A C T A P A L A E O N T O L O G I C A P O L O N I C A
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NEW SPECIES OF MEGASPORES FROM THE TRIAS OF POLAND

Abstract. — Thirty new species and two new genera (*Otynisporites*, *Bothriotriletes*) of megaspores from the Trias of Polish Lowlands have been described. Most of them are from the Lower Keuper (Lettenkohle) and the Upper Buntsandstein. The megaspores from the Lower Buntsandstein have been described.

INTRODUCTION

This is progress report from the author's studies on the Triassic megaspores (Fuglewicz 1973, 1974, 1977). The paper is based upon the megaspore material widely occurring in silt-clayely core deposits from the

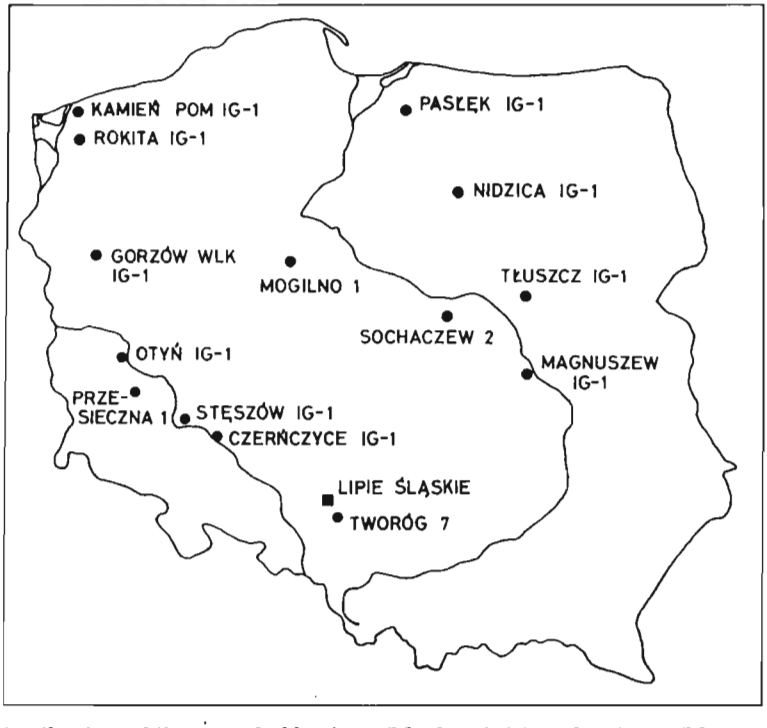

Fig. 1. Distribution of the sampled borings (black points) and outcrop (black quadrate).

Polish Lowlands. The following boreholes sites were sampled: Czerńczyce IG-1, Gorzów Wielkopolski IG-1, Kamień Pomorski IG-1, Kliczków 1, Łopuszno IG-1, Magnuszew IG-1, Mogilno, Nidzica IG-1, Otyń IG-1, Pasłęk IG-1, Przesieczna 1, Rokita IG-1, Sochaczew 2, Stęszów IG-1, Tłuszcz

Species	Assemblages considered in present paper	Index assemblages /Reinhardt, Fricke 1969/ /Kannegieser, Kozur 1972/ /Fuglewicz, 1973/ /Marcinkiewicz, 1976/	Age
1	2	3	4
Trileites sp.	+	-	Upper Keuper
Radosporites planus	+	-	
Echitriletes prerussus sp.n.	+	-	
Horstisporites imperfectus	+	-	
Horstisporites bertelseni sp.n.	+	-	
Trileites altotectatus	+	+	Schilfsandstein
Verrutriletes ornatus	+	+	
Verrutriletes schulzii	-	+	
Radosporites planus	+	+	
Radosporites spinosus	-	+	
Bacutriletes corynactiformis sp.n.	+	-	
Narkisporites harrisi	+	+	
Echitriletes frickei	+	+	
Horstisporites imperfectus	+	+	
Horstisporites nidzicensis sp.n.	+	-	
Hughesisporites ? gibbosus	+	+	
Hughesisporites karnicus	+	+	
Maexisporites meditectatus	+	+	Lettenkohle
Maexisporites magnuszewensis sp.n.	+	-	
Bacutriletes costatispinosus sp.n.	+	-	
Bacutriletes micros sp.n.	+	-	
Echitriletes latispinosus sp.n.	+	-	
Horstisporites irregularis sp.n.	+	-	
Bothriotriletes grandis gen.et sp.n.	+	-	
Dijkstraisporites beutleri	+	-	
Dijkstraisporites capillatus sp.n.	+	-	
Nathorstisporites invenustus sp.n.	+	-	
Tenellisporites marcinkiewiczae	+	+	
Tenellisporites planispinosus sp.n.	+	-	
Aneuletes acrochordonodes sp.n.	+	+	
Aneuletes clavatus sp.n.	+	-	
Aneuletes pomeranus sp.n.	+	-	
Maexisporites magnuszewensis sp.n.	+	-	Upper Muschelkalk
Verrutriletes preutilis sp.n.	+	-	
Bacutriletes micros sp.n.	+	-	
Aneuletes acrochordonodes sp.n.	+	-	
Trileites validus	+	+	Röt
Trileites tenellus	+	+	
Trileites levis	+	+	
Trileites crassitectatus sp.n.	+	-	
Trileites flexuosus sp.n.	+	-	
Maexisporites parvus	+	+	

1	2	3	4
Maexisporites pyramidalis	+	+	
Maexisporites rotundus	+	+	
Maexisporites spongiosus sp.n.	+	-	
Bacutriletes costatispinosus sp.n.	+	-	
Bacutriletes insolitus	+	+	
Bacutriletes pseudoreticulatus sp.n	+	-	Röt
Echitriletes pectinatus sp.n.	+	-	
Erlansonisporites licheniformis sp.n.	+	-	
Triangulatisporites makowskii	+	+	
Triangulatisporites tuberculatus sp.n.	+	-	
Trileites polonicus	+	+	
Trileites sinuosus	-	+	
Maexisporites ooliticus sp.n.	+	-	
Pusulosporites crassus	-	+	
Pusulosporites populosus	+	+	
Pusulosporites inflatus	+	+	Middle
Pusulosporites marginatus	+	+	Bunt-
Bacutriletes globosus	-	+	sand-
Echitriletes echinatus	+	+	stein
Horstisporites heteroreticulatus	-	+	
Horstisporites spinosus	-	+	
Horstisporites sulcatus	-	+	
Horstisporites elegans	-	+	
Erlansonisporites sp.	-	+	
Hughesisporites inflatus	+	+	
Hughesisporites tumulosus	+	+	
Hughesisporites variabilis	+	+	
Triletes sp.	-	+	
Maexisporites ooliticus sp.n.	+	-	
Pusulosporites permotriassicus sp.n.	+	-	Lower
Otynisporites eotriassicus gen. et sp.n.	+	-	Bunt-
Otynisporites tuberculatus sp.n.	+	-	sand-
Triangulatisporites reticulatus sp.n.	+	-	stein
Hughesisporites simplex sp.n.	+	-	
Pusulosporites permotriassicus sp.n.	+	-	Zech- stein

IG-1, Tworóg 7, and from the exposure at Lipie Śląskie near Lubliniec (fig. 1). The age of the sediments supplying material for the present study was determined on account of the index megaspores (Table 1).

The megaspores from the European Lower Buntsandstein (6 species) are here described for the first time.

A few samples from Zechstein have been also taken to the analysis. The age of some samples have been roughly determined by the occurrence below the bottom of the Buntsandstein (Otyń IG-1 boring). In the case of the Łopuszno IG-1 borehole the age of the megaspore samples have been taken from unpublished data yielded kindly by H. Jurkiewicz.

Samples (0.5—3 kg) were taken from grey and grey-greenish clay and silty deposits. After removal of carbonates, the samples were treated with HF conc. for 2—3 days. The resulting residuum was floated with heavy liquid (aqueous solution of CdJ_2 + KJ, density 2.3), megaspores were picked up from suspension with the use of pipette. Megaspores in samples

are, generally, very abundant and well preserved. SEM micrographs were made in the Nencki Institute of the Experimental Biology, Warsaw.

The specimens described in the present paper are stored in collections of the Institute of Geology, Warsaw University (abbreviated IGP).

Acknowledgments. — The author is very grateful to the Department of Geological Institute and especially to Dr. A. Witkowski for making the megaspore materials available to study. He is also very indebted to Dr. J. Karczewska for many helpful discussions and valuable criticism on the manuscript as well as to M. Sc. L. Łuszczewska for taking some photographs.

DESCRIPTIONS

Genus *Trileites* (Erdtman, 1945, 1947) Potonié, 1956

Trileites flexuosus sp.n.
(pl. 28: 4, 5)

Holotype: IGP/45; pl. 28: 4.
Type horizon: Röt.
Type locality: Tłuszcz IG-1, depth 1371,0 m, Poland.
Derivation of the name: Lat. *flexuosus* — winding, with wavy rays.

Diagnosis. — Trilete rays with strong wavy bands. Smooth and glittering surface. Curvaturae lacking.

Material. — 19 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	220—280
Length of Y-rays	0.9R
Height of Y-rays	18—23
Width of Y-rays	15—21

Description. — Megaspores subtriangular; rarely circular in shape; proximo-distally flattened. Trilete rays well developed, more or less undulated, with rounded edges. Curvaturae lacking. Contact areas usually concave and slightly marked by a ridge. The surface of the spore body smooth and glittering.

Remarks. — The megaspores are most similar to those of *Trileites sinuosus* (Dettmann) Fuglewicz, 1973 but they differ in having the concave contact areas with a ridge in their outer margin, and in having longer and more undulated trilete rays.

Occurrence. — Poland: Röt, Tłuszcz IG-1, depth 1370.0—1387.5 m.

Trileites crassitectatus sp.n.
(pl. 28: 1—3)

Holotype: IGP/46; pl. 28: 2.
Type horizon: Röt.
Type locality: Tłuszcz IG-1, depth 1377.5 m, Poland.
Derivation of the name: Lat. *crassus* — thick, *tectum* — roof, from the thick trilete rays.

Diagnosis. — Trilete rays strongly developed in the form of thick and rounded bands. Curvaturae usually lacking.

Material. — About 50 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	330—754
Length of Y-rays	0.8R—R
Width of Y-rays	45—80
Height of Y-rays	25—60

Description. — Megaspores subtriangular, more or less rounded in shape. Trilete rays strongly developed in the form of thick and high bands having rounded edge. Curvaturae usually lacking. The spore surface either smoot or finely granular.

Remarks. — The megaspores are most similar to those of *Trileites validus* Fuglewicz but they differ in having the thick and rounded trilete rays.

Occurrence. — Poland: Röt, Tłuszcz IG-1, depth 1370.8—1382.0 m.

Genus *Maexisporites* Potonié, 1956

Maexisporites magnuszewensis sp.n.

(pl. 28: 6, 7)

Holotype: IGP/47; pl. 28: 7.

Type horizon: Ladinian (Upper Muschelkalk).

Type locality: Magnuszew IG-1, depth 1772.0—1773.0 m, Poland.

Derivation of the name: *magnuszewensis* — named after the type locality.

Diagnosis. — Contact areas almost smooth. Distal surface granulated. Curvaturae lacking.

Material. — More than 100 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	232—350
Length of Y-rays	0.6R
Height of Y-rays	12—18
Width of Y-rays	12—16

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of either straight or slightly folded ridges. Curvaturae lacking. The proximal surface is almost smooth contrary to the distal one which is granulated.

Remarks. — The megaspores are most similar to those of *Maexisporites* cf. *misellus* Marcinkiewicz (Bertelsen, 1970) but they differ by the lack of ornamentation on contact areas and better developed trilete rays.

Occurrence. — Poland: Ladinian (Upper Muschelkalk and Lettenkohle), Magnuszew IG-1, depth 1772.0—1773.0 m; Lettenkohle, Pasłęk IG-1, depth 1034.0—1047.0 m, Nidzica IG-1, depth 1829.0—1829.5 m, Tłuszcz IG-1, depth 1320.5—1330.0 m, Kamień Pomorski IG-1, depth 992.0—1012.0 m.

Maexisporites spongiosus sp.n.

(pl. 28: 8)

Holotype: IGP/48; pl. 28: 8.

Type horizon: Röt.

Type locality: Sochaczew 2, depth 3348.2 m, Poland.

Derivation of the name: Lat. *spongiosus* — spongy, from the spongy distal surface.

Diagnosis. — Trilete rays and curvaturae weakly developed. Proximal surface almost smooth. Distal side features the spongy structure.

Material. — 9 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	340—450
Length of Y-rays	0.9R-R
Height of Y-rays	15—18
Width of Y-rays	18—20

Description. — Megaspores rounded in shape. Trilete rays developed in the form of sligthly folded bands. Curvaturae weakly developed. Proximal surface either smooth or finely granular. Distal side appears to be granular under small magnification, and spongy under big magnification.

Remarks. — The megaspores are most similar to those of *Maexisporites magnuszewensis* sp.n. but they differ in having bigger diameter and longer trilete rays.

Occurrence. — As for the holotype.

Maexisporites ooliticus sp.n.
(pl. 29: 4, 5)

Holotype: IGP/49; pl. 29: 5.
Type horizon: Lower-oolitic Beds of the Lower Buntsandstein.
Type locality: Otyń IG-1, depth 821.0 m, Poland.
Derivation of the name: occurring in the oolitic beds.

Diagnosis. — Trilete rays well developed in the form of bands. Curvaturae weakly developed. The whole surface of the spore body is usually clearly granular.

Material. — About 50 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	290—490
Length of Y-rays	0.8R—R
Height of Y-rays	20—45
Width of Y-rays	12—16

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of either straight or slightly folded bands. Curvaturae weakly developed. The whole surface of the spore body usually clearly granular. The contact areas completely smooth on some specimens only.

Remarks. — The megaspores are most similar to those of *Maexisporites rotundus* Fuglewicz but they differ in having higher trilete rays and weakly developed curvaturae.

Occurrence. — Poland: Lower-oolitic Beds and Upper-oolitic Beds from the Buntsandstein of the Fore-Sudetic monocline, Otyń IG-1, depth 792.0—830.0 m, Września IG-1, depth 2680.0—2681.0 m.

Genus *Verrutriletes* (van der Hammen, 1954) Potonié, 1956

Verrutriletes preutilis sp.n.
(pl. 30: 3,4)

Holotype, IGP/50; pl. 30: 4.
Type horizon: Ladinian (Upper Muschelkalk).
Type locality: Magnuszew IG-1, depth 1772.0—1773.0 m, Poland.

Derivation of the name: older than *Verrutriletes utilis* (Marcinkiewicz) Marcinkiewicz.

Diagnosis. — Trilete rays and curvaturae are well developed. The whole surface of the spore body covered by thick warts.

Material. — 6 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	230—540
Length of Y-rays	0.7R-0.9R
Height of Y-rays	18—23
Width of Y-rays	20—23
Diameter of warts	10—23
Thickness of curvaturae	12—15

Description. — Megaspores rounded in shape. Trilete rays and curvaturae are well developed in the form of ridges. The whole surface of the spore body is covered by the warts having the diameter somewhat larger on the distal surface.

Remarks. — The megaspores are most similar to those of *Verrutriletes utilis* (Marcinkiewicz) Marcinkiewicz but they differ in having less developed trilete rays and finer warts.

Occurrence. — As for the holotype.

Genus *Pusulosporites* Fuglewicz, 1973

Remarks. — Antonescu & Taugourdeau-Lantz (1973) basing upon the structure of the mesospore assigned these megaspores to the genus *Talchirella* Pant & Srivastava, 1961. The present author (1973) errected for the similar megaspore material from Poland, the new genus *Pusulosporites*. However, the system of classifying the megaspores based upon the structure of the mesospore has been considered as doubtful for a pretty long time. Many researchers have drawn attention to the fact that the development of the mesospore can depend on the ontogenetic stage (Fitting, 1900; Potonié, 1958, 1966; Karczewska, 1975). In the material one can find that the specimens having the same morphological features differ in development of the mesospore. The detailed analysis of the Carboniferous coronate megaspores led Karczewska (1975) to a conclusion that "the structure of the mesospore cannot be considered to have taxonomic value within the lower taxonomic levels (species, genus)".

Pusulosporites permotriassicus sp.n.
(pl. 29: 1—3)

Holotype: IGP/51; pl. 29: 2.

Type horizon: Zechstein.

Type locality: Otyń IG-1, depth 992.0 m, Poland.

Diagnosis. — Trilete rays well developed. Curvaturae lacking. Contact areas usually smooth or granular. The rest of the spore body is either granular or covered by numerous warty appendages.

Material. — About 60 well preserved specimens.

Diameter of megaspores	240—300
Length of Y-rays	0.8R
Height of Y-rays	15—28
Width of Y-rays	10—14
Diameter of warts up to	5

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of high bands. Curvaturae lacking. Contact areas usually smooth or granular. The rest of the spore body covered by numerous fine brownish warty appendages which are glittering and varying in diameter.

Remarks. — The megaspores are most similar to those of *Pusulosporites populosus* Fuglewicz but they differ in having less distinct ornamentation on contact areas and higher trilete rays.

Occurrence. — Poland: Zechstein, Łopuszno IG-1, (near Kielce), depth 1707.0—1713.0 m; Zechstein, Lower Buntsandstein, Otyń IG-1, depth 842.0—992.0 m; Lower Buntsandstein, Czerńczyce IG-1, depth 856.0—857.0 m.

Genus *Otynisporites* gen.n.

Type species: *Otynisporites eotriassicus* sp.n.
Derivation of the name: *otynisporites* — named after the locality Otyń.
Species assigned: *O. eotriassicus* sp.n., *O. tuberculatus* sp.n.
Stratigraphical and geographical range: Lower Buntsandstein of the Fore-Sudetic monocline.

Diagnosis. — Trilete rays well developed. Curvaturae present. The whole surface of the spore body covered either by the warts or laterally flattened sharp or blunt tubercles and sharp ribs. The very fine capilli which sometimes may form the brush-like agglomerations (pl. 30: 1a) occur usually at the ends of these warts, tubercles and ribs.

Remarks. — The occurrence of very fine appendages on the elements of ornamentation constitutes the characteristic feature of the described genus which at the same time shows similarity to some other genera (*Verrutriletes*, *Bacutriletes*, *Horstisporites*).

Otynisporites eotriassicus sp.n.
(pl. 30: 1, 2)

Holotype: IGP/52; pl. 30: 2.
Type horizon: Lower-oolitic Beds from the Lower Buntsandstein.
Type locality: Stęszów IG-1, depth 1074.0 m, Poland.

Diagnosis. — Trilete rays well developed. Curvaturae present. The spore surface covered by numerous warts ended by very fine appendages.

Material.— About 70 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	300—420
Length of Y-rays	0.7R-0.9R
Height of Y-rays	12—20
Width of Y-rays	12—18
Diameter of warts	10—18
Length of capilli about	2

Description. — Megaspores rounded in shape. Trilete rays usually well developed in the form of bands or ridges. Curvaturae weakly developed. The whole surface of the spore covered by numerous warts ended by very fine appendages forming the brush-like agglomerations.

Occurrence. — Poland: Lower Buntsandstein (Sub-oolitic Beds and Lower-oolitic Beds) of the Fore-Sudetic monocline, Otyń IG-1, depth 850.0—962.5 m, Stęszów IG-1, depth 1074.0 m, Czerńczyce IG-1, depth 856.0—857.5 m, Września IG-1, depth 2904.0 m, Przesieczna 1, depth 585.0—591.5 m.

Otynisporites tuberculatus sp.n.
(pl. 31: 1—3)

Holotype: IGP/53; pl. 31: 2.
Type horizon: Lower-oolitic Beds from the Lower Buntsandstein.
Type locality: Otyń IG-1, depth 819.0 m, Poland.
Derivation of the name: Lat. *tuberculatus* — covered by tubercles.

Diagnosis. — Trilete rays and curvaturae well developed. The whole surface of the spore body covered by fine laterally flattened tubercles and spines ended by the very fine capillar appendages.

Material. — More than 100 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	300—470
Length of Y-rays	0.9R
Height of Y-rays	15—22
Width of Y-rays	10—15
Thickness of curvaturae	10—15
Length of tubercles and spines up to	15
Thickness of tubercles and spines (at the base)	5—20

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of straight and relatively high, sharp bands. Curvaturae developed in the form of the narrow bands. The whole surface of the spore body covered by fine laterally flattened tubercles and spines having the solid bases. The fine capillar appendages occur on the ends of the tubercles and spines. Similar appendages may occur on the trilete rays as well as on the curvaturae.

Remarks. — The megaspores differ from those of *Otynisporites eotriassicus* sp.n. in having better developed trilete rays and curvaturae as well as by the character of the ornamentation.

Occurrence. — Poland: Lower Buntsandstein (Lower-oolitic Beds) of the Fore-Sudetic monocline, Otyń IG-1, depth 792.0—889.0 m, Gorzów Wielkopolski IG-1, depth 2322.0—2454.0 m, Września IG-1, depth 2904.0 m.

Genus *Bacutriletes* (van der Hammen, 1954) Potonié, 1956

Bacutriletes costatispinosus sp.n.
(pl. 31: 4, 5)

Holotype: IGP/54; pl. 31: 4.
Type horizon: Ladinian (Lettenkohle).
Type locality: Kamień Pomorski IG-1, depth 1012.0 m, Poland.
Derivation of the name: from rib-like spines covering the spore surface.

Diagnosis. — Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by blunt appendages having the elongated ribs and furrows.

Material. — 6 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	270—300
Length of Y-rays	0.7R
Height of Y-rays	12—20
Width of Y-rays	18—20
Length of appendages up to	10
Thickness of appendages (at the base)	10—18

Description. — Megaspore rounded in shape. Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by fine and blunt appendages. The appendages are shorter and more rounded at their ends on the contact areas. The rest of the spore body covered by numerous appendages ornamented by delicate and elongated furrows and ribs.

Remarks. — The megaspores are most similar to those of *Bacutriletes pseudoreticulatus* sp.n. but they differ in shape of the appendages and ornamentation of the distal side.

Occurrence. — Poland: Röt, Lettenkohle, Tłuszcz IG-1, depth 1322.0 m, 1376,0 m; Kamień Pomorski IG-1, depth 1012.0 m.

Bacutriletes pseudoreticulatus sp.n.
(pl. 32: 1, 2)

Holotype: IGP/55; pl. 32: 1.
Type horizon: Röt.
Type locality: Tłuszcz IG-1, depth 1379.0 m, Poland.
Derivation of the name: from distal surface ornamentation.

Diagnosis. — Trilete rays clearly visible. Curvaturae lacking. Contact areas granular. The rest of the spore body covered by short and blunt appendages having the solid bases which often join and form the irregular reticulum.

Material. — 8 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	250—280
Length of Y-rays	0.6R
Height of Y-rays	10—15
Width of Y-rays	10—12
Length of appendages up to	8

Thickness of appendages (at the base) 6—18 (predominantly 8—10)

Description. — Megaspore rounded in shape. Trilete rays well developed in the form of mostly straight ridges or bands. Curvaturae lacking. Contact areas granular. The rest of the spore body covered by short and blunt appendages having the solid bases. The appendages often join and form the irregular reticulum.

Remarks. — The megaspores are most similar to those of *Bacutriletes trammeri* Kozur but they differ in having shorter appendages and reticular character of the distal side.

Occurrence. — As for the holotype.

Bacutriletes corynactiformis sp.n.
(pl. 32: 3)

Holotype: IGP/56; pl. 32: 3.
Type horizon: Schilfsandstein.
Type locality: Nidzica IG-1, depth 1814.0—1815.0 m, Poland.
Derivation of the name: *corynactiformis* — similar to those of *Bacutriletes corynactis* (Harris) Marcinkiewicz.

Diagnosis. — Trilete rays well developed. Curvaturae lacking. Contact areas smooth and distal surface covered by numerous clavate appendages.

Material. — 4 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	580—800
Length of Y-rays	0.65R
Height of Y-rays	24—30
Width of Y-rays	10—15
Length of appendages up to	60
Thickness of appendages	6—8

Description. — Megaspore rounded in shape. Trilete rays well developed in the form of straight or slightly folded bands. Curvaturae lacking. Contact areas smooth, lustrous. The distal surface covered by numerous clavate appendages.

Remarks. — The megaspores are most similar to those of *Bacutriletes corynactis* (Harris) Marcinkiewicz but they differ in having smooth contact areas.

Occurrence. — As for the holotype.

Bacutriletes micros sp.n.
(pl. 33: 1, 2, 4)

Holotype: IGP/57; pl. 33: 2.
Type horizon: Ladinian (Lettenkohle).
Type locality: Tłuszcz IG-1, depth 1321.0 m, Poland.
Derivation of the name: Gr. *micros* — small, from the small dimensions.

Diagnosis. — Trilete rays and curvaturae well developed. The whole surface of the spore body covered by numerous sharp or blunt, digital appendages.

Material. — 26 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	230—370
Length of Y-rays	0.9R-R
Height of Y-rays	16—23
Width of Y-rays	12—15
Length of appendages up to	37
Thickness of appendages (at the base)	6—10

Description. — Megaspores are mostly laterally flattened and rounded in shape. Trilete rays and curvaturae well developed in the form of the bands which get narrower toward the upper part having frequently a jagged ridge. The whole surface of the spore body covered by numerous digital or blunt (sharp are not so frequent) appendages widened at the base. The appendages may be distinct or fused at basis.

Remarks. — The megaspores are most similar to those of *Bacutriletes minimus* Kozur, 1976 (non Cretaceous *Bacutriletes minimus* (Dijkstra, 1949) (Potonié, 1956). Triassic megaspores described by Kozur are poorly illustrated and insufficiently described, what make the comparisons impossible.

Occurrence. — Poland: Lettenkohle, Tłuszcz IG-1, depth 1321.0—1327.0 m, Kamień Pomorski IG-1, depth 992.0—1012.0 m; Upper Muschelkalk and Lettenkohle, Magnuszew IG-1, dept 1762.0—1773.0 m.

Genus *Echitriletes* (van der Hammen, 1954) Potonié, 1956

Echitriletes prerussus sp.n.
(pl. 33: 3, pl. 34: 3—5)

Holotype: IGP/58; pl. 34: 3.
Type horizon: Upper Keuper.
Type locality: brick-yard at Lipie Śląskie near Lubliniec, Poland.

Derivation of the name: older than *Echitriletes russus* (Harris) Reinhardt.

Diagnosis. — Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by the spines which are less numerous, thicker and longer on the proximal surface than on distal one.

Material. — About 60 well preserved specimens.

Dimensions (in microns):

Diameteh of megaspores	300—780
Length of Y-rays	0.4-0.8R
Height of Y-rays	15—20
Width of Y-rays	10—20
Length of appendages on the proximal side up to	45
Length of appendages on the distal side	10—20

Thickness of appendages (at the base) on the proximal side ca. 12
Thickness of appendages (at the base) on the distal side ca. 3

Description. — Megaspores varying in shape from subtriangular to circular. Trilete rays mostly weakly developed. Curvaturae lacking. The whole surface of the spore body laevigate or covered by the sharp appendages which are shorter, much more numerous and densely arranged on the distal side. The appendages are much better developed on the proximal side. The small specimens feature sharp and densely arranged appendages especially on the distal side. The bigger specimens have the appendages less numerous, thicker and shorter.

Remarks. — The megaspores are most similar to those of *Echitriletes russus* (Harris) Reinhardt, but they differ in having much more longer appendages on the contact areas.

Occurrence. — As for the holotype.

Echitriletes pectinatus sp.n.
(pl. 35: 1—3)

Holotype: IGP/59; pl. 35: 2.
Type horizon: Röt.
Type locality: Kliczków 1, depth 1669.5 m, Poland.
Derivation of the name: from pectinate trilete rays.

Diagnosis. — Trilete rays and curvaturae strongly developed. The whole surface of the spore body covered by numerous and mostly sharp spines.

Material. — 9 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	400—560
Length of Y-rays	R
Height of Y-rays	20—50
Width of Y-rays	10—18
Width of curvaturae	15—30
Length of spines up to	50
Thickness of spines (at the base)	6—20

Description. — Megaspores rounded in shape. Trilete rays and curvaturae strongly developed in the form of relatively high and straight or slightly folded bands. The whole surface of the spore body densely covered by mostly thin spines which are better developed on the distal side.

Remarks. — The megaspores are most similar to those of *Echitriletes multispinosus* Fuglewicz, but they differ in having shorter spines and more strongly developed trilete rays and curvaturae.

Occurence. — Poland: Röt, Kliczków 1 (near Sieradz), depth 1669,5 m, Środa IG-2, depth 2298.0 m, Czerńczyce IG-1, depth 333.0—334.2 m.

Echitriletes latispinosus sp.n.
(pl. 34: 1, 2)

Holotype: IGP/60; pl. 34: 2.
Type horizon: Ladinian (Lettenkohle).
Type locality: Sochaczew 2, depth 3185.0 m, Poland.
Derivation of the name: Lat. *latus* — wide, *spinosus* — spiny, from the wide spines covering the spore surface.

Diagnosis. — Trilete rays and curvaturae well developed. The whole surface of the spore body covered by numerous sharp spines having the flat basis.

Material. — About 50 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	340—500
Length of Y-rays	R
Height of Y-rays to	45
Width of Y-rays	10—12
Length of appendages up to	55
Width of appendages (at the base)	12—25
Width of curvaturae	28—40

Description. — Megaspores subtriangular or more rarely circular in shape. Trilete rays well developed in the form of relatively high and sharp mostly folded bands with more or less rugged edge. Curvaturae well developed in the form of mostly strongly jagged band. The whole surface of the spore body covered by numerous single or cohering sharp spines having the wide and flat basis.

Remarks. — The megaspores are most similar to those of *Echitriletes germanicus* (Kozur) comb.n. but they differ in having better developed trilete rays and curvaturae and shorter, sharply ended appendages.

Occurrence. — Poland: Anisian?, Nidzica IG-1, depth 1935,2 m; Ladinian (Lettenkohle), Sochaczew 2, depth 3185.0—3187.5 m.

Genus *Horstisporites* Potonié, 1956

Horstisporites irregularis sp.n.
(pl. 35: 4)

Holotype: IGP/62; pl. 35: 4.
Type horizon: Ladinian (Lettenkohle).
Type locality: Magnuszew IG-1, depth 1762.0 m, Poland.
Derivation of the name: from irregular reticulum covering the spore surface.

Diagnosis. — Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by irregular reticulum.

Material. — 9 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	350—550
Length of Y-rays	0.8R
Height of Y-rays up to	35
Width of Y-rays	15—20
Height of muri up to	35
Thickness of muri	4—8

Description. — Megaspores circular in shape. Trilete rays developed in the form of narrow and strongly folded bands. Curvaturae lacking. The whole surface of the spore body covered by irregular reticulum made of sharply ended, and strongly folded ridges.

Remarks. — The megaspores are most similar to those of *Horstisporites microlumenus* Dettmann but they differ in having less developed irregular reticulum.

Occurrence. — As for the holotype.

Horstisporites bertelseni sp.n.
(pl. 37: 1)

1970. *Horstisporites* sp. (Type N 5); Bertelsen: pl. 7: 5, 6.
Holotype: IGP/63; pl. 37: 1.
Type horizon: Upper Keuper.
Type locality: brick-yard at Lipie Śląskie (near Lubliniec), Poland.
Derivation of the name: After Dr. F. Bertelsen from Copenhagen.

Diagnosis. — Trilete rays strongly developed. Curvaturae present. Contact areas almost smooth. Distal side covered by numerous ridges forming reticulum.

Material. — 6 well developed specimens.

Dimensions (in microns):

Diameter of megaspores	460—580
Length of Y-rays	R
Height of Y-rays	50—80
Width of Y-rays	18—21
Height of ridges	15—18
Thickness of ridges	10—18

Length of spines on the distal side up to 20

Description. — Megaspores varying in shape from subtriangular to circular. Trilete rays well developed in the form of straight or winding and elevated bands diminishing in height toward the equator. Curvaturae are formed by winding ridges or relatively wide zone. Contact areas smooth or granular. The distal side covered by numerous winding ridges which join forming the irregular reticulum. In places where the ridges join there are short spines.

Remarks. — The specimens differ from the megaspores described by Bertelsen (1970) in having somewhat lower trilete rays but better developed ridges on the distal side and curvaturae.

Occurrence. — As for the holotype.

Horstisporites nidzicensis sp.n.
(pl. 36: 2)

Holotype: IGP/64; pl. 36: 2.
Type horizon: Schilfsandstein.
Type locality: Nidzica IG-1, depth 1823.0 m, Poland.

Derivation of the name: *nidzicensis* — named after the locality Nidzica.

Diagnosis. — Trilete rays well developed. Curvaturae lacking. Contact areas almost smooth. The distal side covered by numerous winding ridges.

Material. — 15 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	250—440
Length of Y-rays	0.5R-0.8R
Height of Y-rays	23—60
Width of Y-rays	6—18
Height of ridges	10—30
Thickness of ridges	6—12

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of either straight or slightly winding bands. Curvaturae lacking. Contact areas almost smooth, usually concave. The rest of the spore body covered by high and winding ridges which form irregular reticulum.

Remarks. — The megaspores are most similar to those of *Horstisporites bertelseni* sp.n. but they differ in having smaller diameter, concave contact areas as well as the shorter trilete rays, and in lack of curvaturae.

Occurrence. — Poland: Schilfsandstein (Jul), Nidzica IG-1, depth 1813.0—1823.0 m, Mogilno 1, depth 1150.0 m, 1161.0 m.

Genus *Erlansonisporites* Potonié, 1956

Erlansonisporites licheniformis sp.n.

(pl. 37: 2—4)

Holotype: IGP/65; pl. 37: 4.

Type horizon: Röt.

Type locality: Otyń IG-1, depth 478,7 m, Poland.

Derivation of the name: because of ornamentation they resemble lichens.

Diagnosis. — Trilete rays clearly visible. Curvaturae lacking. The whole surface of the spore body covered by numerous fine bands having uniform bases and split apart ends resembling the lichens.

Material. — 5 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	400—510
Height of Y-rays	15—20
Length of Y-rays	0.9R-R
Width of Y-rays	10—13
Height of muri up to	10
Thickness of muri	3—6
Diameter of lumina	8—20

Description. — Megaspores rounded in shape. Trilete rays developed in the form of narrow strongly jagged bands. Curvaturae lacking. The whole surface of the spore body densely covered by flat (tabular) bands having more or less solid bases and strongly split apart ends provided frequently with single appendages. The ornamentation is less developed on the proximal side.

Remarks. — Specific lichen-like ornamentation differs this species from the others belonging to the genus *Erlansonisporites*.

Occurrence. — Poland: Röt, Otyń IG-1, depth 478.7 m, Stęszów IG-1, depth 593.0—594.0 m.

Genus *Bothriotriletes* gen.n.

Type species: *Bothriotriletes grandis* sp.n.
Derivation of the name: Gr. *bothrios* — cavity.
Stratigraphical and geographical range: Ladinian (Lettenkohle).

Diagnosis. — Megaspores rounded. Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by shallow and spherical cavities.

Remarks. — The described genus is most similar to the *Alienosporites* Kozur, 1976 but it differs in having the proximal side ornamented and in lack of curvaturae. The megaspores *Alienosporites* have the spherical cavities on the distal side only.

Bothriotriletes grandis sp.n.
(pl. 36: 1)

Holotype: IGP/66; pl. 36: 1.
Type horizon: Ladinian (Lettenkohle).
Type locality: Rokita IG-1, depth 1245.0 m, Poland.
Derivation of the name: megaspores having large sizes.

Material. — About 30 mostly well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	600—1334
Length of Y-rays	0.8R-R
Height of Y-rays	10—30
Width of Y-rays	40—70
Diameter of cavities 18—82 (predominantly	30—45)
Space between cavities	12—95

Description. — Megaspores rounded in shape. Trilete rays weakly developed in the form of bands or, rarely, ridges. Curvaturae lacking. The spore surface granular and covered by densely arranged shallow spherical and oval cavities.

Remarks. — Within the material studied the full series of megaspores from the forms having well developed cavities to those having less developed ornamentation occur.

Occurrence. — Poland: Ladinian (Lettenkohle), Tłuszcz IG-1, depth 1321.0—1334.0 m, Rokita IG-1, depth 1245.0 m, Kamień Pomorski IG-1, depth 992.0—1007.0 m, Magnuszew IG-1, depth 1762.0 m.

Genus *Triangulatisporites* (Potonié & Kremp, 1954) Karczewska, 1976

Triangulatisporites tuberculatus sp.n.
(pl. 38: 1, 2)

Holotype: IGP/67; pl. 38: 1.
Type horizon: Röt.
Type locality: Tłuszcz IG-1, depth 1382.0 m, Poland.
Derivation of the name: Lat. *tuberculatus* — covered by tubercles.

Diagnosis. — Trilete rays well developed. Zona radially striated. The whole surface of the spore body covered by numerous flattened tubercles better developed on the distal side.

Material. — 4 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	460—510
Length of Y-rays	R
Height of Y-rays ca.	14
Width of Y-rays	12—15
Width of zona	50—100

Description. — Megaspores flattened proximo-distally varying in shape from the subtriangular to oval. Trilete rays well developed in the form of either straight or slightly winding ridges. Zona radially striated. The whole surface of the spore body covered by numerous flattened tubercles which join forming frequently more elongated elements. The tubercles are better developed on the distal side.

Remarks. — The megaspores are most similar to those of *Triangulatisporites bellus* Karczewska, 1976 but they differ in having narrower zone and ornamentation on the distal side.

Occurrence. — Poland: Röt, Tłuszcz IG-1, depth 1381.0—1382.0 m.

Triangulatisporites reticulatus sp.n.
(pl. 38: 4)

Holotype: IGP/68; pl. 38: 4.
Type horizon: Sub-oolitic Beds from the Lower Buntsandstein.
Type locality: Gorzów Wielkopolski IG-1, depth 2575.5—2576.0 m, Poland.
Derivation of the name: Lat. *reticulatus* — covered by reticulum.

Diagnosis. — Trilete rays distinct. Zona narrow. The spore surface covered by weakly developed reticulum.

Material. — 3 specimens.

Dimensions (in microns):

Diameter of megaspores	400—510
Length of Y-rays	R
Height of Y-rays	18—20
Width of Y-rays	8—10
Diameter of lumina	10—23
Width of zona up to	22

Description. — Megaspores rounded in shape. Trilete rays well developed in the form of narrow and slightly winding bands. Contact areas limited by the narrow and homogenous zona. The spore surface covered by weakly developed reticulum having the low muri.

Remarks. — The megaspores are most similar to those of *Triangulatisporites laevigatus* Karczewska, 1976 but they differ in having the reticular ornamentation.

Occurrence. — As for the holotype.

Genus *Dijkstraisporites* Potonié, 1956

Dijkstraisporites capillatus sp.n.
(pl. 38: 3, pl. 39: 1, pl. 40: 3)

Holotype: IGP/69; pl. 40: 3.
Type horizon: Ladinian (Lettenkohle).
Type locality: Pasłęk IG-1, depth 1047.0 m, Poland.

Derivation of the name: Lat. *capillatus* — covered by capillar appendages.

Diagnosis. — The whole surface of the spore body covered by capillar appendages.

Material. — More than 100 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	400—1100
Length of Y-rays	R
Height of Y-rays up to	100
Width of Y-rays	8—15
Width of zona up to	280
Length of appendages up to	120
Thickness of appendages (at the base)	6—8

Description. — Megaspores are mostly subtriangular in shape; flattened proximo-distally. Trilete rays well developed in the form of high strongly jagged bands. Contact areas limited by broad and more or less jagged zona with delicate radial ribs connected by transparent membrane.

Remarks. — The megaspores are most similar to those of *Dijkstraisporites beutleri* Reinhardt but they differ in having no reticular ornamentation.

Occurrence. — Poland: Ladinian (Lettenkohle), Tworóg 7, dept 50,0—61,0 m, Tłuszcz IG-1, depth 1320,0—1334,0 m, Sochaczew 2, depth 3189,0 m, Pasłęk IG-1, depth 1047,0 m.

Genus *Nathorstisporites* Jung, 1958

Nathorstisporites invenustus sp.n.

(pl. 40: 1, 2)

Holotype: IGP/70; pl. 40: 2.

Type horizon: Ladinian (Lettenkohle).

Type locality: Tłuszcz IG-1, depth 1322.0 m, Poland.

Derivation of the name: Lat. *invenustus* — invenous.

Diagnosis. — Trilete rays weakly developed. Curvaturae lacking. The whole surface of the spore body covered by numerous undulated bands which are connected together forming the reticulum. The spines occur on the muri of the reticulum.

Material. — 16 well developed specimens.

Dimensions (in microns):

Diameter of megaspores	290—550
Length of Y-rays	0.8R
Height of Y-rays	25—60
Width of Y-rays ca.	60
Diameter of lumina	10—25
Height of muri	8—20
Thickness of muri	4—6
Length of spines up to 25/at the proximal pole up to	45
Thickness of spines (at the base)	6—16

Description. — Megaspores rounded in shape. Trilete rays developed in the form of relatively high and mostly strongly split apart bands. Curvaturae lacking. The whole surface of the spore body covered by numerous undulated bands which join to form the reticulum. In the places where the bands are connected there are fine and mostly sharp or flattened spines reaching the maximum of its length in the area of the proximal pole of the spore.

Remarks. — The megaspores are most similar to those of *Nathorstisporites reticulatus* Dettmann but they differ in having lower trilete rays, the lack of curvaturae and smaler spines occurring on the whole surface of the spore.

Occurrence. — Poland: Ladinian (Lettenkohle), Tłuszcz IG-1, depth 1321.0—1330.0 m.

Genus *Hughesisporites* Potonié, 1956

Hughesisporites simplex sp.n.
(pl. 40: 4)

Holotype: IGP/71; pl. 40: 4.
Type horizon: Lower-oolitic Beds from the Lower Buntsandstein.
Type locality: Stęszów IG-1, depth 1064,0 m, Poland.
Derivation of the name: Lat. *simplex* — simple.

Diagnosis. — Trilete rays well developed. Curvaturae present. Contact areas covered by fine tubercles.

Material. — 6 specimens.

Dimensions (in microns):

Diameter of megaspóres	270—430
Length of Y-rays	0.9R
Height of Y-rays	15—20
Width of Y-rays	12—18
Thickness of tubercles up to	6

Description. — Megaspores rounded or oval in shape. Trilete rays well developed in the form of slightly undulated bands. Curvaturae present. Contact areas covered by fine tubercles. The distal surface smooth.

Remarks. — The megaspores are most similar to those of *Hughesisporites inflatus* Fuglewicz but they differ in having mostly flat contact areas and finer tubercles.

Occurrence. — As for the holotype.

Genus *Tenellisporites* Potonié, 1956

Tenellisporites planispinosus sp.n.
(pl. 41: 3, 4)

Holotype: IGP/72; pl. 41: 3.
Type horizon: Ladinian (Lettenkohle).
Type locality: Tłuszcz IG-1, depth 1330 m, Poland.
Derivation of the name: Lat. *planus* — flat, *spinosus* — spiny, from flat appendages covering the spore surface.

Diagnosis. — Trilete rays and curvaturae well developed. The whole surface of the spore body covered by numerous flattened appendages.

Material. — 5 well preserved specimens.

Dimensions (in microns):

Diameter of megaspores	530—860
Length of Y-rays	R
Height of Y-rays up to	35
Width of Y-rays	12—23
Length of appendages up to	80
Width of curvaturae up to	35

Description. — Megaspores rounded in shape. Trilete rays and curvaturae developed in the form of more or less jagged bands or numerous flat appendages fused at the base. Similar appendages discrete or fused at basis cover the whole surface of the spore body, but they are less numerous on the proximal side.

Remarks. — The megaspores are most similar to those of *Tenellisporites marcinkiewiczae* Reinhardt but they differ in having shorter and flattened appendages.

Occurrence. — Poland: Ladinian (Lettenkohle), Tłuszcz IG-1, depth 1330.0 m, Kamień Pomorski IG-1, depth 1012.0 m.

Genus *Aneuletes* Harris, 1961

Remarks. — Within the material studied there are the specimens having the developed dehiscence mark in the form of characteristic crater-like cavity occurring on the contact areas (pl. 41: 1, 2).

Aneuletes acrochordonodes sp.n.
(pl. 40: 5)

Holotype: IGP/73; pl. 40: 5.
Type horizon: Ladinian (Upper Muschelkalk).
Type locality: Magnuszew IG-1, depth 1772.0—1773.0 m, Poland.
Derivation of the name: Gr. *acrochordonodes* — covered by warts.

Diagnosis. — The whole surface of the spore body covered by warts of different sizes which often fuse with one another forming more elongated elements.

Material. — About 30 well preserved specimens.

Dimensions (in microns):
Diameter of spores 300—500

Description. — Spores rounded in shape. Distal side covered by warts of different diameter and different shape. The warts of the proximal side are much more finer.

Remarks. — The described type of ornamentation has not been known so far within the genus *Aneuletes*.

Occurrence. — Poland: Ladinian (Upper Muschelkalk and Lettenkohle), Magnuszew IG-1, depth 1760.0—1773.0 m; Lettenkohle, Kamień Pomorski IG-1, depth 992.0—994.0 m, Tłuszcz IG-1, depth 1320.0—1326.8 m, Nidzica IG-1, depth 1829.0—1846.0 m, Rokita IG-1, depth 1245.0 m.

Aneuletes clavatus sp.n.
(pl. 41: 1)

Holotype: IGP/74; pl. 41: 1.
Type horizon: Ladinian (Lettenkohle).
Type locality: Kamień Pomorski IG-1, depth 992.0 m, Poland.
Derivation of the name: from clavate appendages.

Diagnosis. — The whole surface of the spore body covered by clavate appendages.

Material. — 8 well preserved specimens.

Dimensions (in microns):
Diameter of spores 350—500

Description. — Spores rounded in shape. The whole surface of the spore body covered by more or less regular clavate appendages, which frequently fuse with one

another forming the elongated elements. The finer appendages and warts occur on the contact areas.

Remarks. — The described type of ornamentation has not been known so far within the genus *Aneuletes*.

Occurrence. — As for the holotype.

Aneuletes pomeranus sp.n.
(pl. 41: 2, 5)

Holotype: IGP/75; pl. 41: 2.
Type horizon: Ladinian (Lettenkohle).
Type locality: Kamień Pomorski IG-1, depth 992.0 m, Poland.
Derivation of the name: after the geographical name, Pomerania.

Diagnosis. — Distal side covered by irregular reticulum. The irregular tubercles and ridges occur on the proximal side.

Material. — 25 well preserved specimens.

Dimensions (in microns):

Diameter of spores	320—530
Diameter of lumina	20—60
Height of muri	15—18
Thickness of muri	12—18
Thicknes of tubercles on the proximal side	12—18

Description. — Spores rounded or oval in shape. The irregular tubercles and ridges occur on the proximal side. Distal side covered by irregular reticulum. The mesh of the reticulum limited by not so high muri.

Remarks. — The described specimens differ from those of *Aneuletes reticulata* Butterworth & Spinner by having ornamentation on the proximal side and more strongly developed reticulum on the distal side.

Occurrence. — Poland: Ladinian (Lettenkohle), Tłuszcz IG-1, dept 1321.0—1322.0 m, Kamień Pomorski IG-1, depth 992.0—1012.0 m.

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RYSZARD FUGLEWICZ

NOWE GATUNKI MEGASPOR Z TRIASU POLSKI

Streszczenie

Opisano 30 gatunków megaspor należących do 16 rodzajów, w tym wszystkie gatunki i 2 rodzaje nowe. Większość opisanych gatunków pochodzi z retu oraz kajpru dolnego (Lettenkohle). Po raz pierwszy opisano megaspory z pstrego piaskowca dolne-

go. Materiału do badań dostarczyły wiercenia z obszaru Niżu Polskiego wykonane przez Instytut Geologiczny i Przedsiębiorstwa Przemysłu Naftowego oraz jedno odsłonięcie w Lipiu Śląskim koło Lublińca.

Próby do badań pobierano ze skał ilastych i mułowcowych o zabarwieniu szarym i zielonkawym. Do ich rozpuszczenia zastosowano HCl i HF. Otrzymane reziduum poddano flotacji przy użyciu cieczy ciężkiej. Megaspory badano w świetle odbitym, przechodzącym jak również za pomocą mikroskopu elektronowego.

РИШАРД ФУГЛЕВИЧ

НОВЫЕ ВИДЫ МЕГАСПОР ИЗ ТРИАСА ПОЛЬШИ

Резюме

В настоящей работе представлены результаты палеонтологического изучения новых видов мегаспор из триасовых отложений Польши. Большинство описанных видов выделено из отложений рёта и нижнего кейпера. Впервые в настоящей работе описанны мегаспоры из отложений нижнего пёстрого песчаника. Исследования проводились на материалах буровых скважин пройденных на территории Польской низменности, а также одного обнажения в окрестности Люблинца. Опробование производилось в глинистых и алевролитовых осадках серой и зелёноватой окраски. Образцы обрабатывались соляной и плавиковой кислотами. Оставшиеся после обработки осадки подверглись сепарации в тяжёлой жидкости. Мегаспоры исследовались в отражённом и проходящем свете, а также в сканирующем электронном микроскопе.

Описание охватывает 30 видов мегаспор принадлежащих к 16 родам, в том числе 2 рода и все виды новые.

EXPLANATION OF THE PLATES

Plate 28

Trileites crassitectatus sp.n.

1. Proximal surface, polar compression, from scanning electron microscope, ×100. Tłuszcz IG-1, depth 1382,0 m, Röt.

2. Megaspore in lateral view, in reflected light, ×100. Holotype, IGP/46. Tłuszcz IG-1, depth 1377,5 m, Röt.
3. Proximal surface, polar compression, in reflected light, ×100. Tłuszcz IG-1, depth 1377,5 m, Röt.

Trileites flexuosus sp.n.

4. Proximal surface, polar compression, from scanning electron microscope, ×250. Holotype, IGP/45. Tłuszcz IG-1, depth 1371,0 m, Röt.
5. Proximal surface, polar compression, in reflected light, ×100. Tłuszcz IG-1, depth 1387,5 m, Röt.

Maexisporites magnuszewensis sp.n.

6. Proximal surface, polar compression, in reflected light, ×100. Pasłęk IG-1, depth 1047,0 m, Ladinian (Lettenkohle).
7. Megaspore in lateral view, from scanning electron microscope, ×300. Holotype, IGP/47. Magnuszew IG-1, depth 1772,0—1773,0 m, Ladinian (Upper Muschelkalk).

Maexisporites spongiosus sp.n.

8. *a* megaspore in lateral view, in reflected light, ×100; *b* megaspore in lateral view, from scanning electron microscope, ×200. Holotype, IGP/48. Sochaczew 2, depth 3348,2 m, Röt.

Plate 29

Pusulosporites permotriassicus sp.n.

1. *a* proximal surface, polar compression, from scanning electron microscope, ×200; *b* part of specimen illustrating ornamentation of equatorial area of the megaspore, ×750. Łopuszno IG-1, depth 1707,0—1713,0 m, Zechstein.
2. Proximal surface, polar compression, from scanning electron microscope, ×250. Holotype, IGP/51. Otyń IG-1, depth 992,0 m, Zechstein.
3. Proximal surface, polar compression, in reflected light, ×100. Czerńczyce IG-1, depth 856,0—857,0, m, Lower Buntsandstein, Lower-oolitic Beds.

Maexisporites ooliticus sp.n.

4. Proximal surface, polar compression, from scanning electron microscope, ×250. Otyń IG-1, depth 792,5—793,0 m, Lower Buntsandstein, Lower-oolitic Beds.
5. Megaspore in lateral view, from scanning electron microscope, ×300. Holotype, IGP/49. Otyń IG-1, depth 821,0 m, Lower Buntsandstein, Lower-oolitic Beds.

Plate 30

Otynisporites eotriassicus sp.n.

1. *a* proximal surface, polar compression, from scanning electron microscope, ×250; *b* proximal surface, polar compression, in reflected light, ×100. Stęszów IG-1, depth 1074.0 m, Lower Buntsandstein, Lower-oolitic Beds.
2. *a* proximal surface, polar compression, in reflected light, ×100; *b* proximal surface, polar compression, from scanning electron microscope; ×230. Holotype, IGP/52. Stęszów IG-1, depth 1074,0 m, Lower Buntsandstein, Lower-oolitic Beds.

Verrutriletes preutilis sp.n.

3. Proximal surface, polar compression, in reflected light, ×100. Magnuszew IG-1, depth 1772,0—1773,0 m, Ladinian (Upper Muschelkalk).
4. *a* proximal surface, polar compression, in reflected light, ×100; *b* distal surface, polar compression, in reflected light ×100. Holotype, IGP/50. Magnuszew IG-1, depth 1772,0—1773,0 m, Ladinian (Upper Muschelkalk).

Plate 31

Otynisporites tuberculatus sp.n.

1. Megaspore in lateral view, in reflected light, ×100. Gorzów Wielkopolski IG-1, depth 2454,0 m, Lower Buntsandstein, Lower-oolitic Beds.
2. Megaspore in lateral view, from scanning electron microscope, ×200. Holotype, IGP/53. Otyń IG-1, depth 819,0 m, Lower Buntsandstein, Lower-oolitic Beds.
3. Proximal surface, polar compression, from scanning electron microscope, ×200. Otyń IG-1, depth 819,0 m, Lower Buntsandstein, Lower-oolitic Beds.

Bacutriletes costatispinosus sp.n.

4. Megaspore in lateral view, from scanning electron microscope, ×250. Holotype. IGP/54. Kamień Pomorski IG-1, depth 1012,0 m, Ladinian (Lettenkohle).
5. Proximal surface, polar compression, from scanning electron microscope, ×300. Tłuszcz IG-1, depth 1376,0 m, Röt.

Plate 32

Bacutriletes pseudoreticulatus sp.n.

1. Megaspore in lateral view, from scanning electron microscope, ×250. Holotype, IGP/55. Tłuszcz IG-1, depth 1379,0 m, Röt.
2. Distal surface, polar compression, from scanning electron microscope, ×250. Tłuszcz IG-1, depth 1379,0 m, Röt.

Bacutriletes corynactiformis sp.n.

3. *a* proximal surface, polar compression, from scanning electron microscope, ×150; *b* proximal surface, polar compression, in reflected light, ×100; *c* distal surface, polar compression, in reflected light, ×100. Holotype. IGP/56. Nidzica IG-1, depth 1814,0—1815,0 m, Schilfsandstein.

Plate 33

Bacutriletes micros sp.n.

1. *a* megaspore in lateral view, in reflected light, ×100; *b* megaspore in lateral view, from scanning electron microscope, ×200; *c* distal surface in reflected light, ×100. Magnuszew IG-1, depth 1762,0 m, Ladinian (Lettenkohle).
2. Megaspore in lateral view, from scanning electron microscope, Holotype, IGP/57, ×250. Tłuszcz IG-1, depth 1321,0 m, Ladinian (Lettenkohle).
4. Distal surface, from scanning electron microscope, ×200. Kamień Pomorski IG-1, depth 1012,0 m, Ladinian (Lettenkohle).

Echitriletes prerussus sp.n.

3. Megaspore in lateral view, in reflected light, ×100. Lipie Śląskie brick-yard, Upper Keuper.

Plate 34

Echitriletes latispinosus sp.n.

1. Proximal surface, polar compression, in reflected light, ×100. Nidzica IG-1, depth 1935,2 m, Anisian?.
2. Proximal surface, polar compression, from scanning electron microscope, ×120. Holotype, IGP/60. Sochaczew 2, depth 3185,0 m, Ladinian (Lettenkohle).

Echitriletes prerussus sp.n.

3. Megaspore in lateral view, from scanning electron microscope. ×200. Holotype, IGP/58. Lipie Śląskie, brick-yard, Upper Keuper.

4. Megaspore in lateral view, from scanning electron microscope, ×200. Lipie Śląskie brick-yard, Upper Keuper.
5. Megaspore in lateral view, from scanning electron microscope, ×250. Lipie Śląskie brick-yard, Upper Keuper.

Plate 35

Echitriletes pectinatus sp.n.

1. Megaspore in lateral view, from scanning electron microscope, ×230. Kliczków 1, depth 1669,5 m, Röt.
2. *a* proximal surface, polar compression, from scanning electron microscope, ×300; *b* proximal surface, polar compression in reflected light, ×100. Holotype, IGP/59. Kliczków 1, depth 1669,5 m, Röt.
3. Megaspore in lateral view, in reflected light, ×100. Kliczków 1, depth 1669,5 m, Röt.

Horstisporites irregularis sp.n.

4. *a* proximal surface, polar compression, from scanning electron microscope, ×120; *b* proximal surface, polar compression in reflected light, ×100. Holotype, IGP/62. Magnuszew IG-1, depth 1762 m, Ladinian (Lettenkohle).

Plate 36

Bothriotriletes grandis sp.n.

1. *a* megaspore in lateral view, from scanning electron microscope, ×45; *b* megaspore in lateral view in reflected light, ×60. Holotype, IGP/66. Rokita IG-1, depth 1245,0 m, Ladinian (Lettenkohle).

Horstisporites nidzicensis sp.n.

2. *a* proximal surface, polar compression, from scanning electron microscope, ×250; *b* distal surface from scanning electron microscope, ×250; *c* proximal surface, polar compression in reflected light, ×100. *d* Distal surface in reflected light, ×100. Holotype, IGP/64. Nidzica IG-1, depth 1823,0 m, Schilfsandstein.

Plate 37

Horstisporites bertelseni sp.n.

1. Proximal surface, polar compression, from scanning electron microscope, ×130. Holotype, IGP/63. Lipie Śląskie, Upper Keuper.

Erlansonisporites licheniformis sp.n.

2. Proximal surface, polar compression in reflected light, ×100. Stęszów IG-1, depth 593,0—594,0 m, Röt.
3. Proximal surface, polar compression, from scanning electron microscope, ×150. Otyń IG-1, depth 478,7 m, Röt.
4. *a* proximal surface, polar compression, from scanning electron microscope, ×150; *b* proximal surface, polar compression, from scanning electron microscope, ×300. Holotype, IGP/65. Otyń IG-1, depth 478,7 m, Röt.

Plate 38

Triangulatisporites tuberculatus sp.n.

1. *a* proximal surface, polar compression, from scanning electron microscope, ×150; *b* distal surface from scanning electron microscope, ×200. Holotype, IGP/67. Tłuszcz IG-1, depth 1382,0 m, Röt.

2. Proximal surface, polar compression, from scanning electron microscope, ×150. Tłuszcz IG-1, depth 1381,0 m, Röt.

Dijkstraisporites capillatus sp.n.

3. Proximal surface, polar compression in transmitted light, ×100. Tworóg 7, depth 52,8 m, Ladinian (Lettenkohle).

Triangulatisporites reticulatus sp.n.

4. *a* proximal surface, polar compression, from scanning electron microscope, ×200; *b* proximal surface, polar compression in reflected light, ×100. Holotype, IGP/68. Gorzów Wielkopolski IG-1, depth 2575,5—2576,0 m, Lower Buntsandstein, Sub-oolitic Beds.

Plate 39

Dijkstraisporites capillatus sp.n.

1. *a* proximal surface, polar compression in reflected light, ×100; *b* distal surface in reflected light, ×100. Tworóg 7, depth 61,0 m, Ladinian (Lettenkohle).

Plate 40

Nathorstisporites invenustus sp.n.

1. Proximal surface, polar compression, from scanning electron microscope, ×150. Tłuszcz IG-1, depth 1321,5 m, Ladinian (Lettenkohle).
2. Megaspore in lateral view, from scanning electron microscope, ×150. Holotype, IGP/70. Tłuszcz IG-1, depth 1322,0 m, Ladinian (Lettenkohle).

Dijkstraisporites capillatus sp.n.

3. Proximal surface, polar compression, from scanning electron microscope, ×150. Holotype, IGP/69. Pasłęk IG-1, depth 1047 m, Ladinian (Lettenkohle).

Hughesisporites simplex sp.n.

4. Proximal surface, from scanning electron microscope, ×230. Holotype, IGP/71. Stęszów IG-1, depth 1064,0 m, Lower Buntsandstein, Lower-oolitic Beds.

Aneuletes acrochordonodes sp.n.

5. *a* proximal surface, in reflected light, ×100; *b* distal surface, in reflected light, ×100. Holotype, IGP/73. Magnuszew IG-1, depth 1772,0—1773,0 m, Ladinian (Upper Muschelkalk).

Plate 41

Aneuletes clavatus sp.n.

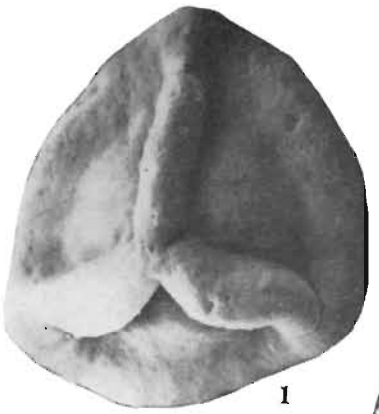
1. *a* proximal surface, polar compression, from scanning electron microscope, ×180; *b* proximal surface, polar compression, in reflected light, ×100. Holotype, IGP/74. Kamień Pomorski IG-1, depth 992,0 m, Ladinian (Lettenkohle).

Aneuletes pomeranus sp.n.

2. Megaspore in lateral view, from scanning electron microscope, ×200. Holotype, IGP/75. Kamień Pomorski IG-1,depth 992,0 m, Ladinian (Lettenkohle).
5. Distal surface from scanning electron microscope, ×200. Kamień Pomorski IG-1, depth 992,0 m, Ladinian (Lettenkohle).

Tenellisporites planispinosus sp.n.

3. Proximal surface, from scanning electron microscope, ×120. Holotype, IGP/72. Tłuszcz IG-1, depth 1330,0 m, Ladinian (Lettenkohle).
4. Proximal surface, from scanning electron microscope, ×170. Kamień Pomorski IG-1, depth 1012,0 m, Ladinian (Lettenkohle).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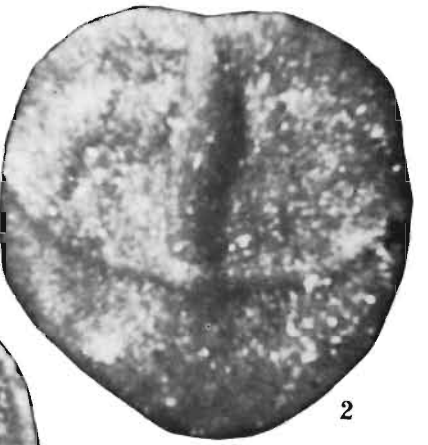
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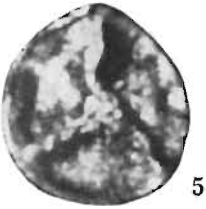
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6


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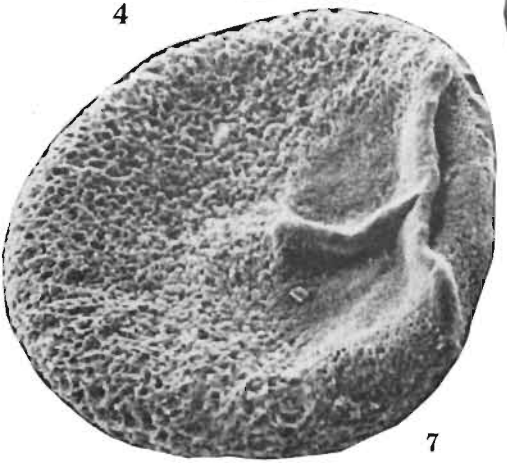
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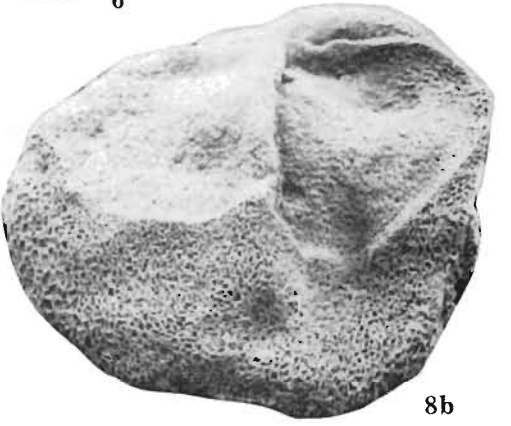
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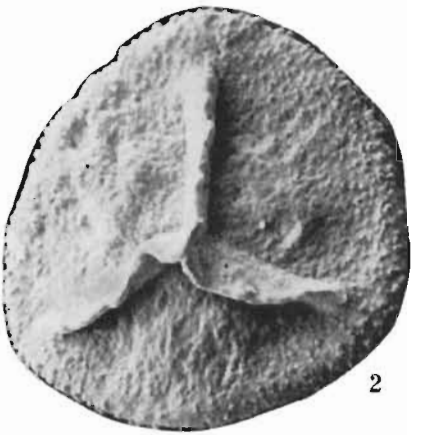
1a



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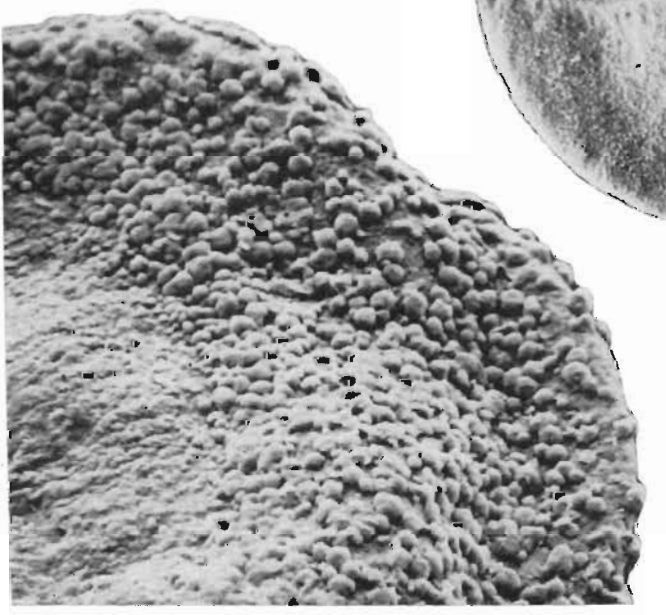

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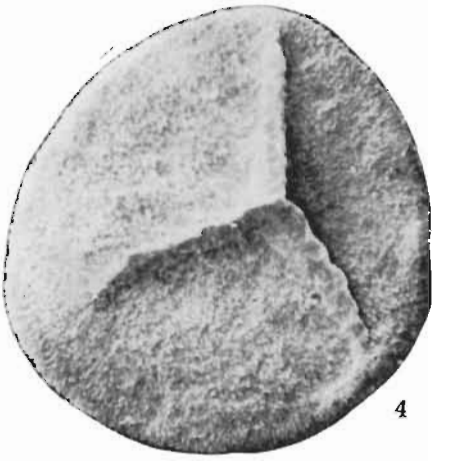

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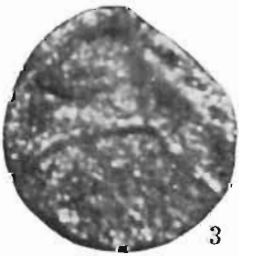

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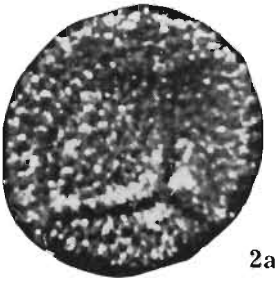

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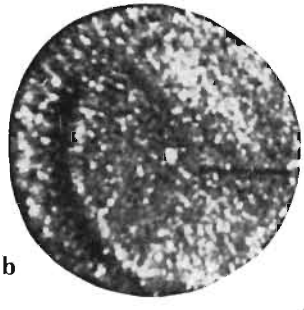

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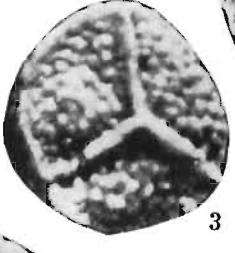
2b



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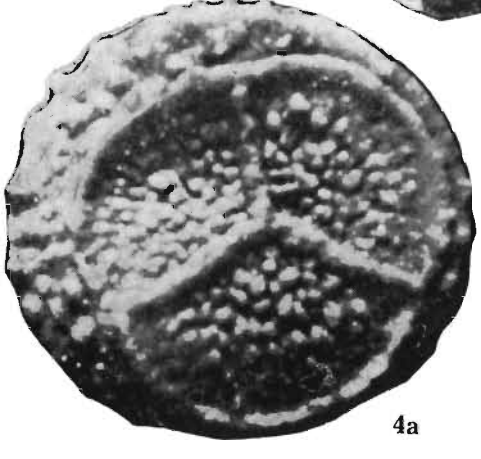

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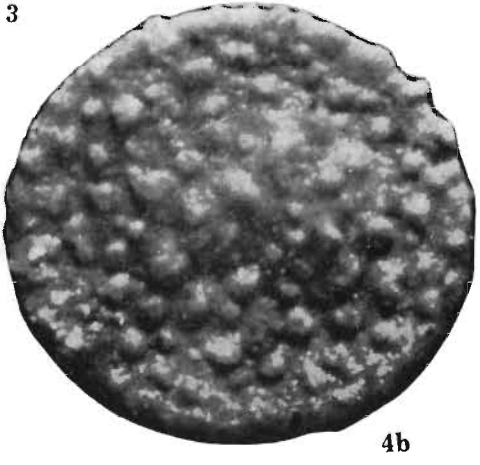

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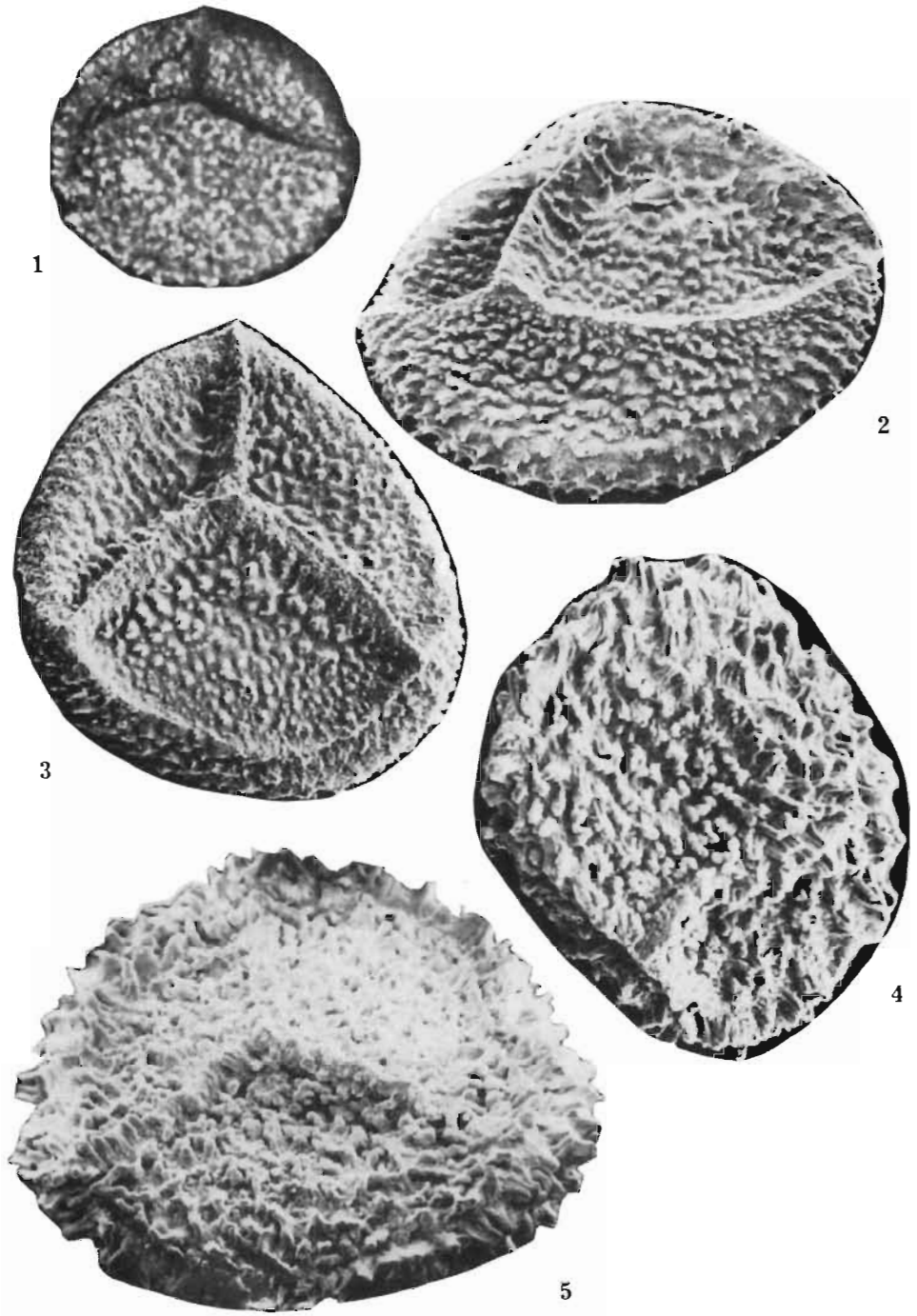
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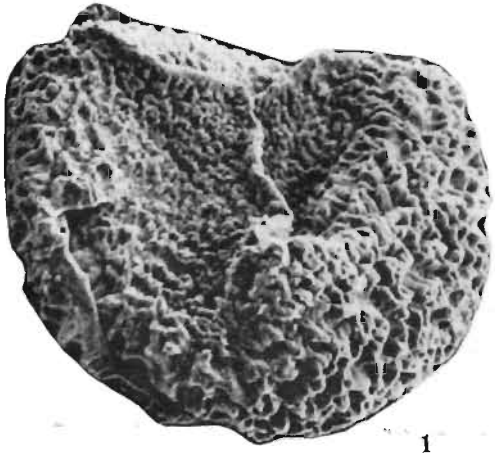

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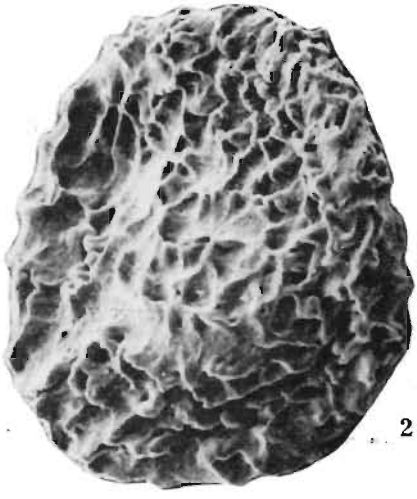

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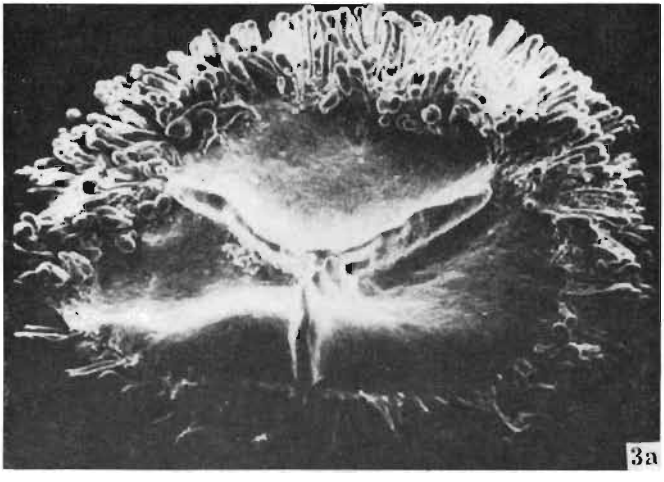

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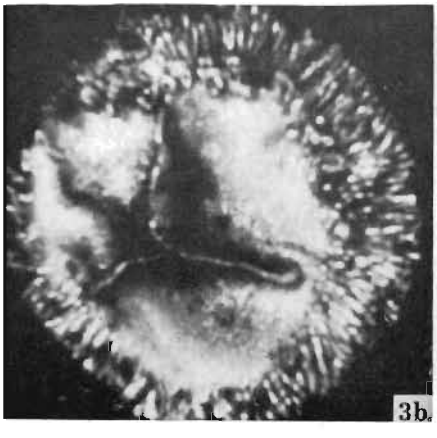

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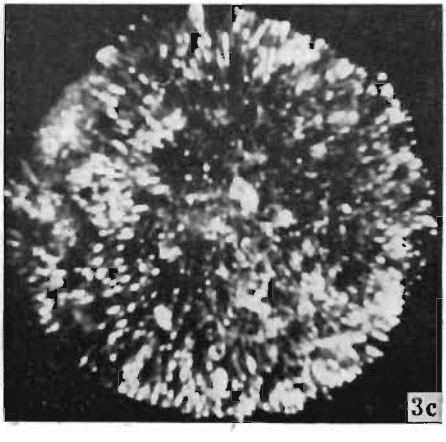

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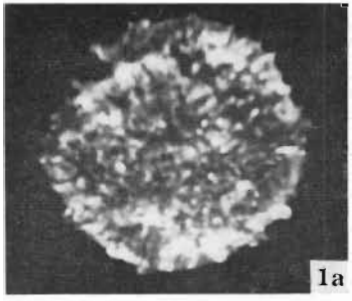
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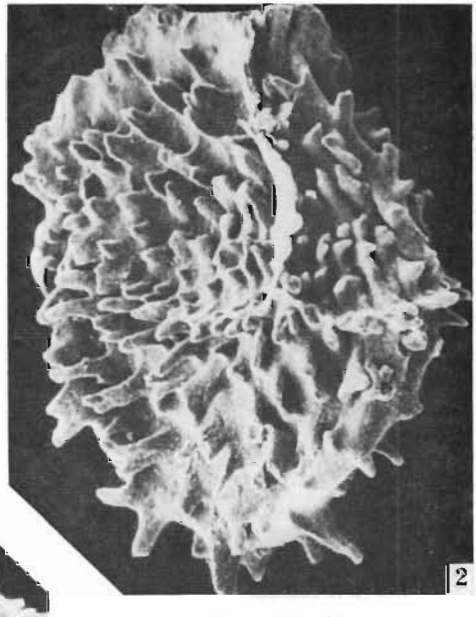
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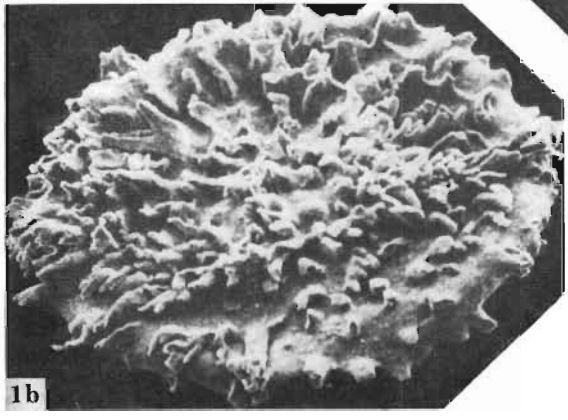
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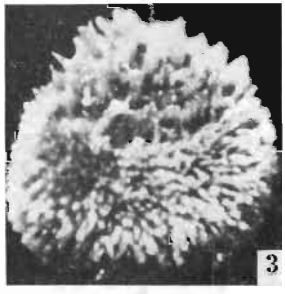
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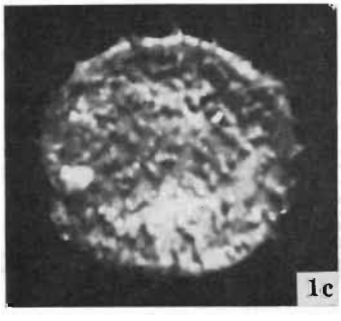
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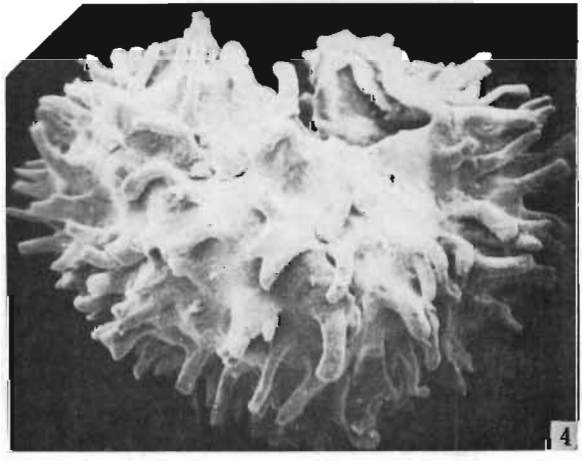
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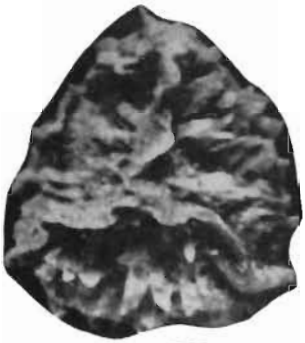

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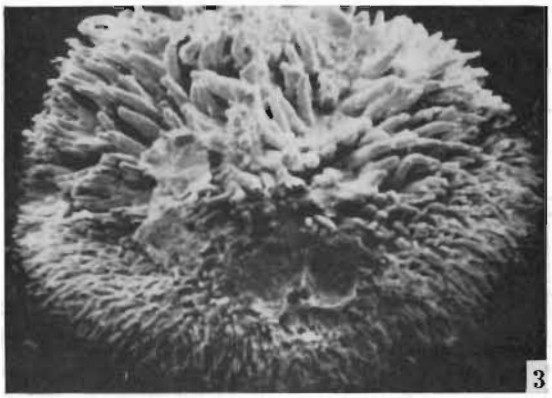

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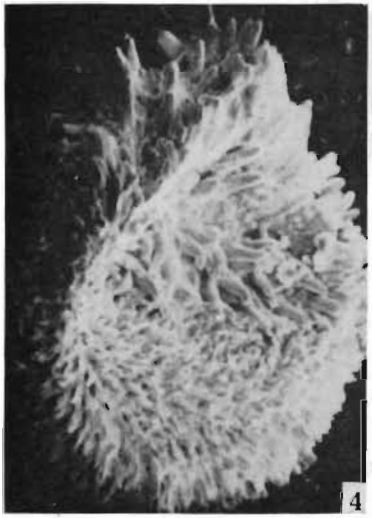

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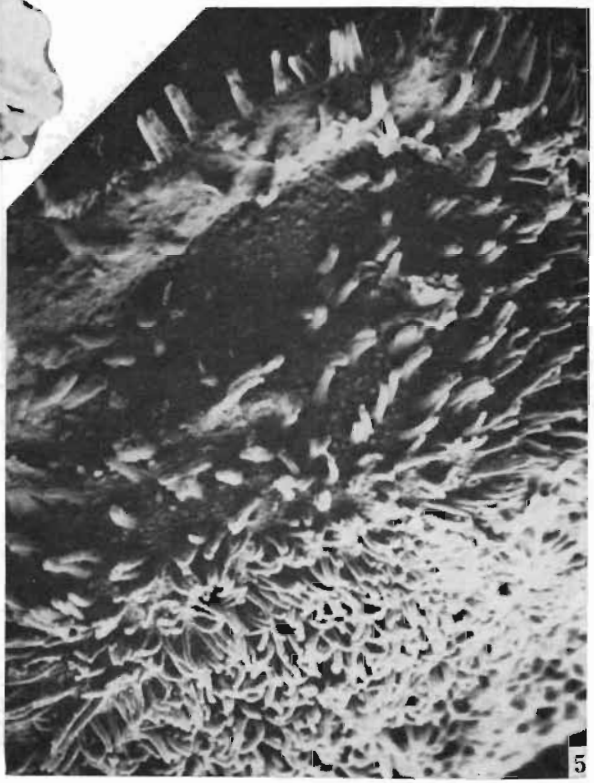

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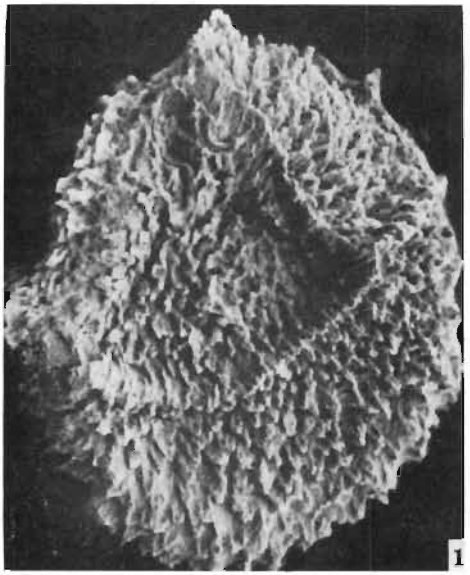
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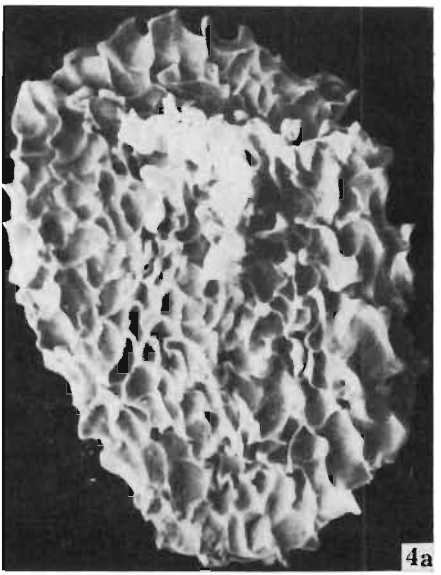
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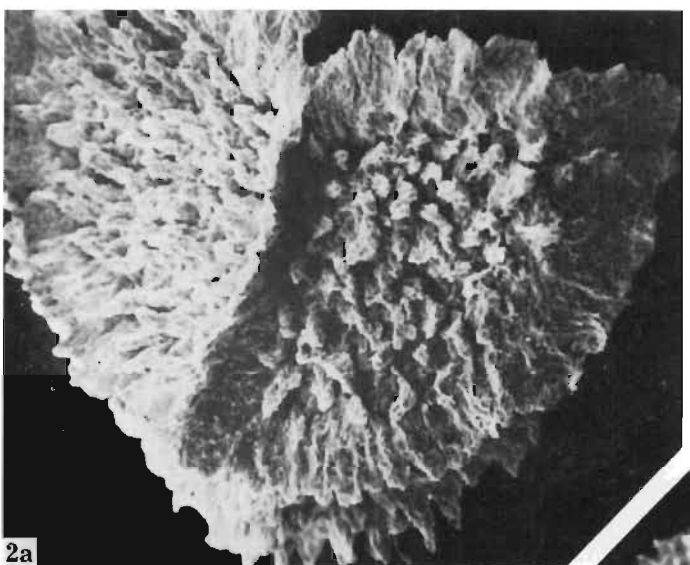
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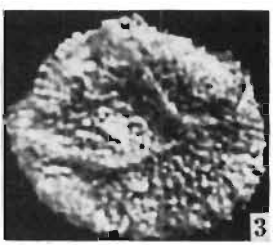
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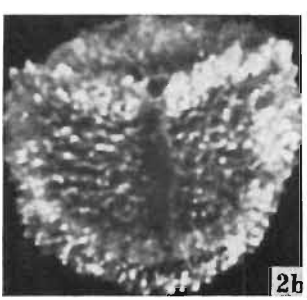
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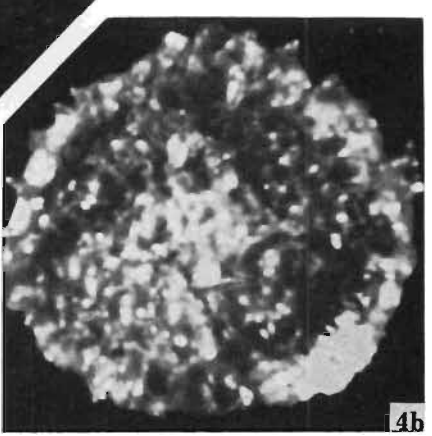
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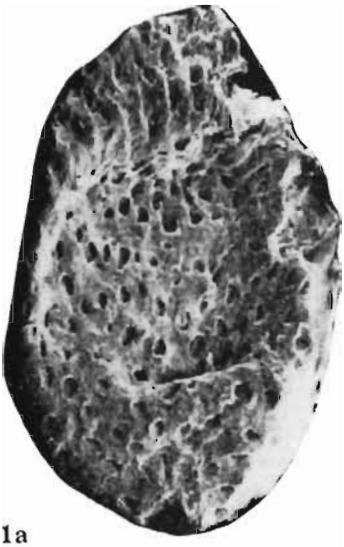

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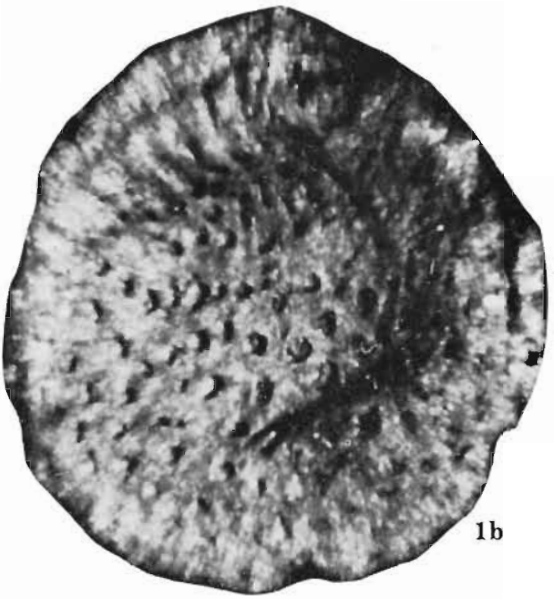

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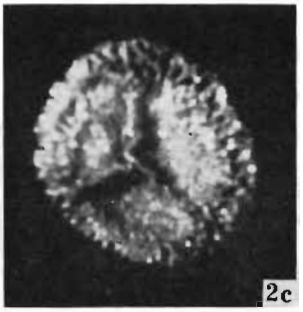

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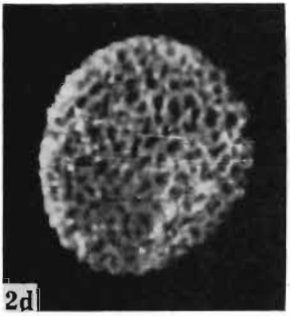

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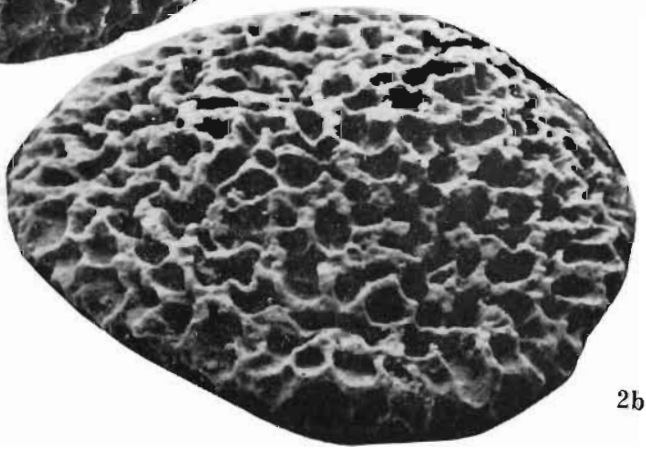

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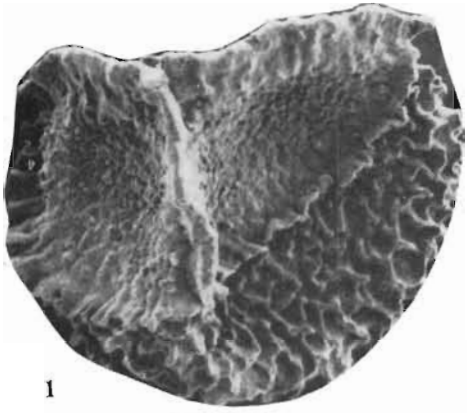

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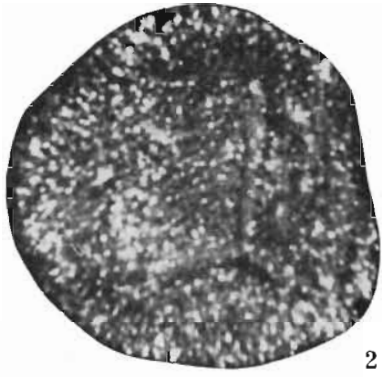

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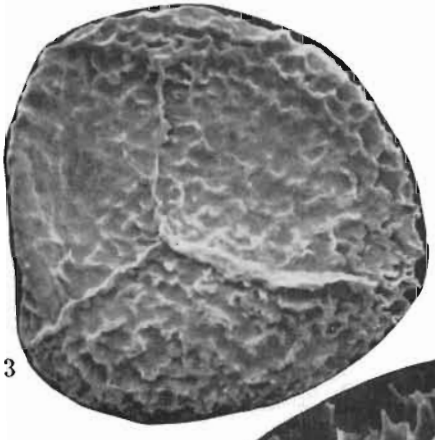

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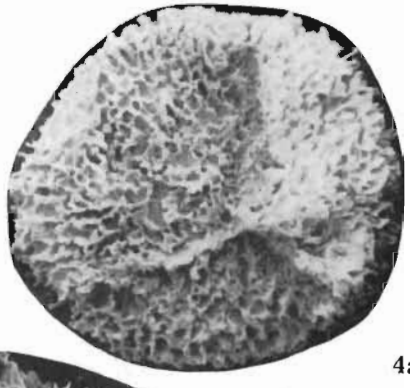

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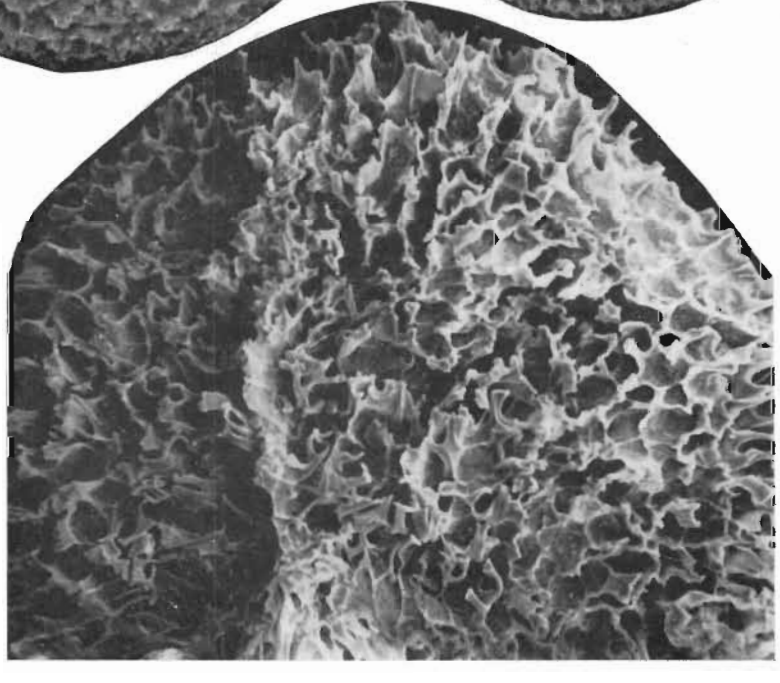

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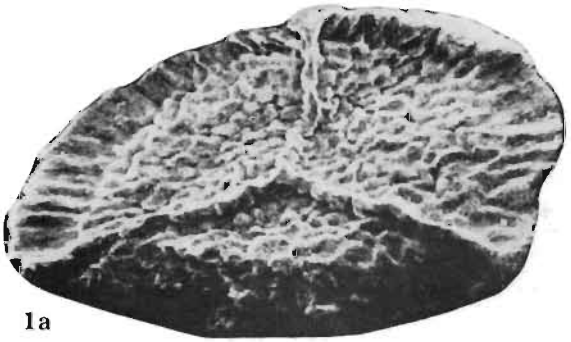

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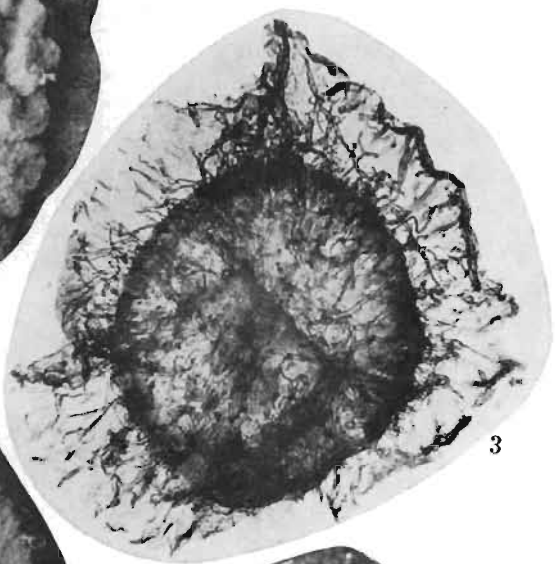

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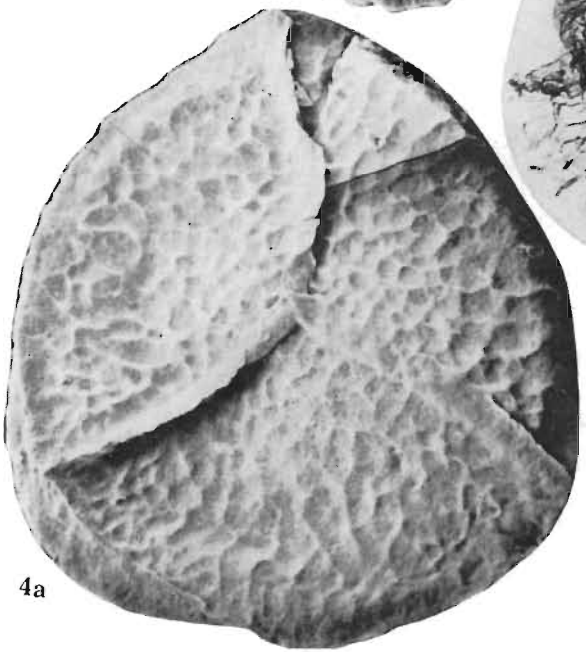

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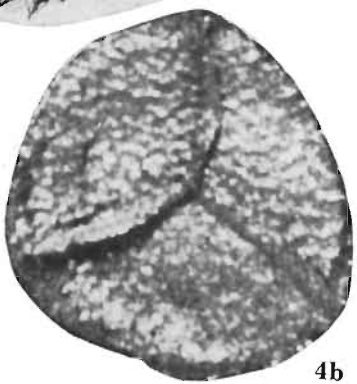

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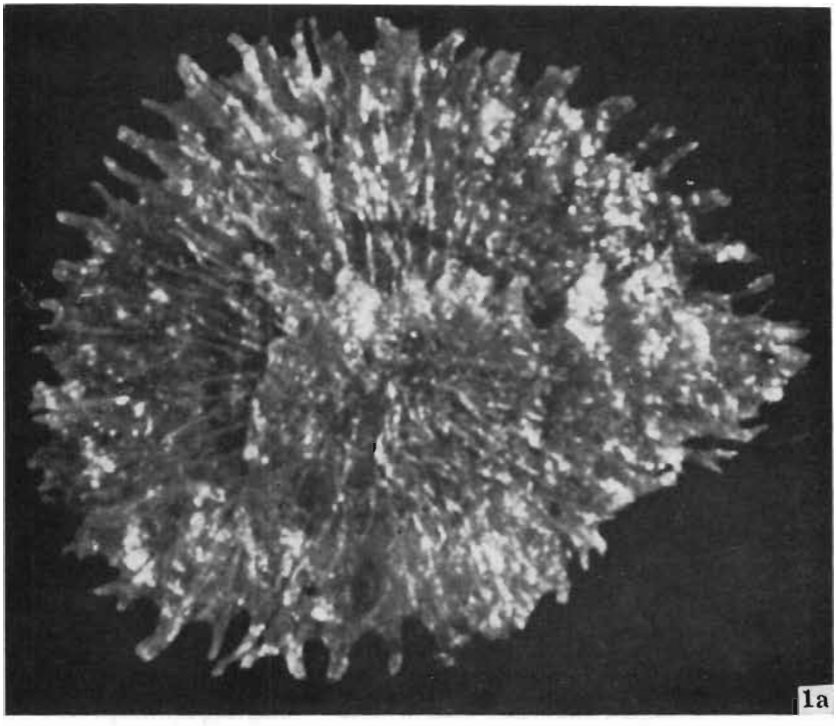

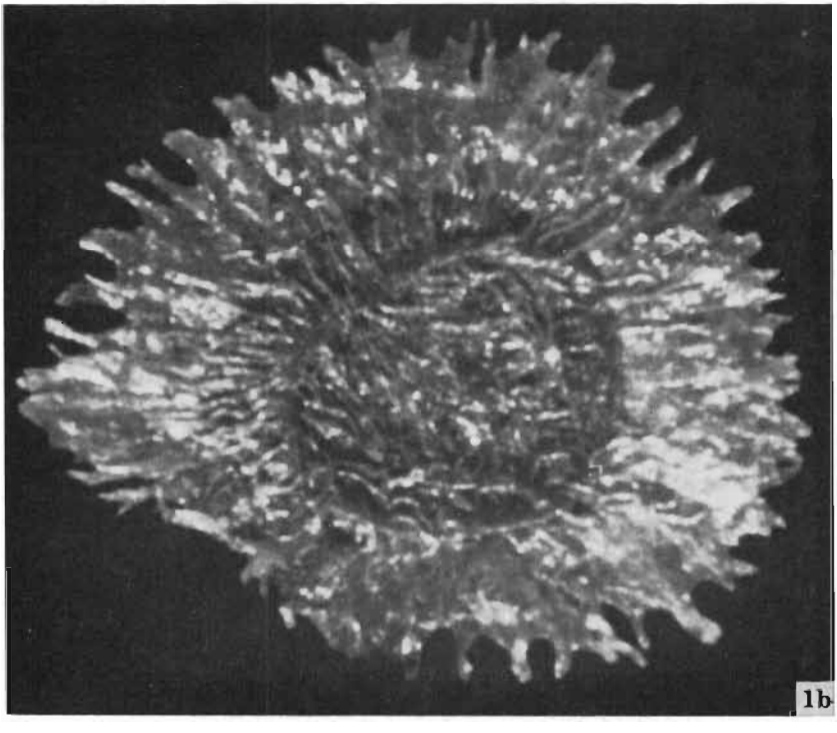

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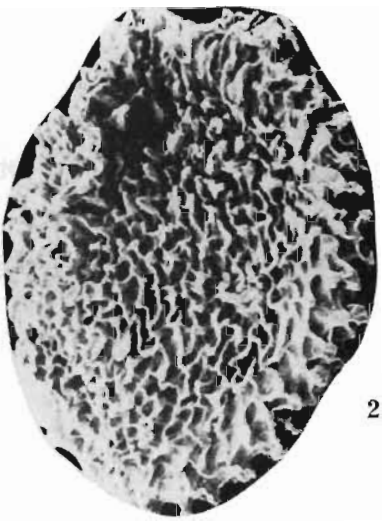

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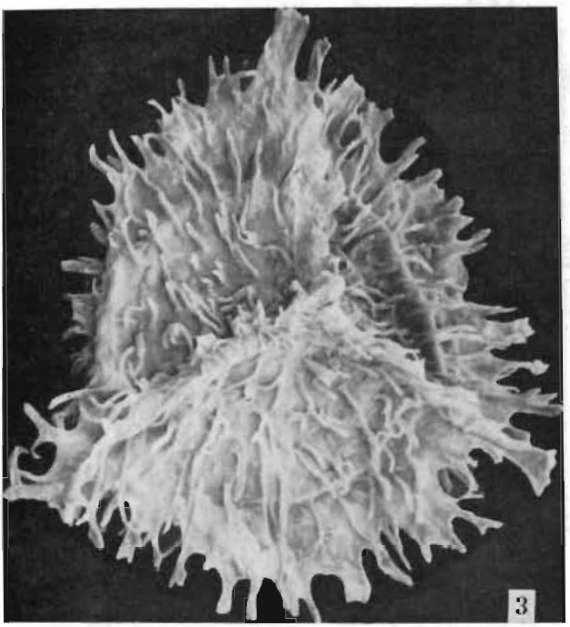

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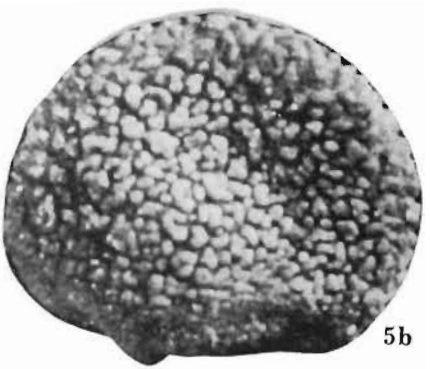

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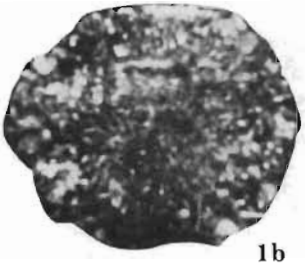

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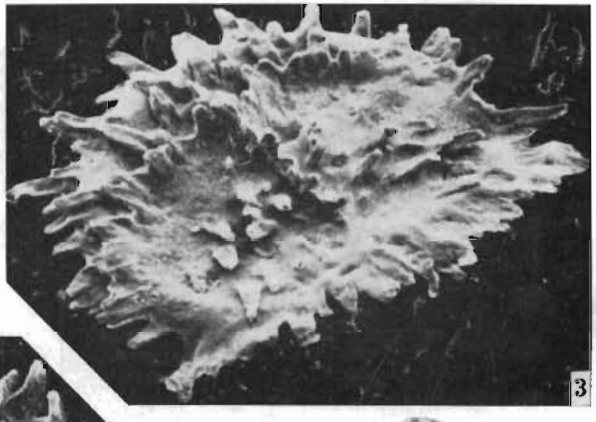

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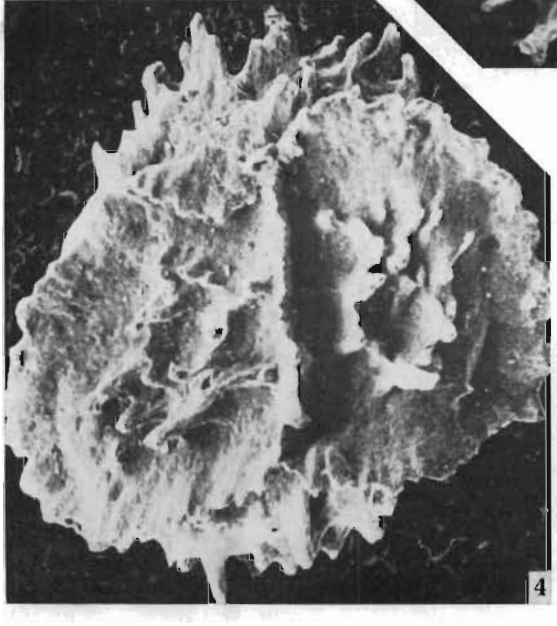

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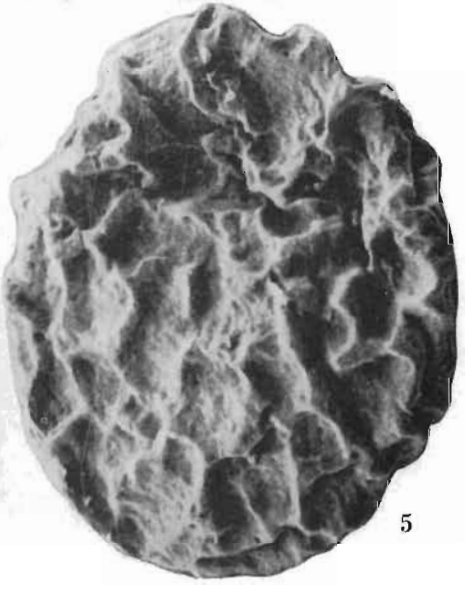

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