (tyton dolny) wykazuje największe podobieństwo ze *Stomiosphaerina* n.gen. Ma on promienistą mikrostrukturę sferolitowej warstwy zewnętrznej, jedno ujście oraz zbliżone parametry z gatunkiem *Stomiosphaerina biedai* n.sp. (por. tabela 1 i 2). Istotną różnicę jednakże stanowi drobnowłóknista mikrostruktura warstwy wewnętrznej — o orientacji promienistej, przypominająca mikrostrukturę ścian niektórych gatunków z rodzaju *Colomisphaera*.

Mikroskamieniałości *Stomiosphaerina* n.gen. reprezentują nową dotychczas nie znaną grupę problematycznych mikroorganizmów okresu kredowego. Ich występowanie w utworach o cechach pelagicznych na terenie polskich Karpat fliszowych — razem z planktonicznymi mikroorganizmami (*Globotruncana*, *Pithonella*, *Palinosphaera*) wskazuje, że mogą one mieć szersze rozprzestrzenienie i w powiązaniu z innymi mikroskamieniałościami będą mogły być spożytkowane dla celów mikrobiostratygraficznej korelacji utworów kredy górnej.

Instytut Geologiczny
Oddział Karpacki w Krakowie,
ul. Skrzatów 1, 31-560 Kraków

EXPLANATION OF PLATES
OBJAŚNIENIA TABLIC

Plate — Tablica I

Fig. 1—2. *Stomiosphaerina biedai* n. gen., holotype. Żegocina, thin section: Ż-3/72, x — 10, y — 64; 900 × „Żegocina Marls", Turonian — ? Santonian. Fig. 1 — one nicol; Fig. 2 — crossed nicols. N. B. Position of microfossils indicated by coordinates established by microscope MIN-8

Fig. 1—2. *Stomiosphaerina biedai* n. gen. et n. sp. holotyp. Żegocina, płytka cienka: Ż — 3/72, x — 10, y — 64; × 900. „Margle Żegocińskie", turon — ? santon. Fig. 1 — jeden nikol; Fig. 2 — nikole skrzyżowane
Uwaga: pozycja mikroskamieniałości określona współrzędnymi przy pomocy mikroskopu MIN-8.

Fig. 3—4. *Stomiosphaerina biedai* n. gen. et n. sp., oblique sections of specimens with high *L/l* ratio, 900 ×. One nicol. „Żegocina Marls", Turonian — ? Santonian

Fig. 3—4. *Stomiosphaerina biedai* n. gen. et n. sp., cięcia skośne okazów o wysokiej elongacji, × 900. Jeden nikol. „Margle Żegocińskie", turon — ? santon

Plate — Tablica II

Fig. 1—2. *Stomiosphaerina* sp., Żegocina, thin section: Ż-3/72, x — 2.3, y — 56; 900 ×. Oblique sections across the lower pole of the longer axis of the test. Sharp-edged process is visible. „Żegocina Marls", Turonian — ? Santonian. Fig. 1 — one nicol; Fig. 2 — crossed nicols

Fig. 1—2. *Stomiosphaerina* sp., Żegocina, płytka cienka: Ż-3/72, x — 2.3, y — 56; × 900. Cięcie skośne tnące dolny biegun dłuższej osi skorupki. Widoczny zaostrzony wyrostek. „Margle Żegocińskie", turon — ? santon. Fig. 1 — jeden nikol; Fig. 2 — nikole skrzyżowane

Fig. 3—4. *Stomiosphaerina biedai* n. gen. et n. sp., oblique sections of large specimens; 900 ×. One nicol. „Żegocina Marls", Turonian — ? Santonian.

Fig. 3—4. *Stomiosphaerina biedai* n. gen. et n. sp., cięcia skośne dużych okazów; × 900. Jeden nikol. „Margle Żegocińskie", turon — ? santon

Plate — Tablica III

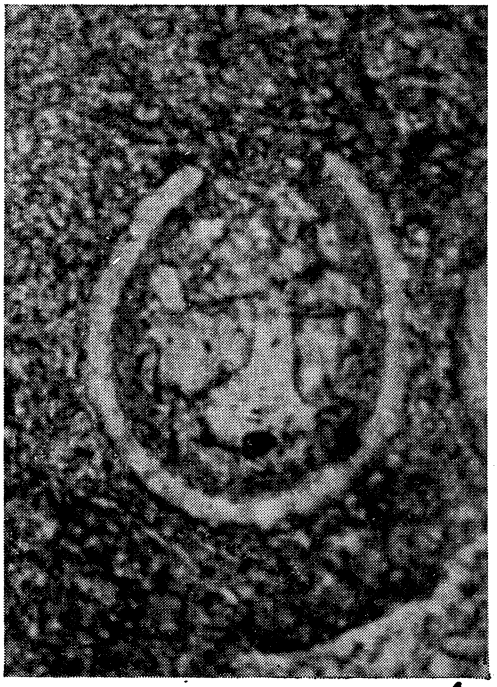
Fig. 1—4. *Stomiosphaerina biedai* n. gen. et n. sp., 900 ×. „Żegocina Marls", Turonian — ? Santonian. Figs. 1, 3, and 4 — oblique sections; Fig. 2 — transversal section
Figs. 1—3 — one nicol; Fig. 4 — crossed nicols.

Fig. 1—4. *Stomiosphaerina biedai* n. gen. et n. sp., × 900. „Margle Żegocińskie", turon — ? santon. Fig. 1, 3 i 4 — cięcia skośne; Fig. 2 — cięcie poprzeczne. Fig. 1—3 — jeden nikol; Fig. 4 — nikole skrzyżowane

Plate — Tablica IV

Fig. 1—4. *Stomiosphaerina biedai* n. gen. et n. sp., 900 ×. „Żegocina Marls", Turonian — ? Santonian. Oblique sections. One nicol. Fig. 2 — small specimen with very thick inner layer

Fig. 1—4. *Stomiosphaerina biedai* n. gen. et n. sp., × 900. „Margle Żegocińskie", turon — ? santon. Cięcie skośne. Jeden nikol. Fig. 2 — mały okaz z bardzo grubą warstwą wewnętrzną



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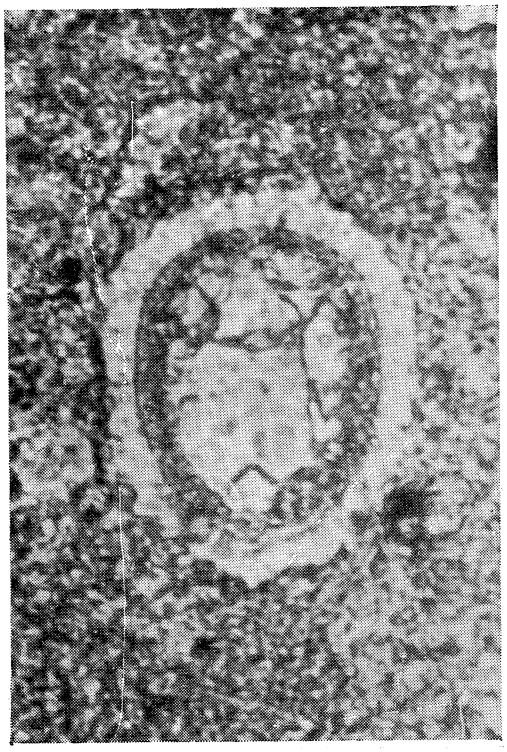

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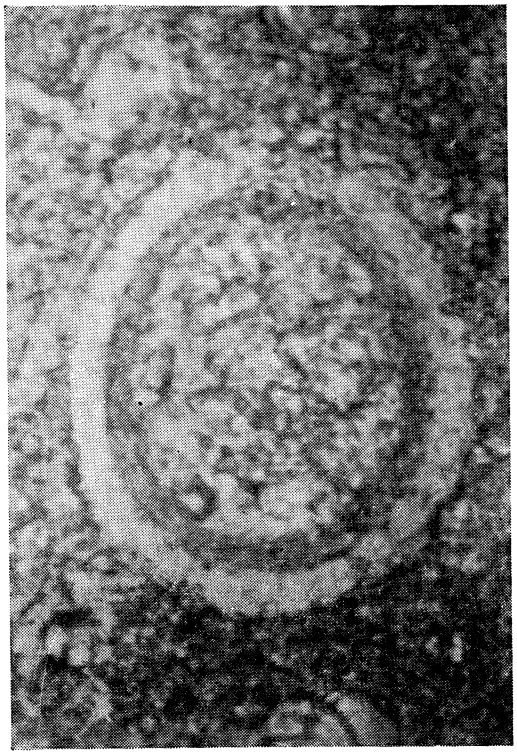

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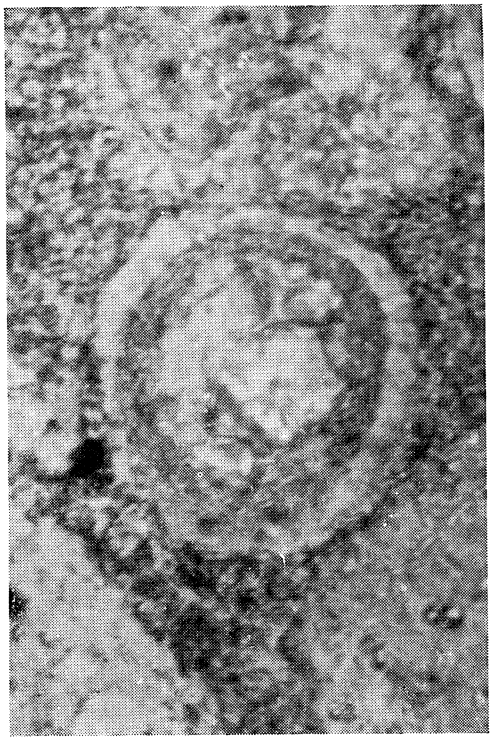
W. Nowak



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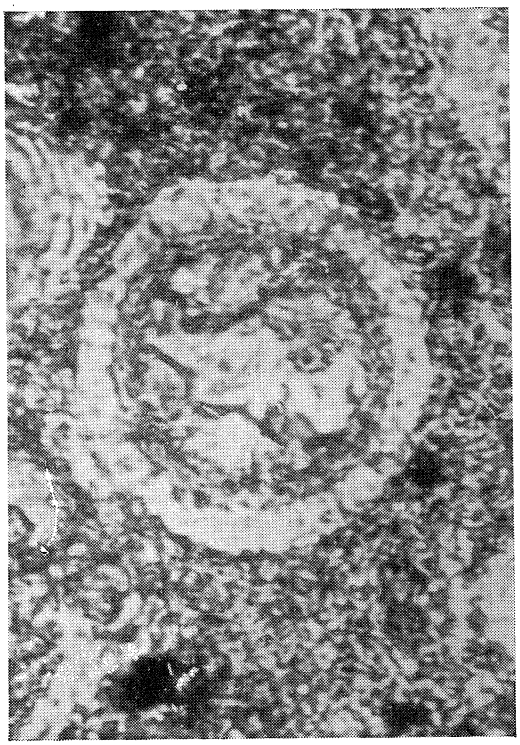

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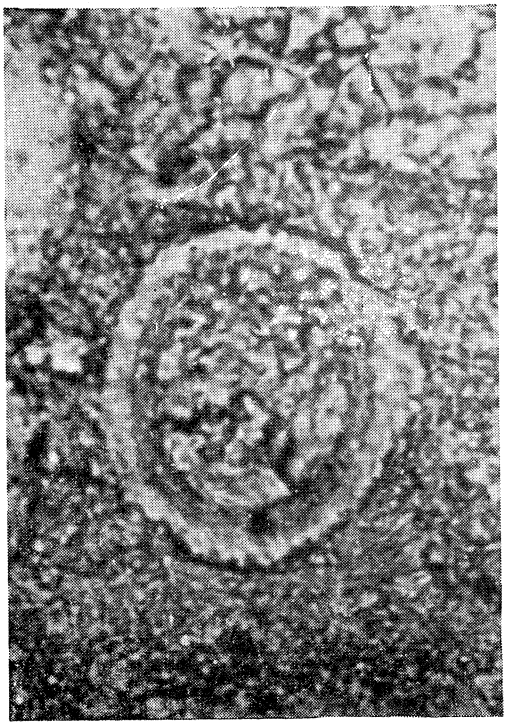

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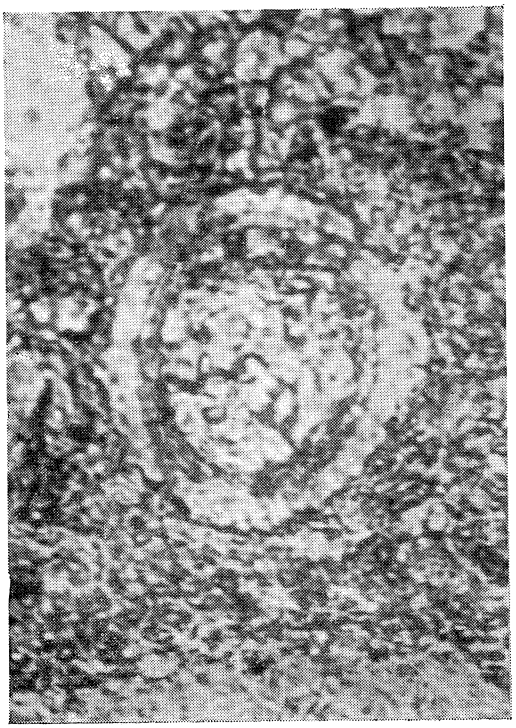

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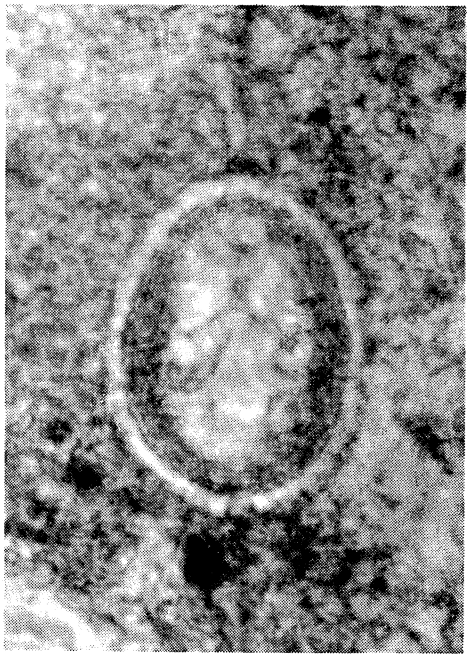

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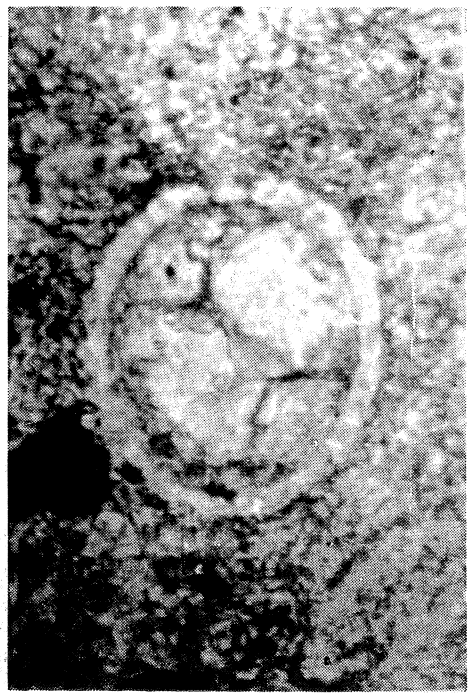

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