Magyarhoni Földtani Társulat
Földtani Közlöny
Hungarian Geological Society

144/3, 231–254., Budapest, 2014

A taxonomic and nomenclatural revision of the historical brachiopod collection from the Lower Jurassic of Yakacik (Ankara, Turkey), housed in the Geological and Geophysical Institute of Hungary

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A Magyar Földtani és Geofizikai Intézetben őrzött törökországi (Yakacik, Ankara) alsó-jura brachiopoda gyűjtemény revíziója

Összefoglalás

Törökország alsó-jura brachiopodáiról az első érdemi adatokat MILLEKER Rezső geográfus expedícióinak és VADÁSZ Elemér publikációinak köszönhetjük. A részben saját költségén megtett utazásai során (1911–1912) MILLEKER — számos más természetrajzi érték mellett — jelentős mennyiségű alsó-jura ősmaradványt gyűjtött az Ankara közelében fekvő Jakadjik (vagy Jakadsik, mai nevén Yakacik) lelőhelyről. A kövületeket — köztük a nagyszámú brachiopodát — jórészt VADÁSZ (1913a, b, 1918) dolgozta fel és publikálta. Az anyag a budapesti Földtani Intézet múzeumába került, ahol ma is becses részét képezi a Magyar Földtani és Geofizikai Intézet gyűjteményének. Vadász úttörő, de előzetes jellegű, szinte vázlatos publikációi, valamint a bennük foglalt, többnyire elavult rendszertani eredmények indokolttá tették a brachiopoda fauna korszerű rendszertani revízióját.

A revízió szerint a 197 brachiopoda példány 27 taxont képvisel. Ezen belül 16 genuszhoz tartozó, 23 névleges fajt sikerült azonosítani; ezek részletes leírását és fotódokumentációját adja a jelen dolgozat, a szükséges esetekben sorozatcsiszolati rajzokkal kiegészítve. A 23 faj közül csupán 8 szerepelt VADÁSZ (1913a, b, 1918) publikációiban. A múzeumi alátét cédulák tanúsága szerint azonban VADÁSZ tovább dolgozott az anyagon: a cédulákon szereplő határozásai közül 12 egyezik a mostani revízióban szereplő fajnevekkel. A VADÁSZ (1913a, b) által leírt két új faj, a *Rhynchonellina anatolica* és a *Waldheimia anatolica* valós új fajnak bizonyult; korszerű nevük *Suessia* ? *anatolica* (VADÁSZ 1913), illetve *Aulacothyris anatolica* (VADÁSZ 1913).

Egy Yakacik melletti lelőhelyről AGER (1959a) is leírt egy 11 fajból álló liász brachiopoda faunát; e fajok közül 7 a jelen revízió során is előkerült. A brachiopoda fajok korábban publikált rétegtani elterjedési adatait figyelembe véve a yakaciki brachiopoda fauna pliensbachi korúnak tekinthető.

A Yakacik környéki lelőhelyek zavart településére, bonyolult tektonikájára VADÁSZ (1918) óta számos szerző (AGER 1959a, TÜRKÜNAL 1959, BREMER 1965) utalt. BAILEY & MCCALLIEN (1950, 1953) korábbi felfogása szerint ez a bonyolult tektonikájú terület a tág értelemben vett „Ankara Melanzs" zónához tartozott. Az újabb vizsgálatok ezt a széles zónát tovább tagolták, és a korszerű tektonikai szintézisek szerint (OKAY & TÜYSÜZ 1999, OKAY et al. 2006) Yakacik környékén a Karakaya akkréciós komplexum húzódik, ami a jura elején vált a Sakarya-zóna részévé. A Sakarya mikrokontinenst ekkor egy keskeny óceáni sáv választotta el az európai kontinensperemtől. Ez ad magyarázatot a yakaciki liász brachiopoda fauna látszólag kevert, de valójában inkább átmeneti paleobiogeográfiai jellegére is: a 4 endemikus és 4 kozmopolita faj mellett, 6 faj az ÉNy-európai, 9 faj pedig a Mediterrán faunaprovinciával mutat erős kapcsolatot.

Tárgyszavak: Brachiopoda, alsó-jura, Törökország, rendszertani revízió

Abstract

In this paper the Early Jurassic brachiopods from Yakacik (Turkey), housed at the Geological and Geophysical Institute of Hungary, are examined in detail in the framework of a taxonomic and nomenclatural revision of the 197 specimens collected by R. MILLEKER in 1911–1912, and shortly described by VADÁSZ (1913a, b, 1918). This revision resulted in the identification of 27 brachiopod taxa. They represent 16 genera and 23 nominal species; these are systematically described and documented by photographs and partly by serial sections. The new brachiopod taxa introduced and illustrated by VADÁSZ (1913a, b): *Rhynchonellina anatolica* and *Waldheimia anatolica* are re-evaluated and their taxonomic positions are updated as *Suessia* ? *anatolica* (VADÁSZ, 1913) and *Aulacothyris anatolica* (VADÁSZ, 1913), respectively. The Early Jurassic (Pliensbachian) brachiopod fauna of Yakacik shows a transitional character between two major faunal provinces: besides 4 endemic and 4 cosmopolitan species, 6 species have NW European, and 9 species have Mediterranean faunal affinity.

Keywords: Brachiopoda, Lower Jurassic, Turkey, taxonomic revision

Introduction

The first significant contribution to the knowledge of Turkish Early Jurassic brachiopods can be attributed to the expeditions led by a Hungarian geographer, Rezső MILLEKER, and the subsequent palaeontological publications by VADÁSZ (1913a, b, 1918). MILLEKER's first, self-financed voyage to central Turkey in 1911 was primarily devoted to improve the knowledge on the topography of this exotic country, but the geological, botanical and zoological results were also remarkable. R. MILLEKER collected, among other items, a good amount of Jurassic fossils from red nodular ammonitic limestone at Jakadjik (now Yakacik), near Ankara. These fossils (including forams, sponges, crinoids, ammonoids and brachiopods) were palaeontologically described by VADÁSZ (1913a, b). He established the Early Jurassic age and pointed to the Mediterranean character of the fauna. From among the brachiopods, VADÁSZ introduced two new taxa and shortly described a few other species.

VADÁSZ (1913a, b) published the Yakacik material in the Annals of the Hungarian Geological Institute. At that time, this periodical appeared in the Hungarian and German languages simultaneously, but in separate volumes. Therefore, in spite of their almost perfectly identical content, it is reasonable to consider these contributions as separate papers: VADÁSZ (1913a) for the Hungarian and VADÁSZ (1913b) for the German version. This is further justified by the minor differences in the page numbers and in the partly erroneous numbering of the text-figures in the Hungarian version. The priority should be given to the Hungarian paper (VADÁSZ 1913a).

On the occasion of his second expedition in 1912, R. MILLEKER was commissioned by the Hungarian Geological Institute and he collected an even greater quantity of fossils from Yakacik than on his earlier trip, and gave more attention to the geology of the locality. Based on these data VADÁSZ (1918) endorsed the lower and middle Liassic age of the ammonoid-bearing layers and complemented the brachiopod faunal list.

Due to the above pioneering publications, the locality became renowned to researchers dealing with the Jurassic: ARKELL (1956, p. 349) mentioned Yakacik as one of the "celebrated localities" of the Liassic of Anatolia.

AGER (1959a) collected new brachiopod material, probably from another part of the Liassic outcrops at Yakacik (erroneously written by him as Yakaçik) and gave the full description of the fauna. Ever since then, this important paper has remained the best record of the Yakacik brachiopod fauna.

MILLEKER's valuable fossil collections from Yakacik were stored in the museum of the Geological and Geophysical Institute of Hungary and, fortunately, they are now again available for study. The well-treated and labelled brachiopod material clearly shows that E. VADÁSZ, after his 1918 publication, continued to work on and improved the identification of the brachiopods; however these data have never been published. Moreover, the present author recognized that most of the identifications by VADÁSZ needed to be corrected. Therefore, this paper is devoted to the full revision and description of those Early Jurassic brachiopods from Yakacik housed at the Geological and Geophysical Institute of Hungary.

The locality

Yakacik once was a small village; now it belongs to the outskirts of the Turkish capital, Ankara (Figure 1). Without personal field experience at Yakacik, the author had to rely on various data and descriptions by previous authors. According to VADÁSZ (1913a, b) and AGER (1959a), the most part of the fossils, especially the brachiopods, have been

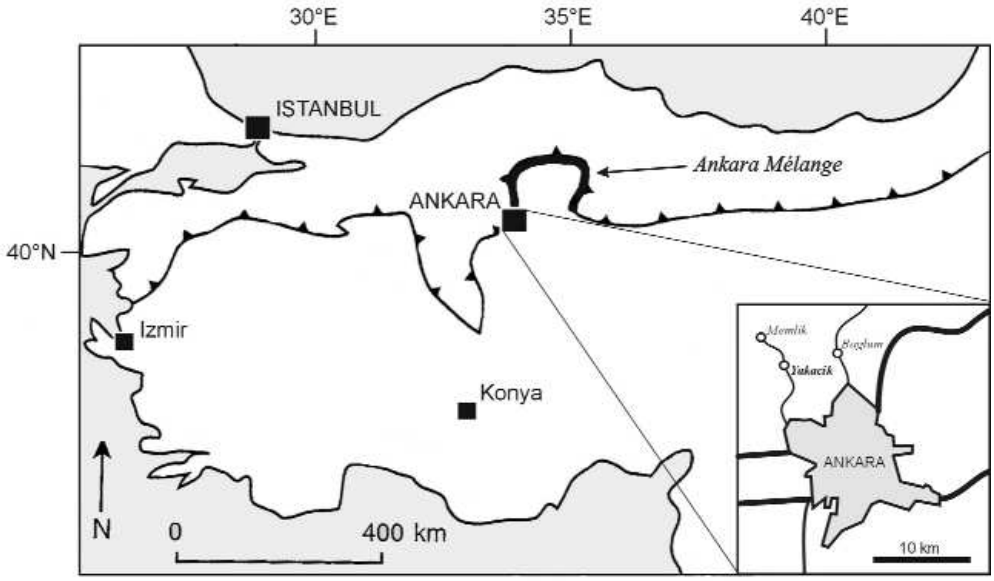


Figure 1. Geographic situation of the Yakacik locality in Turkey. Barbed line: İzmir-Ankara-Erzincan suture zone
Insert map after ALKAYA & MEISTER (1995)

1. ábra. *A yakaciki lelőhely földrajzi helyzete Törökországon belül. Fogazott vonal:İzmir-Ankara-Erzincan szutúra öv*
Részlettérkép ALKAYA & MEISTER (1995) nyomán

collected from the scree coming from dark red, nodular, marly ammonitic limestones. These layers were seen in the sides of small valleys, just north of the village Yakacik.

VADÁSZ (1918) published a concise report on the Jurassic stratigraphy of Yakacik, on the basis of field observations and rock samples collected by MILLEKER. According to VADÁSZ (1918, p. 216) the lowermost exposed rocks were red and greyish-brown limestones with brachiopods, bivalves and crinoids; the brachiopods indicated a Middle Liassic age. The next member was a reddish brown limestone with rich, definitely Lower Liassic ("Lias β") ammonoid fauna. The problem of the apparently reverse order of beds remained unsolved. The red, ammonitic limestone was overlain, without transition, by unfossiliferous sandstones, black marls and grey to brownish, "*Posidonomya* marls" of Middle Jurassic age. VADÁSZ noticed that this Middle Jurassic lithology was different from the Alpine facies and was more akin to the equivalent formations in France, the Crimea and the Caucasus.

BAILEY & MCCALLIEN (1953, p. 427) made a geological survey around Yakacik and recognized that the "Lias deposits" include, besides fossiliferous limestones, shales and polygenetic conglomerates (with pebbles of granite, porphyry and schist). These are in association with the "Steinmann trinity", i.e. the serpentinites, spilites and radiolarites of the ocean-floor rock complex. The radiolarites and the post-Liassic limestones were compared to the Olonos facies (Greece) and the Plattenkalk of the Alps, respectively, by BAILEY & MCCALLIEN (1953).

BREMER (1965, p. 194) gave further geological information on the localities at Yakacik. The description of one of BREMER's localities approximately fits that given by VADÁSZ (1918). At another, nearby locality the fossiliferous red nodular limestone was tectonically wedged between Palaeozoic(?) greywackes and Liassic conglomerates; at a third place the nodular limestone seemed to be in overturned position on sandstones and coarse conglomerates.

KETIN (1969, fig. 17) published a composite stratigraphical column of the Yakacik region suggesting a normal sequence of Jurassic beds with no signs of the obvious tectonic complexity. Other Turkish authors (TÜRKÜNAL 1959, ALKAYA & MEISTER 1995) dealt mainly with the ammonoids from Yakacik; in addition, TÜRKÜNAL (1959, p. 70) mentioned that "the Jurassic shows great tectonic complication".

The tectonically disturbed nature of the outcrops led BAILEY & MCCALLIEN (1950, 1953) to include the Yakacik area in the large belt of the Ankara Mélange. Later studies divided this wide zone, and according to the recent tectonic models (OKAY & TÜYSÜZ 1999, OKAY et al. 2006) the Yakacik area belongs to the Karakaya accretion complex, a remnant of the Palaeo-Tethys, amalgamated to the Sakarya Zone in the Early Jurassic. In those times, the Sakarya microcontinent was separated from the European margin by the narrow, Intra-Pontide-Meliata Ocean. This may be the reason why the Yakacik brachiopod fauna shows a transitional character between the NW European and Mediterranean faunal provinces.

The brachiopod fauna

From the brachiopod material, collected by MILLEKER on the occasion of his first voyage, VADÁSZ (1913a, b) introduced and illustrated two new taxa: *Rhynchonellina anatolica* nov. sp. and *Waldheimia anatolica* nov. f., and shortly described further six species:

Rhynchonella variabilis Schl. sp.
Terebratula punctata Sow.
Terebratula cfr. *erbaensis* Suess.
Waldheimia mutabilis Opp.
Waldheimia subdigona Opp.
Waldheimia cfr. *Fuggeri* Böse

As a result of the new material collected by MILLEKER's second expedition, VADÁSZ (1918) endorsed the "Middle Liassic" age of the Yakacik fauna and complemented the brachiopod faunal list with the following taxa:

Rhynchonella plicatissima Qu.
Rhynchonella Meneghinii Zitt.
Rhynchonella Dalmasi Dum.
Rhynchonella Stachei Böse
Rhynchonella acuta Sow.
Spiriferina sp.
Terebratula adnethensis Suess
Terebratula nimbata Opp.
Terebratula (Orthotoma) margaritata Roem.
Waldheimia furlana Zitt.

In the same paper VADÁSZ (1918, p. 217) emphasized the presence of some "middle-European" species, e.g. "*R". acuta*, besides the "Mediterranean" forms.

The present author had the possibility to make a detailed study of the brachiopod fauna from Yakacik, stored in the collections of the Geological and Geophysical Institute of Hungary. The brachiopod material totals 197 specimens altogether. The taxonomic and nomenclatural revision of all brachiopod specimens, collected by R. MILLEKER and labelled by E. VADÁSZ, was carried out by the present autor. The revised brachiopod names given by the present author and the related identifications, written on the labels by E. VADÁSZ, are shown in Table 1.

According to the museum labels, VADÁSZ identified 30 taxa (which included the informal varieties). The present revision resulted in the identification of 27 brachiopod taxa. From among the 23 nominal species of the revised list, 12 correspond to those written on the labels by VADÁSZ.

It is reasonable to compare the faunal list of the recently revised Yakacik brachiopod fauna to the fauna published by AGER (1959a) also from Yakacik. AGER (1959a) correctly described and presented figures for the following 11 brachiopod taxa:

Homoeorhynchia acuta (J. Sowerby)
Cirpa kiragliae Ager
Cirpa kiragliae globosa Ager
Piarorhynchia deffneri (Oppel)
Holcorhynchia ? *yakacikensis* Ager
Propygope aspasia (Meneghini)
Zeilleria lycetti (Davidson)

Table I. The revised list of the Yakacik brachiopod taxa and their previous identifications by VADÁSZ
I. táblázat. *A Yakacikról gyűjtött brachiopoda taxonok revideált listája, valamint VADÁSZ korábbi meghatározásai*

The revised list	Identifications by VADÁSZ (collection labels)
Aprigia picciniii (Zittel, 1869)	*R. stachei* Böse
Jakubirhynchia latifrons (Geyer, 1889)	*R. subcostellata* Gemm. + *R.* cfr. *greppini* Opp.
Jakubirhynchia ? *laevicosta* (Geyer, 1889)	*R. plicatissima* Qu.
Jakubirhynchia ? sp.	*R. stanleyi* Gemm.+ *R. subpectiniformis* Böse
Cirpa cf. *kiragliae* Ager	*R. tetraedra* Sow. + *R. variabilis* Schl. var. *fronto* Qu.
Cirpa ? sp.	*R. variabilis* Schl. var. *squamata* Qu.
Calcirhynchia hungarica (Böckh, 1874)	*R. plicatissima* Qu.
Calcirhynchia ? *sanctihilarii* (Böse, 1894)	*R. sancti-hilarione* Böse
Homoeorhynchia acuta (J. Sowerby, 1816)	*R. acuta* Sow.
Cuneirhynchia dalmasi (Dumortier, 1869)	*Rhynchonella dalmasi* Dum.
Scalpellirhynchia cf. *scalpellum* (Quenstedt, 1851)	*R. meneghinii* Zitt.
Holcorhynchia meneghinii (Zittel, 1869)	*R. meneghinii* Zitt.
Holcorhynchia yakacikensis Ager	*R. meneghinii* Zitt.
Rhynchonellida indet.	*R. variabilis* Schl.
Liospiriferina alpina (Oppel, 1861)	*Spiriferina alpina* Opp.
Suessia ? *anatolica* (Vadász, 1913)	*Rhynchonellina anatolica* Vad.
Orthotoma quenstedti Buckman, 1904	*Terebratula beyrichi* Opp.
Lobothyris punctata (Sowerby, 1812)	*T. punctata* Sow.
Lobothyris ? sp.	*T. adnethensis* Suess
Securithyris cf. *adnethensis* (Suess, 1855)	*T. adnethensis* Suess
Linguithyris aspasia (Zittel, 1869)	*T. nimbata* Opp.
Zeilleria cf. *waterhousi* (Davidson, 1851)	*W. subdigona* Opp. + *W. furlana* Zitt.
Zeilleria cf. *lycetti* (Davidson, 1851)	*Terebratula* cfr. *erbaensis* Suess
Zeilleria cf. *mutabilis* (Oppel, 1861)	*Waldheimia mutabilis* Opp. + *W. stapia* Opp.
Zeilleria alpina (Geyer, 1889)	*W. alpina* Gey.
Aulacothyris resupinata (Sowerby, 1816)	*Waldheimia resupinata* Sow. + *W.* cf. *fuggeri* Böse + *W. furlana* Zitt. var. *elongata* Can.
Aulacothyris anatolica (Vadász, 1913)	*W. anatolica* Vad. + *W. subdigona* Opp.

Zeilleria indentata (J. de C. Sowerby)
Aulacothyris cf. *resupinata* (J. Sowerby)
Aulacothyris anatolica (Vadász)
Cincta numismalis (Lamarck)

It is remarkable that, from the eleven brachiopod taxa found by AGER (1959a), only seven were also recognized in the revised MILLEKER-VADÁSZ collection. This difference is not surprising, because AGER's fauna probably came from another part of the Yakacik outcrops.

Considering the tectonic and stratigraphic uncertainties of the locality, and the absence of any measured section, the age of the Yakacik brachiopod fauna can be given only with approximation. Many of the identified brachiopods (Table I) are long-ranging forms through the Sinemurian to Pliensbachian interval. On the other hand, only eight species have been recorded from the Pliensbachian, and some of them (*Homoeorhynchia acuta, Aulacothyris resupinata*) occur dominantly in the upper Pliensbachian or even in the Toarcian (*Zeilleria lycetti*). In conclusion, agreement can be made with VADÁSZ (1913a, b, 1918) that the Yakacik brachiopod fauna is of Middle Liassic, i.e. Pliensbachian in age.

A detailed palaeobiogeographical evaluation of the Yakacik brachiopod fauna is beyond the scope of the present paper. Nevertheless, considering only the simple presence vs. absence data of the newly revised species in the major Tethyan palaeogeographic provinces (NW European, vs. Mediterranean) the following numbers were obtained: besides 4 endemic and 4 cosmopolitan species, 6 species have a NW European affinity, and 9 species Mediterranean affinity. This result is in between the two earlier opinions on the affinity of the Yakacik fauna. VADÁSZ (1913a, b, 1918) wrote about the definitely Mediterranean character of the brachiopod fauna, where some "mid-European" species are also present, whereas AGER (1959a, p. 1027) pointed out the "strong affinities with the faunas of western Europe" with rare "Alpine" elements. The present conclusion is that the Early Jurassic brachiopod fauna of Yakacik has a transitional character between the two major faunal provinces.

Systematic descriptions

The twenty-three brachiopod species identified from the Early Jurassic of Yakacik will be described and illustrated below. Many of the identified species are frequently illustrated taxa, well-known from the palaeontological literature and thus needing no detailed description, nor a study of their internal morphology. In these cases only abridged synonym lists and short remarks will be given.

Some other species, with less clear taxonomies — e.g. poorly known, or described by VADÁSZ (1913a, b) as new — will be discussed more comprehensively. In some of these cases, the internal morphology was also examined and illustrated.

In the systematic descriptions, the classification of the revised "Treatise" (SAVAGE et al. 2002, CARTER & JOHNSON 2006, LEE et al. 2006) is followed. The measurements of the figured specimens (L = length, W = width, T = thickness, Ch = height of the deflection in the anterior commissure) are given in millimetres. The brachiopod material is deposited in the collection of the Geological and Geophysical Institute of Hungary, Budapest under the inventory numbers prefixed by "J".

Order Rhynchonellida KUHN, 1949
Superfamily Pugnacoidea RZHONSNITSKAIA, 1956
Family Basiliolidae COOPER, 1959
Subfamily Basiliolinae COOPER, 1959
Genus *Apringia* DE GREGORIO, 1886

Apringia piccininii (Zittel, 1869)
Plate I: 1

* 1869 *Terebratula Piccininii*. Zitt. — ZITTEL, Central-Appenninen, p. 125, pl. XIV, fig. 7.
v 1918 *R.*[*hynchonella*] *Stachei* Böse — VADÁSZ, P. alpina-Schichten, p. 217.
? 1926 *Rhynchonella jaltensis* n. sp. — MOISSEIEV, Crimea, p. 974, 992, pl. XXVIII, figs. 17–19.
? 1934 *Rhynchonella jaltaensis* n. sp. — MOISSEIEV, Crimea and Caucasus, p. 57, 182, pl. IV, figs. 21–23.
v 2009 *Apringia piccininii* (Zittel, 1869) — VÖRÖS, Bakony, p. 43, text-fig. 28, pl. I, figs.1–5 (cum syn.).

Measurements			
L	W	T	Ch
12.4	14.7	6.7	5.2

Material: Three moderately preserved specimens.

Remarks: This species was described and discussed in detail by VÖRÖS (2009), who synonymized *A. piccininii* (Zittel, 1869) with *A. aptyga* (Canavari, 1880), here he took into consideration the latter as a wider and flatter member of the range of variation of *A. piccininii*. The Yakacik specimens stand closer to the "*aptyga*" variant. MOISSEIEV (1926) described a new species from the Crimea under the name "*R. jaltensis*" (and later, in MOISSEIEV 1934, as "*R. jaltaensis*"), which is a typical *Apringia* and stands very close to *A. piccininii*. MOISSEIEV's species is very probably conspecific with *A. piccininii*, but without the examination of the original specimens, the identification remains tentative.

A. piccininii is a typical Mediterranean brachiopod species.

VADÁSZ in his publication (VADÁSZ 1918) and on the museum label identified these specimens with "*Rhynchonella*" *stachei* (Böse, 1898). This species has some similarity to *A. piccininii* in general shape and the arching of the anterior commissure, but the original specimens (Bayerische Staatsammlung, München) bear marked beak ridges (not shown in the figures by BÖSE 1898); therefore *stachei* may not belong to *Apringia*.

Subfamily Pamirorhynchiinae OVCHARENKO, 1983
Genus *Jakubirhynchia* TOMAŠOVÝCH, 2006

Jakubirhynchia latifrons (Geyer, 1889)
Plate I: 2

*v 1889 *R.*[*hynchonella*] *latifrons* Stur. m. s. — GEYER, Hierlatz, p. 54, pl. VI, figs. 25–31.
1893 *Rhynchonella* cfr. *latifrons*. Stur. — PARONA, Revisione Gozzano, p. 32, pl. I, fig. 21.
? 1893 *Rh.*[*ynchonella*] cfr. *latifrons*, Stur. — FUCINI, Alpi Apuane, p. 297, pl. IV, figs. 3–5.
1943 *Rhynchonella latifrons* Stur — VIGH, Gerecse, p. 14, pl. II, fig. 24.
1999 *Cirpa* (?) *latifrons* (Geyer, 1889) — BÖHM et al., Adnet, p. 194, pl. 29, fig. 5.
v 2003 *Cirpa* ? *latifrons* (Stur in Geyer 1889) — VÖRÖS et al., Schafberg, p. 70, pl. VI, figs. 16–18.
2006 *Jakubirhynchia latifrons* (Geyer, 1889) — TOMAŠOVÝCH, Early Jurassic, p. 215, figs. 4–12.
2012 *Cirpa latifrons* (Stur in Geyer 1889) — HÖFLINGER, Deutsch. Lias, p. 45 + fig. (unnumbered).

Measurements			
L	W	T	Ch
11.4	12.9	7.0	2.4

Material: Two well-preserved specimens.

Remarks: This species, as the type species of his new genus *Jakubirhynchia*, was comprehensively described, illustrated and discussed by TOMAŠOVÝCH (2006). The earlier illustrations by GEYER (1889), BÖHM et al. (1999) and VÖRÖS et al. (2003) gave further help in the identification of this species.

J. latifrons had previously been known only from the Alpine-Mediterranean region.

VADÁSZ (1913a, b, 1918) did not mention this species in his publications. On the museum label VADÁSZ identified one of these specimens with "*Rhynchonella*" *subcostellata* Gemmellaro, 1878, while the other specimen was identified as "*Rhynchonella*" cf. *greppini* Oppel, 1861. The latter is not relevant for consideration, because it belongs to the distant genus *Prionorhynchia*. "*R.*" *subcostellata* stands morphologically closer to *J. latifrons*, but according to VÖRÖS (2009) it probably belongs to a separate genus *Cirpa*.

Jakubirhynchia ? *laevicosta* (Geyer, 1889)
Plate I: 3

* 1889 *Rhynchonella laevicosta* nov. sp. Stur m. s. — GEYER, Hierlatz, p. 66, pl. VII, figs. 20, 21.

v? 1895 *Rhynchonella* cfr. *laevicosta* Stur. — FUCINI, Calcari bianchi, p. 184, pl. VII, fig. 10.
v 1918 *Rhynchonella plicatissima* Qu. sp. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
? 1943 *Rhynchonella laevicosta* Stur — VIGH, Gerecse, p. 49, text-fig. 13a, pl. III, fig. 15.
2012 *Calcirhynchia laevicosta* (Stur in Geyer 1889) — HÖFLINGER, Deutsch. Lias, p. 49 + fig. (unnumbered).

Measurements			
L	W	T	Ch
13.1	15.4	8.4	3.8

Material: Three rather well-preserved specimens.

Remarks: This subpentagonal, finely costate species is akin to *Jakubirhynchia latifrons* (Geyer, 1889) and can be attributed to the same genus. *J.* ? *fascicostata* (Uhlig, 1880) differs from this species by its more oval outline, lower uniplication and by slightly different ornamentation — namely, its dichotomous ribs are grouped into bundles. The fine ribbing and the appearance of the anterior commissure (partly undulating, instead of being sharply zig-zagged) are reminiscent of some of the weakly costate species of the distantly related *Apringia* e.g. *A. paolii* (Canavari, 1880).

This Alpine-Mediterranean species was recently recorded from south Germany (Bamberg) by HÖFLINGER (2012).

Vadász, in his publication (VADÁSZ 1918) and on the museum label, identified these specimens with "*Rhynchonella*" *plicatissima* Quenstedt, 1852. This species is very different from *J. laevicosta*; it is much more globose and has marked planareas (TOMAŠOVÝCH, 2006, p. 223). Therefore it probably belongs to *Prionorhynchia* (see discussion in VÖRÖS 2009, p. 79).

Superfamily Wellerelloidea LICHAREW, 1956
Family Wellerellidae LICHAREW, 1956
Subfamily Cirpinae AGER, 1965
Genus *Cirpa* DE GREGORIO, 1930

Cirpa cf. *kiragliae* Ager, 1959
Plate I: 6

v 1913a *Rhynchonella variabilis* Schl. sp. — VADÁSZ, Kisázsia, p. 59 (pars).
v 1913b *Rhynchonella variabilis* Schl. sp. — VADÁSZ, Kleinasien, p. 68 (pars).
v 1918 *Rhynchonella variabilis* Schl. sp. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
* 1959a *Cirpa kiragliae* Ager, n. sp. — AGER, Turkey, p. 1019, text-fig. 2, pl. 128, fig. 2.

Measurements			
L	W	T	Ch
14.5	15.8	10.4	5.7

Material: Four moderately-preserved specimens.

Remarks: This species was introduced by AGER (1959a) and he illustrated its external and internal morphology clearly. Therefore, its attribution to the genus *Cirpa* is beyond doubt. AGER (1959a, b) discussed the relationships of *C. kiragliae* to other species of *Cirpa*, e.g. *C. fronto* (Quenstedt, 1871) and *C. briseis* (Gemmellaro, 1874). The specimens from Yakacik acquired for this paper correspond rather well with the descriptions and figures given by AGER (1959a).

C. kiragliae seems to be endemic for Yakacik.

VADÁSZ in his publications (VADÁSZ 1913a, b, 1918) mentioned "*Rhynchonella" variabilis* Schlotheim, and on the museum labels identified one of these specimens as "*Rhynchonella variabilis* Schlotheim var. *fronto* Quenstedt". Here this identification is revised, following the opinion of AGER (1959a, b), who suggested abandoning the species name *variabilis* as *nomen dubium*. Another three specimens from Yakacik were identified by VADÁSZ on the museum label as "*Rhynchonella*" *tetraedra* Sowerby. This identification was obviously wrong because this species belongs to the very distant genus *Tetrarhynchia*.

Genus *Calcirhynchia* BUCKMAN, 1918

Calcirhynchia hungarica (Böckh, 1874)
Plate I: 4

* 1874 *Rhynchonella Hungarica* n. sp. — BÖCKH, Südlichen Theiles des Bakony, p. 160, pl. IV, figs. 5, 6.
v 1918 *Rhynchonella plicatissima* Qu. sp. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
v 2009 *Calcirhynchia ? hungarica* (BÖCKH, 1874) — VÖRÖS, Bakony, p. 78, pl. VIII, fig. 11. (cum syn.)
2012 *Calcirhynchia plicatissima* (Quenstedt 1852) — HÖFLINGER, Deutsch. Lias, p. 46 + fig. (unnumbered).
? 2013 *Calcirhynchia plicatissima* (Quenstedt, 1852) — BAEZA-CARRATALÁ, Subbetic, p. 82, fig. 4/7.

Measurements			
L	W	T	Ch
12.2	14.0	8.8	5.6

Material: 73 specimens in various state of preservation.

Remarks: This rather globose, uniplicate and fully costate species was described by BÖCKH (1874), who recognized its similarity to "*R.*" *plicatissima* Quenstedt, 1852; however he also listed some differences between the two species. For a long time, many authors regarded the two species as synonymous, with *plicatissima* as the senior synonym. Recently, TOMAŠOVÝCH (2006) analyzed very thoroughly the question of Lower Jurassic multicostate rhynchonellids and stated that QUENSTEDT's original specimens of "*R. plicatissima*" (which he studied in the Tübingen collection) have marked planareas and this probably places them in *Prionorhynchia*. On these grounds, VÖRÖS (2009) restored BÖCKH's species name *hungarica* and suggested using this name instead of *plicatissima*, for the forms which do not have planareas, but show fine riblets on their flat or gently convex lateral parts.

Here the species *hungarica* is placed in *Calcirhynchia*. DULAI (1992, 2003) published serial sections of his "*Calcirhynchia plicatissima*", and these are now regarded as representative of *C. hungarica*. The sections exclude the possibility of attribution to *Mediterranirhynchia* and seem to stand closer to *Calcirhynchia* than to *Jakubirhynchia*.

C. hungarica was predominantly recognized in the Alpine-Mediterranean region, but was also recently recorded in south Germany (Wutach) by HÖFLINGER (2012).

VADÁSZ in his publication (VADÁSZ 1918) and on the museum labels identified these specimens with "*Rhynchonella*" *plicatissima* Quenstedt, 1852. Following the above discussion, they are now identified as *Calcirhynchia hungarica* (Böckh, 1874).

Calcirhynchia ? *sanctihilarii* (Böse, 1898)
Plate I: 5

*v 1898 *Rhynchonella Sancti-Hilarii* n. sp. — BÖSE, Nordalpen, p. 186, pl. XIII, figs. 23–32.
? 1921 *Rhynchonella Sancti-Hilarii* Böse. — FRANCESCHI, Appennino centrale, p. 222, pl. I, fig. 5.
? 1969 *Rostrirhynchia sanctihilarii* (Boese), 1897 — SUČIĆ-PROTIĆ, Mid. Lias. Brach. Yugosl. Carpatho-Balkanids (1), p. 50, pl. X, figs. 6, 7, pl. XXXIV, fig. 2, pl. LII, fig. 6.
v 1994 *Calcirhynchia* ? *sanctihilarii* (BÖSE, 1898) — VÖRÖS, Umbria, p. 358.

Material: One rather well-preserved specimen.

Measurements			
L	W	T	Ch
10.1	10.2	6.6	0.9

Remarks: This indistinct, small species was described, but rather poorly figured by BÖSE (1898). An examination of the originals in the Bayerische Staatssammlung (München) convinced the author that *sanctihilarii* is rather close to *Calcirhynchia* ? *hungarica* (Böckh, 1874), — although it is smaller and has almost no uniplication. VÖRÖS (1994) suggested that the specimen described by ZITTEL (1869, p. 129) as „*Rhynchonella subdecussata* Mstr." should belong to *C.*? *sanctihilarii*.

C.? *sanctihilarii* has only been reported from the Alpine-Mediterranean region, except for the uncertain record by SUČIĆ-PROTIĆ (1969).

The generic position of the species is uncertain. SUČIĆ-PROTIĆ (1969) introduced the new genus *Rostrirhynchia* with *sanctihilarii* as the type species, but the figured specimens give the impression that the species was misidentified. Therefore, it seems reasonable to maintain the attribution of *sanctihilarii* to the genus *Calcirhynchia*, even if it is still questionable.

VADÁSZ did not mention this name in his publications, but on the museum labels he identified this specimen as "*Rhynchonella sancti-hilarione*" (sic).

Superfamily Rhynchonelloidea D'ORBIGNY, 1847
Family Rhynchonellidae D'ORBIGNY, 1847
Subfamily Rhynchonellinae D'ORBIGNY, 1847
Genus *Homoeorhynchia* BUCKMAN, 1918

Homoeorhynchia acuta (J. Sowerby, 1816)
Plate I: 7, 8

* 1816 *Terebratula acuta*. — J. SOWERBY, Mineral Conchology, II, p. 115, pl. CL, figs. 1, 2.
1852 *Rhynchonella acuta*, Sow. Sp. — DAVIDSON, Oolitic and Liasic, p. 76, pl. XIV, figs. 8, 9.
v 1918 *R.*[*hynchonella*] *acuta* Sow. sp. — VADÁSZ, P. alpina-Schichten, p. 217.
1934 *Rhynchonella ringens* (Hérault, L. v. Buch) — MOISSEIEV, Crimea and Caucasus, p. 68, 185, pl. V, figs. 10, 11.
1959a *Homoeorhynchia acuta* (J. SOWERBY) — AGER, Turkey, p. 1019, text-fig. 1, pl. 128, fig. 1.
v 2009 *Homoeorhynchia* cf. *acuta* (J. SOWERBY, 1816) — VÖRÖS, Bakony, p. 80, pl. IX, fig. 5. (cum syn.)
2010 *Homoeorhynchia acuta* (J. SOWERBY, 1818) — ALMÉRAS et al., Massif Armoricain, p. 29, pl.2, fig. 3.
2012 *Homoeorhynchia acuta* (Sowerby 1818) — HÖFLINGER, Deutsch. Lias, p. 50 + fig. (unnumbered).
2013 *Homoeorhynchia acuta* (J. SOWERBY, 1818) — ALMÉRAS & FAURÉ, Quercy, p. 33, pl. 2, fig. 15.
2013 *Homoeorhynchia acuta* (J. SOWERBY, 1818) — ALMÉRAS & COUGNON, Principaux genres, p. 60, pl. 6, figs. 5–7.

Material: Five specimens in a partly good state of preservation.

Measurements			
L	W	T	Ch
14.7	14.7	10.1	11.2
14.0	13.6	10.2	10.0

Remarks: This well-known highly uniplicate ("cynocephalous") species was illustrated extensively by AGER (1956) and the Turkish occurrences were also demonstrated and discussed (AGER 1959a, 1983). On this basis, our specimens from Yakacik were easily identified as *Homoeorhynchia acuta* (J. Sowerby, 1816). From the five studied specimens, one has two secondary riblets or weak deflexions on the sides of the high uniplication (Pl. 1: 7). This phenomenon was illustrated by AGER (1959a) from Yakacik, and was regarded by him as an "attempt" to return to the multicostate form — i.e. an example of a tendency towards allopatric speciation in a "marginal population"(AGER 1983). A similar specimen with an asymmetrically developed fold was illustrated by MOISSEIEV (1934) from the Lias of the Crimea under the name "*Rhynchonella ringens* (Hérault, L. v. Buch)". This is here regarded as a "marginal" *H. acuta*, because *ringens* has much higher uniplication and is an Aalenian species (ALMÉRAS 1964, PROSSER 1993).

The date of publication of this species is inconsistently cited by different authors as 1816 or 1818. J. SOWERBY's "Mineral Conchology" was published in several parts in different years between 1815 and 1818. Here I accepted the

opinion of a leading authority (AGER 1959a, p. 1019) and the revised Treatise (SAVAGE et al. 2002) who cited *H. acuta* (J. Sowerby) with the date 1816.

H. acuta was frequently recorded in the NW European province, but was rarely found in the Carpathians and the Bakony Mts (VÖRÖS 2009). Therefore it may be taken as rather cosmopolitan in its distribution.

VADÁSZ in his publication (VADÁSZ 1918) and on the museum labels correctly identified these specimens as "*Rhynchonella acuta* (Sow.)".

Subfamily Piarorhynchiinae SHI & GRANT, 1993
Genus *Cuneirhynchia* BUCKMAN, 1918

Cuneirhynchia dalmasi (Dumortier, 1869)
Plate I: 9, 10

* 1869 *Rhynchonella Dalmasi* (Nov. spec.). — DUMORTIER, Bassin du Rhône, p. 331, pl. XLII, figs. 3–5.
v 1891 *Rhynchonella Dalmasi* Dum. — DI STEFANO, Erice, p. 198, pl. II, figs. 8–12.
1893 *Rhynchonella Dalmasi,* Dum. — PARONA, Revisione Gozzano, p. 32, pl. I, fig. 22.
v 1898 *Rhynchonella Dalmasi* Dumortier — BÖSE, Nordalpen, p. 208, pl. XV, figs. 16–18.
v 1900 *Rhynchonella Dalmasi* Dum. — BÖSE & SCHLOSSER, Südtyrol, p. 195 (pars), pl. XVIII, fig. 16 (non fig. 17)
v 1918 *R.*[*hynchonella*] *Dalmasi* Dum. — VADÁSZ, P. alpina-Schichten, p. 217.
1962 *Cuneirhynchia dalmasi* (Dumortier). — AGER, British Rhynchonellidae, p. 126, text-figs. 77–80, pl. XI, figs. 4, 5.
? 1964 *Cuneirhynchia dalmasi* (Dumortier, 1869) — SIBLÍK, Belanska Dolina, p. 173, text-fig. 5, pl. VIII, fig. 3.
2012 *Cuneirhynchia dalmasi* (Dumortier 1869) — HÖFLINGER, Deutsch. Lias, p. 62 + fig. (unnumbered).
2013 *Cuneirhynchia dalmasi* (Dumortier, 1869) — BAEZA-CARRATALÁ, Subbetic, p. 84, fig. 5/5.

Material: 37 specimens in various states of preservation.

Measurements			
L	W	T	Ch
12.8	12.9	8.0	4.9
13.8	13.9	8.0	4.4

Remarks: This characteristic species was properly illustrated in the classic literature, and particularly by AGER (1962), what served as a firm basis for the identification of the material from Yakacik. The specimens of this study show the basic features of the genus: the long and sharp beak ridges, and the wide and trapezoidal uniplication, in which the number of costae varies from three to six (but in most cases four). *Cuneirhynchia dalmasi* (Dumortier, 1869) is the second most frequent brachiopod in the material of this study; it is surprising that AGER (1959a) did not record this species from the same locality.

C. dalmasi was first described from France, but later it turned out to be cosmopolitan in distribution.

VADÁSZ in his publication (VADÁSZ 1918) and on the museum labels correctly identified these specimens as "*Rhynchonella Dalmasi* Dum.".

Superfamily Norelloidea AGER, 1959
Family Norellidae AGER, 1959
Subfamily Praemonticlarellinae MANCEÑIDO & OWEN, 2002
Genus *Scalpellirhynchia* MUIR-WOOD, 1936

Scalpellirhynchia cf. *scalpellum* (Quenstedt, 1851)
Plate I: 11

* 1851 *Terebr. scalpellum* — QUENSTEDT, Handbuch, p. 453, pl. XXXVI, fig. 18.
v 1918 *R.*[*hynchonella*] *Meneghinii* Zitt. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
1920 *Rhynchonella scalpellum* Quenstedt — DARESTE DE LA CHAVANNE, Guelma, p. 13, pl. I, fig. 1, pl. III, fig. 1.
1967 *Scalpellirhynchia scalpellum* (Quenstedt). — AGER, British Rhynchonellidae, p. 148, text-figs. 91–94, pl. XII, figs. 11–13.
2012 *Scalpellirhynchia scalpellum* (Quenstedt 1851) — HÖFLINGER, Deutsch. Lias, p. 72 + fig. (unnumbered).

Material: One partly broken specimen.

Measurements			
L	W	T	Ch
12.8	12.4	7.3	1.2

Remarks: This rather tiny species is well illustrated by AGER (1967) and HÖFLINGER (2012). On the basis of its subtriangular outline, uniform ribbing, and very flat and wide uniplication, the Yakacik specimen of this study was tentatively identified with *Scalpellirhynchia scalpellum* (Quenstedt, 1851).

S. scalpellum is substantially a NW European form, but it also occurs (albeit rarelyI in North Africa and Turkey.

One of the specimens listed by VADÁSZ (1918) and identified on the museum labels as "*Rhynchonella Meneghinii* Zitt." is revised here and attributed to *S. scalpellum*.

Subfamily Diholkorhynchiinae XU & LIU, 1983
Genus *Holcorhynchia* BUCKMAN, 1918

Holcorhynchia meneghinii (Zittel, 1869)
Plate I: 12, Figure 2

v* 1869 *Rhynchonella Meneghinii* Zitt. — ZITTEL, Central-Appenninen, p. 130, pl. XIV, figs. 10, 11.
1881 *Rhynchonella* cfr. *Meneghinii* Zitt. — CANAVARI, Aspasia II, p. 184, pl. IX, fig. 13.
v 1918 *R.*[*hynchonella*] *Meneghinii* Zitt. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).

Material: Four rather well-preserved specimens; one of them has been sectioned.

Measurements			
L	W	T	Ch
11.2	10.9	5.4	~1.0

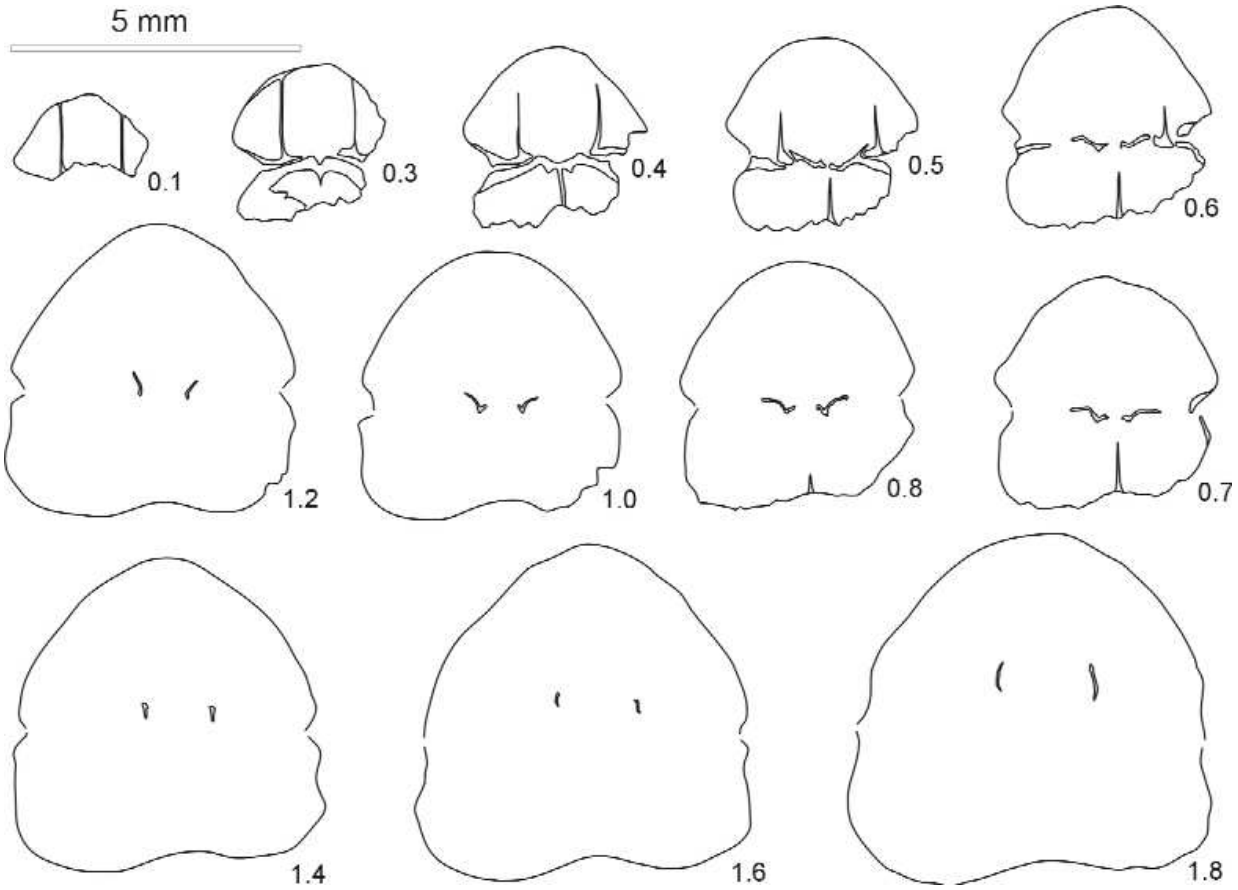


Figure 2. *Holcorhynchia meneghinii* (Zittel, 1869). Twelve transverse serial sections through the posterior part of a specimen from Yakacik (Turkey), Pliensbachian. (J 2014.12.4.2). Distances from posterior end of shell are given in mm. The original length of the specimen is 11.0 mm

2. ábra. Holcorhynchia meneghinii *(Zittel, 1869). Tizenkét sorozatcsiszolati kép egy yakaciki (törökországi) pliensbachi példányról. (J 2014.12.4.2). Feltüntettük a héj hátulsó végétől mm-ben mért távolságokat. A példány eredeti hossza 11,0 mm*

Remarks: This is a rarely illustrated and therefore poorly known species. The author examined the original material of ZITTEL (1869) in the Bayerische Staatssammlung (München) and confirmed, that the tiny "*Rhynchonella*" *meneghinii* is characterized by a subtriangular outline and faint ribs. The latter developed just near the anterior margin and there is also a shallow dorsal sulcus appearing posteriorly and vanishing anteriorly; the anterior margin is not sulcate but nearly straight. The same features can be recognized on the figure given by CANAVARI (1881, l.c.), and on these bases the specimens from Yakacik can definitely be identified with *Holcorhynchia meneghinii*. AGER (1959a) described a closely related species, *H. yakacikensis* Ager from Yakacik. The two species share the basic features characteristic to *Holcorhynchia* but *yakacikensis* is significantly more elongated than *meneghinii*.

The internal features of *H. meneghinii* acquired from a Yakacik specimen by serial sectioning are illustrated in Figure 2. The subparallel dental plates, the shallow septalium, the moderately long median septum and the ventrally bent, raduliform crura agree well with those seen on the serial sections of *Holcorhynchia* published by AGER (1959a, 1967) and support the attribution of the species *meneghinii* to the genus *Holcorhynchia*.

VÖRÖS (1994) tentatively suggested the inclusion of this species with *Pisirhynchia.* However, given the new information on the internal features, this turned out to be erroneous.

H. meneghinii was recorded only from the Mediterranean province.

VADÁSZ (1918) listed "*Rhynchonella Meneghinii* Zitt."; according to the museum labels, four of his specimens were also correctly identified with this species.

Holcorhynchia yakacikensis Ager, 1959
Plate I: 13.

v 1918 *R.*[*hynchonella*] *Meneghinii* Zitt. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).

* 1959a *Holcorhynchia*? *yakaçikensis* Ager, n. sp. — AGER, Turkey, p. 1022, text-fig. 4, pl. 128, fig. 5.

1967 *Holcorhynchia yakaçikensis* Ager — AGER, British Rhynchonellidae, p. 153, text-fig. 96.

? 1994 *Holcorhynchia yakacikensis* Ager, 1959 — TCHOUMATCHENCO, Ouarsenis, p. 33, text-fig. 4, pl. 1, fig. 8.

Material: One rather well-preserved specimen.

Measurements			
L	W	I	Ch
11.9	10.3	7.0	1.2

Remarks: This species was described by AGER (1959a) as *Holcorhynchia*? *yakaçikensis.* The spelling of the name of the species needs emendation for two reasons: (1) the use of the diacritic letter "ç" is against the rules of ICZN; (2) the proper name of the type locality is written as "Yakacik", with a simple "c", which denotes another consonant (d?) in Turkish. On the basis of the description and figures published by AGER (1959a), the identification of the specimen from Yakacik was satisfactory. *H. yakacikensis* is rather similar to *H. meneghinii* (Zittel, 1869) but it is more elongated and its ribbing starts at the mid-length. TCHOUMATCHENCO (1994) figured a specimen tentatively assigned to *H. yakacikensis* but the single dorsal view is not fully convincing; the serial sections (l.c. text-fig. 4) do not seem to fit those published by AGER (1959a, 1967).

AGER (1959a) attributed this species to the genus *Holcorhynchia* — albeit with a query — but later (AGER 1967) endorsed the generic position of *yakacikensis*.

Outside Yakacik, *H. yakacikensis* has only been recorded from Algeria (albeit very doubtfully).

VADÁSZ (1918) probably included this specimen to the item "*Rhynchonella Meneghinii* Zitt." in his faunal list; later he put the name "*Rhynchonella Meneghinii* Zitt. var. *oblonga* Vad." on the respective museum label. Although the name *oblonga* is apt, it can not be restored as species name because it has never been published.

Order Spiriferinida IVANOVA, 1972
Suborder Spiriferinidina IVANOVA, 1972
Superfamily Spiriferinoidea DAVIDSON, 1884
Family Spiriferinidae DAVIDSON, 1884
Subfamily Spiriferininae DAVIDSON, 1884
Genus *Liospiriferina* ROUSSELLE, 1977

Liospiriferina alpina (Oppel, 1861)
Plate I: 14

* 1861 *Spiriferina alpina* Opp. — OPPEL, Brachiopoden des unteren Lias, p. 541, pl. XI, fig. 5.
1934 *Spiriferina alpina* Opp. — MOISSEIEV, Crimea and Caucasus, p. 23, 174, pl. I, figs. 1–7.
1990 *Spiriferina alpina alpina* Oppel, 1861 — TCHOUMATCHENCO, Brach. jur. Kotel II, p. 6, pl. III, figs. 4–7, pl. IV, figs. 1–5.
1994 *Liospiriferina alpina alpina* (Oppel, 1861) — TCHOUMATCHENCO, Ouarsenis, p. 33, pl. 1, fig. 6.
v 2009 *Liospiriferina alpina* (Oppel, 1861) — VÖRÖS, Bakony, p. 112, pl. XII, fig. 2. (cum syn.)
2012 *Liospiriferina alpina* (Oppel 1861) — HÖFLINGER, Deutsch. Lias, p. 113 + fig. (unnumbered).
2013 *Liospiriferina alpina* (Oppel, 1861) — ALMÉRAS & COUGNON, Principaux genres, p. 30, pl. 2, fig. 6.

Material: Three rather well-preserved specimens.

Measurements			
L	W	T	Ch
12.4	12.5	9.7	

Remarks: This is one of the best known Alpine-Mediterranean spiriferinid species; owing to the plentiful illustrations in the classic literature, and the recent revision by VÖRÖS (2009), the identification of the specimens from Yakacik with *Liospiriferina alpina* (Oppel, 1861) was satisfactory. They clearly show the straight anterior commissure and the dorsally pulled umbo, emerging above the hinge margin.

L. alpina is characteristic for the Mediterranean province, but it also occurs in north-west Europe and North Africa; therefore it may be qualified as cosmopolitan in its distribution.

VADÁSZ (1913a, b, 1918) did not mention this species in his publications. On the other hand, the museum label testifies that VADÁSZ correctly identified these specimens as "*Spiriferina alpina* Opp."

Superfamily Suessioidea WAAGEN, 1883
Family Suessiidae WAAGEN, 1883
Genus *Suessia* EUDES-DESLONGCHAMPS, 1855

Suessia ? *anatolica* (Vadász, 1913)
Plate II: 1

v* 1913a *Rhynchonellina anatolica* nov. sp. — VADÁSZ, Kisázsia, p. 58, pl. IV, fig. 5.
v 1913b *Rhynchonella anatolica* nov. sp. — VADÁSZ, Kleinasien, p. 67, pl. IV, fig. 5.
v 1918 *Rhynchonellina anatolica* Vad. — VADÁSZ, P. alpina-Schichten, p. 217.
1959a *Sulcirostra*(?) *anatolica* (Vadasz) — AGER, Turkey, p. 1022.

Material: One well-preserved specimen (holotype: J 2014.16.1).

Measurements			
L	W	T	Ch
7.4	6.2	2.2	

Description: This specimen has a very small, plano-convex double valve with a somewhat elongated subcircular outline. The apical angle is about 120°. The hinge margin is straight and long,occupying nearly eighty percent of the width of the shell. The convex lateral margins join the hinge margin with a very obtuse angle; they form an almost continuous circular curve with the convex anterior margin. The maximum width can be measured at about the half of the length. The ventral valve is of medium convexity; the maximum convexity is attained near the mid-length. The high, straight and pointed beak is apsacline, almost orthocline. The beak ridges are sharp; the interarea is rather wide, and covered by growth lines parallel to the hinge margin. The pedicle opening is wide triangular and bordered by low crests. The dorsal valve is almost flat and partly concave. The lateral commissures are nearly straight. The anterior commissure bears a low and wide central uniplication. A shallow and rather narrow sulcus runs through the ventral valve; a corresponding median plica on

the dorsal valve is less clearly visible. The surface is ornamented with numerous (~70), weak radial riblets; their number increases toward the margins by intercalations. The most posterolateral riblets of the dorsal valve are curved and run to the hinge margin. The riblets are intersected by rather regularly spaced, crenulated growth rugae. Especially on the dorsal valve, the intersection of the radial and comarginal elements of the ornamentation has resulted in a granulated pattern.

The internal characters were not studied by serial sectioning because of the paucity of the material (single specimen).

Remarks: This species was described as nov. sp. by VADÁSZ (1913a) in Hungarian and in German (VADÁSZ 1913b). The holotype (inventory number: J 2014.16.1) is housed in the collections of the Geological and Geophysical Institute of Hungary. An emended description of *Suessia* ? *anatolica* (Vadász, 1913), complemented with a new photographic illustration, is given above.

The generic position of this species has been debated and still uncertain, mainly because it is represented by a single specimen — i.e. the holotype. VADÁSZ (1913a, b, 1918) attributed his new species *anatolica* to the genus *Rhynchonellina* Gemmellaro, 1871 [in the German text (VADÁSZ 1913b, p. 67), it was mistakenly written as *Rhynchonella anatolica* nov. sp.]. VADÁSZ obviously based this attribution on the fine, dense ribbing of the Yakacik specimen and indicated *Rhynchonellina rothpletzi* Böse, 1894 as a similar form. At the same time, he stressed that this, and the other species of *Rhynchonellina* were gently sulcate. This is in contrast to *anatolica* which has an inverse, uniplicate character — i.e. a narrow dorsal fold and corresponding ventral sulcus. It must be noted that in the description and particularly on the figures given by VADÁSZ (1913a, b) this feature is very much exaggerated. The recent examination of the holotype revealed that the narrow ventral sulcus and the uniplication of the anterior margin are rather low and the dorsal fold is barely perceptible (Plate II: 1a, 1b).

AGER (1959a) did not find any further specimens of this species at Yakacik but, based on the figures by VADÁSZ (1913a, b), he discussed the generic attribution of *anatolica*. He suggested (albeit with certain reservation) the inclusion of this species to the genus *Sulcirostra* Cooper & Muir-Wood, 1951 (closely related to *Rhynchonellina*). The arguments were more or less the same as given by VADÁSZ (1913a, b) for the attribution to *Rhynchonellina*; AGER (1959a) also stressed that the fold and sulcus of *S.* ? *anatolica* are opposite to those of *Rhynchonellina* and *Sulcirostra*.

In the opinion of the present author, this species may be best attributed to *Suessia* Eudes-Deslongchamps, 1855. The rhynchonellinid relationship is highly improbable because of the contradictory morphological features mentioned above, and because of the plano-convex shell of *Suessia* ? *anatolica* (in contrast to the usual biconvex valves of Rhynchonellininae). Even the very long and straight hinge margin, the characters of the beak, and especially the wide and partly corrugated interarea, speak against the rhynchonellinid relationship. Revealing the spiralia vs. crura would be decisive, but this was not possible in the case of this single specimen.

Other tiny, flat, Early Jurassic genera of the koninckinids has convavo-convex shells and are smooth, whereas *S.* ? *anatolica* is planoconvex and finely ribbed.

S. ? *anatolica* has many similarities to *Suessia liasiana* (Deslongchamps, 1853). The latter was found in the Crimea by MOISSEIEV (1926, 1934, under the name *Terebratella liasina*) and has recently been illustrated by VÖRÖS & KANDEMIR (2011) from the Eastern Pontides, and by HÖFLINGER (2012, p. 93) from Germany. The two species share the features of almost plano-convex valves and the style of ribbing, but *S. liasiana* is laterally more expanded and its beak is typically apsacline in contrast to the elongate outline and almost orthocline beak of *S.* ? *anatolica*.

Distribution: S. ? *anatolica* seems to be endemic for the Pliensbachian of Yakacik.

Order Terebratulida WAAGEN, 1883
Suborder Terebratulidina WAAGEN, 1883
Superfamily Uncertain
Family Orthotomidae MUIR-WOOD, 1936
Genus *Orthotoma* QUENSTEDT, 1869

Orthotoma quenstedti Buckman, 1904
Plate II: 2

* 1904 *Orthotoma Quenstedti*, nom. nov. — BUCKMAN, Jur. Brach., p. 391.
2012 *Orthotoma quenstedti* Buckman 1904 — HÖFLINGER, Deutsch. Lias, p. 191 + fig. (unnumbered).

Material: One moderately well-preserved specimen.

Measurements			
L	W	T	Ch
11.3	11.3	4.6	1.4

Remarks: This species name was introduced by BUCKMAN (1904) for the form wrongly identified by QUENSTEDT (1851 p. 471, pl. XXXVII, fig. 47) as "*Terebratula heyseana*". DUNKER's species "*heyseana*" (DUNKER 1847, pl. XVIII, fig. 5) is a laterally expanded form, clearly different from *O. quenstedti* Buckman, 1904, which has circular outline. A similarly circular outline and compressed (low convexity) valves are shown by *O. apenninica* (Canavari, 1883), figured recently by VÖRÖS (2009). However, this species is rectimarginate, whereas *O. quenstedti* has a faint sinus in its anterior commissure.

O. quenstedti was hitherto reported only from northwest Europe.

On the museum label VADÁSZ identified this specimen as "*T. beyrichi* Opp.". It is worth mentioning that VADÁSZ (1918) listed "*T.*[*erebratula*] *(Orthotoma) margaritata* Roem." (sic), but the name of this species is absent from the museum labels. It is very likely that, the two names pertain to the same specimen, but VADÁSZ changed his mind when, after his 1918 publication, he tried to improve the identifications of the Yakacik brachiopods.

Superfamily Loboidothyridoidea MAKRIDIN, 1964
Family Lobothyrididae MAKRIDIN, 1964
Subfamily Lobothyridinae MAKRIDIN, 1964
Genus *Lobothyris* BUCKMAN, 1918

Lobothyris cf. *punctata* (J. Sowerby, 1813)
Plate II: 3

* 1813 *Terebratula punctata*. — J. SOWERBY, Mineral Conchology, I, p. 46, pl. XV, fig. 4.
v 1913a *Terebratula punctata* Sow. — VADÁSZ, Kisázsia, p. 59 (pars).
v 1913b *Terebratula punctata* Sow. — VADÁSZ, Kleinasien, p. 68 (pars).
v 1918 *Terebratula punctata* Sow. — VADÁSZ, P. alpina-Schichten, p. 217.
1926 *Terebratula punctata* Sow. — MOISSEIEV, Crimea, p. 975, pl. XXVIII, figs. 23–25.
1965 *Lobothyris punctata* (Sowerby) — TULUWEIT, Nordwestdeutschland, p. 60, text-fig. 1, pl. 7, fig. 2.
1990 *Lobothyris punctata* (J. Sowerby, 1813) — AGER, British Liassic Terebratulida, p. 13, pl. I, fig. 1.
v 2009 *Lobothyris punctata* (J. Sowerby, 1813) — VÖRÖS, Bakony, p. 137, pl. XV, fig. 6 (cum syn.)
2010 *Lobothyris punctata* (J. Sowerby, 1812) — ALMÉRAS et al, Massif Armoricain, p. 48, text-figs. 11, 12, pl. 5, figs. 11, 12.
v 2011 *Lobothyris punctata* (J. Sowerby, 1813) — VÖRÖS & KANDEMIR, Eastern Pontides, p. 357, figs. 5/1, 2 (cum syn.).
2012 *Lobothyris punctata* (J. Sowerby 1812) — HÖFLINGER, Deutsch. Lias, p. 125 + fig. (unnumbered).
2013 *Lobothyris punctata* (J. Sowerby, 1812) — ALMÉRAS & FAURÉ, Quercy, p. 51, pl. 5, figs. 3–12.

Material: 16 specimens in various states of preservation.

Measurements			
L	W	T	Ch
16.7	13.8	8.3	

Remarks: L. punctata is a very widespread and frequently cited Early Jurassic terebratulid species with a rather generalized "*Terebratula*" shape. Apart from the plentiful illustrations in the classic palaeontological literature, the critical revision of *L. punctata* was done recently by prominent brachiopod experts, e.g. AGER (1990) and ALMÉRAS & FAURÉ (2000, 2013).

The date of publication of this species is inconsistently cited by different authors as 1812 or 1813. J. SOWERBY's "Mineral Conchology" was published in several parts in different years between 1812 and 1815. The proper date of publication can not be deciphered from a complete volume in an average library. Therefore, I accepted the opinion of a leading authority (AGER 1990, p. 13) and the revised Treatise (LEE et al. 2006) who cited *L. punctata* (J. Sowerby) with the date 1813.

L. punctata is definitely cosmopolitan in its distribution.

VADÁSZ in his publications (VADÁSZ 1913a, b, 1918) and on the museum labels correctly identified his specimens as "*Terebratula punctata* Sow.".

Superfamily Dyscolioidea FISCHER & OEHLERT, 1892
Family Pygopidae MUIR-WOOD, 1965
Subfamily Triangopinae MANCEŃIDO, 1993
Genus *Securithyris* VÖRÖS, 1983

Securithyris cf. *adnethensis* (Suess, 1855)
Plate II: 4

* 1855 *Terebratula Adnethensis* — SUESS, Brach. Hallstätter Schichten, p. 31.
v 1918 *T.*[*erebratula*] *adnethensis* Suess — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
v 2009 *Securithyris adnethensis* (SUESS, 1855) — VÖRÖS, Bakony, p. 158, text-figs. 89–93, pl. XVII, figs. 4–11, pl. XVIII, figs. 1–5, pl. XIX, figs. 1–4, pl. XX, figs. 1–4, pl. XXI, figs. 1–3, pl. XXII, figs. 1, 2, pl. XXIII, figs. 1, 2 (cum syn.).
2012 *Securithyris adnethensis* (SUESS 1855) — HÖFLINGER, Deutsch. Lias, p. 142 + fig. (unnumbered).

Material: One, somewhat irregularly developed specimen.

Measurements			
L	W	T	Ch
19.7	22.7	10.4	

Remarks: "Terebratula" adnethensis (Suess, 1855) is one of the earliest known brachiopod species of the Alpine Liassic. *Securithyris adnethensis* is the senior synonym of *S. adnethica* introduced by GÜMBEL (1861), and *S. erbaensis* established by PICTET (1867); interestingly, in both cases SUESS was indicated as the author of these new names. Recently *S. adnethensis* was very comprehensively described, illustrated and discussed by VÖRÖS (2009). Its simple, rectimarginate, smooth shells show a wide variation in size and shape. Nevertheless, the Yakacik specimen lies well outside this range with respect to its width. Other characteristics correspond rather well to *S. adnethensis*; therefore, with some hesitation, the Yakacik specimen is identified with that species. It is not damaged, but it may be a specimen that has grown in a slightly irregular way.

S. adnethensis is a typical Alpine-Mediterranean species.

VADÁSZ in his publication (VADÁSZ 1918) listed this species and on the museum labels identified two specimens as "*Terebratula adnethensis* Suess". For one of them this identification is maintained by the present author; the other, poorly preserved specimen appears to represent another taxon, *Lobothyris* ? sp.

Family Nucleatidae SCHUCHERT, 1929
Genus *Linguithyris* BUCKMAN, 1918

Linguithyris aspasia (Zittel, 1869)
Plate II: 5

v* 1869 *Terebratula Aspasia*. Menegh. — ZITTEL, Central-Appenninen, p. 126, pl. XIV, figs. 1–4.

v 1918 *T.*[*erebratula*] *nimbata* Opp. — VADÁSZ, P. alpina-Schichten, p. 217.
1959a *Propygope aspasia* Meneghini — AGER, Turkey, p. 1024, pl. 128, fig. 6.
v 2009 *Linguithyris aspasia* (Zittel, 1869) — VÖRÖS, Bakony, p. 169, text-figs. 96–104, pl. XXIV, figs. 5–13, pl. XXV, figs. 1–11, pl. XXVI, figs. 1–6 (cum syn.).
2012 *Linguithyris aspasia* (Meneghini 1853) — HÖFLINGER, Deutsch. Lias, p. 144 + fig. (unnumbered).
2013 *Linguithyris aspasia* (Zittel, 1869) — BAEZA-CARRATALÁ, Subbetic, p. 84, fig. 5/10.

Material: One well-preserved specimen.

Measurements			
L	W	T	Ch
6.2	7.1	5.1	1.8

Remarks: This is another, well-known and frequently cited Alpine-Mediterranean Liassic brachiopod species. Especially in Italy, in the classical literature, the term "*Terebratula aspasia* beds" has been used as the equivalent of the "middle Lias". *L. aspasia* was very comprehensively described, illustrated and discussed recently by VÖRÖS (2009). The authorship of the species has also been ascertained: the species name *aspasia* was introduced by MENEGHINI (1853, p. 13) in a faunal list and is considered *nomen nudum*; the first description and illustration of *aspasia* was published by ZITTEL (1969).

The single specimen of *L. aspasia*, though very small, clearly shows the basic features of that species and fits to the range of size variation presented by VÖRÖS (2009, figs. 102–104).

This typically Mediterranean species has recently been recorded from more and more localities outside the Mediterranean province; therefore, it may be taken as cosmopolitan in its distribution. Its occurrence in the Crimea and Kotel (Bulgaria) under the name *Nucleata bodrakensis* (Moisseiev, 1947) in TCHOUMATCHENCO (1990) is questionable.

VADÁSZ in his publication (VADÁSZ 1918) and on the museum label identified this specimen as "*Terebratula nimbata* Opp.". However, *nimbata* belongs to another genus *Buckmanithyris* Tchorszhevsky, 1990. This is why the present author prefers the identification *L. aspasia.*

Suborder Terebratellidina MUIR-WOOD, 1955
Superfamily Zeillerioidea ALLAN, 1940
Family Zeilleriidae ALLAN, 1940
Subfamily Zeilleriinae ALLAN, 1940
Genus *Zeilleria* BAYLE, 1878

Zeilleria cf. *waterhousi* (Davidson, 1851)
Plate II: 6

* 1851 *Terebratula Waterhousii*, Dav. — DAVIDSON, Oolitic and Liasic, p. 31, pl. V, figs. 12, 13.
1869 *Terebratula Waterhousi* (Davidson). — DUMORTIER, Bassin du Rhône, p. 324, pl. XLI, figs. 11, 12.
v 1913a *Waldheimia subdigona* Opp. — VADÁSZ, Kisázsia, p. 60 (pars).
v 1913b *Waldheimia subdigona* Opp. — VADÁSZ, Kleinasien, p. 69 (pars).
v 1918 *W.*[*aldheimia*] *subdigona* Opp. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
v 1918 *W.*[*aldheimia*] *furlana* Zitt. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
1934 *Aulacothyris waterhousei* Dav. — MOISSEIEV, Crimea and Caucasus, p. 151, 202, pl. XIX, figs. 26–36.
? 1965 *Keratothyris waterhousi* (Davidson) — TULUWEIT, Nordwestdeutschland, p. 81, text-fig. 22, pl. 8, fig. 5.
1974 *Zeilleria* (*Zeilleria*) *waterhousii* (Davidson 1851) — DELANCE, Zeilleridés, p. 208, pl. 2, figs. 14–19.
1990 *Zeilleria* (*Zeilleria*) *waterhoussii* (Davidson, 1851) — TCHOUMATCHENCO, Brach. jur. Kotel II., p. 26 (pars), text-fig. 15, pl. VIII, figs. 3–8 (non figs. 10, 11).
2000 *Zeilleria* (*Zeilleria*) *waterhousi* (Davidson, 1851) — ALMÉRAS & FAURÉ, Pyrénées, p. 188, pl. 19, fig. 14.
2012 *Zeilleria waterhousi* (Davidson 1851) — HÖFLINGER, Deutsch. Lias, p. 169 + fig. (unnumbered).
2013 *Zeilleria waterhousi* (Davidson, 1851) — ALMÉRAS & FAURÉ, Quercy, p. 61, pl. 8, figs. 7, 8.

Material: Four specimens.

Measurements			
L	W	T	Ch
12.0	10.8	7.8	

Remarks: In the identification of *Zeilleria waterhousi* and its generic attribution the present author relied upon the comprehensive synthesis on zeilleriids by DELANCE (1974) and the subsequent monographs by ALMÉRAS & FAURÉ (2000, 2013). The original figures by DAVIDSON (1851) show specimens with a gently sulcate anterior commisure. Later, by synonymizing the species *subdigona* (Oppel, 1853), the forms with a straight anterior commissure were also included (DELANCE 1974, ALMÉRAS & FAURÉ 2013). The Yakacik specimens show a straight anterior commissure and stand closer to the "*subdigona*"-type.

ANTOSHTCHENKO (1970) ranged this species into the genus *Keratothyris* Tuluweit, 1965, but it was not accepted by DELANCE (1974) and later French authors, and this latter opinion is followed by the present author.

Z. waterhousi is characteristic for north-west Europe, but also occurs in the Crimea, the Balkans and Turkey; therefore it tends to be cosmopolitan in its distribution.

VADÁSZ in his publications (VADÁSZ 1913a, b, 1918) listed "*Waldheimia" subdigona* Opp., and on the museum labels identified three specimens with this name. Here this identification has been revised by accepting that *subdigona* is the junior synonym of *waterhousi*. One further specimen from Yakacik was listed by VADÁSZ (1918) and identified on the museum label as "*Waldheimia furlana* Zitt.". This identification was obviously wrong because the species *furlana* is definitely not a zeilleriid, but a short–looped terebratulid (see discussions in VÖRÖS 2009). This specimen is figured in the present paper (Pl. 2: 6) and is regarded as a typical *Z. waterhousi*.

Zeilleria cf. *lycetti* (Davidson, 1851)
Plate II: 7

* 1851 *Terebratula Lycetii*, Dav. — DAVIDSON, Oolitic and Liasic, p. 44, pl. VII, figs. 17–19 (non figs. 20–22).
non 1878 *Waldheimia Lycetti*, Dav. — DAVIDSON, Supplement, p. 175, pl. XXIV, figs. 30, 31.
v 1913a *Terebratula* cf. *erbaensis* Suess — VADÁSZ, Kisázsia, p. 59.
v 1913b *Terebratula* cf. *erbaensis* Suess — VADÁSZ, Kleinasien, p. 68.
1974 *Zeilleria lycetti* (Davidson 1851, sensu Buckman 1904) — DELANCE, Zeilleridés, p. 158, pl. 2, figs. 11, 12.
? 1994 *Zeilleria* (*Zeilleria*) *lycetti* (Davidson, 1851) — TCHOUMATCHENCO, Ouarsenis, p. 55, pl. V, figs. 4, 5.
non 2000 *Zeilleria* (*Zeilleria*) cf. *lycetti* (non Davidson, 1851) — ALMÉRAS & FAURÉ, Pyrénées, p. 186, pl. 19, fig. 10.
2010 *Zeilleria lycetti* (Davidson, 1851 sensu Buckman, 1904) — ALMÉRAS et al., Massif Armoricain, p. 58, text-fig. 18, pl. 4, figs. 3, 4.
v 2011 *Zeilleria* cf. *lycetti* (Davidson, 1851) sensu Ager — VÖRÖS & KANDEMIR, Eastern Pontides, p. 358, fig. 5/5 (cum syn.).
? 2013 *Zeilleria lycetti* (Davidson, 1851 sensu Buckman, 1904) — ALMÉRAS & FAURÉ, Quercy, p. 65, pl. 9, figs. 1–4.

Material: One slightly crushed specimen.

Measurements			
L	W	T	Ch
9.5	7.7	3.6	

Remarks: This species is frequently cited and illustrated in the classical and modern palaeontological literature but its correct interpretation is still somewhat uncertain. DAVIDSON (1851, pl. VII, figs. 17–22) figured morphologically different specimens under the name *lycetti*. BUCKMAN (1904) designated the specimen on fig. 17 by DAVIDSON (1851) as the type specimen of "*Ornithella Lycetti*" and pointed out that the specimens on figs 20 and 21 were "terebratuloids". In his valuable survey DELANCE (1974) claimed that the specimen on fig. 17 by DAVIDSON is the only typical representative of the species *Zeilleria lycetti* and later French authors (ALMÉRAS et al. 2010, ALMÉRAS & FAURÉ 2013) followed this practice. They regularly complemented the species name *lycetti* with the addition "sensu BUCKMAN, 1904". On the other hand, AGER (1959a) used a wider interpretation and included figs 17–19 of DAVIDSON (1851) as representing the species *Z. lycetti*. This was accepted by VÖRÖS & KANDEMIR (2011) and expressed by the phrase "sensu AGER". *Z. lycetti*, in any sense, has a rather indistinct external morphology; it is elongated, drop-shaped in outline, weakly biconvex and rectimarginate. The tiny specimen from Yakacik fits into this simple morphological frame; its only remarkable feature is the presence of regularly-spaced faint growth rugae.

Z. lycetti is widespread in north-west Europe but was also recorded in Turkey and (possibly) in North Africa.

On the museum label VADÁSZ identified this specimen as *Terebratula*. cfr. *erbaensis* Suess and the same name also appeared in his earlier papers (VADÁSZ 1913a, b). The present author, being familiar with that brachiopod species (*erbaensis* = *adnethensis*, see above), regards this identification as definitely erroneous.

Zeilleria cf. *mutabilis* (Oppel, 1861)
Plate II: 8

* 1861 *Terebratula mutabilis* Opp. (Waldheimia.) — OPPEL, Brachiopoden des unteren Lias, p. 538, pl. X, fig. 7.
v 1913a *Waldheimia mutabilis* Opp. — VADÁSZ, Kisázsia, p. 60.
v 1913b *Waldheimia mutabilis* Opp. — VADÁSZ, Kleinasien, p. 68.
v 1918 *Waldheimia mutabilis* Opp. — VADÁSZ, P. alpina-Schichten, p. 217.
v 2009 *Zeilleria mutabilis* (Oppel, 1861) — VÖRÖS, Bakony, p. 183, text-figs. 110, 111, pl. XXVIII, figs. 5, 6 (cum syn.).
2012 *Zeilleria mutabilis* (Oppel 1861) — HÖFLINGER, Deutsch. Lias, p. 173 + fig. (unnumbered).

Material: Seven specimens in various states of preservation.

Measurements			
L	W	T	Ch
15.0	13.8	7.7	

Remarks: Z. mutabilis, as its name indicates, has a rather variable morphology and this is why, it has frequently been cited by many classic and modern authors. Recently VÖRÖS (2009) gave a detailed description and discussion of this widespread Alpine Liassic brachiopod species. The identification of the Yakacik specimens seems satisfactorily justified.

Z. mutabilis is characteristic for the Mediterranean province, but also occurs in North Africa, the Balkans and Turkey; therefore it can be said to be cosmopolitan in its distribution.

VADÁSZ in his publications (VADÁSZ 1913a, b, 1918) listed this species. On the museum labels five of his specimens were correctly identified as "*Waldheimia mutabilis* Opp.". One further specimen (not mentioned in his publications) was identified as "*Waldheimia stapia* Opp.". However *Z. stapia* (Oppel, 1861) is significantly more biconvex and very much elongated, being subtriangular in outline as compared to *Z. mutabilis*. This specimen is figured in the present paper (Pl. 2: 8) and is regarded as a typical *Z. mutabilis*.

Zeilleria alpina (Geyer, 1889)
Plate II: 9

v* 1889 *Waldheimia alpina* nov. sp. — GEYER, Hierlatz, p. 29, pl. III, figs. 33–38.
v 2009 *Zeilleria alpina* (Geyer, 1889) — VÖRÖS, Bakony, p. 186, text-figs. 112, 113, pl. XXVIII, fig. 7 (cum syn.).
2012 *Zeilleria alpina* (Geyer 1889) — HÖFLINGER, Deutsch. Lias, p. 174 + fig. (unnumbered).

Material: Two, partly incomplete specimens.

Measurements			
L	W	T	Ch
14.5	14.9	6.0	

Remarks: Z. alpina is characterized by a subcircular outline, weak biconvexity, smooth shells and a nearly straight, slightly sulcate anterior commissure. Apart from the good illustrations in GEYER (1889) and in some modern palaeontological papers (DULAI 1992, 2003), one may rely upon the detailed revision given recently by VÖRÖS (2009). On these grounds, the identification of the Yakacik specimens seems adequate.

So far, *Z. alpina* seems to be restricted to the Mediterranean province.

VADÁSZ (1913a, b, 1918) did not mention this species in his publications. On the other hand, the museum label testifies that VADÁSZ correctly identified these specimens as "*Waldheimia alpina* Gey."

Genus *Aulacothyris* DOUVILLÉ, 1879

Aulacothyris resupinata (J. Sowerby, 1816)
Plate II: 10

* 1816 *Terebratula resupinata*. — J. SOWERBY, Mineral Conchology, II, p. 116, pl. 150, figs. 3, 4.
1851 *Terebratula resupinata*, Sow. — DAVIDSON, Oolitic and Liasic, p. 31, pl. IV, figs. 1–5.
v 1913a *Waldheimia* cfr. *Fuggeri* Böse. — VADÁSZ, Kisázsia, p. 60.
v 1913b *Waldheimia* cfr. *Fuggeri* Böse. — VADÁSZ, Kleinasien, p. 69.
v? 1918 *W.*[*aldheimia*] *furlana* Zitt. — VADÁSZ, P. alpina-Schichten, p. 217 (pars).
1959a *Aulacothyris* cf. *A. resupinata* (J. Sowerby) — AGER, Turkey, p. 1025, pl. 129, fig. 5.
1974 *Aulacothyris resupinata* (Sowerby 1816) — DELANCE, Zeilleridés, p. 317, pl. 6, figs. 14–26.
1975 *Aulacothyris resupinata* (Sowerby 1818) — COMAS-RENGIFO & GOY, Ribarredonda, p. 320, pl. 2, figs. 5, 6.
1990 *Aulacothyris resupinata* (J. Sowerby, 1816) — TCHOUMATCHENCO, Brach. jur. Kotel II., p. 35, text-figs. 21, 22, pl. XI, figs. 6–10.
? 2007 *Aulacothyris resupinata* (Sowerby, 1816) morphe *agnata* (Rollier, 1919) — ALMÉRAS et al., Algérie, p. 128, text-figs. 27–29, pl. 11, fig. 5.
2010 *Aulacothyris resupinata* (Sowerby, 1818) — ALMÉRAS et al., Massif Armoricain, p. 62, text-fig. 21.

Material: Six specimens.

Measurements			
L	W	T	Ch
13.8	10.0	5.9	3.1

Remarks: This is a well-known European zeilleriid species with an elongated oval outline, well-developed beak ridges and, most characteristically, a shallow but long dorsal sulcus which begins very posteriorly. There is a variation in the outline (DELANCE, 1974, ALMÉRAS et al. 2010): some more elongate forms have the maximum width near mid-length; in other, subpentagonal forms this maximum is shifted somewhat anteriorly. The Yakacik specimens seem transitional: they are moderately elongate but the maximum width lies rather anteriorly.

A. resupinata occurs frequently in the NW European province, but was also recorded in North Africa, the Balkans and Turkey; therefore, it can be regarded cosmopolitan in its distribution.

VADÁSZ (1913a, b, 1918) did not mention this species in his publications. On the other hand, the museum label testifies that VADÁSZ identified two specimens as "*Waldheimia resupinata* Sow.". Further two specimens have been labelled as *Waldheimia* cfr. *fuggeri* Böse, but this identification was revised because *fuggeri* stands rather close to *Bakonyithyris* Vörös, 1983 (VÖRÖS 2009). Another two specimens of the collection have been labelled by VADÁSZ as "*Waldheimia furlana* Zitt. var. *elongata* Can."; one of these specimens is figured here (Plate II: 10). However, as VÖRÖS (2009) pointed out, ZITTEL's *furlana* is definitely not a zeilleriid, but a short-looped terebratulid, and the cardinalia and loop of the variant *elongata* can be best compared to those of the Nucleatidae. Therefore the identification by VADÁSZ is here revised and also these two specimens are included with *Aulacothyris resupinata* (J. Sowerby, 1816).

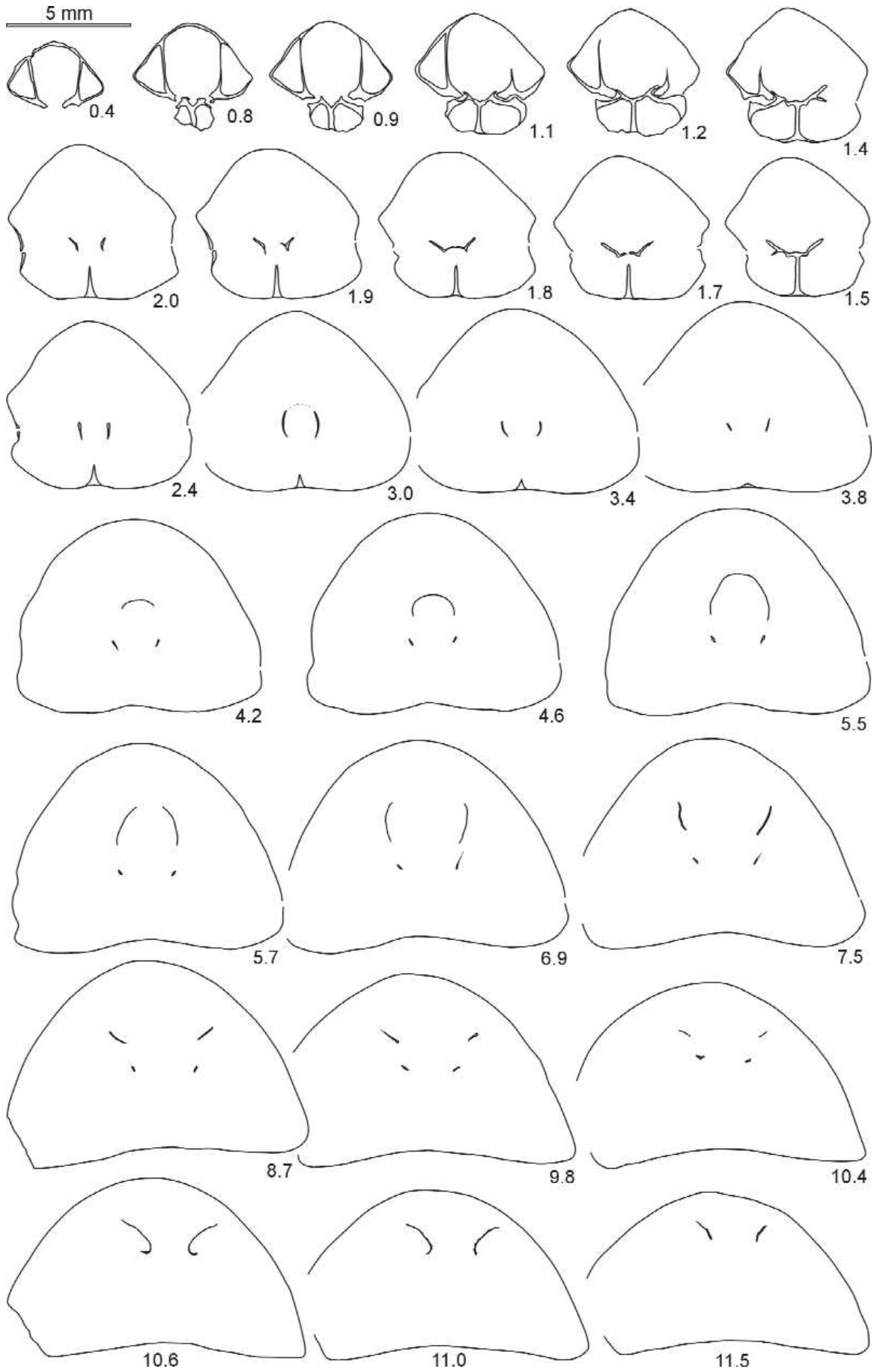
Aulacothyris anatolica (Vadász, 1913)
Plate II: 11, Figure 3.

v* 1913a *Waldheimia anatolica* nov. f. — VADÁSZ, Kisázsia, p. 61, text-fig. 5.
v 1913b *Waldheimia anatolica* nov. f. — VADÁSZ, Kleinasien, p. 69, text-fig. 6.
? 1926 *Waldheimia (Aulacothyris) salgirensis* n. sp. — MOISSEIEV, Crimea, p. 983, 993, pl. XXVIII, figs. 40–42.
? 1934 *Aulacothyris salgirensis* Mois. — MOISSEIEV, Crimea and Caucasus, p. 153, 202, pl. XIX, figs. 22–25.
1959a *Aulacothyris anatolica* (Vadasz) — AGER, Turkey, p. 1025, pl. 129, fig. 1.

Material: 15 specimens.

Measurements			
L	W	T	Ch
17.2	13.0	10.2	6.3

Description: External characters: This is a medium-sized *Aulacothyris* with an anteriorly expanded subtriangular outline. The lateral margins are sinuous; the anterior margin is deeply unisulcate. The apical angle varies between 70–80°. The maximum width is attained near the anterior margin. The ventral valve is strongly and equally convex. The dorsal valve is more inflated posteriorly. The maximum convexity lies near mid-length. The beak is moderately high and is erect to slightly incurved. The foramen is mesothyrid. The delthyrium is covered by a matrix. The ventral beak ridges are rather sharp and well-marked near the termination of the beak, but gradually disappear at the middle of the


5 mm
0.4
0.8
0.9
1.1
1.2
1.4
2.0
1.9
1.8
1.7
1.5
2.4
3.0
3.4
3.8
4.2
4.6
5.5
5.7
6.9
7.5
8.7
9.8
10.4
10.6
11.0
11.5

←**Figure 3.** *Aulacothyris anatolica* (Vadász, 1913). Twenty-seven transverse serial sections through a specimen from Yakacik (Turkey), Pliensbachian. (Paratype: J 2014.27.15.2). Distances from posterior end of shell are given in mm. The original length of the specimen is 15.5 mm

←***3. ábra.*** Aulacothyris anatolica *(Vadász, 1913). Huszonhét sorozatcsiszolati kép egy yakaciki (törökországi) pliensbachi példányról. (Paratypus: J 2014.27.15.2). Feltüntettük a héj hátulsó végétől mm-ben mért távolságokat. A példány eredeti hossza 15,5 mm*

length. The dorsal beak ridges also remain sharp to half-length. Consequently, rather narrow, and oblique planareas have developed. Within the planareas, the lateral commissures run on a sharp crest near the dorsal beak ridges. In a lateral view, the lateral commissures run obliquely and are dorsally arched. They join with a continuous curve to the unisulcate anterior commissure. The sinus is very deep and wide; usually it occupies almost the whole width of the anterior margin of the shell; it forms a U-shaped arch. There is a definite, narrow, incipient sulcus posteriorly which strongly widens anteriorly. A shallow and wide dorsal sulcus and ventral fold appear near the anterior margin. The surface of the shells is smooth.

Internal characters (Figure 3): *Ventral valve*: The delthyrial cavity is a rounded subpentagonal in cross-section. The umbonal cavities are rather subtriangular. No pedicle collar was recorded. The deltidial plates are well-developed and disjunct. The thin dental plates are subparallel. The hinge teeth are rather massive and inwardly oriented; denticula are poorly-preserved. *Dorsal valve*: The septalium is V-shaped but then it becomes rather shallow and U-shaped. The outer socket ridges are moderately wide. The inner socket ridges are narrow and sharp, and they lean well over the sockets. The hinge plates rise from the medial part of the inner socket ridges and are inclined dorsally, forming septalial plates. After separating from the inner socket ridges, the septalial plates remain connected to the dorsal median septum. The median septum is rather massive and long, surpassing the distance of the crural processes. The crura are very thin. The crural processes are crescentic in cross section. They seem to have been fused before releasing the descending branches of the loop. The loop is diploform and distally spinose; it attains 75% of the length of the dorsal valve. The descending branches are very narrow and only slightly divergent. The ascending branches are high and divergent; their anterior part is strongly convex laterally; their posterior part forms a hood-like transverse band.

Remarks: This species was described as "new form" by VADÁSZ (1913a) in Hungarian and in German (VADÁSZ 1913b). In agreement with AGER (1959a), *Aulacothyris anatolica* is regarded here as a distinct species of VADÁSZ. Its holotype (inventory number: J 2014.27.15.1) is housed in the collections of the Geological and Geophysical Institute of Hungary. Therefore an emended description of *Aulacothyris anatolica* (Vadász, 1913), complemented with an illustration of the internal features, was regarded as being relevant here.

It is necessary to note the little inconsistency in the referencing of this species by VADÁSZ. In the Hungarian text (VADÁSZ 1913a), on p. 61, the text-figure is labelled as "Fig. 5."; in fact it should be Fig. 6. In the German text (VADÁSZ 1913b), on p. 70, the text-figure is correctly labelled as "Fig. 6."

DELANCE (1974 p. 317), albeit with a question mark, put the items of *anatolica* by VADÁSZ (1913b) and by AGER (1959a) in the synonym list of *A. resupinata* (J. Sowerby) but without explanation. However, *A. anatolica* differs from *A. resupinata* due to its broad, shallow sulcus and the fact that its greatest width is near the anterior end of the shell.

The species *A.* ? *ballinensis* (Haas, 1912) stands near to *A. anatolica* but it is less elongated and its sulcus is shallower and trapezoidal.

Aulacothyris salgirensis — introduced by MOISSEIEV (1926) and written as *salghirensis* in the English text of MOISSEIEV (1934, p. 202) — is very similar externally and probably conspecific with *A. anatolica.* This view is strongly supported by the serial sections of *A. salgirensis* published by ANTOSHTCHENKO (1970). These sections especially in the case of the adult specimen (ANTOSHTCHENKO 1970, fig. 4), are particularly similar to those shown in the present paper.

VADÁSZ (1913a, b) described this species as "*Waldheimia anatolica* nov. f." and expressed some doubts about its status as a "good species". In his later publication VADÁSZ (1918) did not list this species from Yakacik. According to the museum labels, VADÁSZ probably changed his mind and identified most of his material as "*Waldheimia subdigona* Opp." Only a single specimen remained labelled as "*Waldheimia anatolica* Vad." with the remark: "original specimen" written on a red-framed label.

Distribution: A. anatolica seems to occur only in the Pliensbachian of Turkey or, considering its probable synonymy with *A. salgirensis*, perhaps also in the Crimea.

Conclusions

For the purpose of this paper, the Early Jurassic brachiopods from Yakacik (Turkey), housed at the Geological and Geophysical Institute of Hungary, were examined in detail. The taxonomic and nomenclatural revision of the 197 specimens, collected by R. MILLEKER in 1911-1912, and shortly described by VADÁSZ (1913a, b, 1918) resulted in 27 brachiopod taxa. They represent 16 genera and 23 nominal species; these have been documented by photographs and partly by serial sections.

The new brachiopod taxa introduced and illustrated by VADÁSZ (1913a, b) — *Rhynchonellina anatolica* and *Waldheimia anatolica* — were re-examined and their taxonomic positions updated as *Suessia* ? *anatolica* (Vadász, 1913) and *Aulacothyris anatolica* (Vadász, 1913), respectively.

The Early Jurassic brachiopod fauna of Yakacik has a transitional character between two major faunal provinces. Besides 4 endemic and 4 cosmopolitan species, 6 species have a NW European, and 9 species have a Mediterranean faunal affinity.

Acknowledgements

The author is indebted to Bálint PÉTERDI and the other persons in the staff of the Collection of the Geological and

Geophysical Institute of Hungary, for tracking the Yakacik material and loaning it to the author for study. The helpful advice on the taxonomy and the SEM photos of *Suessia*(?) by Alfréd DULAI are greatly acknowledged. All other brachiopod photographs were taken by Mariann BOSNAKOFF. Thanks are due to Edit LENDVAI TÍMÁR (Hungarian Geographical Museum, Érd) who provided the historical data acquired during MILLEKER's expeditions. The useful comments and corrections from the reviewers Miloš SIBLÍK and Alfréd DULAI were invaluable for the final version of this paper.

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Kézirat beérkezett: 2014. 04. 16.

Plate I — I. tábla

Early Jurassic (Pliensbachian) brachiopods from Yakacik (Turkey), collected by R. MILLEKER in 1911–1912.
Kora-jura (pliensbachi) brachiopodák a törökországi Yakacik lelőhelyről; MILLEKER R. 1911–1912-es gyűjtése.

All figures are magnified twice unless otherwise indicated; a: dorsal view, b: anterior view, c: lateral view, d: posterior view. Specimens have been coated with ammonium chloride before photography. The specimens are deposited in the collection of the Geological and Geophysical Institute of Hungary, Budapest under the inventory numbers prefixed by "J".
Az ábrák kétszeres nagyítású, a jelzett kivételekkel; a: háti nézet, b: mellső nézet, c: oldalnézet, d: hátsó nézet. A példányokat a fotózáshoz ammónium-kloriddal vontuk be. A példányokat a Magyar Földtani és Geofizikai Intézet gyűjteménye őrzi „J" előjelzetű leltári számok alatt.

1. *Apringia piccininii* (Zittel, 1869) — J 2014.1.3.1.
2. *Jakubirhynchia latifrons* (Geyer, 1889) — J 2014.2.2.1.
3. *Jakubirhynchia* ? *laevicosta* (Geyer, 1889) — J 2014.3.3.1.
4. *Calcirhynchia hungarica* (Böckh, 1874) — J 2014.7.73.1.
5. *Calcirhynchia* ? *sanctihilarii* (Böse, 1898) — J 2014.8.1.
6. *Cirpa* cf. *kiragliae* Ager, 1959 — J 2014.5.4.1.
7. *Homoeorhynchia acuta* (J. Sowerby, 1816) — J 2014.9.5.1.
8. *Homoeorhynchia acuta* (J. Sowerby, 1816) — J 2014.9.5.2.
9. *Cuneirhynchia dalmasi* (Dumortier, 1869) — J 2014.10.37.1.
10. *Cuneirhynchia dalmasi* (Dumortier, 1869) — J 2014.10.37.2.
11. *Scalpellirhynchia* cf. *scalpellum* (Quenstedt, 1851) — J 2014.11.1.
12. *Holcorhynchia meneghinii* (Zittel, 1869) — J 2014.12.4.1.
13. *Holcorhynchia yakacikensis* Ager, 1959 — J 2014.13.1.
14. *Liospiriferina alpina* (Oppel, 1861) — J 2014.15.3.1.

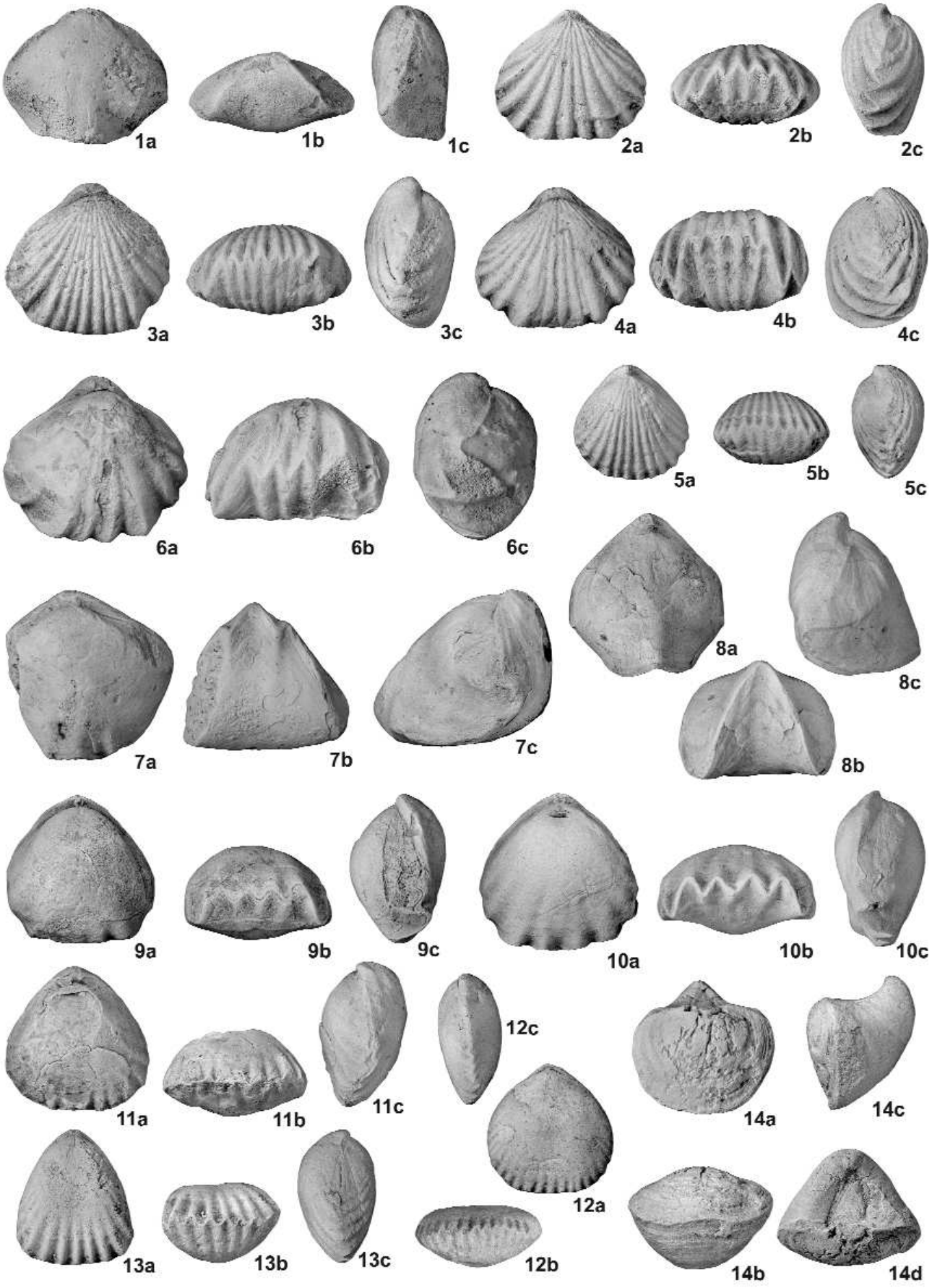
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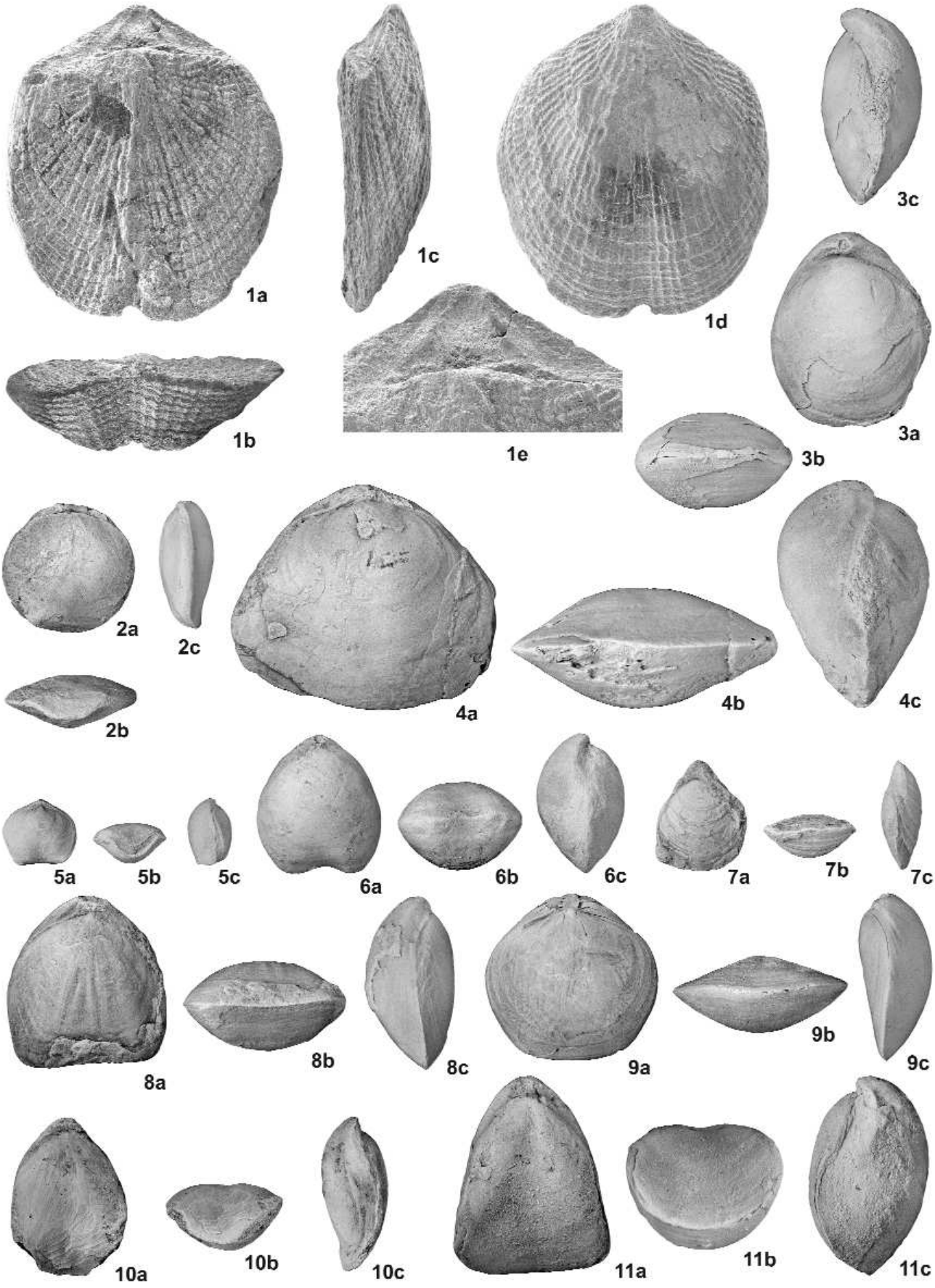
Plate II — II. tábla

Early Jurassic brachiopods from Yakacik (Turkey), collected by R. MILLEKER in 1911–1912.
Kora-jura brachiopodák a törökországi Yakacik lelőhelyről; MILLEKER R. 1911–1912-es gyűjtése.

All figures are magnified twice unless otherwise indicated; a: dorsal view, b: anterior view, c: lateral view, d: ventral view, unless otherwise stated. Specimens have been coated with ammonium chloride before photography. The specimens are deposited in the collection of the Geological and Geophysical Institute of Hungary, Budapest under the inventory numbers prefixed by "J".
Az ábrák kétszeres nagyításúak, a jelzett kivételekkel; a: háti nézet, b: mellső nézet, c: oldalnézet, d: hasi nézet, a jelzett kivétellel. A példányokat a fotózáshoz ammóniumkloriddal vontuk be. A példányokat a Magyar Földtani és Geofizikai Intézet gyűjteménye őrzi „J" előjelzetű leltári számok alatt.

1. *Suessia* ? *anatolica* (Vadász, 1913) – Holotype (holotípus); J 2014.16.1; a, b, c, d (´7.5), e: delthyrium and interarea (nyélkilépési hely és interarea) (×15, SEM photos).
2. *Orthotoma quenstedti* Buckman, 1904 – J 2014.17.1.
3. *Lobothyris* cf. *punctata* (J. Sowerby, 1813) – J 2014.18.16.1.
4. *Securithyris* cf. *adnethensis* (Suess, 1855) – J 2014.20.1.
5. *Linguithyris aspasia* (Zittel, 1869) – J 2014.21.1.
6. *Zeilleria* cf. *waterhousi* (Davidson, 1851) – J 2014.22.4.1.
7. *Zeilleria* cf. *lycetti* (Davidson, 1851) – J 2014.23.1.
8. *Zeilleria* cf. *mutabilis* (Oppel, 1861) – J 2014.24.7.1.
9. *Zeilleria alpina* (Geyer, 1889) – J 2014.25.2.1.
10. *Aulacothyris resupinata* (J. Sowerby, 1816) – J 2014.26.6.1.
11. *Aulacothyris anatolica* (Vadász, 1913) – Holotype (holotípus), J 2014.27.15.1.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