ROCZNIK POLSKIEGO TOWARZYSTWA GEOLOGICZNEGO
ANNALES DE LA SOCIÉTÉ GÉOLOGIQUE DE POLOGNE

Tom (Volume) XXXIX — 1969 Zeszyt (Fascicule) 1—3 Kraków 1969

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LARGE FORAMINIFERA FROM THE LUTETIAN OF THE LUKOVIT SYNCLINE (NORTHERN BULGARY)

(Pl. LI—LIII)

ЕМИЛ БЕЛМУСТАКОВ

Големи фораминифери от лютеса в Луковитската синклинала — Северна България

(Табл. LI—LIII)

INTRODUCTION

Large Foraminifera, mainly Nummulites found in Lutetian rocks of the Loukovit syncline are described in the present study.

The Lutetian rocks of the Lukovit syncline are lying in transgression on limestones of Maestrichtian and Thanetian age. They are developed in a flyschoid facies and display great similarity to coeval rocks occurring in the synclines of Mezdra, Gabrovo, and in many other areas in the Prebalkan and Stara Planina ranges. The Lutetian of the Lukovit syncline is divided into three lithologic complexes (Belmustakov, 1968)

top: massive sandstones and conglomerates,
middle: thick-bedded sandstones alternating with thin-bedded marls and clays
base: alternating thin-bedded sandstones and marls.

Marls are predominating in the basal complex, sandstones in the middle one, while in the top complex both vertical alternation and lateral passages characterize the relation between the sandstones and the conglomerates. The total thickness of the Lutetian rocks of the Lukovit syncline amounts to c. 400 m.

The Lutetian age of the described series was accepted by several authors (Belmustakov, 1959; Beregov, 1937, 1946; Zafirov, 1956). Karagiuleva (1960) assigned the lower and middle complex to the Upper Ypresian on the basis of a nummulite fauna. According to this author the sandstones and conglomerates of the upper complex belong probably to the Lutetian.

These ideas were recently supported by Boncev (1960).

The present author collected, during the past few years, a large number of Nummulites and other large Foraminifera at localities indicated by Karagiuleva, and carried out a revision of the fauna

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described by this author. These investigations proved that the lower and middle complex of the Palaeogene of the Lukovit syncline contain a typical Lower Lutetian assemblage of large Foraminifera, consisting of the following species:

Nummulites atacicus Leymerie (A, B)
Nummulites gallensis Heim (A, B)
Nummulites partschi de la Harpe (A)
Nummulites cf. millecaput Boubée (A)
Nummulites murchisoni Rütimeyer (B)
Nummulites laevigatus (Bruguière) (A, B)
Assilina laxispira (de la Harpe)
Discocyclina roberti H. Douvillé

DESCRIPTION OF SPECIES

Nummulites atacicus Leymerie

1846 *Nummulites atacicus*, Leymerie (23), p. 358—359, pl. XIII, fig. 13 a, b, c, d, e.
1911 *Nummulites atacicus*, Boussac (17), p. 28—32, pl. II, fig. 26; pl. III, fig. 15; Pl. LI, Fig. 5, 10
1929 *Nummulites atacicus*, Llueca (24), p. 104, pl. IV, fig. 2—10; pl. V, fig. 1—5.
1929 *Nummulites subatacicus*, Llueca (24), p. 104, pl. III, fig. 8; pl. IV, Fig. 11—15.
1955 *Nummulites atacicus*, Nemkov (25), p. 166—169, pl. III, fig. 7; pl. V, fig. 1—5; pl. XIII, fig. 1—2; pl. XIV, fig. 7—8.
1959 *Nummulites atacicus*, Belmustakov (2), p. 16, pl. I, fig. 4—6.
1959 *Numulites subatacicus*, Belmustakov (2), p. 17, pl. I, fig. 9—13.
1961 *Nummulites atacicus*, Nemkov et Barkhatova (26), p. 66—69, pl. VI, fig. 4—6 (A), 7—11 (B).
1967 *Nummulites atacicus*, Nemkov (27), p. 205—207, p. XXVI, fig. 9—10 (A), 11—17 (B); pl. XXVII, fig. 1—3 (B).

Megaspheric form (A)
Pl. LI, Fig. 5, 10

Small nummulite lenticular in shape. Diameter range 3—3.7 mm, thickness range 1.7—1.9 mm. Septal filaments radial, straight or slightly curved, S-shaped. The equatorial section displays a regular tight spire with a medium thick whorl-wall. Septa inclined, arched, slightly thicker at the basis. Chamber height slightly exceeding the length. There are 4 whorls on a radius of 1.8 mm. The number of septa in a quarter of a whorls is:

in the first whorl	3
in the second whorl	4.5
in the third whorl	6
in the fourth whorl	7

Diameter of proloculus range: 0.26—0.28 mm.

Microspheric form (B)
Pl. LI, Fig. 1—3

Shape and internal structure analogous with that of the megaspheric form. The diameter of the test ranges up to 10 mm, the thickness ranges up to 4 mm, Septal filaments strongly curved, S-shaped. There are 10 whorls on a radius of 4.5 mm. The aperture of the spire canal in the last whorl is narrower than in the preceding whorls. The character of septal filaments and of chamber is the same as in the megaspheric form. The number of septa in a quarter of a whorl is:

in the 3rd whorl 5
in the 4th whorl 6
in the 5th whorl 7
in the 6th whorl 7
in the 7th whorl . . . . 8—9
in the 8th whorl . . . . 8—9
in the 9th whorl . . . . 9—10
in the 10th whorl . . . . 10—11

Occurence: Berovtsi hamlet (Goliama Brestnitsa village) northern suburbs of Lukovit.
Stage: Lower Lutetian.

Nummulites gallensis Heim

1908 *Nummulites gallensis*, Heim (20), p. 233—236, pl. III, fig. 12—13; pl. IV, fig. 1—8; pl. V, fig. 1—40 (AB).
1931 *Nummulites gallensis*, Bieda (7), p. 9—10 (A, B).
1934 *Nummulites gallensis*, Bieda (8), p. 297—300 (A, B).
1956 *Nummulites lucasi*, Belmustakov (1), p. 12—18, pl. II, fig. 3—9 (A, B).
1959 *Nummulites lucasi*, Belmustakov (2), p. 26—27, pl. IV, fig. 8, 10—16 (A, B).
1967 *Nummulites gallensis*, Nemkov (27), p. 174—178, pl. XX, fig. 1—5, 7—9 (A, B).

Megaspheric form (A)
Plate LI, Fig. 7, 9

Megaspheric specimen lenticular in shape, thick, with rounded margin. The diameter varies from 3.5 to 5 mm, the thickness from 1.7 to 2.4 mm. Surface covered by radial septal filaments slightly curved. Granules of various size are situated on the septal filaments. They are more densely arranged and larger in the central part of the test. Occasionally a few large granules coalesce forming a white central spot.

Spire tight, the thickness of the whorl-wall reaching nearly the half of the channel width. Septa slightly inclined and somewhat curved. regularly spaced in the canal of the spiral. The height of the chambers slightly exceed the length in the first two whorls. In the third whorl (and occasionally in the fourth) the chambers are isometric, and normally in the fourth and fifth whorls their length exceeds the height. There is 5 whorls on a radius of 2.5 mm. The number of septa in a quarter of a whorl is:

in the 1st whorl . . . . 2—3
in the 2nd whorl . . . . 4—5
in the 3rd whorl 6
in the 4th whorl . . . . 6—7
in the 5th whorl . . . . 7—8

The diameter of the proloculus ranges from 0.4 — to 0.5 mm.

Microspheric form (B)
Pl. LI, Fig. 4, 6, 8, Pl. LII, Fig. 5

External features and internal structure are analogous with those of the megaspheric form. The diameter ranges from 5.5 to 8 mm, the thickness ranges from 2.8 to 3.6 mm. There are 9—10 whorls on a radius of 4 mm. The number of septa in a quarter of a whorl is:

in the 3rd whorl . . . . 4—5
in the 4th whorl 6

in the 5th whorl 7
in the 6th whorl . . . . 7—8
in the 7th whorl 8
in the 8th whorl . . . . 9—10
in the 9th whorl 10

Occurrence: Berovtsi hamlet (Goliama Brestnitsa village), northern suburbs of Lukovit, Lazar Stanevo and Petrevene villages.

Nummulites partschi de la Harpe

1934 *Nummulites partschi*, Bieda (8), p. 293—303, pl. 21, fig. 1—2.
1951 *Nummulites partschi*, Schaub (28), p. 140—151, text-fig. 12, pl. 3, fig. 157—183, pl. 4, fig. 3—9, 13—15.
1955 *Nummulites lucasi*, Nemkov (25), p. 184—188 (partim), pl. I, fig. 14—16, pl. II, fig. 1—11, pl. XIV, fig. 3, 4.
1956 *Nummulites lucasi*, Belmustakov (1), p. 17—18 (partim), pl. II, fig. 8, 9 (A).
1961 *Nummulites partschi*, Nemkov et Barkhatova (26), p. 85—91, pl. VIII, fig. 3—4 (A).
1967 *Nummulites partschi*, Nemkov (27), p. 186—188, Pl. XXIII, fig. 1—14, 17—20 (A).

Megaspheric form (A)
Pl. LI, Fig. 11—14, Pl. LII, Fig. 1

Test lenticular with roundel margin. Dimensions: diameter range 4—6 mm, thickness range 1.4—2 mm. Septal filaments radial, slightly curved, often branching towards the edge of the test. Large granules arranged in spiral on the septal filaments and their peripheral branches. Rarely smaller granules are present near the margin of the test between the septal filaments.

The equatorial section shows a rather regular spire, medium thick. The thickness of the spiral increase first slowly and regularly, on the level of the third and fourth whorl it remains constant, and decreases in the last whorl. Septa thin, slightly inclined, curved, crescent-shaped. In the internal whorls the septa are less inclined than in the external whorls. The height of the chambers exceeds the length in the first two whorls, while in subsequent whorls the chambers are isometric, or their length exceeds the height. There are 5 whorls on a radius of 2.5 mm. The number of septa in a quarter of a whorl is:

in the 1st whorl . . . 3
in the 2nd whorl . . . 5—6
in the 3rd whorl . . . 6—7
in the 4th whorl . . . 6—7

The diameter of the proloculus ranges from 0.3 to 0.4 mm.
Occurrence: Berovtsi hamlet (Goliama Brestnitsa village) northern suburbs of Lukovit.
Stratigraphic position: Lower Lutetian.

Nummulites cf. *millecaput* Boubée

1867 *Nummulites helvetica*, Kaufmann (22), pl. VIII, fig. 1—12.
1911 *Nummulites millecaput*, Boussac (17), p. 93.
1929 *Nummulites helvetica*, Llueca (24), p. 158—160.
1959 *Nummulites helveticus*, Belmustakov (2), p. 34 (A), pl. VIII, fig. 10—12.

1959 *Nummulites millecaput,* Bieda (11), pl. I, fig. 10 (A).
1960 *Nummulites millecaput,* Bieda, pl. III, fig. 2, 4, 5, (A).
1963 *Nummulites millecaput,* Bieda (14), p. 89—91, p. X, fig. 1—3 (A) PL; XV, fig. 3—5 (A).
1967 *Nummulites millecaput,* Nemkov (27), p. 130—134, pl. X, fig. 1—6 (A).

Megaspheric form (A)
Pl. LII, Figs. 2—4

Test lenticular with rounded margin. Dimensions: diameter range 4—4.5 mm, thickness range 1.9—2.4 mm. Septal filaments curved, vortex-like in the central region, and bent backwards in the periphery. Irregular swelling, more or less elongated are present on the septal filaments.

In the equatorial section appears a rather regular spire, medium thick. The thickness of the whorl-wall changes from whorl to whorl and within one whorl. The height of the spire decreases distinctly in the last whorl. The septa are thin, inclined towards the whorl-wall at their base, and strongly bent backwards. The upper posterior angle is acute and deep. The septa are not always regularly spaced. Some of them are irregularly bent. Chambers sickle-shaped their height exceeds markedly the length, with the exception of the last whorl, where they are isometric, or with length exceeding the heigth. There are 3 whorls on a radius of 2 mm. The number of septa in a quarter of a whorl is:

in the 1st whorl . . .	3
in the 2nd whorl . . .	5—6
in the 3rd whorl . . .	6—7

The diameter of the proloculus ranges from 1 to 1.2 mm.
Occurrence: northern suburbs of Lukovit, Berovtsi hamlet (Goliama Brestnitsa village).
Stratigraphic position: Lower Lutetian.

Nummulites murchisoni Rütimeyer (B)

1911 *Nummulites murchisoni,* Boussac (17), p. 23—25, pl. IV, fig. 6.
1919 *Nummulites murchisoni,* H. Douvillé (18), p. 67, pl. VI, fig. 5.
1929 *Nummulites murchisoni,* Llueca (24), p. 87—90, pl. II, fig. 5—7; pl. III, fig. 5—7.
1930 *Nummulites murchisoni,* Bieda (6), p. 166—167, pl. I, fig. 12.
1959 *Nummulites murchisoni,* Belmustakov (2), p. 32, pl. VIII, fig. 2—4, 6, 8, 9.
1961 *Nummulites murchisoni,* Nemkov and Barkhatova (26), p. 48—52, pl. III, fig. 7—8.
1962 *Nummulites murchisoni,* Zernetskiy, p. 39—41, pl. VII, fig. 1—3.
1967 *Nummulites murchisoni,* Nemkov (27), p. 122—123, pl. IV, fig. 7—11, 16, 17.

Microspheric form (B)
Pl. LII, Fig. 6

Test flat, with plane margin, slightly bulging in the central part. Dimensions: diameter range 7—10 mm, thickness range 2—2.5 mm. Septal filaments curved, S-shaped. In the equatorial section appears a thin whorl-wall, forming a loose spiral, the width of the whorls increases rapidly. Septa thin, perpendicular to the whorl-wall at their base, but higher curved, crescent-shaped. Chamber height exceeds largely the width. Some of the septa are folded. There are 4 whorls on a radius of 4.5 mm. The number of septa in a quarter of a whorl is:

in the 2nd whorl . . . 6—7
in the 3rd whorl . . . 8
in the 4th whorl . . . 9

Specimens of *N. murchisoni* from the Lukovit region differ from those of the Varna (Belmustakov, 1959) region by smaller size, more regular form of the test and rapid increase of whorl width.
Occurrence: Berovtsi hamlet (Goliama Brestnitsa village).
Stratigraphic position: Lower Lutetian.

Nummulites laevigatus (Bruguière) A et B

1911 *Nummulites laevigatus*, Boussac (17), p. 58—66, pl. II, fig. 1—9, 12, 13, 16—22 (AB)
1929 *Nummulites laevigatus*, Llueca (24), p. 185—188, pl. X, fig. 1—10; pl. XIV, fig. 6—10.
1929 *Nummulites lamarcki*, Llueca (24), p. 188—189, pl. X, fig. 11—13.
1951 *Nummulites laevigatus*, Bieda (9), pl. XIV, fig. 4, 5.
1956 *Nummulites laevigatus*, Belmustakov (1), p. 14—15, pl. I, fig. 8—10, 13.
1965 *Nummulites laevigatus*, Belmustakov (1), p. 15—16, pl. II, fig. 11—12.
1958 *Nummulites laevigatus*, Bieda (10), p. 847, pl. I, fig. 1, 2.
1959 *Nummulites laevigatus*, Belmustakov (2), p. 34—35, pl. VIII, fig. 13, 14, 17; pl. IX, fig. 1, 2, 9.
1959 *Nummulites lamarcki*, Belmustakov (2), p. 35, pl. VIII, fig. 15, 16, 18; pl. IX, fig. 3—6.
1966 *Nummulites laevigatus*, Blondeau (15), p. 910—912, pl. XXVIII, fig. 1, 4, 10, 24, 26, 27; pl. XXIX, fig. 36, 37, 40, 41, 42, 46, 48.
1967 *Nummulites laevigatus*, Nemkov (22), p. 147—151, pl. XIII, fig. 1—11; pl. XIV, fig. 1, 2.

Megaspheric form (A)
Pl. LII, Fig. 7

The lenticular, with rounded margin. A distinct medium tubercle is present in some specimens. Surface of test covered by a network of anastomosing septal filaments, which appear distinctly on the surface of the test near the margin. The septal filaments display there the presence of delicate transversal trabecules. The whole surface of the test is covered by irregular granules, usually situated on the septal filaments on their ramifications and intersections. The granules concentrate in the central part of the test surface.

The equatorial section shows a tight, regular spiral with a whole-wall of medium thickness. There are 5 whorls on a radius of 2 mm. Septa thin, perpendicular to the whorl wall, or slightly inclined at the base, and slightly bent backwards. The number of septa in a quarter of a whorl is:

in the 1st whorl . . . 3
in the 2nd whorl . . . 5—6
in the 3rd whorl . . . 7
in the 4th whorl . . . 8—9
in the 5th whorl . . . 9—10

The height of chambers slightly exceeds their lenght, or chambers are nearly isometric. Both types of chambers are present in a single specimen.

The diameter of the proloculus is 0.5 mm.

Microspheric form (B)
Pl. LII, Fig. 10—11; Pl. LIII, Fig. 1—2, 4—6

Test disc-shaped with rounded margin. In some specimens the test is bent at the periphery. The largest specimen reach a diameter of 12 mm and a thickness of 2.5 mm. The surface is covered by fine septal filaments anastomosing and intersecting, and forming a network of irregular often elongated chamberlets. Numerous granules of different shape and size are present on the septal filaments and especially on their intersections and ramification points. Granules situated between septal filaments are less frequent. Generally the periphery of the test is devoid or nearly devoid of granules. End of septal filaments with trabecules appear clearly there.

The internal structure is analogous with that of megaspheric forms. There are 12 whorls on a radius of 5 mm. The number of septa in a quarter of a whorl is:

in the 4th whorl . . .	6—7
in the 5th whorl . . .	7
in the 6th whorl . . .	8—9
in the 7th whorl . . .	8—9
in the 8th whorl . . .	9—10
in the 9th whorl . . .	11
in the 10th whorl . . .	14—15
in the 11th whorl . . .	15—16
in the 12th whorl . . .	15—16

The conspicuous variability in *N. laevigatus* is well known. The large material collected in the Lukovit region permitted to study the range of variation in shape of test, shape and size of granules, character of spiral and form of chamberlets. Besides convex lenticular tests, disc-shaped and distinctly flattened ones are present. In some specimens the whole surface of test is covered by granules of various shapes and sizes; others are devoid of granules on the last whorl, or display the presence of granules only in the central part of the test surface. With regard to the internal structure, besides forms with a tight spiral and chambers isometric or with lenght slightly exceeding the heigth (Plate LII, Figs. 10, 11) occur forms with a more loose spiral and chambers with heigth exceeding the length (Plate LIII, Fig. 2). However all passage forms between these extremes are observed.
Occurrence: northern suburbs of Lukovit, Berovtsi hamlet (Goliama Brestnitsa village) Petrevene and Lazar Stanove villages.
Stratigraphic position: Lower Lutetian.

Assilina laxispira (de la Harpe) (A et B)

1951 *Assilina douvillei*, Schaub (28), p. 212—214, text fig. 323, 327, 328; pl. 9, fig. 12—16, 20 (A)
1955 *Assilina laxispira*, Schaub (29), p. 409—413.
1960 *Assilina douvillei*, Bieda (13), p. 135—136, pl. VI, fig. 4, 6.
1961 *Assilina laxispira*, Nemkov et Barkhatova (26), p. 104—108, pl. IX, fig. 1 (A), 2—3 (B).
1967 *Assilina laxispira*, Nemkov (27), p. 254—255, pl. XL, fig. 1—9 (A), 10—12 (B).

Megaspheric form (A)
Pl. b III, Fig. 3, 7

Test disc- shaped, flat, with sharp margin. Dimensions: dia-

meter range 5—7.5 mm, thickness range 0.9—1.4 mm. Intermittent traces of septa are visible on the whole surface, with the exception of the central portion, where a few round tubercles are present. Small granules arranged in spiral are situated on the septa in the median part of the test surface.

The equatorial sections shows a tight regular spiral with a thin whorl-wall. There are 5 whorls in a radius of 3.5 mm. Septa perpendicular to the basal whorl-wall straight in their central part, and slightly curved in their upper part. Occasionally some septa are irregularly curved, and spaced at varying intervals. Chamber height slightly exceeding the length. The length of the chambers measured along the outer whorl-wall is slightly larger than that measured along the inner whorl-wall. The number of septa in a quarter of a whorls is:

in the 2nd whorl . . .	3—4
in the 3rd whorl . . .	6
in the 4th whorl . . .	6—7
in the 5th whorl . . .	7

Microspheric form (B)
Pl. LIII, Fig. 8

External features and internal structure similar to that of the megaspheric form. Dimensions: diameter range 9—12 mm, thickness range 1.3—2.2 mm. There are 8 whorls on a radius of 5 mm. The number of septa in a quarter of a whorl is:

in the 3rd whorl . . .	3—4
in the 4th whorl . . .	4—5
in the 5th whorl . . .	5
in the 6th whorl . . .	6
in the 7th whorl . . .	6—7
in the 8th whorl . . .	8—9

Besides typical *A. laxispira* forms, thicker specimens with tubercles and granules arranged in spiral and resembling strongly *A. placentula* (Deshayes) by their external apparition are present in the Lutetian strata of the Lukovit region. However their dimensions and internal structure do not differ from that of the described species.
Occurrence: Berovtsi hamlet (Goliama Brestnitsa village) northern suburbs of Lukovit Rumiantsevo and Lazar Stanevo villages.
Stratigraphic position: Lower Lutetian.

Discocyclina roberti H. Douvillé

Pl. LII, Fig. 8—9

1922 *Discocyclina roberti,* H. Douvillé (19), p. 72—73, pl. IV, fig. 10.
1929 *Discocyclina roberti,* Llueca (24), p. 290—291, pl. XXIII, fig. 29—36.
1954 *Discocylina roberti,* Schweighauser (30), p. 60, text fig. 45, pl. IX, fig. 8; Pl. X, fig. 12, 13.
1959 *Discocyclina roberti,* Belmustakov (2), p. 58, pl. XIX, fig. 3—5.
1963 *Discocyclina roberti,* Bieda (14), p. 123—124, pl. XX, fig. 5.

Test disc-shaped, with protruding median mamelon and broad flat periphery. Dimensions: diameter range 4—5 mm, thickness 1.4—1.9 mm (across the median mamelon). The median mamelon carries 3—10 large granules surrounded by 11—12 small lateral chamberlets, polygonal in

shape. A large number of small granules is present between the large ones, and on the remaining part of the surface of the test. They are encircled by lateral chamberlets identical in size and shape with those encircling the large granules.

The equatorial section shows a large proloculus nearly entirely surrounded by a second small embryonal chamber, circa twice as large as the proloculus (the embryonal apparatus is of the tribliolepidine type). The equatorial chambers of the three first whorls are larger than the chambers in the subsequent whorls.

Occurrence: Berovtsi hamlet (Goliama Brestnitsa village) northern suburbs of Lukovit.

Stratigraphic position: Lower Lutetian.

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РЕЗЮМЕ

Лютесът в Луковитско се разполага трансгресивно върху маастрихтските и танетските варовици. Развит е във флишоподобен фациес и има голямо сходство с лютеса в Мездренската синклинала, Габровската синклинала и редица разкрития в Предбалкана и Стара планина.

Лютесът в Луковитската синклинала се поделя отдолу нагоре на следните скални комплекси (3):

1. Алтернация от мергели и тънкопластови пясъчници.
2. Алтернация от дебелопластови пясъчници и тънкопластови мергели и глини.
3. Дебелопластови пясъчници и конгломерати.

В първия скален комплекс доминират мергелите, във втория — пясъчниците, а в третия пясъчниците и конгломератите се редуват помежду си във вертикална посока и преходят едни в други в страни.

Редица български геолози разглеждат описаните седименти като лютески

(2, 3, 4, 5, 28), а други отнасят долната, флишоподобна част на серията (първите два скални комплекса) към найгорната част на ипреса (16, 21).

Описаните в настоящата серия големи форамиифери са събрани от седиментите на първия скален комплекс. Те са следните:

Nummulites atacicus Leymerie (A, B)
Nummulites gallensis Heim (A, B)
Nummulites partschi de la Harpe (A)
Nummulites cf. *millecaput* Boubée (A)
Nummulites murchisoni Rütimeyer (B)
Nummulites laevigatus (Bruguière)
Assilina laxispira (de la Harpe)
Discocyclina roberti H. Douvillé

Тези фосили определят долнолютеска възраст на пластовете, които гисъдржат.

EXPLANATION OF PLATES

Plate LI

Fig. 1. *Nummulites atacicus* Leymerie (B), magnification 5X, Goliama Brestnitsa village
Fig. 2. *Nummulites atacicus* Leymerie (B), magnification 4X, northern suburbs of Lukovit
Fig. 3. *Nummulites atacicus* Leymerie (B), magnification 5X, Goliama Brestnitsa village
Fig. 4. *Nummulites gallensis* Heim (B), magnification 5.5X, Goliama Brestnitsa village
Fig. 5. *Nummulites atacicus* Leymerie (A), magnification 5X, Goliama Brestnitsa village
Fig. 6. *Nummulites gallensis* Heim (B), magnification 5.5X, Goliana Brestnitsa village
Fig. 7. *Nummulites gallensis* Heim (A), magnification 6X, northern suburbs of Lukovit
Fig. 8. *Nummulites gallensis* Heim (B), magnification 4.5X, Goliama Brestnitsa village
Fig. 9. *Nummulites gallensis* Heim (A), magnification 6X, Goliama Brestnitsa village
Fig. 10. *Nummulites atacicus* Leymerie (A), magnification 6X, Goliama Brestnitsa village
Fig. 11. *Nummulites partschi* de la Harpe (A), magnification 6.5X, northern suburbs of Lukovit
Fig. 12. *Nummulites partschi* de la Harpe (A), magnification 6X, Goliama Brestnitsa village
Fig. 13. *Nummulites partschi* de la Harpe (A), magnification 5X, Goliama Brestnitsa village
Fig. 14. *Nummulites partschi* de la Harpe (A), magnification 5X, northern suburbs of Lukovit

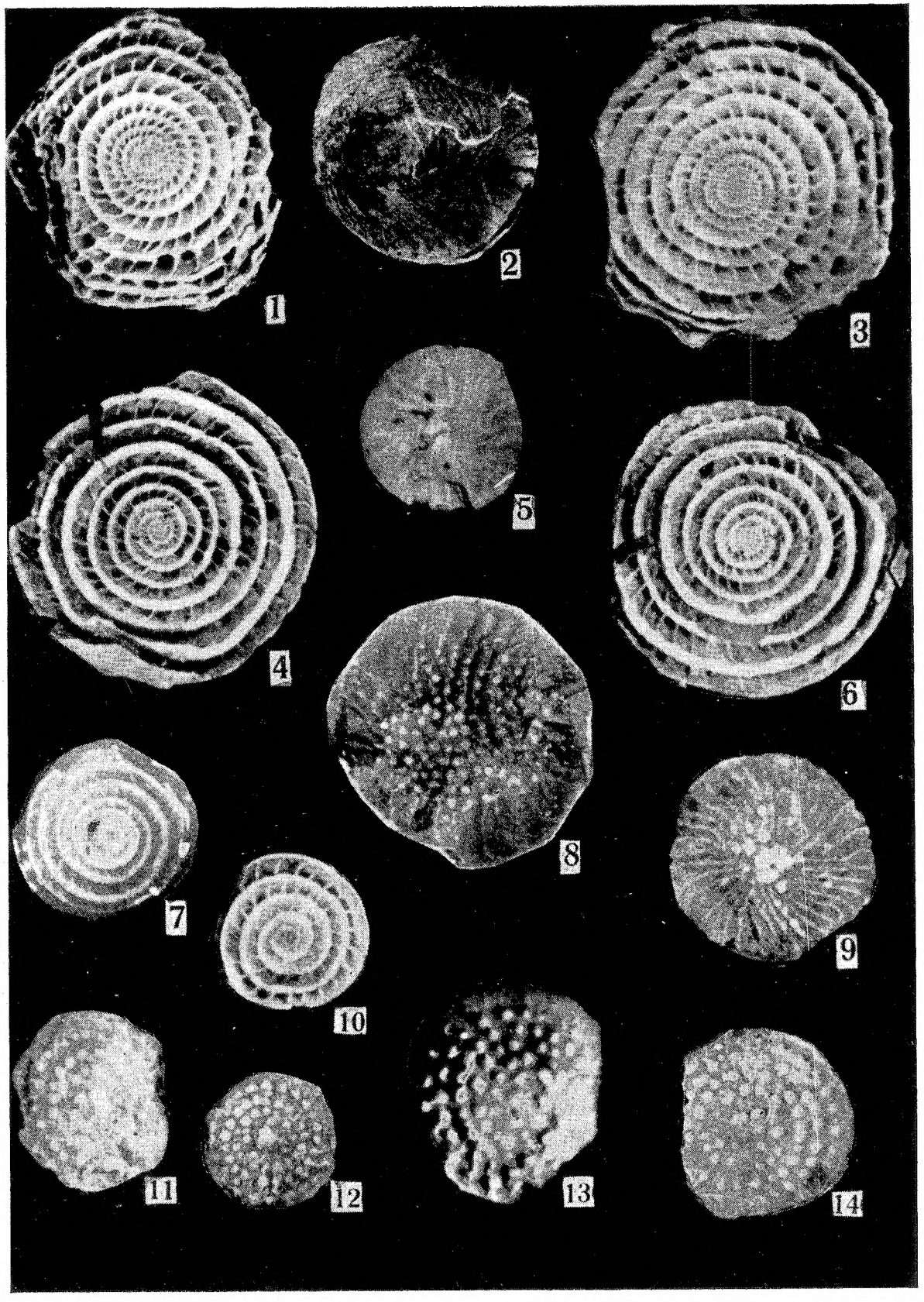
Plate LII

Fig. 1. *Nummulites partschi* de la Harpe (A), magnification 5.5X, Goliama Brestnitsa village
Fig. 2. *Nummulites* cf. *millecaput* Boubé (A), magnification 6X, Goliama Brestnitsa village

Fig. 3. *Nummulites cf. millecaput* Boubée (A), magnification 6×, northern suburbs of Lukovit
Fig. 4. *Nummulites* cf. *millecaput* Boubée (A), magnification 6×, Goliama Brestnitsa village
Fig. 5. *Nummulites gallensis* Heim (B), magnification 5.5×, northern suburbs of Lukovit
Fig. 6. *Nummulites murchisoni* Ruetimeyer (B), magnification 5×, Goliama Brestnitsa village
Fig. 7. *Nummulites laevigatus* (Brugière) (A), magnification 6×, Goliama Brestnitsa village
Fig. 8. *Discocyclina roberti* H. Douvillé, magnification 6×, northern suburbs of Lukovit
Fig. 9. *Discocyclina roberti* H. Douvillé, magnification 6×, Goliama Brestnitsa village
Fig. 10. *Nummulites laevigatus* (Bruguière) (B), magnification 6×, Goliama Brestnitsa village
Fig. 11. *Nummulites laevigatus* (Bruguière) (B), magnification 5.5×, northern suburbs of Lukovit

Plate LIII

Fig. 1. *Nummulites laevigatus* (Bruguière) (B), magnification 5.5×, Goliama Brestnitsa village
Fig. 2. *Nummulites laevigatus* (Bruguière) (B), magnification 5.5×, Goliama Brestnitsa village
Fig. 3. *Assilina laxispira* (de la Harpe) (A), magnification 5×, Goliama Brestnitsa village
Fig. 4. *Nummulites laevigatus* (Bruguière) (B), magnification 6×, northern suburbs of Lukovit
Fig. 5. *Nummulites laevigatus* (Bruguière) (B), magnification 4×, northern suburbs of Lukovit
Fig. 6. *Nummulites laevigatus* (Bruguière) (B), magnification 5×, Goliama Brestnitsa village
Fig. 7. *Assilina laxispira* (de la Harpe) (A), magnification 4×, northern suburbs of Lukovit
Fig. 8. *Assilina laxispira* (de la Harpe) (B), magnification 4×, Goliama Brestnitsa village



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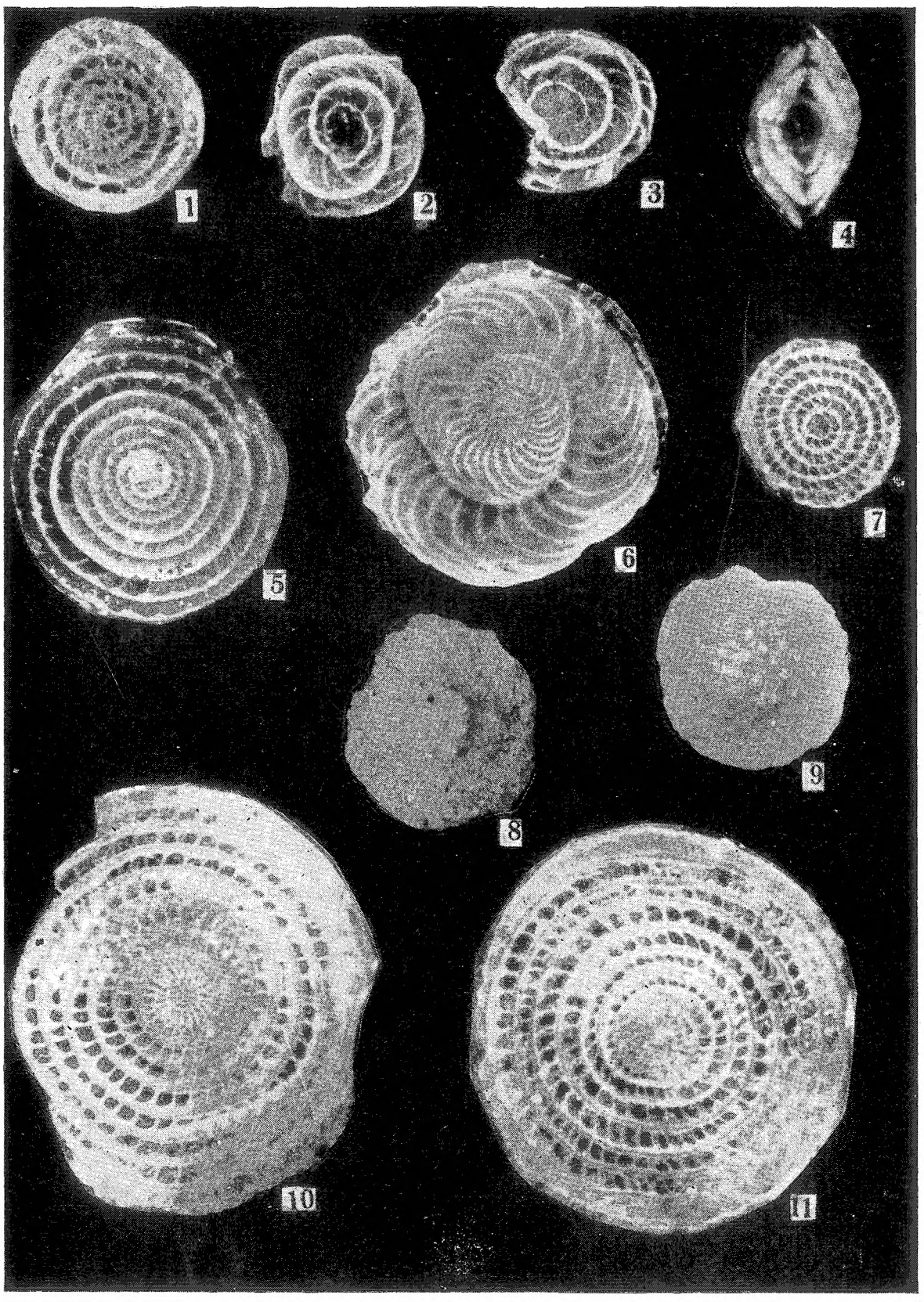

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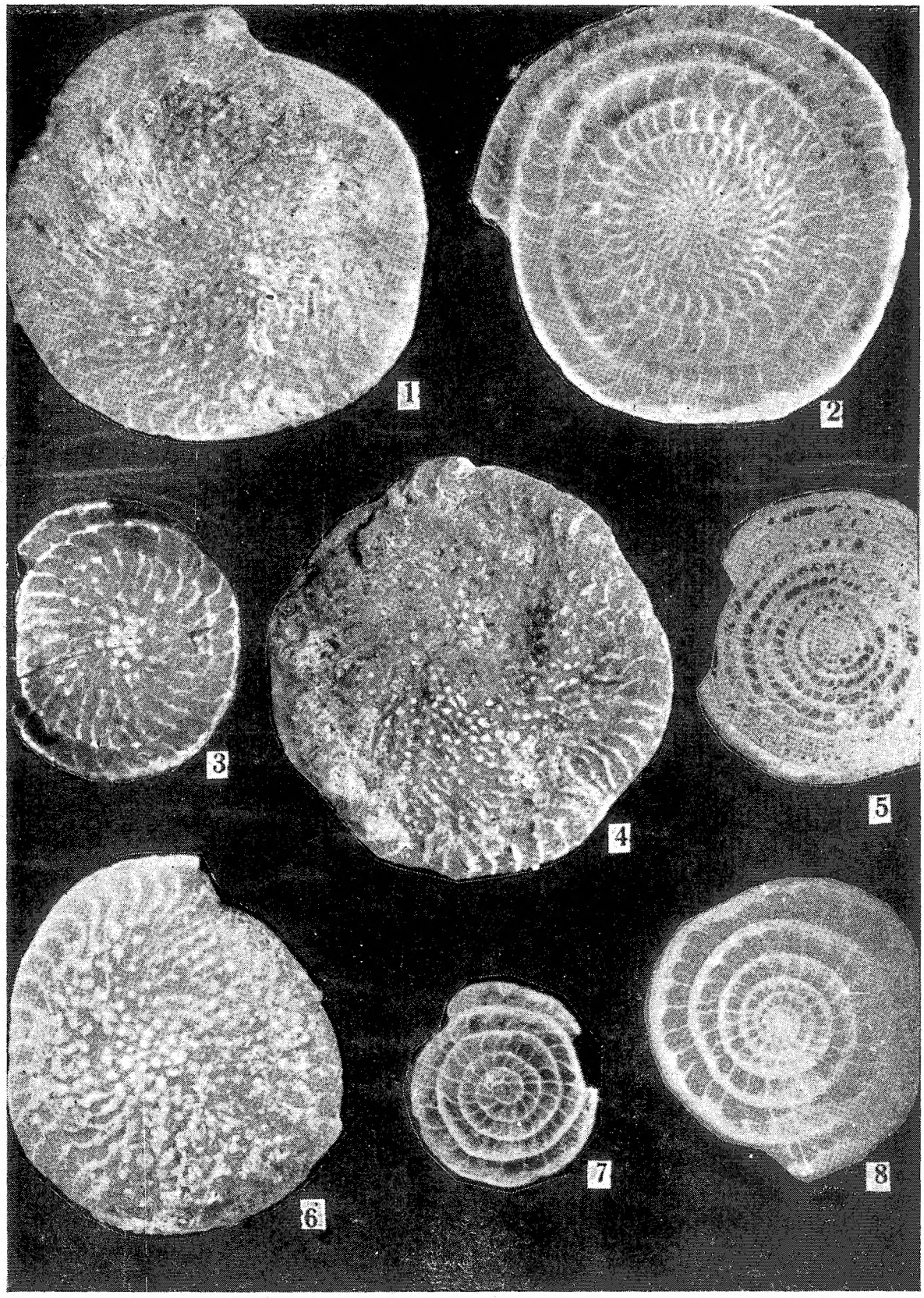

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