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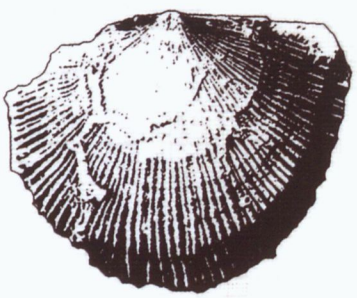
Madis Rubel



Fossilia Baltica **4**

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Abstract

Silurian brachiopods of six orders occurring in Estonia are reviewed, with references to comparative material mainly from the Gotland Island of Sweden, United Kingdom, Anticosti Island of Canada and the subsurface of Lithuania. Estonian material originates from over fifty outcrops and several tens of drillcores penetrating the Silurian succession. Of 78 species, one belongs to order Dictyonellida, 27 to Strophomenida (1 new), 3 to Productida, 8 to Orthotetida, 4 to Protorthida (1 new) and 35 to Orthida (2 new). The new species are *Leptaenoidea biohermica*, *Skenidioides petrasi, Ptychopleurella transversa* and *Mendacella circularis*.

Key words: Brachiopoda, Silurian, Estonia, Lithuania, Dictyonellida, Strophomenida, Productida, Orthotetida, Protorthida, Orthida.

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Edited by Tõnu Meidla and Ivar Puura

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CONTENTS

INTRODUCTION

Silurian brachiopods from Estonia are known since the nineteenth century (Verneuil, 1845; Eichwald, 1860; F. Schmidt, 1858, 1908; Wysogorski, 1900). Descriptions of these brachiopods by many subsequent authors (Teichert, 1928; Rosenstein, 1939, 1940; H. Schmidt, 1954: Rubel, 1962a, 1962b, 1963, 1970, 1977a, 1977b; Rubel & Modzalevskaya, 1967; Modzalevskaya, 1985; Rubel & Rozman, 1977, Boucot et al., 1971; Copper, 1977 and others) are mostly based on the outcrop material, collected from the former shelf area of the Baltic Silurian Basin. Studies of the brachiopods from the Silurian subsurface, comprising more deepwater slope and basinal facies, were started in Latvia and in Lithuania in 1960s (Paškevičius, 1962; Rybnikova, 1966, 1967, Rubel, 1971, Hints, 1979, 1986; Popov, 1981; Musteikis & Puura, 1983 and others). The systematic list of the Silurian brachiopods from the Baltic area, published in 1984, comprises 223 species (Rubel et al., 1984). Numerous papers were dealing with synecology (communities, benthic associations) as well as with temporal succession (zonation) of these brachiopods (Rubel, 1970, 1982; Kaljo & Rubel, 1982, Musteikis, 1989, 1991, 1993, Musteikis & Jushkute, 1999; Musteikis & Paškevičius, 1999; Männil & Rubel, 1999). A number of subsequent studies contain monographic descriptions of some smaller groups of Silurian brachiopods from the Baltica continent in different countries (Baarli, 1988, 1995; Musteikis & Modzalevskaya, 2002; Musteikis & Cocks, 2004; Modzalevskaya & Pushkin, 2007, Copper, 2004).

The present paper is summarizing the Silurian brachiopods of the orders Dictyonellida, Strophomenida, Productida, Orthotetida, Protorthida and Orthida from Estonia, including 78 revised and new species. Systematics in this paper follows the classification of brachiopods by Williams et al. (2000). In justified cases, synonymies (with the indication of types) and remarks to the previously described species are accompanied by longer descriptions. All species are illustrated in 34 plates. Most of the figured specimens belong to the previously unpublished collections.

Stratigraphic distribution of the species in the Estonian outcrops and core sections (paragraphs 'occurrence' and 'localities') is described in terms of the regional stratigraphical standard and tied to global geochronology. In addition, material from the Kalvarija and Girdžiai-50 cores in Lithuania was used in this paper, mainly for illustration purposes, but the relevant distribution data were included as well.

The aim of the present paper is the revision of a large brachiopod material collected during the past 50 years from more than one hundred drill cores penetrating. the Silurian of Estonia. This study gains remarkable benefits from the revisions of same brachiopod groups in the neighbouring areas (Musteikis & Cocks, 2004; Bassett, 1979; Baarli, 1995) and some comparative materials mostly from Lithuania, the Gotland Island (Sweden), the Anticosti Island (Canada) and United Kingdom. In the Llandovery and Wenlock rocks of Estonia, brachiopods are very abundant, especially the orders considered in this paper. This makes Estonia a key area for taxonomic studies, where morphological identity of a species can also be validated according to spatial and temporal distribution of the specimens belonging to this species (like, for example, in Hurst & Watkins, 1978, Musteikis & Puura, 1983, Temple, 1987 or Hoel, 2007).

The figured brachiopods are deposited at the Institute of Geology at Tallinn University of Technology (GIT) and the Museum of Natural History, University of Tartu (TUG), and all the studied brachiopods are listed in the online database of Estonian geological collections (*geokogud.gi.ee*).

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GEOLOGICAL SETTING AND STRATIGRAPHIC DISTRIBUTION OF BRACHIOPODS

In the Silurian, the Baltica Palaeocontinent was situated in equatorial latitudes, drifting northwards (see Torsvik & Cocks, 2005). The Silurian rocks of Estonia comprise shelf to lagoonal carbonates and slope to basinal argillites, deposited in the eastern part of the pericontinental Baltic Silurian Basin. Palaeogeography of this basin in the Homerian epoch is shown in the Figure 1. Due to the southward inclination of the crystalline basement and sedimentary succession, progressively younger beds of the Silurian crop out successively towards south and south-west (see Figure 2 and Table 1). In south Estonia the subsurface Silurian strata are overlain by the Devonian rocks (Text-fig. 2).

The Silurian succession in Estonia is rather complete, but includes numerous sedimentary gaps, especially in the shelf area. The gaps can be traced according to palaeontological or sedimentological data (text-fig. 3). The strata are subdivided into ten regional stages, which comprise a traditional regional subdivision of the exposed formations in the fossil rich shelf zone. Only three stages have their lower boundaries properly defined using regional stratigraphic sections and points (see Table 2 and Nestor, 1997). Only the five older Estonian regional stages are used across the whole eastern Baltic area by some authors (see Paškevičius, 1997). Indices of the stages and formations are used mostly in accordance with the former practice (e.g. Nestor, 1997) and explained in Figure 3.

The last version of the international Silurian standard time scale is dated in My using the upgraded global graptolite composite (Sadler et al., 2009). The time scale involves the graptolite and conodont zones which can be used for dating most of the Estonian regional stages (see Cramer et al., 2010). In spite of that, the position of regional stages in the time scale, as well as the sedimentary gaps in the rock succession, should be taken just as a rough approximation. Stratigraphic distribution of the studied brachiopods is summarised in Table 3. The brachiopod species treated in this volume were more abundant in the shallow shelf and slope deposits, in the communities which occur from the Juuru (G_{1-2}) to the Raikküla (G_3) Stage, in the interval from the topmost Adavere (H) to the Jaagarahu (J_2) Stage, and an interval from the Paadla (K_2) to the Ohesaare (K_4) Stage. Most of the Adavere Stage in the same area is predominantly characterized by the *Pentamerus* and *Stricklandia* communities (the taxa not considered in this volume). The deep water brachiopods of the studied orders have longer and less discontinuous ranges. The distribution of the same brachiopod taxa in the formations is influenced by the facies and time-related controlling factors (Table 2), as the succession of formations in this table only partly reflects spatial and temporal relationships of the formations. According to facies-related distribution, two main groups of brachiopods are distinguished in this table: (1) the species of basinal facies, (2) those from various shallow shelf facies, including reefs.

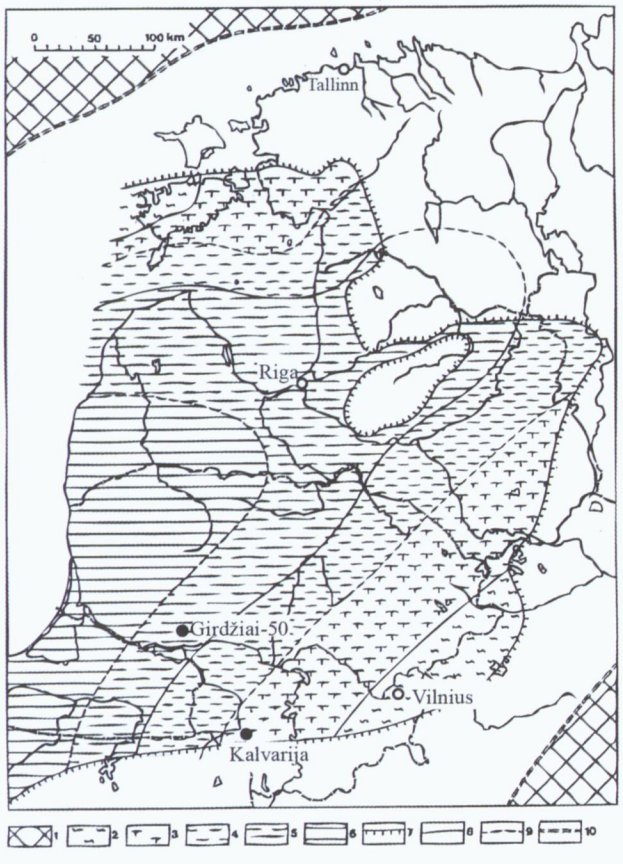

Figure 1. Distribution of rocks and facies belts in Homerian time in the Baltic Silurian Basin (modified from Nestor & Einasto, 1997).
1 – land, 2– bioclastic calcareous mud, 3 – argillaceous–calcareous mud, 4 – green terrigenous mud, 5 – grey terrigenous and dark terrigenous muds with graptolites, 7 – boundary of the present extension of rocks, 8 – main facies boundaries, 9 – boundary of sediment types, 10 – shoreline. Black circle - borehole.

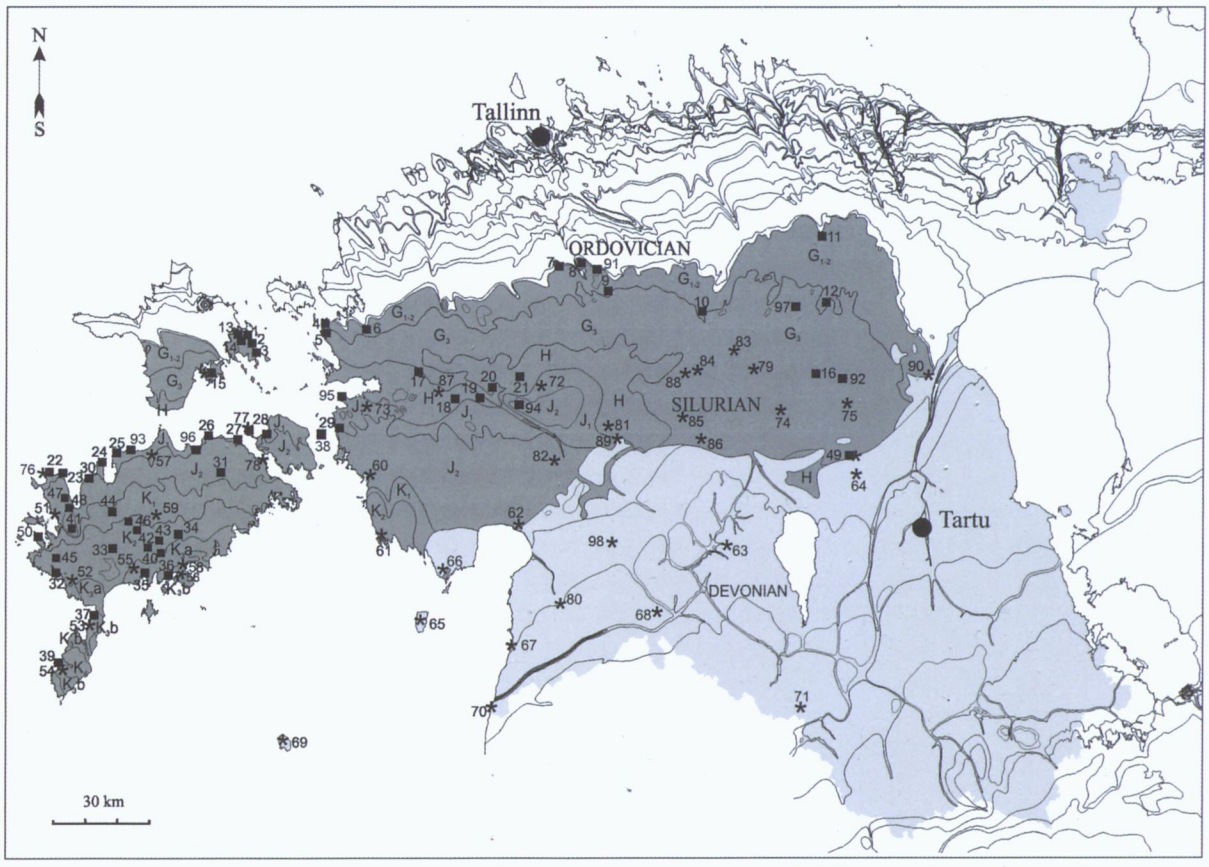

Figure 2. Bedrock geological map of Estonia with outcrop belts of the Silurian regional stages (dark grey area). The subsurface Silurian in Estonia (outcrop belt of the Devonian) is shown in light grey. For indexation of the Silurian stages and formations see Figure 3. The main outcrops (black squares) are listed in the Table 1, boreholes (asterisks) and stratigraphy of the core sections in the Table 2. For the location of the Kalvarija and Girdžiai boreholes in Lithuania see Figure 1.

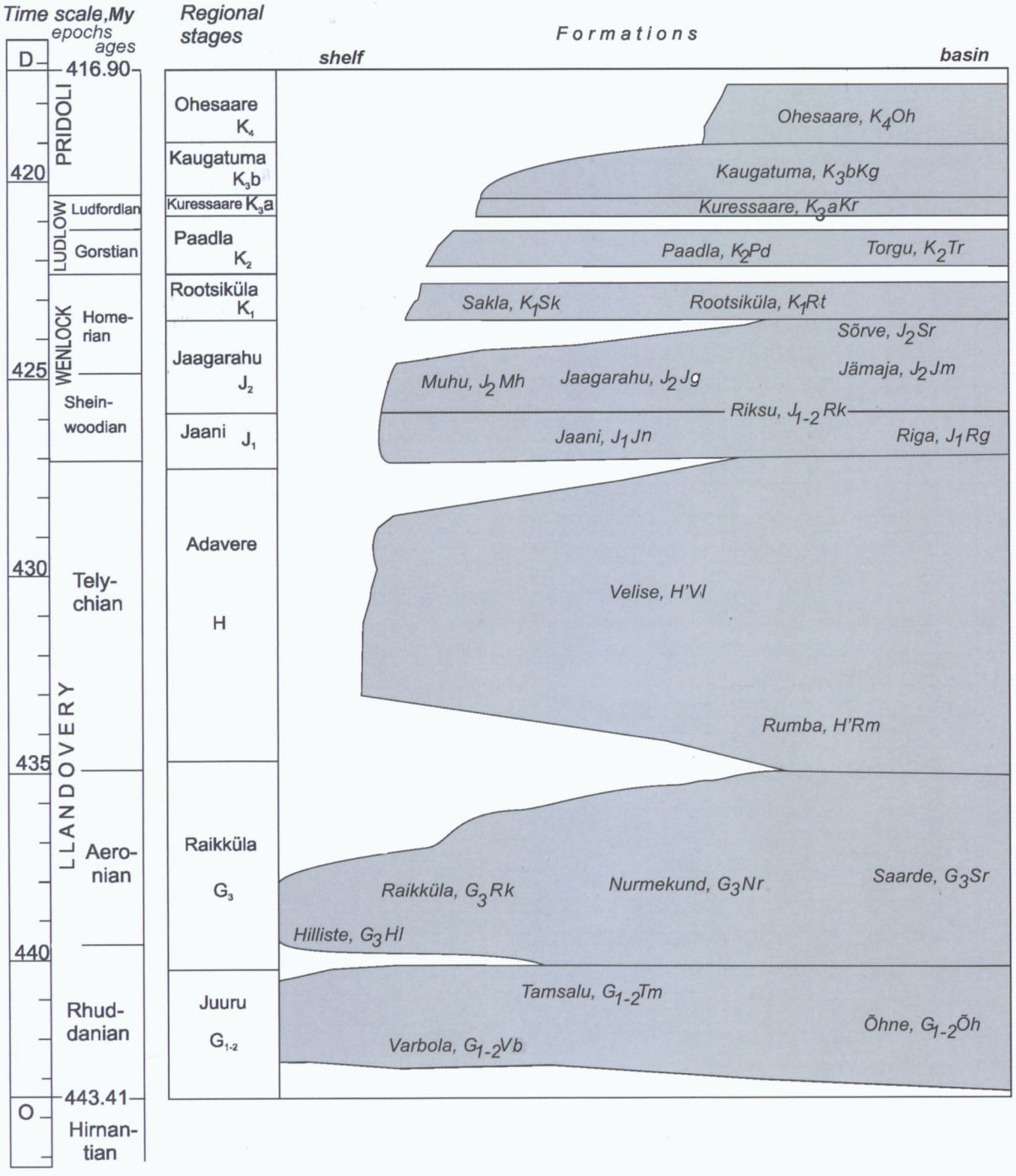

Figure 3. The Silurian regional standard (stages) and formations (right), correlated with the global standard by Cramer et al. 2010 and with the calibrated Silurian time scale (after Sadler et al., 2009).

Table 1. List of Silurian bedrock exposures shown in the Figure 2. See Figure 3 for formation names.

■ no	Locality	Coordinate N	Coordinate E	Remarks	Formations
1	Vahtrepa	58° 57′ 12″	23° 02′ 25″	ditch	$G_{1-2}Vb$
2	Helterma	58° 52′ 16″	23° 02′ 14″	beach	G_3Hl
3	Sarve	58° 51′ 02″	23° 02′ 58″	beach	G_3Hl
4	Kiltsi	58° 55′ 07″	23° 31′ 54″	quarry	$G_{1-2}Vb$
4	Pullapea	58° 56′ 52″	23° 28′ 34″	quarry	$G_{1-2}Vb$
5	Eiglaküla	58°54′45″	23°27′27″	quarry	$G_{1-2}Vb$
5	Rohuküla	58° 53′ 40″	23° 24′ 03″	quarry	$G_{1-2}Vb$
6	Kirimäe	58° 55′ 30″	23° 45′ 05″	quarry	$G_{1-2}Tm$
7	Oela	59° 03′ 14″	24° 55′ 25″	alvar	$G_{1-2}Vb$
8	Härküla	59° 05′ 44″	24° 53′ 48″	ditch	$G_{1-2}Vb$
9	Kuimetsa	59° 02′ 46″	25° 07′ 10″	quarry	$G_{1-2}Vb$
10	Anna	59° 00′ 26″	25° 36′ 23″	quarry	$G_{1-2}Tm$
11	Koigi	58° 50′ 17″	25° 49′ 53″	ditch	$G_{1-2}Vb$
12	Karinu	59° 02′ 26″	25° 57′ 28″	quarry	$G_{1-2}Tm$
13	Hilliste	58° 52′ 30″	22° 59′ 51″	quarry, reef	G_3Hl
14	Kallasto	58° 52′ 53″	23° 00′ 31″	cliff	G_3Hl
14	Pühalepa	58°52′15″	22°57′50″	excavation	G_3
15	Kassari	58° 47′ 38″	22° 50′ 19″	reef, cliff	G_3Hl
16	Kalana	58° 43′ 20″	26° 03′ 23″	quarry	G_3Nr
17	Päri	58° 50′ 27″	24° 02′ 36″	quarry	H'Rm
18	Lätiküla	58° 42′ 53″	24° 24′ 20″	excavations	H'Vl
19	Päärdu	58° 45′ 48″	24° 24′ 16″	cliff	H'Vl
20	Võiva-Velise	58° 47′ 04″	24° 30′ 55″	ditch	H'Vl
21	Valgu	58° 49′ 10″	24° 36′ 07″	river bank	H'Rm
22	Undva	58° 31′ 01″	21° 55′ 27″	cliff	J_1Jn
23	Suuriku	58° 30′ 26″	22° 06′ 06″	cliff	J_1Jn
24	Ninase	58° 31′ 59″	22° 14′ 08″	cliff	J_1Jn
25	Panga	58° 34′ 15″	22° 53′ 51″	cliff	J_1Jn, J_2Jg
26	Paramaja, Jaani	58° 36′ 56″	22° 53′ 51″	cliff, beach	J_1Jn
27	Pulli	58° 36′ 52″	22° 57′ 20″	cliff	J_1Jn
28	Kõinastu	58° 38′ 07″	23° 02′ 59″	cliff	J_1Jn
29	Uisu	58° 39′ 26″	23° 29′ 40″	cliff	J_1Jn
30	Abula	58° 27′ 12″	22° 06′ 51″	cliff	J_2
31	Tagavere	58° 32 ′ 22″	22° 53′ 40″	quarry	J_2
32	Katri	58° 14′ 13″	21° 57′ 59″	cliff	K_2Pd
33	Kogula	58° 15′ 34″	22° 18′ 50″	quarry	K_2Pd
34	Uduvere	58° 21′ 07″	22° 40′ 57″	alvar	K_2Pd
35	Kuressaare	58° 14′ 39″	22° 30′ 09″	excavations	K_3aKr
35	Roomassaare	58° 14′ 39″	22° 30′ 09″	excavations	K_3aKr
36	Muratsi	58° 14′ 40″	22° 34′ 18″	quarry	K_3aKr
36	Äigu	58°16′20″	22°37′18″	quarry	K_3bKg
37	Kaugatuma	58° 07′ 22″	22° 11′ 36″	cliff, beach	K_3aKr
38	Kesselaid	58° 38′ 15″	23° 25′ 04″	cliff	J_1Jn
39	Ohesaare	58° 00′ 02″	22° 01′ 10″	cliff	K_4Oh
40	Laadjala	58° 18′ 21″	22° 32′ 18″	quarry	K_3aKr
41	Kuusnõmme	58°19′30″	21°58′04″	excavation	K_1
41	Viki	58° 20′ 48″	22° 06′ 37″	quarry	K_2Pd
42	Unimäe	58° 17′ 20″	22° 27′ 53″	alvar	K_2Pd

Table 1 (continued from the previous page)

■ no	Locality	Coordinate N	Coordinate E	Remarks	Formations
43	Tahula	58° 18′ 44″	22° 36′ 23″	quarry	K_2Pd
44	Sauvere	58° 23′ 53″	22° 18′ 10″	alvar	K_2Pd
45	Pilguse	58° 15′ 42″	21° 59′ 49″	quarry	K_2Pd
46	Kaarmise	58° 20′ 33″	22° 20′ 57″	quarry	K_2Pd
47	Sepise	58° 27′ 17″	21° 59′ 42″	alvar	J_2
47	Tagamõisa	58°28′	22°00′	quarry	J_1
48	Kurevere-Pangamägi	58° 24′ 30″	22° 00′ 09″	quarry	J_2
49	Kursi	58°35′35″	26°20′39″	excavation	G_3
50	Elda	58° 18′ 16″	21° 49′ 46″	cliff	K_1Rt
51	Kipi	58°15′08″	22°01′50″	rivulet	K_2
56	Nässumaa	58°14′	22°48′	quarry	K_3bKg
91	Atla	59°06′15″	24°49′08″	river	$G_{1-2}Vb$
92	Ellakvere	58°44′32″	26°25′09″	quarry	G_3
93	Liiva	58°34′32″	22°22′06″	cliff	J_1
94	Kergu	58°40′	24°45′	excavation	J_2
95	Saastna	58°43′	23°34′	cape, beach	J_1
96	Tõre	58°34′18″	22°43′3″	river excavation	J_2
97	Vahuküla	58°58′58″	26°04′58″	outcrop	G_3
98	Võrkoja	58°37′31″	23°06′26″	beach	J_1

Table 2. Depths of lower boundaries of the Juuru to Ohesaare stages (G_{1-2}–K_4) in the core sections. Depths shown in bold denote regional stratotype points (Nestor, 1997). Numbers of the boreholes comprise to those in the geological map (Figure 2).

* no	STAGES BOREHOLES	G_{1-2}	G3	H	J_1	J_2	K_1	K_2	K_3a	K_3b	K_4
15	Orjaku	38.6	15.8	-	-	-	-	-	-	-	-
22	Undva-580	148.0	127.1	106.8	79.0	-	-	-	-	-	-
36	Muratsi-805	-	-	-	-	-	-	55.9	39.8	20.6	
38	Viirelaid-590	-	-	-	65.0	32.2	+	-	-	-	-
49	Kursi	107.1	65.7	24.2	-	-	-	-	-	-	-
51	Jaagarahu	-	-	-	55.3	**21.4**	-	-	-	-	-
51	Kipi	-	-	-	139.0+	97.2	53.6	35.6	-	-	-
52	Riksu-803	-	-	-	153.0	127.4	73.7	39.8	-	-	-
53	Kaugatuma-509	340.7	317.0	281.5	244.7	174.8	113.9	75.0	56.6	24.0	
54	Ohesaare	437.7	410.1	372.6	**345.8**	204.9	150.5	123.7	95.1	67.7	
54	Ohesaare-2	-	-	-	-	-	-	-	-	+	**4.1**
55	Kingissepa-GI	-	-	-	-	-	-	+	+	-	-
55	Kingissepa-GV	292.9	261.9	216.9	182.2	122.5	76.9	43.4	**19.8**	-	-
56	Nässumaa-825	-	-	-	186.4	134.5	94.3	65.5	42.0	20.8	-
57	Muhu-590	144.4	114.1	89.9	45.4	-	-	-	-	-	-
58	Murika-511	123,0	103,0	75,0	50,0	-	-	-	-	-	-
59	Eikla-508	217.4	184.1	159.4	116.7	-	-	-	-	-	-
60	Paatsalu-527	170.5	139.6	102.2	70.0	-	-	-	-	-	-

Table 2 (continued from previous page)

* no	STAGES BOREHOLES	G_{1-2}	G3	H	J_1	J_2	K_1	K_2	K_3a	K_3b	K_4
61	Varbla-502	256.0	218.0	167.4	118.3	92.0		33.4	22.0	-	-
62	Pärnu	239.4	189.6	125.6	94.1	39.9	16.1	-	-	-	-
62	Pärnu-6	-	+	+	+	+	-	-	-	-	-
63	Viljandi-91	251,0	152,0	101.2	-	-	-	-	-		-
64	Laeva-294	154.7	95.2	44.4	-	-	-	-	-	-	-
64	Laeva-3	+	+	+	-	-	-	-	-	-	-
64	Laeva-4	+	+	+	-	-	-	-	-	-	-
64	Laeva-8	+	+	+	-	-	-	-	-	-	-
65	Kihnu-526	378.0	-	237.1	200.0	157.0	108.3	93.5	90.7		
66	Seliste-173	343.5	286.4	190.6	165.4	88.6	-	-	-	-	-
67	Häädemeeste-172	426.7	387.5	231.5	214.4	180.0	-	-	-	-	-
68	Abja-92	363.4	301.8	170.4	-	-	-	-	-	-	-
69	Ruhnu-500	601.0	588.1	490.3	457.5	414.0	275.5	248.3	222.2	216.6	175.0
70	Ikla	528.5	498.5	322.3	284.3	186.0	-	-	-	-	-
70	Kabala-13a	112.7	72.7	25.0	-	-	-	-	-	-	-
71	Holdre	421.0	348.5	150,0	-	-	-	-	-	-	-
72	Nurme	112.3	78.6	41.0	17.9	-	-	-	-	-	-
75	Sulustvere-5	110.5	71.9	19.0	-	-	-	-	-	-	-
76	Kirikuküla	110.6	86.4	**50.3**	21.4	-	-	-	-	-	-
77	Kõinastu-540	-	-	66.0	8,0	-	-	-	-	-	-
78	Orissaare-850	147.0	130.0	105.0	70.0	40.0	-	-	-	-	-
79	Pilistvere-4	109.3	85.0	15,0	-	-	-	-	-	-	-
80	Ristiküla-174	368.5	313.7	191.2	180.5	-	-	-	-	-	-
81	Rõusa-5	129.5	85.0	15.6	-	-	-	-	-	-	-
82	Tootsi-175	+	+	+	+	-	-	-	-	-	-
83	Vao-20	44.9	17.7	-	-	-	-	-	-	-	-
84	Kanaküla-3	-	+	+	117.7	96.7	-	-	-	-	-
84	Äiamaa	74.5	53.2	39.4	-	-	-	-	-	-	-
85	Võhma-440/4a	110.8	70.8	31.1	-	-	-	-	-	-	-
86	Navesti-98	+	+	+	-	-	-	-	-	-	-
87	Rumba-307	+	67.1	39.9	-	-	-	-	-	-	-
88	Türi-328	-	+	+	-	-	-	-	-	-	-
89	Vändra	-	+	+	-	-	-	-	-	-	-
90	Ruskavere-451	45.0	+	-	-	-	-	-	-	-	-
	Koksivere-107	117.3	85.0	19.7	-	-	-	-	-	-	-
	Sooääre-330	-	+	+	-	-	-	-	-	-	-
	Taagepera	+	+	-	-	-	-	-	-	-	-

Table 3. Distribution of the studied species in the regional stages and formations.

	G_{1-2}			G_3				H		J_1		$J_{1,2}$	J_2			K_1	K_2		K_3a	K_3b	K_4
	Õh	Vb	Tm	Hl	Rk	Nr	Sr	Rm	Vl	Jn	Rg	Rk	Jg	Mh	Jm	Rt	Pd	Tr	Kr	Kg	Oh
Streptis altosinuata	X																				
Triplesia insularis	X									X											
Epitomyonia glypha	X	X																			
Mendacella sp nov	X	X					X														
Coolinia applanata	X	X	X	X	X	X															
Leptaena (L) haverfordensis	X	X					X														
Onniella trigona	X	X					X														
Skenidioides scoliodus	X						X														
Saukrodictya sp B	X						X														
Templeella sp nov	X						X														
Eostropheodonta delicata	X	X	X	X	X																
Katastrophomena (K) woodlandensis	X	X			X		X														
Dalmanella cyclica	X	X		X			X														
Glyptorthis irrupta	X	X					X	X													
Wangyuia sp	X	X							X	X											
Leangella (L) scissa	X	X				X			X												
Dicoelosia osloensis	X						X														
Strophochonetes cingulatus	X								X	X											
Skenidioides hymiri	X						X		X		X										
Eoplectodonta (E) exceptionis	X						X		X		X										
Eoplectodonta (E) penkillensis	X						X		X		X										
Eoplectodonta (Ygerodiscus) bella	X					X	X		X	X	X				X						
Skenidioides petrasi	X						X			X	X										
Isorthis parvulus	X								X		X										
Hesperorthis hillistensis		X	X	X	X	X	X														
Leptaenoidea biohermica		X		X																	
Eoamphistrophia sp		X		X																	
Triplesia maennili		X		X																	
Ptychopleurella erecta		X		X																	
Neoplatystrophia affabilis		X		X																	
Isorthis mediocra		X		X	X																
Linoporella punctata				X																	
Eodictyonella capewelli				X					X	X											
Mendacella bleikeriensis					X	X	X														
Aegiria norvegica							X														
Jonesea grayi							X		X	X											
Skenidioides acutum							X		X	X	X				X						
Dalmanella rosensteinae							X	X	X												
Hesperorthis davidsoni								X	X												
Dicoelosia baltica								X	X	X											
Dalejina phaseola								X	X	X											
Eoamphistrophia whittardi									X												
Eopholidostrophia sefinensis									X												
Eoplectodonta (E) transversalis									X												
Visbyella pygmae									X	X											
Mesopholidostrophia laevigata									X	X											
Leptaena (L) depressa									X	X											
Leangella (L) segmentum									X	X											
Coolinia pecten									X	X											
Isorthis crassa									X	X											

Table 3 (continued from previous page)

	G_{1-2}			G_3				H		J_1		$J_{1,2}$	J_2			K_1	K_2		K_3a	K_3b	K_4
	Õh	Vb	Tm	Hl	Rk	Nr	Sr	Rm	Vl	Jn	Rg	Rk	Jg	Mh	Jm	Rt	Pd	Tr	Kr	Kg	Oh
Ptychopleurella transversa									X	X											
Resserella sabrinae									X	X					X						
Dicoelosia biloba									X	X	X										
Dicoelosia paralata									X	X	X										
Streptis grayii									X	X	X				X						
Leptaena (L) purpurea									X	X			X								
Brachyprion (B) semiglobosa									X				X								
Resserella canalis									X	X					X						
Eoplectodonta (E) duvalii									X	X	X				X						
Dalejna hybrida									X	X									X	X	
Katastrophomena (K) penkillensis										X											
Neoplatystrophia jaaniensis										X											
Visbyella visbyensis										X											
Resserella elegantula										X											
Isorthis parvulus									?			X									
Leptaena (L) rhomboidalis										*X*			X								
Dolerorthis rustica										*X*			X								
Leptaena (L) altera										*X*					X						
Ravozetina bathysulcata										X					X						
Levenea canaliculata										X							X		X	X	X
Amphistrophia sp. ?																	X				
Salopina conservatrix																	X				
Protochonetes striatellus																	X				
Morinorhynchus crispus																	X		X	X	
Protochonetes piltenensis																			X	X	
Lepidoleptaena poulseni																			X	X	
Shaleria (Janiomya) ornatella																				X	
Shaleria (Shaleriella) ezerensis																				X	X
Morinorhynchus rubeli																					X
Salopina submedia																					X

SYSTEMATIC PALAEONTOLOGY

Class CHILEATA Williams et al., 1996
Order DICTYONELLIDA Cooper, 1956
Superfamily EICHWALDIOIDEA Schuchert, 1893
Family EICHWALDIIDAE Schuchert, 1893

Genus ***EODICTYONELLA*** Wright, 1994

Type species. *Atrypa coralifera* Hall, 1852. Wenlock, Rochester Shale Formation in the New York State, U.S.A.

Eodictyonella capewellii (Davidson, 1848)
Plate 7: 24–26

= *Terebratula Capewellii* Davidson, 1848: 327, pl. 3:34.
= *Por.* ? *Capewellii* (Davidson) – Lindström, 1861: 364.
= *Eichwaldia* ? *Capewelli* (Dav.) – Davidson, 1869: 193, pl. 25:12-15 *non* fig. 13.
= *Dictyonella capewellii* (Davidson) – Rubel, 1963: 132, pl. 4:1–10; Bassett, 1974: 79, pl. 18:1–11, pl. 19:1, **lectotype**; Wright, 1981: 443, pl. 62:5, 9, 11, pl. 63:7, 10, pl. 64:1-3, 6, pl. 65:1–6.

Remarks. The Estonian material was described by Rubel, 1963. New specimens from the Adavere Stage (see below) are the first finds outside the reef facies in Estonia. The species is almost invariable.
Occurrence. Raikküla (G_3) to Jaani (J_1) stages (Rhuddanian-Sheinwoodian) in Estonia. Wenlock and Ludlow on Gotland and in U.K. (Bassett and Cocks, 1974).
Localities (in cores, depth in m). G_3Hl: Hilliste quarry; H'Vl–J_1Jn: Pärnu 88.36-103.76; J_1Jn: Suuriku cliff.

Class STROPHOMENATA Williams et al., 1996
Order STROPHOMENIDA Öpik, 1934
Superfamily STROPHOMENOIDEA King, 1846
Family STROPHOMENIDAE King, 1846
Subfamily FURCITELLINAE Williams, 1965

Genus ***KATASTROPHOMENA*** Cocks, 1968

Type species. *Strophomena antiquata* var. *woodlandensis* Reed, 1917, Late Rhuddanian Woodland Formation of Girvan, U.K.

Subgenus ***KATASTROPHOMENA (KATASTROPHOMENA)*** Cocks, 1968

Type species. As for genus.

Katastrophomena (Katastrophomena) woodlandensis (Reed, 1917)
Plate 1: 4–14

= *Strophomena antiquata* (J. de C. Sowerby) – Davidson, 1883: 193 *pars*, pl. 15:12–14 *only*.
= *Strophomena* ? *costatula* Hall & Clarke – Holtedahl, 1916: 62, pl. 13:6.
= *Strophomena* sp. – Holtedahl, 1916: 63, pl. 13:8.

= *Strophomena antiquata* var. *woodlandensis* Reed, 1917: 902, pl. 18:20–21, pl. 19:1–5.
= *Strophomena scotica* Bancroft, 1949: 13, pl. 1:6–7.
= *Strophomena scotica* Bancroft – Williams, 1951: 116, pl. 7:1–3, textfig.19a–b, **lectotype**.
= *Strophomena* aff. *woodlandensis* Reed – Williams,1951: 118, pl. 7:4.
= *Katastrophomena scotica* (Bancroft) – Cocks, 1968: 296, pl. 3:3–9, **lectotype**; Kulkov & Severgina, 1989: 131, pl. 27:9–10.
= *Katastrophomena woodlandensis* (Reed) – Temple, 1968: 44, pl. 8:16–17; Baarli, 1995: 31, pl. 9:3, 5–18.
= *Katastrophomena woodlandensis* (Reed) *scotica* (Bancroft) – Temple, 1987: 72, pl. 7:1–14.

Remarks. The large ventral valves from the Estonian localities (see below) have flat to gently concave (resupinate) profile and irregular ornamentation typical of the genus. This ornamentation and the cardinalia of the Estonian specimens are identical to those of *K. (K.) woodlandensis* in the sense of Temple, 1968 and Baarli, 1995.
Occurrence. Juuru (G_{1-2}) and mainly Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia, Rhuddanian in Scotland and Norway.
Localities (in cores, depth in m). G_{1-2}Vb: Atla River Bank; Sarve beach; Kaugatuma-509 320.15; G_{1-2}Õh: Laeva-8 153.4; Seliste-173 311.8-324.5; Navesti-98 105.0; Varbla-502 242.35-242.50; Kingissepa–GV 270.5-288.45; Orissaare-850 139.5-140.5; G_{1-2}Vb-G_3Rk: Kabala-13a: 61.0-103.5; G_3Hl: Hilliste quarry, Kallasto cliff; G_3Sr: Häädemeeste-172: 345.4.

Katastrophomena (Katastrophomena) penkillensis (Reed, 1917)
Plate 1:1–2

= *Strophomena antiquata* (J. de C. Sowerby) – Davidson, 1871: 299 *pars*, pl. 44:5, *non* figs 2–4, 6-13, 21, 22; Holtedahl, 1916: 58 *pars*, pl. 10:6–8, *non* pl. 10:9–10.
= *Strophonella penkillensis* Reed, 1917: 900, pl. 18:11–14.
= *Katastrophomena penkillensis* (Reed) – Cocks, 1968: 297, pl. 4:1–6, **lectotype**; Baarli, 1995: 32, pl. 10:1–19.
= *Katastrophomena (Katastrophomena)* sp. – Musteikis & Cocks, 2004: fig. 4G.
= *Katastrophomena (Katastrophomena) penkillensis* (reed) – Hoel, 2011: 212, fig. 6.

Remarks. This species differs from *K. (K.) woodlandensis* in having clearly parvicostellate ornamentation with 4-5 very fine filae in the interspaces and in strong elongated anterior adductor scars (see Baarli, 1995).
Occurrence. Jaani Stage (J_1) (Sheinwoodian) in Estonia; Telychian in Norway; uppermost Llandovery and lower Wenlock in U.K. and Gotland; Wenlock in Lithuania (Musteikis & Cocks, 2004).
Localities. J_1Jn: Undva and Paramaja cliffs; Kaugatuma-509 core 219.0 m.

Genus ***PENTLANDINA*** Bancroft, 1949

Type species. *Strophomena (Pentlandina) tartana* Bancroft, 1949, Telychian Deerhope Formation in the North Esk Inlier, Pentland Hills, U.K.

Pentlandina loveni (de Verneuil, 1848)
Plate 3: 3

= *Leptaena loveni* de Verneuil, 1848: 339, pl. 4:5.
= *Str. Loveni* (Vern.) – Lindström, 1861: 371.
= *Pentlandina loveni* (de Verneuil) – Cocks, 1968: 289; Bassett & Cocks, 1974: 14, pl. 2:4–6, **lectotype**; Hoel, 2011: 208, figs 5A–T.

Remarks. The studied collections contained only one dorsal valve TUG B/1 from an unknown Silurian locality. It was labelled as *L. corobiculata* n. sp., probably by F. Schmidt. The name *L. corobiculata* is considered here as *nomen nudum* and the valve is identified as *Pentlandina loveni* known from the Högklint Formation of Gotland (see Bassett & Cocks, 1974).

Family RAFINESQUINIDAE Schuchert, 1893
Subfamily LEPTAENINAE Hall et Clarke, 1894

Genus ***LEPTAENA*** Dalman, 1828

Type species. *Leptaena rugosa* Dalman, 1828, Hirnantian, *Dalmanitina* Beds of Västergötland, Sweden.
Remarks. In the present paper the systematics of the genus follows Cocks and Rong (2000). They list ten synonyms to the genus name *Leptaena* which are not listed here.

Subgenus ***LEPTAENA (LEPTAENA)*** Dalman, 1828

Type species. As for genus.

Leptaena (Leptaena) altera Rybnikova, 1966
Plate 2: 1–9

= *Leptaena altera* Rybnikova, 1966: 78, pl. 1:4–6, **holotype**; Rybnikova, 1967: 193, pl. 18:4–6; Musteikis & Cocks, 2004: figs 4H–O.

Description. Shell small for the genus, outline slightly transverse, subangular, with small alae. Ventral disc umbonally slightly convex, apex protruding but small, with percurrent foramen. Geniculation sharp, peripheral rim developed only laterally. Anterior margin of the disc without rim. Dorsal disc with a small convex protegulal node, umbonally concave, mostly flat, with a groove corresponding to ventral rim. Trail of ventral valve laterally and anteriorly concave, slightly angular. Radial ornament of rounded costellae, increasing in number by intercalation. Costellae absent on protegulal node, which is covered by concentric filae around the foramen. Rugae suppressed, developed only laterally on the disc. Ventral interarea low, flat, apsacline, delthyrium wide, covered ventrally by a small pseudodeltidium and dorsally by large chilidium. Dorsal interarea flat, lower than the ventral one. Chilidium wide, with a median groove. Ventral interior: teeth small, triangular, posterolaterally fused with interarea, supported partly by narrow dental plates. Delthyrial cavity deep, with pedicle callist in apical part. Posterior thickening ends with myophragm between the adductor scars. Ridges bounding the muscle field elevated anterolaterally, surround large diductor scars, but not the lanceolate and narrow adductor scars. Extramuscular surface covered by radially located taleolae. Dorsal interior: lobes of the cardinal process stout, separated, anteriorly divergent, with a wide alveolus. Myophore scars (surfaces) point ventro-posteriorly. Thin, strict socket plates are flanking shallow sockets. Notothyrial platform anchor-shaped, with strong socket ridges and short and wide median ridge, bilobed anteriorly. Adductor scars posteriorly distinct; ridges bounding the muscle field are weakly developed. Axial ridge faint, located anteriorly of adductor field. Taleolae scarce, regular along external costellae.
Remarks. Characteristic features, like small shells with accentuated specific shape of trail and deficiency of rugation without remarkable variability, allow to distinguish the species well in deep facies of the palaeobasin.

Occurrence. Jaani (J_1) and Jaagarahu (J_2) stages (Sheinwoodian–Homerian) in Estonia; Telychian to Ludfordian in Lithuania, Wenlock and Gorstian in Latvia.
Localities (in cores, depth in m). J_1: Kalvarija core, Lithuania 732.8-832.6; J_1Jn and J_2Jm: Ohesaare 306.25-312.57 and 271.12-292.90.

Leptaena (Leptaena) purpurea Cocks, 1968

Plate 3: 1–9, plate 4: 14–15

= *Leptaena purpurea* Cocks, 1968: 313, pl. 12:1–6, **holotype**; Cocks & Baarli, 1982: pl. 1:10–15; I. Breivel & M. Breivel, 1988: 27, pl. 4:1–4; Baarli, 1995: 39, pl. 12:15.
= *"Leptaena"* sp. - Rõõmusoks, 2004: pl. 33:15.
= *Leptaena* sp. A - Dewing, 1999: 56, pl. 20:7-15, pl. 21:1–3.
= *Leptaena belorussica* Modzalevskaya & Pushkin, 2007: 12, pl. 4:11–14.

Remarks and occurrence. This species is widespread in Adavere (H), Jaani (J_1) and Jaagarahu (J_2) stages (Telychian–Homerian) in Estonia, but also in Ural Mountains (Russia), Belorus and Anticosti in the rocks of nearly same age. *L. (L.) purpurea* is close to the more deepwater *L. (L.) altera* (see above) and probably more nearshore *L. (L.) depressa* (see below), but differs from both in quite distinctive morphology of its trail.
Localities (in cores, depth in m). H'Vl: Lätiküla outcrop, ?Rumba outcrop; J_1Jn: Suuriku cliff, Pulli cliff, Jaani beach, Paramaja cliff, Kesselaid islet, Undva cliff, Saastna cape, Võrkoja beach, Liiva cliff, Ikla 236.0-284.3; Saaremaa boreholes No 940 10.5-20.0; No 941 18.8; No 939 12.0; J_1Jn-J_2Jg: Ohesaare 211.75-250.4 and ?191.34-201.7; J_2Jg: Orissaare-850 29.6-36.0; Saaremaa boreholes No 835 38.1-51.4; No 804 118.2-121.0; No 807 37.0-39.0; No 808 64.0; Nässumaa-825 145.7-181.2; Saaremaa boreholes No 832 15.0 and 52.0; No 831 39.5-41.2; No 861 36.0; No 862 36.3-39.0. The Saaremaa boreholes are not shown in the Table 2.

Leptaena (Leptaena) rhomboidalis (Wahlenberg, 1818)

Plate 1: 15–16, plate 2: 10–12

= *Anomites rhomboidalis* Wahlenberg, 1818: 65.
= *Leptaena depressa* (J.de C. Sowerby) – Dalman, 1828: 107 *pars*, *non* pl. 1:8.
= *Leptaena rhomboidalis* (Wilckens) – Poulsen, 1943: 18, figs: 6b, 7.
= *Leptaena rhomboidalis* (Wahlenberg) - Kelly, 1967: 594, pl. 98:1–3, **neotype**; Bassett & Cocks, 1974: 14, pl. 2:7–8: Hoel, 2005: 265, figs 2, 10, 11A.

Remarks. The species concept in the present paper agrees with Hoel, 2005. The occurrence of *L. (L.) rhomboidalis* on Saaremaa is related to shallow-water, high energy part of the basin.
Occurrence. Jaani (J_1) and Jaagarahu (J_2) stages (Sheinwoodian–Homerian) and possibly Kaugatuma Stage (Přidoli) in Estonia. Sheinwoodian on Gotland (see Hoel, 2005)
Localities. J_1Jn: Ninase cliff; J_2 Jg: Kergu ditch, Tõre river excavation; K_3bKg: ?Kaugatuma cliff.

Leptaena (Leptaena) depressa (J. de C. Sowerby, 1824)

Plate 3: 10–13

= *Producta depressa* J. de C. Sowerby, 1824: 86, pl. 459:3 (upper two figures only).
= *Leptaena depressa* (J. de C. Sowerby) – Dalman, 1828: 107, pl. 1:2; Hisinger, 1837: pl. 20:3; Poulsen, 1943: 18, text-figs 4, 5, 6A; Spjeldnaes, 1957: 178, text fig. 39B, pl. 7:9, 15, pl. 13:1, 3, pl. 14:3–5, 8; Bassett & Cocks, 1974: 14, **lectotype**; Modzalevskaya & Pushkin, 2007: 13, pl. 5:6–9.
= *Rugoleptaena venzavensis* Rybnikova, 1966: 76, pl. 1:1–3.

= *Leptagonia venzavensis* (Rybnikova) - Rybnikova, 1967: 192, pl. 18:1–3.
= *Leptaena* cf. *depressa* (J. de C. Sowerby) - Havlíček, 1967: pl. 16:8–9, 13–15.
= *Leptaena depressa visbyensis* (J. de C. Sowerby) – Hoel, 2005: 11, fig. 4.

Remarks. Hoel (2005) noted gradual morphological change in this species and erected two new subspecies for the earlier representatives of this species on Gotland, *L. depressa visbyensis* and *L. depressa lata*. The earliest forms of *L. (L.) depressa* appear in Estonia in the Ohesaare section above their possible ancestor (or environmental counterpart) *L. purpurea.* The Estonian specimens of *L. (L.) depressa* have typical long trail and similarly to both Gotland subspecies radial costellae, which are only rarely interrupted by concentric growth filae very marginally.
Occurrence. Adavere (H) to Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia. Upper Llandovery to Přidoli in Lithuania and Upper Ludlow in Latvia (see Musteikis & Cocks, 2004: 460, 462). Wenlock–Ludlow in Belarus and on Gotland.
Localities (in cores, depth in m). H'Vl–J_1Jn: Pärnu 92.5-111.11; J_1Jn: Paramaja and Suuriku cliffs; Ohesaare 250.34.

Leptaena (Leptaena) haverfordensis Bancroft, 1949
Plate 4: 8–13, 16–20

= *Leptaena haverfordensis* Bancroft, 1949: 6, pl.: 1:19, 20, 23, 24; Cocks, 1968: 304, pl. 5:4–15; Cocks, 1978: 115, **lectotype**; Thomsen & Baarli, 1982: pl. 2:2–5; Temple, 1987: 75, pl. 8:1–10; Baarli, 1995: 36, pl. 11:2–4, 6–7, 9–10, 12–14, 17.
= *Leptaena haverfordensis* var. *contracta* Bancroft, 1949: 6, pl. 1:18, 21–22.

Description. Shell medium-sized for the genus, disc slightly concavoconvex, geniculation sharp, trail long and convex, with a well-developed rim on the ventral and with a groove on the dorsal valve. Ventral beak short, with a small round and sealed foramen. Ventral interarea apsacline, low. Delthyrium wide, pseudodeltidium convex, well-developed. Dorsal interarea low, anacline. Chilidium large, convex, reaching pseudodeltidium, with a median groove. Disc regularly covered by 9–12 continuous rugae, ornament multicostellate, costellae increase in number by intercalation (on ventral valve), covered by very fine concentric filae. Ventral interior poorly visible in the available material. Dorsal interior (based on two specimens): chilidium wide, with a median groove, covers majority of divergent cardinal lobes, with a weakly developed notothyrial platform in front of them. Socket ridges widely divergent, thin. Sockets deep, triangular. Adductor scars not visible, flanked by anteriorly elevated concave ridges reaching anterior part of the valve. Median ridge thin, developed in anterior part of the field. Disc is interiorly marked by a sharp rim, which is covered by fine radial grooves.
Remarks. In spite of poorly known ventral valve interior and very prominent dorsal ridges flanking the adductor field, the studied material is identified as *L. haverfordensis,* based on other characteristic features – rounded pedicle foramen, finely multicostellate radial ornament and continuous rugae over the valve disc.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia. Lower Llandovery of Wales, U. K.
Localities (in cores, depth in m). G_{1-2}Vb: Kabala-13a 93.5-109.4; Vao-20 42.8; G_{1-2}Õh: Ohesaare 416.24; Kingissepa–GV 270.5-270.6; Viljandi-91 223.1; G_{1-2}Õh–G_3Sr: Abja-92 264.9-351.8; G_3Hl: Hilliste quarry.

Genus ***LEPIDOLEPTAENA*** Havlíček, 1963

Type species. *Strophomena rhomboidalis lepidula* Barrande, 1879, Pragian, Koněprusy Limestone Formation in Czech Republic.

Lepidoleptaena poulseni (Kelly, 1967)

Plate 3: 14–15

= *Strophomena rhomboidalis* (Wilckens) – Davidson, 1871: 281 *pars*, pl. 39:1, 10–11, 15 *non* figs 2–9, 12, 14, 16–21.
= *Leptaena poulseni* Kelly, 1967: 597, pl. 98:10–13, **holotype**.
= *Lepidoleptaena poulseni* (Kelly) – Bassett, 1977: 132, pl. 35:1–9; Jin & Chatterton, 1997: 30, pl. 19:1–20; Hoel, 2005: figs 8, 9A–G; Modzalevskaya, Pushkin, 2007: 13, pl. 4:15–20.

Remarks. The well-developed equal costellae as well as specific shape of the Estonian shells make them well comparable to the specimens of *L. poulseni* from Lau Baka (Eke Formation in Gotland). No complete interiors are available for the Estonian specimens. However the identification of the Estonian specimens is supported by a ventral valve interior of *Lepidoleptaena poulseni* from the Kaugatuma Stage of Ezere core, Latvia, having diagnostic of this genus high bounding rim around the ventral disc curving inward before joining with hinge (author's observation).
Occurrence. Kuressaare (K_3a) and Kaugatuma (K_3b) stages (Ludlow–Přidoli) in Estonia.
Localities. K_3aKr: Kuressaare entrenchment; K_3bKg: Kaugatuma cliff; Nässumaa quarry, Kaugatuma-509 core, 11.80-13.0 m.

Family LEPTAENOIDEIDAE Williams, 1953

Genus ***LEPTAENOIDEA*** Hedström, 1917

= *Scamnomena* Bassett, 1977: 134.

Type species. *Strophomena rugata* Lindström, 1861 from the Wenlock of Gotland (by subjective synonymy as presented below).
Remarks. According to Hoel (2007: 595) the genera *Leptaenoidea* and *Scamnomena* are synonymous, as their type species *Leptaenoidea silurica* Hedström, 1917 and *Strophomena rugata* Lindström, 1861, respectively, have found to be the end members of the variation range (from cementing to ambitopic shells) of the same species.

Leptaenoidea biohermica sp. n.

Plate 4: 1–7

Derivatio nomini. After its occurrence in bioherms.
Holotype. Selected here, complete shell TUG 1278/71 from a marlstone lens in the Hilliste quarry, Juuru Stage, coll. T. Meidla.
Studied material. 15 shells, 3 fragmentary ventral and 4 dorsal valves.
Diagnosis. *Lepidoleptaena* with subtrapezoidal outline. Rugae well developed in lateral areas, radial ribs accentuated in median sector, suppressed by concentric filae (laminae).
Description. Shell small or medium-sized for the genus, weakly concavoconvex, convexity of ventral valve developed in median sector, which is distinguished by accentuated costellae. Rugae developed mostly on lateral areas of the disc. Up to seven rugae are mostly continuous, rounded in cross section. Radial ornament of multi- to parvicostellate fine rounded costellae covered with very fine concentric filae, costellae increase in number by intercalation. Geniculation dorsally rounded, trail short. Outline transverse, subtrapezoidal, maximum width on hinge line, cardinal angles slightly alate. Ventral beak inconspicuous, with apical foramen. Ventral interarea high, flat, horizontally striated. Pseudodeltidium present, higher than chilidium which has a central groove. Lobes of cardinal process thin, widely separated, with a wide depression between them. Socket plates widely divergent, thin and low, delimiting sockets anteriorly. Adductor field weakly developed. Weak ridges anterior of the socket

plates extend half length of the valve. Median ridge thin and weakly developed in the anterior half of the valve. Marginal rim low, angular. Extramuscular area covered by talaeolae.

Discussion. The relatively small specimens of this species differ from other three species of *Leptaenoidea* in irregular but strong rugae and poorly developed dorsal adductor field, i.e. features which makes it close to *L. (L.) rhomboidalis* which is common in moderate energy environments (reefs) of the early Wenlock in Gotland (Hoel, 2005: 5). The new species differs from more or less contemporaneous species of *Leptaena* in its higher pseudodeltidium and laterally developed weak rugae.

Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.

Localities. G_{1-2}Vb: Vahtrepa ditch; Orjaku 29.6; Kabala-13a 93.5-93.6; G_3Hl: Hilliste bioherm; Kallasto bioherm.

Family AMPHISTROPHIIDAE Harper, 1973
Subfamily AMPHISTROPHIINAE Harper, 1973

Genus ***AMPHISTROPHIA*** Hall et Clarke, 1892

Type species. *Strophomena striata* Hall, 1843, Wenlock–Ludlow, Niagara Group in the New York State, U.S.A.

***Amphistrophia* ? sp.**
Plate 5: 12

Remarks, occurrence and localities. Two dorsal valves from the Paadla Stage (Gorstian) in the Katri cliff are characterized by apically weakly convex beak and anteriorly round geniculation, with clearly unequally parvicostellate radial ornamentation and slight rugation on cardinal angles. They differ from the contemporaneous species, like *Amphistrophia funiculata* (Mc'Coy, 1846) in the Slite and Mulde beds of Gotland or in the upper Wenlock-lower Ludlow of U.K., in a more rounded geniculation.

Genus ***EOAMPHISTROPHIA*** Harper et Boucot, 1978

Type species. *Amphistrophia whittardi* Cocks, 1967, Telychian, Hughley Shale Formation of Domas, Shropshire, U.K.

Eoamphistrophia whittardi (Cocks, 1967)
Plate 5: 1–4

= *Amphistrophia whittardi* Cocks, 1967: 261, pl. 39:3, 5, 8, **holotype**; Bassett, 1977: 152, pl. 41:13–15; Bassett & Cocks, 1974: 16.
= *Eoamphistrophia whittardi* (Cocks) – Harper & Boucot, 1978: 154, pl. 33:18–20, **non** 17; Cocks & Rong, 2000: 260, figs 163, 2a b.
≠ *Amphistrophia (Amphistrophia) whittardi* (Cocks) – Bassett, 1971: 319, pl. 58:2–4.

Occurrence and remarks. The species is identified here only on the basis of some exteriors from the Adavere Stage (Telychian) of Estonia. The closest species *Amphistrophia (Amphistrophiella) funiculata* (Mc'Coy) in the Wenlock and Ludlow of Gotland (Bassett & Cocks, 1974) differs in ventral valve muscle field shape and more unequally radial ornamentation. The specimens assigned to *Amphistrophia (Amphistrophia) whittardi* by Bassett (1971) have been assigned to another unnamed

species by Harper & Boucot (1978: 154). The latter differs from *E. whittardi* s. str. (see synonymy) in less strong resupination and radial ornament.
Localities. H'Vl: Lätiküla excavations.

Eoamphistrophia sp.

Plate 5: 5–11

?= *Rafinesquina expansa* (Sowerby) – Teichert, 1928: 58.

Description. Shell large, umbonally concavoconvex but in most part concavoconcave, i.e. resupinate. Outline transversely semioval, with maximum width at straight hinge line, cardinal angles angular. Commissure rectimarginate. Umbones inconspicuous. Ventral interarea low, plane; delthyrium wide, covered apically by narrow pseudodeltidium. Dorsal interarea flat, anacline; chilidium strong, convex. Radial ornamentation parvicostellate, costellae rounded, increasing in number by intercalation, covered by irregular concentric filae. Rugae weak, developed posterolaterally. Interior of ventral valve unknown. Dorsal interior (based on a broken specimen): lobes of cardinal process distinct, oblong and stout, directed anterolaterally, with a supporting narrow chilidium ridge between them. Notothyrial platform extended anteriorly, low, with a small depression before cardinal processes and a tapering weak median ridge reaching one third of valve length. Socket ridges long, low, diverging at an angle 130° from each other. Extramuscular area covered by taleolae of equal size, arranged along exterior costellae.
Remarks. The described specimens differ from other amphistrophiids in large size (up to 5 cm wide) and modest resupinate profile. In spite of the large size, the described brachiopod is tentatively assigned to *Eoamphistrophia*. ?*Rafinesquina expansa* (Sowerby) noted by Teichert (1928) from the Hilliste quarry could perhaps be conspecific with *Eoamphistrophia* sp. because of its larger and resupinate shell, in spite of its older stratigraphic position.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities. G_{1-2}Vb: Koigi; G_3Hl: Hilliste quarry, Kassari, Vändra core (depth unknown); unknown loc. and strat. Männiku, sample no 9260.

Family LEPTOSTROPHIIDAE Caster, 1939

Genus ***EOSTROPHEODONTA*** Bancroft, 1949

Type species. *Orthis hirnantensis* Mc'Coy, 1851, Hirnantian, Hirnant Formation of Aber Hirnant, Bala, U.K.

Eostropheodonta delicata Baarli, 1995

Plate 6: 1–12

= *Eostropheodonta delicata* Baarli, 1995: 43. pl. 14:9–15, **holotype**.
?= *Plectambonites aequalis* Teichert, 1928: 58, pl. 5:18–20.

Description. Shell moderately concavoconvex, umbones inconspicuous. Ornamentation unequally parvicostellate, with very fine irregular concentric filae. Costae increase by intercalation, with 2-3 costellae between them. Pseudodeltidium narrow, developed apically. Ventral process present as apical callosity, in anterior part as short ridge bifurcating anteriorly and surrounding small adductor tracks. Dental plates at delthyrial end of the hinge line with 8 striae, stout and very short. Muscle field developed as a triangular depression, with straight lateral walls, diverging anteriorly, separated from

dental plates. Diductor scars elongated, subdivided by a low transmuscle ridge and separated medially by a narrow median septum. Extramuscular area covered by taleolae of equal size. Cardinal processes completely separated, diverging anteriorly, stout, erect, both processes bear a narrow groove on ventral surface. Chilidial plates supported by a thin ridge between the processes. Notothyrial platform consists of two low elevations developed as extensions of the bases of cardinal processes, joined anteriorly in form of a tapering median septum. Socket ridges subparallel to cardinal process, low, denticulated on its posterior side (poorly visible in the studied material). Adductor field elongate, open anteriorly, surrounded by low lateral ridges which begin near the ends of socket plates and have variable length; transmuscle septa may be developed anteriorly. Posterolateral area, outside of muscle field, covered by rare but well developed taleolae.

Remarks. Morphology of the Estonian material agrees well with that of the Norwegian species *E. delicata*. *Plectambonites aequalis* Teichert (see synonymy) could also be conspecific with *E. delicata*, but type material is lost and attempts to find possible topotypes have been so far unsuccessful.

Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia. Llandovery in Norway.

Localities (in cores, depth in m). G_{1-2}Vb: Vahtrepa ditch, Kiltsi quarry, Kabala-13a 97.3-101.3; Rumba 69.0-83.5; G_{1-2}Õh: Abja-92 318.4; Sooääre-330 50.0; Viljandi-91 153.14; Rõusa-5 172.2; G_{1-2}: Kursi 79.7; G_3Hl: Kallasto cliff; G_3Rk: Kursi excavation, Ellakvere quarry; Vao-20 19.0-19.2; Kabala-13a 20.45-51.1; G_3Sr: Pärnu 186.8.

Genus ***BRACHYPRION*** Shaler 1865

Type species. *Strophomena leda* Billings, 1860, Aeronian to Telychian, Jupiter Formation in Anticosti Island, Quebec, Canada.

Subgenus ***BRACHYPRION (BRACHYPRION)*** Shaler, 1865

Type species. As for genus.

Brachyprion (Brachyprion) semiglobosa (Davidson, 1871)

Plate 14: 9–14

= *Strophomena imbrex* (Pander) – Davidson, 1847: 55, pl. 12:25–28; *non* Pander, 1830; Davidson, 1848: 318, pl. 3:8; *non* Pander 1830.

= *Strophomena imbrex* (Pander) var. *semiglobosa* Davidson – Davidson, 1871: 286, *pars,* pl. 41:1–4, *non* figs 5–6.

= *Megastrophia (Protomegastrophia) semiglobosa (*Davidson) – Bassett, 1971: 308 *pars,* pl. 54:9–13, pl. 55:1–2, **lectotype**; *non* fig. 3; Bassett, 1977: 141, pl. 37:1–5.

= *Brachyprion (Protomegastrophia) semiglobosa* (Davidson) – Harper & Boucot, 1978: 18, pl. 38:3, 5, ?figs 4, 6–8.

= *Brachyprion (Protomegastrophia)* sp. – Harper & Boucot, 1978: pl. 37:1–11; pl. 38:9.

= *Brachyprion* sp. - Musteikis & Cocks, 2004: 464.

= *Brachyprion (Brachyprion) semiglobosa* (Davidson) - Hoel, 2011: fig. 9.

Remarks. In Estonia the species is abundant in the Jaagarahu Stage (J_2), but occurs also in the Adavere Stage (H). The stratigraphic range of this species in Estonia is thus roughly similar to its range in Gotland and longer than in the British Isles (Bassett, 1977).

Occurrence. Adavere (H) and Jaagarahu (J_2) stages (Telychian–Homerian) in Estonia, all parts of the Visby Formation, the Slite Group and rarely the Klinteberg Formation in Gotland (Hoel, 2011). Upper

Llandovery of the Malvern area in British Isles, rarely also upper Wenlock of the Welsh Borderland and south-central Wales, British Isles (Bassett, 1977: 140).
Localities. H'Vl: Lätiküla excavations; J_2Jg: Sepise alvar, Abula cliff, Kurevere-Pangamägi.

Family EOPHOLIDOSTROPHIIDAE Rong et Cocks, 1994

Genus ***EOPHOLIDOSTROPHIA*** Harper, Johnson et Boucot, 1967

Type species. *Stropheodonta sefinensis* Williams, 1951, Aeronian, Rhydings Formation in the bank of the River Sefin, Carmantenshire, U.K.

Eopholidostrophia sefinensis sefinensis (Williams, 1951)
Plate 21:1–6

= *Stropheodonta (Brachyprion) sefinensis* Williams, 1951: 124, pl. 8:10–11.
= *Pholidostrophia (Eopholidostrophia) sefinensis* (Williams) – Cocks, 1968, pl. 39:11, **lectotype**.
= *Eopholidostrophia sefinensis* (Williams) – Harper, Johnson & Boucot, 1967, pl.1: 7–8, pl. 2:1–9; Rong & Cocks, 1994: pl. 5:6–7; Cocks & Rong, 2000: 291, figs 185, 2a–c.
= *Pholidostrophia (Eopholidostrophia) sefinensis sefinensis* (Williams) – Hurst, 1974: 302, fig. 2:10–11.

Remarks. The nominate subspecies differs from the *E. sefinensis ellisae* Hurst, 1974 (p. 304, fig. 3:11-17) in its greater convexity. However, in the Early Llandovery of Mathrafal *E. sefinensis ellisae* is having greater convexity/concavity of the valves, and is also characterized by "... ribbing being finer and more strongly differentiated into costae and costellae and lacking an accentuated sagittal costa on the ventral valve" (Temple, 1987: 84). This makes these two subspecies difficult to distinguish. Estonian specimens of the nominate subspecies have notably larger valves than any other subspecies.
Occurrence. Adavere Stage (H) (Telychian) in Estonia.
Localities. H'Vl: Valgu river bank and ditch, Päärdu cliff, Lätiküla.

Genus ***MESOPHOLIDOSTROPHIA*** Williams, 1950

Type species. *Pholidostrophia (Mesopholidostrophia) nitens* Williams, 1950, Homerian, Mulde Marl Formation in Gotland, Sweden, a subjective junior synonym of *Leptaena laevigata* (J. de C. Sowerby, 1839) from Homerian, Coolbrookdale Shale Formation of Burrington near Ludlow, Shropshire, U.K.

Mesopholidostrophia laevigata (J. de C. Sowerby, 1839)
Plate 13: 1–3

= *Leptaena laevigata* J. de C. Sowerby *in* Murchison, 1839: 629, pl. 13:3 – Davidson, 1871: 328 *pars*, pl. 49:1–5, *non* figs 6–12.
= *Pholidostrophia (Mesopholidostrophia) nitens* Williams, 1950: 290, figs 7–10, Harper, Johnson & Boucot, 1967: 414, pl. 3:1–3.
= *Lissostrophia (Mesolissostrophia) pellucida* Williams, 1950: 280, figs 13–14.
= *Pholidostrophia (Mesopholidostrophia) laevigata* (J. de C. Sowerby) – Bassett, 1971: 331, pl. 60:3, **holotype**; Bassett & Cocks, 1974: 18; Hurst, 1974: 311, fig. 3 (9–10); Bassett, 1977: 155, pl. 42:12.
= *Mesopholidostrophia laevigata* (J. de C. Sowerby) – Musteikis & Cocks, 2004: fig. 5H–K.

Description. Shell medium-sized, semioval in outline, gently concavoconvex. Ventral umbo small, slightly overhanging the straight hinge line, which may extend laterally into alae. Anterior commissure

rectimarginate. Ventral interarea low, plane, orthocline; delthyrium wide, open or with apical deltidium. Dorsal interarea low, plane, hypercline; notothyrium covered by convex chilidium. Valve surface is covered by irregular concentric filae accentuated by weak growth lines anteriorly, radial ornamentation absent.

Remarks. Exceptionally smooth exterior of the in Estonian specimens shell suggests that they are conspecific with the species listed in synonymy. This species is rare in Estonia.

Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia. It is distributed widely (up to the lower Přidoli) in Lithuania and only in Wenlock of U.K. (see Musteikis & Cocks, 2004).

Localities. H'Vl: Pärnu core 87.5–107.77 m; H'Vl–J_1Jn: Kõinastu cliff.

Family SHALERIIDAE Williams, 1965

Genus ***SHALERIA*** Caster, 1939

Type species. *Strophomena gilpeni* Dawson, 1881, Přidoli–Lochkov, Stonehouse Formation in Arisaig, Canada.

Subgenus ***SHALERIA (JANIOMYA)*** Havlíček, 1967

Type species. *Janiomya parallelomya* Havlíček, 1967, Ludlow–Přidoli, Budnanian in Bohemia, Czech Republic.

Shaleria (Janiomya) ornatella (Davidson, 1871)

Plate 7: 1–11

= *Strophomena ornatella* [Salter MS] Davidson, 1871: 309, pl. 43:16–20.
= *Strophomena impressa* Lindström – Munthe, 1902: 233, figs 3–4.
= *Shaleria ornatella* (Davidson) – Holland, Lawson & Walmsley, 1963: 154, pl. 3:1.
= *Shaleria* aff. *ornatella* (Davidson) – Bassett & Cocks, 1974: 17.
= *Shaleria (Protoshaleria) ornatella* (Davidson) – Harper & Boucot, 1978: 162, pl. 35:1–10; Cocks, 1978: 129, **lectotype**.
= *Shaleria (Shaleria) ornatella* (Davidson) – Musteikis & Cocks, 2004: 466, fig. 5L–O, 6B–H.
= *Shaleria (Janiomya) ornatella* (Davidson) – Hoel, 2011: 223, fig. 12A–N.

Remarks. This species has wide stratigraphic and facies distribution (see Hoel, 2011: 225). The material documented here is more similar to the specimens from Lithuania than those from Gotland. In the East Baltic it occurs in the Přidoli and is restricted to the facies of moderate energy environments (e.g. reefs).

Occurrence. Kaugatuma (K_3b) Stage (Přidoli) in Estonia.

Localities. K_3bKg: Äigu quarry, Kaugatuma cliff, Kaugatuma-509 core 9.8-24.75 m.

Subgenus ***SHALERIA (SHALERIELLA)*** (Harper *et* Boucot, 1978)

Type species. By original designation: *Shaleriella delicata* Harper & Boucot, 1978, Ludlow, Hemse Group in Gotland, a subjective junior synonym of *Shaleria (Shaleriella) ezerensis* (Rybnikova) (see below).

Shaleria (Shaleriella) ezerensis (Rybnikova, 1966)
Plate 7: 12–14

= *Brachyprion ezerensis* Rybnikova, 1966: 80, pl. 1: 9–10; Rybnikova, 1967: 193, pl. 21: 1–2, **holotype**.
= *Shaleriella delicata* Harper & Boucot; 1978: 161, pl. 34: 11–25, 29 – Cocks & Rong, 2000: 302: fig. 192: 2a–c.
= *Shaleria (Shaleriella) ezerensis* (Rybnikova) – Musteikis & Cocks, 2004: 468, fig. 5P, 6A,I–P; Hoel, 2011: 226, figs 12M–P.

Remarks. Limited material from Estonia (few specimens) is very similar to the specimens described by Musteikis and Cocks, 2004 (see synonymy) from Lithuania.
Occurrence. Kaugatuma (K_3b) and Ohesaare (K_4) stages (Přidoli) in Estonia.
Localities. K_3bKg: Kaugatuma cliff, Kuressaare entrenhment; K_4Oh: Ohesaare cliff.

Superfamily PLECTAMBONITOIDEA Jones, 1928
Family LEPTESTIIDAE Öpik, 1933

Genus ***LEANGELLA*** Öpik, 1933

Type species. *Plectambonites scissa* var. *triangularis* Holtedahl, 1916, Llandovery, Solvik Formation in Asker, Norway.

Subgenus ***LEANGELLA (LEANGELLA)*** Öpik, 1933.

Type species. As for genus.

Leangella (Leangella) scissa (Davidson, 1871)
Plate 8: 1–16

= *Leptaena scissa* [Salter MS] Davidson, 1871: 325, pl. 47:21–23, *non* 24–25; Davidson, 1883: 170: pl. 12:22.
= *Plectambonites scissa* (Salter) – Reed,1917: 880, pl. 14:34–35.
= *Plectambonites segmentum* (Angelin) var. *woodlandensis* Reed, 1917: 881, pl. 14: 36–41.
= *Leptelloidea scissa* (Davidson) – Jones, 1928: 481, pl. 25:8–12; Öpik, 1933: 42; Williams, 1965: H378, Fig. 242: 2a–c; Rybnikova, 1967: 186, pl. 18:7–10; Cocks, 1970: 160, **lectotype**; Temple, 1970: 36, pl. 9:1–22; Musteikis & Cocks, 2004: 468.
= *Leangella scissa* (Davidson) *triangularis* (Holtedahl) – Baarli, 1995: 24, pl. 7:1–11.

Remarks. All descriptions of the species on abundant material (Temple, 1970; Baarli 1995; Musteikis and Cocks, 2004) show variation in convexity and outline of the shell and in radial ornamentation, but these changes are not related to the stratigraphic age of the specimens. This is valid for the Estonian material, too. Both species occur in deepwater environment but are of different age. *L. (L.) scissa* has a distinctive triangular platform, whilst *L. (L.) segmentum* has oval platform (see below).
Occurrence. Juuru (G_{1-2}) to Adavere (H) stages (Rhuddanian–Telychian) in Estonia, Llandovery in Latvia, Norway and U.K., Wenlock in Lithuania.
Localities (in cores, depth in m). G_{1-2}Vb: Kabala-13a 99.4-108.8; G_{1-2}Õh: Viljandi-91 197.8-217.9; Laeva 101.05-149.8; Varbla-502 227.4-255.7; G_{1-2}Õh–G_3Nr: Pärnu 186.8-237.0; Ohesaare ?369.2-17.43; Holdre 294.0- 411.0; G_3Sr: Abja-92 186.8-302; Tootsi-175 146.7; Sulustvere-5 158.8-188.15; G_3–H: Ikla 297.5-478.1; G_{1-2}Õh–H'Vl: Kingissepa–GV 212.7-292.4; Seliste-173 164.2-328.9; Häädemeeste-172 191.7-388.2; Ruhnu-500 487.0-590.5.

Leangella (Leangella) segmentum (Lindström, 1861)
Plate 12: 7–11

= *Leptaena segmentum* [Angelin MS] Lindström, 1861: 374 – Davidson, 1871: 321, pl. 48: 28–30; Öpik, 1933: 42, text-fig. 8; Cocks, 1970: 162, pl. 3:1, pl. 4:7– 12, **lectotype**; Bassett and Cocks, 1974: 13; Bassett, 1974: 83, pl. 19:3–16, pl. 20:1–7; Musteikis & Cocks, 2004: 468, figs 4A–D; Modzalevskaya & Pushkin, 2007: 9, pl. 7:30–31.
= *Leptelloidea segmentum* (Lindström) – Jones, 1928: 485, pl. 25:13–18.

Description. Shell small, concavoconvex, with medium and even longitudinal curvature, with the highest point in the middle of ventral valve. Ventral umbo inconspicuous. Ventral interarea low, plane, apsa- to orthocline, dorsal interarea low, plane, hypercline. Outline transversely semioval, with alate cardinal angles, especially in juvenile specimens. Ornament of up to 9 rounded ribs, from which the median and two laterals originate at the apex; new ribs intercalate on some distance from the umbo. Interspaces between the ribs are (on the studied specimens) covered by occasionally developed radial capillae. Dorsal cardinalia strong, with tripartite cardinal process and socket plates nearly parallel to hinge line. Bema transversely oval, medially elevated, marginally invaginated (W-shaped), subperipheral rim anteriorly slightly elevated, parallel to valve margin (not invaginated as in *L. scissa*), with radial grooves corresponding to the main ribs.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia. Llandovery to Ludlow of Belarus (Modzalevskaya, Pushkin, 2007), Gotland, Lithuania and U.K. (Musteikis and Cocks, 2004).
Localities (in cores, depth in m). J_1: Kalvarija, Lithuania 766.2-835.2; H'Vl–J_1Jn: Pärnu 85.95-121.1; J_1Jn: Sooääre-330 108.3-137.5; Ohesaare 284.32; Paramaja cliff.

Family XENAMBONITIDAE Cooper, 1956
Subfamily AEGIROMENINAE Havlíček, 1961

Genus ***JONESEA*** Cocks et Rong, 1989

Type species. *Leptaena grayi* Davidson, 1849, Homerian, Much Wenlock Limestone Formation in Dudley, West Midlands, U.K.

Jonesea grayi (Davidson, 1849)
Plate 12: 1–4

= *Leptaena grayi* Davidson, 1849: 271, fig. 1, 1a.
= *Chonetoidea grayi* (Davidson) – Jones, 1928: 500.
= *Plectodonta aknistensis* Rybnikova, 1967: 188, pl. 19:1–2.
= *Aegiria grayi* (Davidson) – Cocks, 1968: pl. 12: 3, **lectotype**; Cocks, 1970: 197, pl. 17:8–14; Bassett & Cocks, 1974: 13; Modzalevskaya & Pushkin, 2007: 11, pl.5:1–5.
= *Jonesea grayi* (Davidson) – Musteikis & Cocks, 2004: figs 4E–F.

Description. Shell small, concavoconvex, outline semielliptical. Costae angular, covered by very thin concentric filae (usually not preserved), increase in number by intercalation. Median costa with lateral costellae forms ventral fold, dorsal sinus sometimes quite deep, delineated by two costae. Umbones inconspicuous, with protegulal nodes, which on ventral valve are apically extended by a short tube (usually broken).

Remarks. The Baltic specimens have a small foramen on the ventral peak with a thin calcitic tube, the base of which was described by Rybnikova (1967: 188) as a protegulal node. In spite of poor preservation of this tube, it is diagnostic for *J. grayi* and allows to distinguish it from juveniles of other strophomenids quite well.
Occurrence. Raikküla (G_3) to Jaani (J_1) stages (Aeronian-Sheinwoodian) in Estonia. Ludlow on Gotland (Bassett & Cocks, 1974) and in Latvia (Rybnikova, 1967), topmost Wenlock and Ludlow in Belarus (Modzalevskaya, Pushkin, 2007: 12), upper Llandovery to lower Přidoli of Lithuania (Musteikis & Cocks, 2004: 470).
Localities (in cores, depth in m). G_3Sr: Ruhnu-500 493.6-572.8; Ikla 461.4-485.6; Häädemeeste-172 342.7-341.5; Holdre 371.0; H'Vl: Kingissepa–GV 202.7-214.9; Orissaare-850 86.5; H'Vl–J_1Jn: Ohesaare 287.7-369.3.

Genus *AEGIRIA* Öpik, 1933

Type species. *Aegiria norvegica* Öpik, 1933, Rhuddanian, Solvik Formation in the Oslo Region, Norway.

Aegiria norvegica Öpik, 1933
Plate 12: 5–6

= *Aegiria norvegica* Öpik, 1933: 55, pl. 10:1–5, pl. 11:3–5, **holotype**; Thomsen & Baarli, 1982: pl. 1:18, Baarli, 1987: fig. 5e; Baarli 1995: 26, pl. 7:12–23.

Description. Shell medium-sized, concavo- to planoconvex, with moderate convexity and concavity, respectively. Outline transversely semielliptical; cardinal angles obtuse to alate. Ventral umbo inconspicuous, not incurved; interarea low, plane to weakly concave, apsacline; pseudodeltidium apical. Dorsal umbo not developed; interarea low, plane, hypercline, chilidium with small chilidial plates, protruding cardinal process filling space between them. Ventral fold developed umbonally, turns anteriorly into slight sulcus. Dorsal fold narrow, begins from apex, disappears anteriorly. Radial ornament finely multi- to fascicostellate, costae rounded, covered by concentric filae, 6-7 costae per mm at the anterior margin. Ventral interior: teeth bluntly rounded, situated close to the delthyrium. Dental plates short, diverging widely and joining with muscle bounding ridge. Pedicle callist present, extended anteriorly by a ridge, which separates small and oval adductor scars. Diductor scars large, divergent anteriorly. Internal surface with expression of external radial ornament, with marginal papillae. Mantle canals obscure. Dorsal interior: undercut cardinal process trifid, high. Sockets shallow, completely bordered by socket plates, which are widely splayed, parallel to the hinge line, with small protruding plates at their ends. Median ridge begins anteriorly of the depression, it is strong, rising up to the margin of bema and continuing anteriorly of the bema. Bema semioval, well-developed, undercut, with two radial ridges, with striae following the external costellae.
Remarks. The Estonian specimens of *A. norvegica* (with maximum width 10 mm and sagittal length 5 mm) are larger than the specimens from Norway (9 to 10 mm in dorsal valve and 4 to 5 mm, respectively) or specimens of *A. garthensis* from Wales (average values 7.9 mm and 3.37 mm, respectively). That suggests also stronger expression of internal structures of the Estonian specimens, but this is valid only for the dorsal median ridge, which is more prominent here. All other structures remain within the variation range, which is moderate in the described species.
Occurrence. Raikküla Stage (G_3) (Rhuddanian–Aeronian) in Estonia.
Localities. G_3Sr: Ikla core 395.4-397.6 m.

Family SOWERBYELLIDAE Öpik, 1930
Subfamily SOWERBYELLINAE Öpik, 1930

Genus ***EOPLECTODONTA*** Kozłowski, 1929

Type species. *Sowerbyella praecursor* Jones, 1928, a junior synonym of *Leptaena duplicata* J. de C. Sowerby, 1839, late Rhuddanian, Gleugoed Formation in Cefn Ry, Carmantershire, U.K.

Subgenus ***Eoplectodonta (Eoplectodonta)*** Kozłowski, 1929

Type species. As for the genus.

Eoplectodonta (Eoplectodonta) transversalis (Wahlenberg, 1818)
Plate 9: 1–12

= *Anomites transversalis* Wahlenberg, 1818: 64.
= *Leptaena transversalis* (Wahlenberg) – Dalman, 1828: 109, pl 1:4, *non* Davidson, 1871: 318, pl. 48:1–9.
= *Eoplectodonta transversalis* (Wahlenberg) – Cocks, 1970: 177, pl. 12:1–13, **neotype**; Bassett & Cocks, 1974: 13; Cocks & Rong, 1989, figs 131–136.

Remarks and **occurrence.** This species has many specific features (rounded outline, well-developed interareas and hinge denticulation) making it different from other species of *Eoplectodonta* in the Baltic area. Until recently it was known only from the latest Telychian, Lower Visby Marls in Gotland. In Estonia, rare specimens were found in the Velise Formation, Adavere Stage (H) (Telychian) in the Lätiküla outcrop, Estonia.

Eoplectodonta (Eoplectodonta) duvalii (Davidson, 1847)
Plate 10: 15–18

= *Leptaena Duvalii* Davidson, 1847: 58, pl. 12: 20–21.
= *Leptaena transversalis* (Wahlenberg) – Davidson, 1871: 318 pars, pl. 48: 1, 2, 4–6, ?7–8, *non* figs 3, 8–9.
= *Eoplectodonta duvalii* (Davidson) – Cocks, 1970: 182, pl. 12:14–16; pl. 13: 3, 7, 10, **holotype**; Bassett & Cocks, 1974: 13; Cocks & Rong, 1989: 135, figs 124c–d, 130, 137; Modzalevskaya & Pushkin, 2007: 10, pl. 3:4–9.
= *Eoplectodonta (E.) duvalii* (Davidson); Musteikis & Cocks, 2004. Fig. 8: A–F.

Remarks. Large, densely ribbed semioval shell lacks undulation, both valves have all internal structures which are typical of the species. *Eoplectodonta (E.) duvalii* is widespread mostly in Wenlock of Lithuania, Gotland, U.K. and also in Estonia.
Occurrence. Adavere (H) to Jaagarahu (J_2) stages (Telychian–Homerian) in Estonia.
Localities (in cores, depth in m). H'Vl–J_1Jn: Pärnu 76.78-121.33; J_1Jn: Paramaja cliff; Kaugatuma-509 219.0-234.3; J_1Rg–J_2Jm: Ruhnu-500 400.6-418.5.

Eoplectodonta (Eoplectodonta) exceptionis (Rybnikova, 1967)
Plate 11: 1–9

= *Plectodonta exceptionis* Rybnikova, 1967: 189, pl. 19:6–12, text-fig. 30, **holotype**.
= *Eoplectodonta (E.) exceptionis* (Rybnikova) – Musteikis & Cocks, 2004, figs 8 H–I.

Remarks. This species is considered here in the sense of Musteikis and Cocks (2004). It is closely similar to *E. (E.) duvalii,* differing in more alate outline and slight posterolateral rugation on the ventral valve.
Occurrence. Juuru (G_{1-2}) to Jaani (J_1) stages (Rhuddanian–Sheinwoodian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Õh–G_3Sr: Holdre 294.0-396.0; Häädemeeste-172 315.3-424.8; G_3Sr–J_1Rg: Ikla 234.0-480.0; H'Vl: Ohesaare 371.1-371.2.

Eoplectodonta (Eoplectodonta) penkillensis (Reed, 1917)

Plate 11: 10–19

= *Plectodonta exceptionis* Rybnikova, 1967: 189, pl. 19:6–12, text-fig. 30, **holotype**.
= *Leptaena transversalis* (Wahlenberg) – Davidson, 1871: 318 pars, pl. 48:3, 8–9 *non* 1, 2, 4–7.
= *Plectambonites transversalis* (Wahlenberg) var. *penkillensis* Reed, 1917: 888, pl. 16:3–7.
= *Sowerbyella penkillensis* (Reed) – Jones, 1928: 444, pl. 23:13–16.
= *Sowerbyella millinensis* Jones, 1928: 444, pl. 23:13–16.
= *Sowerbyella millinensis* var. *parabola* Jones, 1928: 446, pl. 23:18-20.
= *Plectodonta millinensis* (Jones) – Kozłowski, 1929: 113.
= *Eoplectodonta penkillensis* (Reed) – Cocks, 1970: 172, pl. 9:1–15, pl.10:1–12, pl. 11:1–16, **lectotype**; Cocks & Baarli, 1982: pl. 1:1–9; Modzalevskaya & Pushkin, 2007: 10, pl. 3:1-3.
= *Eoplectodonta (Eoplectodonta) penkillensis* (Reed) – Musteikis & Cocks, 2004: figs 7, 8G.

Remarks. The species differs from other species of the genus *Eoplectodonta* in having small shell, low number of accentuated radial ribs, semielliptical (and not alate) outline.
Occurrence. Juuru (G_{1-2}) to Jaani (J_1) stages (Rhuddanian–Sheinwoodian) in Estonia. Llandovery in Belorus, Lithuania and U.K..
Localities (in cores, depth in m). G_{1-2}Õh–J_1Jn: Kingissepa–GV 134.0-289.0; G_{1-2}Õh–G_3Sr: Ruhnu-500 564.0-590.9 and questionably 523.5-559.4; H'Vl: Ohesaare 355.1-369.2; Kaugatuma-509 254.5-263.5; H'Vl–J_1Rg: Häädemeeste-172 197.1-231.7; J_1: Saaremaa borehole no 859 77.2-82.6; Kalvarija (Lithuania) 810.6-847.3.

Genus ***EOPLECTODONTA (YGERODISCUS)*** Havlíček, 1967

Type species. *Leptaena transversalis* var. *undulata* Salter in Phillips & Salter, 1848, late Rhuddanian to early Aeronian, Mathrafal, Meifod, U.K.

Eoplectodonta (Ygerodiscus) bella Musteikis et Cocks, 2004

Plate 10: 1–14

= *Eoplectodonta (Ygerodiscus) bella* Musteikis & Cocks, 2004: 473, figs 8M–Q, **holotype**.

Remarks and **occurrence**. All exteriorly undulating shells with strong internal features on the dorsal valve are identified as *E. (Y.) bella* in the Juuru (G_{1-2}) to Jaagarahu (J_2) stages (Rhuddanian–Homerian) in Estonia. In Lithuania, distribution of this species is diachronous, being confined to onshore facies in Wenlock and Ludlow.
Localities (in cores, depth in m). G_{1-2}Õh–G_3Sr: Ohesaare 383.5-434; Viljandi-91 171.5-265.7; Laeva-297 114.0; Abja-92 317.5-357.6 and 248.1-266.5; G_3Nr–J_1Jn: Seliste-173 137.1-337.2; J_1: Pärnu 94.03; Kalvarija (Lithuania) 720.0-810.0; G_3Sr–J_2Jm: Ruhnu-500 308.2-508.2.

Order PRODUCTIDA Sarycheva et Sokolskaya, 1959
Suborder CHONETIDINA Muir-Wood, 1962
Superfamily CHONETOIDEA Bronn, 1862
Family STROPHOCHONETIDAE Muir-Wood, 1962
Subfamily STROPHOCHONETINAE Muir-Wood, 1962

Genus ***STROPHOCHONETES*** Muir-Wood, 1962

Type species. *Chonetes cingulata* Lindström, 1861, Homerian, Halla Formation of Gotland, Sweden.

Strophochonetes cingulatus (Lindström, 1861)
Plate 13: 4–6

= *Chonetes cingulata* Lindström, 1861: 374, pl. 13:19; Hede, 1917: 14, pl. 1:11–13.
= *Strophochonetes cingulatus* (Lindström) – Muir-Wood, 1962: 40, pl. 2:10–11.

Remarks. The mostly Wenlock *S. cingulatus* has similar counterparts in Gotland (*S. piptis* Bassett, 1979) and in Bohemia (*S. gluma* (Barrande, 1879), *S. soror* (Barrande, 1879), *S. omissus* (Havlíček et Racheboeuf, 1979). They differ from *S. cingulatus* in density of radial ribs, as well as strength of cardinalia and ventral septum. The systematic relationships of *S. cingulatus* with these related taxa can be adequately reconstructed only after investigation of the rich collection of the *Strophochonetes* from Lithuania.
Occurrence. Juuru (G_{1-2}), Adavere (H) and Jaani (J_1) stages (Rhuddanian–Sheinwoodian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Õh: Holdre 351.3; H'Vl: Pärnu 115.13; J_1Jn: Ohesaare 288.4-308.0.

Subfamily PROTOCHONETINAE Racheboeuf, 2000

Genus ***PROTOCHONETES*** Muir-Wood, 1962

Type species. *Chonetes novascoticus* var. *missendenensis* Straw, 1933, Přidoli, Little Missenden borehole, Buckingamshire, U.K.; a senior synonym of *Protochonetes ludloviensis* Muir-Wood, 1962.

Protochonetes striatellus (Dalman, 1828)
Plate 13: 7–13

= *Orthis striatella* Dalman, 1828: 111, pl. 1:5a–b.
= *Protochonete striatellus* (Dalman) – Muir-Wood, 1962: 50, pl. 3:6–7, pl. 8:1–2: Böger, 1968: 123, figs 1–6, 9–11.

Remarks. The Estonian specimens are identical to *P. striatellus* from Gotland.
Occurrence. Paadla Stage (K_2) (Gorstian–Ludfordian) in Estonia, Wenlock and Ludlow on Gotland and in Latvia. Abundant but insufficiently studied materials from Lithuania, Latvia and Belarus make necessary a future revision of several *Protochonetes* species (*striatellus, ludloviensis, dniestrensis, piltenensis*).
Localities (in cores, depth in m). K_2: Uduvere, Viki, Paadla 0.2-4.7; Ohesaare 82.5-98.3; Kingissepa–GI 21.7-25.0.

Protochonetes piltenensis (Rybnikova, 1967)
Plate 13:14–16, plate 14; 2–8

= *Protochonetes piltenensis* Rybnikova, 1967: 196, pl. 22:4, **holotype**.

Remarks. The species is widespread in the East Baltic area but needs additional study (see above).
Occurrence. Kuressaare (K_3a) and Kaugatuma (K_3b) stages (Ludfordian–Přidoli) in Estonia, Přidoli in Latvia. In the context of adopted species concept, the material from other areas would need a revision.
Localities (in cores, depth in m). K_3aKr: Laadjala quarry; Roomassaare excavations; Kingissepa–GI 4.6-15.5; K_3aKr–K_3bKg: Muratsi quarry; Kaugatuma-509 4.2-62.5; Ohesaare 12.47-62.56.

Order ORTHOTETIDA Waagen, 1884
Suborder ORTHOTETIDINA Waagen, 1884
Superfamily CHILIDIOPSOIDEA Boucot, 1959
Family CHILIDIOPSIDAE Boucot, 1959
Subfamily CHILIDIOPSINAE Boucot, 1959

Genus ***COOLINIA*** Bancroft, 1949

Type species. *Orthis* ? *applanata* Salter in Mc'Coy, 1846, Telychian beds at Coolin, Galway, Ireland.

Coolinia applanata (Salter, 1846)
Plate 15: 1–9

= *Orthis* ? *applanata* Salter in Mc'Coy, 1846: 72, pl. 5:1a–c.
= *Strophomena pecten* (Linneaus) – Davidson, 1871: 304 pars, pl.43:4–6, 9, *non* figs 1–3, 7–8, 10–11; Teichert, 1928: 55.
= *Coolinia applanata* (Salter) – Bassett, 1974: 94, pl. 23:1-7; Cocks & Baarli, 1982: pl. 1:16–17.

Remarks. This species has 2 radial ribs per mm at the margin of the ventral valve. Some dorsal valves from the Varbla core have an incomplete chilidium, consisting of two separate chilidial plates. These forms are within the variation range of *Coolinia applanata*, although usually this feature is considered to be characteristic of the genus *Fardenia.*
Occurrence. Widespread in the Juuru and Raikküla stages (Rhuddanian–Aeronian) in Estonia, Llandovery in U.K and Norway.
Localities (in cores, depth in m). G_{1-2}: Heltermaa beach, Anna, Härküla, Pullapea, Koigi, Vahtrepa ditch, Kirimäe quarry, Kiltsi quarry, Kuimetsa, Rohuküla quarry, Kingissepa–GV 263.5-289.0, Navesti-98 70.7-105.0, Laeva-4 82.25-101.5, Pärnu 216.9; G_{1-2}–G_3: Varbla-502 187.5-248.8, Kabala-13a 67.9-106.5, Rõusa-5 96.6-110.3, Kirikuküla 83.4-110.2; G_3: Vao-20 15.6, Laeva-3 133.0, Koksivere-107 65.0, Türi-328 55.1, Ellakvere quarry, G_3Hl: Kallasto cliff, Hilliste quarry.

Coolinia pecten (Linnaeus, 1758)
Plate 15: 10–12

= *Anomia pecten* Linnaeus, 1758: 702, no. 193.
= *Strophomena pecten* (Linnaeus) - Davidson, 1871: 304 *pars*, pl. 43:1–3, 7–8, *non* figs 4–6, 9–11.
= *Coolinia pecten* (Linnaeus) – Brunton & Cocks, 1967: 166, pl. 1:22–26, **lectotype**; Bassett & Cocks, 1974: 18; Dewing, 1999: 41, pl. 15:14–22, pl. 16:1–18, text-figs 37–38.

Remarks. In comparison with *C. applanata* (see above), this species has more and thinner radial ribs (3 per mm at the margin of the ventral valve), socket plates are thinner and more widely placed; notothyrial platform and median ridge stronger.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia. Wenlock on Anticosti and Gotland, in U.K.
Localities (in cores, depth in m). H: Lätiküla excavations; J_1: Suuriku cliff, Kingissepa–GV 176.95-177.0; Saaremaa borehole No 835 38.1-60.5. The Saaremaa borehole is not shown in the Table 2 and Figure 2.

Genus ***MORINORHYNCHUS*** Havlíček, 1965

Type species. *Morinorhynchus dalmanelliformis* Havlíček, 1965, Ludlow, Kopanina Formation of Bohemia, Czech Republic.

Morinorhynchus crispus (Lindström, 1861)
Plate 15: 13–15

= *Strophomena crispa* Lindström, 1861: 373, pl. 13:17.
= *Strophomena serrulata* Lindström, 1861: 373, pl. 13:18.
= *Morinorhynchus crispus* (Lindström) – Bassett & Cocks, 1974: 20, pl. 4:1–8; Nikiforova et al, 1985: 26, pl. 6:4–9; Williams & Brunton, 2000: 674, fig. 487:1d–f, **lectotype**.

Remarks. This variable species differs from *M. rubeli* (see below) in its widely positioned socket ridges and smaller denticles.
Occurrence. Paadla (K_2) to Kaugatuma stages (K_3b) (Gorstian–Přidoli) in Estonia.
Localities. K_2Pd: Uduvere quarry, Pilguse quarry, Unimäe; K_3aKr–K_3bKg: Kingissepa–GI core 12.0-21.6 m; K_3bKg: Muratsi quarry; Kaugatuma cliff.

Morinorhynchus rubeli Musteikis et Cocks, 2004
Plate 33: 1

= *Morinorhynchus rubeli* Musteikis & Cocks, 2004: 474: fig. 6R–T, 10, **holotype**.

Remarks and **occurrence**. The available specimens, all from the Ohesaare Formation (K_4Oh, Přidoli) in the Ohesaare cliff section, are distinct in having plastic asymmetric shell shape. Although this feature could make the identification questionable, the cardinalia with closely spaced socket plates allow to consider these specimens as *M. rubeli.*

Suborder TRIPLESIIDINA Moore, 1952
Superfamily TRIPLESIOIDEA Schuchert, 1913
Family TRIPLESIIDAE Schuchert, 1913

Genus ***TRIPLESIA*** Hall, 1859

Type species. *Atrypa extans* Emmons, 1842, Caradoc, New York State, U.S.A.

Triplesia maennili Rubel, 1963
Plate 16: 4–12

= *Triplesia maennili* Rubel, 1963: 130, pl. 3:11–20, **holotype**.

Remarks. This species differs from *T. insularis* (see below) in its more erect ventral beak, less convex valves, less prominent sulcus and fold, and in slight asymmetry of the shell.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia, mainly in bioherms.
Localities. G_{1-2}Vb: Vahtrepa ditch; G_3Hl: Hilliste quarry, Kassari bioherm.

Triplesia insularis (Eichwald, 1843)
Plate 6: 13, plate 16: 1

= *Triplesia insularis* (Eichwald) – Tsegelnjuk, 1976: 56, pl. 7: 13–15, holotype, full synonymy,
= *Triplesia* sp. Rubel, 1963: 131, pl. 4: 11–15.

Remarks. The Late Ordovician *Triplesia insularis* and *Grammoplecia triplesoides* (see Tsegelnjuk, 1976 and Wright & Jaanusson, 1993) are closely similar to the Llandovery material illustrated here. *T. insularis* in the Vormsi Stage of Estonia is only slightly larger, while *G. triplesoides* from Sweden differs certainly in finely capillate exterior.
Our Wenlock specimens from the Ikla core are yet smaller and resemble the British *Triplesia wenlockiensis* Davidson (see Bassett, 1972: 73). The latter and two Czech species, *Mimulus moera* and *M. contrarius* (see Havlíček and Storch, 1990: 58) have no pseudodeltidial fold (monticulus) and have been attributed to the genus *Placotriplesia* (Wright, 1993: 485). Unfortunately no ventral valves are known from the Ikla core.
Occurrence. Vormsi and Pirgu Stages (Upper Ordovician), Juuru (G_{1-2}) and questionably Jaani (J_1) stages (Rhuddanian) in Estonia. Subboch Formation (Upper Ordovician) in Ukraine.
Localities (in cores, depth in m). G_{1-2}: Heltermaa beach; Viljandi-91 249.0–250.2; Abja-92 ?167.7 and 322.8; Seliste-173 308.5; Ohesaare 419.6; ?J_1: Ikla 276.0-284.3.

Genus ***STREPTIS*** Davidson, 1881

Type species. *Terebratula grayii* Davidson, 1848, Homerian, Much Wenlock Limestone Formation of Dudley or Walsall, West Midlands, U.K.

Streptis grayii (Davidson, 1848)
Plate 21: 8–9

= *Terebratula Grayii* Davidson, 1848: 331, pl. 3:33.
= *Streptis grayii* (Davidson) – Bassett, 1972: 74, pl. 16:11–13, pl. 17:1–5, **lectotype**; Hints, 1986: 13–24.

Remarks. This species has stable, characteristic morphology. It differs from the stratigraphically older *T. altosinuata* (see below) in more distinct asymmetry of the shell.
Occurrence. Adavere (H) to Jaagarahu (J_2) stages (Telychian–Homerian) in Estonia. Upper Llandovery in Norway, Wenlock in U.K. and on Gotland.
Localities (in cores, depth in m). H: Pärnu 109.6-122.22, Kõinastu cliff 34.5, J_1: Kingissepa–GV 163.0, Seliste-173 149.5, Ristiküla-174 157.7, Ikla 276.0-278.9, Kaugatuma-509 219.9-223.2, Viirelaid 57.2; J_2: Ruhnu-500 402.6.

Streptis altosinuata Holtedahl, 1916

Plate 27: 7

= *Streptis monilifera* (Mc'Coy) – Rubel *et al.*, 1984: 11.
= *Streptis altosinuata* Holtedahl – Hints, 1986: 23, pl. 2: 11–12.

Remarks and **localities**. The single Silurian specimen of this species (from Abja-92 core, 311.0 m, G_{1-2}Õh) is identified by Hints, 1986 (see synonymy).
Occurrence. Juuru (G_{1-2}, Rhuddanian) in Estonia.

Class RHYNCHONELLATA Williams et al., 1996
Order PROTORTHIDA Schuchert et Cooper, 1931
Superfamily SKENIDIOIDEA Kozłowski, 1929
Family SKENIDIIDAE Kozłowski, 1929

Genus ***SKENIDIOIDES*** Schuchert et Cooper, 1931

Type species. *Skenidioides billingsi* Schuchert & Cooper, 1931, Burrelian Black River Formation of Quebec, Canada.

Skenidioides scoliodus Temple, 1968

Plate 17: 16–20

= *Skenidioides scoliodus* Temple, 1968: 28, pl. 5:1–2, **holotype**; Baarli, 1995: 22, pl. 6:1–6.
= *Skenidioides* cf. *scoliodus* Temple - Havlíček, 1968: 101, pl. 33:20; Havlíček & Storch, 1990: 49, pl. 6:11.
= *Skenidioides* sp. – Baarli & Harper, 1986: pl. 3a–b.

Description. Shell small, 5-7 mm wide, ventribiconvex; outline transversely semioval, cardinal angles obtusely rounded to acute; anterior commissure deeply unisulcate. 14 to 15 radial costae are rounded, with few secondary branches. Ventral median rib with several lateral branches, costae covered by concentric filae and anteriorly by growth lamellae. Ventral valve with slightly rounded beak, continued immediately by a pronounced fold with laterally flattened flanks; ventral interarea high, flat, catacline; delthyrium wide, apically obtuse. Dorsal valve slightly convex, with deep anteriorly widening sulcus; dorsal interarea low, anacline. Dorsal median septum high, long, reaching the anterior margin. Cardinal process plate-like, widening anteriorly, joined with median septum. Brachiophores widely divergent, stout, with rod-like extensions (usually not preserved), directed antero-ventrally; cruralium rhombic, low and slightly elevated from the bottom of valve. Sockets shallow, elevated by small fulcral plates. Shell material fibrose.
Remarks. *S. scoliodus*, originally a British species, has been identified in Norway (see synonymy) and now in Estonia. The new species of the genus described below (*S. petrasi* sp. n.) is an immediate successor of the *S. scoliodus*. They both belong to the same intrageneric lineage which has its roots in the Ordovician.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia. Rhuddanian in Norway, U. K. and Czech Republic.
Localities (in cores, depth in m). G_{1-2}Õh: Abja-92 328.0-357.6; Ruhnu-500 590.5-?598.0; G_{1-2}–G_3: Häädemeeste-172 390.2-424.8 and 324.3-325.0; Ikla 501.2-519.0 and 472.0-482.0; Kaugatuma-509 289.7-335.8.

Skenidioides acutum (Lindström, 1861)

Plate 17: 12–15

= *Orthis acuta* Lindström, 1861: 370, pl. 13:13.
= *Skenidioides acutum* (Lindström) – Whittard & Barker, 1950: 563; Bassett & Cocks, 1974: 9.

Type specimen. Not selected, see Bassett, 1972: 9.
Description. Shell small with maximum width on posterior part, outline transversely suboval, cardinal angles obtuse to rectangular. Costae appear around apical protegulum, increasing in number by rare secondary branching, especially from ventral median costa. Number of densely spaced rounded costae along the margins of the shell varies from 26 to 30, costae are covered with concentric filae or lamellae. Ventral valve high, slightly and evenly convex. Ventral interarea high, plane to slightly concave, apsacline to catacline. Dorsal valve slightly convex, with a very weak sulcus or occasionally nonsulcate. Cruralium short, with rounded anterior margins, joined with anteriorly raising cardinal process, transferring into high and long median septum. Brachiophores strong and long (usually broken), directed ventrally, constrain sockets with fulcral plates. Shell material fibrose.
Remarks. In having a small, densely costate shell, erect and high ventral beak and slightly developed sulcus on nearly planar dorsal valve, this species is closely similar to *S. lewisii* (see Bassett, 1972: 35, pl. 5:10, 6:1-12). However, its small dimensions, absence of well-developed concentric ornamentation and relatively weak dorsal sulcus allow consider it within the variation range of *S. acutum,* an insufficiently known species from Gotland.
Occurrence. Raikküla (G_3) to Jaagarahu (J_2) stages (Aeronian-Homerian) in Estonia, Homerian on Gotland.
Localities (in cores, depth in m). G_3Sr: Ruhnu-500 526.6-566.0; G_3–H: Seliste-173 157.0-239.4; H: Ohesaare 368.3-369.2; H–J_1: Häädemeeste-172 205.7-219.7; Varbla-502 127.3-148.9; Ristiküla-174 243.3; Murika-511 42.9-55.2; Kingissepa–GV 134.0-216; J_1: Kaugatuma-509 232.55-243.1; J_1–J_2: Ikla 283.3-285.0 and 234.0-257.7.

Skenidioides petrasi sp. nov.

Plate 17: 1–11

Derivatio nomini. After Petras Musteikis.
Holotype. Selected here, complete shell GIT 506-2134a, Ikla core, depth 281.0-281.1 m, Tõlla Member, Jaani Stage, Wenlock.
Studied material. Over twenty shells, ventral and dorsal valves (including interiors) from six boreholes.
Diagnosis. *Skenidioides* with small, pyramidal, convexo-flat shell, no ventral fold, dorsal sulcus weak; up to 20 costae rounded, covered by strong concentric growth lamellae.
Description. Shell small, pyramidal, with high ventral and convex dorsal valves, may be asymmetrical. Outline transversely subquadrate, maximum width at hinge line, cardinal angles angular, anterior commissure rectimarginate to slightly unisulcate. Radial ornamentation costate, costae rounded, rarely bifurcated, covered by concentric growth lamellae or filae, number of costae along the margin of valve 16-20. Ventral valve without a fold, laterally slightly convex, ventral interarea high, flat, anacline to catacline, delthyrium apically slightly rounded, protegulum usually not developed, teeth small, spondylium not high, with a narrow supporting septum extending anteriorly. Dorsal valve evenly convex, sulcus weak, widening anteriorly, dorsal interarea extremely narrow, anacline, notothyrium open: cardinal process platelike, strong, striated, grading into a high median septum, which reaches anterior margin. Brachiophores strong, with rod-like extensions up to 2/3 of the valve length, constrain sockets, cruralium with rounded anterior margins. Shell material fibrose.
Discussion. The new species is similar to *S. scoliodus* (see above) and also to other strongly costate species, differing in asymmetry of shell and less distinct sulcus and fold. Because of high variability of concentric ornamentation (up to the absence), density of radial costae and dimensions in *S. petrasi,*

distinction between the new species and *S. acutum* (see above) may sometimes be difficult, especially in intervals of their possible co-occurrence or in case of fragmentary preservation.

Occurrence. Juuru (G_{1-2}) to Jaani (J_1) stages (Rhuddanian-Sheinwoodian) in Estonia.

Localities (in cores, depth in m). G_{1-2}–H: Häädemeeste-172 202.5-397.7; G_3: Ruhnu-500 523.0, ?590.5, ?598.0; H-J_1: Seliste-173 146.8-160.0; Ikla 274.0-282.0; J_1: Pärnu 98.49-105.2; Varbla-502 120.0-126.4.

Skenidioides hymiri Baarli, 1995

Plate 17: 21–22; plate 18: 1–17; plate 19: 10–11

= *Skenidioides lewisi* (Davidson) – Rubel, 1963: 128, pl. 3:1–10.
= *Skenidioides woodlandiensis* (Davidson) – Thomsen & Baarli, 1982: pl. 1:4.
= *Skenidioides hymiri* Baarli, 1995: 23, pl. 6:7–14, **holotype**.

Remarks. *S. hymiri* differs from other Estonian species of the genus in its larger size, strongly and densely ribbed ventribiconvex shell, slightly concave ventral area and weakly sulcate anterior commissure. The septalium in Estonian material is composed of straight brachiophore-supporting plates fusing with the median septum. The relatively short dorsal median septum reaches only the anterior margin of the adductor field, making this species different from *S. scoliodus*. Shells of *S. hymiri* from different boreholes of Estonia may differ both in strength of imbricative growth lamellae and in frequency and height of radial ribs. According to Baarli (1995) these features are shared by *S. hymiri* and *S. worsleyi* from the Llandovery of Norway.

All large Llandovery *Skenidioides* in Estonia have true endopunctae, which were described by Temple (1970: 19) in *Skenidioides* sp. (?=*S. woodlandiense* Davidson, 1883 according to Temple, 1968) from the Lower Llandovery of Fridd Mathrawal, Montgomeryshire. According to Baarli (1995), *S. woodlandiense* is not conspecific with *S. hymiri.* Unfortunately Baarli could not describe the shell structure of the Norwegian *hymiri,* having mostly casts in her collection. The endopunctae in the Estonian valves (plate 18: 9) are small and do not reach the outer layer, but are evenly distributed all over the valve. It is noteworthy that the shell structure of other species of *Skenidioides* in Estonia (*S. scoliodus* and *S.* sp. nov.) is fibrose, like it is typical of protorthids. Some punctate shells, e.g. from the Ikla section, resemble *S. worsley* Baarli from Llandovery of Norway in ribbing and very short median septum which supports spondylium. The stout septum occurs under the whole spondylium in one ventral valve from the Ristiküla-174 core, but only in the most posterior part of spondylium in another specimen from the Abja-92 core at a depth 321.1-.2 m. In the Abja-92 section, the early Juuru age specimens of *S. hymiri* are characterized by strong rounded ribs with well developed imbrication, by strongly convex ventral valve, concave interarea and small protegulum. In younger beds (Raikküla Stage), the ribs in *S. hymiri* are usually denser and higher and ventral area may change from apsacline to orthocline. A reversed trend can be observed in the Ikla and Häädemeeste sections.

The systematic position of *Skenidioides* sp. from the Mathrawal and *S. hymiri* from Estonia and perhaps Norway is somewhat unclear, because of their endopunctae and septalium which differs from other species of *Skenidioides* species, a short dorsal median septum, a weaker septum under the spondylium and larger size of their shells. If considering these endopunctate taxa as true Dalmanellidina, then they comprise a new genus, perhaps within Linoporellidae which share important features with *Skenidioides hymiri.*

Occurrence. Juuru (G_{1-2}) to Jaani (J_1) stages (Rhuddanian–Sheinwoodian), slope to outer shelf facies in Estonia, Rhuddanian in Norway.

Localities (in cores, depth in m). G_{1-2}Õh: Viljandi-91 195.8-238.5; Laeva-297 99.05-125.5; Ristiküla-174 325.8-331.4; G_3: Ruhnu-500 526.6-572.9; Seliste-173 280.6-320.9; G_3–J_1: Ikla 472.0-482.0, 374.3-397.6, ?305.5-320.2, ?286.0-298.4; G_{1-2}–G_3: Varbla-502 217.7 and 223.5; Pärnu 156.7-199.6, 118.1-122.22; Häädemeeste-172 389.4-399.5, 317.3-341.5, 206.8-209.6; Abja-92 308.2-336.3, 260.1-266.1, 220.3-221.2; Ohesaare 416.24, G_3–H: 372.95-385.68.

Order ORTHIDA Schuchert et Cooper, 1932
Suborder ORTHIDINA Schuchert et Cooper, 1932
Superfamily ORTHOIDEA Woodward, 1852
Family GLYPTORTHIDAE Schuchert et Cooper, 1931

Genus ***GLYPTORTHIS*** Foerste, 1914

Type species. *Orthis insculpta* Hall, 1847, Cautleyan, Richmond Formation of Ohio, U.S.A.

Glyptorthis irrupta Rubel, 1962
Plate 22: 19–23

= *Glyptorthis irrupta* Rubel, 1962a: 89, pl. 4:1–4, **holotype**.

Remarks. It is a rare species. The new material allows to describe the ventral muscle field, which is slightly elevated anteriorly, like in the type species (*G. insculpta* – see Zuykov & Butts, 2008: fig. 2.2). The new material from the Juuru Stage, Kingissepa–GV core, includes one dorsal valve with well-developed sinus and exopunctae, which are smaller and less regular than in the Ordovician genus *Bassettella* Zuykov & Butts (2008: 200).

The species is close to the British Wenlock *Glyptorthis whitei* (Bassett, 1972: 28, pl. 4:1-6), differing in less developed sinus (sulcus) in most dorsal valves. Poorly preserved specimens in our collection do not allow comparison with the Late Ordovician *Glyptorthis plana* Rõõmusoks, 1964 (p. 3, pl. 1:1-5) from Estonia. One ventral valve from the Ikla core at (377.2 m) is of remarkably large size.

Occurrence. Juuru (G_{1-2}) to Adavere (H) stages (Rhuddanian–Telychian) in Estonia.

Localities (in cores, depth in m). G_{1-2}: Kabala-13 83.2-107.5; Kingissepa–GV 268.5-288.35; Pärnu 189.9; Sulustvere-5 167.7; Ohesaare 419.4; G_3: Ikla 377.2 m; Abja-92 218.1-218.3; Kanaküla-3 133.4; H: Võiva, Päärdu, Valgu.

Family HESPERORTHIDAE Schuchert et Cooper, 1931

Genus ***HESPERORTHIS*** Schuchert et Cooper, 1931

Type species. *Orthis tricenaria* Conrad, 1843, Llanvirn, Guttenberg Formation of Wisconsin, U.S.A.

Hesperorthis hillistensis Rubel, 1962
Plate 20: 1–7

= *Hesperorthis imbecilla* Rubel, 1962a: 83, pl.2:1–9, **holotype**.
= *Hesperorthis hillistensis* Rubel, 1962a: 84, pl. 2:10-19, pl. 3:1–4, text-figs 6–7, **holotype**; Baarli, 1995: 15, pl. 3:3–10, 12–13.

Type specimen. According to the position in text, the name *Hesperorthis imbecilla* has priority before *Hesperorthis hillistensis* but the unfortunate choice of the name and the fact that the name *hillistensis* was preferred by Baarli (see synonymy) support maintaining the name *hillistensis*.

Remarks. It is reasonable to assign all specimens of *Hesperorthis* in the Rhuddanian shallow shelf facies with reefs (bioherms) to one species, *H. hillistensis*. Some variation was observed in this species within the reef facies and in the normal shelf facies but all have well-developed concentric filae, small antegydium and apical deltidium.

Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.

Localities (in cores, depth in m). G_{1-2}: Koigi ditch, Heltermaa beach, Vahtrepa ditch, Kuimetsa quarry, Murika-511 110.2-124.1; Pilistvere-4 94.9-101.5; Koksivere-107 91.5 and 99.3; Äiamaa 62.8-74.0; Kirikuküla 93.4-110.2; G_{1-2}–G_3: Hilliste bioherm, Kabala-13a 64.8-112.0; Kingissepa-GV 235.5-290.1; G_3: Rõusa-5 101.25-115.55; Ohesaare 382.79; Sulustvere-5 91.70-95.03.

Hesperorthis davidsoni (de Verneuil, 1848)

Plate 21: 12–13

= *Orthis davidsoni* de Verneuil, 1845: 341. pl. 4:9a–c – Wysogorski, 1900: pl. 8.
= *Hesperorthis torquata* Rubel, 1962: 86, pl. 3:5–10, **holotype**.
= *Hesperorthis davidsoni* Rubel, 1962: 87, pl. 3:11–16, text-fig. 11; Bassett & Cocks, 1974: 6, pl. 1:1–2, **lectotype**; Jin et al., 1993: 111: pl. 33:10–17.

Remarks. The species is rare in Wenlock and Upper Llandovery. It differs from *H. hillistensis* in its angular radial ribs, which on the contrary allows to consider *H. torquata* in the Adavere Stage of Estonia conspecific with *H. davidsoni*.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia, Wenlock on Gotland.
Localities. H: Päri quarry, Valgu River Bank, Võiva-Veliseditch; Orissaare-850 core 98.0-100.4 m; J_1: Saastna cape exposure

Genus ***DOLERORTHIS*** Schuchert et Cooper, 1931

Type species. *Orthis interplicata* Foerste, 1909, Telychian, Osgood Formation of Indiana, U.S.A.

Dolerorthis rustica (J. de C. Sowerby, 1839)

Plate 21: 10–11

= *Orthis rustica* J. de C. Sowerby *in* Murchison, 1839: 624, pl. 12.9; Davidson, 1847: 64, pl. 13:1–4 Davidson, 1869: 238, pl. 34:13–17, **non** 18–22; Gagel, 1890: 30, pl. 2:26a–b.
= *Orthis osiliensis* Schrenk, 1854: 76, *nomen nudum*; Schmidt, 1858: 215.
= *Orthis plicatella* Eichwald, 1861: 242.
= *Dolerorthis rustica osiliensis* Schmidt – Schuchert & Cooper, 1932: 89, pl. 5:10, 12, 15, 19–21, 23.
= *Dolerorthis osiliensis* Schmidt – Rubel, 1963: 126, pl. 2:1–11.
= *Dolerorthis rustica* (J. e. C. Sowerby) – Bassett, 1970: 18, pl. 1:1–13, **lectotype**; Bassett & Cocks, 1974: 6.

Remarks. In spite of wide occurrence of the species in the Wenlock of North Europe there is no spatially or temporally lasting varieties to be considered even as subspecies.
Occurrence. Jaani (J_1) and Jaagarahu (J_2) stages (Sheinwoodian–Homerian) in Estonia.
Localities. J_1Jn: Suuriku cliff, Liiva cliff, Ninase cliff, Panga cliff, Jaani beach, Võrkoja, Paramaja cliff, Uisu; Orissaare-850 core 30.0-39.0 m; J_2: Tagamõisa quarry, Kurevere-Pangamägi, Kuusnõmme.

Genus ***PTYCHOPLEURELLA*** Schuchert et Cooper, 1931

Type species. *Orthis bouchardi* Davidson, 1847, Homerian, Much Wenlock Limestone Formation of Benthall Edge, Shropshire, U.K.

Ptychopleurella erecta Rubel, 1962

Plate 22:17–19

= *Ptychopleurella erecta* Rubel, 1962: 90, pl. 4:5–16, text-figs 4–5, **holotype**.

Type species. *Orthis bouchardi* Davidson, 1847, Homerian, Much Wenlock Limestone Formation of Benthall Edge, Shropshire, U.K.

Remarks. This species was first described from bioherms (Rubel, 1962a), but was later recorded also from other shallow water facies.

Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.

Localities (in cores, depth in m). G_{1-2}Vb: Kabala-13a 107.2-107.5; Rõusa-5 107.5; Kaugatuma-509 331.0-335.8; G_3Hl: Hilliste quarry, Kallasto cliff.

Ptychopleurella transversa sp. nov.

Plate 22: 27–30

Holotype. Selected here, complete shell GIT 554-587, Pärnu-6 core, depth 92.4 m, Jaani Stage.

Studied material. Over twenty shells, ventral and dorsal valves (including interiors) from five boreholes.

Diagnosis. Small, ventribiconvex shell with erect ventral apex and central rib, dorsal sulcus deep, strong ribs covered by growth lamellae. Outline transversely oval.

Description. Shell small to medium-sized, moderately ventribiconvex. Outline transversely suboval, hinge line straight, maximum width slightly anterior of the mid-length. Lateral margins gently curved, anterior commissure sulcate. Ventral beak erect, interarea triangular, plane, apsacline. Delthyrium open, narrow. Dorsal beak low, curved over the hinge line, dorsal interarea short, plane, anacline. Notothyrium open, occupied medially by the cardinal process. Ornament coarsely costellate, angular, primary costae slightly rounded. The strong median costa branches once to both sides. Dorsal sulcus bound by the first pair of medially branching primary ribs. All costae are crossed by strong, closely spaced growth lamellae. Well-preserved specimens possess exopunctae. Ventral interior: delthyrial chamber triangular, open. Hinge teeth triangular, small, with receding dental plates which bound anteriorly elevated muscle field. Dorsal interior: brachiophores widely diverging, platelike; small sockets with small fulcral plates. Cardinal process thick, extending anteriorly in a form of wide and high median ridge up to margin of the valve. Adductor field rhombic in outline, with elevated margins.

Discussion. The new species differs from the closest species, *P. erecta,* in its oval outline and rounded cardinal angles. *Ptychopleurella bouchardi* from the Wenlock of Gotland (Bassett & Cocks, 1974) has less transverse outline than the new species.

Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia.

Localities (in cores, depth in m). H–J_1: Pärnu 85.7-114.6; Pärnu-6 92.4-92.5; Kaugatuma-509 198.35-240.7; Kingissepa–GV 268.5-270.5; Sooääre-330 108.3-109.4.

Superfamily PLECTORTHOIDEA Schuchert et Le Vene, 1929
Family PLATYSTROPHIIDAE Schuchert et Le Vene, 1929
emend. Zuykov et Harper, 2007

Genus *NEOPLATYSTROPHIA* Zuykov et Harper, 2007

Type species. *Platystrophia lutkevichi* Alichova, 1951, Rakvere Stage (Katian), St. Petersburg Region, Russia.

Neoplatystrophia affabilis (Rubel, 1962)

Plate 23:1–2

= *Platystrophia affabilis* Rubel, 1962a: 80, pl. 1:1-10, text figs 8-9, **holotype**.
= *Platystrophia* sp. indet. – Rubel, 1963: 121, pl. 2:17, pl. 1:5.
= *Platystrophia* cf. *brachynota* (Hall) – Rubel, 1962a: 81, pl. 1:14, text-fig. 10.

Remarks. A specimen from the Hilliste quarry has well-preserved granulated exterior. The interiors known up to now (see Rubel, 1963) support the affiliation of Estonian material to the genus *Neoplatystrophia.*
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities. G_{1-2}Vb: Rohuküla quarry; Kirikuküla core 102.6 m; G_3Hl: Hilliste quarry; G_3: Kassari quarry, Sarve beach.

Neoplatystrophia jaaniensis (Rubel, 1963)

Plate 23: 3–4

= *Platystrophia jaaniensis* Rubel, 1963: 120, pl. 2:13–16, **holotype**.
= *Neoplatystrophia jaaniensis* (Rubel) – Zuykov & Harper, 2007: 28, pl. 2:9–11, fig. 2F.
= *Platystrophia* sp. – Rubel, 1963: 82, pl. 1:11–13.

Remarks. This species is recorded also from the Visby Formation of Gotland (see Zuykov and Harper, 2007).
Occurrence. Jaani Stage (J_1, Sheinwoodian) in Estonia.
Localities. J_1Jn*:* Suuriku cliff.

Family WANGYUIIDAE Zhang, 1989

*Genus **WANGYUIA** Zhang, 1989*

Type species. *Wangyuia thorsteinsoni* Zhang, 1989, Wenlock, Cape Phillips Formation, Baillie Hamilton Island, Canada.

Wangyuia sp.

Plate 20: 8–14

Remarks and **occurrence.** Fragmentary material from the Adavere and Jaani stages (Telychian-Sheinwoodian) in Estonia can be assigned to *Wangyuia* because of its typical cordate ventral muscle field, wavy (S-like profile) brachial plates and stout linear cardinal process with a short shaft. Specimens in the Juuru Stage (Rhuddanian) may not be conspecific but this could be confirmed only on well-preserved new specimens.
Localities (in cores, depth in m). G_{1-2}: Kingissepa–GV: 214.6-283.65; Ohesaare 430.7; Pilistvere-4 89.2; Kabala-13a 93.5-107.7; H–J_1: Kingissepa–GV: 200.5-200.6; Pärnu 83.6-108.86.

Suborder DALMANELLIDINA Moore, 1952
Superfamily DALMANELLOIDEA Schuchert, 1913
Family DALMANELLIDAE Schuchert, 1913
Subfamily DALMANELLINAE Schuchert, 1913

Genus ***DALMANELLA*** Hall et Clarke, 1892

Type species. *Orthis testudinaria* Dalman, 1828, Hirnantian, *Dalmanitina* beds of Borenshult, Västergötland, Sweden.

Dalmanella cyclica Rubel, 1962
Plate 25: 1–16

= *Dalmanella cyclica* Rubel, 1962b: 177, pl. 2:1-5, pl. 3:6, 7b, 14, text-fig. 3, **holotype.**

Remarks. This species has a high ventribiconvex shell with weak dorsal sulcus; its radial ribs are unequal (the primary ones are stronger) and covered by concentric filae. All these features and interior structures of both valves support the generic affiliation of this species to *Dalmanella*
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Vb: Rohuküla quarry, Kiltsi, Kabala-13a 104.0-105.1; G_{1-2}Õh: Kingissepa–GV 268.5-270.6; Abja-92 318.1-340.3; Pilistvere-4 98.0-100.5; Koksivere-107 107.2; Sulustvere-5 176,5-189.6; Rõusa-5 106.7-118.5; Tootsi-175 127.4-149.0; Vao-20 30.85; Viljandi-91 247.0; Laeva-294 107.0; G_3: Häädemeeste-172 337.3-390.9; Ruhnu-500 489.9-510.7; G_3Hl: Hilliste quarry, Kallasto cliff, Kassari quarry, Eiglaküla.

Dalmanella rosensteinae Rubel, 1962
Plate 23: 7–11, plate 25: 18

= *Dalmanella* n. sp.– Rosenstein, 1939: text-fig. 77-4.
= *Dalmanella rosensteinae* Rubel, 1962: 178, pl. 2:6–15, pl. 3:8, **holotype**.

Remarks. This species resembles *Dalmanella cyclica* (see above) by its dorsal and ventral interiors, as well as uneven primary radial ribs, but the ribs are finer than in *D. cyclica*.
Occurrence. Raikküla (G_3) and Adavere (H) stages (Aeronian–Telychian) in Estonia.
Localities. G_3: Ikla core 370.5-402.2 m; H: Valgu ditch and Valgu river bank.

Genus ***ONNIELLA*** Bancroft, 1928

Type species. *Onniella broeggeri* Bancroft, 1928, Streffordian, Onny Formation in the banks of Onny River, Shropshire, U.K.

Onniella trigona Rubel, 1962
Plate 24: 11–20, plate 26: 1–16

= *Onniella trigona* Rubel, 1962b: 174, pl. 1:11–15, pl. 3:1–4, text-figs 1, 4, *non* pl. 1:16–17, **holotype**; Rybnikova, 1967: 173, pl. 14:6; Hints, 1975: 45, pl. 11:8–13, text-figs 26–27.

Remarks. This species is widespread in Estonia and differs from coeval species of *Isorthis* and *Dalmanella* in its higher ventral valve with a relatively short ventral muscle field and, first of all, in its strong and regular concentric filae between and on the radial ribs.
Occurrence. Porkuni (F_{II}) to Raikküla (G_3) stages (Hirnantian–Aeronian) in Estonia.
Localities (in cores, depth in m). G_{1-2}: Pärnu 197.35-235.60; G_{1-2}: Seliste-173 239.1-334.1; Laeva-294 96.39-148.05; Kihnu-526 317.0; Murika-511 109.6-117.0; Taagepera 302.5-404.0; Kabala-13a 7.35-112.0; Varbla-502 236.8-255.6; Koksivere-107 94.6, Sulustvere-5 187.25; Rõusa-5 15.65-121.0; Pilistvere-4 83.6-108.8; Viljandi-91 220.4-240.4; G_{1-2}–G_3: Kingissepa-GV 83.6-292.6; Ohesaare 372.95-433.09; Ristiküla-174 244.7-342.8; Abja-92 314.6-363.2; Ikla 471.5-478.1, 514.9-523.5; Holdre 286.5-420.0.

Genus ***RAVOZETINA*** Havlíček, 1974

Type species. *Orthis honorata* Barrande, 1879, Ashgill, Králův Dvůr Formation of Bohemia, Czech Republic.

Ravozetina sp.
Plate 19: 1–5, 7–9

Remarks. This species has been identified as *Ravozetina* cf. *sawddensis* from the Wenlock of Lithuania (P. Musteikis, personal communication from 1985). In later stratigraphic papers by P. Musteikis it was considered as a new species *Ravozetina bathysulcata* (*nomen nudum*). This species has pitted (saucrodictyid) microornamentation in Lithuania. The same ornamentation is present at least on the specimens from the Ruhnu-500 core, being only very fine and preserved locally in interspaces of costae. Estonian specimens are considered to be conspecific with this species, not yet formally described. For the purpose of completeness of treating the Estonian material, this species is illustrated here under open nomenclature prior to its formal description. All this material will be described by Musteikis, Bassett and Rubel in a paper, which is now in progress.
Occurrence. Jaani (J_1) and Jaagarahu (J_2) stages (Sheinwoodian–Homerian) in Estonia and Lithuania.
Localities (in cores, depth in m). J_1: Ikla 264.56-286.1; Ohesaare 301.78-319.05; J_2: Ruhnu-500 402.6; Kalvarija (Lithuania) 775.6.

Subfamily ISORTHINAE Schuchert et Cooper, 1931

Genus ***ISORTHIS*** Kozłowski, 1929

Type species. *Dalmanella (Isorthis) szajnochai* Kozłowski, 1929, Borshchov Formation (Lochkovian) of Podolia, Ukraine.
Remarks. The taxonomic concept of this genus and its species follows that of Hurst and Watkins, 1978. The subgeneric classification of the isorthids (Walmsley & Boucot, 1975) is not accepted here.

Isorthis mediocra (Rubel, 1962)
Plate 26: 1–10

= *Onniella mediocra* Rubel, 1962b: 175, pl. 1:1–10, pl. 3:5, 9–13, text-fig.2, **holotype**.

Remarks. Due to its close resemblance to *Onniella trigona* (see above), this species was previously assigned to the genus *Onniella*. *Isorthis mediocra* differs from *O. trigona* in having somewhat larger shell and stronger ribs without well-developed concentric filae. Its ventral muscle field is longer and

bears narrower adductor scars. Low notothyrial platform grades into a low and wide median widening with narrow central depression. The widening grades anteriorly into a thin median septum, which terminates anterior of the weakly expressed adductor field. The above named features and evenly convex shell allow to consider this species as an early *Isorthis*.

Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.

Localities (in cores, depth in m). G_{1-2}Vb: Oela, Koigi, Vahtrepa ditch, Kuimetsa, Heltermaa beach; G_3Hl: Sarve beach, G_3: Kingissepa–GV 235.5-237.2; Kirikuküla 96.7-110.1; Varbla-502 240.8; Ristiküla-174 266.6.

Isorthis parvulus Rybnikova, 1967

Plate 27: 1–14, 17

= *Isorthis parvulus* Rybnikova, 1967: 180, pl.16:7-10, **holotype**.

= *Isorthis (Ovalella) parvulus* Rybnikova – Walmsley & Boucot, 1975: 78.

Remarks. This species has subrectangular outline of the shell and narrow elevated borders of the ventral muscle and dorsal adductor fields.

The upper part of the Jaani Stage in the Ikla core (257.7-296.5 m) contains unidentifiable *Isorthis* specimens, which are fragmentary and probably comprise small adults. Dorsal and ventral interiors available in this material are identical with those of *I. parvulus* in younger beds.

Occurrence. Juuru (G_{1-2}), Jaani (J_1) and possibly the uppermost Adavere (H) stages (Rhuddanian, Sheinwoodian–Homerian) in Estonia, Wenlock in Latvia.

Localities (in cores, depth in m). G_{1-2}: Kingissepa–GV 273.5-287.8; Varbla-502 234.5-287.8; J_1: Ohesaare 236.8-299.2; Ikla 221.7-247.1; ?H–J_1: Ikla 253.3-296.5.

Isorthis crassa (Lindström, 1861)

Plate 27: 19

= *Orthis crassa* Lindström, 1861: 369, pl. 13:11.

= *Isorthis (Arcualla) crassa* (Lindström) – Walmsley & Boucot, 1975: 80, pl. 7:16–23, **lectotype**.

Remarks. The earlier authors have distinguished this species mainly by the internal features and by its strongly biconvex shell. Estonian specimens have small, strongly biconvex shells, ventral valves with the typical muscle field with diverging and short diductor scars and narrow, slightly corrugated median ridge bearing adductor scars, and dorsal valves with narrow adductor field without transverse ridge.

Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia.

Localities (in cores, depth in m). H and J_1: Kingissepa–GV 134.0-213.9; J_1: Pärnu 76.0.

Genus **LEVENEA** Schuchert & Cooper, 1931

Type species. *Orthis subcarinata* Hall, 1857, Early Devonian, Lower Helderberg Group, New York, U.S.A.

Levenea canaliculata (Lindström, 1861)

Plate 16: 11–14; plate 25: 19–22; plate 28: 1–12; plate 33: 10–13

= *Orthis canaliculata* Lindström, 1861: 368, pl. 13:10.

= *Isorthis usari* Rubel, 1963: 150, pl. 7:16–23.

= *Platyorthis* cf. *ovalis* Paškevičius – Rubel, 1963: 149, pl. 1:1–4.

= *Isorthis orbicularis ovalis* Paškevičius – Rybnikova, 1967: 180, pl. 16:4–6.
= *Levenea canaliculata* (Lindström) – Walmsley & Boucot, 1975: 93, pl. 10:12–18.

Remarks. The shell of this species is of medium size, weakly ventribiconvex; ventral muscle field with long diductor scars separated by shorter median rim, on both sides of which are adductor scars. Specimens in the Přidoli and Ludlow on Saaremaa and in Latvia (Rybnikova, 1967) are conspecific, demonstrating some variability in size and in details of both muscle fields. *L. canaliculata* from Gotland, described by Walmsley and Boucot (1975), has subrectangular outline like *I. parvulus,* but the specimens from Saaremaa (see Plate 25: 19-22) have more subtriangular (cordate) outline. The relationship of these specimens of *canaliculata* with somewhat younger Lithuanian *Isorthis ovalis* need additional study. Teh identification of *L. canaliculata* from the Jaani Stage extend the range of this species tentatively into the Jaani Stage.
Occurrence. ?Jaani Stage (?J_1, Sheinwoodian), Paadla (K_2) to Ohesaare (K_4) (Gorstian–Přidoli) in Estonia. Ludlow and Přidoli in Latvia, Přidoli in Lithuania.
Localities (in cores, depth in m). ?J_1: Jaani beach; K_2Pd: Tahula N; K3aKr: Kuressaare entrenchment; K_3aKr–K_3bKg: Kingissepa–GI 3.1-6.85; Ohesaare 4.18-61.97, K_4Oh: Ohesaare cliff. Dubysa Stage (Přidoli, Lithuania): Girdžiai-50 974.0-974.4.

Subfamily RESSERELLINAE Walmsley et Boucot, 1971

Genus ***RESSERELLA*** Bancroft, 1928.

Type species. *Orthis canalis* J. de Sowerby in Murchison, 1839, Homerian, Coalbrookdale Formation of Woolhope, Herefordshire, U.K.

Resserella elegantula (Dalman, 1828)
Plate 22: 24–26

= *Orthis elegantula* Dalman, 1828: 117, pl. 2: 6a-e – Lindström, 1861: 366.
= *Parmorthis elegantula* (Dalman) – Schuchert & Cooper, 1932: 128, pl. 21: 2, 3, 9, 10, 13, 14, 16, 29.
= *Resserella elegantula* (Dalman) – Walmsley & Boucot, 1971: 499, pl. 91: 5a–d, pl. 95:8a–c, 9a–e, pl. 96:1a–e, 2a–e,3a–e, 4a–h, pl. 97:2a–b, 3a–b; Bassett & Cocks, 1974: 10, **lectotype**.

Remarks. The genus *Resserella* was revised by Walmsley and Boucot (1971) and Bassett (1972). According to this revision, *R. elegantula* occurs only in the Mulde Marl on Gotland. Its record in Estonia is based on relatively small specimens from the Ikla and Ohesaare cores which have asymmetrically branching dorsal median costella, flat to slightly convex dorsal valve, crenulated teeth and sockets. *R. elegantula* differs clearly from *R. sabrinae* (in the same interval of the Ikla core) in more oval shell and in morphology of the ventral muscle field.
Occurrence. Jaani Stage (J_1) (Sheinwoodian) in Estonia; Mulde Marl (Wenlock) on Gotland.
Localities (in cores, depth in m). J_1: Ikla 236.0-284.3; Ohesaare 289.7-314.9; Pärnu 83.6-94.5.

Resserella sabrinae Bassett, 1972
Plate 29: 6–10

= *Resserella sabrinae* Bassett, 1972: 53, pl. 11:6–10, **holotype**.
= *Resserella sabrinae sabrinae* Hurst, 1975: 319, pl. 1:1–11, pl. 2:17–21.

Remarks. The Estonian specimens have the shell typical of *R. sabrinae* shell, but the interiors of both valves resemble more *R. canalis*.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian-Sheinwoodian) in Estonia, Wenlock in U.K.
Localities (in cores, depth in m). H–J_1: Pärnu 91.35-119.2; J_1: Ikla 255.0-284.2; Ristiküla-175 157.7-167.3; Sooääre-330 103.45-109.4.

Resserella canalis (J. de C. Sowerby, 1839)
Plate 19: 1–5, plate 29: 6

= *Orthis canalis* J. de C. Sowerby in Murchison, 1839: 630 *pars*, pl. 13:12a, *non* pl. 20:8.
= *Orthis elegantula* Dalman – Davidson, 1847: 62, pl. 13:9–11, *non* Dalman, 1828; Davidson,1869: 211 *pars*, pl. 27:1–8, *non* fig. 9, *non* Dalman, 1828.
= *Resserella canalis* (J. de C. Sowerby) – Schuchert & Cooper, 1932: 126 *pars*, *non* pl. 17:14–16, **lectotype**; Walmsley & Boucot, 1971: 497, pl. 97:1, 4–7, pl. 98:1–2, pl. 100:4.
= *Resserella concavoconvexa* (Twenhofel) – Rubel, 1963: 134, pl. 5:1–7, text-figs 8–9.

Remarks. The specimens of *Resserella*, which occur stratigraphically somewhat higher than *R. elegantula* in the Ikla core, have larger and more elongated shell with concave dorsal valve and asymmetrical median costellae and can be assigned to *R. canalis*. Interiors on casts from the Panga Cliff are similar to the specimens of *R. canalis* in the Wenlock Shale of Herefordshire (Walmsley & Boucot, 1971). The only difference of the Estonian specimens from the Panga cliff may be the presence of an apical pedicle callist. A previous identification of *R. concavoconvexa* from Estonia (Rubel, 1963; see synonymy) was incorrect: the Estonian specimens have anacline to catacline dorsal area, instead of a hypercline one in the true *concavoconvexa* from Anticosti, which is assigned to *Visbyella* by Li and Copper (2006).
Occurrence. Adavere (H) to Jaagarahu (J_2) stages (Telychian–Homerian) in Estonia.
Localities (in cores, depth in m). H: Lätiküla outcrop; J_1; Panga cliff; Suuriku cliff, Võrkoja outcrop, Paramaja cliff, Ninase cliff; Kalvarija (Lithuania) 775.6; J_2: Ohesaare 196.76-289.15; Ikla 219.0-240.9.

VISBYELLA Walmsley, Boucot, Harper et Savage, 1968

Type species. *Orthis visbyensis* Lindström, 1861, Telychian, Lower Visby Marl on Gotland, Sweden.

Visbyella visbyensis (Lindström, 1861)
Plate 30: 1–5

= *Orthis visbyensis* Lindström, 1861: 366, pl. 12:8.
= *Parmorthis visbyensis* (Lindström) – Schuchert & Cooper, 1932: 129, pl. 21:1,
= *Resserella visbyensis* (Lindström) – Rubel, 1963: 137, pls. 5:8–16, text-fig. 10.
= *Visbyella visbyensis* (Lindström) – Walmsley et al., 1968: 307, pl. 60:1–9, **lectotype**; Bassett & Cocks, 1974: 11; Li & Copper, 2006: pl. 10:23–29.

Remarks. This species occurs widely in the Lower Visby and Upper Visby beds of Gotland. Specimens from the lower marlstone of the Undva and Suuriku cliffs (Jaani Stage), Estonia, are numerous, but not as large as the Gotland ones.
Occurrence. Jaani Stage (J_1) (Sheinwoodian) in Estonia, Lower Visby and Upper Visby marls (Sheinwoodian) on Gotland.
Localities. J_1Jn: Undva cliff; Suuriku cliff.

Visbyella pygmae (Whittard et Parker, 1950)
Plate 30: 6–10

= *Parmorthis visbyensis* (Lindström) var. *pygmae* Whittard & Parker, 1950: 575, pl. 8:9–15, **holotype**.
= *Visbyella pygmae* (Whittard & Parker) – Walmsley et al., 1968: 310, pl. 61:1–5, text-fig 1.

Remarks. This species is very close to *Visbyella visbyensis*, differing in less emphasized internal structures and smaller size.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia.
Localities (in cores, depth in m). H: Lätiküla outcrop, Võiva-Velise ditch, Pärnu 119.20-120.52; Ikla 287.0-308.35; Ohesaare 363.1-366.2; Kingissepa–GV 202.7-214.6; Seliste-173 173.2; J_1Jn: Häädemeeste-172 213.7; Murika-511 15.0-54.1.

Subfamily TEMPLEELLINAE Harper, 2000

Genus ***TEMPLEELLA*** Rozman et Rong, 1993

Type species. *Templeella gobiensis* Rozman and Rong, 1993 from the Sarinul Formation (Aeronian) of Mongolia.

***Templeella* sp.**
Plate 2: 18–20

= *Kayserella* sp. nov. – Temple, 1970: 31, pl. 7:1–9.
= *Visbyella* sp. nov. – Temple, 1987: 48, pl. 3:8–9.

Remarks. Shell very small, concavo- to planoconvex, with prominent ventral umbo. Direct comparison of dorsal valve interiors in British and Estonian materials leaves no doubt that both belong to the same new species illustrated by Temple under open nomenclature (see synonymy). Rozman and Rong (1993) have attributed the British species to their new genus *Templeella* with the type *T. gobiensis* from Rhuddanian of Mongolia. The latter differs from British and Estonian species of *Templeella* in its larger size, shorter dorsal median septa and more strongly expressed ventral muscle field.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities (in cores, depth in m). G_{1-2}–G_3: Ikla 483.1-519.0; Holdre 401.9.

Family DICOELOSIIDAE Cloud, 1948

Genus ***DICOELOSIA*** King, 1850

Type species. *Anomia biloba* Linneaus, 1767, probable Wenlock of either Gotland (Sweden) or Shropshire, U.K. (see Bassett, 1972: 59).

Dicoelosia biloba (Linnaeus, 1758)
Plate 31: 1–20

= *Anomia biloba* Linnaeus, 1758: 703, no 204 – Linnaeus, 1767: 1154, no. 240.

= *Terebratula sinuata* Sowerby, 1818: 516, pl. 28:5–6.
= *Terebratula Cardiospermiformis* Hisinger, 1827: 323, 333, pl. 7:6.
= *Delthyris ? cardiospermiformis* (Hisinger) – Dalman, 1828: 124, pl. 3:7; Hisinger, 1828: 220, 258, pl. 7:6.
= *Orthis biloba* (Linnaeus) – Davidson, 1848: 321, pl. 3:8; Lindström, 1891: 370 *pars; non* de Verneuil, 1848; Davidson, 1869: 206 pars, pl. 26:10–11, 13–15, *non* fig. 12.
= *Dicoelosia biloba* (Linnaeus) – King, 1850: 106; Wright, 1964**:** 291, pl. 1:1–17, pl. 2:1–10; Brunton et al., 1967: 168, pl. 1:18–21, **lectotype**; Amsden, 1968: pl. 8:3a–e, pl. 13:12a; Rubel, 1971: 55, pl. 9:26–31, pl. 10:1–17 *non* figs 18–22; Bassett & Cocks, 1974: 11; Havlíček, 1977: 210, pl. 35:16–17; Musteikis & Puura, 1983: 144, pl. 2:6–12.
= *Bilobites biloba* (Linnaeus) – Hall & Clarke, 1892: 204.
= *Bilobites bilobus* (Linnaeus) – Schuchert & Cooper, 1932: 130.
= *Dicoelosia oklahomensis* Amsden – Rybnikova, 1967: 175, pl. 14:7–8; Rubel, 1971: 57, pl. 9:32, pl. 10:23–40.

Remarks. The wide concept of this species in the present paper is based on Musteikis & Puura (1983). The supposed temporal trend on changes of convexity of the dorsal valve and environmentally controlled changes in outline of the shell (Amsden, 1968; Rubel, 1971) were not confirmed by Musteikis & Puura (1983). At the same time this concept of *D. biloba* differs from that of the older species (*D. paralata, D. baltica, D. osloensis* – see below) which are distinguished, first of all, according to the same features.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Homerian) in Estonia. Wenlock and Ludlow in Latvia and Lithuania, on Gotland and in U.K.
Localities (in cores, depth in m). H'Vl: Varbla-502 118.1-121.7; Sooääre-330 103.4-109.4; H–J_1: Pärnu 82.1-121.5; Paatsalu-527 56.9-78.2; J_1Jn: Seliste-173 149.5; Kingissepa–GV 174.4-175.8; Ikla 235.5-284.3.

Dicoelosia paralata Bassett, 1972

Plate 33: 3-7; plate 32: 5–11

= *Spirifer sinuatus* J. de C. Sowerby *in* Murchison, 1838: 630 *pars*, pl. 13:10 (bottom right hand figure only).
= *Bilobites bilobus* (Linnaeus) – Venjukoff, 1899: 102, pl. 1:5; Alikhova, 1954: 36, pl. 22:3–5; Nikiforova,1954: 53, pl. 2:8–22, *non* pl. 2:14a–b.
= *Dicoelosia biloba* (Linnaeus) – Alikhova, 1960: 192, pl. 14:14–15. Rubel, 1971: pl. 10:18–23, *non* pl. 9:26–31, pl. 10:1–17.
= *Dicoelosia osloensis* Wright – Rubel, 1971: 53, pl. 9:11–13, *non* pl. 8:26–31, pl. 9:1–10, 14.
= *Dicoelosia paralata* Bassett, 1972: 60, pl. 12:14–19, **holotype**; Musteikis & Puura, 1983: 143, pl. 1:15–26, pl. 2:1–5.

Remarks. The juvenile specimens of this species are morphologically rather similar to *D. baltica* (see below). However, larger specimens of *D. paralata* are usually very distinctive, having sub-parallel to parallel shell margins and lower angle of divergence of the two lobes than in any other species of the genus. During the growth of *D. paralata*, this angle decreases considerably (see Bassett, 1972). In most geological sections of Estonia, the range of *D. paralata* is confined to a relatively narrow interval above the occurrence of *D. baltica* and below the occurrence of *D. biloba.*
Occurrence. Topmost Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia.
Localities (in cores, depth in m). H'Vl: Pärnu 119.35-124.0; Ohesaare 355.2-358.2; H'Vl–J_1Jn: Ikla 285.0-299.5; Kaugatuma-509 219.0-254.35; Seliste-173 147.4-157.0; J_1Rg: Häädemeeste-172 203.3-211.5; Ruhnu-500 457.3; Varbla-502 126.3-131.3; Kipi 134.7-134.8.

Dicoelosia baltica Musteikis et Puura, 1983

Plate 32: 1–4

= *Dicoelosia osloensis* Wright – Rubel, 1971: 53 *pars*, pl. 8:29–31, pl. 9:6–10, *non* pl. 8:26–28, pl. 9:1–5, 1–14.
= *Dicoelosia baltica* Musteikis & Puura, 1983: 141, pl. 1:1–14, **holotype**.

Remarks. The concept of this species follows Musteikis and Puura (1983). *D. baltica* and *D. paralata* have partly overlapping total ranges within the Adavere and Jaani stages, but in separate sections, *D. baltica* occurs, as a rule, below *D. paralata*.
Occurrence. Adavere (H) and Jaani (J_1) stages (Telychian–Sheinwoodian) in Estonia.
Localities (in cores, depth in m). H'Rm: Ikla 305.1-320.0; H'Vl: Varbla-502 140.8-148.9; Seliste-173 163.2-169.2; Eikla-508 130.6-139.0; Kõinastu-540 29.5-34.5; Kaugatuma-509 250.9-264.2; Saaremaa borehole no 825 (not in the Figure 2) 199.0-213.0; H'Vl–J_1Jn: Ruhnu-500 455.9-478.4; Kingissepa–GV 134.0-210.0; J_1: Murika-511 11.0-52.7.

Dicoelosia osloensis Wright, 1968

Plate 32: 12–16

= *Dicoelosia osloensis* Wright, 1968: 309, pl. 5:6–11, pl. 6:7–10, **holotype**; Rubel, 1971:53, pl. 8:26–28, *non* 29–31, pl. 9:1–5, 14 *non* 6–13; Thomsen & Baarli, 1982: pl. 1:15; Baarli & Harper, 1986: pl. 2i; Temple, 1987: 49, pl. 3:10–12; Baarli, 1988: 1119, pl. 97:6–9, 13, 21–26.
= *Dicoelosia* aff. *osloensis* Rubel, 1971: 51, pl. 8:18–25.

Remarks. *D. osloensis* was redescribed from Norway by Baarli (1988) who showed wide morphological variation of the species. Variation in concavity of the dorsal valve is considerable also in the quite numerous specimens from the Raikküla Stage of Estonia.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Õh: Pärnu 223.5-237.55; Kaugatuma-509 320.15-337.6; G_{1-2}Õh–G_3Sr: Abja-92 215.7-345.6; Ruhnu-500 490.65-598.0; Häädemeeste-172 345.4-424.2; G_{1-2}Õh–H'Vl: Kingissepa–GV 210.0-265.26; Seliste-173 301.7-324.5; G_3: Ikla 371.6-395.4.

Genus ***EPITOMYONIA*** Wright, 1968

Type species. *Epitomyonia glypha* Wright, 1968a, Sweden, Boda, Boda Limestone Formation, Rawtheyan.

Epitomyonia glypha Wright, 1968

Plate 33: 1–2

= *Epitomyonia glypha* Wright, 1968a: 128, pl. 1:1–16, **holotype**; Rubel, 1971: 58, pl. 8:8–17.
= *Epitomyonia* sp. Temple, 1970: 29, pl. 6:7, 9, 10.

Remarks. The new material is represented by complete shells and few dorsal valves. No good ventral valve interiors were found, but these have been documented by Temple (1970) who had only ventral valves in his collection. The latter ones are considered here conspecific with *Epitomyonia glypha*.
Occurrence. Uppermost Ordovician Boda Limestone in Sweden, Juuru Stage (G_{1-2}, Rhuddanian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Vb: Kabala-13a 111.8-112.0; G_{1-2}Õh: Abja-92 363.3; Häädemeeste-172 417.3; Ikla 478.0-512.9; Seliste-173 321.8-333.8; Ruskavere-451 39.45-39.90.

Family RHIPIDOMELLIDAE Schuchert, 1913
Subfamily RHIPIDOMELLINAE Schuchert, 1913

DALEJINA Havlíček, 1953

Type species. *Dalejina hanusi* Havlíček, 1953, Emsian, Zlichov Limestone of Bohemia, Czech Republic.

Dalejina hybrida (J. de C. Sowerby, 1839)
Plate 22: 1–14

= *Orthis hybrida* J. de C. Sowerby, 1839: 630, pl. 13: 11.
= *Rhipidomella hybrida* (J. de C. Sowerby) – Boucot & Amsden, 1958: 166, text-fig. 42.
= *Rhipidomelloides tripartita* Rubel, 1963: 143, pl. 6:10–13, pl. 8:1–6, text-fig. 12.
= *Rhipidomelloides hybrida* (J. de C. Sowerby) – Rubel, 1963: 145, pl. 7:7–15.
= *Rhipidomelloides* cf. *hybrida* (Sowerby) – Rybnikova, 1967: 176, pl. 15:5–7.
= *Dalejina hybrida* (J. de C. Sowerby) – Bassett, 1972: 62, pl. 13:8–11, pl. 14:1–9, **lectotype**; Bassett & Cocks, 1974: 11.

Remarks. The large material from the Wenlock of Estonia can be attributed to *D. hybrida,* in spite of somewhat larger size of the shells. The specimens previously assigned to *Rhipidomelloides tripartita* (see synonymy) are here considered to be within the variation range of *D. hybrida.*
Occurrence. Adavere (H) to Jaani (J_1) stages (Telychian–Homerian) and Kuressaare (K_3a) to Kaugatuma (K_3b) stages (Ludfordian–Přidoli) in Estonia. Wenlock and Ludlow in Latvia and U.K, Wenlock on Gotland.
Localities (in cores, depth in m). H'Vl–J_1Jn: Pärnu 74.78-119.95; J_1Jn: Suuriku, Panga, Liiva and Paramaja cliffs; Varbla-502 114.3-129.0; Seliste-173 114.3-151.3; Sooääre-330 103.45-109.5; Ikla 235.0-287.1; K_3aKr: Roomassaare; K_3bKg: Kaugatuma cliff, Äigu quarry, Muratsi quarry, Kaugatuma-509 4.3-9.8.

Dalejina phaseola (Rubel, 1963)
Plate 16: 7–10

= *Rhipidomelloides phaseola* Rubel, 1963: 142, pl. 5:24, pl. 6:1–9, **holotype.**
= *Dalejina phaseola* (Rubel) – Bassett & Cocks, 1974: 11.

Remarks. The species differs from the closest *Dalejina hybrida* in its larger size and more transverse elliptical outline of the shell.
Occurrence Adavere (H) to Jaani (J_1) stages (Aeronian–Sheinwoodian) in Estonia and Lower Visby Marl (Telychian) on Gotland
Localities. H'Rm–H'Vl: Võiva-Veliseditch, Päri quarry, Valgu River Bank, J_1Jn: Saastna cape, Suuriku cliff; Muhu-590 core 110.8 m.

Genus ***MENDACELLA*** Cooper, 1930

Type species. *Orthis uberis* Billings, 1866 Ellis Bay Formation, Hirnantian, of the Anticosti Island, Canada.

Mendacella circularis sp. nov.

Plate 34: 1–9, 12–17

= *Mendacella* sp. nov. Li & Copper, 2006: 50, pl. 16:21, 25–30, 33–34.

Holotype. Selected here, complete shell GIT 554-1504 from the Õhne Formation, Juuru Stage (Rhuddanian), Laeva–294 core, depth 114.15 m, Estonia.
Studied material. Over 50 specimens from 18 localities.
Derivatio nomini. Latin, *circularis*, referring to circular outline of the shell.
Diagnosis. *Mendacella* with small, slightly ventribiconvex shell of rounded outline. Length of straight hinge line equals nearly half of shell width, anterior commissure rectimarginate; radial ribs relatively coarse, diverging.
Description. Shell small, slightly ventri- to biconvex; longitudinally evenly convex, with the highest point in centre of the valves. Ventral valve evenly convex, dorsal valve slightly sulcate, anterior commissure rectimarginate. Ventral interarea low, concave, apsacline; delthyrium triangular, wide and open; teeth triangular, small, with crural fossettes, dental plates short, bounding laterally muscle field; adductor scars on the slightly elevated median ridge, diductor scars simple, longer than the adductor ones, extended anteriorly by diverging vascula media. Dorsal valve with narrow anacline interarea; notothyrium open, filled by stout cardinal process with short shaft. Brachiophore plates diverging anterolaterally, bounding small sockets with fulcral plates. The base of brachiophore plates converge laterally to the wide median ridge, which is wide and subdividing quadratic slightly impressed adductor field.
Discussion. The described species is close to the highly variable *Mendacella mullockiensis* (Davidson) sensu Temple (1987: 39) i.e. to many British Lower Llandovery dalmanellids. It differs by its smaller size, stronger radial ribs, nonsulcate anterior margin. These features in turn characterize the specimens described as *Mendacella* sp. nov. from the Aeronian of the Anticosti Island, Canada (see synonymy), considered to be conspecific with *M. circularis* here.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia.
Localities (in cores, depth in m). G_{1-2}Õh: Laeva-294 108.28-114.15; Kingissepa–GV 262.2-292.6; Pärnu 190.65-239.2; Seliste-173 275.6-337.9; Viljandi-91 256.1; Abja-92 351.2-351.3; Koksivere-107 95.7; Sulustvere-5 169.6-187.5; Tootsi-175 149.7; Are-171 181.15; Saaremaa borehole no 404 (not in the Figure 2) 28.6-28.7; Võhma-440/4a 98.7; G_{1-2}Vb: Heltermaa beach; Orjaku 35.5; Rõusa-5 97.85-117.5; Äiamaa 62.5-73.05; Kabala-13a 103.0-112.0; Kirikuküla 95.4-110.4; G_{1-2}–G_3: Varbla-502 213.8-256.2; Vao-20 16.2-41.0; Murika-511 101.0-123.1; Pilistvere-4 80.1-111.0.

Mendacella bleikeriensis Baarli, 1988

Plate 34: 10–11

= *Rhipidomelloides* sp. Rubel, 1963: 141, pl. 5:17–23.
= *Mendacella bleikeriensis* Baarli, 1988: 113, pl. 98:1–6, 9, 11, 13,-15, **holotype**; Li & Copper, 2006: 50, pl. 17:1–30, text-fig. 12.

Remarks. The Estonian *M. bleikeriensis* differs from *M. circularis* (see above) in its larger size, equally biconvex shell and anteriorly developed wide fold on the dorsal valve.
Occurrence. Raikküla (G_3) Stage (Rhuddanian–Aeronian) in Estonia, Gun River Formation (Aeronian) on Anticosti, and Solvik Formation (Rhuddanian–Aeronian) in Norway.
Localities (in cores, depth in m). G_3: Vahuküla outcrop, Karinu quarry; Varbla-502 188.65-197.5; Seliste-173 219.9-236.8; Pärnu 158.2-189.8; Ellakvere 4.4.

Superfamily ENTELETOIDEA Waagen, 1884
Family DRABOVIIDAE Havlíček, 1950
Subfamily DRABOVIINAE Havlíček, 1950

Genus ***SALOPINA*** Boucot, 1960

Type species. *Orthis lunata* J. de C. Sowerby, 1839, Ludfordian, Upper Ludlow of Clun, Shropshire, U.K.***Salopina conservatrix*** (McLearn, 1924)

Salopina conservatrix (McLearn, 1924)
Plate 28: 16–17

= *Dalmanella conservatrix* McLearn, 1924: 52, pl. 2:24, **holotype,** *non* fig. 26.
= *Salopina conservatrix* (McLearn) – Walmsley et al., 1969: 505, pl. 77:15–22, pl. 78:1–11; Bassett, 1972: 39, pl. 7:1–9.

Remarks. The Estonian specimens possess hollow radial ribs (aditicules) and are barely sulcate. The last feature makes them more similar to *S. submedia* (McLearn), although presence of a dorsal sulcus is not visible on complete valves anteriorly.
Occurrence. Studied material comes from a quite restricted stratigraphic interval in the Paadla Stage (K_2, Gorstian), and from a unique locality of the Ohesaare Stage (K_4, Přidoli) in Estonia. Record in other areas comprises Llandovery and lower Wenlock of Canada, Wenlock of U. K. and Ludlow on Gotland.
Localities. K_2Pd: Ohesaare 97.35-110.64; Kingissepa–GV 39.39-46.00; Kingissepa–GI 21.6-25.0; Sauvere, Kogula; Paadla 0.2-9.4 K_4: Ohesaare 1.75-4.15.

Salopina submedia (McLearn, 1924)
Plate 28: 13–15; plate 33: 8–9

= *Dalmanella elegantula* var. *submedia* McLearn, 1924: 53, pl. 3:3–6, pl. 4:8, **holotype**.
= *Dalmanella submedia* McLearn – Walmsley *et al.*, 1969: 504, pl. 75:8–12, pl. 76:1–26, pl. 77:1–3.

Remarks, **occurrence**, **localities**. All four Estonian specimens of this species come from the Ohesaare Stage (K_4, Přidoli) of the Ohesaare cliff. *S. submedia* differs from the closest *S. conservatrix* (see above) in its finer hollow radial ribs which are crossing the hinge line. This species is also recorded from the Llandovery, Wenlock and Přidoli of U.S.A and Canada. Devonian record in known from the Gedinnian of Canada.

Family LINOPORELLIDAE Schuchert et Cooper, 1931

Genus ***LINOPORELLA*** Schuchert et Cooper, 1931

Type species. *Orthis punctata* de Verneuil, 1848, Silurian of Gotland, Sweden.

Linoporella punctata (de Verneuil, 1848)
Plate 24: 17–23

= *Orthis punctata* de Verneuil, 1848: 343, pl. 4:8a–c; Lindström: 370.

= *Linoporella punctata* (Verneuil) – Schuchert *et* Cooper, 1931: 247; Schuchert & Cooper, 1932: 150, pl. 18:13–14, 17–18, 24, 33; Whittard & Parker, 1950: 580, pl. 8:19–28; Bassett & Cocks, 1974: 12, pl. 2:2, **holotype**.
= *Linoporella* cf. *punctata* (Verneuil) – Rubel, 1963: 153, pl. 8:1–15, text-figs 16–17.

Remarks. This species occurs in two bioherms (reefs) in Estonia. In Gotland it is known from the bioherm-containing strata which are much younger.
Occurrence. Raikküla (G_3) Stage (Rhuddanian–Aeronian) in Estonia, Slite Beds (Wenlock) on Gotland.
Localities. G_3 Hl: Hilliste quarry; Kallasto cliff.

Family SAUKRODICTYIDAE Wright, 1964

Genus ***SAUKRODICTYA*** Wright, 1964

Type species. - *Saukrodictya hibernica* Wright, 1964, Ordovician of Co. Dublin, Ireland.

***Saukrodictya* sp. B:** Hints, 1979
Plate 23: 5–6

= *Saukrodictya* sp. B: Hints, 1979: 58, pl. 4:3–13.
= *Saukrodictya* sp.: Li & Copper, 2006: 60 pl. 19:21–29.

Description. Shell small to medium-sized. Ventral valve gently convex, with apsacline and slightly concave interarea. Delthyrium open, teeth small, triangular. Outline roundedly subquadrate, with maximum width medially. Cardinal angles obtuse. Ribs rounded, their number increasing by branching, with wider interspaces. Exopunctae on interspaces of ribs well developed, small and dense, morphologically related to the endopunctae of smaller size. Small (young) shells have slightly concave or plane dorsal valve with a median sulcus.
Remarks. The new material has clearly stronger ribs than other species of *Saukrodictya* in Estonia. Similarly strong ribs are described on a single specimen of *Saukrodictya* sp. from the Llandovery of Anticosti (Li & Copper, 2006). Most of the described Estonian specimens are small, but in the same interval of the Ruhnu-500 core, two larger shells were found. The specimens from Kanaküla-3 and Viljandi cores have rounded outline and very fine set of exopunctae. Exopunctae are lacking at cardinal angles, where only concentric filae are present.
Occurrence. Juuru (G_{1-2}) and Raikküla (G_3) stages (Rhuddanian–Aeronian) in Estonia, Llandovery on Anticosti.
Localities (in cores, depth in m). G_{1-2}Õh: Viljandi-91 224.1; Pärnu 223.5-239.4; Vao-20 34.4-39.35; G_{1-2}Õh–G_3Sr: Häädemeest-172 320.2-321.1; G_3: Seliste-173 225.6-235.1; Kanaküla-3 122.8-135,0; Koksivere-107 82.0; Ruhnu-500 490.6-503.7; Kingissepa–GV 216.0-216.1; Holdre 297.4-303.2.

REFERENCES

Alikhova, T. N. 1951. *Brachiopods from the middle and upper part of the Lower Silurian from the Leningrad Region and their stratigraphical significance.* VSEGEI, Gosgeolizdat, Moscow. 80 p. [in Russian]

Alikhova, T. N. 1960. Otryad Orthida. *In*: *Osnovy paleontologij. Mshanki i brakhiopody.* Moskva, 190-195. [in Russian]

Alikhova, T. N., Balashova, E. A. & *Balashov*, Z. G. 1954. *Polevoi atlas kharakternykh kompleksov fauny siluriskikh otlozheniy yuzhnoy chasti Litovskoy SSR.* Gosgeoltekhizdat. Moskva. 43 p. [in Russian]

Amsden, T. W. 1968. Articulate brachiopods of the St. Clair Limestone (Silurian), Arkansas, and the Clarita Formation (Silurian), Oklahoma. *Memoirs Paleontological Society,* **1**: 1-117.

Baarli, B. G. 1987. Benthic faunal associations in the Lower Silurian Solvik Formation, central Norway. *Lethaia,* **20:** 75-90.

Baarli, B. G. 1988. The Llandovery enteletacean brachiopods of the central Oslo region, Norway. *Palaeontology*, **31**: 1101-1129.

Baarli, B. G. 1995. Orthacean and strophomenoid brachiopods from the Lower Silurian of the Oslo Region. *Fossils & Strata*, **39**: 1-93.

Baarli, B. G. & Harper, D. A. T. 1986. Relict Ordovician brachiopod faunas in the Lower Silurian of Asker, Oslo Region, Norway. *Norsk Geologisk Tidsskrift,* **66:** 87-98.

Bancroft, B. B. 1928. On the notational representation of the rib-system in Orthacea. *Memoirs and Proceedings of Manchester Literary and Philosophical Society*, **72**: 53-90.

Bancroft, B. B. 1949. *Welsh Valentian Brachiopods and the* Strophomena antiquata *Group of Fossil Brachiopods*. Mexborough. 16 p.

Barrande, J. 1879. *Systême Silurien du centre de la Bohême, vol. 5*. Prague and Paris. 226 p.

Bassett, M. G. 1970. The articulate brachiopods from Wenlock Series of the Welsh Borderland and South Wales. Part 1. *Monograph of the Palaeontographical Society,* 1-26.

Bassett, M. G. 1971. Wenlock Stropheodontidae (Silurian Brachiopoda) from the Welsh Borderland and south Wales. *Palaeontology*, **14**: 303-337.

Bassett, M. G. 1972. The articulate brachiopods from Wenlock Series of the Welsh Borderland and South Wales. Part 2. *Monograph of the Palaeontographical Society,* 27-78.

Bassett, M. G. 1974. The articulate brachiopods from Wenlock Series of the Welsh Borderland and South Wales. Part 3. *Monograph of the Palaeontographical Society,* 79-122.

Bassett, M. G. 1977. The articulate brachiopods from Wenlock Series of the Welsh Borderland and South Wales. Part 4. *Monograph of the Palaeontographical Society,* 123-176.

Bassett, M. G. 1979. Brachiopods. *In* Jaanusson, V., Laufeld, S. & Skoglund, R. (eds). Lower Wenlock faunal and floral dynamics - Vattenfallet section, Gotland. *Sveriges Geologiska Undersökning*, serie C, **762**, 185-206.

Bassett, M. G. & Cocks, L. R. M. 1974. A review of Silurian brachiopods from Gotland. *Fossils & Strata*, **3**: 1-56.

Billings, E. 1860. On the Devonian fossils of Canada West. *Canada Journal of Science, Literature and History,* **5**: 249-282; **6:** 138-148, 253-274, 329-363.

Billings, E. 1866. Catalogue of the Silurian fossils of the Island Anticosti, with descriptions of some new genera and species. *Geological Survey of Canada Reports of Progress.* Montreal. 93 p.

Böger, H. 1968. Paläoökologie silurisher Chonetoidea auf Gotland. *Lethaia*, **1**: 122-136.

Boucot, A. J. 1959. A new family and genus of Silurian orthotetacid brachiopods. *Journal of Paleontology,* **33**: 25-28.

Boucot, A. J. 1960. Lower Gedinnian brachiopods of Belgium. *Louvain University, Institute of Geology, Memoir,* **21**: 281-324.

Boucot, A. J. & Amsden, T. W. 1958. New genera of brachiopods. *Bulletin of the Oklahoma Geological Survey,* **78**: 159-170.

Boucot, A. J., Johnson, J. G. & Rubel, M. 1971. Description of brachiopod genera of subfamily Virgianinae Boucot et Amsden, 1963. *Eesti NSV Teaduste Akadeemia Toimetised. Keemia. Geoloogia,* **20**: 271-280.

Breivel, I. A. & Breivel, M. G. 1988. *Biostratigrafia i brakhiopody silura vostochnogo sklona Urala.* Ministerstvo Geologii SSSR. Uralskoe proizvodstvennoe otdelenie. Nedra. Moskva. 204 p. [In Russian]

Bronn, H. G. 1862. *Die Klassen und Ordnungen der Weichtiere (Malacozoa), vol. 3, pt. 1.* C. F. Wintersche Verlagshandlung. Leipzig & Heidelberg. 518 pp.

Brunton, C. H. C. & Cocks, L. R. M. 1967. Brachiopods in the Linnaean Collection. *In* Dance, S. P. 1967. Report on the Linnaean shell collection. *Proceedings of the Linnean Society of London*, **178**: 161-183.

Caster, K. E. 1939. A Devonian fauna from Colombia. *Bulletin of American Paleontology,* **24**: 1-218.

Cloud, P. E. 1948. *Dicoelosia* versus *Bilobites*. *Journal of Paleontology*, **22**: 373-374.

Cocks, L. R. M. 1967. Llandovery stropheodontids from the Welsh Borderland. *Palaeontology,* **10**: 245-265.

Cocks, L. R. M. 1968. Some strophomenacean brachiopods from the British Lower Silurian. *Bulletin of the British Museum (Natural History), Geology*, **15**: 283-324.

Cocks, L. R. M. 1970. Silurian Brachiopods of the superfamily Plectambonitacea. *Bulletin of the British Museum (Natural History). Geology,* **19**: 139-203.

Cocks, L. R. M. 1978. A review of British Lower Palaeozoic brachiopods, including a synoptic revision of Davidson's monograph. *Monographs of the Palaeontographical Society*, **131**: 1-256.

Cocks, L. R. M. 2008. A revised review of British Lower Palaeozoic brachiopods. *Monographs of the Palaeontographical Society*, **161**: 1-276.

Cocks, L. R. M. & Baarli, B. G. 1982. Late Llandovery brachiopods from the Oslo region. *In* Worsley, D. (ed.). Field Meeting Oslo Region 1982. *Paleontological Contributions from the University of Oslo*, **278:** 79-90.

Cocks, L. R. M. & Rong Jia-Yu. 1989. Classification and review of the brachiopod superfamily Plectambonitacea. *Bulletin of the British Museum (Natural History). Geology,* **45**: 77-163.

Cocks, L. R. M. & Rong Jia-Yu. 2000. Strophomenida. *In* Kaesler, R. (ed.) *Treatise on Invertebrate Paleontology. Part H Brachiopoda Revised, vol. 2-3.* Geological Society of America and Kansas University Press, 216-348.

Conrad, T. A. 1843. Observations of the lead-bearing limestone of Wisconsin and descriptions of a new genus of trilobites and fifteen new Silurian fossils. *Journal of the Academy of Natural Sciences of Philadelphia,* **8**: 329-335.

Cooper, G. A. 1930. New species from the Upper Ordovician of Percé. *American Journal of Science,* **20**: 265-392.

Cooper, G. A. 1956. Chazyan and related brachiopods. *Smithsonian Miscellaneous Collections*, **127:** 1-1245.

Copper, P. 1977. The late Silurian brachiopod genus *Atrypoidea. Geologiska Föreningens i Stockholm Förhandlingar,* **99:** 10-26.

Copper. P. 2004. *Silurian (Late Llandovery-Ludlow) Atrypid Brachiopods from Gotland, Sweden and the Welsh Borderlands, Great Britain*, NRC Research Press, Ottawa. 215 p.

Cramer, B. D., Brett, C. B., Melchin, M. J., Männik, P., Kleffner, M. A., Maclaughlin, P. I., Loydell, D. K., Munnecke, A, Jeppson, L., Corradini, C., Brunton, F. R. & Saltzman, M. R. 2010. Revised correlation of Silurian Provincial Series of North America with global and regional chronostratigraphic units and $\delta^{13}C_{carb}$ chemostratigraphy. *Lethaia,* **44**: 185-202.

Dalman, J. W. 1828. Uppställing och beskrifning af de i Sverige funne Terebratuliter. *Konglinga Vetenskaps-academien, Handlingar for År 1827*, 85-155.

Davidson, T. 1847. Observations on some of the Wenlock-limestone Brachiopoda, with descriptions of several new species. *London Geological Journal*, **1**: 52-65.

Davidson, T. 1848. Mémoire sur les brachiopodes du système silurien supérieur d'Angleterre. *Bulletin de la Societé géologique de France,* **5**: 309-338, 370-374.

Davidson, T. 1949. Observation sur quelques brachiopodes siluriens. *Bulletin de la Societé géologique de France,* **6**: 271-275.

Davidson, T. 1869. A Monograph of the British Fossil Brachiopoda, vol. 3. Silurian Brachiopoda, part 7, no 3. *Monographs of the Palaeontographical Society,* 169-248.

Davidson, T. 1871. A Monograph of the British Brachiopoda. Part 7, no. 4. The Silurian Brachiopoda. *Monographs of the Palaeontographical Society,* 249-397.

Davidson, T. 1881. Description of new Upper Silurian Brachiopoda from Shropshire. *Geological Magazine (new series)*, **8**: 145-156.

Davidson, T. 1883. A Monograph of the British Fossil Brachiopods. Silurian Supplement. *Monographs of the Palaeontographical Society,* **5**: 135-242.

Dawson, J. W. 1881. New facts respecting the geological relations and fossil remains of the Silurian iron-ores of Pictou, Nova Scotia. *Canadian Naturalist and Geologist (new series),* **9**: 332-344.

Dewing, K. 1999. Late Ordovician and Early Silurian strophomenid brachiopods, Anticosti Island, Québec, Canada. *Paleontographica Canadiana*, **17**: 1-143.

Eichwald, E. 1842. *Neuer Beitrag zur Geognosie Estlands und Finlands. Die Urwelt Russlands durch Abbildungrn erlautert. 2nd part.* St. Petersburg. 184 p.

Eichwald, E. 1860. *Lethaea Rossica.* Stuttgart. 1657 p.

Eichwald, E. 1861. *Paleontologija Rossii. Drevniy period.* St. Petersburg. 521 p. [in Russian]

Emmons, E. 1842. *Geology of New York. Part II, comprising the survey of the second geological district. Natural History of New York.* White and Vissher, Albany, New York. 437 p.

Foerste, A. F. 1909. Preliminary notes on Cincinnatian fossils. *Bulletin of the Scientific Laboratories of Denison University,* **14**: 209-228.

Foerste, A. F. 1914. Notes on the Lorraine Faunas of New York and the Province of Quebec. *Bulletin of the Scientific Laboratories of Denison University*, **17**: 247-328.

Gagel, C. 1890. Die Brachiopoden der cambrischen und silurischen Geschiebe im Diluvium der Provinzen Ost- und Westpreussen. *Beiträge zur Naturkunde Preussens Physikalisch-Ökonomischen Gesellschaft zu Königsberg,* **6**: 1-81.

Hall, J. 1843. *Geology of New York. Part 4, comprising the survey of the fourth geological district. The Natural History of New York.* Caroll and Cook Printers, Albany. 683 p.

Hall, J. 1847. *Paleontology of New York, vol.1 Containing descriptions of the organic remains of the lower divisions of the New York System.* C. van Benthysen. New York. 338 p.

Hall, J. 1852. *Paleontology of New York*, vol. 2. *Containing descriptions of the organic remains of the lower middle division of the New York System.* C. van Benthysen. New York. 362 p.

Hall, J. 1857. Descriptions of new species of Paleozoic fossils from the Lower Helderberg, Oriskany Sandstone, Upper Helderberg, Hamilton and Chemung Groups. *New York State Cabinet of Natural History, Annual Report,* **10**: 41-186.

Hall, J. 1859. Observations on genera of Brachiopoda. *New York State Cabinet of Natural History, Annual Report,* **12**: 8-110.

Hall, J. & Clarke, J. M. 1892-1895. An Introduction to the study of the genera of Palaeozoic Brachiopoda. *New York State Geological Survey. Paleontology of New York,* **8** (1): 1-367, **8** (2): 1-394.

Harper, C. W. 1973. Brachiopods of the Arisaig Group (Silurian-lower Devonian) of Nova Scotia. *Bulletin of the Geological Survey of Canada,* **215**: 1-163.

Harper, C. W., Johnson, J. G. & Boucot, A. J. 1967. The Pholidostrophiinae (Brachiopoda; Ordovician, Silurian, Devonian). *Senckenbergiana Lethaea*, **48**: 403-461.

Harper, C. W., Jr. & Boucot, A. J. 1978. The Strophodontacea. Part I: Leptostrophiidae, Eostropheodontiidae and Strophonellidae. *Palaeontographica*, A**161**: 55-175.

Harper, D. A. T. 2000. Suborder Dalmanellidina. *In* Kaesler, R. L. (ed.) *Treatise on Invertebrate Paleontology. Part H Brachiopoda Revised*, vol. 2-3. Geological Society of America and Kansas University Press, 782-844.

Havlíček, V. 1950. Ramenonožci českeho ordoviku. *Rozpravy Ústředího Ústavu geologického*, **13**: 1-72.

Havlíček, V. 1953. On some new brachiopods of the Czech and Moravian Middle Devonian. *Vestnik Ústředího Ústavu geologického*, **28**: 4-9.

Havlíček, V. 1961. Rhynchonelloidea des böhmischen älteren Paläozoikums (Brachiopoda). *Rozpravy Ústředího Ústavu geologického*, **27**, 211 p.

Havlíček, V. 1963. Family Leptaenidae (Brachiopoda) im böhmischen Altpaläozoikums. *Casopis Narodniho Muzea, Prague,* **82**: 220-225.

Havlíček, V. 1965. Family Leptostrophiidae Caster, 1939 (Strophomenida, Brachiopoda) in the Bohemian Palaeozoic. *Casopis Narodniho Muzea, Prague,* **134**: 6-7.

Havlíček, V. 1967. Brachiopoda of the suborder Strophomenidina in Czechoslovakia. *Rozpravy Ústředího Ústavu geologického*, **33**: 1-235.

Havlíček, V. 1968. New brachiopods from the lower Caradoc of Bohemia. *Vestnik Ústředího Ústavu geologického*, **43**: 123-125.

Havlíček, V. 1974. New genera of Orthidina (Brachiopoda) in the Lower Palaeozoic of Bohemia. *Vestnik Ústředího Ústavu geologického*, **49**: 167-170.

Havlíček, V. 1977. Brachiopods of the Order of Orthida in Czechoslovakia. *Rozpravy Ústředího Ústavu geologického*, **44**: 1-328.

Havlíček, V. & Storch, P. 1990. Silurian brachiopods and benthic communities in the Prague Basin (Czechoslovakia). *Rozpravy Ústředího Ústavu geologického*, **48**, 275 p.

Hede, J. E. 1917. Faunan i kalksandstenens märgliga bottenlager söder om Klintehamn på Gottland. *Sveriges geologiska Undersökning,* **C281**: 1-32.

Hedström, H. 1917. Über einige mit der Schale befestigte Strophomenidae aus dem Obersilur Gotlands. *Sveriges geologiska Undersökining,* **C276**, 14 p.

Hints, L. 1975. *Brakhiopody Enteletacea ordovika Pribaltiki.* Eesti NSV Teaduste Akadeemia Geoloogia Instituut. Tallinn. 117 p. [in Russian]

Hints, L. 1979. Genus *Saukrodictya* (Enteletacea) from the Ordovician and Silurian of Estonia. *Eesti NSV Teaduste Akadeemia Toimetised, Geoloogia*, **28**: 52-59. [in Russian]

Hints, L. 1986. Genus *Streptis* (Triplesiidae, Brachiopoda) from the Ordovician and Silurian of Estonia. *Eesti NSV Teaduste Akadeemia Toimetised. Geoloogia,* **35**: 20-26. [in Russian]

Hints, O. 2008. The Silurian System in Estonia. *In* Hints, O., Ainsaar, L., Männik, P. & Meidla, T. (eds). *The 7th Baltic Stratigraphical Conference.* Tallinn, 113-115.

Hisinger, W. 1827. Gottland, geognosiskt beskrifvit. *König. Svenska Vetenskaps Akademien. Handlingar* (for 1826), 311-336.

Hisinger, W. 1828. *Anteckningar i Physik och Geognosi under resor uti Sverige och Norrige*, **4**: 1-258.

Hisinger, W. 1837. *Lethaea suecica seu petrificata suecicaea iconibus et characteribus illustrata.* Stockholm. 124 p.

Hoel, O. A. 2005. Silurian Leptaeninae (Brachiopoda) from Gotland, Sweden. *Paläontologische Zeitschrift*, **79**: 263-284.

Hoel, O. A. 2007. Cementing strophomenide brachiopods from the Silurian of Gotland, Sweden: morphology and life habits. *Geobios,* **40**: 589-608.

Hoel, O. A. 2011. Strophomenidae, Leptostrophiidae, Strophodontidae and Shaleriidae (Brachiopoda, Strophomenida) from the Silurian of Gotland, Sweden. *Paläontologische Zeitschrift*, **85**: 201-239.

Holland, C. H., Lawson, J. D. & Walmsley, V. G. 1963. The Silurian rocks of the Ludlow district, Shropshire. *Bulletin of the British Museum (Natural History) Geology*, **8**: 93-171.

Holtedahl, O. 1916. The Strophomenidae of the Kristiania region. *Skrifter utgit av videnskapsselskapets i Kristiania (I. Matematisk-Naturvitenskapelig Klasse)*, **12**: 1-118.

Hurst, J. M. 1974. Aspects of the systematics and ecology of the brachiopod *Pholidostrophia* in the Ashgill, Llandovery and Wenlock of Britain, *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen*, **146**: 298-324.

Hurst, J. M. 1975. *Resserella sabrinae* Bassett in the Wenlock of Wales and Welsh Borderland. *Journal of Paleontology*, **49**: 316-328.

Hurst, J. M. & Watkins, R. 1978. Evolutionary patterns in a Silurian orthide brachiopod. *Geologica et Palaeontologica*, 12: 73-102.

Jin, J. & Chatterton, B. D. E. 1997. Late Ordovician-Silurian articulate brachiopods and biostratigraphy of the Avalanche Lake area, southwestern District of Mackenzie, Canada. *Palaeontographica Canadiana*, **13**: 1-167.

Jin, J., Caldwell, W. G. E. & Norford, B. S. 1993. Early Silurian brachiopods and stratigraphy of the Hudson Bay Lowlands, Manitoba, Ontario and Quebec. *Geological Survey of Canada, Bulletin*, **457**: 1-221.

Jones, O. T. 1928. *Plectambonites* and some allied genera. *Memoirs of the Geological Survey of Great Britain, Palaeontology,* **1**: 367-527.

Kaljo, D. & Rubel, M. 1982. Svyaz' soobschsestv brakhiopod s fatsialnoj zonal'nost'yu (silur Pribaltiki). *In* Kaljo, D. & Klaamann, E. (eds). *Soobschsestva i biozony v silure Pribaltiki.* Valgus, Tallinn, 11-34. [in Russian]

Kelly, F. B. 1967. Silurian leptaenids (Brachiopoda). *Palaeontology*, **10**: 590-602.

King, W. 1848. Remarks on certain genera belonging to the class Palliobranchiata. *Annals and Magazine of Natural History (series 1),* **18**: 26-42, 83-94.

King, W. 1850. A monograph of the Permian fossils of England. *Monographs of the Palaeontographical Society,* **3**: 1-258.

Kozłowski, R. 1929. Les brachiopodes gothlandiens de la Podolie polonaise. *Paleontologica Polonica,* **1**: 1-254.

Kulkov, N. P. & Severgina, L. G. 1989. Stratigrafiya i brakhiopody ordovika i nizhnego silura Gornogo Altaya. *Transactions of the Institute of Geology and Geophysics, Siberian Branch of the Academy of Sciences of the USSR*, **717**, 223 p. [in Russian]

Lamont, A. &. Gilbert, D. L. 1945. Upper Llandovery Brachiopoda from Coneygore Coppice and Old Storridge Common, near Alfrick, Worcestershire. *Annals and Magazine of Natural History*, **12**: 641-682.

Li, R. & Copper, P. 2006. Early Silurian (Llandovery) orthide brachiopods from Anticosti Island, eastern Canada; the O/S extinction recovery fauna. *Special Papers in Palaeontology*, **76**. 71 p.

Lindström, G. 1861. Bidrag till kännedomen om Gotlands brachiopoden. *Öfversigt af Könglingun Vetenskaps-Akademiens Förhandlingar (for 1860),* **17**: 337-382.

Linnaeus, C. 1758-1767. *Systema Naturae, sive Regna tria Naturae systematicae proposita per Classes, Ordines, Genera et Species.* 10th ed. 1758, **1**: 1-284, 12th ed. 1767, **1**: 533-1327. Stockholm.

Mc'Coy, F. 1846. *A Synopsis of the Silurian Fossils of Ireland collected from the several districts by Richard Griffith, F. G. S.* Privately published. Dublin. 72 p.

Mc'Coy, F. 1851. On some new Cambro-Silurian fossils. *Annals and Magazine of Natural History, (Series 2)*, **8**: 387-409.

McLearn, F. 1924. Paleontology of the Silurian Rocks of Arisaig, Nova Scotia. *Memoirs of the Geological Survey of Canada*, **137:** 1-180.

Männil, Reet & Rubel, M. 1999. Selected brachiopod and trilobite communities of the East Baltic Silurian. *In* Boucot, A. J. & Lawson, J. D. (eds). *Paleocommunities: A Case Study from the Silurian and Lower Devonian.* Cambridge University Press, 253-259.

Modzalevskaya, T. L. 1985. *Brahiopody silura i rannego devona Evropeyskoj chasti SSSR. Otryad Athyridida.* Moskva, Nauka. 129 p. [in Russian]

Modzalevskaya, T. L. & Pushkin, V. I. 2007. Silurian and early Devonian brachiopods of Byelorussia. *In* Abushik, F., Modzalevskaya, T. L., Moisseeva, T. I. & Pushkin, V. I. *Silurian and Early Devonian brachiopods and ostracods of Byelorussia.* Interdepartmental Stratigraphic Comittee of Russia. VSEGEI Press, Saint Petersburg, 9-56. [in Russian]

Moore, R. C. 1952. Brachiopoda *In* Moore, R. C., Lalicker, C. G. & Fisher, A. G. *Invertebrate Fossils.* McGraw-Hill. New York, 197-267.

Muir-Wood, H. M. 1955. *A History of the Classification of the Phylum Brachiopoda.* British Museum (Natural History). London. 124 p.

Muir-Wood, H. M. 1962. *On the morphology and classification of the brachiopod suborder Chonetoidea.* Monographs of the British Mueum of Naural History. 132 p.

Munthe, H. 1902. Stratigrafiska studier öfver Gotlands Silurlager. *Sveriges Geologiska Undersökning*, **C192**, 55 p.

Murchison, R. I. 1839. *The Silurian System.* John Murray, London, 768 p.

Musteikis, P. 1989. Results of quantitative stratigraphic correlation in the Silurian of Lithuania: brachiopods. *In* Oleynikov, A. & Rubel, M. (eds). *Quantitative stratigraphy – retrospective evaluation and future development.* Tallinn, 155-167. [in Russian]

Musteikis, P. 1991. Silurian brachiopod communities in the section of the Vilkavishkis-129 boring. *Geologija*, **12**: 47-66.

Musteikis, P. 1993. Silurian brachiopod communities in the section of the Pilvishkai-141 borehole. *Geologija*, **14**: 118-129.

Musteikis, P. & Cocks, L. R. M. 2004. Strophomenide and orthotetide Silurian brachiopods from the Baltic region, with particular reference to Lithuanian boreholes. *Acta Palaeontologica Polonica,* **49**: 455-482.

Musteikis, P. & Jushkute, V. 1999. Late Silurian brachiopod communities from western Lithuania. *Geologija,* **27:** 10-25.

Musteikis, P. & Modzalevskaya, T. L. 2002. Some Silurian brachiopods from Lithuania and their palaeobiogeographical significance. *Palaeontology*, **45**: 595-626.

Musteikis, P. & Paškevičius, J. 1999. Brachiopod communities of the Lithuanian Silurian. *In* Boucot, A. J. & Lawson, J. D. (eds). *Paleocommunities: A Case Study from the Silurian and Lower Devonian.* Cambridge University Press, 305-326.

Musteikis, P. & Puura, I. 1983. Brachiopods of the genus *Dicoelosia* from The Baltic Silurian. *Eesti NSV Teaduste Akadeemia Toimetised. Geoloogia,* **32**: 138-146. [in Russian]

Nestor, H. 1997. Silurian. *In* Raukas, A. & Teedumäe, A. (eds). *Geology and mineral resources of Estonia.* Institute of Geology. Estonian Academy Publisher. Tallinn, 89-106.

Nestor, H. & Einasto, R. 1997. Ordovician and Silurian carbonate sedimentation basin. *In* Raukas, A. & Teedumäe, A. (eds). *Geology and mineral resources of Estonia.* Institute of Geology. Estonian Academy Publisher. Tallinn, 192-205.

Nikiforova, O. I. 1954. *Stratigrafiya i brakhiopody siluriyskikh otlozheniy Podolij.* Gosgeolizdat, Moskva, 178 p. [in Russian]

Nikiforova, O. I., Modzalevskaya, T. L. & Bassett, M. G. 1985. Review of the upper Silurian and lower Devonian articulate brachiopods of Podolia. *Special Papers in Palaeontology*, **34**: 1-66.

Öpik, A. 1930. Brachiopoda Protremata der Estlandischen Ordovizischen Kukruse-Stufe. *Acta et Commentationes Universitatis Tartuensis (Dorpatensis),* **A17**: 1-262.

Öpik, A. 1933. Über Plectamboniten. *Acta et Commentationes Universitatis Tartuensis (Dorpatensis),* **A24**: 1-79.

Öpik, A. 1934. Über Klitamboniten. *Acta et Commentationes Universitatis Tartuensis (Dorpatensis),* **A26**: 1-239.

Pander, C. H. 1830. *Beiträge zur Geognosie des Russischen Reiches.* Karl Kray, St. Petersburg. 165 p.

Paškevičius, J. 1962. *Platyorthis ovalis* sp. n. i ejo stratigraficheskoe znachenie v otlozheniyakh verkhnego ludlova juzhnoy Pribaltiki. *Nauchnye soobschenia Instituta geologii i geografii AN Litovskoy SSR,* **14**: 33-44. [in Russian]

Paškevičius, J. 1997. *The geology of the Baltic republics.* Vilnius University. Geological Survey of Lithuania. Vilnius, 187 p.

Phillips, J. & Salter, J. W. 1848. Palaeontological appendix to Professor John Phillips' Memoir on the Malvern Hills compared with the Palaeozoic districts of Abberley etc. *Memoirs of the Geological Survey of Great Britain, London*, **2**: 331-386.

Popov, L. E. 1981. The first find of macroscopic inarticulate brachiopods of family Acrotretidae in Silurian of Estonia. *Eesti NSV Teaduste Akadeemia Toimetised. Geoloogia,* **30**: 34-41. [in Russian]

Poulsen, C. 1943. The Silurian Faunas of North Greenland, II: The fauna of the Offley Island Formation, Pt. 2, Brachiopoda. *Meddelelser om Gronland*, **72**, 60 p.

Racheboeuf, P. R. 2000. Chonetidina. *In* Kaesler, R. L. (ed.). *Treatise on Invertebrate Paleontology. Part H Brachiopoda Revised, vol 2.* Geological Society of America and Kansas University Press, 362-423.

Reed, F. R. C. 1917. The Ordovician and Silurian Brachiopoda of the Girvan District. *Transactions of the Royal Society of Edinburgh,* **51**: 795-998.

Rõõmusoks, A. 1964. Some brachiopods from the Ordovician of Estonia. Tartu Riikliku Ülikooli Toimetised, **153**: 3-28. [in Russian]

Rõõmusoks, A. 2004. Ordovician strophomenoid brachiopods of northern Estonia. *Fossilia Baltica,* **3**. 151 p.

Rong, Jia-Yu & Cocks, L. R. M. 1994. True *Strophomena* and a revision of the classification and evolution of strophomenoid and ´strophodontoid´ brachiopods. *Palaeontology*, **37**: 651-694.

Rosenstein, E. 1939. Adavere lademest (Silur) Lääne-Eestis. *Eesti Loodus,* **4/5**: 136-140.

Rosenstein, E. 1940. Andmed Juuru lademe kohta. *Eesti Loodus,* **4/5**: 178-186.

Rozman, K. S. & Rong, Jia-yu. 1993. New brachiopods from the Middle Llandoverian of South Mongolia. *Paleontologicheskii Zhurnal,* 1993, **2**: 36-43. [in Russian]

Rubel, M. 1962a. Brachiopods Orthacea from Llandovery of Estonia. *Eesti NSV Teaduste Akadeemia Geoloogia Instituudi Uurimused,* **9**: 75-92. [in Russian]

Rubel, M. 1962b. New species of brachiopods (Dalmanellidae) from the Llandoverian of Estonia. *Eesti NSV Teaduste Akadeemia Geoloogia Instituudi Uurimused,* **10**: 173-186. [in Russian]

Rubel, M. 1963. Silurian brachiopods Orthida of Estonia. *Eesti NSV Teaduste Akadeemia Geoloogia Instituudi Uurimused,* **13**: 109-160. [in Russian]

Rubel, M. 1970a. *Silurian brachiopods Pentamerida* and *Spiriferida of Estonia.* Valgus, Tallinn, 75 p. [in Russian]

Rubel, M. 1970b. On the distribution of brachiopods in the lowermost Llandovery of Estonia. *Eesti NSV Teaduste Akadeemia Toimetised. Keemia. Geoloogia,* **19**: 69-79.

Rubel, M. 1971. Taxonomy of dicoelosiid brachiopods from the Ordovician and Silurian of the East Baltic. *Palaeontology*, **14:** 34-60.

Rubel, M. 1977a. Evolution of genus *Stricklandia* (Pentamerida, Brach.) in Llandovery of Estonia. *In* Kaljo, D. & Klaaman, E. (eds). *Facies and fauna of Baltic Silurian.* Eesti NSV Teaduste Akadeemia Geoloogia Instituut, Tallinn, 193-212. [in Russian]

Rubel, M. 1977b. Revision of Silurian Dayiacea (Brach.) from the North-East Baltic. *Eesti NSV Teaduste Akadeemia Toimetised. Keemia. Geoloogia,* **26**: 211-220. [in Russian]

Rubel, M. 1982.The succession of brachiopods as a tool for correlation in the Silurian of the East Baltic. *In* Kaljo, D. & Klaamann, E. (eds). *Ecostratigraphy of the East Baltic Silurian.* Valgus, Tallinn, 51-62.

Rubel, M., Musteikis, P. & Popov, L. 1984. *Sistematicheskiy spisok brakhiopod silura Pribaltiki.* Preprint. Tallinn. 36 p. [in Russian]

Rubel, M., Hints, O., Männik, P., Meidla, T., Nestor, V.-K., Sarv, L. & Sibul, I. 2007. Lower Silurian biostratigraphy of the Viirelaid core, western Estonia. *Estonian Journal of Earth Sciences,* **56**: 193-204.

Rubel, M. & Modzalevskaya, T. L. 1967. New Silurian brachiopods of family Athyridae. *Eesti NSV Teaduste Akadeemia Toimetised. Geoloogia,* **16**: 238-249. [in Russian]

Rubel, M. & Rozman, H. 1977. New species of Silurian rhynchonelloid brachiopods of Estonia. *In* Kaljo, D. & Klaamann, E. (eds). *Facies and fauna of the Baltic Silurian.* Tallinn, 213-236. [in Russian]

Rybnikova, M. V. 1966. Nekotorye brakhiopody Strophomenida iz verhnesilurijskikh otlozhenij Latvii. *In*: *Paleontologia i biostratigrafia Pribaltiki i Belorussii, I.* Vilnius, 75-95. [in Russian]

Rybnikova, M. V. 1967. Description of brachiopods. *In* Gailite, L. K., Rybnikova, M. V. & Ulst, R. Z. *Stratigraphiya, fauna and conditions of formation of the Silurian rocks, central Pribaltic.* Institut Geologii Riga. Zinatne, Riga, 169-221. [in Russian]

Sadler, P. M., Cooper, R. A. & Melchin, M. 2009. High-resolution, early Paleozoic (Ordovician-Silurian) time scales. *GSA Bulletin,* **121**: 887-906.

Salter, J. W. 1846. Addendum containing descriptions of new species. *In* McCoy, F. *A Synopsis of the Silurian Fossils of Ireland, collected from the several districts by Richard Griffith, F.G.S.,* University Press. Dublin, 69-72.

Sarytcheva, T. G. & Sokolskaya, A. N. 1959. O klassifikatsii lozhnoporistykh brakhiopod. *Doklady Akademii Nauk SSSR,* **125**: 181-184. [in Russian]

Schmidt, F. 1858. Untersuchungen über die silurische Formation von Ehstland, Nord-Livland und Oesel. *Archiv für Naturkunde Liv-, Ehst- und Kurlands. Erste Serie. Mineralogosche Wissenschaften, nebst Chemie, Physik und Erdbeschreibung,* **2:** 1-248.

Schmidt, F. 1908. Beitrag zur Kenntnis der ostbaltischen, vorzüglich untersilurischen Brachiopoden der Gattungen *Plectambonites* Pand., *Leptaena* Dalm. und *Strophomena* Blainv. *Bulletin d' Academie Sci. St.-Petersburg, sér. 6,* **2**: 717-726.

Schmidt, H. 1954. *Sphaerirhynchia (Estonirhynchia) estonica* n. subgen. n. sp. *Senckenbergiana Lethaea,* **35**: 235-245.

Schrenk, A. 1854. Uebersicht des oberen silurischen Schichtensystems Liv- und Ehstlands, vornämlich ihrer Inselgruppe. *Archiv für Naturkunde Liv-, Ehst- und Kurlands. Erste serie*, **1**: 1-248.

Schuchert, C. 1893. A classification of the Brachiopoda. *American Geologist,* **11**: 141-165.

Schuchert, C. 1913. Systematic paleontology of the Lower Devonian deposits of Maryland. Brachiopoda. *Michigan Geological Survey Stratigraphy, Memoirs*: 290-449.

Schuchert, C. & Cooper, G. A. 1931. Synopsis of the brachiopod genera of the suborders Orthoidea and Pentameroidea, with notes on the Telotremata. *American Journal of Science*, **29**: 241-251.

Schuchert, C. & Cooper, G. A. 1932. Brachiopod genera of the suborders Orthoidea and Pentameroidea. *Memoirs of Peabody Museum of Natural History*, **4**: 1-270.

Schuchert, C. & Le Vene, C. M. 1929. Brachiopoda (generum et genotyporum index et bibliographia). *In* Pompeckj, J. F. (ed.). *Fossilium Catalogus, vol. 1, Animalia. Pars 42.* W. Junk, Berlin, 140 p.

Shaler, N. S. 1865. List of the Brachiopoda from the Island of Anticosti sent by the Museum of Comparative Zoology to different institutions in exchange for other specimens, with annotations. *Bulletin of the Museum of Comparative Zoology, Harvard*, **1**: 61-70.

Sowerby, J. 1818. Some account of the spiral tubes or ligaments in the genus *Terebratula* of Lamarck, as observed in several species of fossil shells. *Transactions of the Linnaean Society,* **12**: 514-516.

Sowerby, J. 1824. *In* Sowerby, J. & Sowerby, J. de C. 1812-1846. *The Mineral Conchology of Great Britain; or coloured figures and descriptions of those remains of testaceous animals or shells, which have been preserved at various times and depth in the earth.* London.

Sowerby, J. de C. 1839. On the fossil shells of the Silurian Rocks. *In* Murchison, R. I. *The Silurian System.* London, 579-712.

Spjeldnaes, N. 1957. The Middle Ordovician of the Oslo region, Norway. 8, Brachiopods of the Suborder Strophomenida. *Norsk geologisk Tidsskrift*, **37**: 1-214.

Straw, S. H. 1933. The fauna of the Palaeozoic rocks of the Little Missenden boring. *Summary of Progress of the Geological Survey,* part II, 112-142.

Teichert, C. 1928. Stratigraphische und paläontologische Untersuchungen im unteren Gotlandium (Tamsal-Stufe) des westlichen Estlands und der Insel Dagö. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie,* **B60**: 1-112.

Temple, J. T. 1968. The Lower Llandovery (Silurian) brachiopods from Keisley, Westmorland. *Monographs of the Palaeontographical Society*, **122**: 1-58.

Temple, J. T. 1970. The Lower Llandovery brachiopods and trilobites from Ffridd Mathrafal, near Meifod, Montgomeryshire. *Monograph of the Palaeontographical Society*, **127:** 1-76.

Temple, J. T. 1987. Early Llandovery brachipods of Wales. *Monographs of the Palaeontological Society*, **139**: 1-137.

Thomsen, E. & Baarli, G. 1982. Brachiopods of the Lower Llandovery Saelobonn and Solvik formations of the Ringerike, Asker and Oslo districts. *In* Worsley, D. (ed.). *Field Meeting, Oslo Region 1982.* Palaeontological Contributions of the University of Oslo, **278:** 63-78.

Tsegelnjuk P. D. 1976. *Brakhiopody i stratigrafiya nizhnego Paleozoya Volyno-Podolii.* Naukova Dumka, Kiew, 155 p. [in Russian]

Venjukoff, P. N. 1899. Fauna siluriyskikh otlozheniy Podolskoi gubernii. *Imperatorskoe Mineralogicheskoe Obshsestvo*, **29**: 21-266. [in Russian]

Verneuil, E. de. 1845. Paléontologie, Mollusques, Brachiopodes. *In* Murchison, R., Verneuil, E. de & Keyserling, R. *Géologie de la Russie d' Europe et des Montagnes de l'Oural. Vol. 2.* John Murray Bertrand, London—Paris, 17-395.

Verneuil, E. de 1848. Note sûr de quelques Brachiopodes de l'ile de Gothland. *Bulletin de la Societé géologique de France*, **5**: 339-347.

Waagen, W. 1884. Salt Range Fossils, vol. 1, part 4. *Productus* Limestone fossils. Brachiopoda. *Memoirs of the Geological Survey of India. Palaeontologia Indica,* (series 13), **3-4**: 547-770.

Wahlenberg, G. 1818. Petrifacta Telluris Svecana. *Nova Acta Regiae Societatis Scientiarum Upsaliensis,* **8**: 1-116, 293-297.

Walmsley, V. G. & Boucot, A. J. 1971. The Resserellinae – a new subfamily of Late Ordovician to Early Devonian dalmanellid brachiopods. *Palaeontology*, **14**: 487-531.

Walmsley, V. G. & Boucot, A. J. 1975. The phylogeny, taxonomy and biogeography of Silurian and early to mid Devonian Isorthinae (Brachiopoda). *Palaeontographica,* **A148**: 34-108.

Walmsley, V. G., Boucot, A. J. & Harper, C. W. 1969. Silurian and Lower Devonian salopinid brachiopods. *Journal of Paleontology*, **43**: 492-516.

Walmsley, V. G., Boucot, A. J., Harper, C. W. & Savage, N. M. 1968. *Visbyella* — a new genus of resserellid brachiopod. *Palaeontology*, **11:** 306-316.

Whittard, W. F. & Barker, G. H. 1950. The Upper Valentian brachiopod fauna of Shropshire, I. Inarticulata: Articulata, Protremata, Orthoidea. *Annals and Magazine of Natural History* (series 12), **3**: 553-590.

Williams, A. 1950. New stropheodontid brachiopods. *Journal of the Washington. Academy of. Sciences,* **40**: 277-282.

Williams, A. 1951. Llandovery brachiopods from Wales with special reference to the Llandovery district. *Quarterly Journal of the Geological Society, London*, **107**: 85-136.

Williams, A. 1953. North American and European Strophodontids, their morphology and systematics. *Memoirs of the Geological Society of America,* **56**: 1-67.

Williams, A. 1965. Suborder Strophomenidina. *In* Moore, R. C. (ed.). *Treatise on Invertebrate Paleontology. Part H. Brachiopoda,* The Geological Society of America & The University of Kansas Press. New York & Lawrence, 362-412.

Williams, A. & Brunton, C. H. C. 2000. Suborder Orthotetidina. *In* Kaesler, R. L. (ed.). *Treatise on Invertebrate Paleontology, Part H: Brachiopoda Revised.* Geological Society of America, Boulder and University of Kansas Press, Lawrence, 644-681.

Williams, A., Carlson, S. J. & Brunton, C. H. C. 2000. Brachiopod classification. *In* Kaesler, R. L. (ed.). *Treatise on Invertebrate Paleontology,, Part H: Brachiopoda Revised.* Geological Society of America, Boulder and University of Kansas Press, Lawrence, 1-21.

Williams, A., Carlson, S. J., Brunton, C. H. C., Holmer, L. E. & Popov, L. E. 1996. A supra-ordinal classification of the Brachiopoda. *Philosophical Transactions of the Royal Society of London,* **B351**: 1171-1193.

Woodward, S. P. 1851-1854. *A Manual of the Mollusca.* John Weale, London, 488 pp.

Wright, A. D. 1964. The fauna of the Portrane Limestone, II. *Bulletin of the British Museum (Natural History). Geology,* **9**: 137-256.

Wright, A. D. 1968a. The brachiopod *Dicoelosia biloba* (Linnaeus) and related species. *Arkiv för Zoologi,* **20**: 261-319.

Wright, A. D. 1968b. A new genus of dicoelosiid brachiopod from Dalarna. *Arkiv för Zoologi*, **22**: 127-138.

Wright, A. D. 1981. The external surface of *Dictyonella* and of other pitted brachiopods, *Palaeontology*, **24**: 443-481.

Wright, A. D. 1993. Subdivision of the Lower Palaeozoic articulate brachiopod family Triplesiidae. *Palaeontology*, **36**: 481-493.

Wright, A. D. 1994. *Eodictyonella*, a new name for *Dictyonella* Hall, 1868, not *Dictyonella* Schmidt, 1868. *Journal of Paleontology*, **68**: 908-909.

Wright, A. D. & Jaanusson, V. 1993. New genera of Upper Ordovician triplesiid brachiods from Sweden. *Geologiska Föreningens i Stockholm Förhandlingar,* **115**: 93-108.

Wysogorski, J. 1900. Zur Entwicklungsgeschichte der Orthiden im Ostbaltischen Silur. *Zeitschrift der Deutschen Geologischen Gesellshaft*, **52**: 220-236.

Zhang, N. 1989. Wenlockian (Silurian) brachiopods of the Cape Phillips Formation, Baillie Hamilton Island, Arctic Canada, Part I. *Palaeontographica,* **A206**: 46-98.

Zhang, N. 1989. Wenlockian (Silurian) brachiopods of the Cape Phillips Formation, Baillie Hamilton Island, Arctic Canada, Part II. *Palaeontographica,* **A206**: 99-135.

Zuykov, M. A. & Butts, S. H. 2008. *Glyptorthis* (Foerste, 1914) and *Bassettella* new genus (Brachiopoda, Orthida) from the Late Ordovician of the East Baltic. *Journal of Paleontology*, **82**: 197-200.

Zuykov, M. A. & Harper, D. A. T. 2007. *Platystrophia* (Orthida) and new related Ordovician and Early Silurian brachiopod genera. *Estonian Journal of Earth Sciences,* **56**: 11-34.

PLATES

PLATE 1

Figures 1–2. *Katastrophomena (Katastrophomena) penkillensis* (Reed). Page 18.

1. Dorsal view of the shell TUG K/1, Paramaja cliff, J_1.

2a–b. Exterior and interior of the broken dorsal valve TUG K/2, Paramaja cliff, J_1.

Figure 3. *Pentlandina loveni* (de Verneuil). Page 18.

3a–b. Exterior and interior of the dorsal valve TUG B/1, loc. and strat. indet., Estonia.

Figures 4–14. *Katastrophomena (Katastrophomena) woodlandensis* (Reed). Page 17.

4. Interior of the broken dorsal valve TUG A/A1, Kabala-13a: 98.4 m, G_{1-2}Vb

5. Dorsal view of the shell TUG 1238/1, Hilliste quarry, G_3Hl.

6a–b. Ventral and dorsal views of the shell TUG 1238/2, Kallasto cliff, G_3Hl.

7. Ventral view of the shell TUG 808/6, Kabala-13a: 81.0-81.1 m, G_{1-2}Vb.

8. Interior of the ventral valve TUG 78/16, loc. indet., G_{1-2}, Estonia.

9. Interior of the broken ventral valve GIT 506-1882, Kingissepa–GV: 276.3-276.4 m, G_{1-2}.

10. Interior of the broken dorsal valve GIT 506-1320, Varbla-502: 242.35-242.5 m, G_{1-2}.

11. Interior of the broken dorsal valve GIT 506-1218, Seliste-173: 324.5 m, G_{1-2}.

12. Interior of the broken dorsal valve GIT 506-1348a, Hilliste quarry, G_3Hl.

13. Interior of the broken dorsal valve GIT 506-1879, Kingissepa–GV: 270.5-270.6 m, G_{1-2}.

14. Interior of the broken dorsal valve GIT 506-1348b, Hilliste quarry, G_3Hl.

Figures 15–16. *Leptaena rhomboidalis* (Wahlenberg). Page 20.

15a–b. Cast and latex replica of interior of the ventral valve GIT 2/474, Kergu excavation, J_2.

16a–b. Ventral and dorsal view of the shell GIT 506-1864, ?Kaugatuma cliff, K_3bKg.

Plate 1

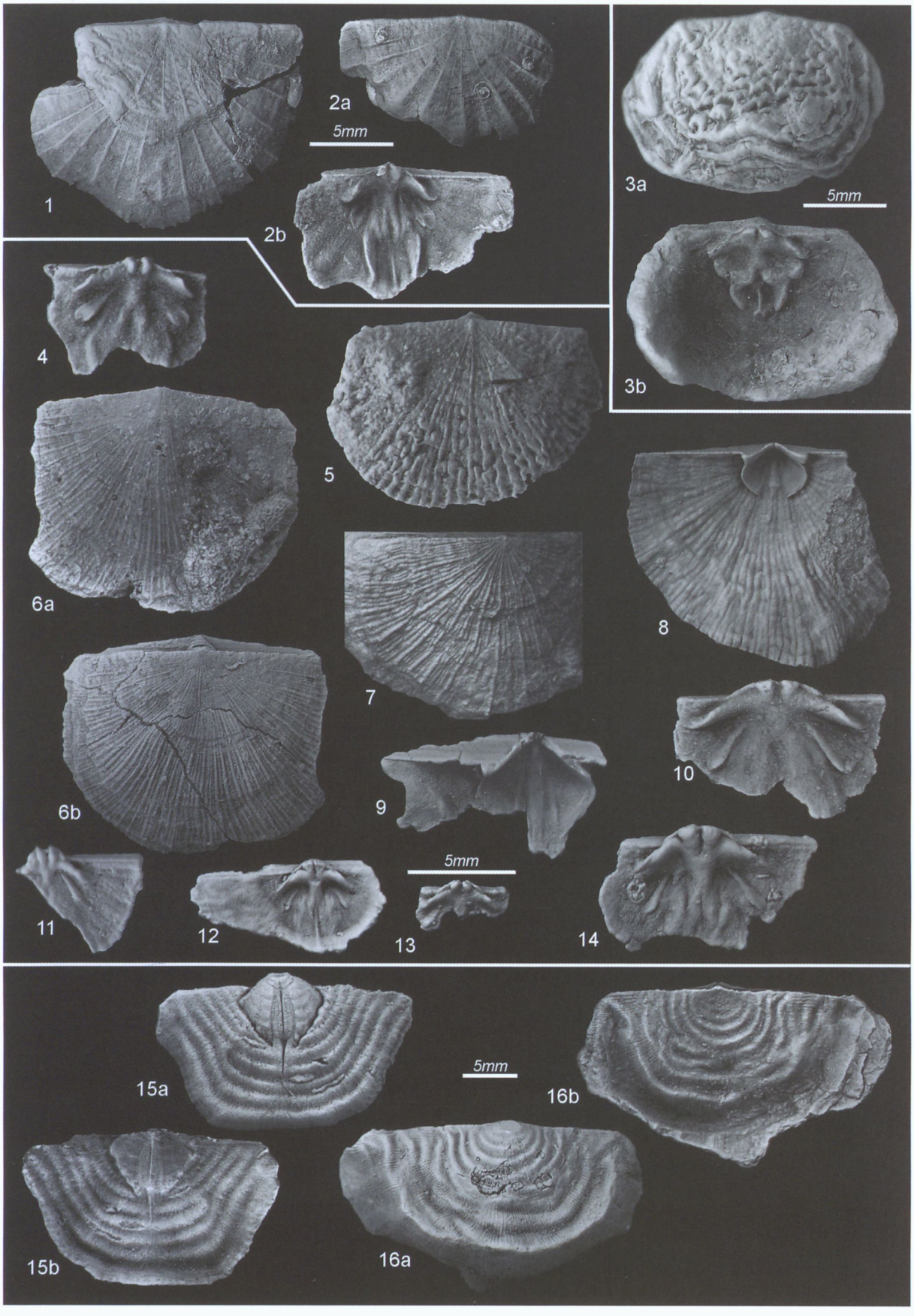
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PLATE 2

Figures 1–9. *Leptaena (Leptaena) altera* Rybnikova. Page 19.

1a–b. Ventral and anterior views of the shell TUG 1235/77, Ohesaare: 278.38-278.48 m, J_1.

2. Interior of the broken dorsal valve GIT 506-649, Lithuania, Kalvarija: 794.0 m, J_1.

3a–b. Ventral and lateral views of the shell GIT 506-675, Lithuania, Kalvarija: 73.4 m, J_1.

4a–c. Ventral, dorsal and posterior views of the shell GIT 506-643, Lithuania, Kalvarija: 794.3 m, J_1.

5a–c. Ventral, lateral and posterior views of the ventral valve GIT 506-653, Lithuania, Kalvarija: 790.9 m, J_1.

6. Interior of broken dorsal valve GIT 506-676, Lithuania, Kalvarija: 772.6 m, J_1.

7a–b. Posterior and anterior views of the shell GIT 506-669, Lithuania, Kalvarija: 777.8 m, J_1.

8. Interior of the broken ventral valve GIT 506-665, Kalvarija: 781.0 m, J_1.

9a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 506-642, Lithuania, Kalvarija: 794.3 m, J_1.

Figures 10–12. *Leptaena (Leptaena) rhomboidalis* (Wahlenberg). Page 20.

10a–b. Cast and replica of the ventral valve, TUG 2/473a, Kergu, J_2.

11a–b. Cast and replica of the ventral valve, TUG 2/475b, Kergu, J_2.

12a–b. Cast and replica of the dorsal valve, TUG 1242, Tõre river excavation, J_2.

Plate 2

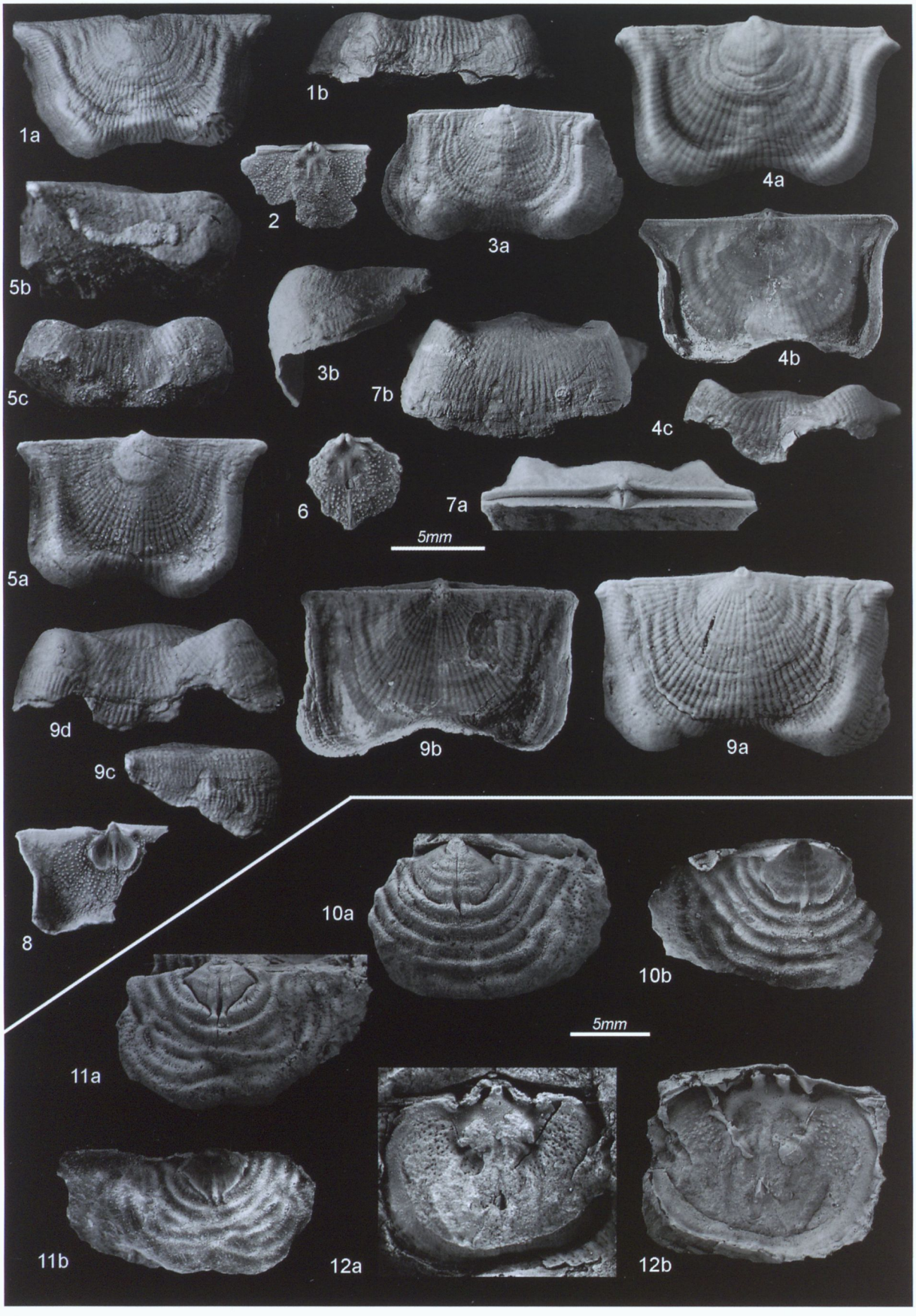
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PLATE 3

Figures 1–9. *Leptaena (Leptaena) purpurea* Cocks. Page 20.

1a–b. Ventral and lateral views of the shell TUG 1242/3, Suuriku cliff, J_1.

2. Posterior view of the shell TUG 1235/60b, Ohesaare: 236.9-237.0 m, J_1.

3. Ventral view of the shell TUG 1242/3, Suuriku cliff, J_1.

4. Ventral view of the broken shell GIT 506-1836, Ikla: 274.0-274.1 m, J_1.

5a–b. Ventral and lateral views of the shell TUG 39/296, Lätiküla, H.

6. Interior of the broken ventral valve GIT 506-1837, Ikla: 277.0-277.1 m, J_1.

7. Interior of the broken ventral valve GIT 506-1835, Ikla: 274.0-277.1 m, J_1.

8. Interior of the ventral valve TUG 42/151, Paramaja cliff, J_1.

9. Interior of the dorsal valve TUG 39/299, Paramaja cliff, J_1.

Figures 10–13. *Leptaena (Leptaena) depressa* (J. de C. Sowerby). Page 20.

10. Interior of the dorsal valve TUG 1251/5, Suuriku cliff, J_1.

11. Ventral view of the shell TUG 47/974a, Paramaja cliff, J_1.

12. Ventral view of the ventral valve TUG 47/965, Paramaja cliff, J_1.

13. Interior of the broken dorsal valve TUG 1235/67, Ohesaare: 250.34 m, J_1.

Figures 14–15. *Lepidoleptaena poulseni* (Kelly). Page 22.

14. Exterior of the ventral valve TUG 39/298, Kuressaare entrenchment, K_3a.

15a–b. Ventral and lateral views of the ventral valve TUG 1251/7, Nässumaa quarry, K_3b.

Plate 3

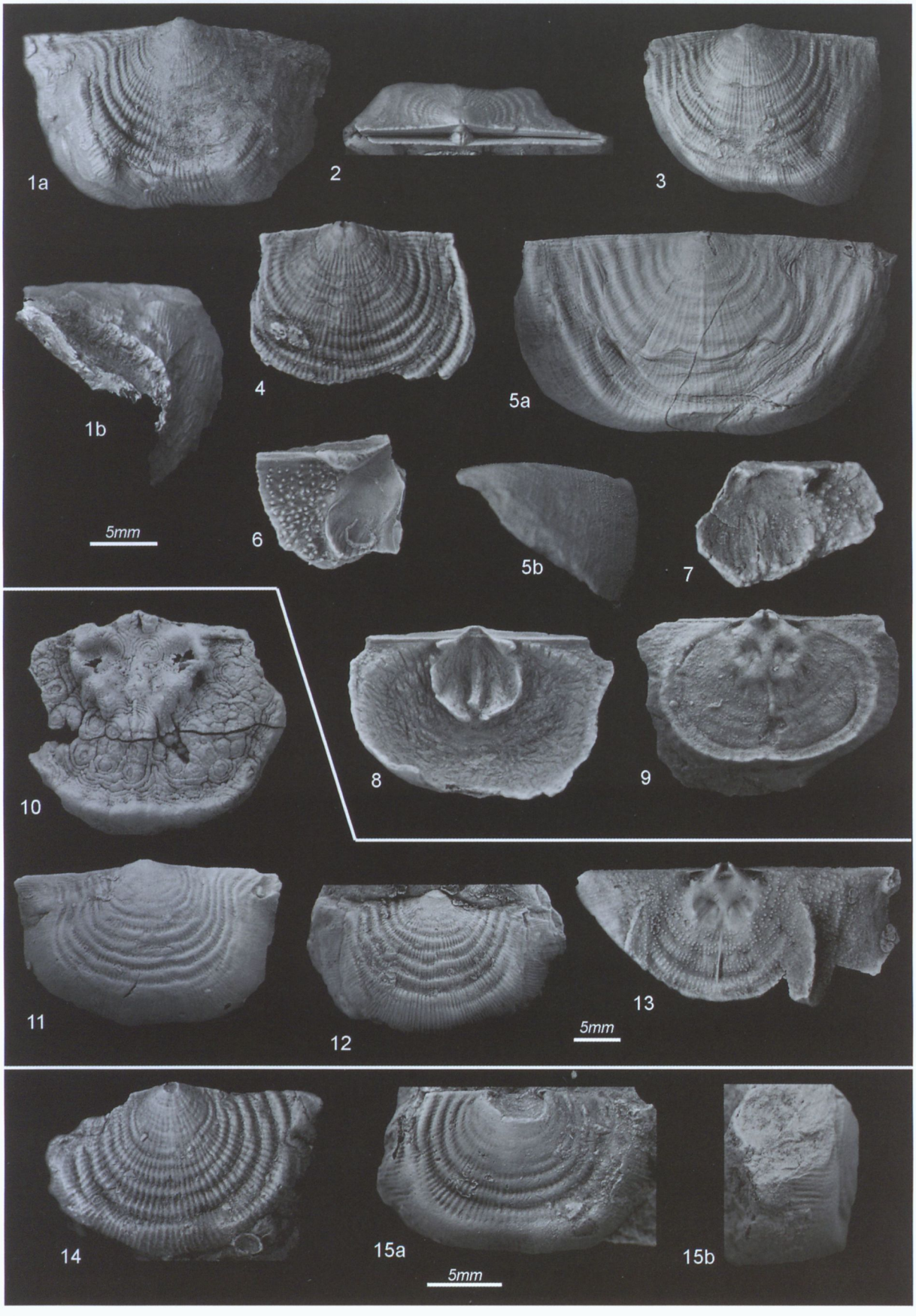

PLATE 4

Figures 1–7. *Leptaenoidea biohermica* sp. nov. Page 22.

1a–b. Ventral and dorsal views of the shell TUG 1278/74, Orjaku: 29.6 m, G_{1-2}.

2. Anterior interior of broken dorsal valve TUG 1235/65, Kabala-13a: 93.5-93.6 m, G_{1-2}.

3a–b. Holotype, ventral and dorsal view of the shell TUG 1278/71, Hilliste bioherm, G_3Hl.

4a–b. Ventral and dorsal views of the shell TUG 1278/73, Hilliste bioherm, G_3Hl.

5a–b. Ventral and dorsal views of the shell TUG 1238/14a, Hilliste bioherm, G_3Hl.

6a–b. Ventral and dorsal views of the shell TUG 1238/14b, Hilliste bioherm, G_3Hl.

7. Interior of the dorsal valve TUG 1238/13, Vahtrepa ditch, G_{1-2}Vb.

Figures 8–13, 16–20. *Leptaena (Leptaena) haverfordensis* Bancroft. Page 21.

8. Interior of the broken ventral valve GIT 506-1255, Kabala-13a: 92.7-92.9 m, G_{1-2}Vb.

9. Interior of the broken ventral valve GIT 506-1876, Kabala-13a: 98.4-98.5 m. G_{1-2}Vb.

10. Ventral view of the ventral valve TUG 1238/4, Hilliste, G_3Hl.

11a–b. Ventral and dorsal views of the umbonally deformed shell TUG 78/42, Hilliste bioherm, G_3Hl.

12. Interior of the dorsal valve GIT 506-1895, Kingissepa–GV: 270.5-270.6 m, G_3.

13. Cardinalia of the broken dorsal valve TUG 1235/64, Kabala-13a: 102.5 m, G_{1-2}Vb.

16. Exterior of the ventral valve TUG 1235/66, Kabala-13a: 102.5-102.7 m, G_{1-2}Vb.

17. Interior of the dorsal valve TUG 47/964, Heltermaa beach, G_{1-2}.

18. Interior of the broken dorsal valve GIT 506-1892, Abja-92: 322.8-322.9 m, G_{1-2}Õh.

19. Interior of the broken ventral valve GIT 506-1356, Abja-92: 314.6-314.7 m, G_{1-2}Õh .

Figures 14–15. *Leptaena (Leptaena) purpurea* Cocks. Page 20.

14. Ventral view of the ventral valve GIT 506-1865, Undva cliff, J_1.

15. Ventral view of the ventral valve GIT 506-1896, Undva cliff, J_1

Plate 4

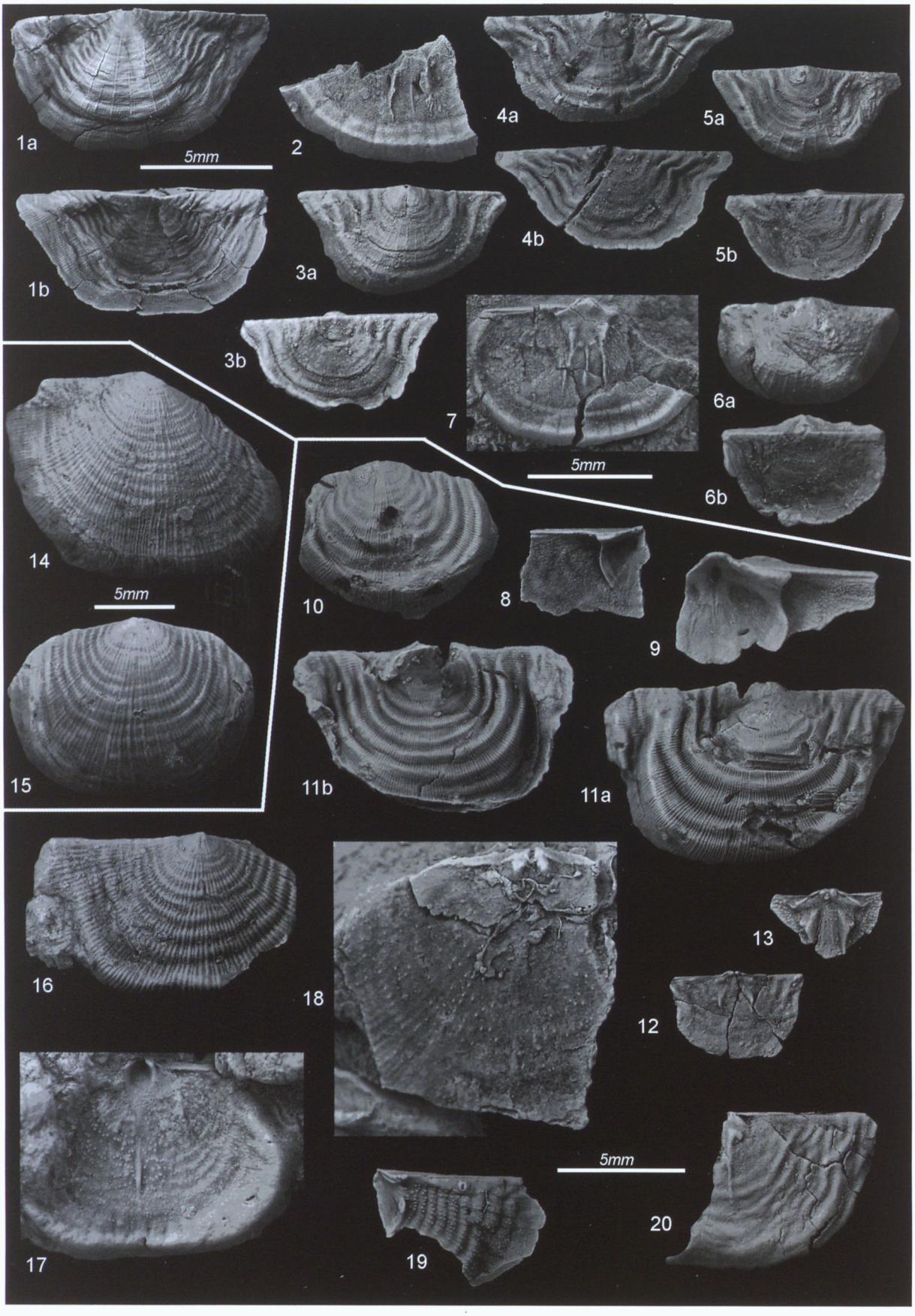
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PLATE 5

Figures 1–4. *Eoamphistrophia whittardi* (Cocks). Page 23. All from Lätiküla, H'Vl.

1a–c. Ventral, dorsal and lateral views of the shell TUG 169-296.

2. Dorsal view of the broken shell TUG 169/294.

3. Dorsal view of the shell TUG 169/295.

4. Ventral view of the shell TUG 169/293.

Figures 5–11. *Eoamphistrophia* sp. Page 24.

5. Ventral view of the broken shell TUG 78/19, Hilliste quarry, G_3Hl.

6. Ventral view of the broken shell TUG 39/249, Hilliste quarry, G_3Hl.

7. Ventral view of the broken shell TUG 1244/1, unknown Männiku locality, sample no. 9260.

8. Dorsal view of the broken shell TUG 78/20, Koigi, G_3Hl.

9. Interior of the broken dorsal valve TUG 78/19b, Hilliste quarry, G_3Hl.

10. Dorsal view of the broken shell TUG 808-5, Hilliste quarry, G_3Hl.

11. Interior of the broken dorsal valve TUG 78/19, Hilliste quarry, G_3Hl.

Figure 12. *Amphistrophia* ? sp. Page 23. Dorsal view of dorsal valve GIT 506-2560, Katri cliff, K_2.

Plate 5

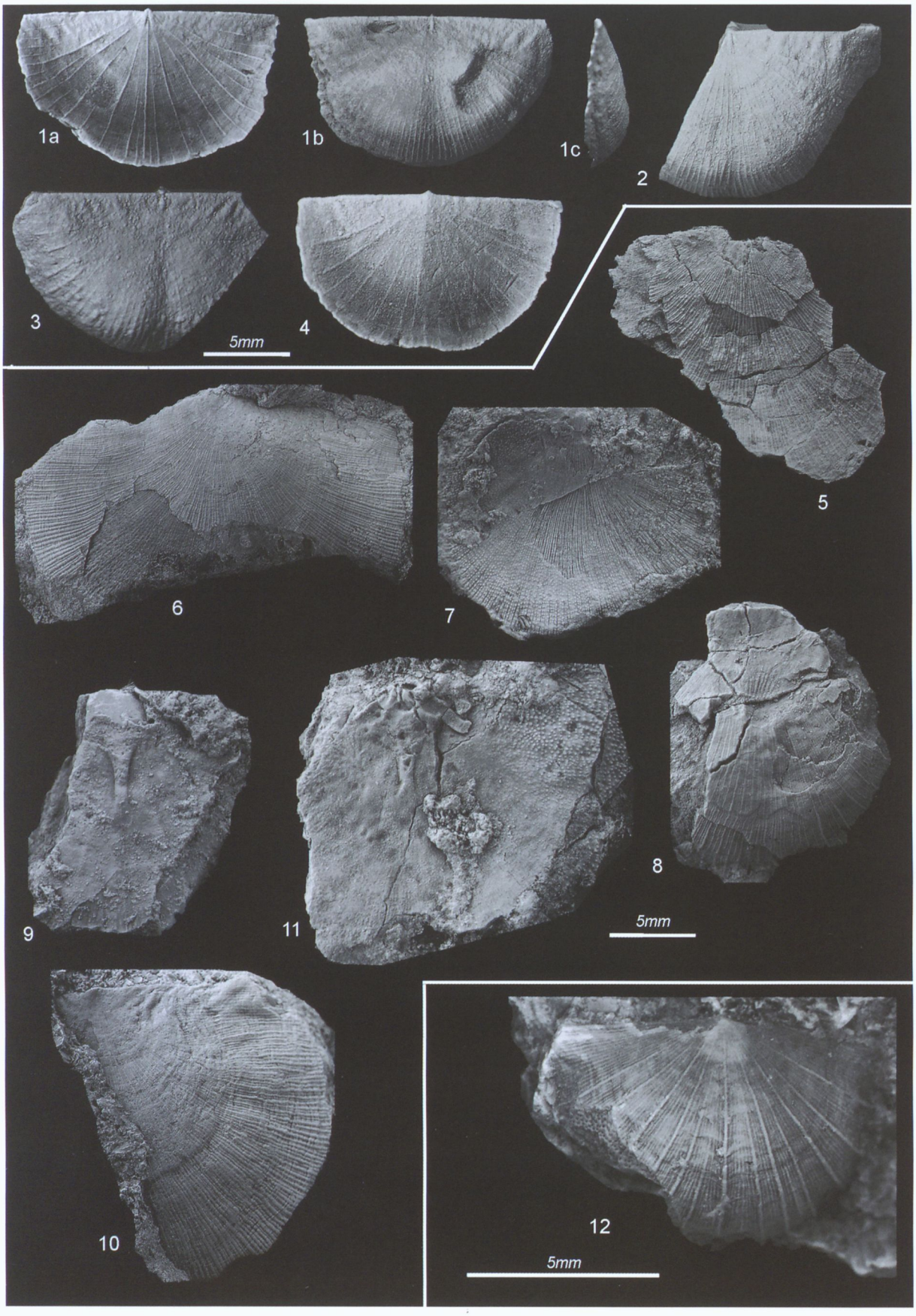

PLATE 6

Figures 1–12. *Eostropheodonta delicata* Baarli. Page 24.

1. Ventral view of the broken shell TUG 1235-20, Kabala-13a: 97.3-97.5 m, G_{1-2}Vb.
2. Cardinalia of the broken dorsal valve TUG 47-943d, Ellakvere quarry, G_3.
3. Cardinalia of the broken ventral valve TUG 47-943a, Ellakvere quarry, G_3.
4. Cardinalia of the broken dorsal valve TUG 1238-7, Vahtrepa ditch, G_{1-2}Vb.
5. Interior of the broken ventral valve TUG 47-943b, Ellakvere, G_3.
6. Interior of the broken ventral valve TUG 1238/3, Kursi excavation, G_3.
7. Interior of the broken ventral valve GIT 506-2542, Kursi excavation, G_3.
8. Cardinalia of the broken dorsal valve TUG 1235-26, Kabala-13a:101.03 m, G_{1-2}Vb.
9. Ventral view of the ventral valve TUG 1238/6, Vahtrepa ditch, G_{1-2}Vb.
10. Dorsal view of the dorsal valve TUG 1235/15, Rumba: 83.5 m, G_3.
11. Interior of the broken dorsal valve TUG 47-943c, Ellakvere quarry, G_3.
12. Interior of broken dorsal valve GIT 554-2362, Kursi: 79.7 m, G_3 .

Figures 13a–e. *Triplesia insularis* (Eichwald). Page 36. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2363, Viljandi-91: 249.0 m, G_{1-2}Õh.

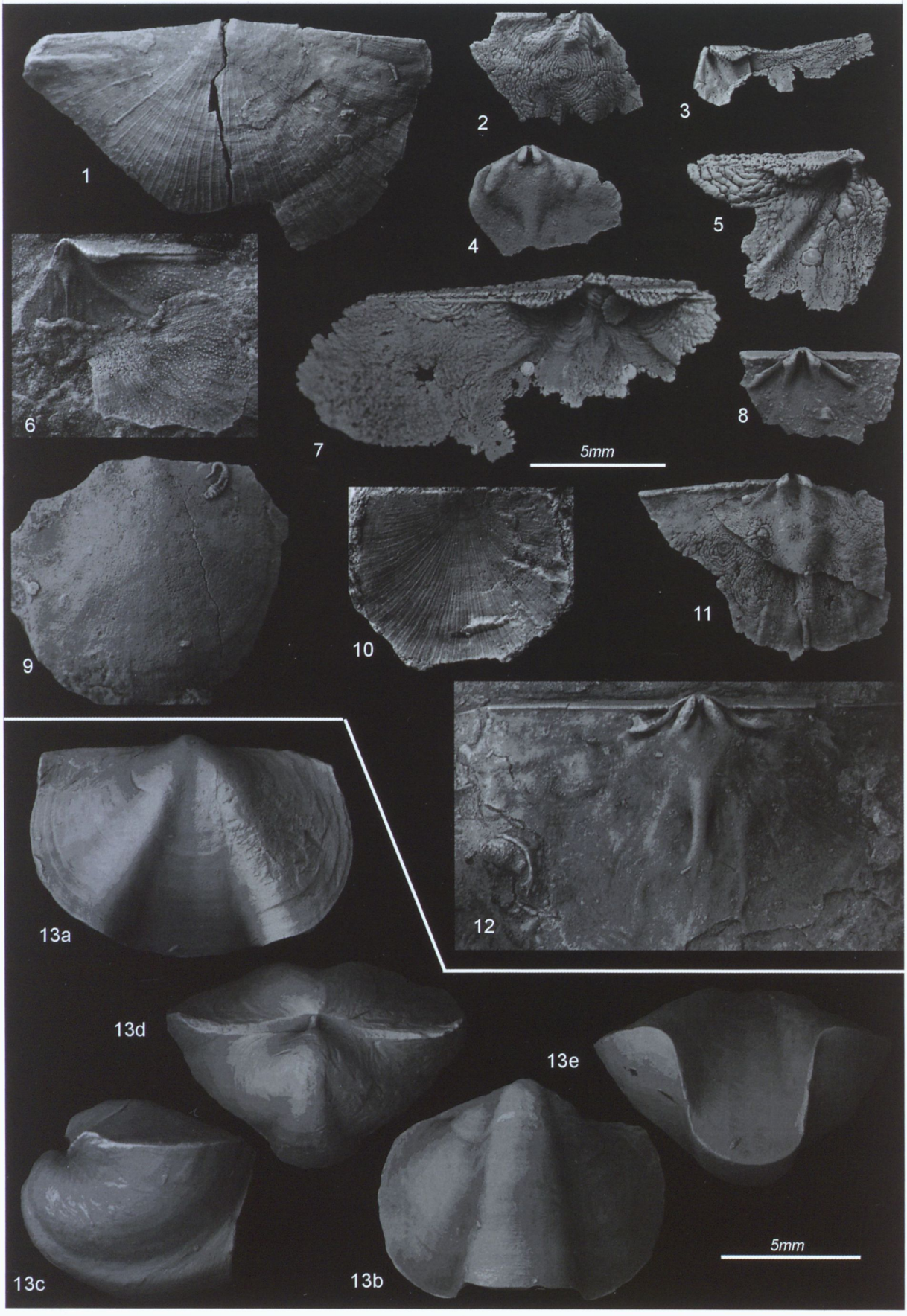
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PLATE 7

Figures 1–11. *Shaleria (Janiomya) ornatella* (Davidson). Page 27.

1. Exterior of the ventral valve GIT 506-1992d, Kaugatuma beach, K_3bKg.
2. Exterior of the dorsal valve GIT 506-1992b, Kaugatuma beach, K_3bKg.
3. Interior of the ventral valve GIT 506-1992f, Kaugatuma beach, K_3bKg.
4. Exterior of the broken ventral valve GIT 506-1992e, Kaugatuma beach, K_3bKg.
5. Interiors of the dorsal valves GIT 506-1992b, c, Kaugatuma beach, K_3bKg.
6. Interior of the broken dorsal valve TUG A/A2, Äigu quarry, K_3bKg.
7. Interior of the ventral valve GIT 506-1991a, Äigu quarry, K_3bKg.
8. Exterior of the broken dorsal valve GIT 506-1991b, Äigu quarry, K_3bKg.
9. Dorsal view of the dorsal valve GIT 506-1992g, Kaugatuma beach, K_3bKg.
10. Interior of the broken dorsal valve TUG 1278/67, Kaugatuma cliff, K_3bKg.
11. Interior of the ventral valve GIT 506-1993, Äigu quarry, K_3bKg.

Figures 12–14. *Shaleria (Shaleriella) ezerensis* (Rybnikova). Page 28.

12. Exterior of the ventral valve TUG A/A4, Kaugatuma cliff, K_3bKg.
13. Exterior of the ventral valve GIT 506-1994, Kaugatuma cliff, K_3bKg.
14. Interior of the broken ventral valve TUG A/A5, Kuressaare entrenchment, K_3bKg.

Plate 7

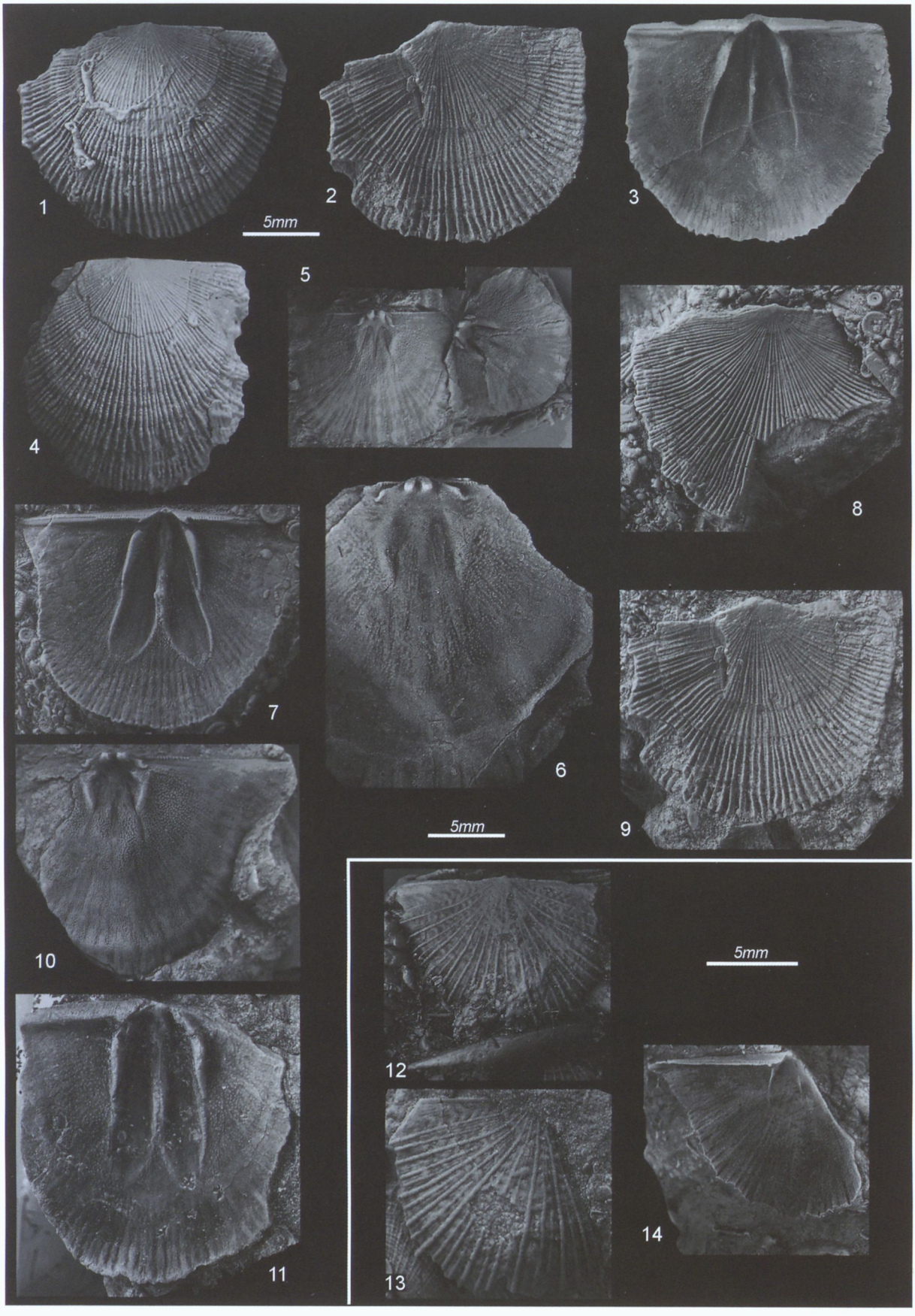

PLATE 8

Figures 1–16. *Leangella (Leangella) scissa* (Davidson). Page 28.

1. Ventral view of the shell GIT 506-1013, Pärnu: 195.55 m, G_{1-2}.
2. Interior of the broken ventral valve GIT 506-1012, Pärnu: 195.6 m, G_{1-2}.
3. Interior of the broken ventral valve GIT 506-1011, Pärnu: 196.0 m, G_{1-2}.
4. Dorsal view of the shell GIT 506-979, Sulustvere-5: 158.8 m, G_{1-2}.
5. Ventral view of the shell GIT 506-376, Kingissepa–GV: 285.2-285.3 m, G_{1-2}.
6. Interior of the broken dorsal valve GIT 506-1010, Pärnu: 199.5 m, G_{1-2}.
7. Interior of the dorsal valve GIT 506-1141, Ikla: 391.0-391.1 m, G_3.
8. Interior of the dorsal valve GIT 506-597, Häädemeese-172: 344.1 m, G_3.
9. Cardinalia of the dorsal valve GIT 506-597, Häädmeeste-172: 344.1 m, G_3.
10a–b. Ventral and dorsal views of the shell GIT 506-431, Ruhnu-500: 528.6 m, G_3.
11. Interior of the ventral valve GIT 506-1222, Pärnu: 386.8-386.9 m, G_{1-2}.
12a–b. Ventral and lateral views of the shell GIT 506-1152, Ikla: 386.8-386.9 m, G_3.
13. Ventral view of the shell GIT 506-432, Ruhnu-500: 528.6 m, G_3.
14. Interior of the broken dorsal valve GIT 506-416, Ruhnu-500: 506.7 m, G_3.
15. Interior of the dorsal valve GIT 506-1151, Ikla: 386.8-386 .9 m, G_3.
16. Ventral view of the shell GIT 506-1148, Ikla: 388.5-388.6 m, G_3.

Plate 8

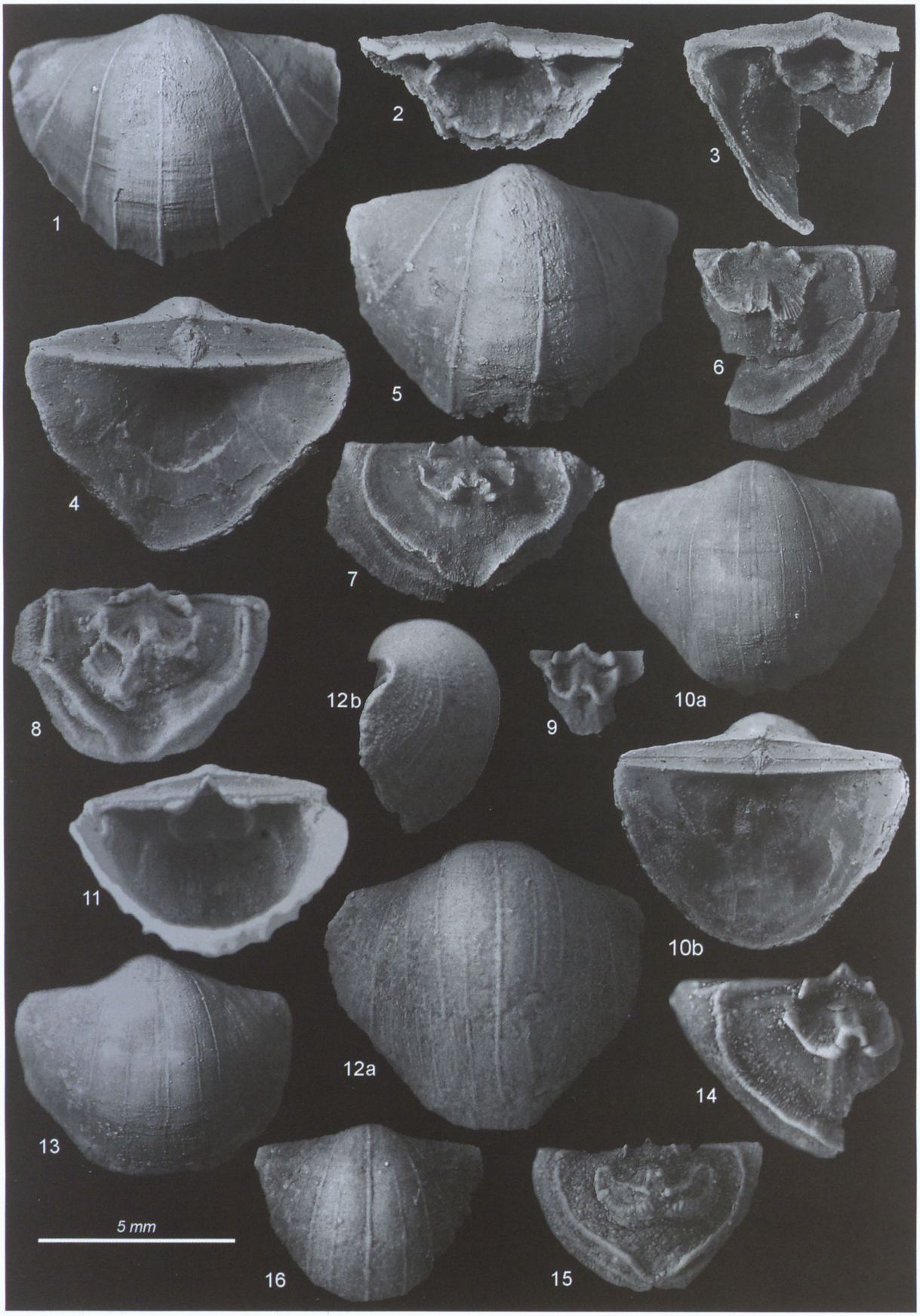

PLATE 9

Figures 1–12. *Eoplectodonta (Eoplectodonta) transversalis*. Page 31. All from Lätiküla, H.

1a–c. Ventral, dorsal and lateral views of the shell GIT 506-316.

2. Cast of the ventral valve GIT 506-308.

3a–c. Ventral, dorsal and lateral views of the shell GIT 506-12.

4. Interior of the broken ventral valve GIT 506-8.

5a–b. Ventral and dorsal views of the broken shell GIT 506-14.

6. Denticulated interarea of the ventral valve GIT 506-5.

7. Interior of the dorsal valve GIT 506-13.

8. Interior of the broken dorsal valve GIT 506-308.

9. Interior of the broken dorsal valve GIT 506-5.

10a–c. Ventral, dorsal and lateral views of the shell GIT 506-312.

11. Ventral view of the shell GIT 506-10.

12. Ventral view of the shell GIT 506-315.

Plate 9

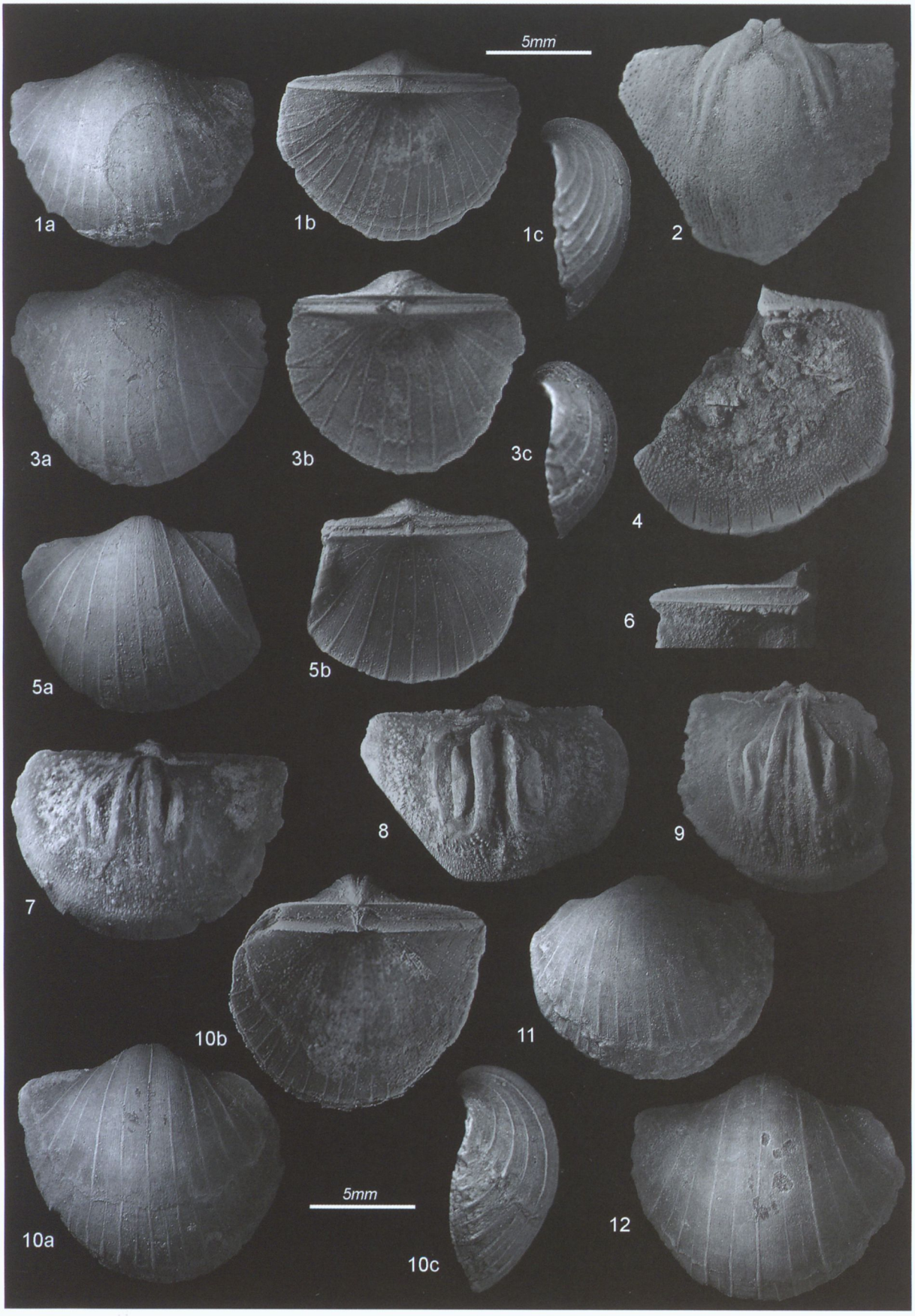

PLATE 10

Figures 1–14. *Eoplectodonta (Ygerodiscus) bella* Musteikis et Cocks. Page 32.

1a–b. Ventral and lateral views of the shell TUG K/3, Viljandi-91: 171.5 m, G_3.

2a–b. Ventral and lateral views of the shell TUG K/4, Viljandi-91: 260.0 m, G_{1-2}Õh.

3. Interior of the broken ventral valve TUG K/5, Ohesaare: 384.37-384.41 m, G_3.

4. Ventral view of the shell GIT 506-1593, Pärnu: 94.51 m, J_1.

5a–b. Dorsal and lateral views of the shell GIT 506-474, Ruhnu-500: 403.7 m, J_1

6. Interior of the dorsal valve GIT 506-1486, Pärnu: 94.03 m, J_1.

7. Dorsal view of the shell GIT 506-470, Ruhnu-500: 508.2 m, H.

8. Interior of the dorsal valve GIT 506-500. Ruhnu-500: 460.1 m, H.

9. Ventral view of the shell GIT 506-502, Ruhnu-500, 458.8 m, H.

10. Ventral view of the shell GIT 506-1838, Pärnu: 93.9 m, J_1.

11. Interior of the broken dorsal valve GIT 506-1559, Pärnu: 92.37-92.41 m, J_1.

12a–b. Ventral and dorsal views of the shell GIT 506-1746, Pärnu: 106.13 m, J_1.

13. Ventral view of the shell GIT 506-505, Ruhnu-500, 455.9 m, J_1.

14.a–b. Ventral and lateral views of the shell GIT 506-1608, Pärnu: 96.0 m, J_1.

Figures 15–18. *Eoplectodonta (Eoplectodonta) duvalii* (Davidson). Page 31.

15. Interior of the broken dorsal valve GIT 506-1497, Pärnu: 87.8-87.9 m, J_1.

16. Ventral view of the shell GIT 506-517, Ruhnu-500: 414.3 m, J_1.

17a–b. Dorsal and ventral views of the broken shell GIT 506-514, Ruhnu-500: 415.2 m, J_1.

18. Interior of the ventral valve TUG 1278-66, Kaugatuma: 327.1 m, G_{1-2}Vb.

Plate 10

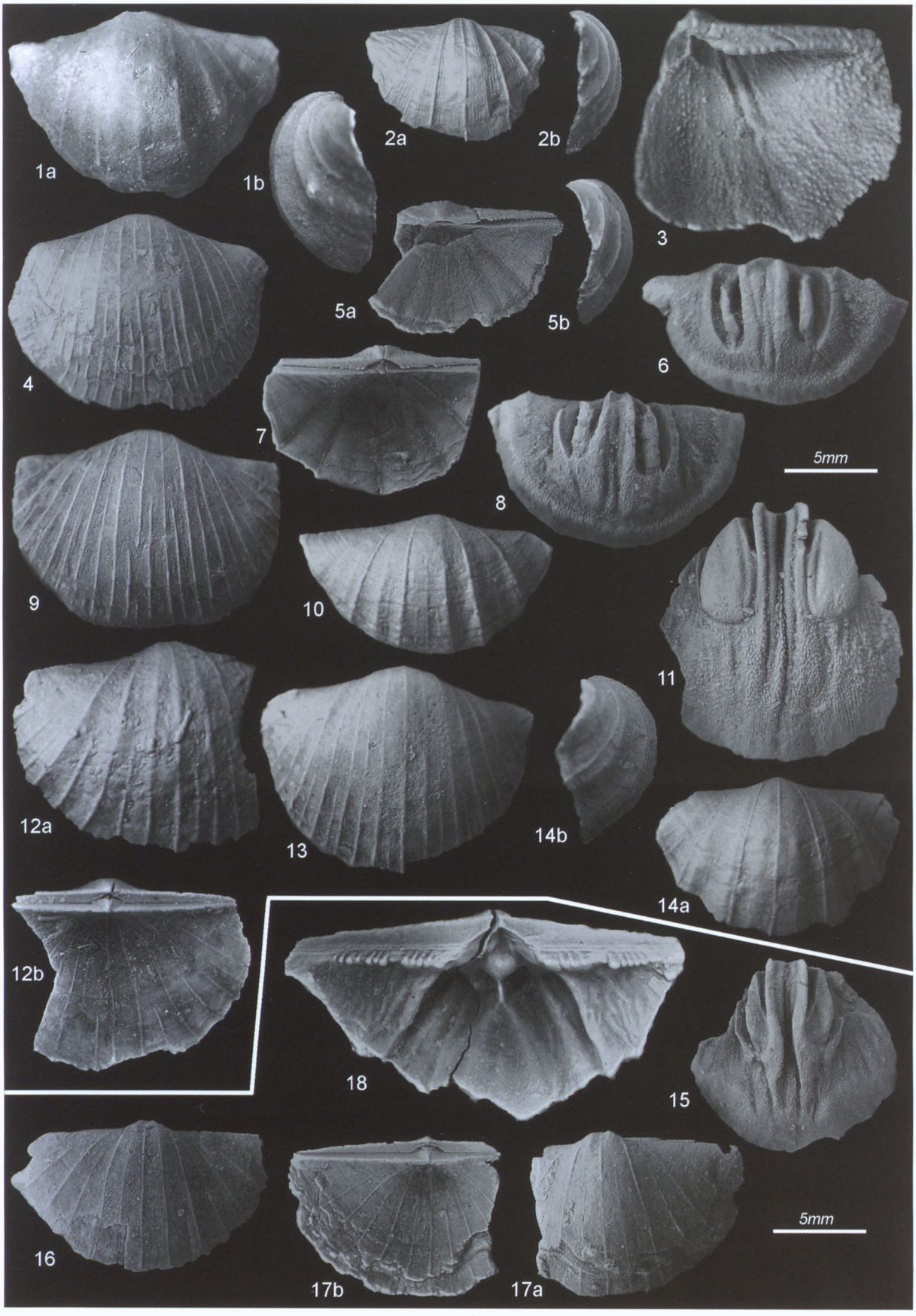
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PLATE 11

Figures 1–9. *Eoplectodonta (Eoplectodonta) exceptionis* (Rybnikova). Page 31.

1. Ventral view of the shell GIT 506-571, Häädemeeste-172: 322.2 m, G_3.
2. Ventral view of the broken shell GIT 506-572, Häädemeeste-172: 322.2 m, G_3.
3. Ventral view of the broken shell GIT 506-869, Ikla: 385.9-386.0 m, G_3.
4. Interior of the broken ventral valve GIT 506-611, Häädemeeste-172: 395.0 m, G_{1-2}.
5. Interior of the ventral valve GIT 506-569, Häädemeeste-172: 322.2 m, G_3.
6. Interior of the dorsal valve GIT 506-588, Häädemeeste-172: 321.2 m, G_3.

7a–b. Dorsal and lateral views of the broken shell GIT 506-841, Ikla: 479.9-480.0 m, G_3.

8a–b. Dorsal and lateral views of the broken shell GIT 506 845, Ikla: 473.5 m, G_3.

9a–b. Dorsal and lateral views of the shell GIT 506-863, Ikla: 391.6-391.7 m, G_3.

Figures 10–19. *Eoplectodonta (Eoplectodonta) penkillensis* (Reed). Page 32.

10a–b. Ventral and dorsal views of the shell GIT 506-1943, Saaremaa borehole No. 859: 82.5-82.6 m, J_1.

11. Interior of the ventral valve GIT 506-1944, Saaremaa borehole No. 859: 77.2-77.5 m, J_1.
12. Interior of the broken ventral valve GIT 506-342, Kingissepa–GV: 171.4-171.5 m. J_1.
13. Interior of the broken ventral valve GIT 506-323, Kingissepa–GV: 212.7.-212.8 m, H.
14. Dorsal view of the shell GIT 506-319, Kingissepa–GV: 289.0-289.1 m, G_{1-2}.
15. Interior of the broken dorsal valve GIT 506-320, Kingissepa–GV: 14.6-14.7 m, H.
16. Interior of the broken dorsal valve GIT 506-458, Ruhnu-500: 564.8 m, G_3.
17. Ventral view of the ventral valve GIT 506-352, Kingissepa–GV: 164.8-164.9 m, J_1.
18. Ventral view of the shell GIT 506-529, Ohesaare: 366.1 m, H.
19. Ventral view of the shell GIT 506-464, Ruhnu-500: 529.0 m, G_3.

Plate 11

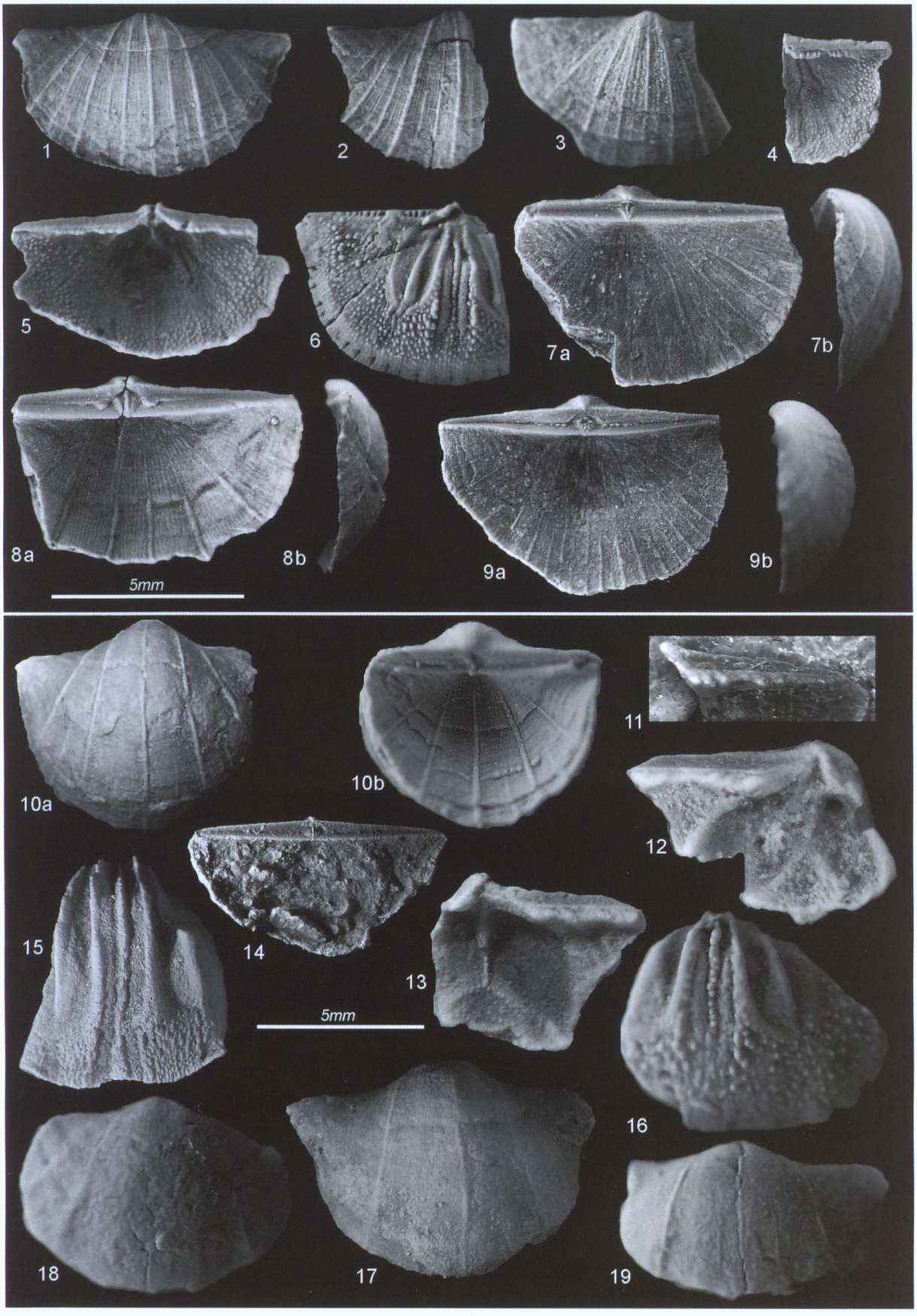

PLATE 12

Figures 1–4. *Jonesea grayi* (Davidson). Page 29. All SEM photos.

1a. Ventral view of the shell GIT 506-2004, Ohesaare: 289.15 m, J_1.

1b. View to protegulal node with broken pedicel tube of the same shell as 1a.

2. Posterior view to the umbonal part of the shell GIT 506-2005, pedicle tube broken, Ohesaare: 289.5 m, J_1.

3a–b. Dorsal view of the shell GIT 506-2006 and its enlarged dorsal umbo, Kingissepa–GV: 212.7-212.8 m, H.

4. Ventral view of the juvenile shell GIT 506-2007, Kingissepa–GV: 214.9 m, H

Figures 5–6. *Aegiria (Aegiria) norvegica* Öpik. Page 30. All from the Ikla core, 397.5-397.6 m, G_3

5a–b. Ventral view and interior of the broken ventral valve GIT 506-1334.

6a–b. Interior and exterior of the broken dorsal valve, GIT 506-1333.

Figures 7–11. *Leangella (Leangella) segmentum* (Lindström). Page 29.

7a–c. Ventral, dorsal and lateral views of the shell GIT 506-1743, Pärnu: 106.17 m, J_1.

8. Ventral view of the juvenile shell GIT 506-1028, Pärnu: 123.1 m, J_1.

9. Interior of the dorsal valve GIT 506-1032, Pärnu: 94.11 m, J_1.

10. Ventral view of the shell GIT 506-1030, Pärnu: 120.3 m, J_1.

11. Interior of the broken dorsal valve GIT 506-1443, Pärnu: 93.3 m, J_1.

Plate 12

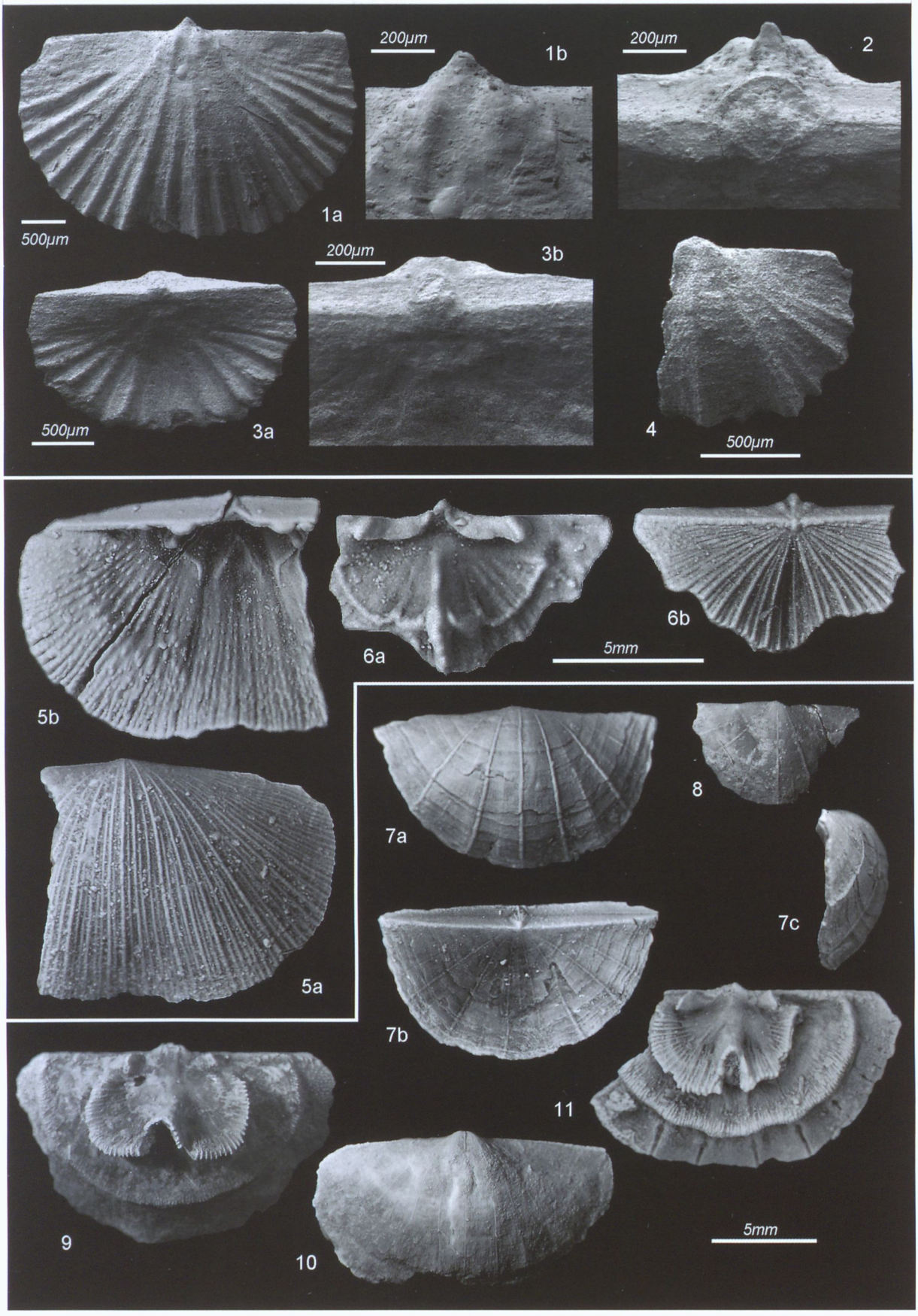
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PLATE 13

Figures 1–3. *Mesopholidostrophia laevigata* (J. de C. Sowerby). Page 26.

1a–b. Ventral and lateral views of the shell GIT 506-1447, Kõinastu cliff, H.

2a–c. Ventral, dorsal and lateral views of the shell TUG 169-292, Kõinastu cliff, H.

3a–c. Ventral, dorsal and lateral views of the shell GIT 506-1449, Pärnu: 9.94 m, H.

Figures 4–6. *Strophochonetes cingulatus* (Lindström). Page 33.

4. Exterior of the ventral valve GIT 554-2265, Ohesaare: 306.95-307.00 m, J_1.

5. Exterior of the ventral valve GIT 554-2264, Ohesaare: 288.4 m, J_1.

6. Exterior of the ventral valve GIT 554-2263, Ohesaare: 307.28-307.36 m, J_1.

Figures 7–13. *Protochonetes striatellus* (Dalman). Page 33.

7. Ventral view of the broken ventral valve, GIT 554-2270 with spines, Ohesaare: 82.02-82.09 m, K_2.

8. Exfoliated ventral valve GIT 554-2271, Uduvere alvar, K_2.

9. Interior of the exfoliated dorsal valve GIT 554-4868, Paadla: 1.15 m, K_2.

10. Exterior of the broken ventral valve GIT 554-2267 with spines, Ohesaare: 82.21-82.22 m, K_2.

11. Ventral view of ventral valve GIT 554-2266, Viki quarry, K_2.

12. Interior of dorsal valve GIT 554-2268, Ohesaare: 98.27 m, K_2.

13. Exterior of ventral valve GIT 554-2269a (left) and the same of juveniles GIT 554-2269b (right), Ohesaare: 98.27 m, K_2.

Figures 14–16. *Protochonetes piltenensis* (Rybnikova). Page 34.

14. Exterior of ventral valve GIT 554-2274, Ohesaare: 62.45-62.56 m, K_3b.

15. Exterior of ventral valve GIT 554-2273, Ohesaare: 29.28-29.33 m, K_3b.

16. Exterior of ventral valve GIT 554-2275, Ohesaare: 12.47-12.50 m, K_3b.

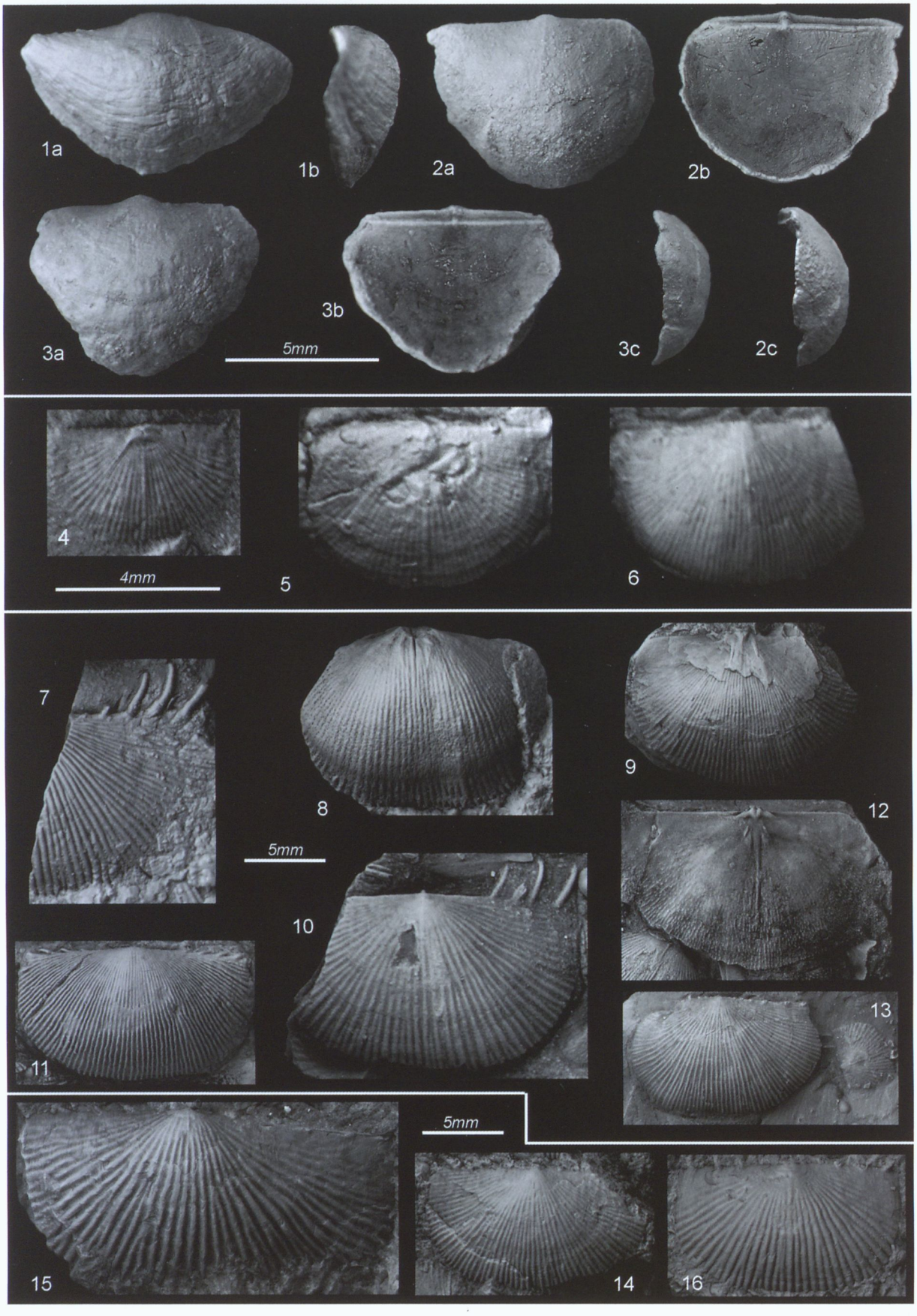
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PLATE 14

Figures 1a–b. *Morinorhynchus rubeli* Musteikis et Cocks. Page 35. Interior and exterior of the ventral valve TUG M/1, Ohesaare cliff, K_4Oh.

Figures 2–8. *Protochonetes piltenensis* (Rybnikova). Page 34.

2. Exterior of the ventral valve GIT 554-2276b, Ohesaare: 25.65-25.68 m, K_3b.
3. Juvenile ventral valve GIT 554-2276c (left) and interior of the dorsal valve GIT 554-2276a, Ohesaare: 25.65-25.68 m, K_3b.
4. Exterior of ventral valve GIT 554-2277, Ohesaare: 23.20-23.32 m, K_3b.
5. Interior of the dorsal valve GIT 554-2278, Ohesaare: 4.20-4.30 m, K_3b.
6. Oblique view to interior of the dorsal valve GIT 554-2281, Ohesaare: 27.60-27.65 m, K_3b.

7a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2279, Ohesaare: 7.65 m, K_3b.

8a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2780, Ohesaare core, exact depth unknown, K3b.

Figures 9–14. *Brachyprion (Brachyprion) semiglobosa* (Davidson). Page 25. All from Sepise, J_2.

9. Dorsal view of the shell GIT 506-8.
10. Interior of exfoliated and broken ventral valve GIT 506-11.
11. Exterior of ventral valve GIT 506-9.
12. Ventral view of ventral valve GIT 506-9.
13. Interior of broken ventral valve GIT506-7.
14. Interior of exfoliated ventral valve GIT 506-10.

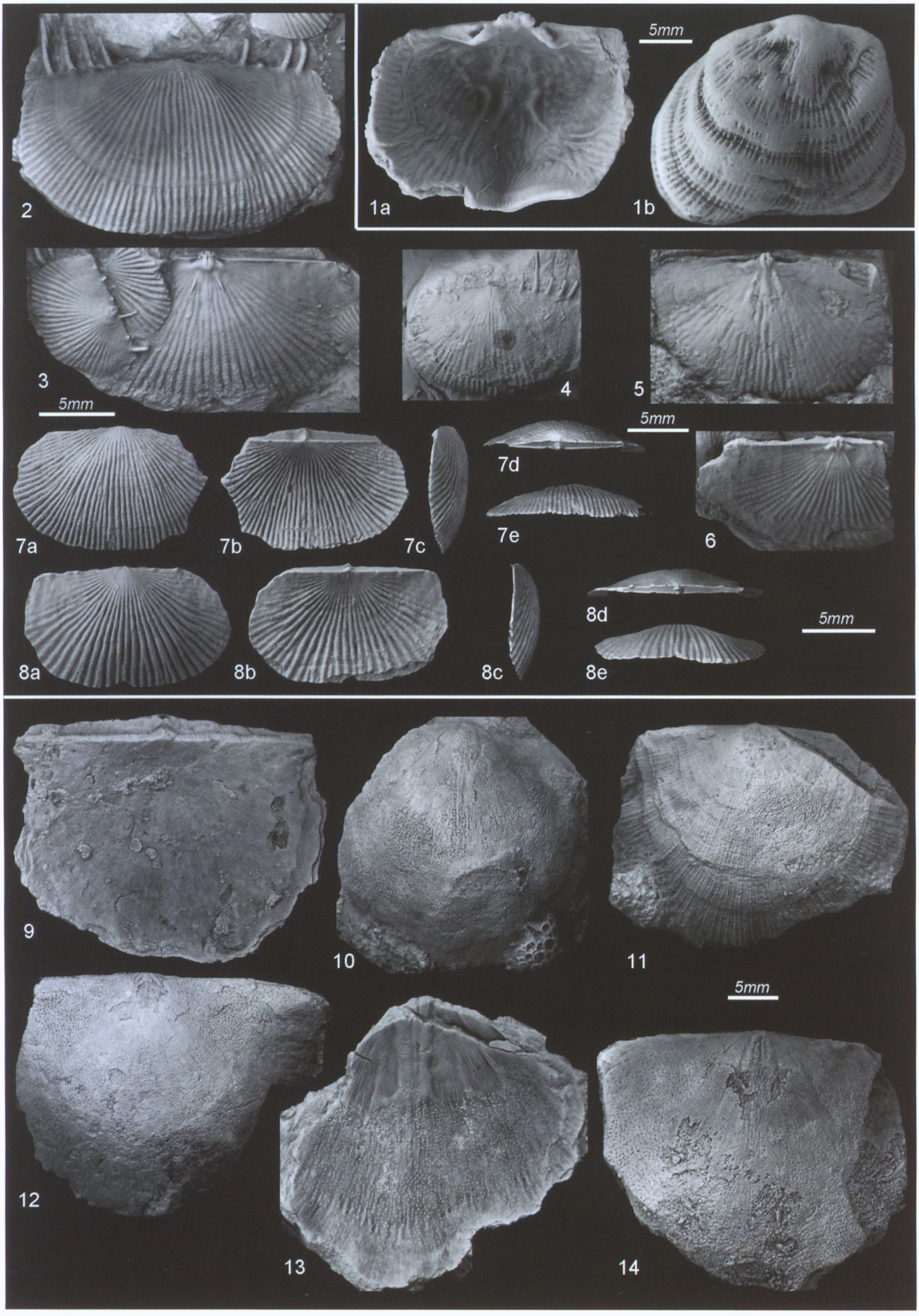
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PLATE 15

Figures 1–9. *Coolinia applanata* (Salter). Page 34.

1a–c. Ventral, dorsal and lateral views of the shell GIT 506-2187, Hilliste bioherm, G_3Hl.

2. Ventral view of the shell TUG 808/10, Hilliste bioherm, G_3Hl.

3. Interior of the broken ventral valve GIT 506-2188, Hilliste bioherm, G_3Hl.

4. Interior of the broken dorsal valve TUG 1241/5, Kabala-13a: 94.3 m, G_{1-2}Vb.

5. Cardinalia of the broken dorsal valve GIT 506-1201a, Kingissepa–GV: 282.25-282.35 m, G_{1-2}.

6. Interior of the broken dorsal valve GIT 506-1201, Rohuküla quarry, G_{1-2}Vb.

7. Ventral view of shell GIT 506-1254, Kabala-13a: 92.7 m; G_{1-2}.

8. Interior of the broken dorsal valves GIT 506-1200, Kingissepa–GV: 282.25-282.35 m, G_{1-2}.

9. Interior of the broken dorsal valves GIT 506-1213, Kingissepa–GV: 274.5-274.6 m, G_{1-2}.

Figures 10–12. *Coolinia pecten* (Linneaus). Page 34.

10a–b. Ventral and posterior views of the shell TUG 1252/2a, Lätiküla, H'Vl.

11a–b. Dorsal and posterior views of the shell GIT 506-1349, Lätiküla, H'Vl.

12. Interior of the broken dorsal valve TUG 47/945, Suuriku cliff, J_1.

Figures 13–15. *Morinorhynchus crispus* (Lindström). Page 35.

13a–c. Ventral, dorsal and lateral views of the shell TUG 97/17, Pilguse quarry, K_2.

14. Ventral view of the ventral valve TUG 506/2648, Pilguse quarry, K_2.

15. Posterior view of the ventral valve TUG 97/16, Muratsi quarry, K_3aKr.

Plate 15

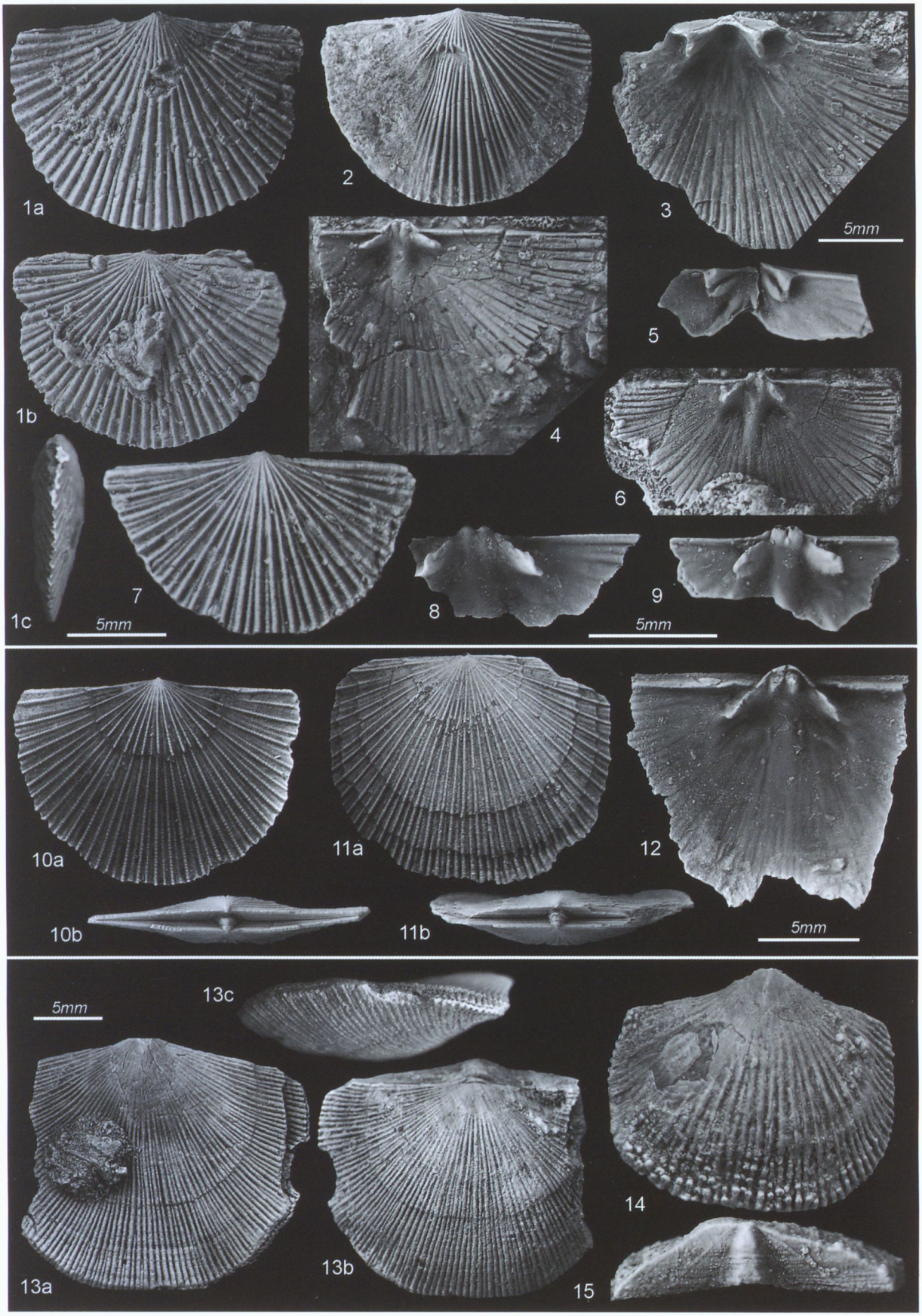
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PLATE 16

Figures 1a–d. *Triplesia insularis* (Eichwald). Page 36. Ventral, dorsal, lateral and anterior views of the shell GIT 128-47 (Br 2903), Heltermaa beach, G_{1-2}.

Figures 2–6. *Triplesia maennili* Rubel. Page 36.

2a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 128-46, Vahtrepa ditch, G_{1-2}Vb.

3a–b. Holotype, ventral and dorsal views of the shell GIT 128-45 (Br 2904), Hilliste quarry, G_3Hl.

4a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2364, Hilliste bioherm, G_3Hl.

5a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2365a, GIT 554-2365b, Hilliste bioherm, G_3Hl.

6a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2365b, Hilliste bioherm, G_3Hl.

Figures 7–10. *Dalejina phaseola* (Rubel). Page 52. All from Saastna cape, J_1.

7a–b. Ventral and anterior views of partly exfoliated shell GIT 554-2438.

8a–b. Ventral and lateral views of the shell GIT 554-2439 with partly preserved dorsal valve.

9a–b. Dorsal and anterior views of the shell GIT 2440 with completely exfoliated ventral valve.

10a–b. Ventral and lateral view of the umbonally broken shell GIT 554-2441.

Figures 11–14. *Levenea canaliculata* (Lindström). Page 46. All from Kuressaare entrenchment, K_3a.

11a–c. Ventral, dorsal, lateral and anterior views of the shell GIT 128-90

12a–b. Ventral view and interior of the ventral valve GIT 128-89.

13a–b. Dorsal view and interior of the dorsal valve GIT 128-88.

14. Interior of the ventral valve GIT 128-91.


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13b
5mm

PLATE 17

Figures 1–11. *Skenidioides petrasi* sp. nov. Page 38.

1a–c. Holotype, ventral, dorsal and lateral views of the shell GIT 506-2134a, Ikla: 385.8-386.0 m, G_3.

2. Exterior of the ventral valve GIT 506-2136, Ikla: 276.0-276.1 m, J_1.

3. Anterior view of the shell GIT 506-2501b, Ikla: 281.0-281.1 m, J_1.

4. Dorsal view of the juvenile shell GIT 506-2168, Häädemeeste-172: 231.7 m, H.

5. Ventral view of the shell GIT 506-2140, Häädemeeste-172: 396.2 m, G_{1-2}.

6. Dorsal view of the dorsal valve GIT 506-2501a, Ikla: 281.0-281.1 m, J_1.

7. Interior of the dorsal valve GIT 506-2147, Häädemeeste-172: 390.2 m, G_3.

8. Ventral view of the ventral valve GIT 506-2138, Ikla: 274.0-274.1 m, J_1

9. Ventral view of the shell GIT 506-2501b, Ikla: 281.0-281.1 m, J_1.

10-11. Exterior of the ventral valve GIT 506-2501a and view to ventral beak with protegulum, Ikla: 281.0-281.1 m, J_1.

Figures 12–15. *Skenidioides acutum* (Lindström). Page 38.

12a–b. Ventral and dorsal views of the shell GIT 506-2335, Ikla: 283.3 m, J_1.

13. Exterior of the ventral valve GIT 506-2302,Varbla-502: 147.0-147.1 m, H.

14. Ventral view of the ventral valve GIT 506-2300, Ohesaare: 289.30 m, J_1.

15. Anterior view of the shell GIT 506-2335, Ikla: 283.3 m, J_1.

Figures 16–20. *Skenidioides scoliodus* Temple. Page 37.

16. Interior of the broken dorsal valve GIT 506-2077, Ikla: 472.0-472.1 m, G_3.

17. Dorsal view of the shell GIT 506-2086, Häädemeeste-172: 412.1 m, G_{1-2}.

18a–b. Ventral and dorsal view of the shell GIT 506-2072, Ikla: 506.9 m, G_{1-2}.

19. Interior of the dorsal valve TUG 1278-1, Kaugatuma-509: 320.15 m, G_{1-2}.

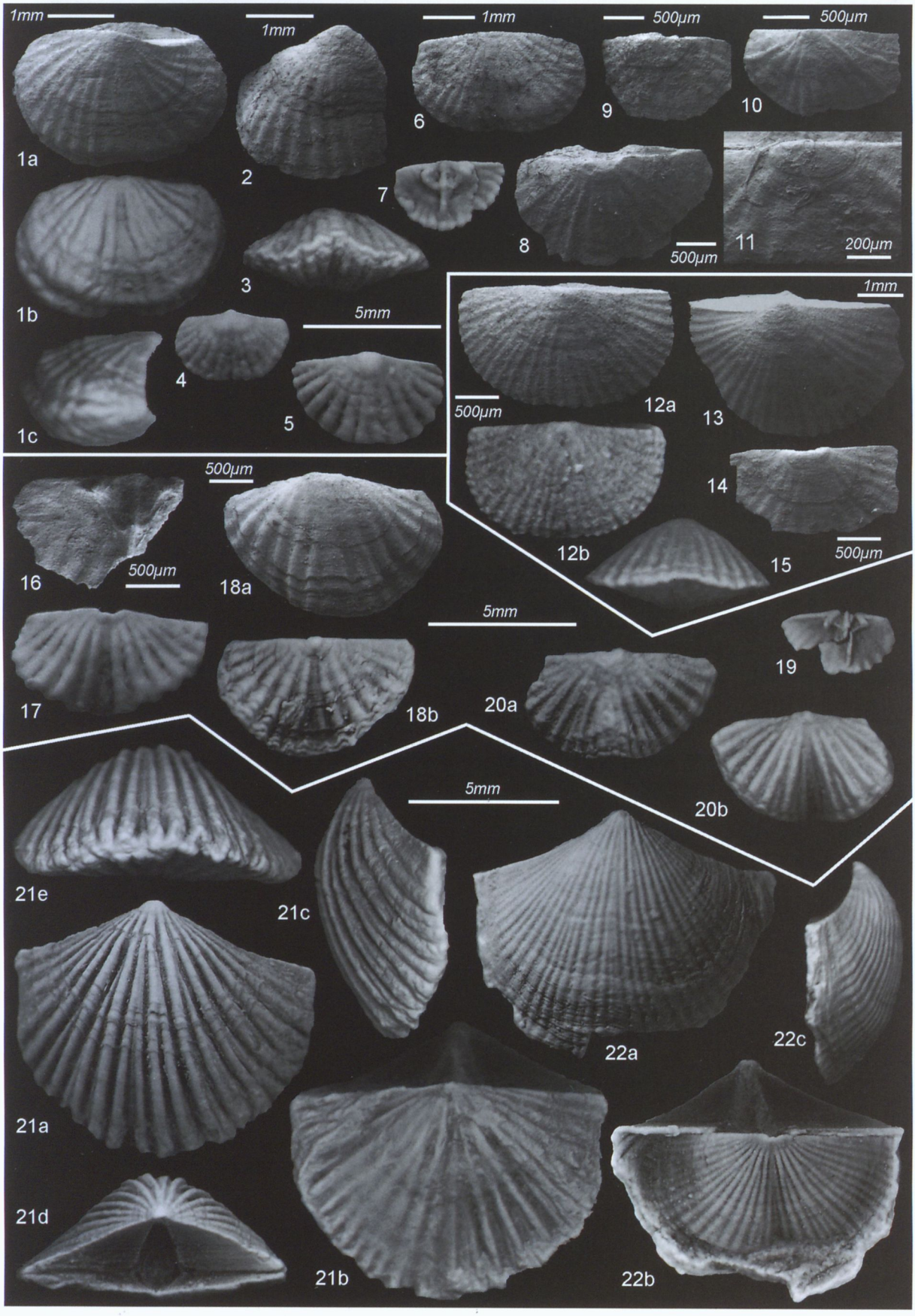
20a–b. Ventral and dorsal view of the shell GIT 506-2071, Ikla: 519.0 m, G_{1-2}.

Figures 21–22. *Skenidioides hymiri* Baarli. Page 39.

21a–d. Ventral, dorsal (eroded surface), lateral and anterior views of the shell GIT 506-2224, Abja-92: 310.2 m, G_{1-2}.

22a–d. Ventral, dorsal, lateral and posterior views of the partly broken shell GIT 506-2125, Ikla: 286.8 m, H.

Plate 17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22c
21a
21d
21b
22b

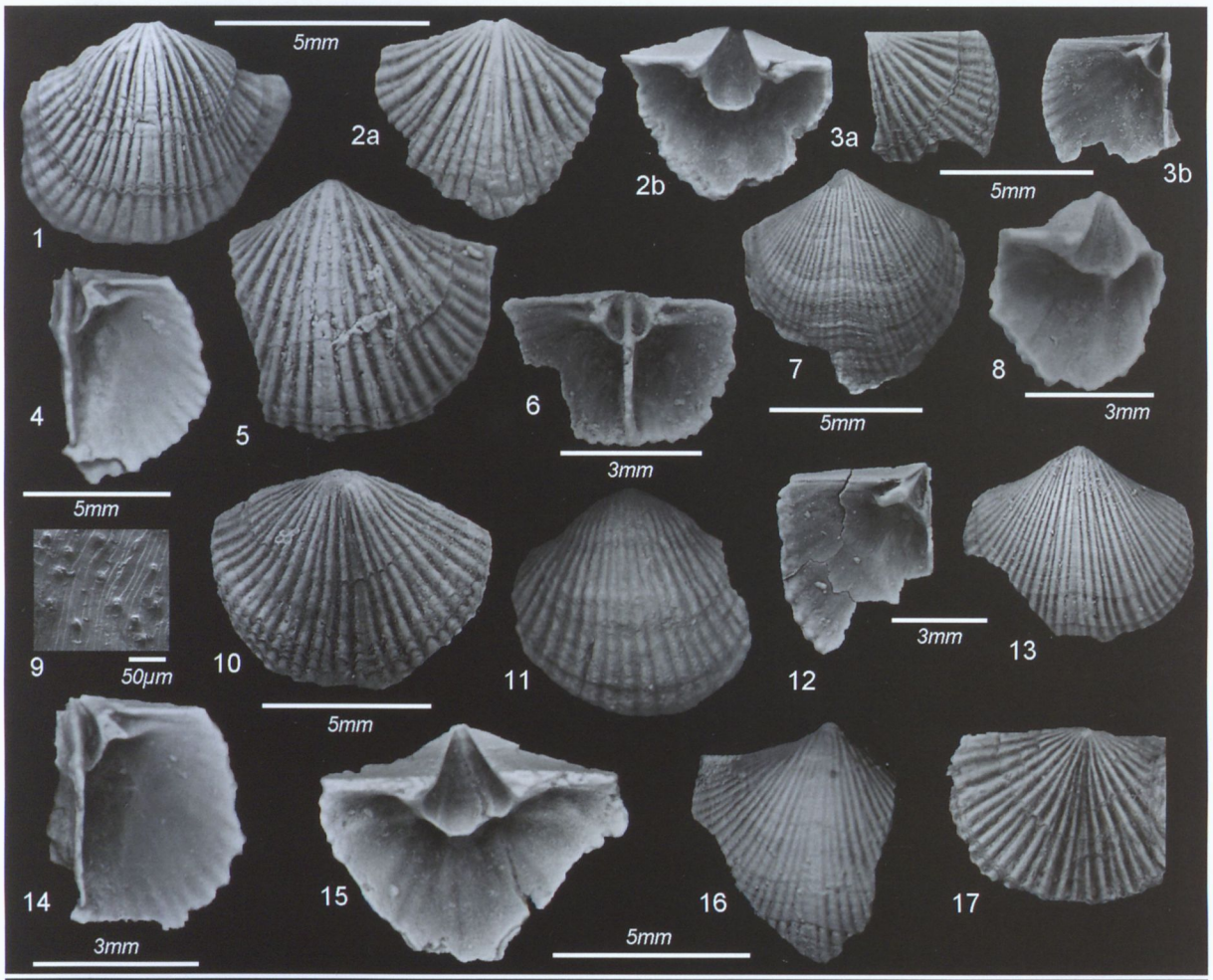
PLATE 18

Figures 1–17. *Skenidioides hymiri* Baarli. Page 39.

1. Exterior of the ventral valve GIT 506-2129, Ristiküla-174: 325.8 m, G_{1-2}.
2a–b. Exterior and interior of the ventral valve GIT 506-2131, Laeva-2: 340.3 m, G_{1-2}.
3a–b. Exterior and interior of the broken dorsal valve GIT 506-2128, Häädemeeste-172: 340.6 m, G_3.
4. Interior of the broken dorsal valve GIT 506-2129, Ikla: 387.9-388.0 m, G_3.
5. Exterior of the broken ventral valve GIT 506-2127, Häädemeeste-172: 399.5 m, G_{1-2}.
6. Interior of the broken dorsal valve GIT 506-2249, Abja-92: 220.3 m, G_3.
7. Ventral view of the partly broken shell GIT 506-2125, Ikla: 386.8-386.9 m, G_3.
8. Interior of the broken ventral valve GIT 506-2130, Ristiküla-174: 331.4 m, G_{1-2}.
9. Fibrous shell structure with endopunctae of the ventral valve, Ikla: 387.9-388.0 m, G_3. Scale 20 microns.
10. Dorsal view of the dorsal valve GIT 506-2229, Abja-92: 265.9 m, G_3.
11. Ventral view of the ventral valve GIT 506-2230, Abja-92: 265.7 m, G_3.
12. Interior of the broken dorsal valve GIT 506-2198, Häädemeeste-172: 399.5 m, G_{1-2}.
13. Ventral view of the ventral valve GIT 506-2126, Häädemeste-172: 399.5 m, G_{1-2}.
14. Interior of the broken dorsal valve GIT 506-2192, Ikla: 387.9-388.0 m, G_3.
15. Interior of the broken ventral valve GIT 506-2218a, Abja-92: 321.1-321.2 m, G_{1-2}.
16. Ventral view of the broken ventral valve GIT 506-2185, Ikla, 385.9-386.0 m, G_{1-2}.
17. Dorsal view of the dorsal valve GIT 506-2218b, Abja-92: 321.1-321.2 m, G_{1-2}.

Figures 18–20. *Templeella* sp. nov. Page 49.

18a–b. Ventral and dorsal views of the shell GIT 554-2043, Ikla: 483.1 m, G_3.
19a–c. Ventral, dorsal and lateral views of the shell GIT 554-2035, Ikla: 511.5 m, G_{1-2}.
20a–c. Ventral, dorsal and lateral (all slightly declined) views of the shell GIT 554-2039, Ikla: 505.2 m, G_{1-2}.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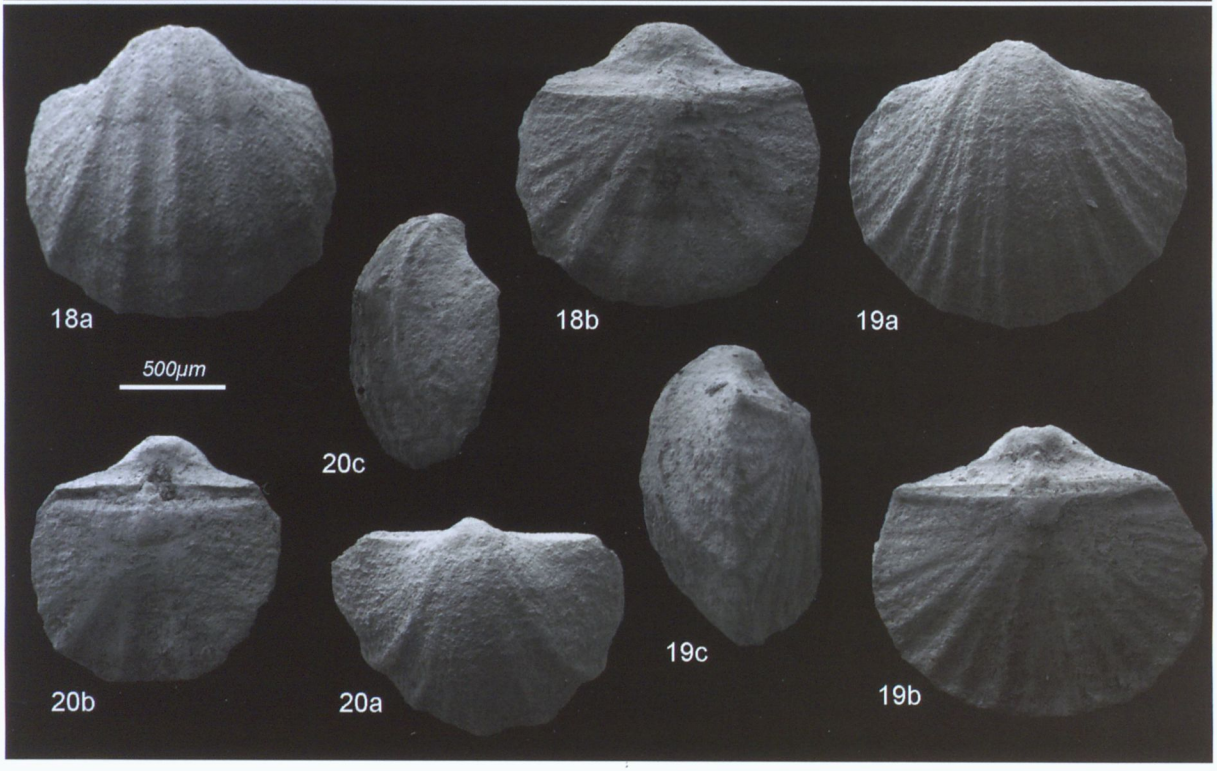
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19b

PLATE 19

Figures 1–5, 7–9. *Ravozetina* sp. Page 45. 1-5 and 7-8 from Ruhnu-500: 402,6 m, J_2.

1a–d. Ventral, lateral, posterior and anterior views of the shell GIT 554-217 m.

2. Interior of the partly broken dorsal valve GIT 554-218.

3. Interior of the broken dorsal valve GIT 554-216.

4. Interior of broken ventral valve GIT 554-219.

5. Interior of the broken ventral valve GIT 554-220.

7a–e. Ventral, dorsal, anterior, lateral and posterior views of the shell GIT 554-214.

8a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-215.

9a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-205a, Lithuania, Kalvarija: 775.6 m, J_1.

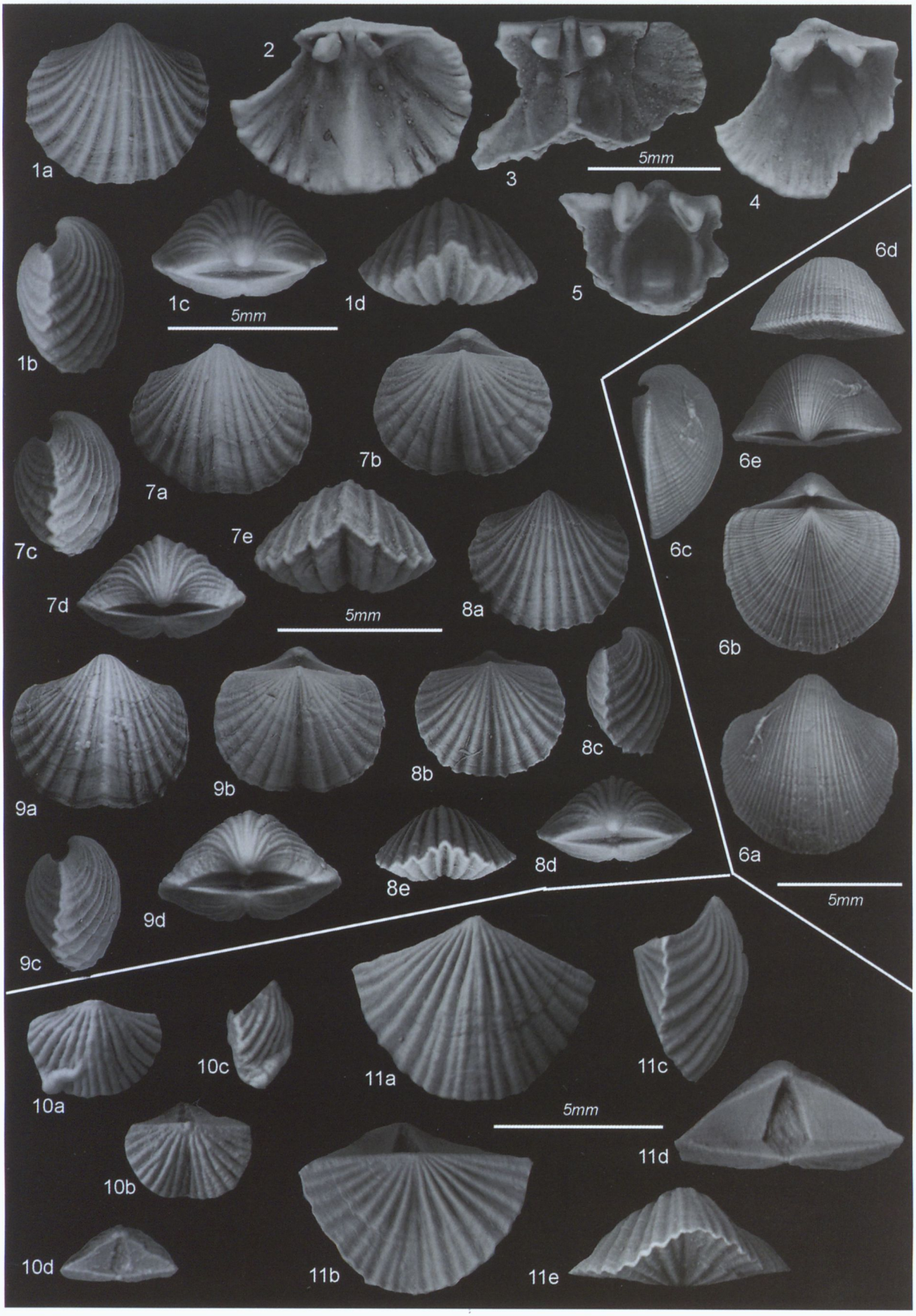
Figures 6a–e. *Resserella canalis* (J. de C. Sowerby). Page 48. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-205b, Lithuania, Kalvarija: 775.6 m, J_1.

Figures 10–11. *Skenidioides hymiri* Baarli. Page 39.

10a–d. Ventral, dorsal, lateral and anterior views of the hell GIT 554-48, Seliste-173: 320.9 m, G_{1-2}.

11a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-47, Seliste-173: 280.6 m, G_3.

Plate 19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5mm
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11c
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5mm
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11e

PLATE 20

Figures 1–7. *Hesperorthis hillistensis* Rubel. Page 40.

1a–d. Ventral, dorsal, lateral and anterior views of the shell, GIT 554-1950, Pilistvere-4: 93.1 m, G_{1-2}.

2a–b. Interior and exterior of the dorsal valve GIT 554-1946, Kabala-13a: 105.3-105.5 m, G_{1-2}.

3. Exterior of the ventral valve GIT 554-1948, Kabala-13a: 93.5-93.6 m, G_{1-2}.

4. Interior of dorsal valve GIT 554-1949, Kabala-13a: 93.35-93.45 m, G_{1-2}.

5. Cardinalia of the broken dorsal valve GIT 554-1953, Kabala-13a: 106.5-106.8 m, G_{1-2}.

6. Interior of dorsal valve GIT 554-1947a, Kabala-13a: 98.7-98.8 m, G_{1-2}.

7. Fragment of the dorsal valve exterior GIT 554-1947b, Kabala-13a: 98.7-98.8 m, G_{1-2}.

Figures 8–14. *Wangyuia* sp. Page 43.

8. Cardinalia of the broken dorsal valve GIT 554-1954, Kabala-13a: 104.9-105.1 m, G_{1-2}.

9a–b. Interior and exterior of the broken ventral valve GIT 554-1951, Kingissepa–GV: 200.5-200.6 m, H.

10. Interior of the broken ventral valve GIT 554-1952, Pilistvere-4: 89.2 m, G_{1-2}.

11. Interior of the broken ventral valve GIT 554-2048a, Pärnu: 83.6 m, H.

12. Interior of the broken dorsal valve GIT 554-2047, Pärnu: 93.80 m, J_1.

13. Cardinalia of the broken dorsal valve GIT 554-2046, Kabala-13a: 107.5-107.7 m, G_{1-2}.

14. Interior of the broken dorsal valve GIT 554-2048b, Pärnu: 83.6 m.

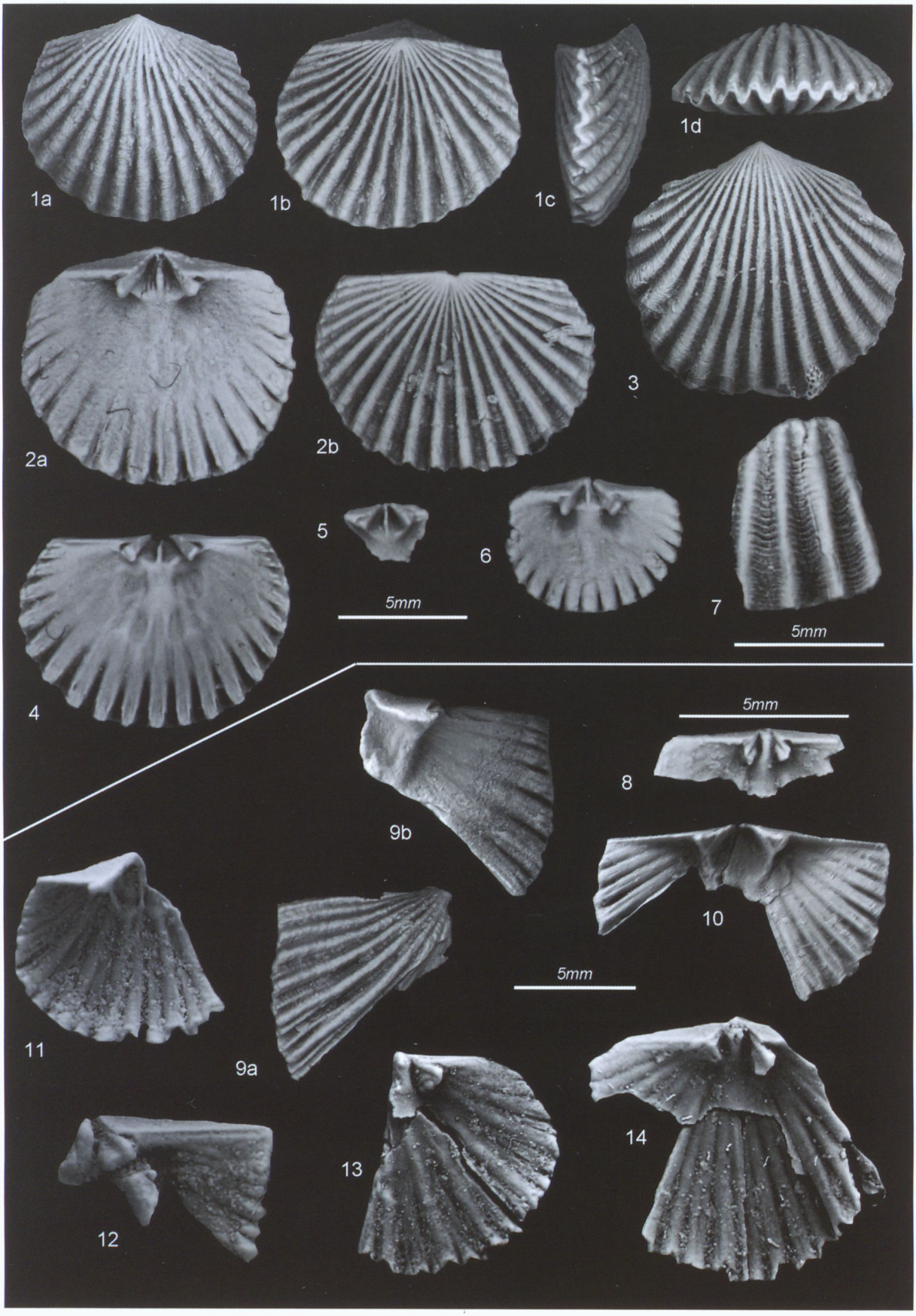
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PLATE 21

Figures 1–6. *Eopholidostrophia sefinensis sefinensis* (Williams). Page 26.

1. Ventral view of the ventral valve GIT 506-5, Lätiküla, H.
2. Posterior view of half of the shell GIT 506-2, Lätiküla, H.
3. Posterior view of the shell GIT 506-3, Lätiküla, H.
4. Lateral view of the shell GIT 506-4, Lätiküla, H.
5. Interior of the broken dorsal valve GIT 506-1, Valgu ditch, H.
6. Lateral view of the ventral valve GIT 506-6. Lätiküla, H.

Figure 7. *Streptis altosinuata* Holtedahl. Page 37. Ventral view of the ventral valve GIT 130-17, Abja-92: 311.0 m, G_{1-2}.

Figures 8–9. *Streptis grayii* (Davidson). Page 36.

8. Exterior of the ventral valve GIT 230-20, Ikla: 287.0-287.1 m, J_1.

9a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 230-18, Ruhnu-500: 402.6 m, J_1.

Figures 10–11. *Dolerorthis rustica* (J. de C. Sowerby). Page 41.

10. Cast of interior of the ventral valve GIT 128-37, Panga cliff, J_1.
11. Interior of the dorsal valve GIT 128-36, Suuriku cliff, J_1.

Figures 12–13. *Hesperorthis davidsoni* (de Verneuil). Page 41.

12a–b. Exterior and interior of the ventral valve GIT 128-18, Saastna cape, J_1.

13a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 126-13, Pärі quarry, H.

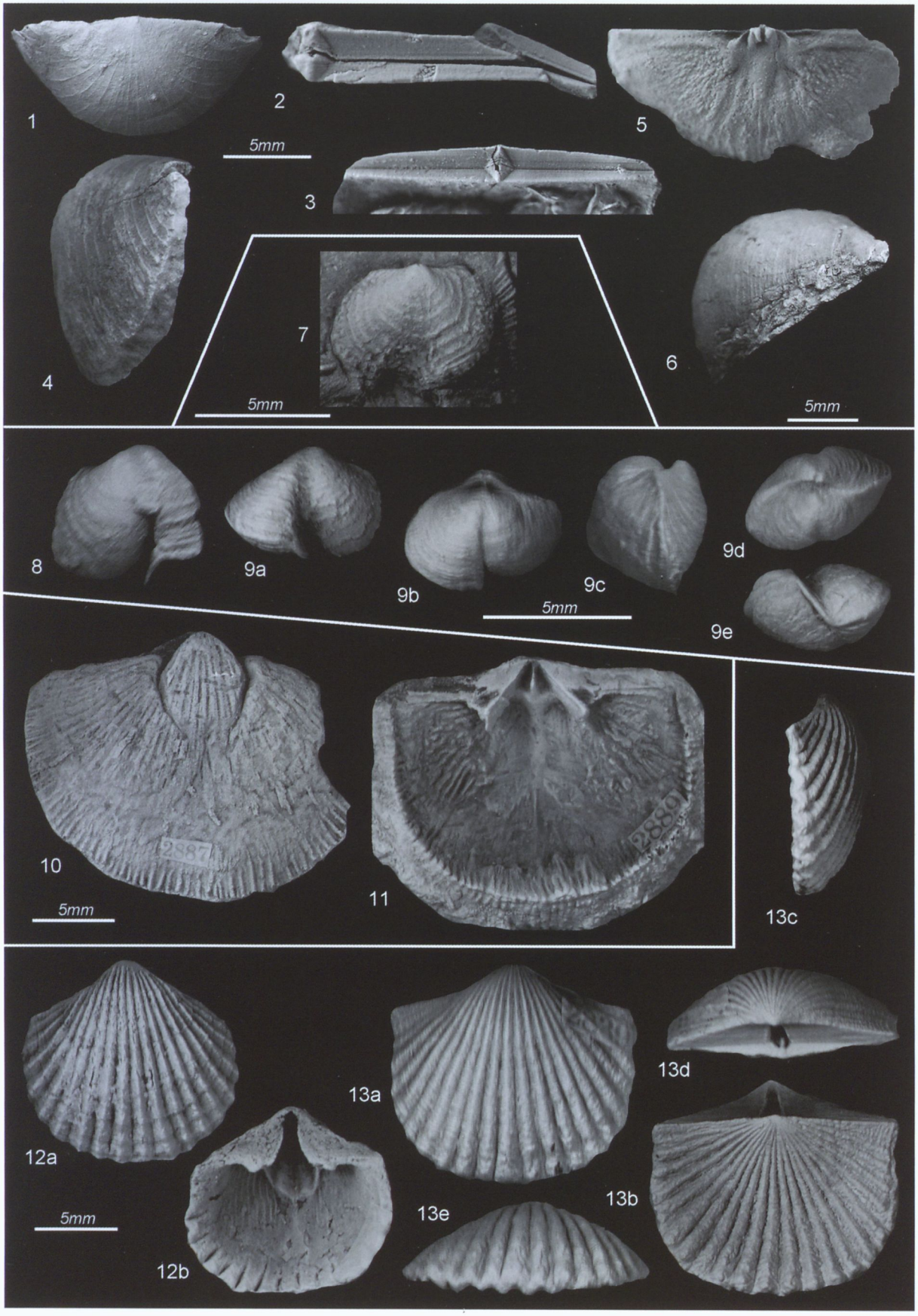
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PLATE 22

Figures 1–14. *Dalejina hybrida* (J. de C. Sowerby). Page 52.

1. Interior of the broken ventral valve GIT 554-691, Pärnu: 85.50 m, J_1.
2. Interior of the broken ventral valve GIT 554-741, Pärnu: 89.04 m, J_1.
3a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-692, Pärnu: 76.82 m, J_1.
4a–c. Ventral, dorsal and lateral views of the shell GIT 554-694, Pärnu: 78.32 m, J_1.
5a–c.d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-750, Pärnu: 89.7 m, J_1.
6. Interior of the ventral valve GIT 554-879, Pärnu: 94.87 m, J_1.
7a–d. Ventral, dorsal lateral and anterior views of the shell GIT 554- 810, Pärnu: 92.87 m, J_1.
8. Interior of the broken ventral valve GIT 554-921, Pärnu: 100.76 m, H.
9. Interior of the broken dorsal valve GIT 554-991, Pärnu: 105.91 m, H.
10. Interior of the dorsal valve GIT 554-897, Pärnu: 105.91 m, H.
11. Interior of the dorsal valve GIT 554-866, Pärnu: 105.91 m, H.
12a–d. Ventral, dorsal lateral and anterior views of the shell GIT 554-991, Pärnu: 105.91 m, H.
13. Cardinalia of the broken dorsal valve GIT 554-1209. Ikla: 266.5-266.6 m, J_1.
14. Interior of the ventral valve GIT 554-1208, Ikla: 264.8 m, J_1.

Figures 15–18. *Ptychopleurella transversa* sp. nov. Page 42.

15. Interior of the dorsal valve GIT 554-594, Pärnu: 92.75 m, J_1.
16a–d. Holotype, ventral, dorsal anterior and lateral views of the shell GIT 554-587, Pärnu-6: 92.4 m, J_1.
17. Interior of the broken ventral valve GIT 554-590, Pärnu: 92.94 m, J_1.
18. Exterior of the ventral valve GIT 554-1588b, Pärnu-6, J_1.

Figures 19–23. *Glyptorthis irrupta* Rubel. Page 40.

19. Interior of the broken ventral valve GIT 554-652, Kabala-13a: 83.20-83.40 m.
20. Interior of the broken dorsal valve GIT 554-651, Kanaküla-3: 133.4 m, G_3.
21. Interior of the broken dorsal valve GIT 554-1594, Abja-92: 218.1-218.3, G_3 m.
22. Exterior of the ventral valve GIT 554-1591, Ikla: 377.2 m, G_3.
23. Interior of the broken ventral valve GIT 554-1941, Kabala-13a: 107.2-107.5 m, G_{1-2}.

Figures 24–26. *Resserella elegantula* (Dalman). Page 47.

24a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-189, Ikla: 250.5-250.6 m, J_1.
25. Interior of the broken ventral valve GIT 554-185, Ikla: 262.5-262.6 m, J_1.
26. Interior of the dorsal valve GIT 554-184, Ikla: 262.5-262.6 m, J_1.

Figures 27–30. *Ptychopleurella erecta* (Rubel). Page 42.

27. Interior of the ventral valve GIT 554-1558a, Hilliste quarry, G_3Hl.
28. Exterior of the ventral valve GIT 554-1558b, Hilliste quarry, G_3Hl.
29. Ventral view of the shell GIT 554-648, Rõusa-5: 107.5 m, G_{1-2}.
30a–c. Ventral, dorsal and lateral views of the shell GIT 128-18, Hilliste quarry, G_3Hl.

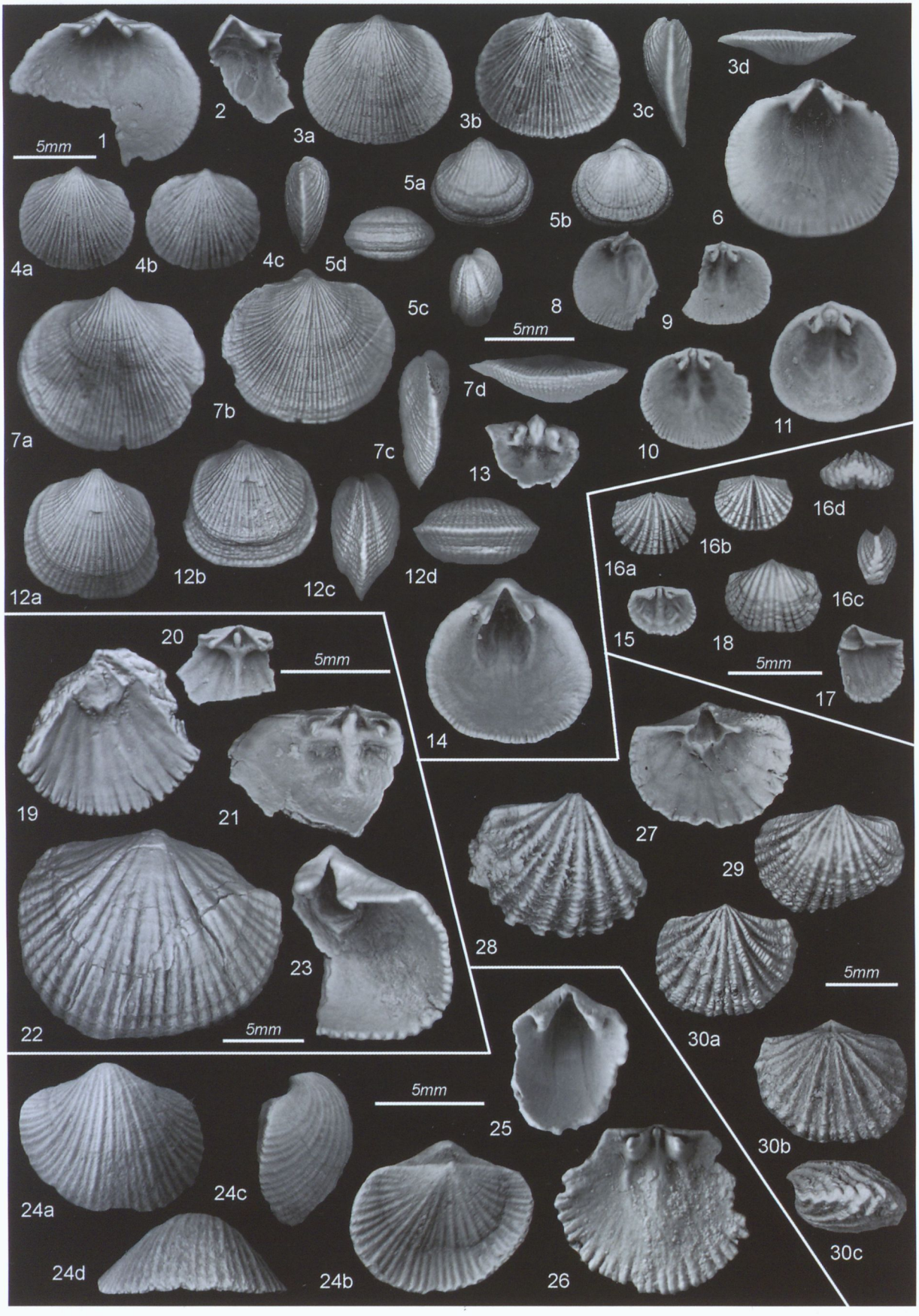
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PLATE 23

Figures 1–2. *Neoplatystrophia affabilis* (Rubel). Page 43.

1. Exterior of the dorsal valve GIT 554-1587, Hilliste bioherm, G_3Hl.

2a–e. Dorsal ventral, anterior, posterior and lateral views of the shell GIT 554-2068, Sarve beach, G_3.

Figures 3–4. *Neoplatystrophia jaaniensis* (Rubel). Page 43. All from Suuriku cliff, J_1.

3a–b. Exterior and interior of the ventral valve GIT 128-12.

4a–b. Exterior and interior of the dorsal valve GIT 128-2.

Figures 5–6. *Saukrodictya* sp. B: Hints, 1979. Page 55.

5a–b. Exterior and interior of the dorsal valve GIT 554-2360, Seliste-173: 235.1 m, G_3.

6 and 6a. Exterior and a detail of the ornament of ventral valve GIT 554-6, Ruhnu-500: 495.4 m, G_3.

Figures 7–11. *Dalmanella rosensteinae* Rubel. Page 44.

7. Interior of the broken ventral valve GIT 554-2463a, Ikla: 397.5-397.6 m, G_3.

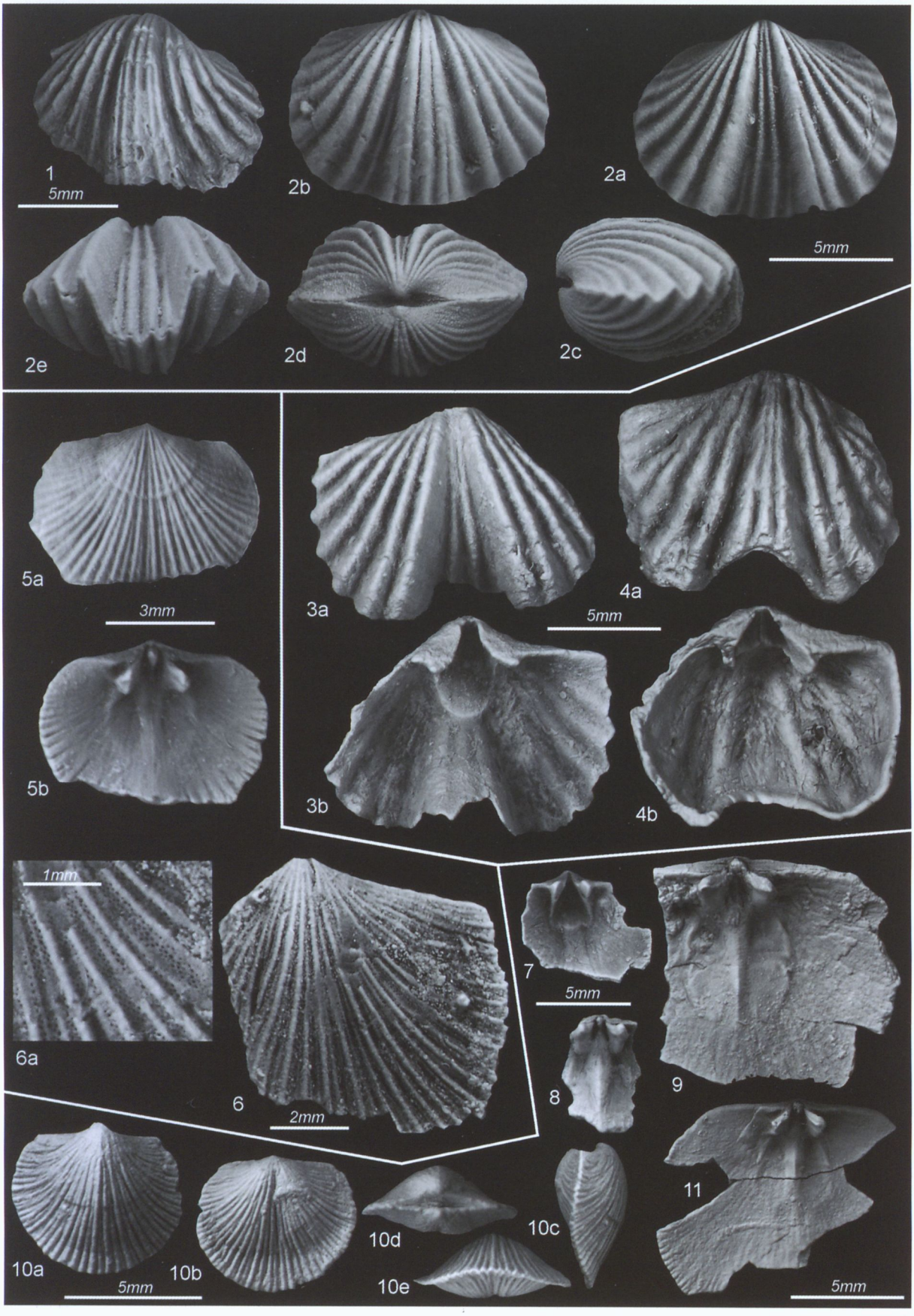
8. Interior of the broken dorsal valve GIT 554-2463b, Ikla: 397.5-397.6 m, G_3.

9. Interior of the dorsal valve GIT 554-2448, Ikla: 380.5-380.6 m, G_3.

10a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-2458, Ikla: 394.4-394.5 m, G_3.

11. Interior of the broken dorsal valve GIT 554-2457, Ikla: 391.0-391.1 m, G_3.

Plate 23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5mm

PLATE 24

Figures 1–16. *Onniella trigona* Rubel. Page 44.

1a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-17, Seliste-173: 296.9 m, G_{1-2}.

2a–d. Ventral, dorsal, anterior and lateral views of the shell GIT 554-14, Abja-92: 342.5-342.6 m, G_{1-2}Õh.

3a–d. Ventral, lateral, dorsal and anterior views of the shell GIT 554-16, Seliste-173: 294.7 m, G_{1-2}.

4. Interior of broken ventral valve GIT 554-12, Abja-92: 357.5-357.6 m, G_{1-2}Õh.

5. Interior of dorsal valve GIT 554-18, Seliste-173: 301.7 m, G_{1-2}.

6. Interior of the partly broken dorsal valve GIT 554-15, Seliste-173: 282.3 m, G_{1-2}.

7. Interior of the partly broken ventral valve, GIT 554-19, Seliste-173: 314.8 m, G_{1-2}.

8. Interior of the ventral valve GIT 554-1802, Pilistvere-4: 83.6 m, G_{1-2}.

9. Interior of the broken ventral valve GIT 554-1827, Viljandi-91: 240.0 m, G_{1-2}.

10. Interior of the broken ventral valve GIT 554-1945, Kabala-13a: 107.2-107.5 m G_{1-2}.

11. Interior of the dorsal valve GIT 554-1944, Kabala-13a: 107.2-107.5 m, G_{1-2} .

12a–b. Dorsal and ventral view of the shell GIT 554-1824, Viljandi-91: 220.8 m, G_{1-2}.

13. Interior of the broken ventral valve GIT 554-2224a, Ikla: 478.0-478.1 m, G_3.

14. Interior of the broken dorsal valve GIT 554-2223, Ikla: 473.5 m, G_3.

15. Interior of the broken ventral valve GIT 554-2227, Ikla: 519.5 m, G_{1-2}.

16. Interior of the broken dorsal valve GIT 554-2224b, Ikla: 478.0-478.1 m, G_3.

Figures 17–23. *Linoporella punctata* (de Verneuil). Page 54. 17-20 and 22-23 from Hilliste quarry, G_3Hl.

17a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-53.

18. Interior of the dorsal valve GIT 554-54.

19a–c. Ventral, anterior and lateral views of the shell GIT 554-72.

20. Interior of the broken dorsal valve GIT 554-52.

21. Interior of the broken dorsal valve GIT 554-68, Kallasto cliff, G_3.

22. Interior of the broken ventral valve, GIT 128-95.

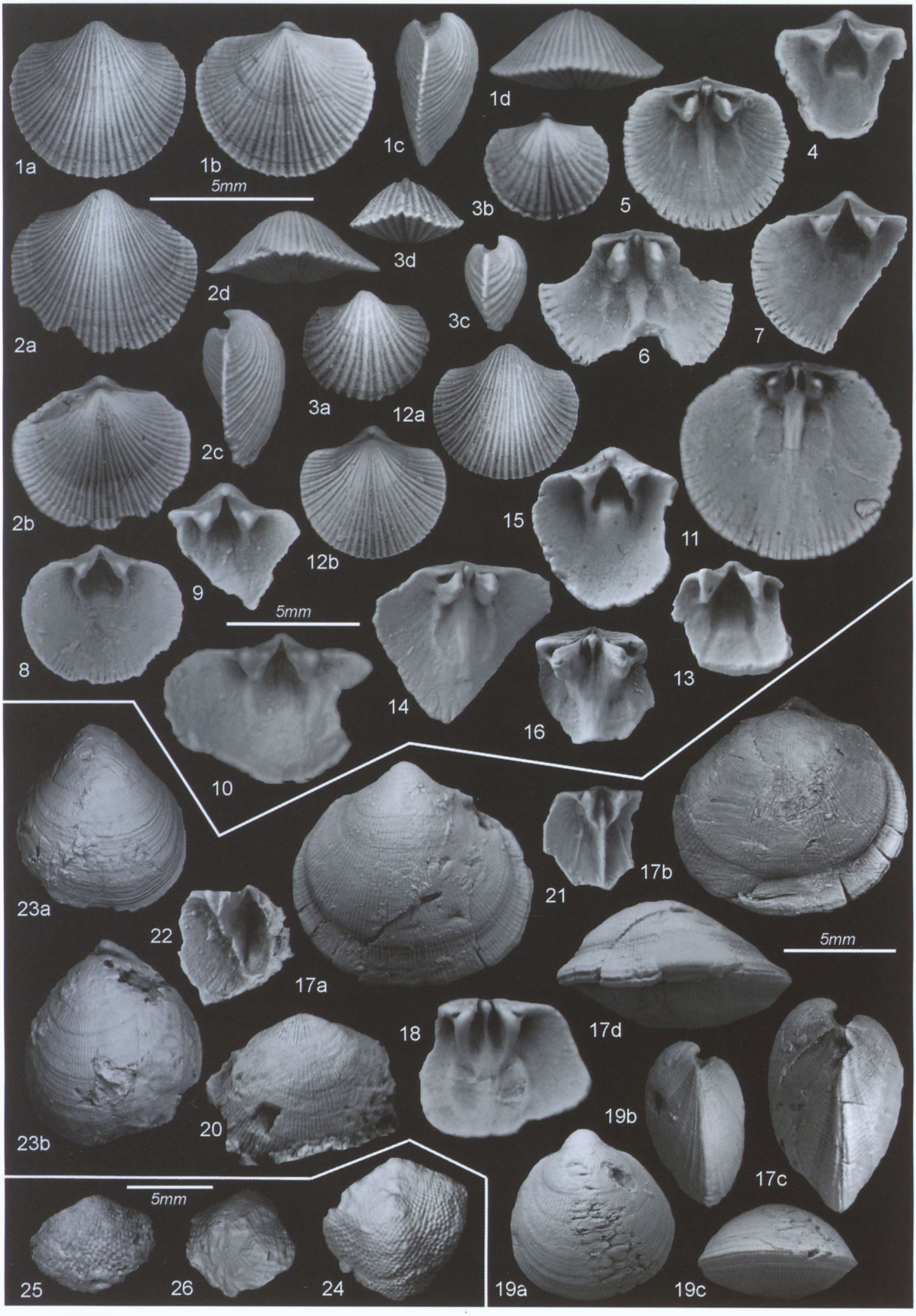
23a–b. Ventral and dorsal views of the shell GIT 128-92.

Figures 24–26. *Eodictyonella capewellii* (Davidson). Page 17. All from Hilliste quarry, G_3Hl.

24. Dorsal view of the dorsal valve GIT 128-48

25. Ventral view of the ventral valve GIT 128-49.

26. Ventral view of the ventral valve GIT 128-50.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23b
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19b
17c
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25
26
24
19a
19c

PLATE 25

Figures 1–17. *Dalmanella cyclica* Rubel. Page 44.

1a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-1365, Hilliste bioherm, G_3Hl.

2a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-1360, Hilliste quarry, G_3Hl.

3. Interior of the broken dorsal valve GIT 554-490, Varbla-502: 241.4-241.5 m, G_{1-2}.

4. Interior of the broken ventral valve GIT 1386, Hilliste bioherm, G_3Hl.

5. Exterior of the dorsal valve GIT 554-1375, Kiltsi roadside, G_{1-2}.

6. Exterior of the ventral valve GIT 554-1367, Hilliste bioherm, G_3Hl.

7. Interior of the broken dorsal valve Git 554-1370, Hilliste quarry, G_3Hl.

8. Interior of the dorsal valve GIT 554-1384, Kassari bioherm, G_3Hl.

9. Interior of the broken dorsal valve GIT 554-1372, Kallasto cliff, G_3Hl.

10. Interior of the ventral valve GIT 554-1783, Häädemeeste-172: 390.9 m, G_{1-2}.

11a–d. Ventral, dorsal, lateral and posterior views of the shell GIT 554-758, Rõusa-5: 113.6 m. G_{1-2}.

12. Interior of the dorsal valve GIT 554-1807, Vao-20: 30.85 m, G_{1-2}.

13. Interior of the broken ventral valve GIT 554-1761, Rõusa-5: 111.3 m, G_{1-2}.

14. Interior of the dorsal valve GIT 554-1762, Rõusa-5: 110.3 m, G_{1-2}.

15a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-1378, Hilliste quarry, G_3Hl.

16. Interior of the broken dorsal valve GIT554-1384, Kassari quarry, G_3Hl.

17a–d. Ventral, lateral, dorsal and posterior views of the shell GIT 554-1507, Kingissepa–GV: 268.5-268.6 m, G_{1-2}.

Figures 18a–e. *Dalmanella rosensteinae* Rubel. Page 44. Ventral, dorsal, lateral, anterior and posterior views of the shell GIT 554-1395, Valgu ditch, H.

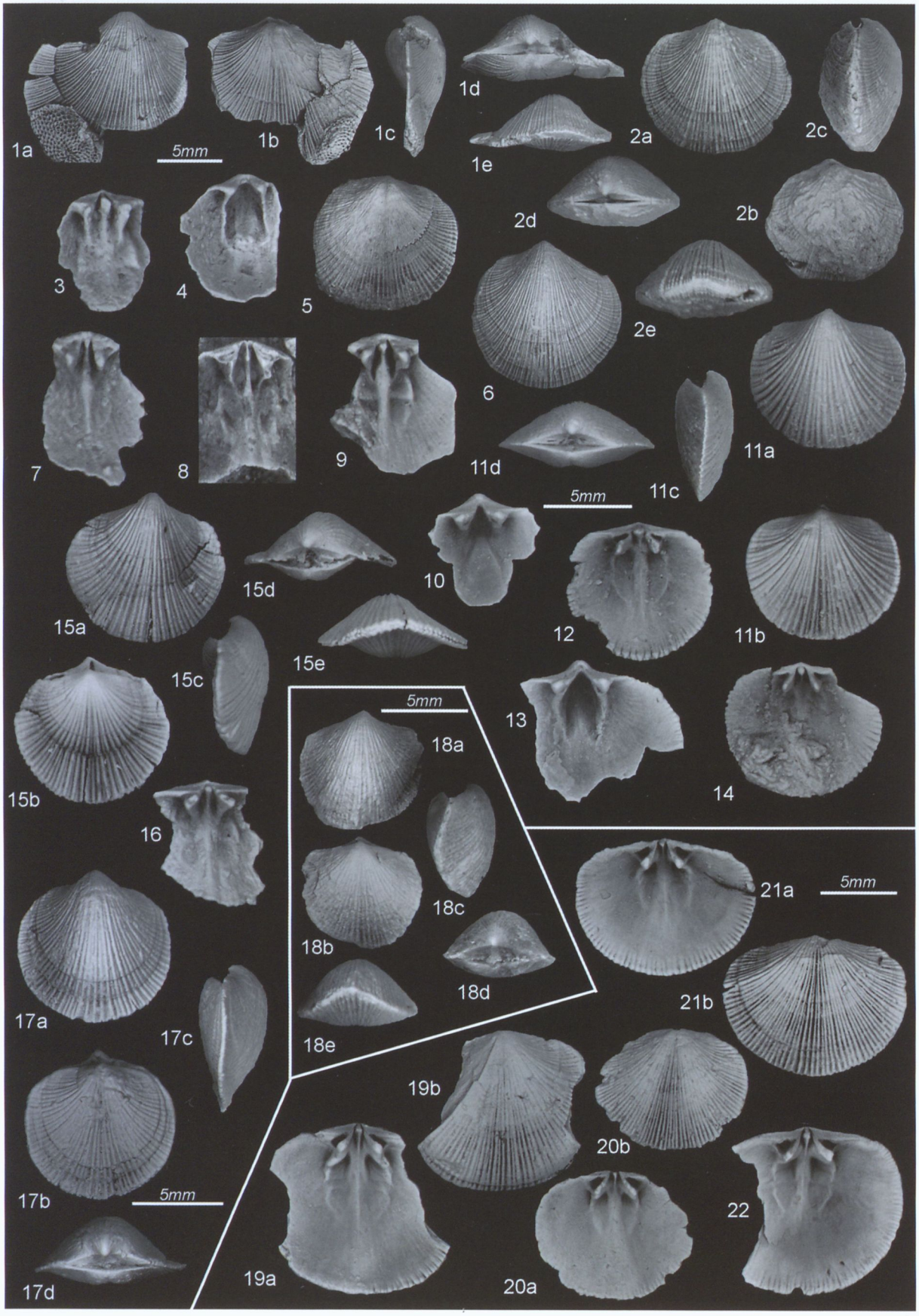
Figures 19–22. *Levenea canaliculata* (Lindström). Page 46. All from Lithuania, Girdžiai-50: 974.0-974.4, Minija Formation, Přidoli.

19a–b. Interior and exterior of the broken dorsal valve GIT 554-1358.

20a–b. Interior and exterior of the dorsal valve GIT 554-1361.

21a–b. Interior and exterior of the dorsal valve GIT 554-1360.

22. Interior of dorsal valve GIT 554-1359.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18a
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14
15b
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18b
18d
18e
21a
5mm
21b
17a
17c
19b
20b
17b
5mm
22
19a
20a
17d

PLATE 26

Figures 1–10. *Isorthis mediocra* (Rubel). Page 45.

1a–d. Ventral, dorsal, anterior and posterior views of the shell GIT 554-380, Koigi, G_{1-2}.

2a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-395. Vahtrepa ditch, G_{1-2}Vb.

3. Interior of the broken ventral valve GIT 554-376, Vahtrepa ditch, G_{1-2}Vb.

4a–d. Ventral, dorsal, lateral and posterior views of the shell GIT 554-390, Vahtrepa ditch, G_{1-2}Vb.

5. Interior of the broken dorsal valve GIT 554-486, Ristiküla-174: 266.6 m, G_3.

6. Interior of the broken ventral valve GIT 554-2076a, Heltermaa, G_3Hl.

7. Interior of the broken ventral valve GIT 554-2071, Heltermaa, G_3Hl.

8. Interior of the broken dorsal valve GIT 554-379, Koigi, G_{1-2}.

9. Interior of the broken dorsal valve GIT 554-381, Vahtrepa ditch, G_{1-2}Vb.

10. Interior of the dorsal valve GIT 554-383, Vahtrepa ditch, G_{1-2} Vb.

Figures 11–20. *Onniella trigona* Rubel. Page 44.

11. Interior of the broken ventral valve GIT 554-460, Kabala-13a: 101.7-101.8.m, G_{1-2}Vb.

12. Interior of the ventral valve GIT 554-485, Kingissepa–GV: 236.0-236.1 m, G_3.

13. Interior of the broken dorsal valve GIT 554-487, Kingissepa–GV: 235.7-235.8 m, G_3.

14. Interior of the broken ventral valve GIT 554-286a, Ristiküla-174: 266.6 m, G_3.

15. Interior of the broken ventral valve GIT 554-459, Kabala-13a: 99.1-99.2 m, G_{1-2}.

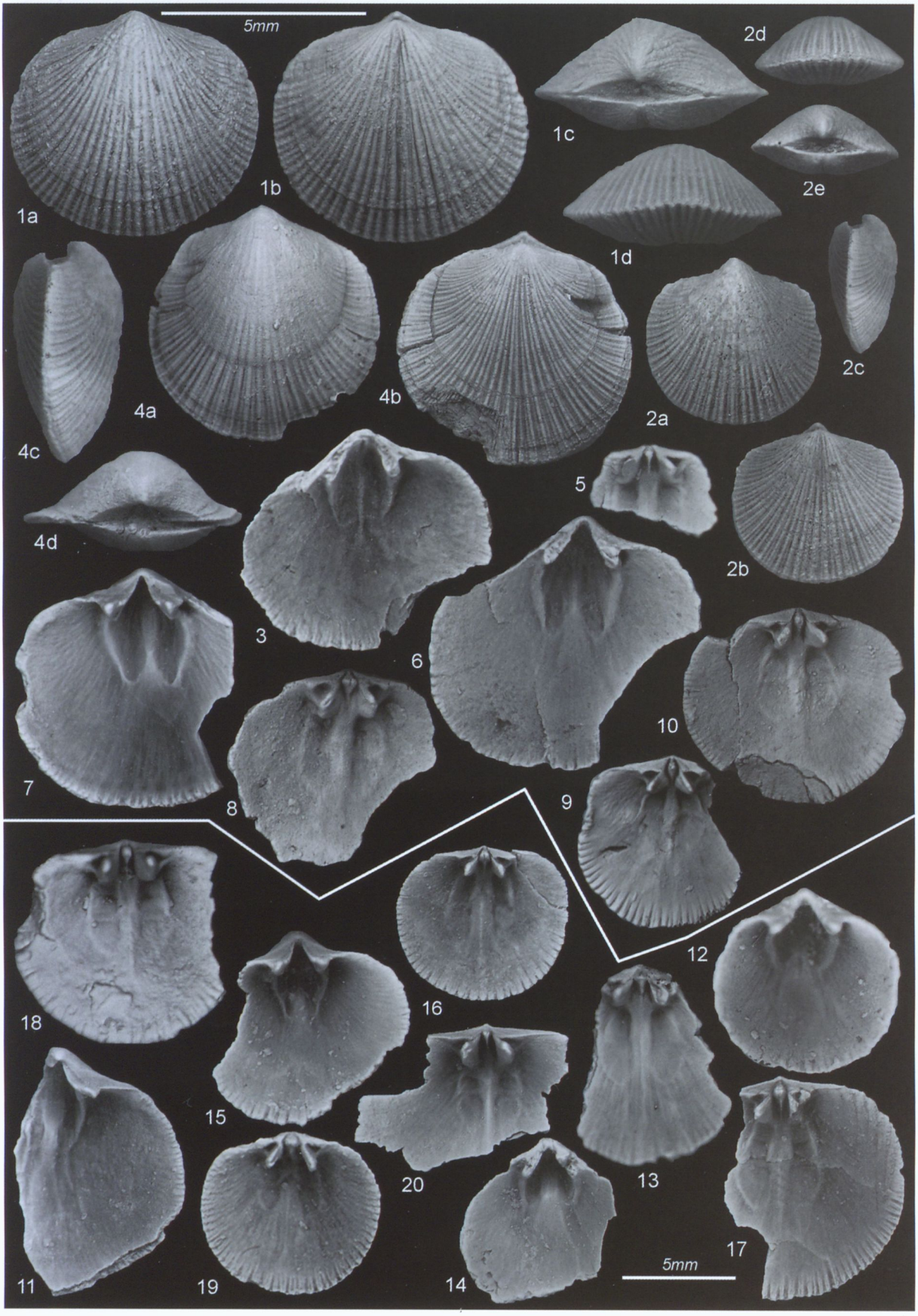
16. Interior of the dorsal valve GIT 554-373, Kabala-13a: 99.3-99.4 m, G_{1-2}.

17. Interior of the broken dorsal valve GIT 554-458, Kabala-13a: 98.4-98.6 m, G_{1-2}.

18. Interior of the broken dorsal valve GIT 554-425, Pärnu: 197.35 m, G_{1-2}.

19. Interior of the dorsal valve GIT 554-457, Kabala-13a: 46.5-46.6 m, G_3.

20. Interior of the broken dorsal valve GIT 554-290, Ristiküla-174: 249.9 m, G_3.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5mm

PLATE 27

Figures 1–14, 17. *Isorthis parvulus* Rybnikova. Page 46.

1a–e. Ventral, dorsal lateral, posterior and anterior views of the shell GIT 554-523, Ohesaare: 269.08 m, J_1.

2a–e. Ventral, dorsal, anterior, posterior and lateral views of the shell GIT 554-524, Ohesaare: 236.8-236.9 m, J_1.

3. Interior of the broken dorsal valve GIT 554-515, Ohesaare: 281.75-281.81 m, J_1.

4a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-575, Ikla: 232.0-232.1 m, J_1.

5. Interior of the broken dorsal valve GIT 554-491, Kingissepa–GV: 287.6-287.8 m, G_{1-2}.

6. Interior of the broken ventral valve GIT 554-493, Kingissepa–GV: 276.15-276.25 m, G_{1-2}.

7a. Interior of the broken ventral valve GIT 554-581, Ikla: 288.3 m, H.

7. Interior of the broken ventral valve GIT 554-519, Ohesaare: 277.06-277.15 m, J_1.

8. Interior of the broken dorsal valve GIT554-495, Kingissepa–GV: 271.6-271.9 m, G_{1-2}.

9. Interior of the broken ventral valve GIT 554-1213, Pärnu: 75.45-75.50 m, G_{1-2}.

10. Interior of the broken ventral valve GIT 554-492, Kingissepa–GV: 276.15-276.25 m, G_{1-2}.

11. Interior of the broken ventral valve GIT 554-499, Varbla-502: 235.95 m, G_{1-2}.

12. Interior of the broken ventral valve GIT 554-494, Kingissepa–GV: 273.5-273.6 m, G_{1-2}.

13. Interior of the broken ventral valve GIT 554-498, Varbla-502: 234.5-234.6 m, G_{1-2}.

14. Interior of the broken ventral valve GIT 554-500, Varbla-502: 249.6-249.8 m, G_{1-2}.

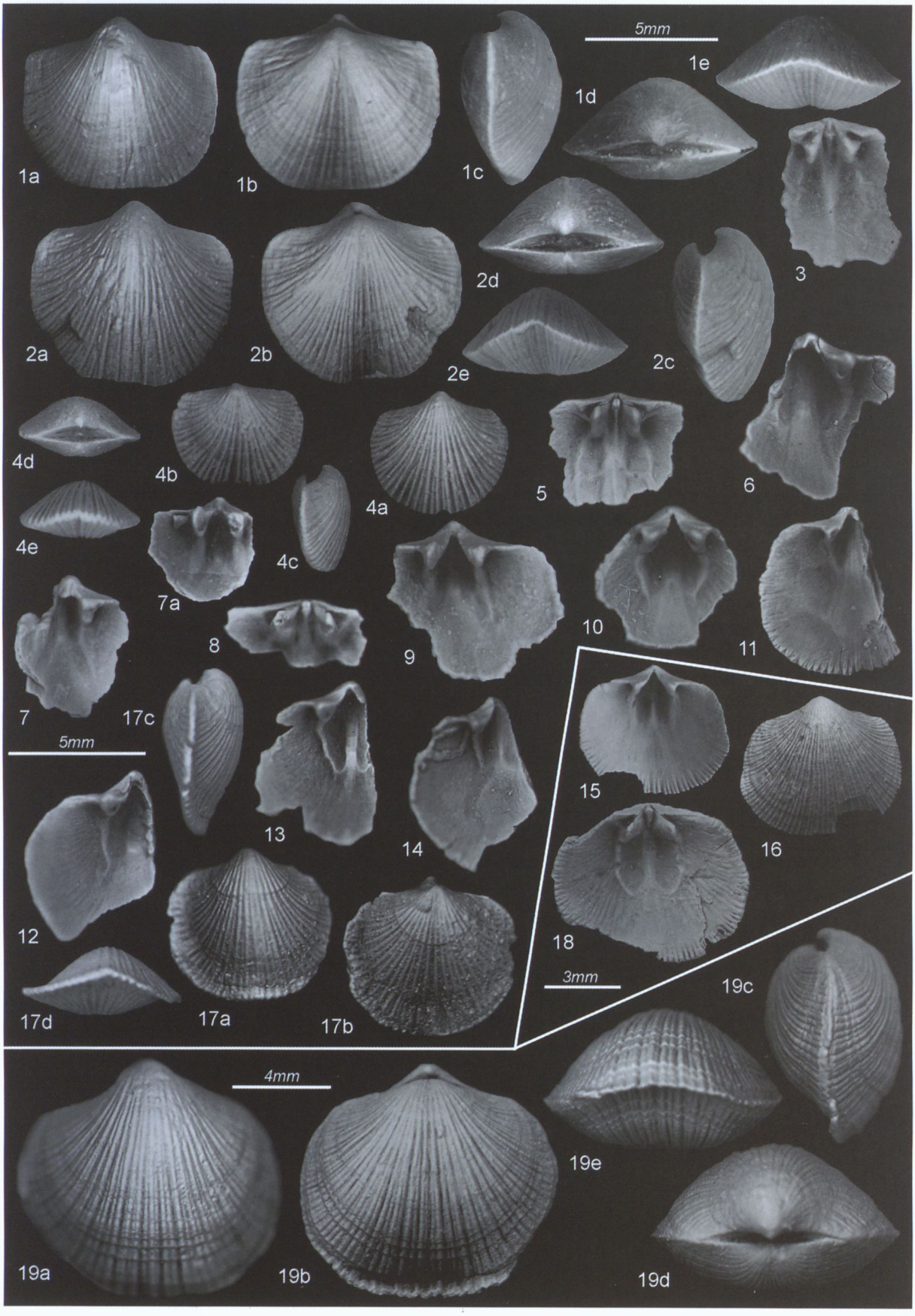
17a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-496, Ikla: 238.0-238.1, J_1.

Figures 15–16, 18. *Levenea canaliculata* (Lindström). Page 46. All from Jaani beach, J_1.

15-16. Interior and exterior of the ventral valve GIT 554-2147.

18. Interior of the dorsal valve GIT 554-2146.

Figures 10a–e. *Isorthis crassa* (Lindström). Page 46. Ventral, dorsal, posterior, lateral and anterior views of the shell GIT 554-502, Pärnu: 76.0 m, J_1.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12
13
14
15
16
18
3mm
19c
17d
17a
17b
4mm
19a
19b
19e
19d

PLATE 28

Figures 1–12. *Levenea canaliculata.* (Lindström). Page 46.

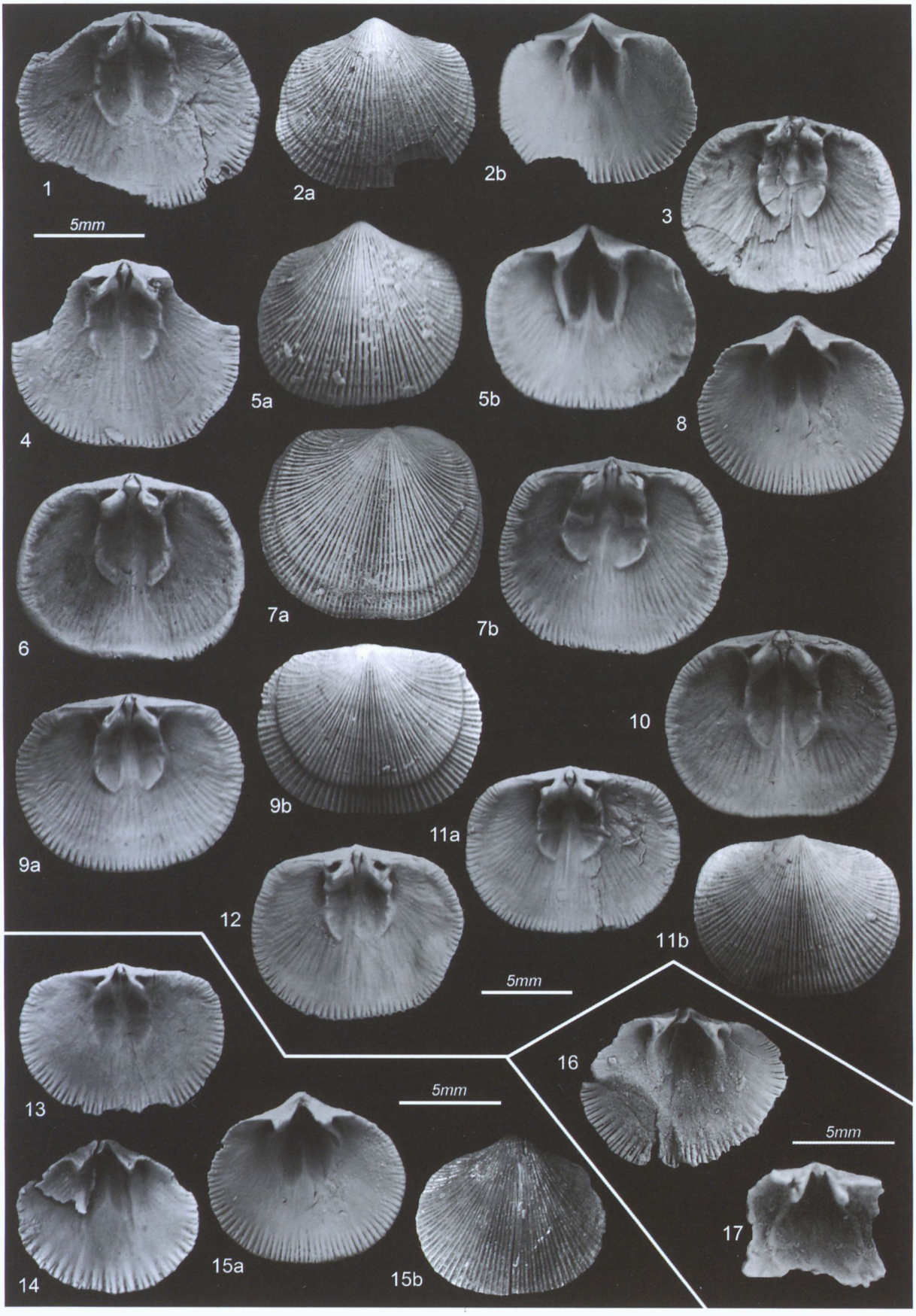
1. Interior of the dorsal valve GIT 554-2146, Jaani beach, J_1.
2a–b.Ventral view and interior of the ventral valve GIT 554-2147, Jaani beach, J_1.
3. Interior of the dorsal valve GIT 554-2149, Tahula N quarry, K_2.
4. Interior of the dorsal valve (broken) GIT 554-2150, Tahula N quarry, K_2.
5a–b. Ventral view and interior of the ventral valve GIT 554-2151, Tahula N quarry, K_2.
6. Interior of the dorsal valve GIT 554-2153, Tahula N quarry, K_2.
7a–b. Dorsal view and interior of the dorsal valve GIT 554-2152, Tahula N quarry, K_2.
8. Interior of the ventral valve GIT 554-2130, Kuressaare entrenchment, K_3a.
9a–b. Interior and exterior of the dorsal valve GIT 554-2139, Kuressaare entrenchment, K_3a.
10. Interior of the dorsal valve GIT 554-2135, Kuressaare entrenchment, K_3a.
11a–b. Interior and exterior of the dorsal valve GIT 554-2137, Kuressaare entrenchment, K_3a.
12. Interior of the dorsal valve GIT 554-2136, Kuressaare entrenchment, K_3a.

Figures 13–15. *Salopina submedia* (McLearn). Page 54. All from Ohesaare cliff, K_4.

13. Interior of the dorsal valve GIT 554-2155.
14. Interior of the ventral valve GIT 554-2154.
15a–b. Interior of the ventral valve GIT 554-2156.

Figures 16–17. *Salopina conservatrix* (McLearn). Page 54.

16. Interior of the ventral valve GIT 554-1959, Ohesaare: 1.75-4.15 m, K_4.
17. Cardinalia of the broken dorsal valve GIT 554-1962, Sauvere quarry I, K_2Pd.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13
5mm
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5mm
14
15a
15b
17

PLATES 29

Figures 1–5. *Resserella canalis* (J. de C. Sowerby). Page 48.

1a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-248, Ohesaare: 255.84 m, J_1.

2a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-205, Lithuania, Kalvarija: 775.6 m, J_1.

3. Interior of the dorsal valve GIT 554-216, Panga cliff, J_1.

4. Interior of the dorsal valve GIT 554-244, Ohesaare: 236.9 m, J_1.

5. Interior of the broken dorsal valve GIT 554-253, Ohesaare: 278.38-278.48 m, J_1.

Figures 6–10. *Resserella sabrinae* Bassett. Page 47.

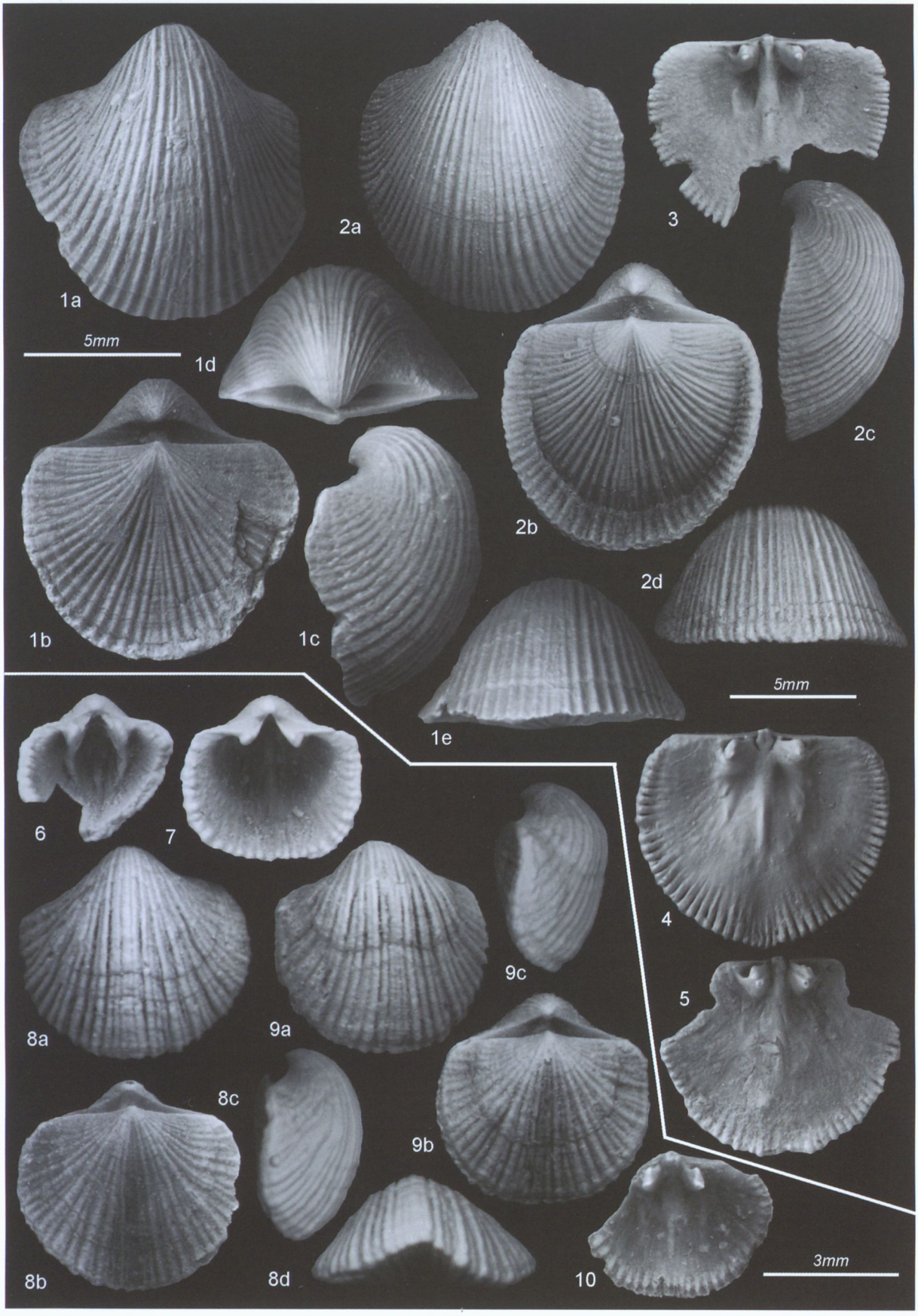
6. Interior of the broken ventral valve GIT 554-173, Ikla: 266.5-266.6 m, J_1.

7. Interior of the ventral valve GIT 554-163, Ikla: 278.6 m, J_1.

8a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 554-153, Ikla: 277.0-277.1 m, J_1.

9a–c. Ventral, dorsal and lateral views of the shell GIT 554-154, Ikla: 277.0-277.1 m, J_1.

10. Interior of the dorsal valve GIT 554-75, Ikla: 264.5-264.6 m, J_1.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3mm

PLATE 30

Figures 1–5. *Visbyella visbyensis* (Lindström). Page 48. 1-3 from Upper Visby Marl of Snäckgärden, Visby, Gotland, 4-5 from Undva cliff J_1.

1a–e. ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-75.

2. Interior of the dorsal valve GIT 554-73.

3. Interior of the ventral valve GIT 554-74.

4a–c. Ventral dorsal and lateral views of the shell GIT 554-145.

5a–c. Ventral, dorsal and lateral views of the shell GIT 554-144.

Figures 6–10. *Visbyella pygmae* (Whittard et Parker). Page 49. 6-9 from Lätiküla, H.

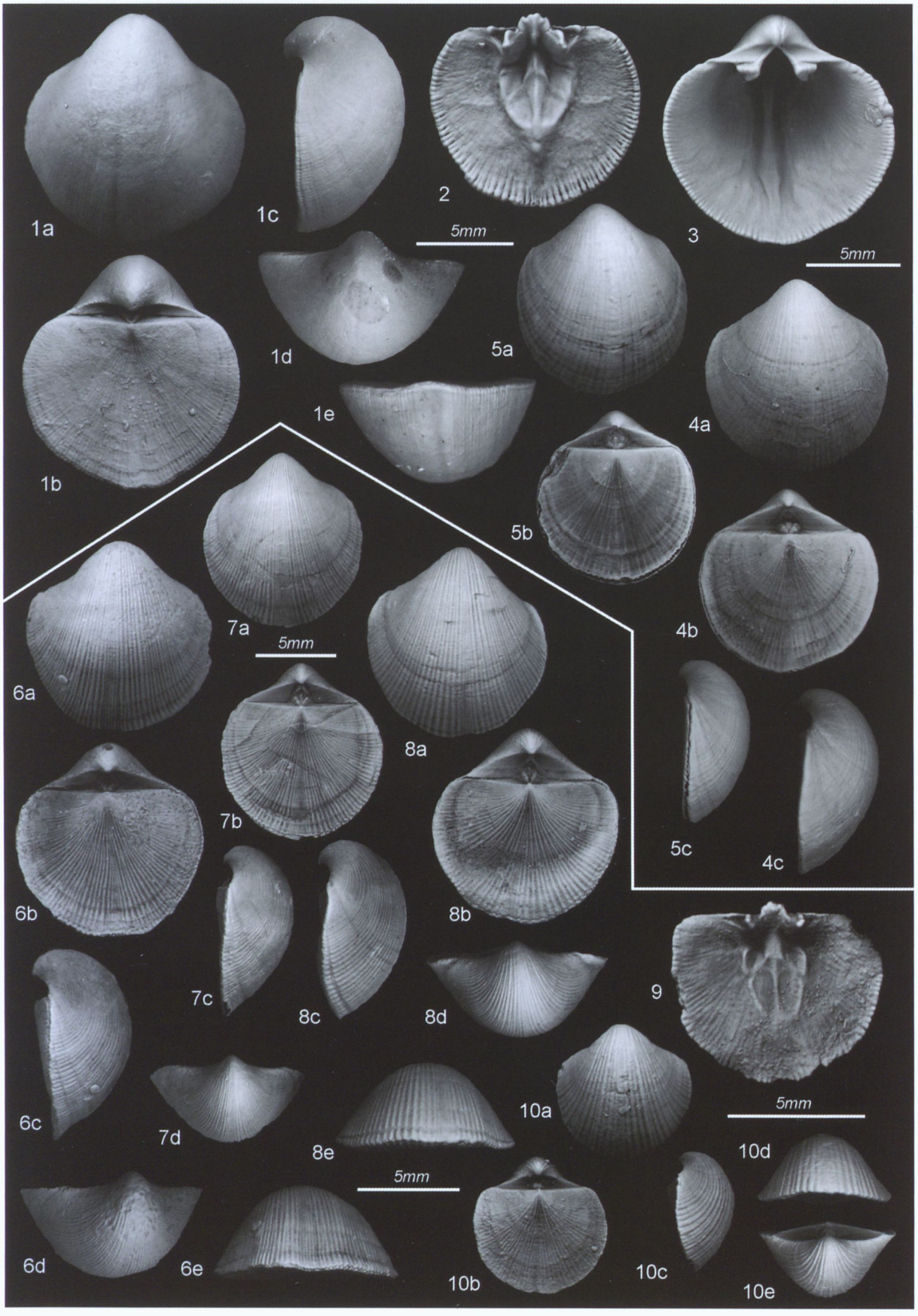
6a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-78.

7a–d. Ventral dorsal, lateral and posterior views of the shell GIT 554-76.

8a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-77.

9. Interior of the dorsal valve GIT 554-79.

10a–e. Ventral, dorsal, lateral, anterior and posterior views of the shell GIT 554-81, Ikla: 287.4 m, H.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10a
5mm
7d
8e
10d
5mm
6d
6e
10b
10c
10e

PLATE 31

Figures 1–20. *Dicoelosia biloba* (Linnaeus). Page 49. All from Jaani Stage.

1a–c. Ventral, dorsal and lateral views of the shell GIT 552-5, Pärnu: 100.51 m.

2a–b. Ventral and lateral views of the shell GIT 552-4, Pärnu: 100.51 m.

3a–c. Ventral, dorsal and lateral views of the shell GIT 552-3, Pärnu: 103.58 m.

4a–c. Ventral, dorsal and lateral views of the shell GIT 552-2, Pärnu: 103.76 m.

5a–b. Interior and exterior of the dorsal valve GIT 552-1, Pärnu: 107.6 m.

6a–c. Ventral, dorsal and lateral views of the shell GIT 552-6, Pärnu: 100.51 m.

7 a–c. Ventral, dorsal and lateral views of the shell GIT 552-11, Pärnu: 94.18-94.19 m.

8a–c. Ventral, dorsal and lateral views of the shell GIT 552-8, Pärnu: 98.14 m.

9. Interior of the dorsal valve GIT 552-10, Pärnu: 97.49 m.

10a–c. Ventral, dorsal and lateral views of the shell GIT 552-7, Pärnu: 98.14 m.

11a–c. Ventral, dorsal and lateral views of the shell GIT 552-9, Pärnu: 98.32.

12a–c. Ventral, dorsal and lateral views of the shell GIT 552-17, Pärnu: 91.73 m.

13. Ventral view of the shell GIT 552-23, Pärnu: 88.15-88.20 m.

14a–c. Ventral, dorsal and lateral views of the shell 552-18, Pärnu: 88.42 m.

15a–c. Ventral, dorsal and lateral views of the shell GIT 552-15.

16a–c. Ventral, dorsal and lateral views of the shell GIT 552-16, Pärnu: 92.88 m.

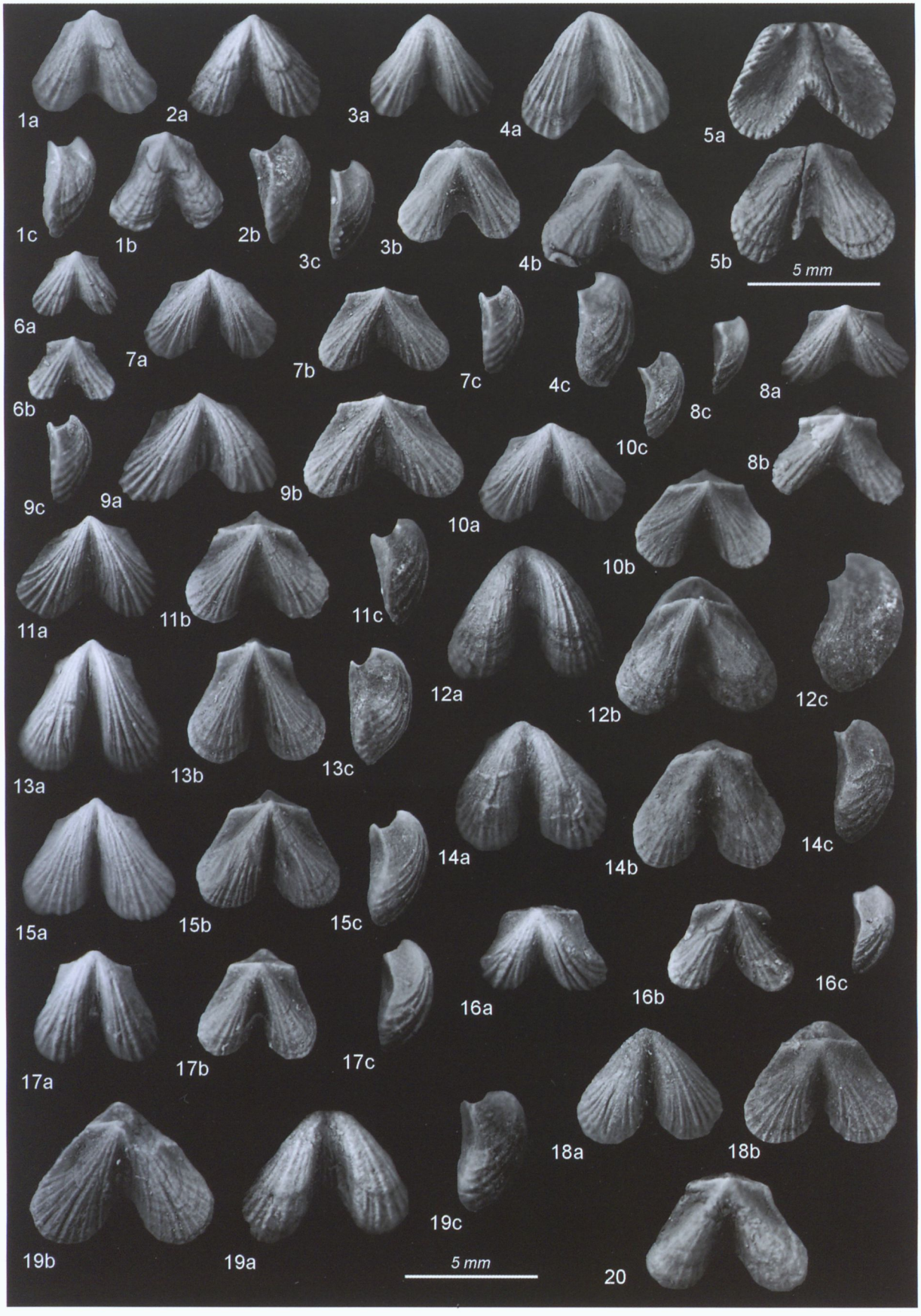
17a–c. Ventral, dorsal and lateral views of the shell GIT 552-22, Pärnu: 86.61-86.65 m.

18a–b. Ventral and dorsal views of the shell GIT 552-19, Pärnu: 88.36 m.

19. Ventral view of the shell GIT 552-24, Pärnu: 88.15-88.20 m.

20. Ventral view of the shell GIT 552-20, Pärnu: 88.23 m.

21. Ventral view of the shell GIT 552-21, Pärnu: 87.75 m.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15c
16a
16b
16c
17a
17b
17c
18a
18b
19c
19b
19a
5 mm
20

Plate 32

Figures 1–4. *Dicoelosia baltica* Musteikis et Puura. Page 51.

1. Interior of the dorsal valve GIT 506-2512, Saaremaa borehole No. 825: 213.0 m, H.
2. Dorsal view of the shell GIT 506-2510b, Saaremaa borehole No. 825: 211.2-211.3 m, H.
3. Lateral view of the shell GIT 506-2514, Saaremaa borehole No. 825: 199.0 m, H.
4. Ventral view of the shell GIT 506-2509, Saaremaa borehole No. 825: 213.0 m, H.

Figures 5–11. *Dicoelosia paralata* Bassett. Page 50.

5a–b. Ventral and anterior views of the shell GIT 552-46, Kaugatuma-509: 222.3 m, J_1.

6a–d. Ventral, dorsal, anterior and lateral views of the shell GIT 552-40, Kaugatuma-509: 222.1 m, J_1

7a–d. Ventral, dorsal, anterior and lateral views of the shell GIT 552-45, Kaugatuma-509: 222.3 m, J_1.

8a–c,e. Ventral, dorsal, anterior and lateral views of the shell GIT 552-37, Kaugatuma-509: 223.2 m, J_1.

9a–b. Ventral and dorsal views of the shell GIT 552-70, Seliste-173: 157.0 m, J_1.

10. Interior of the dorsal valve GIT 552-57, Kaugatuma-509: 219.9 m, J_1.

11. Interior of the dorsal valve GIT 552-27, Kaugatuma-509: 227.0 m, J_1.

Figures 12–16. *Dicoelosia osloensis* Wright. Page 51.

12a–d. Ventral (with epibionts), dorsal, lateral and anterior views of the shell GIT 552-71, Seliste-173: 301.7 m, G_{1-2}.

13a–d. Ventral, dorsal, lateral and anterior views of the shell GIT 552-69, Seliste-173: 324.5 m, G_{1-2}.

14a–d. Ventral, dorsal and anterior views of the shell GIT 552-72, Ikla: 391.0-391.1 m, G_3.

15a–c. Lateral, ventral and dorsal views of the shell GIT 552-66, Ruhnu-500: 498.3 m, G_3.

16. Interior of the dorsal valve GIT 552-68, Ruhnu-500: 498.3 m, G_3.


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12a
12c
13a
14b
16
12b
13b
14c
12d
13c
13d
3mm
15c
15a
15b

PLATE 33

Figures 1–2. *Epitomyonia glypha* Wright. Page 51. All from Ruskavere: 39.45-39.60 m, G_{1-2}.

1a–b. Interior, dorsal view of the dorsal valve GIT 554-64.

2. Ventral view of the shell GIT 552-6.

Figures 3–7. *Dicoelosia paralata* Bassett. Page 50. 5-7 from Kipi: 134.7-134.8 m, H.

3a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 552-905, Ikla: 288.0 m, H.

4. Interior of the dorsal valve GIT 552-900, Ikla: 287.0-287.1 m, H.

5. Interior of the ventral valves GIT 552-1321.

6. Interior of the ventral valve GIT 552-1322.

7. Interior of the dorsal valve GIT 552-1323.

Figures 8–9. *Salopina submedia* (McLearn). Page 54. All from Ohesaare cliff, K_4.

8. Interior of the broken dorsal valve GIT 554-2155.

9. Interior of the ventral valve GIT 2154.

Figures 10–13. *Levenea canaliculata* (Lindström). Page 46. All from Kuressaare entrenchment, K_3bKg

10. Interior of the broken dorsal valve GIT 554-2134.

11a–b. Interior and exterior of the dorsal valve GIT 554-2131.

12. Interior of the dorsal valve GIT 554-2132.

13. Interior of the ventral valve GIT 554-2133.

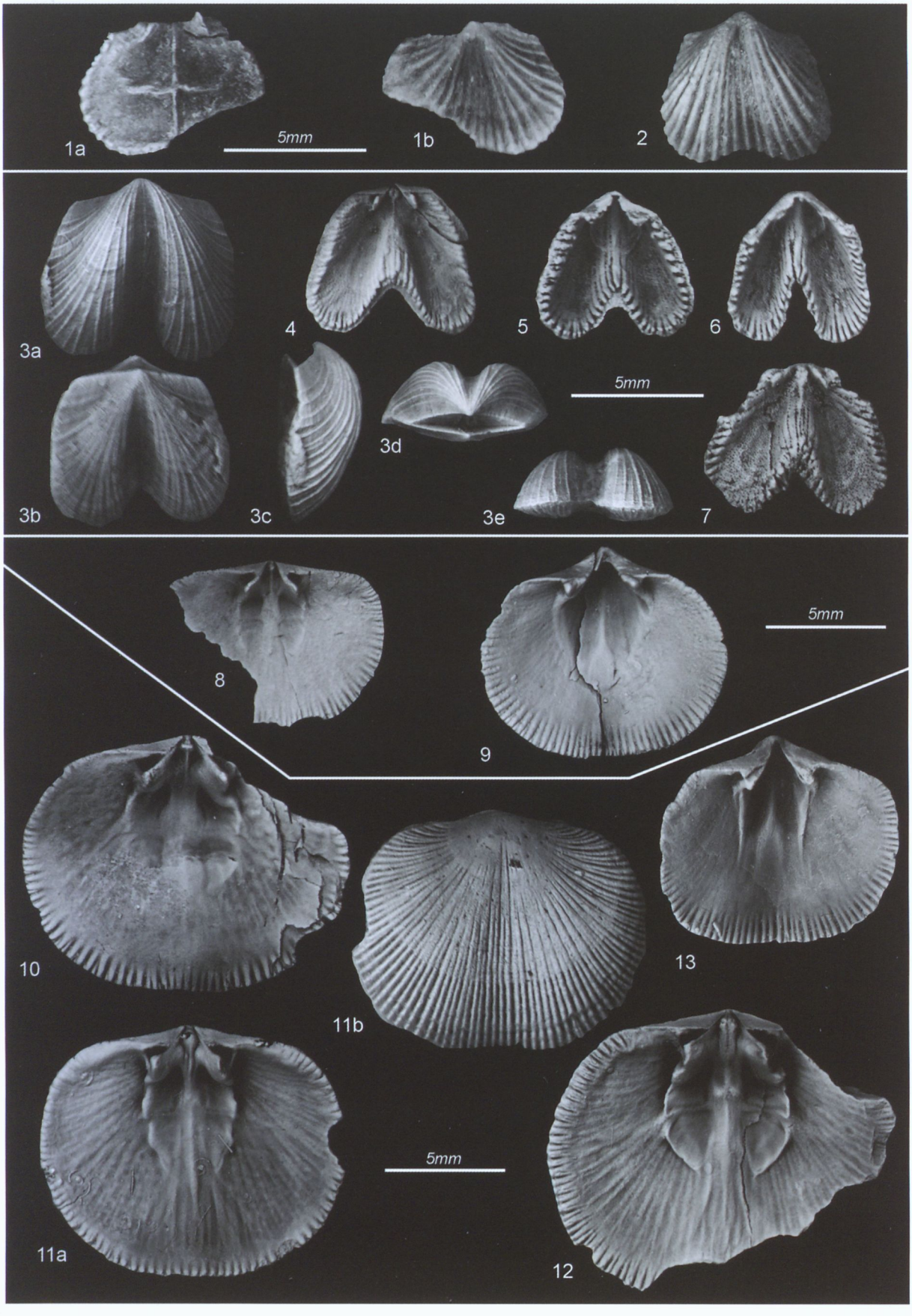

1a
5mm
1b
2
3a
4
5
6
3b
3c
3d
5mm
3e
7
8
9
5mm
10
11b
13
11a
5mm
12

PLATE 34

Figures 1–9, 12–17. *Mendacella circularis* sp. nov. Page 53.

1a–e. Ventral, dorsal, lateral, anterior and posterior views of the shell GIT 554-1166, Seliste-173: 296.9 m, G_{1-2}.

2a–e. Ventral dorsal, lateral, posterior and anterior views of the shell GIT 554-1060, Varbla-502: 238.3-283.4 m, G_{1-2}.

3a–d. Ventral, dorsal, lateral and posterior views of the shell GIT 554-1068, Kabala-13a: 110.4-110.6 m G_{1-2}.

4. Interior of the broken dorsal valve GIT 554-1115, Kingissepa–GV: 271.6-271.9 m, G_{1-2}.

5. Interior of the brachial valve GIT 554-1074, Kabala-13a: 103.2-103.5 m, G_{1-2}.

6. Interior of the ventral valve GIT 554-1067a, Laeva-294: 108.28 m, G_{1-2}.

7. Interior of the broken dorsal valve GIT 554-1266, Pärnu: 196.07 m, G_{1-2}.

8. Interior of the dorsal valve GIT 554-1264, Pärnu: 196.5 m, G_{1-2}.

9. Interior of the dorsal valve GIT 554-1069, Kabala-13a: 109.34 m, G_{1-2}.

12a. Interior of the ventral valve GIT 554-1505, Borehole 404: 28.6-28.7 m.

12b. Interior of the dorsal valve GIT 554-1665, Heltermaa, G_{1-2}.

13a–e. Ventral, lateral, dorsal, anterior and posterior views of the shell GIT 554-1504, holotype. Laeva-294: 114.15 m, G_{1-2}.

14a–e. Ventral, dorsal, lateral, posterior and anterior views of the shell GIT 554-1503a, Võhma 440/4a: 98.7 m.

15. Interior of the broken dorsal valve GIT 554-1503b, Võhma 440/4a: 98.7 m.

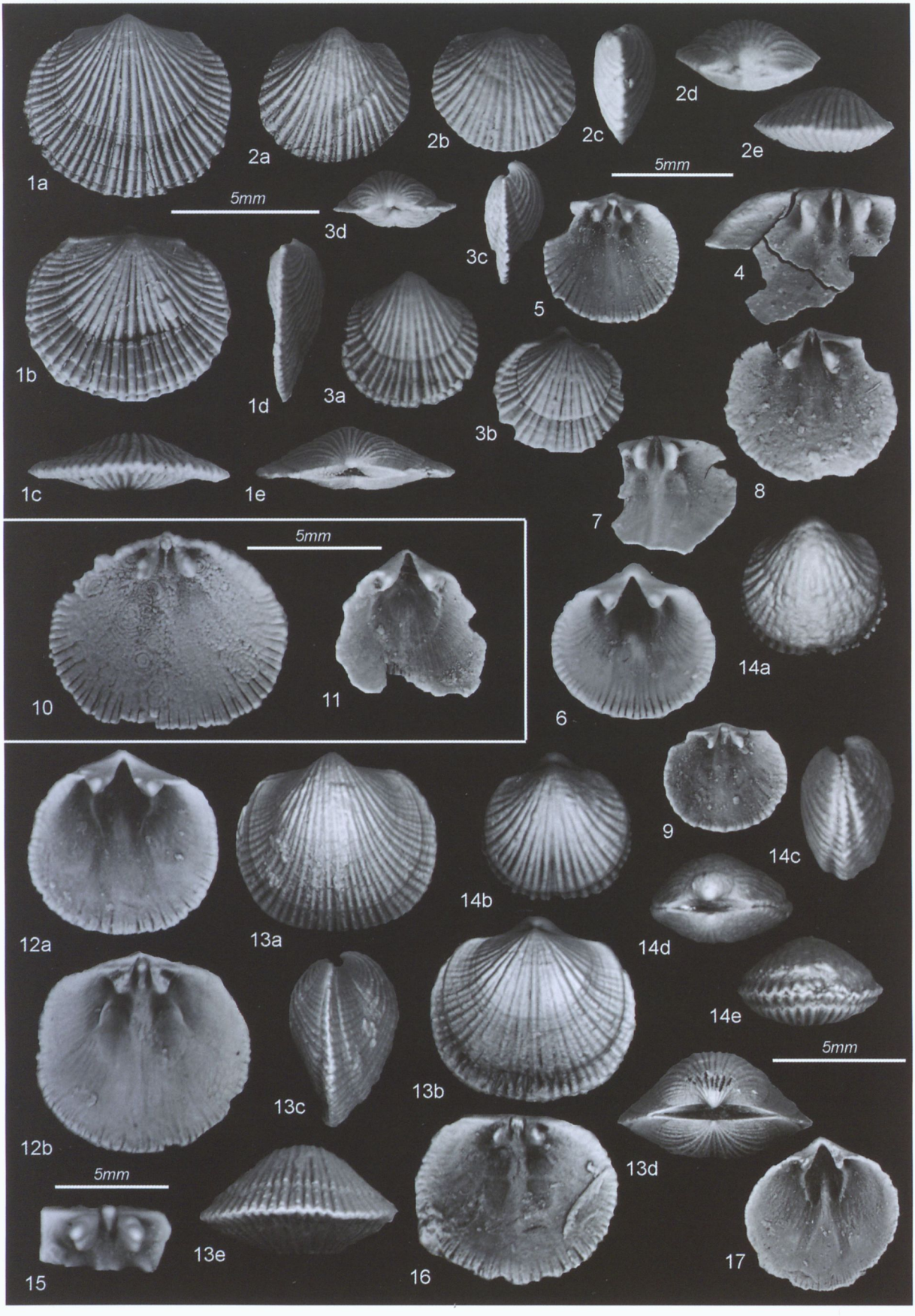
16. Interior of the dorsal valve GIT 554-1666, Heltermaa, G_{1-2}.

17. Interior of the ventral valve GIT 554-1667, Heltermaa: G_{1-2}.

Figures 10–11. *Mendacella bleikeriensis* Baarli. Page 53.

10. Interior of the broken ventral valve GIT 554-1275, Pärnu: 189.8 m, G_{1-2}.

11. Interior of the dorsal valve GIT 554-1066, Vahuküla outcrop, G_3.


1a
2a
2b
2c
2d
2e
5mm
1b
1d
3a
3c
3d
5mm
4
5
1c
1e
3b
7
8
5mm
10
11
6
14a
9
14c
12a
13a
14b
14d
14e
12b
13c
13b
5mm
13d
5mm
15
13e
16
17

ERRATA

Page & line	Title of the chapter	Printed	Correct
p. 17, line 10	*Eodictyonella capewellii*	Plate 7: 24-26	Plate 24: 24-26
p. 18, line 38	*Pentlandina loveni*	Plate 3: 3	Plate 1: 3
p. 35, line 24	*Morinorhynchus rubeli*	Plate 33: 1	Plate 14: 1
p. 36, line 2	*Triplesia maennili*	Plate 16: 4-12	Plate 16: 2-6
p. 37, line 2	*Streptis altosinuata*	Plate 27: 7	Plate 21: 7
p. 42, line 2	*Ptychopleurella erecta*	Plate 22: 17-19	Plate 22: 27-30
p. 42, line 12	*Ptychopleurella transversa*	Plate 22: 27-30	Plate 22: 15-18
p. 44, line 9	*Dalmanella cyclica*	Plate 25: 1-16	Plate 25: 1-17
p. 44, line 32	*Onniella trigona*	Plate 24: 11-26, plate 26: 1-16	Plate 24: 1-16, plate 26: 11-26
p. 48, line 8	*Resserella canalis*	Plate 19: 1-5, plate 29: 6	Plate 19: 6, plate 29: 1-5
p. 49, line 16	*Templeella* sp.	Plate 2: 18-20	Plate 18: 18-20

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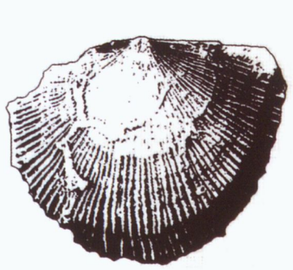
Silurian brachiopods Dictyonellida, Strophomenida, Productida, Orthotetida, Protorthida and Orthida from Estonia

Madis Rubel



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