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THE LOWER CRETACEOUS AMMONITE ASSEMBLAGES AND FOSSILIFEROUS SITES IN THE DÂMBOVICIOARA REGION

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Abstract. A complete inventory of the Lower Cretaceous ammonites (some 270 species) from the region, housed in the Geological Institute of Rumania repository, is presented. These fossils were recorded in 76 fossiliferous sites, as noted in the new, more complete map of the region annexed to the paper. Besides, all the ammonites from Herbich's (1888), Simionescu's (1898), Popovici-Hatzeg's (1898), Jekelius' (1938) collections still housed in the repositories of the Geological Institute of Rumania/paleontology (nos.: IG P….), but also of the universities of Cluj-Napoca (CU….) and Iassi (IU….) and some of the University of Bucharest (BU….) were also listed with their source, as presented by the authors. As a result, it was argued the Late Berriasian age of the calcareous succession underlying the Dâmbovicioara Formation and the Late Valanginian-Early Aptian age of the latter, and is confirmed the latest Albian age of the sandy/sandstone Cretaceous cover of the area. The detailed stratigraphy of each structural compartment of the region needs still to be completed, some suggestions on this way being advanced in the paper.

Keywords: Lower Cretaceous, Ammonites, biostratigraphy, new map, Dâmbovicioara, Romania

INTRODUCTION

The paleontologic researches in the Lower Cretaceous successions of the region bounded by the Piatra Craiului and Bucegi Mts. in eastern end of the South Carpathian Getic Nappe (= "the Dâmbovicioara Couloir" in the Rumanian literature) have been started almost 150 years ago. The main papers on the matter were published by Herbich (1888), Simionescu (1898), Popovici-Hatzeg (1898), Jekelius (1938), Oncescu (1943), Patrulius (1963, 1969) and by Patrulius, Avram (1976). However, several other papers of the same or other authors and some critical remarks concerning the ammonite assemblages of the region were also issued, thus a complete history of the researches there is much larger. It was successively summarized by Oncescu (1943), Patrulius (1969) and Patrulius, Avram (1976).

The goal of this paper is to complete with the new records the ammonite assemblages published by Patrulius, Avram (1976), and to add to the revised ammonite species published by the ancient authors still preserved in visitable repositories. Besides, to put the biostratigraphic data in accordance with the recent ammonite zonations (Hoedemaeker et al., 1990-2000, etc.), and to offer a more accurate location of the ammonite fossiliferous sites, on a detailed map of the region.

To summarize the lithostratigraphic data by Patrulius, Avram (1976), the Cretaceous stratigraphy of the region includes Berriasian-?Lower Valanginian bioconstructed limestones, a transgressive Upper Valanginian-Lower Aptian calcareous and marly succession, rich in ammonites (= "the Dâmbovicioara Formation") and an uppermost Albian sandy/sandstone cover (" the Podu Dâmboviței Sandstone"), containing, only locally, scarce ammonite assemblages. Besides, an also transgressive Upper Aptian (namely, the "Gura Râului") calcareous conglomerate was identified in northwestern end of the region.

The Dâmbovicioara Formation is built up, in its lower "Cetatea Neamțului Member", by a 0.1-1.5 m thick glauconite limestone bed, followed by 5-25 m thick grained limestone, and then by some 25 m thick bioclastic-oncolithic limestones. The next in succession "Dealul Sasului Member", latest Valanginian-Hauterivian in age, is constituted of some 100 m thick marls, marlstones and cherty calcarenites with marly matrix, in places rich in glauconite. The third, last in succession, "Valea Muierii Member", latest Hauterivian-early Aptian in age, and some 90 m in thickness, is mainly built of marls and marlstones. The Dâmbovicioara Formation also includes at least four interbeds of reefal calcareous breccias, the lowermost of which ("RB1") located at the boundary between the Dealul Sasului and the Valea Muierii members (for details, see Patrulius, Avram, 1976). The accurate location of the sites is necessary as much as the region is fragmented into numerous structural compartments, partly different to one another by the detailed stratigraphy of the Lower Cretaceous successions.

AMMONITE ASSEMBLAGES

Among the still preserved ammonite collections published by the ancient authors the Herbich's one is housed in the Cluj University (registered as CU…), the Simionescu's one – in the Iassi University (IU….), in the Bucharest University (BU…) and in the Geological Institute of Rumania / paleontology (IG P), the last repository preserving also the Popovici-Hatzeg's and Jekelius' collections from Dâmbovicioara. Unfortunately, these authors' fossils, and some other gathered by the recent researchers (dr. Paulian Dumitrică, dr. Ileana Popescu, and also some ammonites from Patrulius and Avram's collection) have only a vague location, or come from alluvial deposits; consequently, they were listed

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separately here below. On the other hand, the fossils noted with asterisk come in all probabilities from the area where they are listed now, although they are unprecisely cited as recorded in some other areas, too.

In the Sasului Hill (? uppermost Tithonian-lowermost Berriasian, and Hauterivian-Barremian successions) – *Berriasella* (*Picteticeras*) aff. *elmii* LE HEGARAT (= *Perisphinctes eudichotomus*, in Popovici-Hatzeg's coll., IG P 10522), and *Phyllopachyceras infundibulum* (d'ORBIGNY) (IG P 794, 795, 10523, 20480), *Holcophylloceras?* sp. ex gr. *tethys* (d'ORBIGNY) (IG P 758, 796, 797, 13432), *Ptychophylloceras semisulcatum* (d'ORBIGNY) (IG P 10524), *Eulytoceras phestum* (MATHERON) (IG P 10519), *Protetragonites muierense* (SIMIONESCU)***** (IU Cr-b-D 1 = holotype), *Hamulina* sp. (IG P 3742, 10525), *Euptychoceras teschenense* [(HOHENEGGER) UHLIG] (IG P 14809), *Ptychoceras*? cf. *morloti* OOSTER (IG P 14815), *Crioceratites duvali* LEV. (IG P 832), *Crioceratites emerici* LEVEILLE (IU Cr-b-D 121), *C.* sp. ex gr. *C. nolani* (KILIAN) (IG P 20515), *Imerites* cf. *giraudi* (KILIAN) (IU Cr-b-D 134), *Neolissoceras grasianum* (d'ORBIGNY) (IG P 3530), *Olcostephanus (O.)* cf. *sayni* (KILIAN) (IG P 18942), *Avramidiscus* cf. *seunesi* (KILIAN) (IG P 18710), *A*. aff. *seunesi* (IG P 62), S. *intermedius* (d'ORBIGNY) (IG P 18713), *Lyticoceras* sp. (IG P 3928), *Leopoldia leopoldina* (d'ORBIGNY) (IG P 763, 764), *Barremites difficilis* (d'ORBIGNY) s. l. (IG P 782-784), *B. waageni* (SIMIONESCU) (IG P 762), *Torcapella suessi* (SIMIONESCU) (IU Cr-b-D 13 a, holotype; IG P 10520), *Melchiorites cassidoides* (UHLIG) (IG P 781, 786, 787), *Silesites vulpes* (COQAND) (IG P 757, 765), *Silesites seranonis* (d'ORBIGNY) (IG P 766).

In the Orății valley (from the Valanginian/Hauterivian boundary beds, up to the bottom of the Upper Barremian, in several structural compartments): *Phyllopachyceras cf. ladinum* (UHLIG) (IG P 13459), *P. cf. eichwaldi occidentale* WIEDMANN (IG P 13472), *Protetragonites crebrisulcatus* (UHLIG) (IG P 13778), *Anahamulina subcyncta* (UHLIG) (IG P 14821), *Hamulina cf. alpina* d'ORBIGNY (IG P 14819), *Dissimilites subalternatus* (BRESKOVSKI) (IG P 14823), *Paraspiticeras* aff. *percevali* (UHLIG) (IG P 19122), *Holcodiscus tzankovi* AVRAM (IG P 18694), *H.* aff. *fallax* (COQUAND in MATHERON) (IG P 18701), *Avramidiscus seunesi* (IG P 18708), *Astieridiscus elegans* (KAR.) (IG P 18715), *A. morleti* (KIL.) (BU 0259), *Barremites* cf. *difficilis damboviciorensis* BRESK. (IG P 18967, 18969, 18986d), *B. difficilis hemiptychus* (KILIAN) (IG P 18975), *B.* cf. *waageni* (IG P 18996), *Barremitites* cf. *strettostoma* (UHLIG) (IG P 19008), *Torcapella suessi* (IG P 17611, 19016), *Pseudohaploceras* cf. *tachthaliae* (TIETZE) (IG P19078), *Silesites seranonis seranonis* (IG P 19019), *Kotetishvilia sauvageaui* (HERMITE) (IG P 19048), *Kotetishvillia* n. sp. (IG P 19061), *Heinzia provincialis* (d'ORBIGNY) (IG P 19072, 19076).

In the Muierii Valley (Lower Barremian-Lower Aptian sequences, in two different compartments) – *Hypophylloceras*? sp. indet. (CU 5046, =*Phylloceras Gregorianum* HERBICH; CU 5044, =*Phylloceras semistriatum*, in Herbich, 1888; CU 5045, =*Phylloceras Terverii*, idem), *Phyllopachyceras* sp. (CU 5034, =*Scaphites aequalis*, ibidem; CU 5035 + 5040, =*Scaphites Meriani*, ibidem; CU 5041, =*S. apertus, ibidem*), *P. infundibulum* (CU 5036, =*Acanthoceras angulicostatum*, ibidem; IG P 11923), *P. ladinum* (UHLIG) (IU Cr-b-D 40*****; IG P 793), *P. eichwaldi* (ROUSSEAU) (IG P 13466), *Lytoceras* sp. (CU 4924, =*L. subfimbriatum*, ibidem; CU 4932, =*L. quadrisulcatum*, ibidem), *L. anisoptychum* UHLIG (IG P 13747), *L. inaequalicostatum* d'ORBIGNY (CU 4930; ? CU 4926, =*Lytoceras recticostatum,* in Herbich, 1888), *E. phestum* (IG P 13751, 13761; CU 4931, =*Lytoceras recticostastum*, idem), *E. rosii* (PARONA) (IG P 13765), *Eotetragonites* sp. ex gr. *E. duvalianus* (IG P 13785), *Protetragonites crebrisulcatus* (13777, 13780, 13783), *Costidiscus*? sp. (CU 4935, =*Lytoceras recticostatum*, ibidem), *Anahamulina* sp. (CU 4949, =*Baculites neocomiensis*, ibidem; CU 4959, =*Hamites attenuatus*, ibidem), *A.*cf. *subcincta* (IU Cr-b-D-66), *A.* cf. *boutini* [(COQAND) MATHERON] (IG P 14822, 20501), A. *glemmbachensis* IMMEL (IG P 20503), *Leptoceras svinitense* AVRAM (=*L. studeri*, in Simionescu, 1898, IU Cr-b-D 128)**,** *Crioceratites* sp. (CU 4936, =*Crioceras Duvalii*, in Herbich, 1888), *Pseudothurmannia simionescui* SARKAR (IU Cr-b-D 119, =*Crioceras angulicostatum*, in Simionescu, 1898), *Toxoceras* cf. *varusense* d'ORB. (IG P 20536), *T.* cf. *moutonianum* d'ORBIGNY (CU 4937, =*Crioceras obliquatum*, in Herbich, 1888;? CU 4939, =*C. annulare*, idem; IU Cr-b-D 14*, =*Heteroceras* n. sp. ind., in Simionescu, 1898; IG P 20532), *T.* cf. *marii* (VERMEULEN) (IG P 20535), *Audouliceras* sp. (IG P 14837), *Australiceras* sp. ex gr. *A. gigas* (SOWERBY) (IG P 14838), *Dissimilites* aff. *subalternatus* (IU Cr-b-D 122, =*Crioceras dissimile*, in Simionescu, 1898), *Toxoceratoides parvus* AVRAM (IG P 14828), *T.* cf. *royerianus* (d'ORBIGNY) (IG P 14829), *Argvethites godoganiensis* ERISTAVI (IU Cr-b-D 124, =*Crioceras furcatum,* in Simionescu, 1898; IG P 14788, 14789), *Eristavia* cf. *dicotoma* n. ssp. (IG P 14389), *Colchidites*? sp. (IG P 14392), *Simionescites* sp. (IG P 20548), *S. simionescui* AVRAM (BU 1130), *Prochelonicera albrechtiaustriae* [(HOHENEGGER) UHLIG] (IU Cr-b-D118), *P.* cf. *sporadicum* (ROUCHADZE) (IG P 20575), *Deshayesites* sp. (IU Cr-b-D 111, =*Hoplites Borowae*, in Simionescu, 1898*)*, *Holcodiscus* cf. *gastaldii* KILIAN (CU 4952, =*Crioceras Villiersianum*, in Herbich, 1888; IU Cr-b-D 99; IG P 760, 18696), *H. tzankovi* (IG P 18693), *Avramidiscus gastaldianus* (d'ORBIGNY) (CU 4943,

=*Lytoceras Stefanescuarum* HERBICH), *Barremitites strettostoma* (? CU 4910, =*Haploceras Beudanti*, in Herbich, 1888; IG P 10518, 19003), *Barremites* sp. very deformed by lateral compression (CU 4909, 4915 and 4921, =*Haploceras cassida*, in Herbich, 1888; CU 4914 and 5050, =*Haploceras difficile*, idem), *B. difficilis** (IU Cr-b-D 76), *B.* cf. *difficilis dambovicioren*sis (IG P 18971), *B. difficilis hemiptychus* (? IU Cr.-b-D 77, =*Desmoceras difficile*, in Simionescu, 1898; IG P 18981, 18985), *B.* cf. *subdifficilis* (IG P 18990), *B. waageni* (SIMIONESCU) (IU Cr-b-D 10, holotype*; ? CU 5058 = *Haploceras Parandieri*, in Herbich, 1888; IG P 761, 18997, 18998), *Torcapella suessi* (CU 6020, =*Haploceras bicurvatum*, idem), *Melchiorites* sp. (CU 4928, =*Phylloceras Calypso*, idem), *M. melchioris* (TIETZE)* (IU Cr-b-D 92), *M. muierense* (HERBICH) (CU 2048), *M.* cf. *rumanus* (KILIAN) (= *Desmoceras cassidoides*, in Simionescu, 1898*; IG P 19108, 19109), *Pseudohaploceras matheroni lateumbilicatum* AVRAM (IG P 19088), *Silesites vulpes* (CU 5029, =*Lytoceras Honnoratianum*, in Herbich, 1888; CU 5031, =*L. striatosulcatum*, idem; CU 5032, =*L. strangulatum*, ibidem; IG P 19030), *Silesites seranonis** (IU Cr-b-D 96;), *Silesites* cf. *typus* MILASCHEWITSCH (IG P 19033), *Kotetishvilia sauvageaui* (IG P 19046), *K. delanoyi* AVRAM (IG P 19059), *K. compressissima* (=*Hoplites Didayanus,* in Herbich, 1888), *Pulchellia* cf. *caicedi* (KARSTEN) (IG P 19069, 19071), *Heinzia provincialis* (IU Cr-b-D 116, =*Pulchellia provincialis* var *Lindigi*, in Simionescu, 1898), *Carstenia lindigi* (KARSTEN) (IG P 19077).

In the Zamvelei Valley (with an Upper Hauterivian sequence near the valley's mouth, but mainly – an uppermost Lower Barremian–Upper Barremian succession): *Partschichyceras* ? *stuckenbergi* (KARAKASCH) (IG P 13483), *Lytoceras subfimbriatum* d'ORBIGNY (IG P 13738), *Eulytoceras phestum* (IG P 13752), *Anahamulina* cf. *boutini* (IG P 20502), *Karsteniceras beyrichi* (KARSTEN) (IG P 20540), *Holcodiscus tzankovi* (IG P 18695), *H.* cf. *simionescui* AVRAM (IG P 18698), *Avramidiscus* aff. *vandecki* (d'ORBIGNY) (IG P 18712), *Barremites difficilis hemiptychus* (IG P 18973), *B. cf. subdifficilis* (IG P 18992), *B.* cf. *waageni* (IG P 18995), *Melchiorites* cf. *compsense* (KILIAN) (IG P 19117), *Silesites seranonis seranonis* (IG P 19022), S. vulpes (IG P 19027), *Patruliusiceras* ? cf. *trapezoidale* AVRAM (IG P 20625), *Kotetishvilia sauvageaui* (IG P 20630, 20632),.

In the Cheii Valley (Hauterivian-lowermost Aptian successions, in several structural compartments): *Phyllopachyceras ladinum* (IG P 13447), *P.* cf. *eichwaldi* (IG P 13468), *Protetragonites crebrisulcatus* (IG P 13779), *Crioceratites* ex gr. *nolani** (IU Cr-b-D 13, =*Crioceras Kiliani*, in Simionescu, 1898), *Avramidiscus* ? n. sp. (IG P 18703), *Torcapella suessi* (IG P l9012), *Melchiorites* cf. *rumanus* (IG P 19114), *M.* cf. *compsense* (IG P 19119).

From "East-Brusturet"(unprecised section): *Lytoceras anisoptychum* (IG P 13746).

In the Muierii Valley of Brusturet (Lower Hauterivian): *Lyticoceras* cf. *cryptoceras* (d'ORBIGNY) (IG P 20615).

In the Dâmbovicioara Valley, south of the homonymous village (Upper Valanginian-Hauterivian and Upper Barremian successions, in at least two different compartments): Phyllopachyceras sp. (CU 5033, =*Olcostephanus Jeannoti*, in Herbich, 1888), *Lytoceras subfimbriatum* (IG P 13735), *L.* cf. *inaequalicostatum* (CU 4930), *Pseudothurmannia* sp. (IG P 20568), *Avramidiscus gastaldianus* (d'ORBIGNY) (CU 4943, =*Lytoceras Stefanescuarum*, in Herbich, 1888), *Lyticoceras* sp. (CU 4944 + 4946, =*Hoplites cryptoceras*, idem), *Silesites seranonis* (? CU 5030, =*Perisphinctes petraeregis* HERBICH).

In the Brătoaia Valley (Hauterivian): *Euptychoceras teschenense* [(HOHENEGGER0 UHLIG] (IG P 13807) and *Crioceratites* cf. *matsumotoi* (SARKAR) (IG P 20509).

In the Izvorului Valley (Hauterivian): *Euptychoceras inornatum** (IU Cr-b-D 4, holotype), *Silesites* cf. *concretus* KARAKASCH (IG P 19034).

In the Padina Şirnei Valley (unprecised): *Ptychoceras* ? *poni* SIMIONESCU (IU Cr-b-D 3, holotype).

And finally, **in the Urzicaru Valley** (gallets in conglomerates): *Leptoceras brunneriforme* (IG P 20538) and *Melchiorites* cf. *rumanus* (IG P 19115).

Even labbeled only as coming from "**Dâmbovicioara**", some other ammonites from the Popovici Hatzeg's collection is also to be emphasized: *Berriasella (Picteticeras)* cf. *picteti* (JACOB) (= *B. callisto*, in coll., IG P 780), which, together *B.* (*P.*) aff. *elmii* from the Sasului Hill (see above), are the only proofs for the Berriasian age of the limestones underlying the Dâmbovicioara Formation. Even not so very important, the same collection in the IGR repository includes, with the same vague indication: *Melchiorites* sp. (IG P 759, =*M.* aff. *neumayri*, in coll.); *Heteroceras obliquatus* d'ORB. (IG P 2455); *Pulchellia* cf. *communis* BÜRGL (IG P 10526, = *Nicklesia pulchella,* in coll.); *Ptychoceras* sp. aff. *P. puzosianum* (IG P 10528), *Toxoceratoides* sp. (IG P 10529, =*Toxoceras royeri* in coll.).

Unfortunately, as the whole region is highly compartimented, and within these compartments the exposures are generally low and not continuous, it was not possible to realise up to now a bed-by-bed biostratigraphy in larger intervals, but only the ammonite assemblages inventory of the outcrops. The ammonite species, as listed here below, were collected from the Dealul Sasului and the Valea Muierii Members, mainly by D. Patrulius and E.

Avram, with some help from the colleagues Dr. Paulian Dumitrică, Dr. Mihai Stefănescu, Dr. Eugen Grădinaru, Dr. Iulia Lazăr, Dr. Marius Stoica, Dana Popescu-Răileanu, I. Dinică. Besides, the ammonite inventories of the two sites explored by Popovici-Hatzeg (1898) and Simionescu (1898), and by Patrulius (1969), respectively, in the Podu Dâmboviței Sandstone, are also mentioned.

From north to south, the Lower Cretaceous sites excavated so far by these researchers in the region, and their ammonite inventories are as follows (in brackets are indicated the mapping numbers of the outcrops, as written on the fossils, too):

1 (1248 P) – **right side of the Muierii Valley of Brusturet, 60 m S of the forest road climbing southwards the right slope of the Brusturet Valley:** *Crioceratites* aff. *honnoratianus* (d'ORBIGNY) (IG P 20531), *Olcostephanus (O.)* cf. *latiflexus* BAUMBERGER (IG P 18943), *O.* (*O.*) *hispanicus* (MALLADA) (IG P 20592), *O. (O.)* cf. *mittreanus* (MATHERON, non d'ORBIGNY) (IG P 20590), *O. (O.)* cf. *carpathicus* JEKELIUS (IG P 20591), *Teschenites pachydicranus* THIEULOY (IG P 18948), *T.* n. sp. aff. *T. pachydicranus* (IG P 20595), *Leopoldia leopoldina* (d'ORB.) (IG P 20611), ? a neocomitid new genus aff. *Eleniceras* (IG P 20609). **2** (1250 P) – **the same side, 130 m S of the site 1**: *Neolissoceras grasianum* (IG P 20606), *Spitidiscus* cf. *cancovi* VASICEK (IG P 20634), *Jeanthieuloyites* cf. *nodosus* (MANDOV) (IG P 20633), *Neocomites (Teschenites) pachydicranus* (IG P 18948), *Eleniceras* cf. *transylvanicum* (JEKELIUS) (IG P 20601), ? a new neocomitid genus aff. *Eleniceras* (IG P 20607), *Olcostephanus (O.) carpathicus* (IG P 18945). **3** (1222 P) - **the path going down southwards from the Cuibul Uliului Glade, 270 m N of its crossing with the forest road mentioned above:** *Pseudothurmannia* cf. *mortilleti* (PICTET & de LORIOL) (IG P 20561), *P.* cf. *catulloi* (PARONA) (IG P 20564). **4** (1223 P) –**the same path, 250 m N of the crossing:** *Crioceratites* ? cf. *elegans* (d'ORBIGNY) (IG P 20527). **5** (1227 P) – **idem, just near the crossing:** *Neolissoceras grasianum* (IG P 20583). **6** (1175 P) –**left slope of the Brusturet Valley, some 100 m E from the waterway and 150 m N of the Ciocanu Valley:** *Avramidiscus* cf. *gastaldianus* (IG P 20635), *Pseudohaploceras* ? sp. (IG P 19090). **7** (1155 P) – **the Ciocanu valley, 150 m upstream its mouth:** *Arnaudiella* cf. *anglesense* VERMEULEN (IG P 19041).**8** (910 P) – **the street along the right slope of the Padina Şirnei Valley, some 460 m N of its mouth, in the Dâmbovicioara village:** *Eulytoceras phestum* (IG P 13754), *Lytocrioceras* ? n. sp. aff. *L. vocontiense* EBBO ET AL. (IG P 20497), *Dissimilites* n. sp. (IG P 14826), *Melchiorites blayaci* (KILIAN) (IG P 19105), *Patruliusiceras gracile* AVRAM (IG P 19035), *Kotetishvilia sauvageaui* (IG P 19057, =*Subpulchellia plana*, in coll.). **9** (912 P) - **85 m south of the site 8, on the same street:** *Kotetishvilia sauvageaui* (IG P 19058, =*S. plana*, in coll.), *Barremites difficilis hemiptychus* (IG P 18982). **10** (915 P) – **left bank of the Padina Şirnei Valley, 10 m upstream the path near its mouth:** *Costidiscus* cf. *nodosostriatus* UHLIG (IG P 14153), *Dissimilites* cf. *trinodosus* (d'ORBIGNY) (IG P 14825), *Heinzia (H.?) provincialis* (IG P 19073), *H.* cf. *provincialis* (IG P 19074). **11** (534 + 537 P) – **left side of the Izvorului Valley, near the boundary with the Jurassic limestones from the Vântarnița Summit:** *Protetragonites quadrisulcatus* (d'ORB.) (IG P 13766), *Euptychoceras* cf. *inornatum* SIMIONESCU (IG P 14813). **12** (556 + 560 + 1360 P) – **right bank of the Dâmbovicioara Valley, between 50-100m south of the Izvorului Valley mouth:** *Phyllopachyceras* cf. *bulgaricum* (IG P 20483), *Euptychoceras teschenense* (IG P 14810), *E. inornatum* (IG P 14812), *Neolissoceras grasianum* (IG P 20584), *Spitidiscus* cf. *darderi* (FALLOT & TERMIER) (IG P 20638). **13** (200A) – **the same bank, face to the Zamvelei Valley mouth:** *Lytoceras* cf. *subfimbriatum* (IG P 20490), *Neolissoceras desmoceratoides* WIEDMANN (IG P 20587), *Olcostephanus (O.) thieuloyi* AUTRAN (IG P 20594), *O. (O.)* cf. *mittreanus* (IG P 20589), *Rodighieroites* cf. *cardulus* COMPANY (IG P 20610), *Criosarasinella* cf. *furcillata* THIEULOY (IG P 20600), Oosterella ondulata REBOULET (IG P 20617). **14** (199 A +246 A +1359 P) – **right slope of the Dâmbovicioara Valley, from 60 to 150 m upstream the Brătoaia Valley mouth:** *Eulytoceras phestum* (IG P 19491), *Eristavia dichotoma* (ERISAVI) (IG P 14385), *E. dichotoma* n. ssp. (IG P 14386, 14387), *E.* aff. *tvishiensis* KAKABADZE (IG P 14390), *Procheloniceras sporadicum* (IG P 19600), *Barremitites* cf. *strettostoma* (IG P 19010), *Silesites seranonis seranonis* (IG P 19023). **15** (572 +573 P) – **right slope of the Zamvelei Valley, near its mouth** (just above the RB1 reefal limestone): *Holcophylloceras* ? ex gr. *tethys* (d'ORBIGNY) (IG P 13433), *Euptychoceras inornatum* (IG P 14811), *Hamulina* cf. *alpina* d'ORBIGNY (IG P 14817), *Paraspinoceras* cf. *pulcherrimum* (d'ORBIGNY) (IG P 14530), *Melchiorites* cf. *compsense* (IG P 19118). **16** (23 A + 24 A) – **the Zamvelei Valley, at 470 m and 500 m upstream its mouth:** *Torcapella suessi* (IG P 19011), *Melchiorites* cf. *rumanus* (IG P 19110a) *Heinzia provincialis* (IG P 20628), and respectively: *Avramidiscus* cf. *vandecki* (IG P 20637), *Torcapella* cf. *falcata* BUSNARDO (IG P 20620), *Melchiorites* cf. *uhligi* (HAUG) (IG P 19102), *M.* cf. *blayaci* (IG P 19106), *M.* cf. *rumanus* (IG P 19110b), *Silesites vulpes* (IG P 19029), *Nicklesia* ? sp. (IG P 19044), *Pulchellia (P.)* cf. *multicostata* (IG P 19065), *Heinzia (H.)* sp. (IG P 19075). **17** (25 A) – **same valley, 530 m upstream its mouth:**

Phyllopachyceras cf. *ladinum* (IG P 13457 +13458), *P.* cf. *eichwaldi* (IG P 13467), *P.* cf. *eichwaldi occidentale* (IG P 13471 + 13473), *P.* n. sp. (IG P 13478), *Eulytoceras phestum* (IG P 13753), *Holcodiscus* cf. *caillaudianus* (d' ORBIGNY) (IG P 18689), *Barremites* cf. *difficilis damboviciorensis* (IG P 18968), *Melchiorites* cf. *rumanus* (IG P 19110c). **18** (28 A) – **idem, left bank at 1 km upstream its mouth:** *Phyllopachyceras* cf. *vergonsense* DELANOY & JOLY (IG P 20485), *P.*n. sp. (IG P 20486), *Ancyloceras* cf. *vandenheckii* ASTIER (IG P 14834), *A.* n. sp. aff. *A. vandenheckii* (IG P 20545), *Barremites difficilis hemiptychus* (IG P 18973 a), *Silesites* cf. *vulpes* (IG P 19031), *Patruliusiceras* sp. (IG P 19037). **19** (1A) – **the "classic" Muierii Valley** (left tributary of the Izvorului Valley, south of the Dâmbovicioara village)**, 230 m upstream its mouth:** *Holcophylloceras* cf. *ernesti* (UHLIG) (IG P 13489), *Eulytoceras phestum* (IG P 13756), *Costidiscus tardus* AVRAM (IG P 13798), *Macroscaphites* cf. *tirolensis* UHLIG (IG P 14161). **20** (3 A) – **right bank of the Muierii Valley, 400 m upstream its mouth: a**) in a lower layer - *Phyllopachyceras* cf. *ladinum* (IG P 13456), *Partschiceras*? *stuckenbergi* (IG P 13482), *Protetragonites* cf. *crebrisulcatus* (IG P 13776), *Barremites* cf. *difficilis damboviciorensis* (IG P 18970), *B. difficilis hemiptychus* (IG P 18981a), *Kotetishvilia* cf. *changarnieri* (SAYN) (IG P 19052), *Kotetishvilia* cf. *compressissima* (d'ORBIGNY) (IG P 19053), *K.* cf. *brevicostata* (KOTETISHVILI) (IG P 19056), *K. sauvageaui* (IG P 19057), *Pulchellia* cf. *communis* (IG P 19066); **b**) same outcrop, some 1 m above - *Karsteniceras pumilum* (UHLIG) (IG P 14796), *Leptoceras subtile* UHLIG (IG P 14798), *L.* cf. *brunneriforme* AVRAM (IG P 14799), *Holcodiscus simionescui* (IG P 18697), *H. diversecostatus* (COQAND) (IG P 18699), *H. geronimaeformis* TZANKOV (IG P 20640), *H. ziczac* KARAKASCH (IG P 20642), *Avramidiscus oosteri* (SARASIN & SCHÖNDELMAYER) (IG P 18702), *A. seunesi* (IG P 18709), *Nicklesia* ? sp. (IG P 19043). **21** (5+90 A) – **the same bank of the Muierii Valley, 570 m upstream its mouth:** *Phyllopachyceras eichwaldi occidentale* (IG P 13475), *Eulytoceras phestum* (IG P 13758), *Protetragonites crebrisulcatus* (IG P 13775), *Lithancylus tirolensis* CASEY (IG P 14528), *Silesites seranonis seranonis* (IG P 19020), **continued 10 m upstream, in the same bank and layer**(6 A)**:** *Protetragonites* cf. *crebrisulcatus* (IG P 13774) and *Colchidites ?* sp. (IG P14392) **and also, 30 m further** (7 A)**:** *Barremitites* cf. *strettostoma* (IG P 19004). **22** (8 A) – **left bank of the Muierii valley, 640 m upstream the valley's mouth:** *Partschiceras* ? *stuckenbergi* (IG P 13484), *Parancyloceras meridionale* AVRAM (IG P 14805, 14806), *Silesites seranonis seranonis* (IG P 20622), *S.* cf. *vulpes* (IG P 20623). **23** (9 A+20) – **the Muierii Valley left bank and thalweg, 680 m from its mouth:** *Eulytoceras phestum* (IG P 13732), *Costidiscus recticostatus* (d'ORBIGNY) (IG P 14148), *Macroscaphites* sp. (IG P 14160). **24** (11 A) – **left bank and thalweg-right bank of the Muierii Valley, 730-740 m from its mouth:** *Eulytoceras phestum* (IG P 13760), *Protetragonites crebrisulcatus* (IG P 13781), *Eotetragonites* sp. ex gr. *E. duvalianus* (d'ORBIGNY) (IG P 13784), *Costidiscus recticostatus* (IG P 14149), *C.* cf. *olcostephanoides* UHLIG (IG P 14156), *Hamulinites* cf. *munieri* NICKLÈS (IG P 14793), *Audouliceras thomeli* AVRAM (IG P 11961), *Simionescites* sp. (IG P 11965), *Barremitites* cf. *strettostoma* (IG P 19005), *Pseudohaploceras douvillei* (FALLOT) (IG P 19081, 19613), *P.* aff. *matheroni* (d'ORBIGNY) (IG P 19087), *Pseudohaploceras* sp. (related both to *Pseudohaploceras* and *Valdedorsella*) (IG P 19089 a), *Valdedorsella* sp. (IG P 19094). **25** (11' A) – **the right side of the Muierii Valley, in a creek, some 40 m above the site 24:** *Argonauticeras* cf. *belliseptatum* (ANTHULA) (IG P 20494), *Audouliceras thomeli* (IG P 11962), *Toxoceratoides depressus* AVRAM (IG P 14831, 14832), *Argvethites* cf. *minor* (ROUCHADZE) (IG P 20548), *Silesites* aff. *seranonis trajani* (TIETZE) (IG P 19024) and *Melchiorites* sp. (IG P 19099). **26** (12 A) – **left bank of the Muierii Valley, 760 m upstream its mouth, just above a 1,5 m thick white calcarenite:** *Macroscaphites* sp. (IG P 14159 a). **27** (13 A) – **left bank of the Muierii Valley, some 800 m upstream its mouth:** *Phyllopachyceras* cf. *ladinum* (IG P 13461, 13463), *P. eichwaldi occidentale* (IG P 13476), *Eulytoceras* cf. *raricinctum* (UHLIG) (IG P 13763), *Protetragonites crebrisulcatus* (IG P 13782), *Argonauticeras* cf. *belliseptatum* (IG P 20495), *Costidiscus* cf. *nodosostriatus* (IG P 14154), *C.* cf. *olcostephanoides* (IG P 14155), *Toxoceratoides* cf. *starrkingi* (ANDERSON) (IG P 14830 a), *T.* aff. *depressus* (IG P 14833), *Audouliceras* cf. *collignoni* (SARKAR) (IG P 20546), *Simionescites princeps* AVRAM (IG P 11963, 11964), *Prochelonicera albrechtiaustriae* [(HOHENEGGER) UHLIG] (IG P 20576), *Deshayesites planus planus* CASEY (IG P 18802 a), *D. planus_pyritosus* CASEY (IG P 18804 a), *D. luppovi* BOGDANOVA (IG P 18805), *D.* aff. *saxbyi* CASEY (IG P 18813), *D.* cf. *topleyi* SPATH (IG P 18815), *D. bogdanovae* AVRAM (IG P 18818, 18819), *Barremitites strettostoma* (IG P 19002), *Pseudohaploceras* aff. *matheroni* (IG P 19086), *Melchiorites* cf. *melchioris* (IG P 19096 a). **28** (+13 A) – **the same valley right bank, 830 m upstream its mouth:** *Phyllopachyceras* cf. *eichwaldi* (IG P 13469), *Eulytoceras phestum* (IG P 13757, 13758), *Costidiscus microcostatus* SIMON0VICS, BATSEVICS & SOROKIN (IG P 14157), *C.* cf. *olcostephanoides* (IG P 14155), *Macroscaphites* sp. (IG P 14159 b), *Ptychoceras laeve* MATHERON (IG P 14814), *Deshayesites weissi* (NEUMAYR &

UHLIG) (IG P 18791), *D. weissiformis* BOGDANOVA (IG P 18794), *D. cf. similis* BOGDANOVA (IG P 18795), *D.* aff. *oglanlensis* BOGDANOVA (IG P 18796), *D. multicostatus* (SWINNERTON) (IG P 18797), *D. gracilis* CASEY (IG P 18798), *D. latilobatus* (SINZOW) (IG P 18800), *D. planus planus* (IG P 18802 b), *D. planus pyritosus* (IG P 20573), *D. aff. luppovi* (IG P 18806), *D. planicostatus* BOGDANOVA (IG P 18807), *D.* aff. *planicostatus* (IG P 18808), *D. forbesi* CASEY (IG P 18809), *D.* aff. *normani* CASEY (IG P 18814 a), *D. pygmaeus* CASEY (IG P 18817), *D.* sp. (M) ex gr. *D. topleyi* (IG P 20573), *Pseudohaploceras liptoviense* (ZEUSCHNER) (IG P 17605, 19080), *P. douvillei* (IG P 19082), *P.* aff. *douvillei* (IG P 19083) *Patruliusiceras* ? cf. *trapezoidale* (IG P 20626, 20627). **29** (15 A) – **left bank of the Muierii Valley, 875 m from the mouth, or 55 m upstream the site 28:** *Toxoceratoides* aff. *starrkingi* (IG P 14830 b), *Deshayesites planus planus* (IG P 18802 c), *D. planus pyritosus* (IG P 18804 b), *Melchiorites* cf. *melchioris* (IG P 19096 b). **30** (16 A) – **left slope of the Muierii Valley, 960 m from its mouth, near a spring:** *Pseudocrioceratites gradinarui* AVRAM (IG P 19543), *Pseudohaploceras ?* sp. (displaying common features with both *Pseudohaploceras* and *Valdedorsella* genera) (IG P 19089 b). **31** (U2 A) – **above the the old commercial road Rucăr-Bran, at the Zamvelei Valley spring:** *Holcophylloceras* aff. *sabliense* KARKASCH (IG P 13448), *Toxoceratoides* cf. *fustiformis* (v. KOENEN) (IG P 14824), *Toxoceratoides* sp. (IG P 20547), *Heteroceras* sp. (IG P 20550), *Imerites* cf. *giraudi* (KILIAN) (IG P 14384), *Eristavia* cf. *dichotoma* (IG P 14388), *Eristavia* ? n. sp. (IG P 14391), *Barremites difficilis hemiptychus* (IG P 18973 c), *Barremitites* cf. *strettostoma* (IG P 19009), *Pseudohaploceras liptoviense* (IG P 19079). **32** - **a) below the RB2 reefal breccia in the path northwards from the Dl. Sasului Inn , 150 m SE of the old commercial road Rucăr-Bran** (256 P)**:** *Phyllopachyceras* n. sp. (IG P 13477), *Barremitites* cf. *strettostoma* (IG P 19005a), *Barremites* n. sp. (IG P 19006 b), and also **b) 25 m north-eastwards, on the same path** (254 P)**:** *Barremites difficilis hemiptychus* (IG P 18979). **33** (243 P) – **right slope of the Orății Valley, 350 m north-westward from the Bran-Rucăr road and 100 m below the site 32:** *Leptoceras brunneriforme* (IG P 20537). **34** (30 A+ 25) –**right bank of the Orății Valley, 75 m upstream the old commercial road Rucăr-Bran, below (north of) the Neamțului Fortress ruins:** *Neolissoceras grasianum* (IG P 20582), *Olcostephanus (O.) hispanicus* (IG P 18946), *Teschenites* cf. *jodariensis* (DOUVILLE) (IG P 20597). **35** (33'A + 34) – **the right bank and the thalweg of the Orății valley, between 230 and 260 m upstream the site 34:** *Hamulina* cf. *alpina* (IG P14819), *Olcostephanus (O.)* sp. (IG P 18947). **36** (38 A) – **the Orății Valley thalweg and left bank, 1015 m upstream the site 34:** in a lower level (-38 A), - *Phyllopachyceras* n. sp. (IG P 20487), *Argonauticeras* ? cf. *vogdti* (KARAKASCH) (IG P 20496), *Anahamulina* cf. *silesiaca* (UHLIG) (IG P 20499), *Avramidiscus* cf. *andrussowi* (KARAKASCH) (IG P 20636), *Barremites* cf. *subdifficilis* (KARAKASCH) (IG P 18991 a), *Melchiorites* aff. *fallaciosus* (KILIAN) (IG P 19100), *Silesites vulpes* (IG P 19025), *Kotetishvilia sauvageaui* (IG P 19047), *Coronites* cf. *coronatoides* (SAYN) (IG P 20629) and, in an upper level (38 A) - *Phyllopachyceras ladinum* (IG P 13452), *Eulytoceras phestum* (IG P 13755), *E.* cf. *raricinctum* (IG P 13764), *Protetragonites crebrisulcatus* (IG P 13772), *Costidiscus nodosostriatus* (IG P 14152), *Ptychoceras* ? *poni* SIM. (IG P 20508), *Anahamulina* n. sp. (IG P 20505), *Toxoceras* cf. *marii* (VERMEULEN) (IG P 20534), *Ancyloceras* cf. *vandenheckii* (IG P 20544 a), *A. mojsisowiczi* HAUG (IG P 14836), *Barremites difficilis hemiptychus* (IG P 18972 a, 18983), *B. difficilis damboviciorensis* (IG P 18986 a), *B.* cf. *subdifficilis* (IG P 18991 b), *Barremitites* cf. *strettostoma* (IG P 19007 a), *Melchiorites cf. compsense* (IG P 19116), *Silesites vulpes* (IG P 17610), *Kotetishvilia brevicostata* (IG P 19055), *Nicklesia* cf. *pseudokarsteni* BÜRGL. (IG P 19068), *Pulchellia* cf. *caicedi* (KARSTEN) (IG P 19070), *Heinzia* cf. *sayni* HYATT (IG P 20544 b). **37** (40 A+ 90) – **the Orății Valley, 225 m upstream the site 34:** *Lytoceras densifimbriatum* UHLIG (IG P 13748), *L.* cf. *puezanum* HAUG (IG P 13751), *Torcapella* cf. *suessi* (IG P 19014). **38** (41 A + 43 A) – **the Orății Valley, 45 m downstream, and 65 m upstream, respectively, from the left tributary goind down from the water-prize of the Dl. Sasului inn**, both of them in the same layer: *Neolissoceras grasianum* (IG P 20586) and *B. difficilis damboviciorensis* (IG P 18986 b), and *Phyllopachyceras* cf. *bulgaricum* (IG P 13465), *Holcodiscus diversecostatus* (IG P 18700), *Barremites difficilis hemiptychus* (IG P 18972 b), *B.* cf. *subdifficilis* (IG P 18991 c), *Melchiorites* ? cf. *karakaschi* (SIMIONESCU) (IG P 19107 a), *M.* cf. *rumanus* (IG P 19111 a), *Silesites vulpes* (IG P 19026), respectively. **39** (44 A + 45 A) – **the thalweg and right bank of the Orății Valley, some 40-65 m upstream the site 38:** *Protetragonites crebrisulcatus* (IG P 13773), *Holcodiscus* cf. *caillaudianus* (IG P 18692 a), *Barremitites* cf. *strettostoma* (IG P 19007 b), *Barremites difficilis hemiptychus* (IG P 18972 c), *Torcapella* cf. *suessi* (IG P 19015), *Melchiorites* cf. *rumanus* (IG P 19111 b), *K.* cf. *compressissima* (IG P 19060), *Kotetishvilia* aff. *nicklesi* HYATT (IG P 19063). **40** (46 A=266P) – **right bank of the Orății Valley, 180 m upstream the left tributary from the site 38:** *Eoleptoceras* cf. *parvulum* (UHLIG) (IG P 14790, 20541), *Leptoceras* sp. (IG P 14800), *Karsteniceras pumilum* (IG P 14797), *Barremites*

difficilis dambovicioarensis (IG P 18986 c). **41** (47 A) –**right bank of the Orății Valley, 220 m upstream the same tributary:** *Anahamulina* cf. *capellini* [(COQUAND) MATHERON] (IG P 20504). **42** (414 P) –**back to a winter-stable on the Sasului Hill, 400 m E of the Dl. Sasului Inn and 150 m SE from the Bran-Rucăr highway:** *Holcophylloceras* cf. *ponticuli* (ROUSSEAU) (IG P 20479), *Phyllopachyceras ladinum* (IG P 20481), *Partschiceras* ? cf. *winkleri* (UHLIG) (IG P 13486), *P.* ? *stuckenbergi* (IG P 13481), *Lytoceras subfimbriatum* (IG P 13733), *Protetragonites quadrisulcatus* (IG P 13767), *P.* cf. *crebrisulcatus* (IG P 13770), *Anahamulina* sp. (IG P 20506), *Hamulina* cf. *alpina* (IG P 14818), *Crioceratites krenkeli* BRAGA non SARKAR (IG P 17607), *C. nolani* (IG P 20514), *C.* n. sp. (IG P 20516-20518), *C. basseae* (SARKAR) (IG P 20521), *C.* cf. *pseudothurmanni* DIMITROVA (IG P 20512), *C.* cf. *binelli* ASTIER (IG P 20524), *C.* cf. *ibizensis* WIEDMANN (IG P 20523), *Pseudothurmannia* cf. *sarasini* SARK. (IG P 20556), *P.* cf. *belimelense* DIMITROVA (IG P 20559), *P. ohmi* (WINKLER) (IG P 20554), *Paraspinoceras jourdani* (ASTIER) (IG P 14529), *P.* cf. *pulcherrimum* (IG P 14531). **43** (213 P) –**230 m S of the Dl. Sasului Inn, on the Sasului Hill:** *Torcapella* cf. *suessi* (IG P 19013). **44** (2+3+5P) – **along the cutting of Bran-Rucăr highway east of the Dl. Sasului Inn, up to 50 m NNE of its water-prize:** *Phyllopachyceras* cf. *ladinum* (IG P 13455), *Leptoceras* sp. (IG P 14803 = 5P), *Holcodiscus* cf. *gastaldii* KILIAN (IG P 20641 =2P), *Melchiorites* cf. *rumanus* (IG P 19112), *Kotetishvilia sauvageaui* (IG P 19049 = 3P). **45** (8P) – **around the water-prize of the Dl. Sasului Inn and just above it, in the cutting of Bran-Rucăr highway:** *Barremites* cf. *subdifficilis* (IG P 18993), *Melchiorites* cf. *rumanus* (IG P 19112), *M.* ? cf. *karakaschi* (IG P 19107 b), *Silesites vulpes* (IG P 19027), *Patruliusiceras* sp. cf. *P. gracile* (IG P 19039), *Kotetishvilia compressissima* (IG P 19054), and *Leptoceras* aff. *brunneriforme* (IG P 20539), *Eoleptoceras* sp. (IG P 20542), *Melchiorites melchioris* (IG P 19095), respectively. **46** (75 A) – **the cutting of the Bran-Rucăr highway 15 m S of its bend above the water-prize :** *Lytoceras subfimbriatum* (IG P 13736), *Lytocrioceras* ? sp. (IG P 20498), *Melchiorites* cf. *fallaciosus* (IG P 19101), *Patruliusiceras* aff. *gracile* (IG P 19036), *Nicklesia* cf. *karsteni* (UHLIG) (IG P 19042). **47** (77 A) – **the same cutting, 325 m SW of the Dl. Sasului Inn:** *Holcodiscus caillaudianus* (IG P 18690). **48** (78 A) – **idem, in the right slope of a left tributary of the Orății Valley:** *Holcophylloceras* ex gr**.** *milaschewitschi* (KARAKASCH) (IG P 20488), *Phyllopachyceras* cf. *ladinum* (IG P 13453), *P.* cf. *vergonsense* (IG P 13479), *Lytoceras subfimbriatum* (IG P 13737), *L.* aff. *subsequens* KARAKASCH (IG P 13741), *L. anisoptychum* (IG P 13743), *Protetragonites* aff. *muierensis* (IG P 20493), *Hamulina* cf. *alpina* (IG P 14820), *H.* cf. *astieriana* d'ORB. (IG P 20507), *Crioceratites maghrebiensis* IMMEL (IG P 20519), *C.* cf. *paramahansai* (SARKAR) (IG P 20520), *C.* ? *munieri* (SARASIN & SCHÖNDELMAYER) (IG P 20530), *Pseudothurmannia mortilleti* (IG P 20562), *P.* aff. *mortilleti* (IG P 17606), *P.* cf. *simionescui* (IG P 20565), *P.* cf. *sarasini* (IG P 20555), *P.* aff. *sarasini* (IG P 20557), *P. belimelense* (IG P 20558), *P. ohmi* (IG P 20551, 20552), *P.* cf. *catulloi* (IG P 20563), *P. pseudomalbosi* (SAR. & SCHÖND.) (IG P 20566), *P.* cf. *simionescui* (IG P 20565), *P.* cf. *grandis* BUSNARDO (IG P 20572), *Pseudothurmannia* spp., macroconcs of ? *P. catulloi* (IG P 20570) and ? *P. ohmi* (IG P 20571), *Karsteniceras* cf. *beyrichi* (IG P 14804), *Hamulinites munieri* (IG P 14792), *H. nicklesi* AVRAM (IG P 14794, 14795), *Paraspiticeras* sp. (IG P 19120, 19598), *P. guerrinianum* (d'ORBIGNY) (IG P 19121), *Neolissoceras grasianum* (IG P 20585), (!) a *Spitidiscus* example very related to *S. meneghinii* [(de ZIGNO) RODIGHIERO] (IG P 18707), *Barremites difficilis hemiptychus* (IG P 18976), *B.* cf. *waageni* (IG P 18999), *Melchiorites* cf. *uhligi* (IG P 19103), *Buergliceras favrei* (OOSTER) (IG P 19040); **and 80 m farther southwards on the same highway:** *Lytoceras subfimbriatum* (IG P 20489). **49** (96 P) – **150 m above the highway. on the left side of the Orății Valley tributary from the site 48:** *Melchiorites* cf. *karakaschi* (IG P 19107 c), *Kotetishvilia* cf. *changarnieri* (IG P 19051). **50** (35 P) – **the cutting of the Bran-Rucăr highway, at its bend 300 m W of the site 48** (sequence of cherty calcarenites)**:** *Lytoceras* aff. *strambergense* ZITTEL (IG P 13742). **51** (40 P) – **the same cutting, 150 m farther vestwards:** *Holcodiscus* cf. *caillaudianus* (IG P 18692 b). **52** (42 + 43 P) - **just before (above) the bend rightwards of the Bran-Rucăr highway, 1.5 km W of the Dl. Sasului Inn:** *Crioceratites* sp. (with very open spire) (IG P 20529), *Olcostephanus* sp. ex gr. *O. hispanicus* (IG P 20593), *Spitidiscus intermedius* (IG P 20639), *S. meneghinii* (IG P 17604), *Teschenites* cf. *flucticulus* THIEULOY (IG P 20596), *Leopoldia leopoldina* (IG P 18954), *L.* cf. *laevigata* BUSNARDO (IG P 20612), *Eleniceras* sp. (infantile) (IG P 20603), *Saynella* aff. *clypeiforme* (d'ORBIGNY) (IG P 20621). **53** (50 P) – **southern slope of the Sasului Hill, 80 m SSW of the site 52:** *Lytoceras densifimbriatum* (IG P 13749). **54** (55 P) - **same slope, but 300 m SSW from the site 52:** *Lytoceras subfimbriatum* (IG P 13734), *Barremites* cf. *difficilis hemiptychus* (IG P 18978), *Melchiorites* cf. *uhligi* (IG P 19104). **55** (113 P) – **the cutting of the Bran-Rucăr highway, 250 m NNE of the site 52:** *Phyllopachyceras ladinum* (IG P 13451), *Partschiceras* ? cf. *winkleri* (IG P 13485), *Holcophylloceras* ? ex gr. *tethys* (IG P 13431),

Protetragonites quadrisulcatus (IG P 13769), *Bochianites oosteri* [(SARASIN & SCHÖNDELMAYER] (IG P 14816), *Neolissoceras grasianum* (IG P 20580), *Saynella clypeiformis* (IG P 18964), and also *Barremites* cf. *difficilis hemiptychus* (IG P 18984), recorded in northern end of the same exposure (114 P); besides, *Olcostephanus* (*Jeannoticeras)* cf. *jeannoti* (d'ORB.) (IG P 18941), gathered in the bottom of the marly succession, below the highway (1353 P). **56** (121 P) – **the cutting of the same highway, 400 m NNE of the site 52 (just after a winding leftwards):** *Holcophylloceras* aff. *sabliense* (IG P 13447), *Phyllopachyceras* aff. *ladinum* (IG P 13462), *Lytoceras* cf. *puezanum* (IG P 13750), *Holcodiscus* cf. *caillaudianus* (IG P 18691), *Avramidiscus* cf. *oosteri* (IG P 18706), *A. vandecki* (IG P 18711), *Barremites* sp. (IG P 18988), *Kotetishvilia sauvageaui* (IG P 19045), *K.* cf. *changarnieri* (IG P 19050), *K. aff. nicklesi* (IG P 19062), *Arnaudiella* ? cf. *schlumbergeri* (NICKLES) (IG P 19064); besides, *Pseudothurmannia* sp. (IG P 29569), recorded below the highway, in the same compartment. **57** (133P +135 P) – **idem, at some 250 m WSW (below) the next winding leftwards of the route, in both sides of the creek going down nearby the sites 48 and 56:** *Leptoceras* sp. (IG P 14801), in the right side, and *Phyllopachyceras* cf. *eichwaldi* (IG P 20484), *P.* cf. *eichwaldi occidentale* (IG P 13474), *Lytoceras anisoptychum* (IG P 13745), *Protetragonites crebrisulcatus* (IG P 13771), *Anahamulina* cf. *silesiaca* (IG P 20500), *Eoleptoceras* cf. *parvulum* (IG P 14791), *Barremites* cf. *fallotiformis* (IG P 18989), *Torcapella* cf. *davidovi* [(TRAUTSCHOLD) KARAKASCH] (IG P 19017), *Melchiorites* cf. *rumanus* (IG P 19113), *Silesites* cf. *vulpes* (IG P 19032), *Patruliusiceras* ? cf. *uhligi* AVRAM (IG P 19038), in the left side. **58** (152 P) – **idem, just in the locally doubled highway above the Neamțului fortress ruins:** *Phyllopachyceras* cf. *ladinum* (IG P 13454), *P.* cf. *vergonsense* (IG P 13480), *Protetragonites* ? cf. *muierensis* (IG P 20492), *Crioceratites* cf. *emerici* (IG P 20526), *Paraspinoceras* cf. *pulcherrimum* (IG P 20543). **59** (80 A) –**the left slope of the Orății Valley, under the Bran-Rucăr highway, 150 m ESE from the Neamțului fortress ruins** (in the path branching north-eastwards from the old route Rucăr-Bran): *Phyllopachyceras* cf. *bulgaricum* (IG P 13464), *Oosterella cultrataeformis* (UHLIG) (IG P 18965), *O.?* n. sp. (IG P 20618), *Teschenites* cf. *muretensis* (BREISTROFFER) (IG P 20598), *Eleniceras* sp. (IG P 18950), ?a new neocomitid genus aff. *Eleniceras* (IG P 20608). **60** (158 P + 66 A) – **both sides and the thalweg of a small tributary of the Orății Valley, above the Bran-Rucăr highway, 180-230 m S of the site 58:** *Crioceratites trinodosu*s (THIEULOY) (IG P 17609), in the right side; *Phyllopachyceras ladinum* (IG P 13450), *Partschiceras* ? cf. *winkleri* (IG P 13487), *Lytoceras subfimbriatum* (IG P 13732), *Neolissoceras grasianum* (IG P 20577), *N. desmoceratoides* (IG P 18940), *Spitidiscus* cf. *rotula* (SOWERBY) (IG P 18704), *S.* cf. *darderi* (IG P 18714), *Leopoldia leopoldina* (IG P 17603), *Eleniceras* ? *spiniger* (v. KOENEN) (IG P 18952, 18953), in the left side at 1 m above the highway (and some 1.5 m above the outcrop in the right side); *Crioceratites* aff. *majoricensis remanei* WIEDMANN (IG P 20522), *C.* cf. *piveteaui* (SARKAR) (IG P 20513), *C.* cf. *loryi* (SARKAR) (IG P 20511), *Neolissoceras grasianum* (IG P 20578), *Teschenites* ? sp. (IG P 20599), *Leopoldia sueuri* (PICTET & CAMPICHE) (IG P 18955), *Lyticoceras* cf. *nodosoplicatum* (KILIAN & REBOUL) (IG P 18957), *L.* cf. *vicarius* (VACEK) (IG P 18958), *L.* cf. *bargemense* (KILIAN.) (IG P 18960, 18961), 6 m above the highway, in the creek; and *Lyticoceras inaequicostatum* (KILIAN & REBOUL) (IG P 18962), *L.* cf. *cryptoceras* (d'ORBIGNY) (IG P 18963), *Lyticoceras* sp. (IG P 18959, 20613, 20614), in the thick calcarenite bed settled immediately above. Besides, in the stone debris below the outcrop were identified: *Partschyceras* ? cf. *winkleri* (IG P 13488), *Neolissoceras grasianum* (IG P 20579), *Spitidiscus* cf. *rotula* (IG P 18705), *Olcostephanus (Jeannoticeras) jeannoti* (IG P 20588) and *Lyticoceras* ex gr. *cryptoceras* (IG P 20614). **61** (704 P) –**the southern face of the Sasului Hill, 230 m ESE from the highway bridge over the creek in site 60**: *Pseudothurmannia* cf. *ohmi* (IG P 20553) and *P.* cf. *belimelense* (IG P 20560). **62** (731 P) – **the same face, 210 m N of the last winding rightwards of the highway, below the "Colțul Sălătrucului" rock:** *Neolissoceras grasianum* (IG P 20581). **63** (727 P) - **below the site 62, 80 m N of the same winding:** *Lytoceras anisoptychum* (IG P 13744). **64** (180 P) – **like the site 62, but 550 m NE of the same winding:** *Lytoceras subsequens* (IG P 13739) and *Protetragonites quadrisulcatus* (IG P 13768). **65** - **the cutting of the Bran-Rucăr highway, just below Paul Everac's house** (at the top of the highway descent toward the Podu Dâmboviței village) (Popovici-Hatzeg's and Simionescu's classical site)**:** *Scaphites meriani* PICTET & CAMPICHE (IG P 891), *Lechites gaudini* (PICTET & CAMPICHE) (IG P 897, 899), *Anisoceras armatum* (SOWERBY) (IG P 870, 893, 894), *Puzosia* cf. *planulata* SOWERBY (IG P 11925), *P. subplanulata* (SCHLÜTTER) (IG P 3349, 11924), *P. majoriana* (d'ORBIGNY) (IG P 875), *P. takei* POPOVICI-HATZ.EG (IG P 874), *Mortoniceras rostratum* (SOWERBY) (IG P 877). **66** (1026 P) –**the cutting of the forest roadin the Cheii Valley right bank, 500 m downstream the Strâmba Valley mouth:** *Barremites* cf. *difficilis hemiptychus* (IG P 18977). **67**

(62 A) – **idem, but 215 m downstream the Strâmba Valley mouth:** *Pulchellia* cf. *communnis* (IG P 19067). **68** (755 P + 1009 P) – **the right slope of the Cheii valley, some 100 m above the site 67:** *Phyllopachyceras* sp., *Kotetishvilia sauvageaui* (IG P 20631), and *Torcapella* ? ex gr. *radiarca* BUSNARDO (IG P 19018). **69** (61 A) – **the cutting of the forest road in the Cheii Valley right slope, 95 m downstream the Strâmba Valley:** *Toxoceratoides parvus* AVRAM (IG P 14827), *Deshayesites* cf. *similis* (IG P 18795), *D.* aff. *normani* (IG P 18814 b), *D. euglyphus* CASEY (IG P 18816), *Silesites seranonis seranonis* (IG P 19021). **70** (60 A) – **idem, just opposite to the Strâmba Valley mouth:** *Pseudosaynella raresulcata* [(LEYMERIE) d'ORBIGNY] (IG P 20619). **71** (58 A) –**the cutting of the same road, but on the left side of the Cheii Valley, 220 m downstream its first tributary east of the Strâmba Valley:** *Pseudohaploceras matheroni* (IG P 19084, 19085). **72** (56 A) – **the cutting of the forest road in the right bank of the Cheii Valley, 560 m downstream the Crovului Valley:** *Costidiscus recticostatus* (IG P 14150, 14151). **73** (55 A) – **idem, 410 m downstream the Crovului Valley:** *Toxoceras* cf. *moutonianum* (IG P 20533), *Barremites* sp. (IG P 18987 d). **74** (945 P + 54 A) – **ibidem, 300 m and 220 m downstream the Crovului Valley:** *Barremites* cf. *waageni* (19000), and *Crioceratites piveteaui* (IG P 20525), *C.* cf. *quenstedti* ADAMICOVA, non OOSTER (IG P 20510), respectively. **75** (957 P) – **the left slope of the Cheii Valley, 300 m S of the site 74:** *Euptychoceras teschenense* (IG P 14808). **76** - **left bank of the Stramba Valley, 850 m upstream its mouth:** *Lechites gaudini* (IG P 19730), *L. gaudini raricostatus* BREISTROFFER (IG P 19731), *L. vraconensis* RENZ (IG P 19732), *Desmoceras latidorsatum* (MICHELIN) (IG P 19733), *Puzosia* sp. (IG P 19734).

BIOSTRATIGRAPHY

Since the paper Patrulius, Avram (1976) was submitted, some new data concerning the age of the Dâmbovicioara Formation members were brought out, on the ground of new fossil records and of the improvements in ammonite zonal divisions carried out during the decade 1990-2000. These latter are mainly due to the efforts of Lower Cretaceous Cephalopod Team efforts, reported by Hoedemaeker, Bullot (1990), Hoedemaeker, Company et al. (1993), Hoedemaeker, Cecca et al. (1995), Rawson, Hoedemaeker et al. (1999), Hoedemaeker, Rawson et al. (2000), but also to Atrops, Reboulet (1995), Company et al. (1995), Hoedemaeker, Leereveld (1995), Reboulet (1995), Vermeulen (1996, 1998), Klein, Hoedemaeker (1999), Hoedemaeker et al. (in press), etc.

By the way, the bottom of the Dealul Sasului Member, previously accepted as located at the Valanginian-Hauterivian boundary, is certainly Late Valanginian in age, the assemblage of the site 13 (with *Rodighieroites cardulus*, *Criosarasinella furcillata*, *Oosterella ondulata*, *Olcostephanus thieulloyi*) being typical for the Trinodosum Zone, as presented by Reboulet (1995).

The top of the Valanginian stage (=? the Callidiscus Zone), with *Teschenites pachydicranus*, *T.* cf. *muretensis*, *Eleniceras* ex gr. *transylvanicum*, *Oosterella* spp., appears in the wrong exposures of the sites 1 and 2, and in the bottom of site 59. To the same interval or to the immediately above one belongs the sequences exposed in sites 1, 4, 52 (bottom), 59 and 60 (bottom) which yielded some large uncoiled ammonites, from which the most interesting ones are very similar to *Hymantoceras trinodosum* in Thieuloy (1979, pl.3. fig 11), here counted as *Crioceratites* ? *honnoratianus*.

The next in succession Radiatus Zone is illustrated in the sites 1, 2, 34, 52 and 60, where *Leopoldia leopoldina*, *Teschenites flucticulus*, *T. jodariensis*, *Jeanthieuloyites nodosus* and the first *Spitidiscus* were recorded.

The Loryi Zone, illustrated by *Crioceratites piveteaui* and *C. quenstedti*, was proved in site 74. Besides, the top of this zone, or the bottom of Nodosoplicatum Zone, with *Leopldia sueuri*, *Crioceratites* cf. *loryi*, some other species of *Crioceratites*, *Saynella clypeiformis* and also *Spitidiscus intermedius* and some species of *Lyticoceras* including *L. nodosoplicatum* is exposed in the upper part of sites 52 and 60. The same age is shown by *Olcostephanus* (*Jeannoticeras*) *jeannoti*, recorded in unclear stratigraphical conditions below the sites 55 and 60.

The Upper Hauterivian Sayni Zone is not, or scarcely illustrated so far in Dâmbovicioara, although not any break in sedimentation was recognised between the Nodosoplicatum and Balearis Zone. Even the latter is questionably supported, in site 42 only, by some species of *Crioceratites* (*C. krenkeli*, *C. basseae*, *C.* cf. *pseudothurmannii*, *C.* cf. *ibizensis*), common to both the Balearis and Ohmi Zones. In fact, only the interval with *Pseudothurmannia* is better represented, namely the Ohmi Zone in sites 42 and 61, both the Ohmi and Catulloi zones – in site 48, and the Catulloi Zone – in site 3. The sites 11, 15, and also the top of site 12, all of them displaying large *Euptychoceras*, in places (15) assembled with *Hamulina* cf. *alpina*, *Paraspinoceras pulcherrimum*, etc., seem to be latest Hauterivian in age, too.

The earliest Barremian age is poorly proved so far, only in site 7, by the Mazuca Zone, sensu Vermeulen (1996, 1998) (with *Arnaudiella anglesense*), while the immediately underlying Hugii Zone, and the immediately overlying Colombiana

Zone were not yet identified. The Nicklesi Zone is supported in sites 39 and 56 by its index species, assembled in the latter site with *Avramidiscus oosteri* and *A. vandecki*. *Holcodiscus fallax*, which characterizes the upper part of the Pulchella Zone (idem), was met only in the Orății Valley (site not specified), but the same zone seems to be reprezented in site 20 (by *A. seunesi*) and 46 (by *Lytocrioceras* sp.). The Compressissima Zone is far better proved, in sites 20 a, 39, 45, by its index species, but also in sites 20, 38, 67 - by *Pulchellia communis*, *Avramidiscus seunesi*, *Holcodiscus diversecostatus* and in sites 17, 39, 47, 51 and 56 - by *Holcodiscus caillaudianus*. Although the uppermost Lower Barremian interval, i. e. the Moutonianum Zone (see Klein, Hoedemaeker, 1999) was identified *in situ* only in the site 73, it could also be proved in sites 20, 49, 56 (by *Kotetishvilia changarnieri*) and 36 (by *Pulchellia* cf. *caicedi*).

The first Upper Barremian Vandenheckii Zone is exposed in sites 18 and 36, where its index species was recognized, but also in sites 8 (? with *Eulytoceras phestum*), 19 (with *Macroscaphites tirolensis*) and in the lower layer of the site 36 (with *Coronites coronatoides*). To the Sartousiana Zone belong the intervals with *Heinzia provincialis* from the sites 10 and 16, while the Feroudianus Zone could be only supposed as present in the Zamvelei and the Dâmbovicioara valleys, where the next in succession Giraudi Zone was also recognized (in sites 31 and 14, respectively). Its interval seems to be also represented in site 21, where only a helix was identified so far.

The Barremian-Aptian boundary assemblages were clearly illustrated only in the sites 23-25, on the Muierii Valley (= sites 9-11 in Avram, Melinte, 1998), where not any index ammonite species was recognized, but where the first occurrence of *Neohibolites* was signalled. At the last, the lowermost Aptian ammonite assemblages, typical to the Forbesi Zone, Kiliani and Callidiscus subzones, were inventoried (Avram, 1999) in the sites 27-30 from the Muierii Valley and in sites 69-70 from the Cheii Valley.

The break in sedimentation between the lowermost Aptian and the uppermost Albian is general in Dâmbovicioara, the latter age being proved by such species as *Scaphites meriani*, *Lechites gaudini*, *Anisoceras armatum*, *Mortoniceras rostratum*, etc., gathered in sites 65 and 76.

SOME SUGGESTIONS FOR THE NEXT BIOSTATIGAPHIC STUDIES

Despite its richness in ammonite remains, the Dâmbovicioara region had a low contribution to the Tethyan Lower Cretaceous biostratigraphy due to its faulted structure, low and discontinuous exposures and almost horizontal position of strata, unfavorable to a bed-by-bed inventory of fossils.

Thus, the next contributions of this area to the Upper Valanginian-Lower Aptian ammonite biostratigraphy need to be referred exclusively to the best-exposed stratigraphical intervals. These are: (1) the left slope of the Orății Valley, ESE of the Neamțului Fortress ruins (site 59) for the uppermost Valanginian-lowermost Hauterivian; (2) the outcrops 52 and 60, along the Bran-Rucăr highway; for the Lower Hauterivian (3) the site 48, for the uppermost Hauterivian; (4) the site 56 alongside the same highway on the Sasului Hill, and the sites 20 a+b on the Muierii Valley, for the Lower Barremian; (5) the Zamvelei Valley course between the sites16-18 and the upper course of the Orății Valley, especially the site 36, continued upstream, up to site 39 or 40, for the boundary interval between the Lower and Upper Barremian (in fact the most interesting interval of the region for new biostratigraphical contributions); (6), at the last, the Muierii Valley between the sites 24 and 30, for the Barremian-Aptian boundary and the Lower Bedoulian intervals.

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