

# Barremian-Early Albian Deshayesitidae, Oppeliidae, Desmoceratidae and Silesitidae of Colombia

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Forty seven species (among them fourteen new that are listed below) of the following ammonite genera of the families Deshayesitidae Stoyanow, Oppeliidae Douvillé, Desmoceratidae Zittel, and Silesitidae Hyatt are described. *Neodeshayesites* includes the new species *N. buergli*, *N. striatus*, *N. buplicatus*, *N. longicostatus*, *N. multicostratus*, *N. euglyphoides* and *N. tuberculatus*. *Dufrenoyia* includes the new species *D. renzi*. *Pseudohaploceras* includes the new species *P. gerhardti*, *P. yucaense*, *P. ? yeseraense* and *P. simile*. *Melchiorites* includes the new species *M. colombianus*. *Zuercherella* includes the new species *Z. etayosernai*. Other species belong to the genera *Juandurhamiceras*, *Aconeceras*, *Pseudosaynella*, *Valdedorsella*, *Puzosia*, *Carloscaceresiceras*, *Kennicottia* and *Miyakoceras*.

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## Systematic descriptions

All specimens described below are kept in the Nationaal Natuurhistorisch Museum (prefixed RGM, referring to the former Rijksmuseum van Geologie en Mineralogie).

### Class Cephalopoda Zittel, 1884 Superfamily Deshayesitoidea Stoyanow, 1949

The ammonites of the superfamily Deshayesitoidea are very important in the stratigraphy of the Lower Cretaceous, as they take part in the zonal subdivision of the lower Aptian and its boundary layers in many areas of the Boreal and Tethyan realms, viz. in the south of western Europe, in the Caucasus and Transcaucasia, in the western part of central Asia (Hoedemaeker *et al.*, 1993), and in England and Germany (Casey, 1961; Kemper, 1967, 1976). The superfamily consists of one family, to which the genera *Turkmeniceras* Tovbina, 1962, *Deshayesites* Kazansky, 1914, *Paradeshayesites* Kemper, 1967, *Dufrenoyia* Kilian & Reboul, 1915, and *Obsoleticeras* Bogdanova & Michailova, 1999, 'certainly' belong. According to the Wright *et al.* (1996), the genera *Neodeshayesites* Casey, 1964, *Kuntziella* Collignon, 1962, and *Burckhardtites* Humphrey, 1949, 'probably' also belong to this family. In this discussion we make a distinction between 'certain' and 'probable' genera. Wright *et al.* (1996) considered *Juandurhamiceras* Etayo

Serna, 1979, to be a junior synonym of *Dufrenoyia*. However, it clearly differs morphologically from *Dufrenoyia*, as do *Neodeshayesites* and *Burckhardtites*, and we regard them as independent genera.

The biozonation of the uppermost Barremian and lower Aptian (Bogdanova & Mikhailova, 1999, figs. 1, 3) has been founded on the recently established phylogenetic line for the 'certain' deshayesitids. The uncertainty as to whether the 'probable' deshayesitid genera belong to the family is caused by the fact that the ontogeny of their suture lines has not been investigated. The suture lines of adult deshayesitids and parahoplites are very similar, but their ontogenetic developments are different, and the separation of deshayesitid and parahoplites families is based on this difference in development (Mikhailova, 1983). Casey, who introduced the new genus *Neodeshayesites*, indicated the morphological similarity of this genus with Acanthohoplites (family Parahoplites) (Casey, 1964, p. 289). Therefore, until the origin of each element of the suture lines of the 'probable' genera is known, their assignment to Deshayesitidae remains doubtful. Casey (1964) and Wright *et al.* (1996) included Mathoceratinae Casey, 1964, in Deshayesitidae as a subfamily. However, Kvantaliani (1980, 1989), who studied the ontogeny of the suture line of representatives of this subfamily, has, not without justification, excluded it from Deshayesitidae.

The geographic distribution of the genera of the family Deshayesitidae is not uniform. The representatives of *Turkmeniceras* (Turkmenistan, France), *Deshayesites* (France, England, Germany, Georgia, Turkmenistan) and *Paradeshayesites* (Germany) are characteristic of Europe and central Asia. The genus *Dufrenoyia* is known from both the western and eastern hemispheres. The genus *Burckhardtites* occurs in Mexico, but recently species of this genus were found in central Asia (Turkmenistan) (Bogdanova & Mikhailova, 2004). The genus *Neodeshayesites* is known only from South America (Colombia, Venezuela). The genus *Kuntziella* is based on material from Madagascar. As to the latter genus, it should be mentioned that the description and the photographic representation of the characteristics of the single specimen of the unique species *K. kuntzi* (Collignon, 1962, p. 64) are insufficient to obtain a good idea about this taxon.

Thus, representatives of only three of the seven known genera of the family Deshayesitidae occur in the Lower Cretaceous of Colombia, *viz.* *Dufrenoyia*, *Neodeshayesites* and *Juandurhamiceras*. The last two are endemic to South America. The genus *Dufrenoyia* in Colombia consists of endemic South American species, though some of them are morphologically rather close to European species. So *D. justinae* likely belongs to the group of *D. dufrenoyi* and *D. sanctorum* to the group of *D. furcata-lurensis*. The representatives of the genus *Neodeshayesites* are known from both Colombia and Venezuela. There is no univocal opinion about the stratigraphical range of this genus in these two regions. According to Etayo-Serna (1979), all species of *Neodeshayesites* occur in lower Albian deposits, whereas according to Riedel (1938) and Renz (1982) in Venezuela they occur in the Aptian. Renz did not recognize the independence of *Neodeshayesites* and considered all species of this genus to belong to *Deshayesites*. Moreover, Renz supported Wright's assumption that the genus *Dufrenoyia* originated from the genus *Neodeshayesites* (Renz, 1982, p. 17). We do not agree with this assumption, as *Neodeshayesites* morphologically differs in many aspects from *Deshayesites sensu stricto*; *Neodeshayesites* is morphologically closer to *Dufrenoyia* and to a few other late Aptian genera. For example, by its ribbing the species *Neodeshayesites columbianus* is closely reminiscent of the genus *Hypacanthoplites*.

To conclude, the inclusion of *Neodeshayesites* in the Deshayesitidae is conditional and one needs more data before one can solve the phylogeny of *Neodeshayesites*.

**Family Deshayesitidae Stoyanow, 1949**  
**Genus *Neodeshayesites* Casey, 1964**

1938 *Deshayesites*: Riedel, p. 37.

1964 *Neodeshayesites*: Casey, p. 289.

1982 *Deshayesites*: Renz, p. 16.

1996 *Neodeshayesites*: Wright *et al.*, p. 273.

*Type species* – *Deshayesites stutzeri* Riedel, 1938, p. 37, pl. 7, fig. 5-7; pl. 12, fig. 14, pl. 14, fig. 17, lower Aptian, Río Simiti, Bolivar, Colombia.

*Generic characters* – Discoidal shells of different size with flattened or gently convex flanks. Ventrolateral margins well-defined, umbilical border poorly defined. Involution varies from one-third to four-fifths; at large diameters a marked widening of the umbilical spiral characterizes the final whorls. Sculpture consists of sparse or dense ribbing differentiated into main and intermediate ribs. Ribs are prorsiradiate and clearly sigmoidal. Main ribs usually simple, but in some species they bifurcate or bifurcate twice. The main ribs occasionally bear peri-umbilical ridges or bullae. Intermediate ribs are intercalated or branch from main ribs on the flanks. On the early whorls all ribs are interrupted on the venter, on later whorls they pass straight over the flat venter and are well-elevated on the shoulders. On still later whorls the ribs tend to lose the ventrolateral elevation and cross the venter with a gentle forward curve. The ontogeny of the suture lines has not been studied.

*Composition* – The genus includes the following species; *N. karsteni* (Marcou, 1875), *N. columbianus* (Riedel, 1938), *N. nodosus* (Riedel, 1938), *N. stutzeri* (Riedel, 1938), *N. rotundus* (Riedel, 1938), *N. contracta* (Riedel, 1938), *N. umbilicostatus* (Scott, 1940), *N. nicholsoni* (Benavides-Cáceres, 1956), *N. albertoalvarezii* Etayo-Serna, 1979, *N. cingulatus* Etayo-Serna, 1979, *N. aff. cingulatus* Etayo-Serna, 1979, *N. aff. rotundus* (Riedel, 1938), *N. buergli* sp. nov., *N. striatus* sp. nov., *N. biplicatus* sp. nov., *N. longicostatus* sp. nov., *N. tuberculatus* sp. nov., *N. multicosatus* sp. nov. and *N. euglyphoides* sp. nov.

The species of this genus may be divided into two or three groups. The first group consists of species exhibiting the typical ontogenetic stages of *Neodeshayesites*. In the early stage the ribs are elevated on the ventrolateral margins and interrupted on the venter; in the next stage the ribs pass without weakening straight over the venter; in the last stage bifurcation occurs and umbilical ridges or bullae are formed. *Neodeshayesites karsteni*, *N. columbianus*, *N. striatus*, *N. umbilicostatus*, *N. nicholsoni*, *N. biplicatus* and *N. longicostatus* belong to the first group.

The second group consists of species exhibiting the following ontogenetic stages: interruption of the ribs on the venter in the early stages of ontogeny; elevation of the ribs at the ventrolateral shoulders is entirely absent, ribs begin to cross the venter in an early stage of growth; and finally all ribs exhibit a smooth siphonal band at the middle of the venter. *Neodeshayesites stutzeri*, *N. tuberculatus*, *N. multicosatus*, *N. aff. rotundus*, *N. euglyphoides* and *N. aff. cingulatum* belong to this group.

The third group includes those species that show a combination of the features of the two first groups, i.e., interruption of ribs in early ontogenetic stages, possibly with elevations of the ribs at the ventrolateral margins (early ontogeny is not perfectly studied); in later stages the smooth band at mid-venter is poorly defined or totally absent. The species of the third group are *N. buergli* and *N. ex gr. nodosus*.

*Comparison and remarks* – The majority of the species of *Neodeshayesites* differ from *Deshayesites* in having straight ribs on the venter in the middle stage of shell growth and in the ribs making an angle at the ventrolateral shoulders. However, some species of *Neodeshayesites*, for instance *N. euglyphoides*, are very similar to *Deshayesites* in having almost the same type of ribbing on the venter as *Deshayesites*. On the other hand, there are no traces of tubercles in *Deshayesites*, as in *N. nodosus*. It is possible that *Deshayesites* is ancestral to *Neodeshayesites*. *Neodeshayesites* markedly differs from *Dufrenoyia* in the absence of clavi at the ventrolateral shoulders, in the absence of a broadening of the ribs in the upper part of the flanks and in the presence of umbilical ridges or bullae. It resembles *Hypacanthoplites* only in showing a smoothness of the ribs at mid-venter in late growth stages of the shell, but *Neodeshayesites* often has umbilical ridges and on the flanks its ribs tend to be sigmoid or biconcave, very often rursiradiate. *Neodeshayesites* has also some features in common with *Colombiceras*. However, on the upper flanks and venter the latter has strongly broadened and flattened ribs with sloping sides and flat tops; the ribs cross the venter rectilinearly. Moreover, *Colombiceras* lacks peri-umbilical bullae, but has lateral tubercles in the early ontogenetic stages. *Neodeshayesites* occasionally shows peri-umbilical ridges; in late ontogenetic stages of *Neodeshayesites* the ribs pass the venter with a forward curvature, and broaden and flatten less strongly on the outer flank than in *Colombiceras*.

*Distribution* – Aptian of Venezuela, uppermost Aptian/lower Albian of Colombia, Peru.

***Neodeshayesites cf. karsteni* (Marcou, 1875)**

Pl. 1, fig. 1.

1858 *Ammonites acostae* Karsten, p. 111, pl. 5, fig. 1.

1875 *Ammonites karsteni* Marcou, p. 165.

1886 *Ammonites karsteni* Marcou: Karsten, p. 62, pl. 5, fig. 1.

1979 *Neodeshayesites karsteni* (Marcou): Etayo-Serna, p. 64, pl. 9, fig. 2; pl. 10, fig. 6; text-figs. 6L, 6M, 6N, 17.

*Lectotype* – The specimen depicted by Karsten (1858, pl. 5, fig. 1), deposited in the Naturkunde Museum in Berlin, designated herein.

*Material* – Four specimens in one piece of rock, RGM 283 030.

*Description* – The whorl section is broad, low trapezoidal; it is broadest in the peri-umbilical part of the flanks. Sparse ribbing with a regular alternation of one intercalatory rib and one main rib. The main ribs are thin, slightly flexuous; in the peri-umbilical part they curve forwards, in the middle of flanks they describe a wide forward curve,

and in the upper part of flanks they slightly curve backwards. In upper third of the flanks they become broader and flattened. The venter is adorned with straight ribs.

*Comparison* – This species can be distinguished from *N. columbianus* (Riedel) by its broader whorl section and its sparse, regular ribbing.

*Occurrence* – Lower Albian of Anapoima-Apulo.

*Distribution* – Lower Albian of Colombia.

***Neodeshayesites columbianus* (Riedel, 1938)**

Pl. 1, figs. 2-6; Pl. 2; Pl. 3, fig. 1; Pl. 4, fig. 1.

1938 *Deshayesites columbianus* Riedel, p. 40, pl. 7, figs. 16-20; pl. 12, fig. 1; pl. 14, fig. 21.

1955 *Colombiceras karsteni* (Marcou): Bürgl, p. 15, pl. 4, figs. 1, 2.

1958 *Colombiceras karsteni* (Marcou): Bürgl, p. 136, pl. 9, fig. 1.

1964 *Neodeshayesites columbianus* (Riedel): Casey, p. 294.

1979 *Neodeshayesites columbianus* (Riedel): Etayo-Serna, p. 62, pl. 9, fig. 8; pl. 10, fig. 7; text-figs. 6P, 6R, 6T, 15.

*Lectotype* – The specimen figured by Riedel, 1938, pl. 7, fig. 16-17, pl. 12, fig. 12. Designated by Etayo-Serna (1979, p. 62).

*Material* – One hundred and nineteen specimens of different growth stages, RGM 212 041, 212 059-212 167, 212 172-212 176 and 212 326-212 329.

*Description* – Large semi-evolute shells with flattened whorls, which moderately increase in height. The flanks are slightly and regularly convex; the maximum thickness is in the umbilical third of the flanks. The venter of early whorls is rather narrow, and becomes narrower and convex with growing diameters. The umbilicus is moderately wide and has a low, almost vertical (on the shell gently sloping) wall. The whorl section is on the whole oval or slightly trapezoidal.

The sculpture consists of moderately dense radial ribs. The main ribs are simple or bifurcate. The intermediate ribs are simple or approach the main ribs. The number of intermediate ribs between each pair of main ribs is irregular and very often zero. Main ribs usually originate just above the umbilical seam. On the umbilical wall they are slightly rursiradiate. On the umbilical rim they sharply change direction and become slightly elevated forming low umbilical ridges. Near the lower third of flanks they change their direction again and occasionally there is a strong curvature. At this curvature one can occasionally observe a junction of an intermediate ribs with a main rib. In the upper part of the flanks of shells smaller than 80 mm in diameter, all ribs are prorsiradiate; on larger shells they are radial or rursiradiate. Intermediate ribs usually arise at the middle of flanks and are intercalated or (less frequently) split from the main ribs. All ribs are equal on the upper third of flanks. On shells of less than 50-60 mm diameter the ribs pass the ventrolateral shoulder with a distinct angle; in this growth stage all ribs show a feeble mid-ventral lowering. At somewhat larger diameters the ventrolateral angle disappears and becomes smooth. On very large whorls (D=100 mm and larger) all ribs slightly curve forwards on the venter.

*Measurements* – Key: D = diameter; U = umbilical width; H = whorl height; h = whorl height at 180°; W = whorl thickness; ribs = number of ribs per whorl at the venter; - = not measured.

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 212 098	23.2	5.9	10.6	5.8	8.2	25	46	1.8	35	40
RGM 212 101	38.2	10.8	16.6	11.5	12.0	28	43	1.4	31	~44
RGM 212 164	41.8	13.2	16.8	11.9	12.2	31	40	1.4	29	43
RGM 212 080	46.3	11.9	21.0	13.4	14.6	26	45	1.6	31	39
RGM 212 108	50.4	14.9	21.0	14.3	14.9	29	42	1.5	29	44
RGM 212 078	51.8	18.4	19.8	14.0	13.5	35	38	1.4	26	44
RGM 212 118	55.5	17.5	22.4	15.7	14.6	31	40	1.4	26	49
RGM 212 122	59.7	21.5	21.5	16.4	16.2	36	36	1.3	27	49
RGM 212 123	60.7	18.0	24.7	16.6	18.6	29	40	1.5	30	42
RGM 212 105	65.0	23.0	24.5	18.0	17.0	35	37	1.3	26	45
RGM 212 135	66.2	20.6	27.3	19.3	19.7	31	41	1.4	30	50
RGM 212 140	71.2	26.0	25.7	18.6	20.1	36	36	1.3	28	50
RGM 212 092	73.3	24.5	28.4	18.7	22.6	33	39	1.5	31	47
RGM 212 142	80.4	30.8	26.6	21.8	22.3	38	33	1.2	28	52
RGM 212 089	81.9	31.0	28.6	21.5	22.8	38	35	1.3	28	49
RGM 212 146	82.8	28.7	31.4	21.8	22.4	35	38	1.4	27	41
RGM 212 149	88.4	31.3	33.5	23.3	23.1	38	35	1.4	26	51
RGM 212 147	91.7	29.3	36.2	24.8	26.0	32	39	1.4	28	55
RGM 212 152	107.7	35.8	42.6	27.9	30.5	26	39	1.5	28	49
RGM 212 153	109.5	41.5	45.8	35.0	30.8	38	42	1.3	28	65
RGM 212 154	112.9	43.1	43.3	33.5	30.8	38	38	1.3	27	-

*Comparison and remarks* – Of all species of *Neodeshayesites*, this species has the greatest frequency in the Aptian-Albian deposits of Colombia. It differs from many other species in having thin, sharp, distant ribs with an almost regular alternation of main and intermediate ribs. Ribs show a characteristic sharp bend at mid-flank, which distinguishes *N. columbianus* from the other species. It differs from *N. karsteni* in having a thinner whorl section and in the branching of some of the intermediate ribs from the main ribs.

*Occurrence* – Upper Aptian of Mesitas del Colegio (Río Bogotá), Barbosa - Vales; lower Albian of Anapoima-Apulo, Viota-Tocaima.

*Distribution* – Upper Aptian/lower Albian of Colombia.

### *Neodeshayesites stutzeri* (Riedel, 1938)

Pls. 7, 8; Pl. 9, figs. 1, 2.

1938 *Deshayesites stutzeri* Riedel, p. 37, pl. 7, figs. 5-7; pl. 12, fig. 14; pl. 14, fig. 17.

non 1946 *Deshayesites* cf. *stutzeri* Riedel: Sutton, p. 1644, pl. 3, figs. 7, 8.

non 1958 *Deshayesites stutzeri* Riedel: Bürgl, p. 134, pl. 8, fig. 3.

1982 *Deshayesites stutzeri* Riedel: Renz, p. 17, pl. 1, figs. 4, 5.

*Lectotype* – *Deshayesites stutzeri* Riedel, 1938, pl. 7, figs. 5-6. Selected by Casey (1964, p. 289).

*Material* – Thirty four specimens, RGM 212 049, 212 353-212 358, 291 849-291 850, 291 856-291 880.

*Diagnosis* – Large involute shells of medium thickness with high whorls, which moderately to rapidly increase in height. Umbilicus rather narrow with a high, moderately steep to gently sloping wall. Ribbing rather dense (40 to 65 ribs per whorl); alternation of main and intermediate ribs irregular.

*Description* – Large involute shells with medium thick whorls, which moderately to rapidly increase in height. The flanks are moderately and evenly convex. The venter is broad. The umbilicus is stepped, on the early whorls with a high and steep wall, which on later whorls becomes gently sloping. The umbilical border is rounded and indistinct. The whorl section is in general oval to rectangular.

The ribbing consists of main and intermediate ribs. The main ribs originate low on the umbilical wall and are inclined backwards. Passing the umbilical border many of them form long peri-umbilical thickenings, which sharply turn forwards. On the flanks the ribs are distinctly sigmoidal. Some ribs bifurcate at the umbilical rim. The intermediate ribs vary in length and originate in the lower half of the flanks or at mid-flank. The lower ends of some intermediate ribs closely approach the main ribs giving the impression as if they branch from the main ribs. Approximately from the middle of the flanks all ribs grow in strength: they become broader and lower; near the ventrolateral margin they are broad, low, and inflated. On the venter they are straight and the interspaces are narrower than the ribs. On the early whorls the ribs are depressed at the middle of the venter, but in the course of ontogeny this depression disappears.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 865	37.3	9.2	16.5	10.0	13.2	24.6	44.2	1.65	35.7	~40
RGM 291 878	44.5	12.0	20.9	12.7	17.2	26.9	46.9	1.64	38.6	-
RGM 291 861	50.0	9.3	24.9	14.5	17.5	18.6	49.8	1.71	35.0	~48
RGM 291 850	60.2	~11.0	29.0	18.3	20.8	18.2	48.1	1.58	34.5	~57
RGM 291 849	62.7	13.0	30.0	18.5	22.7	20.7	47.8	1.62	36.2	~44
RGM 291 857	68.4	12.5	33.5	19.4	23.6	18.2	48.9	1.72	34.5	~44
RGM 291 858	70.7	15.8	34.6	21.0	24.8	22.3	48.9	1.64	35.0	~48
RGM 291 871	81.2	18.8	38.1	23.6	26.9	23.0	46.9	1.61	33.1	55
RGM 291 859	88.7	17.4	44.7	25.6	32.1	19.6	50.3	1.74	36.1	~50
RGM 291 868	96.0	18.2	49.8	31.8	32.4	18.9	51.8	1.56	33.7	~54
RGM 291 856	135.0	27.5	64.6	39.3	40.0	20.3	47.8	1.64	29.6	~64

*Comparison* – The specimens of the Creutzberg Collection differ from the holotype of *N. stutzeri* in having thicker whorls, thicker ribs and more rounded ventrolateral

margins. The described specimens are morphologically closest to the second specimen of this species figured by Riedel (1938, pl. 7, fig. 7), which has broad and dense ribs.

*Occurrence* – Upper Aptian of Guane (Vereda Chaguete); Villa de Leyva - Sutamarchan; Villa de Leyva (Loma Blanca, opposite of Loma la Asomada, Loma Catalina, on the premises of Francisco Castilla); Anapoima-Apulo; lower Albian of Anapoima-Apulo.

*Distribution* – Upper Aptian/lower Albian of Colombia; late Aptian (Machiques Formation) of Venezuela.

***Neodeshayesites* aff. *rotundus* (Riedel, 1938)**

Pl. 3, fig. 3; Pl. 6, fig. 2.

*Material* – Four specimens, RGM 291 840, 291 881-291 883.

*Description* – Medium-sized, semi-involute shell with medium thick whorls, which moderately increase in height. The flanks are slightly convex, the venter is broad and flattened. The umbilicus is wide and shallow with a low, gently sloping wall. In general the whorl section is low rectangular.

The ribbing is irregular, the ribs are rather weak. The main ribs originate just above the umbilical seam, on the umbilical wall they are inclined backwards. On the umbilical border some of them slightly rise, forming low ridges from which ribs bifurcate. The intermediate ribs vary in length, and there is only one, or no intermediate rib between each pair of main ribs. All ribs are slightly sigmoidal. On the upper third of flanks all ribs become slightly broader, flatter, and lower in relief. They slightly rise on the ventrolateral margins. In the early ontogenetic stages the ribs weaken when crossing the venter; in later ontogenetic stages, however, the ventrolateral strengthening of the ribs disappears and they cross the venter with a weak forward curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 882	24.1	8.5	9.3	6.1	8.8	35.2	38.5	1.52	36.5	45
RGM 291 881	27.2	7.3	11.3	8.1	9.5	26.8	41.5	1.39	34.9	42
RGM 291 883	27.4	7.2	13.1	7.3	9.5	26.2	47.8	1.79	34.6	38
RGM 291 840	29.2	9.0	11.7	8.5	10.3	30.8	40.0	1.37	35.2	?

*Comparison* – The above description of the specimens applies to *Neodeshayesites rotundus* by its feeble ribbing, the irregular alternation of main and intermediate ribs, and the characteristics of the venter. They differ from *N. rotundus* figured by Riedel in having a narrower whorl section and more distinct ribs on the lower half of the flanks, in the absence of distinct umbilical ridges, and in the weaker ribbing on the venter. The specimen figured by Renz (1982, pl. 1, fig. 6a, b) is morphologically closer to our specimens as to their ribbing, but differs in its whorls being less thick.

*Occurrence* – Upper Aptian of Mesitas del Colegio (Río Bogotá); Villa de Leyva; Guane (Quebrada “El Hoya”); Chipatá Vieja – Chipatá.

***Neodeshayesites ex gr. nodosus* (Riedel, 1938)**

Pl. 3, fig. 2.

*Material* – Two incomplete specimens, RGM 291 847-291 848.

*Descriptions* – Small shells with low, thick whorls. Flanks converging towards the venter. Umbilical border rounded. Venter flattened. Ventrolateral margins rounded. Umbilical wall high and steep.

Ribbing rather dense (25 ribs per half whorl). Ribs thin from umbilicus to venter. Main ribs originate just above the umbilical seam. Passing over the umbilical border they become higher and form distinct umbilical ridges. The intermediate ribs (one to three between each pair of main ribs) vary in length; the anterior ones are usually longer than the posterior ones. All ribs are slightly flexuous. They pass straight over the venter and exhibit a weak siphonal depression.

*Comparison* – The specimens of the Creutzberg Collection differ from the holotype of *Neodeshayesites nodosus* (Riedel, 1938, pl. 7, fig. 11) in having a wider venter with rounded ventrolateral margins and in the absence of real umbilical tubercles. They differ from the specimen of *N. nodosus* figured by Renz (1982, pl. 1 fig. 3) in having thinner ribs and flanks that converge towards the venter. Besides, the venter of these specimens is broad with rounded 'shoulders'.

*Occurrence* – Upper Aptian of Utica; Villa de Leyva.

***Neodeshayesites aff. cingulatus* Etayo-Serna, 1979**

Pl. 9, figs. 3-7; Pl. 10; Pl. 11, fig. 1.

*Material* – Eighty seven specimens, RGM 212 002-212 040, 212 042, 212 047-212 048, 212 055-212 056, 212 336, 212 339-212 352, 291 893-291 900, 291 945-291 948, 291 950-291 954, 291 956-291 964, 354 130-354 131.

*Description* – Medium sized, semi-involute shell with whorls of medium thickness, which moderately to rapidly increase in height. Flanks moderately convex; venter broad, fairly convex. Umbilical wall high and steep; with growth of the shell it becomes gently sloping. Umbilicus moderately wide; umbilical border rounded. Whorl section in general squarish-rounded in the early whorls, becoming rectangular-oval in later whorls.

Ribbing rather dense with an irregular alternation of main and intermediate ribs. The main ribs arise just above the umbilical seam and are inclined backwards on the umbilical wall. When passing the umbilical border they become acute and form weak umbilical ridges. Some ribs bifurcate from these ridges. The intermediate ribs vary in length and originate in the lower half of the flanks. Occasionally there are no intermediate ribs between two main ribs. Below a diameter of about 30 mm all ribs are almost straight and prorsiradiate. Above that diameter the ribs are sigmoidal. All ribs become broader and flatter from the middle of the flanks upward, rarely from the umbilical border. The sides of the ribs are steep or vertical and their tops are only slightly convex.

At the ventrolateral margins the ribs keep their relief and the ventrolateral shoulders are indistinct. On the early whorls the ribs are interrupted at the middle of the venter exhibiting pointed ends. Slightly later in ontogeny ribs appear in the smooth siphonal band, at first weak ribs, later stronger ones. The siphonal smooth band disappears at about 50 mm diameter.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 899	12.1	3.6	6.6	2.7	5.3	29.8	54.5	2.44	38.0	-
RGM 291 947	14.4	4.0	6.0	3.7	5.9	27.7	41.6	1.62	40.9	37
RGM 291 895	19.2	5.6	7.0	5.3	7.6	29.1	36.4	1.32	39.5	-
RGM 291 894	19.2	6.2	7.5	5.3	7.2	32.2	39.0	1.41	37.5	33
RGM 291 946	23.0	7.4	9.2	6.5	8.3	32.1	40.0	1.41	36.0	35
RGM 212 033	25.5	7.3	10.6	6.9	9.7	28.6	41.5	1.53	38.0	-
RGM 291 898	32.0	9.6	13.3	8.5	12.2	30.0	41.5	1.56	38.1	-
RGM 212 029	44.3	14.0	18.0	12.4	14.6	31.6	40.6	1.45	32.9	-
RGM 291 893	49.0	13.1	19.9	14.8	15.2	26.0	40.6	1.34	31.0	38
RGM 291 896	52.3	14.4	21.4	15.0	18.6	27.5	40.9	1.42	35.5	-

*Intraspecific variation* – There are some specimens with denser ribbing (40 to 54 ribs per whorl), narrower umbilicus (U/D = 21-25) and without umbilical ridges.

*Measurements of densely ribbed forms*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 212 006	13.7	3.3	6.3	3.6	5.0	24.0	45.9	2.26	36.4	54
RGM 291 951	14.9	4.1	7.2	4.1	6.6	21.5	48.3	1.75	44.2	~40
RGM 212 035	18.1	4.7	8.0	4.5	7.7	25.9	44.1	1.77	42.5	~50
RGM 291 963	44.0	-	-	-	18.0	-	-	-	40.9	-
RGM 354 130	66.1	21.2	25.4	18.7	20.7	32.0	38.4	1.35	31.3	~ 50

*Comparison* – The specimens studied here differ from *N. cingulatus* Etayo-Serna, 1979, in their early whorls, *viz.* in the absence of distinct umbilical bullae, in having a steep umbilical wall, in having thinner and less flattened ribs, and in having a wider umbilicus. The multi-ribbed specimens differ in having a greater number of sharper and finer ribs.

*Occurrence* – Upper Aptian of Villa de Leyva (Santo Ecce Homo, Loma Catalina, Loma Blanca, Sutamarchan, opposite to Loma la Asomada); Chipatá Viejo-Chipatá; Galan (left bank of Río Suarez); Guane (Vereda Chaguete); Sáchica; Barbosa-Vélez; lower Albian of Anapoima-Apulo.

*Neodeshayesites* ex gr. *albertoalvarezii* Etayo-Serna, 1979

Pl. 4, figs. 2, 3.

*Material* – Five specimens, RGM 291 884-291 888.

*Description* – Medium-sized semi-involute shells with whorls of medium thick-

ness, which moderately to rapidly increase in height. Flanks slightly convex, venter rather narrow with distinct ventrolateral margins. Umbilicus moderately wide, on the early whorls with a high steep wall, which becomes more sloping with the growth of the shell.

The ribbing on the early whorls is rather dense (about 54 ribs at the whorl), later becoming more sparse (to 40 ribs). Alternation of main and intermediate ribs is irregular: on the early whorls there are two intermediate ribs between two main ribs; on later whorls there is a regular alternation of one main rib and one intermediate rib. The main ribs originate just above the umbilical seam and are slightly rursiradiate on the umbilical wall. On the umbilical rim they become slightly higher without forming ridges. The intermediate ribs appear in the lower part of flanks. All ribs are distinctly sigmoidal.

At mid-flank the ribs become stronger and broader, above this point the ribs are scull-shaped. On the ventrolateral margin the ribs are slightly elevated, and pass with a distinct angle onto the venter where they are straight and not interrupted. With shell growth the ventrolateral elevations disappear and the ribs pass the venter as broad strong ridges with a forward curve.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 884	25.6	6.0	12.5	7.6	8.9	23.4	48.8	1.64	34.7	38
RGM 291 885	27.6	7.2	13.7	7.7	10.0	26.0	49.6	1.77	36.2	38
RGM 291 888	33.5	9.5	15.2	8.8	10.9	28,3	45.3	1.72	32.5	48-40
RGM 291 887	43.6	10.5	21.3	12.4	14.4	24.0	48.8	1.71	33.0	54-42
RGM 291 886	51.0	13.7	22.2	14.5	15.3	26.8	43.5	1.53	30.0	40

*Comparison –* The described specimens show some similarity with *N. albertoalvarezii* Etayo-Serna, 1979, especially at diameters of about 40 mm; they have strong and rather widely spaced ribs, a narrow umbilicus with a gently sloping umbilical wall at large diameters and a steep umbilical wall on early whorls. However, it differs from *N. albertoalvarezii* in having a narrower whorl section and denser ribbing on the early whorls. The small number of specimens does not allow the introduction of a new species, but the similarities with *N. albertoalvarezii* indicate that they belong to the same group of species.

*Occurrence –* Upper Aptian of Villa de Leyva (Loma Blanca); Socorro; lower Albian of Anapoima-Apulo.

***Neodeshayesites buergli* sp. nov.**

Pl. 5, figs. 2, 3.

1958 *Colombiceras alexandrinum* (d'Orbigny): Bürgl, pl. 8, fig. 1.

*Holotype –* RGM 291 844.

*Paratype –* Five specimens, RGM 212 359-212 361, 291 845, 291 846.

*Type locality* – Utica.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – The species is named in the memory of Hans Bürgl.

*Diagnosis* – Medium-sized shells with whorls that moderately increase in height; whorl section rectangular to trapezoidal; ventrolateral margins rounded and indistinct; ribbing dense consisting of almost straight prorsiradiate ribs.

*Description* – Medium-sized, semi-involute shell with medium thick whorls, which moderately increase in height. Flanks flattened, gently convex; umbilical wall low, sloping and rounding into flanks. Venter broad and gently convex with rounded ventrolateral margins. Umbilicus stepped, moderately wide. The whorl section is on the whole oval to rectangular.

Costation consists of dense, narrowly rounded, almost straight ribs, slightly bending towards the aperture. The alternation of main and intermediate ribs is irregular, i.e., there are simple and bifurcating main ribs, without or with only one intermediate rib between each pair of main ribs. The main ribs begin just above umbilical seam; on the umbilical wall they are bent backwards and slightly strengthen when passing the umbilical border. On the inner third of flanks some of the main ribs bifurcate. Intermediate ribs vary in length and are usually simple. They originate in the lower part of the flanks. In the direction of the venter all ribs become broader, but gain only insignificantly in height; there is practically no flattening of the ribs. All ribs are projected near the venter. The ribs only slightly rise on the ventrolateral margins. They cross the venter with a weak convexity towards the aperture.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 845	35.0	10.7	15.0	9.6	12.7	30.5	42.8	1.56	36.2	65
RGM 291 844	37.7	11.0	16.4	10.7	14.2	29.1	43.5	1.53	37.6	44
RGM 212 359	45.7	~ 13	20.6	12.4	17.2	28.4	45.0	1.66	37.6	-
RGM 291 846	51.4	15.9	21.3	12.7	-	30.9	41.4	1.67	-	-

*Comparison* – This species differs from many species of *Neodeshayesites* by its straight ribs on the flanks. It is practically identical with the specimen figured by Bürgl (1958, pl. 8, fig. 1) under the name *Colombiceras alexandrinum* (d’Orbigny).

*Remarks* – This species differs from many species of *Neodeshayesites* in the shape of its ribs; the ribs are straight on the flanks, but have a high, rather narrow cross section at the venter instead of flat and broad as in *Colombiceras*. On account of these features it is practically identical to the specimen figured by Bürgl (1958) under the name *Colombiceras alexandrinum* (d’Orbigny). Many species that are presently considered to belong to the genus *Neodeshayesites* were previously published as *Colombiceras*. The ammonite described and figured by d’Orbigny (1842b, p. 75, pl. 17, figs. 8-10) really belongs to *Colombiceras* because of its type of ribbing. The genus *Colombiceras* differs

from *Neodeshayesites* in having more strongly broadened and flattened ribs in the upper part of the flanks, in the ribs crossing the venter rectilinearly and in the absence of real umbilical bullae.

*Occurrence* – Upper Aptian of Utica.

***Neodeshayesites striatus* sp. nov.**

Pl. 4, fig. 4.

*Holotype* – RGM 291 843. The only specimen known.

*Type locality* – Anapoima-Apulo.

*Type horizon* – Lower Albian.

*Derivatio nominis* – The species is named after the striations on the ribs.

*Diagnosis* – Large discoidal shell with compressed whorls of high oval section. Umbilicus moderately wide with a low vertical wall. Ribbing very dense consisting of main ribs that bifurcate from umbilical bullae and simple intercalated ribs. Surface of the shell covered with thin striae, which replace ribs on the body chamber.

*Description* – Large shell with high compressed whorls which slowly grow in height. The greatest thickness is situated at the lower third of the flanks. The flanks are gently convex and gradually converge towards a rather narrow venter. The umbilicus is moderately wide, and has a low umbilical wall and rounded rim. The whorl section is on the whole high oval.

The ribbing is dense, rectiradiate. Main ribs originate just above the umbilical seam and are rursiradiate on the umbilical wall. On the umbilical border the ribs become straight and are furnished with short bullae. The ribs are generally prorsiradiate and slightly flexing at mid-flank. The ribs split from the bullae; the anterior branches are more sigmoidal than the posterior ones. The intermediate ribs are long, originate near the point bifurcation of the main ribs and are situated either between a pair of bifurcating main ribs or between the branches of one main rib. All ribs, the main ones from their bullae and the intermediate ones from their origin, are flattened and become more closely spaced near the venter. All ribs rise on the ventrolateral shoulders and pass straight over the venter as broad bands. All ribs are prorsiradiate and covered with fine striae. With growth ribs gradually disappear and on the body chamber there are only striae. Near the aperture they are biconcave: one concavity is situated just above the umbilical border, the upper concavity is near the venter; on the whole, however, they form a wide forward curve.

*Measurements* –  $D = 118.7$ ;  $U = 35.7$ ;  $H = 47.2$ ;  $h = 35.0$ ;  $W = 29.2$ ;  $U/D = 30.0$ ;  $H/D = 35.9$ ;  $H/h = 1.22$ ;  $W/D = 24.5$ .

*Comparison* – A very unusual *Neodeshayesites*, which differs from all known species in having very dense ribbing with thin striae on the ribs and in changing this

ribbing in the course of the ontogeny from real ribs, which split just above the umbilical rim, into very closely spaced striae arising from short umbilical bullae. The ribbing of the early whorls of *N. striatus* is rather close to the ribbing of *N. umbilicostatus* Scott (1940, pl. 63, fig. 10). However, the body-chamber of the latter species is not known and it is therefore difficult to claim these two species to be identical. The type of ribbing of *Neodeshayesites biplicatus* is very close to that of *N. umbilicostatus* Scott (1940, pl. 63, fig. 10). However, the early whorls of *N. umbilicostatus* are not known. *Neodeshayesites biplicatus* differs from *N. nicholsoni* Benavides-Caceres (1956, pl. 108, fig. 11, 12) in its finer ribbing, the absence of massive bullae at its umbilical rim and its thinner whorls.

*Occurrence* – Lower Albian of Anapoima-Apulo.

*Neodeshayesites biplicatus* sp. nov.

Pl. 5, fig. 1; Pl. 13, fig. 1.

*Holotype* – RGM 291 841.

*Paratype* – RGM 291 842.

*Type locality* – Villa de Leyva, Loma Blanca.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – The species is named after its biplicate ribs.

*Diagnosis* – Large involute shell with flattened whorls which moderately increase in height. Umbilicus moderately narrow, umbilical wall steep, ribbing dense. Main and intercalated ribs bifurcate at different heights of the flanks, forming indistinct bunches.

*Description* – Large to very large involute shells with flattened whorls, which moderately increase in height. Flanks flattened, almost parallel, slightly convex in the lower part and converging towards the venter in the upper part. Venter narrow and convex. Umbilicus stepped, rather deep; umbilical wall high, steep; umbilical border distinct, but rounded. The whorl section on the whole is high triangular-oval.

The ribbing is very dense (to 100 ribs on a whorl). Main ribs originate at the middle of the umbilical wall and have a radial direction. They form weak bullae on the umbilical border. The ribs bifurcate or trifurcate just above the umbilical border forming bunches; the branching is indistinct. The intercalated ribs vary in length and there are one or more of them between each pair of main ribs; they also branch at mid-flank or higher. All ribs become broader towards the venter, but keep their triangular section. At a diameter of 70 mm the ribs rectilinearly cross the venter without weakening. They rise on the ventrolateral shoulders and pass over the shoulders making an obtuse angle. At larger diameters this angle disappears and ribs cross the venter with a rather strong, forward curve. The interspaces are narrower than the breadth of the ribs near the venter. Up to a diameter of 60 mm the surface of the shell is covered with fine radial striae.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 841	116.7	21.8	53.4	30.1	29.9	18.6	45.7	1.77	25.6	95
RGM 291 842	133.0	26.5	66.0	42.6	38.8	20.0	50.0	1.54	29.1	100

*Comparison* – This species differs from *N. columbianus* (Riedel) in having whorls that rapidly increase in height, in its very dense ribbing, in the bifurcation and trifurcation of the ribs, which form bundles just above the umbilical border, and in the absence of a sharp angle of the ribs on the ventrolateral shoulders.

*Occurrence* – Upper Aptian of Utica, Villa de Leyva (Loma Blanca).

*Neodeshayesites longicostatus* sp. nov.

Pl. 6, fig. 1.

*Holotype* – RGM 291 892. The only specimen known.

*Type locality* – Guana, Vereda Chaguete.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – The species is named after its long intermediate ribs.

*Diagnosis* – Large shell of medium thickness. Ribbing rather dense with regularly alternating main and intermediate ribs. With growth, the point of origin of the intermediate ribs gradually moves upward from the umbilical border to the middle of the flanks.

*Description* – Large shell of medium thickness; the whorls increase in height, at first slowly, later moderately. Flanks moderately and regularly convex; venter broad, truncated. Umbilicus stepped, changing from rather narrow to moderately wide; umbilical wall rather high and almost vertical. Whorl section on the whole high, rectangular-oval.

Ribbing rather dense with a regular alternation of main and intermediate ribs. The main ribs originate just above the umbilical seam and are slightly rursiradiate on the umbilical wall. Passing the umbilical border they become thin and acute. On the flanks the ribs are slightly sigmoidal. On the earliest visible part of the whorl the intermediate ribs arise from just above the umbilical border, but later at midflank. On the upper third of the flanks all ribs become broader and higher, and near the venter they have a rather high and scalene-triangular section. On the ventrolateral margin all ribs make a sharp bend and cross the venter as strong ridges curving towards the aperture.

*Measurements* – Key:  $\frac{1}{2}$  ribs = number of ribs on half a whorl.

	D	U	H	h	W	U/D	H/D	H/h	W/D	$\frac{1}{2}$ Ribs
RGM 291 892	68.6	15.7	31.7	20.0	21.6	22.8	46.2	1.58	31.4	48
Same specimen	98.5	29.2	39.3	30.4	33.3	29.3	39.1	1.29	33.1	46

*Comparison and remarks* – The described species differs from other *Neodeshayesites* in the gradual upward shift of the point of origin of the intermediate ribs from the umbilical border to the middle of the flanks throughout ontogeny. This is one of the species of *Neodeshayesites* that preserve a sharp bend on the ventrolateral margin throughout ontogeny. It is therefore morphologically very similar to species of the genus *Dufrenoyia*. If Wright *et al.* (1996) and Renz (1982, p. 16-17) would have been right in considering *Neodeshayesites* a subjective synonym of *Deshayesites* and ancestral to *Dufrenoyia*, then we would have regarded *N. longicostatus* as the original species of the genus *Dufrenoyia*. But, as *Dufrenoyia* occurs in the uppermost part of the lower Aptian, and *Neodeshayesites* in the upper Aptian/lower Albian, the ancestor-descendant relation may be the reverse. Indeed, large specimens of some species of the genus *Dufrenoyia* (such as *D. truncata* Spath, *D. praedufrenoyi* Casey) are very close to species of *Neodeshayesites* in having the same ribbing at the venter. *Neodeshayesites*, and in particular this species, differ from representatives of *Dufrenoyia* in the absence of any tubercles throughout ontogeny, especially such tubercles that widen the rib-end at the ventrolateral shoulders by forming clavi.

*Occurrence* – Upper Aptian (?) of Guane (Vereda Chaguete).

***Neodeshayesites multicostatus* sp. nov.**

Pl. 11, fig. 2; Pl. 14, figs. 1, 2; Pl. 15.

*Holotype* – RGM 212 043.

*Paratypes* – Seventeen specimens, RGM 212 001, 212 044-212 046, 212 050-212 054, 212 057, 212 058, 212 330-212 335.

*Type locality* – Villa de Leyva, Sáchica.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – The species is named after its great number of ribs.

*Diagnosis* – Large semi-involute shells with flattened whorls which rapidly increase in height. Umbilicus narrow, deep, stepped. Whorl section high-oval. Ribbing dense, main ribs bifurcate at different heights of the flanks, intermediate ribs differ in length. All ribs cross the venter with a weak forward curve; on the early whorls they are interrupted on the venter, later there is a smooth band at midventer.

*Description* – Large to very large shells with flattened whorls, which rapidly increase in height. Flanks very weakly convex in the middle of the flanks. Venter of the early whorls is rather broad, with the growing of the shell it becomes narrower. Umbilicus narrow, stepped, with high, vertical or steep wall. Umbilical border rounded, but distinct. Whorl section high-oval or subtriangulate-oval.

Ribbing very dense (60-80 ribs per whorl). Main ribs arise just above the umbilical seam and are slightly rursiradiate on the umbilical wall at diameters smaller than 30 mm;

they are almost radial on the umbilical wall of later whorls. Passing the umbilical border ribs gain in strength without forming umbilical ridges. On the lower third of the flanks the ribs are distinctly inclined forward, on the higher two thirds of the flanks they are slightly sigmoidal. The ribs are thus prorsiradiate. Main ribs commonly bifurcate, but may also be simple. The ribs bifurcate at mid of flanks or a little higher. Intermediate ribs differ in length and originate on the lower three quarters of the flanks. There are one or two intermediate ribs between each pair of main ones. Some intermediate ribs also bifurcate at midflank. All ribs become broader and flatter towards the venter, crossing the latter as broad low swellings; the interspaces are narrower than the swellings. On the early whorls the ribs are interrupted on the venter; they do not show any strengthening at the ventrolateral margins. With increasing diameter they cross the venter with a mid-ventral smooth band and still later without weakening forming a distinct forward curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 212 051	31.4	6.6	16.6	8.1	10.9	21.0	52.8	2.04	34.7	> 60
RGM 212 001	51.0	13.6	24.5	13.7	15.4	26.6	48.0	1.78	30.1	64
RGM 212 046	71.4	14.7	35.7	20.7	23.1	20.5	50.0	1.72	32.3	54
RGM 212 053	92.0	20.5	52.0	28.0	30.7	22.2	56.5	1.85	33.3	60
RGM 212 043	140.0	31.6	67.8	41.6	44.7	22.5	48.4	1.62	31.9	86
RGM 212 054	160.0	33.0	85.0	48.2	-	20.6	53.1	1.76	-	72

*Comparison* – The above described species differs from many species of *Neodeshayesites* in reaching a large size, in having high involute whorls, which rapidly increase in height, and in having very dense ribbing. It differs from *N. biphlicatus* in the absence of bundles.

*Occurrence* – Upper Aptian of Villa de Leyva (Loma Blanca), Sáchica; Anapoima-Apulo; Galan (Loma Gonzales); Guane (Quebrada Barichara, Vereda Chaguete, Quebrada “El Hoya”).

***Neodeshayesites euglyphoides* sp. nov.**

Pl. 11, fig. 3; Pl. 12, figs. 2, 3.

*Holotype* – RGM 291 889.

*Paratypes* – RGM 291 890, 291 891.

*Type locality* – Guane, Vereda Chaguete.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – Named for its similarity with *Deshayesites euglyphus* Casey, 1964.

*Diagnosis* – Large, semi-involute shells of medium thickness with whorls, which moderately increase in height. Umbilicus rather narrow, deep. Whorl section high-

oval. Ribbing coarse, rather dense (about 50 ribs per whorl), with an almost regular alternation of simple main and intermediate ribs. All ribs rectilinearly cross the venter without interruption and strengthening.

*Description* – Large semi-involute shells with whorls of medium thickness which moderately increase in height. Whorl sides uniformly convex, rounding into a convex venter. Umbilicus rather narrow, deep, stepped. Umbilical wall rather high, steep or sloping. Umbilical border rounded, indistinct. Whorl section on the whole high-oval.

Ribbing coarse, rather dense, with an almost regular alternation of main and intermediate ribs. Main ribs originate just above the umbilical seam and are distinctly rur-siradiate on the umbilical wall. Passing the umbilical border they become sharp, without forming umbilical ridges. The main ribs rarely bifurcate. On the flanks all ribs are distinctly sigmoidal. The intermediate ribs appear on midflank and are also sigmoidal. There are rarely two intermediate ribs between a pair of main ribs; and in these cases one of them begins on the lower third of the flanks. Near the venter all ribs become broader and flatter, and cross the venter like broad swellings in a straight line or with a forward curve. The ribbing on the venter of the early whorls is not visible.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 281 889	114.0	25.2	53.0	35.3	37.6	22.1	46.4	1.50	32.9	44
RGM 291 891	120.6	30.1	55.1	36.0	43.8	24.9	45.6	1.53	36.3	46
RGM 291 890	129.4	31.8	59.8	39.6	37.9	24.5	46.2	1.51	29.2	-

*Comparison* – *Neodeshayesites euglyphoides* differs from many species of *Neodeshayesites* in having coarse ribbing. It has almost the same type of ribbing on the venter as *Deshayesites*.

*Remarks* – The described specimens are very similar to *Deshayesites euglyphus* Casey var. *corneus* (Casey, 1964, pl. 50, fig. 1) in the large size of the shell, the kind of ribbing, and the coarsening of the ribs. However, *N. euglyphoides* differs primarily in its generic features, i.e., thinner ribs on the flanks and broad low swellings on the venter. Because of the lack of young specimens it is impossible to compare such generic feature as the mode of ribbing on venter of the inner whorls.

*Occurrence* – Upper Aptian of Villa de Leyva (Loma Blanca); Guane (Vereda Chaguete).

***Neodeshayesites tuberculatus* sp. nov.**

Pl. 12, figs. 1, 4; Pl. 13, fig. 2; Pl. 14, fig. 3.

*Holotype* – RGM 291 833.

*Paratypes* – Fifteen specimens, RGM 291 824-291 832, 291 834-291 839.

*Type locality* – San Joaquin.

*Type horizon* – Upper Aptian.

*Derivatio nominis* – The species is named after having umbilical tubercles.

*Diagnosis* – Medium-sized, rather thick, semi-evolute shells with wide umbilicus. Ribbing sparse; main ribs broad, thick, usually bifurcated or (rarely) trifurcated from strong, short and high umbilical bullae, or slightly stretched umbilical tubercles. Intermediate ribs strongly differ in length and on larger shells the long ones also bear umbilical tubercles. Ribs cross the venter without interruption and describe a weak forward curve.

*Description* – Medium sized semi-evolute shells with whorls of medium thickness, which moderately increase in height. Flanks convex, evenly rounded into broad, arched venter. Umbilicus wide, stepped, with high steep wall. Umbilical border rounded. Whorl section wide-oval or trapezoidal.

Ribbing coarse, rather widely spaced (about 35 ribs per whorl). Main ribs originate just above the umbilical seam and are slightly inclined backward on the umbilical wall. On the umbilical border they form rather distinct ridges, bullae or tubercles. On the early whorls every fourth rib bifurcates from the umbilical tubercles. The intermediate ribs vary in length; the long ribs, usually simple, begin at the umbilical border and with the growth of the shell also form bullae; the short ribs begin at the lower third of the flanks. All ribs are feebly sigmoidal, usually radial, broadening and coarsening from the umbilical rim to the venter. They cross the latter as strongly swollen, straight or slightly forward-curving ribs.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 291 829	22.4	7.0	9.1	6.3	8.6	31.2	40.6	1.44	38.3	34
RGM 291 839	25.0	8.4	10.1	7.0	9.6	33.6	40.4	1.44	38.4	37
RGM 291 831	27.4	8.0	11.6	7.3	10.8	29.1	42.3	1.58	39.4	34
RGM 291 824	28.9	10.7	9.8	8.0	10.4	36.6	33.9	1.22	35.9	30
RGM 291 836	32.0	11.8	11.2	8.9	12.1	36.8	35.0	1.25	30.8	32-34
RGM 291 838	32.3	11.4	11.4	8.5	11.5	35.2	35.2	1.34	35.6	32
RGM 291 825	32.7	8.2	15.0	8.8	12.6	25.0	45.8	1.32	38.5	36
RGM 291 835	33.3	10.3	14.5	9.0	11.5	30.9	43.5	1.61	34.5	37
RGM 291 837	33.4	11.4	12.7	9.4	12.0	34.1	38.0	1.35	35.9	34
RGM 291 826	34.9	10.8	14.7	10.4	15.0	30.9	42.1	1.41	42.9	32
RGM 291 827	44.0	15.2	17.7	10.4	16.4	34.5	40.2	1.66	37.2	40

*Intraspecific variability* – There is a group of specimens without distinct umbilical bullae, with narrower umbilicus, and with higher and thicker whorls; however, the ribbing of both groups is the same.

*Comparison* – This species is reminiscent of *N. ex gr. nodosus* in having umbilical ridges and a similar whorl section, but differs from it in having fewer, thicker and more swollen ribs. The described species is morphologically close to *N. cingulatus* in

its broad and thick ribs, but can be distinguished from it by its fewer, thicker and coarser ribs on the flanks from umbilicus to venter.

*Occurrence* – Upper Aptian of San Joaquin, Villa de Leyva (Loma Catalina), Galan, Villa de Leyva (opposit to land of Francisco Castillo), Guane (Vereda Chaguete), Mesitas del Colegio (Río Bogotá).

### Genus *Dufrenoyia* Kilian & Reboul, 1915

- 1915 *Parahoplites* (*Dufrenoyia*): Kilian & Reboul, p. 34.
- 1922 *Stenohoplites*: Spath, p. 100.
- 1923 *Dufrenoyia*: Spath, p. 147.
- 1925 *Dufrenoyia*: Burckhardt, p. 15.
- 1930 *Dufrenoyia*: Spath, p. 437.
- 1940 *Dufrenoyia*: Scott, p. 1021.
- 1949 *Dufrenoyia*: Humphrey, p. 119.
- 1949 *Dufrenoyia*: Stoyanow, p. 124.
- 1957 *Dufrenoyia*: Wright, p. 388.
- 1964 *Dufrenoyia*: Casey, p. 373.
- 1996 *Dufrenoyia*: Wright *et al.*, p. 273.
- 1999 *Dufrenoyia*: Bogdanova & Michailova, p. 527.

*Type species* – *Ammonites furcatus* J. de C. Sowerby (*in* Fitton, 1836); lower Aptian, England (designated by Kilian & Reboul, 1915, p. 34).

*Diagnosis* – Medium-sized shell, rarely large. Whorl section rounded-trapezoidal, with a narrow and flattened venter. Umbilicus moderately wide. One or two intermediate ribs are intercalated between two primary ribs. Ribs become weak and disappear on venter forming nodes on ventrolateral shoulders. Up to the middle of the fourth whorl the suture comprises four lobes; a bifid ventral lobe, a non-bifid lateral lobe, an umbilical lobe and an inner (or dorsal) lobe. The fifth lobe emerges from the subdivision of the inner saddle in the third whorl. The external saddle (E/L) first has a low external branch, but at the end of fifth to beginning of sixth whorl height of both branches becomes the same even. Sutural formula,  $ELU^1U^3:U^2I$ .

*Species composition* - Thirty-two species. *Dufrenoyia furcata* (J. de C. Sowerby *in* Fitton, 1836), Bowerbanki Zone of England, Furcata-Subfurcata Zone of the northern Caucasus, Furcata Zone of Turkmenistan, lower Aptian of Mangyschlag; *D. dufrenoyi* (d'Orbigny, 1841), lower Aptian of France, Furcata Zone of Turkmenistan, upper Aptian of Roumania, lower Aptian of Mexico; *D. codazziana* (Karsten, 1858), Sokota Formation of South America (Ecuador, Colombia, Venezuela); *D. lurensis* (Kilian, 1888), lower Aptian of France, Bowerbanki Zone of England, Furcata Zone of Turkmenistan, Peña Formation of Mexico; *D. justina* (Hill, 1893), upper Aptian of Texas, Mexico, Colombia; *D. somalica* (Mayer-Eimar), Aptian? of Somalia; *D. stuebeli* (Gerhardt, 1897), Aptian of Colombia; *D. subfurcata* (Kazansky, 1914), Furcata-Subfurcata Zone of the northern Caucasus, lower Aptian of Mangyschlag; *D. truncata* Spath, 1930, Bowerbanki Zone of England; *D. burckhardti* Scott, 1940, upper Aptian

of Mexico; *D. bösei* Humphrey, 1949, *D. durangensis* Humphrey, 1949, *D. mulatoensis* Humphrey, 1949, *D. scotti* Humphrey, 1949, *D. stenzeli* Humphrey, 1949, Peña Formation of Mexico; *D. sinzowi* Luppov *et al.*, 1949, lower Aptian of Povolzhye, Furcata Zone of Turkmenistan, Bowerbanki Zone of England; *D. joserita* Stoyanow, 1949, Joserita Formation (Aptian) of Arizona; *D. sanctorum* Bürgl, 1956, upper Aptian of Colombia; *D. huastezensis* Cantú Chapa, 1963, upper Aptian of Mexico; *D. discoidalis* Casey, 1964, *D. formosa* Casey, 1964, *D. mackesoni* Casey, 1964, *D. notha* Casey, 1964, *D. praedufrenoyi* Casey, 1964, *D. transitoria*, Casey, 1964, Bowerbanki Zone of England; *D. scalata* Casey, 1964, Bowerbanki Zone of England, Furcata Zone of Turkmenistan; *D. boteroi* Etayo-Serna, 1979, *D. hansbuergli* Etayo-Serna, 1979, Sokota Formation of Colombia; *D. fursovae* Bogdanova, Furcata Zone of Turkmenistan, lower Aptian of Mangyschlak.

*Comparison* – This genus differs from *Deshayesites* Kazansky, 1914, in its ribs becoming broad, often spatulate, on the upper part of the flanks and bearing elongated nodules or clavi at the ventrolateral shoulders.

*Distribution* – Lower Aptian of southeastern France, Roumania, Mexico, Texas, Arizona, Equador, Venezuela, England, Russian platform, north Caucasus, Georgia, Turkmenistan, western Kasakhstan, Nigeria, Japan, Somali, Colombia.

#### *Dufrenoyia codazziana* (Karsten, 1858)

Pl. 16, figs. 1-3.

1858 *Ammonites codazzianus* Karsten: Karsten, p. 108, pl. 3, figs. 4, 5.

1886 *Ammonites codazzianus* Karsten: Karsten, p. 108, pl. 3, figs. 4, 5.

1925 *Ammonites codazzianus* Karsten: Burckhardt, p. 18, pl. 10, figs. 10, 11.

1936 *Colombiceras codazzianus* (Karsten): Botero, p. 25, figs. 50, 51.

1979 *Dufrenoyia codazziana* (Karsten): Etayo-Serna, p. 58, pl. 1, figs. 1, 7, 8.

*Lectotype* – The specimen figured by Karsten (1858, pl. 3, fig. 4) from the “Gault of Nuevo Granada” (designated by Etayo-Serna, 1979, p. 59).

*Material* – Ten specimens, RGM 282 406-282 415.

*Description* – Involute shell with whorls that rapidly increase in height. Flanks slightly convex, venter flattened. Umbilicus narrow, stepped with a low subvertical umbilical wall and a rounded umbilical rim. Whorl section subrectangular or rectangular-oval.

The ribs are thin and dense, becoming stronger and wider from the middle of the flanks. The main ribs arise at the umbilical wall and may cross the umbilical rim as a weak ridge. Each main rib regularly alternates with one intermediate rib. The latter arise at different heights on the flanks, in the lower part or at the middle of the flanks. All ribs are slightly sigmoidal. On the ventrolateral margins at the ends of the ribs there are small nodules or indistinct low clavi. On the early whorls the venter is practically smooth, but at larger shell diameters the ribs cross the venter with a slight adorally convex curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	W/D	H/h	Ribs
RGM 282 409	15.4	4.6	6.9	3.6	5.8	30	45	38	1.9	48
RGM 282 410	18.0	4.9	8.4	5.0	6.1	27	47	34	1.7	48
RGM 282 414	19.3	5.6	8.2	5.1	6.3	29	42	33	1.6	~ 30
RGM 282 407	55.5	12.0	26.7	15.4	17.9	22	48	32	1.7	~ 37
RGM 282 411	56.3	14.7	25.7	16.0	21.0	26	46	37	1.6	~ 46
RGM 282 412	61.9	19.2	29.6	17.6	20.5	30	47	33	1.7	~ 50

*Comparison* – This species most probably belongs to the group of *D. dufrenoyi*. It differs from the latter species in the whorls being higher and more rapidly growing in height. Ribs on the ventrolateral shoulders are less prominent, the clavi less distinct. *Dufrenoyia fursovae* Bogdanova is close to *D. codazziana* in having such dense ribbing, but the first has dense ribbing at the expense of two intermediate ribs between each pair of main ribs.

*Occurrence* – Uppermost lower Aptian of Chipatá Vieja - Chipatá, Sáchica, Guane, Villa de Leyva (Loma Blanca), Galan.

*Distribution* – Uppermost lower Aptian of Colombia and Venezuela.

***Dufrenoyia* aff. *codazziana* (Karsten, 1858)**

Pl. 23, fig. 1.

*Material* – One specimen, RGM 282 416.

*Measurements* – D = 72.5; U = 12.8; H = 37.6; h = 20.0; W = 24.4; U/D = 18; H/D = 52; H/h = 1.7; W/D = 33.

*Remarks* – Differs from *D. codazziana* in its narrower umbilicus, its higher whorls and in its denser ribbing, which tends to smoothen with the growth of the shell.

*Occurrence* – Uppermost lower Aptian of Guane.

***Dufrenoyia* ex gr. *lurensis* Kilian, 1888**

Pl. 16, figs. 4, 5.

*Material* – Nine well preserved specimens, RGM 282 418-282 426.

*Description* – Small and medium sized, semi-involute shells with broad whorls, which slowly grow in height. The flanks are slightly convex or flattened, the venter is flat or slightly convex. The umbilicus is moderately wide; the umbilical wall is low and steeply or gently sloping. The umbilical rim is rounded and very indistinct. The whorl section is oval.

The sculpture consists of main and intermediate ribs bearing ventrolateral clavi. The main ribs originate just above the umbilical seam, cross umbilical rim slightly elevated and have a radial direction in the lower part of the flanks. In the outer part of the flanks,

they lose their height, and become broader and flatter towards the venter. On the ventrolateral margins they end in clavi, which are slightly outward directed. Intermediate ribs are very rare, irregular and originate at the middle of flanks or are equal to main ribs on the periventral part of flanks. The convex venter is smooth and moderately broad.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs.
RGM 282 418	14.0	4.1	6.2	4.0	5.7	28	44	1.5	40	20/11
RGM 282 423	15.5	4.5	6.4	4.3	5.6	29	40	1.5	36	22/14
RGM 282 424	17.9	5.7	7.3	4.8	6.4	31	40	1.5	36	16/18
RGM 282 419	22.6	6.1	9.1	6.4	7.4	27	40	1.4	33	16/12

*Comparison and remarks –* The group described here differs from the French *Dufrenoyia lurenensis* Kilian in the presence of intermediate ribs. The English specimen of *D. lurenensis* figured by Casey (1964, pl. 64, figs. 3-4) has coarser ribs with real tubercles instead of clavi on the ventrolateral shoulders. Besides, the shells of the English *D. lurenensis* are very large. Casey (1964, p. 383, text-figs. 138-139) believes that there are possibly ‘microconchs’ and ‘macroconchs’. Anyhow, the large specimens of the English *D. lurenensis* have a ribbing that differs from the small French *D. lurenensis*. The Colombian specimens look like the French ones. This species is morphologically very close to *D. furcata*. Both species belong to the same group characterized by an inflated shell with distant, rather coarse ribs, but *D. lurenensis* has even fewer and broader ribs.

*Occurrence –* Uppermost lower Aptian of Chipatá, Vieja-Chipatá, Guane, Galan, Villa de Leyva (Loma Blanca, Loma Moniquira).

***Dufrenoyia justinae* (Hill, 1893)**

Pl. 16, fig. 6; Pl. 17, figs. 1-4; Pl. 18; Pl. 19, fig. 1.

1893 *Acanthoceras? Justinae*: Hill, p. 38, pl. 7, figs. 1-3.

1893 *Hoplites roemeri*: Cragin, p. 234, pl. 44, figs. 4, 5.

1901 *Ammonites justinae*: Hill, pl. 21, fig. 6.

1925 *Dufrenoyia justinae* (Hill): Burckhardt, p. 17, pl. 10, figs. 14, 15.

1925 *Dufrenoyia texana*: Burckhardt, p. 20, pl. 9, figs. 2-15.

1940 *Dufrenoyia justinae* (Hill): Scott, p. 1022, pl. 60, fig. 62; pl. 62, fig. 9.

1949 *Dufrenoyia justinae* (Hill): Humphrey, p. 122, pl. 6, figs. 1-7; pl. 7, figs. 1-9.

1949 *Dufrenoyia justinae* (Hill): Stoyanow, p. 127, pl. 21, figs. 11-17.

1956 *Dufrenoyia texana* (Burckhardt): Bürgl, p. 3, pl. 1, fig. 1; pl. 2, figs. 2, 4; pl. 3, figs. 2-4.

1963 *Dufrenoyia justinae* (Hill): Cantú-Chapa, p. 57, pl. 4, fig. 6.

1982 *Dufrenoyia justinae* (Hill): Renz, p. 18, pl. 1, fig. 8.

*Holotype –* N1125, Bureau of Economic Geology, Austin, Texas; from the Cow Creek beds, Travis Reak Formation and lower beds of Cuchillo Formation; Aptian, Texas.

*Material –* Seventy two specimens, RGM 282 257-282 328.

*Revised diagnosis –* Medium-sized shell with semi-evolute (embracing about one-third of the preceding whorls), rather thick whorls. Ribbing fairly dense, up to 40 ribs

per whorl. Each main rib regularly alternates with one intermediate rib, except on the last parts of outer whorls of large specimens, where some intermediate ribs may be absent between two main ribs. Clavi on the ventrolateral shoulders not prominent. Ventral sides of late whorls covered with strong, coarse, asymmetrical ridges.

*Description* – Medium-sized shell with semi-evolute whorls, which slowly to moderately increase in height; the whorls are of medium thickness. The lower part of the flanks is slightly convex and flattened towards the venter; truncated venter flattened and narrow. Umbilicus moderately wide with high, generally almost vertical, but sometimes gently sloping wall; umbilical rim rounded. The whorl section is sub-rectangular to trapezoidal, and thickest in the lower part of the flanks.

Ribbing is fairly dense and consists of main and intermediate ribs, which usually regularly alternate. However, from a diameter of 40 mm, some intermediate ribs may be absent and two or more main ribs may follow each other. The main ribs originate just above the umbilical seam or at the middle of the umbilical wall. On the umbilical rim they are slightly strengthened and occasionally umbilical ridges are developed. The intermediate ribs usually begin at the middle of or at the lower third of the flanks as single ribs, but occasionally they split from the main ribs. All ribs are high, thin and moderately sigmoidal. On the outer part of the flanks all ribs tend to broaden and flatten like skulls, and on the ventrolateral shoulders they bear obtuse, clavate tubercles. These tubercles are connected by flat, rather broad belts that cross the venter of the early whorls; later, these junctions increase in height and obtain asymmetrical cross sections, i.e., the anterior slopes are gentle, whereas the posterior ones are steep to vertical.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 282 257	20.0	5.7	9.2	6.1	6.7	29	46	1.5	34	40
RGM 282 271	30.3	9.6	13.2	8.5	10.1	32	44	33	1.5	19/8
RGM 282 322	34.5	12.0	15.2	9.4	11.0	35	44	1.6	32	32
RGM 282 290	35.5	11.8	14.6	10.2	11.1	34	41	1.4	32	36
RGM 282 296	36.9	10.9	14.8	10.0	11.5	29	40	1.5	31	25/17
RGM 282 262	37.6	12.5	14.7	9.8	11.0	33	39	29	1.5	21/7
RGM 282 301	38.4	12.0	15.2	10.8	12.0	32	40	1.4	31	34
RGM 282 264	40.7	13.2	16.0	10.9	12.2	32	39	1.5	30	31
RGM 282 263	45.4	15.4	17.4	12.3	14.4	34	38	1.4	32	31
RGM 282 311	45.9	15.2	17.5	11.7	15.0	33	38	1.5	33	32
RGM 282 286	46.3	14.3	19.1	12.5	13.9	31	41	1.5	30	34
RGM 282 312	46.6	14.6	19.3	13.0	14.8	31	41	1.5	32	36
RGM 282 305	46.8	16.5	17.2	13.1	13.5	35	37	1.3	29	33
RGM 282 277	52.5	14.3	23.0	14.0	16.8	27	44	1.6	32	36
RGM 282 284	52.8	16.6	20.0	14.3	-	31	38	1.4	-	31
RGM 282 280	57.7	15.3	25.4	17.2	17.6	26	44	1.5	30	37
RGM 282 285	62.8	19.8	24.8	17.9	19.0	32	39	1.4	30	36
RGM 282 324	68.2	20.5	27.8	19.9	20.1	30	40	1.4	29	38
RGM 282 327	81.6	26.6	30.4	24.0	24.5	32	37	1.3	30	35

*Comparison and remarks* – This species resembles *D. dufrenoyi* d'Orbigny (1841, pl. 33, figs. 4-6), but the large diameters reached by *D. justinae* are unknown for *D. dufrenoyi*. Small specimens of *D. justinae* differ from *D. dufrenoyi* in their smaller involution, in the thicker whorls (the flanks are more convex near the umbilical rim), in the ribs being stronger in lower part of flanks than in the upper and crossing the venter as prominent belts.

*Dufrenoyia justinae* is a very variable species. Almost all Colombian species formerly formed part of '*D. justinae sensu lato*'. Gradually '*D. justinae sensu lato*' has been split up, first into subspecies, which later were regarded as separate species, such as *sanctorum*, *hansbuergli* and *renzi*. That is the reason why all these species are rather similar to each other. For comparison of each of these species with each other, see the descriptions below.

*Occurrence* – Uppermost lower Aptian of Villa de Leyva (Loma La Yesera, Loma Blanca), Chipatá Vieja-Chipatá, Guane (Finca Butaragua), Guane (along the road near the house of Fam. Rivera), Guane (Vereda Chaguete), Guane, Socorro, Galan, Sáchica (Loma Gonzales).

*Distribution* – Uppermost lower Aptian of North America (Texas, Mexico), South America (Colombia, Venezuela).

#### *Dufrenoyia* ex gr. *boesei* Humphrey, 1949

Pl. 19, fig. 2; Pl. 20, fig. 1.

*Material* – Two large internal moulds, RGM 282 404, 282 405.

*Description* – Large shells with high oval whorl sections. Flanks moderately convex; venter flattened; umbilicus rather narrow with low steep wall. Main ribs arise just above the umbilical seam, intermediate ribs at the lower third of the flanks. All ribs are rather sigmoidal, every two main ribs are separated by one intermediate rib. At the smallest visible diameter all ribs have pointed ends at the ventrolateral shoulders. On the venter the ribs are thin and acute, and run across the venter in a straight line. At larger diameters the ribs end in obtuse elevations and the ventral ribs are coarse and slightly curved towards the aperture.

#### *Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 282 405	94.3	24.2	43.3	27.6	-	26	46	1.6	-	~44
RGM 282 404	94.4	23.0	45.9	27.0	30.4	24	49	1.7	32	~50

*Remarks* – The described specimens differ from that of Humphrey (1949, p. 126, pl. 9, figs. 1, 2) in the wider umbilicus, the less high and almost perpendicular umbilical wall, in the ribs arising just above the umbilical seam instead of at the umbilical rim (probably all these differences are due to the deformation of the Mexican specimen), and in the lack of frequent and regular bifurcations of the ribs. However, Humphrey

wrote that the ribs regularly alternate on the outer half of the last whorl. The diameter of the Mexican specimen is 61 mm, that of the Colombian specimens nearly 95 mm. The described Colombian specimens may be regarded as belonging to the group of very closely related species, viz. *D. boesei*, *D. sinzowi* Luppov (in Luppov *et al.*, 1949 = *Hoplites cf. furcatus* Sowerby in Sinzow, 1910, p. 13, pl. 1, figs. 5, 6), and *D. formosa* Casey (1964, p. 395, pl. 63, fig. 3; pl. 65, fig. 3; pl. 66, figs. 4, 5a, b; text-fig. 140h). These species are characterized by rather fine, high, sharp ribs, which rather bear small tubercles than clavi at the ventrolateral shoulders. The exact determination of the Colombian specimens and the unification of these three species into one is not possible because of the different stages of shell growth and the incomplete preservation of these species. *Dufrenoyia ex gr. boesei* differs from *D. sinzowi* in its thinner whorl section and in the broader ribs on the outer part of the flanks. The ribs of the Colombian specimens bear short, obtuse clavi on the ventrolateral shoulders instead of nodose tubercles or simple elevations.

*Occurrence* – Uppermost lower Aptian of Villa de Leyva (Loma Catalina), Guane (Vereda Chaguete).

***Dufrenoyia sanctorum* Bürgl, 1956**

Pl. 17, fig. 5; Pl. 20, figs. 2-5; Pl. 21; Pl. 22, figs. 1-4.

1956 *Dufrenoyia texana sanctorum* Bürgl, p. 3, pl. 1, fig. 2; pl. 2, fig. 3, pl. 3, figs. 3-5.

1979 *Dufrenoyia sanctorum* (Bürgl): Etayo-Serna, p. 59, pl. 1, figs. 2-3; p. 60, pl. 1, fig. 3.

*Lectotype* – Universidad Nacional de Colombia, Museo de Historia Natural, Colección Paleontología (U.N.C.M.H.N.C.P.) HB. 406/1, figured by Bürgl (1956, pl. 1, fig. 2); designated by Etayo-Serna (1979, p. 59).

*Material* – Seventy five specimens, RGM 282 329-282 403.

*Description* – Shells of medium size with whorls of medium thickness or compressed, moderately growing in height, embracing the preceding whorl by about one-third or, very rarely, one-half of its whorl height. The lower part of the flanks are convex, but flattened up to the venter; the latter is rather broad and flattened, but may be slightly convex. The ventrolateral shoulders are indistinct. Umbilicus moderately wide; umbilical wall rather high, steep on the steinkern, but gently sloping on the shell; umbilical rim rounded. Whorl section subrectangular or slightly trapezoidal.

Ribbing consists of main and intermediate ribs; each pair of main ribs is separated by one intermediate rib, which is rarely absent. Besides, on the last portions of some large whorls the costation simplifies to simple, closely spaced, main ribs (probably on the last part of the body-chamber). On the internal mold the main ribs originate just above the umbilical seam, but on the shell they arise halfway up the umbilical wall. In the lower part of flanks the main ribs are thin and high; on the umbilical rim and a little higher they are generally (not all) elevated as umbilical ridges. From a diameter of < 20 mm the main ribs broaden and flatten from mid-flank upwards. The ribs become broader than their interspaces. The intermediate ribs arise at mid-flank or a little lower,

and broaden and flatten like the main ribs from their very start. All ribs are strongly flexuous. At the ventrolateral shoulders they terminate in distinct clavi, which are clearly elongated in the direction of the spire. These clavi are not united across the venter up to a diameter of 30 mm; from about this diameter onward the clavi are connected across the venter by flat transverse bars, which are broader than their interspaces. After a diameter of 60 mm the venter is crossed by strong and high ridges, which connect ventrolateral elevations instead of marginal clavi. These ridges cross the venter with a weak forward curve.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 282 393	18.4	6.5	7.6	5.2	6.1	35	41	1.5	33	32/17
RGM 282 338	23.4	6.0	10.3	7.0	8.0	26	44	1.6	34	40
RGM 282 339	24.0	7.2	10.3	6.6	6.9	30	43	1.6	29	37/19
RGM 282 333	24.2	5.7	11.7	7.2	9.6	24	48	1.6	40	40
RGM 282 346	25.0	7.5	11.3	6.9	9.2	30	45	1.6	37	28/20
RGM 282 340	25.5	6.8	11.7	7.4	8.7	27	46	1.6	34	42
RGM 282 376	25.6	7.1	11.0	7.1	8.2	28	44	1.5	32	33/19
RGM 282 334	26.3	7.1	11.6	8.1	9.4	27	44	1.4	36	31/18
RGM 282 330	31.5	9.2	13.0	10.3	9.1	29	40	1.2	29	16/8
RGM 282 347	33.4	10.2	13.0	9.0	11.0	30	39	1.4	33	29/19
RGM 282 381	36.0	11.2	15.2	10.5	10.8	31	42	1.4	30	26/18
RGM 282 351	37.8	12.4	15.2	10.5	12.0	33	40	1.4	32	30/24
RGM 282 336	38.4	11.5	16.3	11.0	-	30	42	1.5	-	-
RGM 282 382	39.6	13.6	16.7	11.4	12.7?	34	42	1.5	32	30/22
RGM 282 332	41.5	12.5	18.0	11.4	12.6	30	43	1.6	30	30/19
RGM 282 355	43.5	12.5	18.3	12.2	13.2	29	42	1.5	30	33/18
RGM 282 384	44.4	14.5	18.0	11.6	14.3	33	40	1.5	32	27/18
RGM 282 358	45.8	15.6	18.4	12.5	14.3	34	40	1.5	31	30/26
RGM 282 357	46.5	14.6	19.5	13.0	15.1	31	42	1.5	32	26/14
RGM 282 342	48.0	15.7	17.5	14.2	14.3	33	36	1.2	30	32/22
RGM 282 400	49.4	14.7	21.0	13.6	17.7	30	42	1.5	36	32/16
RGM 282 361	51.6	14.4	22.4	14.1	17.8	28	43	1.6	34	24/18
RGM 282 387	53.8	18.0	21.0	14.3	16.9	33	39	1.5	31	31/19
RGM 282 401	54.4	16.1	21.4	15.0	-	30	39	1.4	-	32/16
RGM 282 391	56.4	17.1	23.0	15.5	17.5	30	41	1.5	31	34/18
RGM 282 367	57.4	19.3	21.4	16.7	17.7	34	37	1.3	31	28/19
RGM 282 368	59.8	20.3	23.0	16.5	17.2	34	38	1.4	29	29/17
RGM 282 364	60.1	20.9	22.8	16.9	18.9	35	38	1.3	31	32/17
RGM 282 335	68.1	21.4	27.6	19.0	21.7	31	40	1.4	32	29/14
RGM 282 390	66.4	21.2	25.8	18.3	17.4	32	39	26	1.4	33/19
RGM 282 369	69.2	24.2	25.6	18.5	19.4	35	37	1.4	28	30/16
RGM 282 370	70.5	24.7	25.3	19.0	21.0	35	36	1.3	30	-
RGM 282 374	70.8	21.2	29.3	20.8	23.2	30	41	1.4	33	34/18
RGM 282 373	74.6	27.3	28.0	19.6	25.5	36	37	1.4	34	30/20
RGM 282 389	81.4	27.5	29.6	24.2	23.7	34	36	1.2	29	-

*Comparison* – This species is very close to *D. justinae*. At first it was introduced as a variety of *D. texana* (= *D. justinae*). However, *D. sanctorum* is characterized by stronger and broader ribs, and therefore has more elongated clavi and broader ventral bars. Besides, the broadening and flattening of the ribs begins in an earlier stage of the growing shell (specimens of about 20 mm diameter already show these ribs). Finally, the venter of *D. sanctorum* remains smooth up to a larger diameter than the venter of *D. justinae*.

*Occurrence* – Aptian of Mesa de los Santos, Utica, Chipatá Vieja – Chipatá, Guane, Villa de Leyva (Loma Blanca), Galan, Guane (Vereda Chaguete), Guana (Quebrada “El Hoya”).

*Distribution* – Uppermost lower Aptian of Colombia.

***Dufrenoyia ex gr. scalata* Casey, 1964**

Pl. 22, fig. 5.

*Material* – One specimen, RGM 282 417.

*Diagnosis* – Semi-evolute shell with thick whorls that slowly increase in height. Umbilicus wide with high, steep wall and rounded umbilical rim. Flanks almost regularly convex. Venter narrow and flattened. Ribs dense, with an irregular alternation of main and intermediate ribs; in some examples long intermediate ribs are missing between pairs of main ribs. Ribs strong, sharp in the lower part of the flanks, raised and broadened on the upper half, at the ventrolateral shoulders ending in tubercles that are elongated in the direction of the spire. All ribs cross the venter as raised rounded bars.

*Measurements* – D = 56.6; U = 17.6; H = 24.4; h = 15.4; W = 20.2; U/D = 31; H/D = 43; H/h = 1.56; W/D = 35; Ribs = 38/20.

*Remarks* – The described specimen is very similar to *D. scalata* Casey (1964, p. 386, pl. 63, fig. 6; pl. 66, fig. 1; text-fig. 140j) in having inflated whorls, narrow venter and strong, distinctly flexuous ribs. The venter is crossed by straight, thick ribs, which do not bear clavi at the ventrolateral shoulders. The Colombian specimen differs from *D. scalata* in its thicker whorl section and in the absence of bifurcating ribs; intermediate ribs are often missing between two main ribs.

*Occurrence* – Uppermost lower Aptian of Villa de Leyva (Loma Blanca).

***Dufrenoyia boteroi* Etayo-Serna, 1979**

Pl. 23, fig. 2; Pl. 24, figs. 1, 2.

1979 *Dufrenoyia boteroi* Etayo-Serna, p. 59, pl. 1, fig. 6; text-fig. 5M, 5N.

*Holotype* – C-233x-10 (U.N.C.M.H.N.C.P. N48), Museo de Historia Natural of the Universidad Nacional de Colombia, Bogotá.

*Material* – Seventeen specimens, RGM 282 427-282 443.

*Description* – Shells may reach large sizes, are semi-involute with thick whorls, which moderately increase in height. The convexity of the flanks is unequal; the whorl is thickest at the lower third of the whorl height. The venter is flat. The umbilicus is moderately wide and has a rather high, steep wall. The umbilical rim is rounded and indistinct. The whorl section is trapezoidal, increasing in height with shell growth.

The ribs are dense and strong. The main ribs are clearly sigmoidal on small shells and straighter on the large ones; they originate just above the umbilical seam or on the umbilical wall. Near the umbilical rim some ribs develop low umbilical ridges. From mid-flank the ribs become stronger. Up to 40-50 mm diameter the ribs are raised a little and are triangular or spatulate in section, but they change with growth to simply triangular. At the ventrolateral shoulders the ribs bear rounded nodes, which later become elongated in the direction of the spire. Joining of ribs across the venter begins at a diameter of 30-35 mm; they cross as thin, elevated ridges, but later with wide forward curves. On large specimens the ventrolateral nodes are small and the ventrolateral shoulders are merely angular. Every two main ribs is separated by one intermediate rib. The latter originate just above the umbilical rim on earlier whorls, but with growth the point of origin moves to mid-flank. On the upper part of the flanks and on the venter the intermediate ribs are equal to the main ribs.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs.
RGM 282 431	21.7	5.6	10.0	6.0	-	26	46	1.66	-	36
RGM 282 434	25.5	7.2	11.0	7.0	8.5	28	43	1.57	33	35
RGM 282 438	34.8	9.7	15.2	10.8	11.6	28	44	1.40	33	36
RGM 282 434	36.6	11.2	16.1	10.2	12.7	31	44	1.57	35	-
RGM 282 441	43.7	10.2	20.0	13.2	14.0	23	46	1.51	32	-
RGM 282 435	51.1	15.3	23.7	13.9	16.6	29	45	1.70	31	32
RGM 282 427	58.3	18.4	24.0	17.2	19.0	31	41	1.39	32	38
RGM 282 436	59.2	16.8	25.9	16.8	21.3	28	44	1.54	36	42
RGM 282 432	63.3	19.4	26.1	17.3	21.6	30	41	1.50	34	36
RGM 282 429	89.4	23.4	40.1	26.1	29.3	26	45	1.53	33	-

*Comparison* – *Dufrenoyia boteroi* differs from *D. justinae* in the broader and stronger ribs and the narrower interspaces. The venter is narrower. These features bring *D. boteroi* close to *D. scalata* Casey, from which it differs in the less convex whorl sides, in the thinner and finer ribs, and in the absence of bifurcating ribs. From *D. sanctorum* this species differs in the greater number of ribs, which bear rounded nodes instead of distinct clavi on the ventrolateral shoulders; it differs also in the narrower umbilicus and narrower venter.

*Distribution* – Uppermost lower Aptian of Colombia.

*Occurrence* – Uppermost lower Aptian of Villa de Leyva (Loma Catalina), Villa de Leyva (Loma Blanca), Chipatá Vieja – Chipatá, Guane (Finca Butaragua, Vereda Chaguete), Galan.

***Dufrenoyia renzi* sp. nov.**

Pl. 24, figs. 3-5; Pls. 25-27.

1982 *Dufrenoyia justinae* (Hill): Renz, p. 8, pl. 1, fig. 8a-b.*Holotype* – Compressed morph; RGM 212 382.*Paratypes* – Forty six specimens, RGM 212 362-212 381, 212 383-212 400, 282 249-282 256.*Type locality* – Guane.*Type horizon* – Uppermost lower Aptian.*Derivatio nominis* – In honour of the Swiss paleontologist Otto Renz.*Diagnosis* – Flattened, semi-evolute shell of medium size. Whorl sides very feebly convex, venter truncated with angular margins. Umbilicus moderately wide with low wall and indistinct rounded border. Ribs rare, feebly sigmoidal with marked strengthening on the flanks, terminating in short indistinct ventrolateral clavi.*Description* – Medium sized shells with compressed whorls which slowly to moderately increase in height. Flanks almost flat or very feebly convex. Venter wide and flattened with angular margins. Umbilicus moderately wide with a low, gently sloping wall on the early whorls, which later becomes rather steep. Whorl section high-rectangular.

Ribbing rather rare with an irregular alternation of main and secondary ribs. Main ribs considerably predominate. They begin at the umbilical seam or on the umbilical wall and some of them cross the umbilical rim forming weak ridges. On the flanks they are slightly sigmoidal and prorsiradiate. Secondary ribs are of different length, but almost all begin on the lower part of the flanks. Bifurcation is absent. In the lower part of the flanks all ribs are high and narrow, tending to broaden and flatten as they approach the venter. The ribs terminate in short and feeble clavi at the ventrolateral margins. On the early whorls the rib ends unite across the venter with thin low ridges; later, these connections develop into broad elevated ridges which are of the same width as the clavi.

*Measurements* –

	D	U	H	h	W	U/D	H/D	W/D	H/h	Ribs
RGM 212 372	29.9	9.7	11.7	8.0	9.4	32	39	31	1.4	20/8
RGM 212 393	31.8	10.8	12.8	8.2	10.8	34	40	34	1.6	26/17
RGM 212 375	32.0	11.0	12.5	8.8	9.3	34	39	29	1.4	28
RGM 212 374	35.5	10.8	15.3	10.3	11.7	30	43	33	1.5	30/20
RGM 282 256	36.0	11.1	14.8	10.0	11.3	31	41	31	1.5	24/18
RGM 212 362	38.8	14.5	14.0	11.0	11.5	37	39	30	1.3	18/6
RGM 212 394	39.0	12.5	16.1	11.0	11.6	32	41	29	1.5	28

	D	U	H	h	W	U/D	H/D	W/D	H/h	Ribs
RGM 212 391	40.2	13.4	16.0	10.8	12.0	33	40	30	1.5	18/8
RGM 212 376	41.0	14.8	15.3	10.7	11.5	36	37	28	1.4	29
RGM 212 373	41.6	15.6	14.7	10.7	11.8	37	35	28	1.4	24/10
RGM 212 365	42.7	13.1	18.0	12.1	14.7	31	42	34	1.5	22/8
RGM 212 384	43.0	14.8	16.0?	11.8	12.5	34	37	29	1.4	32
RGM 212 395	43,1	14.2	17.6	12.1	13.2	33	40	36	1.4	25/0
RGM 212 385	44.0	14.9	17.8	11.4	13.4	34	40	30	1.6	25/19
RGM 212 378	45.8	15.2	17.7	12.7	14.1	33	39	30	1.4	30
RGM 282 249	47.6	16.0	17.2	12.9	14.0	34	36	29	1.3	26/14
RGM 212 366	49.5	16.2	19.6	14.0	14.5	33	39	29	1.4	30/22
RGM 212 380	50.0	18.5	19.2	13.5	14.2	37	38	28	1.4	32
RGM 282 254	51.5	18.0	19.4	14.0	14.2	35	38	28	1.4	31/19
RGM 212 379	51.6	17.2	20.5	13.6	14.9	33	40	29	1.5	32
RGM 212 370	53.7	18.2	20.5	14.8	15.3	34	38	28	1.4	28/18
RGM 212 381	55.7	18.7	21.0	15.8	15.0	33	38	27	1.3	-
RGM 212 382	58.7	21.5	19.2	17.0	15.4	36	33	26	1.1	30/22
RGM 212 398	60.3	21.3	21.5	17.0	19.1	35	36	32	1.3	34/20
RGM 282 255	64.2	23.0	23.6	18.0	18.0	36	37	28	1.3	34/22
RGM 212 399	75.9	24.6	27.9	21.2	20.2	32	37	27	1.3	31/19
RGM 212 383	75.6	26.0	27.7	21.2	20.8	34	36	26	1.3	36/25
RGM 212 371	77.0	26.5	28.7	21.3	21.4	34	36	28	1.3	35/22

*Comparison* – This new species is similar to *D. lurenensis* (Kilian, 1888, p. 681, pl. 20, fig. 2a-b) in the absence of intermediate ribs, but differs in the smaller thickness of the whorls and the larger size of the shells. Specimens with greater numbers of intermediate ribs are very similar to *D. justinae* (Hill, 1893, p. 38, pl. 7, fig. 1-3). Renz (1982) probably described such a specimen in his monograph. *Dufrenoyia renzi* differs from *D. justinae* in its smaller number of weaker ribs, less distinct ventrolateral clavi, smaller thickness of the whorls and less convex flanks. The connections between the clavi across the venter are less distinct and coarse.

*Occurrence* – Uppermost lower Aptian of Utica, Guane, Guane (Finca Butaragua), Socorro, Villa de Leyva (Loma Blanca), Galan, Guane (Vereda Chaguete).

*Distribution* – Aptian (Cogollo Formation) of Venezuela, Aptian of Colombia.

### Genus *Juandurhamiceras* Etayo-Serna, 1979

1979 *Juandurhamiceras* Etayo-Serna, p. 42.  
 pars 1996 *Dufrenoyia* Wright *et al.*, p. L273.

*Type species* – *Juandurhamiceras juandurhami* Etayo-Serna, 1979.

*Diagnosis* – The adult shells may reach very large sizes, have high whorls with a subrectangular section in the early growth stages and an oval-rectangular or simply oval section in the adult stage. The flanks are almost parallel up to D = 70-80 mm, where

they become slightly convex. The venter is wide, flattened; ventrolateral shoulders are shown only because of the sharp thickening and bending of the ribs. The umbilicus is moderately wide and shallow. The ribs are rather widely spaced, and show an almost regular alternation of main and intermediate ribs. The ribs conspicuously change their relief on the flanks; in the lower part of the flanks they are high, sharp and thin, then the ribs show a sharp lowering, and in the upper part they are broad and thick. The ribs make a sharp bend at the ventrolateral shoulders and cross the venter as thick, straight ribs with rectangular cross section.

*Remarks* – Since Etayo-Serna introduced this genus in 1979, no subsequent publications on it have appeared that could have cleared up its taxonomic position. Etayo-Serna included this genus in the family Douvilleiceratidae; the reason for this is not clear. As to its ribbing, *Juandurhamiceras* is close to *Dufrenoyia*. That is probably the reason why *Juandurhamiceras* is included as a junior synonym of *Dufrenoyia* into the family Deshayesitidae by Wright *et al.* (1996, p. L273). However, we are of the opinion that *Juandurhamiceras* has sufficient characteristics of its own to consider it a valid, separate genus. Etayo-Serna, after Casey (1964, p.18), compared *Juandurhamiceras* with *Colombiceras* Spath, 1923, which exhibits a similar strengthening of the ribs in the upper part of flanks and on the venter, but this is only a minor morphological similarity. The ontogeny of the suture line of *Colombiceras* is different from that of the Deshayesitidae; on account of this *Colombiceras* has been included in another family, *viz.* Parahoplitidae.

At this moment the genus consists of three species; *J. juandurhami* Etayo-Serna, 1979, *J. joepecki* Etayo-Serna, 1979 and *J. giraldoi* Etayo-Serna, 1979. These are morphologically very close, especially the latter two, of which only one specimen of each is known.

*Distribution* – Upper Aptian of Colombia.

***Juandurhamiceras juandurhami* Etayo-Serna, 1979**

Pl. 49.

1979 *Juandurhamiceras juandurhami* Etayo-Serna, p. 42, pl. 4, fig. 2; pl. 3, fig. 5; text-figs. 5C, 5J, 12.

*Holotype* – Santa Ana A.P.G. (U.N.C.M.H.N.C.P. Ht. 31), Universidad Nacional de Colombia Museo de Historia Natural, Bogota.

*Paratypes* – Santa Ana A.P.G. (U.N.C.M.H.N.C.P. Pt. 32, 33, 34), Universidad Nacional de Colombia Museo de Historia Natural, Bogotá.

*Material* – Seven specimens, RGM 212 319-212 325.

*Description* – Large to very large shells with compressed or medium thick whorls, which rapidly increase in height. The flanks are almost flat and parallel up to D <50 mm, and slightly convex from D ~90 mm and more. At first the venter is wide and tabulate; with increasing diameter it becomes increasingly convex. The umbilicus is moderately wide and shallow with a low sloping wall. The umbilical rim is indistinct. The cross section of the whorls changes from almost square in the

young whorls to subrectangular or high-trapezoidal in the adult whorls.

The early whorls (D~20-25 mm) exhibit closely set, long ribs, which begin high on the umbilical wall. They are probably only main ribs. Then the ribbing becomes less dense and between each pair of long main ribs usually one intermediate rib appears. There is no bifurcation. The intermediate ribs are long and begin in the lower part of the flanks. All ribs are almost straight or very weakly sigmoidal. In the lower part of the flanks just a little above the umbilical rim all ribs are narrow, sharp and high. At the middle of the flanks there is a faint swelling on each rib. Above these swellings the ribs suddenly become low forming a depression, then grow in strength and breadth, and exhibit distinct elevations on the ventrolateral shoulders. On the venter the ribs are straight, broad and flat topped with a steep back slope and a gentle front slope. The ribbing of adult shells exhibits a weak difference in the relief of the main and intermediate ribs. Only a very few ribs bifurcate at the middle of the flanks.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	Ribs
RGM 212 320	29.4	9.6	13.2	8.1	9.5	33	45	1.6	32	25
RGM 212 319	38.6	13.3	14.3	9.9	11.3	35	37	1.4	29	-
RGM 212 319	52.0	20.5	19.3	13.5	14.3	39	37	1.4	37	26
RGM 212 323	90.0	27.8	38.6	23.0	26.7	31	43	1.7	30	2/11
RGM 212 321	95.0	27.4	36.0	20.2	25.3	29	38	1.8	27	22/12
RGM 212 321	117.0	37.0	42.0	31.5	34.6	32	44	1.3	30	-
RGM 212 322	217.0	64.6	93.0	62.0	>50	30	43	1.5	>23	-/14

*Remarks –* As said above, there are only three species in *Juandurhamiceras*, viz. *juandurhami*, *joepecki* and *giraldoi*. The two latter species differ from *J. juandurhami* only in having slightly thinner ribs on the whole; it is very difficult to distinguish them from the described species. Moreover, these species are unsatisfactorily figured in Etayo-Serna's monograph, so it is difficult to judge whether they might be regarded as separate species or not.

*Occurrence –* Middle/upper Aptian, Villa de Leyva, Galan (left bank Río Suárez, house of Don Alvero, Santander); Aptian of Loma Blanca (Villa de Leyva), along the road from Anapoima to Apulo (Cundinamarca).

*Distribution –* Middle/upper Aptian of Colombia.

**Superfamily Haploceratoidea Zittel, 1884**

**Family Oppeliidae H. Douvillé, 1890**

**Subfamily Aconeceratinae Spath, 1923**

***Aconeceras* Hyatt, 1903**

*Type species –* *Ammonites nisus* d'Orbigny, 1841, p. 184.

*Diagnosis –* Small oxyconic shells; whorl section high, subrectangular; flanks almost flat, diverging towards umbilicus; umbilicus narrow with low wall and angular rim.

Venter broad, with distinct or indistinct ventrolateral shoulders. Finely serrated carina situated in the middle of venter. Sculpture consists of fine sickle-shaped ribs, which may differ in strength.

*Comparison* – This genus differs from *Protaconeceras* Casey, 1954, in having a smaller shell size, a narrower venter with a more delicate crenulate keel, flatter flanks and more lateral lobes. From *Falciferella* Casey, 1954, it differs in having a keeled venter throughout ontogeny instead of a flat venter in the later whorls. *Falciferella* has very prominent, acutely falcate ribs with a furrow at mid-flank, where the ribs change direction. The suture line of *Aconeceras* is characterized by more incised elements.

*Distribution* – Upper Barremian – Lower Albian; Europe, central Asia, Greenland, northern and southern Africa, Madagascar, Australia, South America.

***Aconeceras nisoides* (Sarasin, 1893)**

Pl. 45, figs. 1, 2.

1893 *Oppelia nisoides* Sarasin, p. 155, pls. 4-6, fig. 10a-c; text-figs. 3, 5.

1902 *Oppelia nisoides* Sarasin: v. Koenen, p. 51, pl. 16, fig. 6a- c; pl. 45, fig. 4a, b.

1906 *Oppelia nosoides* Sarasin: Danford, p. 111, pl. 14, fig. 7.

1921 *Aconeceras nisoides* (Sarasin): Spath, p. 311, pl. 26, fig. 4a, b; text-fig. 9b.

1954 *Aconeceras nisoides* (Sarasin): Casey, p. 270, pl. 7, fig. 6.

? 1960 ?*Aconeceras nisoides* (Sarasin): Reyment, p. 113, pl. 1, fig. 1.

1961 *Aconeceras nisoides* (Sarasin): Casey, p. 125, pl. 26, fig. 3-5; text-fig. 41a-c.

*Holotype* – *Oppelia nisoides* Sarasin, 1893, pls. 4-5, fig. 10a-c, designated by Casey (1961, p. 125).

*Material* – Five specimens, RGM 212 189-212 193.

*Description* – Small, involute oxycones with flat whorls which rapidly increase in height. The umbilicus is narrow with a low sloping wall and an angular umbilical rim. The venter is rather broad; the ventrolateral shoulders are distinct on well preserved specimens. The whorl section is high, trapezoidal to subrectangular.

The ornamentation consists of lateral ribs and a ventral keel. The ribs are rather fine, flat, of low relief, but distinctly sickle-shaped. Sometimes the 'handle of the sickle' is finely striated, sometimes as is the sickle itself. The ventral keel is extremely finely serrated.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D
RGM 212 189	14.7	2.2	8.8	3.8	4.5	14	59	2.3	30
RGM 212 192	16.5	2.6	9.4	5.0	5.0	15	56	1.8	30
RGM 212 193	16.6	2.5	9.2	4.4	5.2	15	55	2.1	31
RGM 212 191	19.0	3.5	10.3	5.4	5.2	18	54	1.9	27

*Comparison* – The species *nisoides* occupies an intermediate position between the species *A. nisum* (d'Orbigny, 1841, p. 184, pl. 55, fig. 7-9) and *A. haugi* (Sarasin, 1893, p.

156, pls. 4-6, fig. 11a-c). From *A. nisum* this species differs in having more distinct ribs; *A. nisum* has almost smooth flanks. The ribs of *A. haugi* have more relief especially in the middle of flanks, where the ribs change direction from radiate to rursiradiate.

*Occurrence* – Lower Aptian: Sáchica, Socorro, Villa de Leyva (Loma Blanca), Guane.

*Distribution* – Lower Aptian of Europe (southern England, northern Germany, France, Bulgaria, Russia (Povoljje), central Asia (Transcaspian area), Colombia.

**Superfamily Desmoceratoidea Zittel, 1895**

**Family Desmoceratidae Zittel, 1895**

**Subfamily Pseudosaynelliinae Casey, 1961**

**Genus *Pseudosaynella* Spath, 1923**

*Type species* – *Ammonites bicurvatus* Michelin, 1838.

*Diagnosis* – Oxycones with flexuous to falcooid ribs and constrictions. Early and later whorls smooth. Whorls of 30-100 mm diameter are ribbing. Suture line with numerous, descending auxiliaries.

*Comparison* – *Pseudosaynella* differs from the other genus in this subfamily, *Aioloceras* Whitehouse, in having smooth whorls in the early growth stages of the shell and in the late appearance of its sculpture; in *Aioloceras*, on the contrary, the sculpture disappears with the growth of the shell

*Distribution* – Aptian of western Europe, Georgia, central Asia (Transcaspian area), Colombia and Japan?

***Pseudosaynella bicurvata* (Michelin, 1838)**

Pl. 28, figs. 1, 2.

1838 *Ammonites bicurvatus* Michelin, p. 101, pl. 12, fig. 7.

*pars* 1841 *Ammonites bicurvatus* Michelin: d'Orbigny, p. 286, pl. 84, only fig. 3, *non* figs. 1, 2, 4 (= holotype of *Cleonicerias cleon* d'Orbigny).

*non* 1865 *Ammonites bicurvatus* Michelin: Trautschold, p. 22, pl. 3, fig. 17 (= holotype of *Sinzovia trautscholdi* Sinzow).

*non* 1872 *Ammonites bicurvatus* Michelin: Tietze, p. 137, pl. 9, fig. 5 (= *Barremites strettostoma* Uhlig).

1893 *Sonneratia bicurvata* (Michelin): Sarasin, p. 161, pl. 4, figs. 1a, 2a, 3a; pl. 5, figs. 1b, 3b, 3b, figs. 8, 9.

1960 *Pseudosaynella bicurvata* (Michelin): Drushchits, p. 302, pl. 45, figs. 2a, b, text-fig. 88.

1964 *Pseudosaynella bicurvata* (Michelin): Casey, p. 171, text-fig. 53a, b, c.

1975 *Pseudosaynella* aff. *bicurvata* (Michelin): Lillo Beviá, p. 686, pl. 4, figs. 7, 8.

1982 *Pseudosaynella bicurvata* (Michelin): Martinez, p. 57, pl. 3, figs. 1a, b, 2a, b, 3a, text-fig. 9.

1999 *Pseudosaynella bicurvata* (Michelin): Bogdanova & Prozorovsky, pl. 7, figs. G, H.

*Holotype* – *Ammonites bicurvatus* Michelin, 1838, pl. 12, fig. 7, deposited in the École des Mines, Paris.

*Material* – Four specimens, RGM 353 739-353 742.

*Description* – Strongly compressed, discoidal, involute, medium sized shells with whorls that rapidly grow in height. Venter very narrow, almost sharp, ventrolateral shoulders practically absent. Flanks flat or slightly convex, gradually converging to the venter. Greatest thickness at the umbilical rim. Umbilicus narrow, stepped, deep; umbilical wall low. Whorl section sagittate.

Ribs are sigmoidal and indistinct. They originate on the flanks near the umbilical rim. In the lower part of the flanks they are prorsiradiate, in the middle they sharply curve backwards and in the upper part of flanks they form a weak adapical curve. Near the venter ribbing fades away; the venter is smooth. Ribbing is of unequal breadth, sometimes covered with longitudinal furrows. The ribs may branch in the lower part of the flanks. On the early whorls the shell bears constrictions, which gradually weaken with growth and at last merge with the interspace. Suture line not visible.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D
RGM 353 740	23.8	2.9	13.4	7.6	7.2	12	56	1.8	30
RGM 353 741	37.3	4.3	21.3	11.7	10.7	11	57	1.8	28
RGM 353 739	47.8	4.9	27.0	15.8	12.3	10	56	1.7	25

*Comparison* – *Pseudosaynella bicurvata* differs from the *P. raresulcata* Leymerie in d'Orbigny (1841, p. 288, pl. 85, figs. 5-7) and *P. heimi* Sarasin (1893, p. 162, pl. 4, fig. 7) in its feeble ribbing, smaller whorl thickness and the less prominent constrictions, which are also present on the early whorls.

*Occurrence* – Lower Aptian of Villa de Leyva, Loma Blanca.

*Distribution* – Lower Aptian of Colombia; lower Aptian of France (Paris Basin), north Caucasus (Kuban river), Transcaspien area (Tuarkyr, Great Balkhan).

***Pseudosaynella ex gr. undulata* (Sarasin, 1893)**

Pl. 28, fig. 3.

*Material* – Three specimens, RGM 212 317, 212 318, 353 756.

*Description* – Compressed, discoidal, involute, medium sized shell with whorls that rapidly grow in height. Venter very narrow, sharp on the early whorls and later becoming rounded. Ventrolateral shoulders not prominent. Flanks slightly convex. Umbilicus narrow, deep, stepped; the umbilical wall is very low, vertical; the umbilical rim is angular. Whorl section sagittate and later high-oval; greatest thickness near the umbilicus.

The ribs are falcid and originate near the umbilical rim. On the lower part of the flanks they are thin, indistinct and branching; on upper part of flanks they have the shape of broad blunt swellings. Near the end of the last whorl they cross the venter as low broad ridges. Suture line not visible.

*Measurements* – RGM 353 756: D = 33.6; U = < 5.0; H = 17.5; h = 11.0; W = 11.0; U/D = < 14; H/D = 52; H/h = 1.6; W/D = 32.

*Remarks* – This specimen has distinct convex flanks, rather prominent ribs and belongs to the *Pseudosaynella undulata* group. However, the specimen figured by Sarasin (1893, pl. 4, fig. 8) and *P. aff. undulata* in Casey (1961, p. 173, pl. 29, fig. 4a, b, c) have stronger ribs. *Pseudosaynella ex gr. undulata* differs from *P. bicurvata* in its oval whorl section with rounded venter. Besides, the ribs of the Colombian species are crossing the venter.

*Occurrence* – Lower Aptian of Anapoima-Apulo.

**Subfamily Puzosiinae Spath, 1922**  
***Valdedorsella* Breistroffer, 1947**

*Type species* – *Desmoceras akuschaense* Anthula, 1899, p. 104, pl. 8, fig. 3a-c.

*Diagnosis* – Inflated shell with broad, rounded venter; whorl section oval to depressed; radial constrictions more or less sigmoidal, with a prominent rounded rib in the middle; normally rather weak ribs between constrictions.

*Comparison* – In the subfamily Puzosiinae *Valdedorsella* shows the closest morphological similarities with *Pseudohaploceras* Hyatt. *Valdedorsella* differs from the latter in having a much greater whorl thickness (H/W commonly < 1.0) and a weaker sculpture; intermediate ribs are shorter and do not approach the umbilical rim. Large specimens of *Valdedorsella* (for instance, *V. inca*) with smoothed sculpture look like *Abrytusites* Nikolov & Breskovski. The late whorls of the latter genus have rather thick undulations of irregular length, whereas *Valdedorsella* has regular ribs between the constrictions.

*Distribution* – Lower Barremian - upper Aptian of southeastern Europe, Caucasus, central Asia (Transcaspien area), northern Africa, Madagascar, Japan, Alaska, Colombia, Argentina.

***Valdedorsella ex gr. getulina* (Coquand, 1880)**  
Pl. 28, figs. 4, 5.

*Material* – Three specimens, RGM 353 753, 353 755, 353 760.

*Description* – Medium-sized, compressed shells with low, broad whorls, which moderately increase in height. Whorl sides are convex, slightly diverging towards the umbilicus; venter broad, evenly convex. Ventrolateral margins indistinct. Umbilicus rather narrow, deep, stepped; umbilical wall high, vertical; umbilical border smoothly rounded. Whorl section on the whole wide-oval and broadest near the umbilicus, with a shallow groove at the dorsum.

There are six collars on the shell, which begin at the umbilical border and rapidly become broad; they are slightly sigmoidal and prorsiradiate on the flanks. They cross the venter as broad, flattened and rather low bands, slightly curving forward at mid-venter. Along the anterior as well as the posterior side of the collars are weak constrictions, the anterior one being narrower than the posterior one. In the interspace

between two successive collars there are about eight weak ribs. The ribs originate at the umbilical rim or a little above it. In the interspaces on the early whorls the ribs are thinner and more approximated than on later whorls. Some ribs are a little more prominent, while some are branching near the umbilical border.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 760	33.5	9.5	13.2	10.4	17.3	28	39	1.26	52	0.76
RGM 353 753	36.6	9.4	15.9	11.0	20.7	26	43	1.44	56	0.76

*Comparison* – The described specimens are very close to *V. getulina* (Coquand, 1880, p. 18), above all by their wide and low whorl section. However, they differ from *V. getulina* by their larger shells. Besides, the ribs of the Colombian specimens are more distinct, which may be explained by their occurrence on more adult whorls. The specimen from Madagascar figured by Collignon (1962, p. 33, pl. 229, fig. 978) is also small and has a thick whorl section, but it is a steinkern whereas the Colombian specimens are covered with shell; it is therefore very difficult to compare the sculpture of these specimens. The Colombian specimens may be conspecific with Coquand's species, but the latter has a smaller number of constrictions. *Valdedorsella akuschaensis* (Anthula, 1899, p. 104, pl. 8, fig. 3) is also very close to the Colombian specimens, but has a higher whorl section.

*Occurrence* – Barremian of Villa de Leyva (Loma la Yesera, Santo Ecce Homo).

***Valdedorsella ex gr. akuschaensis* (Anthula, 1899)**

Pl. 28, fig. 6.

*Material* – Four specimens, RGM 353 751, 353 754, 353 757, 353 761.

*Description* – Medium-sized, semi-involute shells with inflated, depressed whorls which moderately increase in height. Flanks flattened or evenly convex, slightly diverging towards the umbilicus. Venter broad and rounded. Umbilicus deep; umbilical wall high, almost vertical; umbilical rim rounded, but distinct. Whorl section wide-oval.

Sculpture consists of constrictions, collars and intermediate ribs between the constrictions. The constrictions, especially distinct on steinkerns, begin on the umbilical wall; they are slightly sigmoidal on the flanks. There are seven collars, which divide the constrictions into two parts. The constriction on the posterior side is wider and shallower than the one on the anterior side. Collars begin at the umbilical rim, where they are relatively weak and do not differ from some intermediate ribs. On the upper half of the flanks the collars strengthen and are distinctly sigmoidal. There are seven to nine intermediate ribs between the constrictions. Some of them (one or two) begin at the umbilical rim and bifurcate at mid-flank. This bifurcation is not distinct. Besides, there are short intermediate ribs, which begin just below or above mid-flank; they are simple, or branch from the long intermediate ribs.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 757	38.1	10.5	16.3	11.3	20.0	27.5	42.7	1.44	52.4	0.81
RGM 353 761	42.1	11.4	18.0	12.7	19.7	27.0	42.7	1.41	46.7	0.91
RGM 353 751	48.3	13.6	19.7	14.5	22.9	28.1	40.7	1.35	47.4	0.86

*Comparison* – *Valdedorsella akuschaensis* (Anthula) is morphologically closest to the described species. The Caucasian specimens (Anthula, 1899, p. 104, pl. 8, fig. 3; Lupov *et al.*, 1949, p. 213, pl. 60, fig. 2; Drushchits, 1960, p. 301, pl. 44, fig. 3) are, however, characterized by finer intermediate ribs between the collars. Closer to the Colombian species are the French (Jacob, 1905, p. 402, pl. 12, fig. 1; Thomel, 1980, p. 121, fig. 241) and Madagascan specimens (Collignon, 1962, p. 33, pl. 129, fig. 979), as the intermediate ribs are stronger than those of the Caucasian specimens. Among the Colombian species described by Etayo-Serna (1979) there is one, *Valdedorsella? colombiana*, with strong intermediate ribs (too strong for *Valdedorsella*). However, the description of this species is not understandable; “27 flared ribs per whorl” (Etayo-Serna, 1979, p. 24). Besides, the number of intermediate ribs of the described specimens does not decrease with the growth of the shell, as it does on the species of Etayo-Serna.

*Occurrence* – Middle/upper Aptian of Villa de Leyva (Loma Catalina), Sáchica, Galán, Anapoima-Apulo.

***Valdedorsella inca* (Forbes, 1845)**

Pl. 29, figs. 1, 2; Pl. 30, figs. 1, 2; Pl. 31 figs. 1, 2; Pl. 32, fig. 1.

1845 *Ammonites inca* Forbes, p. 176, 177, fig. 10.

1938 *Pseudohaploceras? incertum* Riedel, p. 14, pl. 4, fig. 1-5.

1958 *Pseudohaploceras inca* (Forbes): Bürgl, p. 133, pl. 5, fig. 1, 3.

? 1966 *Pseudohaploceras incertum* Riedel: Breskovski, p. 96, pl. 8, fig. 7.

*Holotype* – Specimen figured by Forbes (1845, p. 177, fig. 10) is designated herein, deposited in the Natural History Museum, London, registration number C 53228.

*Material* – Seventy eight specimens. *Morpha planata*, H/W > 1: RGM 212 306-212 307, 212 311-212 315, 354 036-354 054, 354 069, 354 072-354 088, 354 091-354 092, 354 094-354 102-354 105, 354 111-354 116. *Morpha normal*: RGM 354 071, 354 090, 354 108, 354 110. *Morpha inflata*, H/W < 1: RGM 212 308-212 310, 212 316, 354 070, 354 089, 354 093, 354 106, 354 107, 354 109.

*Revised diagnosis* – Large shell with thick, trapezoidal or depressed-oval whorl section. Thickness of the whorls changes from moderately thick to inflated. Width of umbilicus varies from rather narrow to moderately wide. Constrictions wide and deep, slightly sinuous. Very fine ribs of different length between the constrictions.

*Description* – Large, semi-involute shells with depressed whorls which moderately increase in height. Flanks are evenly convex and slightly converging to the venter. The latter is broad and slightly convex; the ventrolateral margins are rounded and indis-

tinct. The width of the umbilicus varies from rather narrow to moderately wide; it is deep, stepped and has a high vertical wall; the umbilical border is rounded, but distinct. Whorl section depressed-oval or wide-trapezoidal.

The sculpture consists of constrictions and intercalated ribs in each sector between two successive constrictions. The constrictions are wide, begin on the umbilical wall, where they are prorsiradiate. On the flanks they are also prorsiradiate, very weakly sigmoidal. There are thick ribs (on the shell material) or still more prominent collars (on the steinkern) which divide the constrictions into two unequal parts; the posterior part is shallower and wider than the anterior part. Thick ribs or collars begin at the umbilical border or higher, on different heights of the flanks. In some the lower end of this ribs approach the border of the anterior constriction. The ribs between the constriction are very weak, fine and of different length. Some ribs of the anterior part of a sector approach the border of the constriction and connect with it at different heights of the flank, forming bundles. The umbilical parts of these bundles are swollen. Very rarely there is one strong rib within a sector, which begins at the umbilical border as a swelling and indistinctly bifurcates on the flanks. On the broad wide venter there are distinct thick ribs bordered by the two parts of the constrictions and very weak ribs or striae in between the constrictions.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 076	27.3	5.7	12.6	8.6	-	20	46	1.5	-	-
RGM 354 073	31.5	6.1	14.9	-	-	19	47	-	-	-
RGM 354 082	41.0	8.3	19.7	12.9	16.1	20	48	1.5	39	1.22
RGM 354 083	51.0	13.1	21.8	15.3	20.1	26	42	1.4	39	1.08
RGM 354 089	59.0	16.6	25.7	19.3	26.0	28	43	1.3	44	0.98
RGM 354 086	68.0	21.8	28.5	20.0	28.0	32	42	1.4	41	1.17
RGM 354 106	81.3	25.2	31.7	23.9	38.3	31	49	1.3	47	0.82
RGM 354 107	81.5	22.1	36.8	25.0	37.1	27	45	1.5	45	0.99
RGM 354 048	81.8	23.2	33.9	24.0	28.3	28	41	1.4	34	1.19
RGM 354 109	83.1	20.	37.6	25.2	42.0	24	45	1.5	50	0.89
RGM 354 103	87.3	27.8	32.8	26.3	31.2	32	37	1.2	36	1.05
RGM 354 072	88.1	25.3	35.6	25.2	29.5	29	40	1.4	33	1.20
RGM 354 070	98.7	28.3	39.2	29.4	40.6	29	40	1.3	41	0.96

*Intraspecific variation* – Among the described specimens there are inflated forms (morpha inflata) with  $H/W < 1$  and compressed forms (morpha planata) with  $H/W > 1$ . The compressed forms predominate. Subdivision into 'forma inflata' and 'forma planata' is not appropriate, because the compressed shells are also rather swollen. There are transitional forms between the two morphs, the so-called 'normal' forms.

*Comparison and remarks* – *Valdedorsella inca* differs from *V. akuschaensis* (Anthula) in attaining a larger size, and in having more swollen collars and wider constrictions near the umbilical border. It differs from *V. getulina* in having a larger size and a smaller whorl thickness. According to Cecca (written comm., 2004), '*V. inca* Forbes is a typical representative of the genus *Pseudovaldedorsella* Cecca et al., 1998.

Some compressed shells of 50-70 mm in diameter are rather similar to the early whorls of *Pseudohaploceras leywaense*, for instance, in both species the ends of the constrictions approach the umbilical rim, umbilical parts of the collars are swollen. These similarities between the species of *Valdedorsella* and *Pseudohaploceras* show the close relations between these genera. However, the intermediate ribs between the constrictions of *P. leywaense* become more distinct in the course of the shell growth, whereas those of the described species become weak and indistinct.

*Occurrences* – Barremian of Villa de Leyva (Loma Blanca, Loma la Yuca, Loma Cabrera, Loma La Yesera, Santo Ecce Homo), Velez-Chipatá; Aptian of Mesa de Los Santos, Villa de Leyva (Santo Ecce Homo, Loma Blanca), Puente Nacional - Jesus Maria (Río Suarez).

*Distribution* – Lower Barremian of Colombia, Bulgaria.

### ***Pseudohaploceras* Hyatt, 1900**

*Type species* – *Ammonites liptoviensis* Zeuschner, 1856, p. 181, pl. 2, figs. 1a, b, c.

*Diagnosis* – Moderately involute, slightly to moderately compressed shell, with convex or flattened sides; with regular, more or less sinuous constrictions (almost always collared). Between these constrictions rather fine, distinct, sharp or rounded, branching ribs are present, which originate at the umbilical rim or higher and cross the venter.

*Comparison* – The comparison with the morphologically most similar genus of this subfamily, *Valdedorsella*, is discussed above. *Pseudohaploceras* differs from the genus *Abrytusites* Nikolov & Breskovski in having real ribs between the collars/constrictions instead of radial undulations, and in the absence of umbilical bullae.

*Distribution* – Barremian-Aptian of Europe, central Asia (Transcaspian area), Sinai, Japan, Mexico, Colombia.

### ***Pseudohaploceras hopkinsi* (Forbes, 1845)**

Pl. 32, figs. 2-5; Pl. 33, fig. 6.

1845 *Ammonites hopkinsi* Forbes, p. 176, fig. 9.

1858 *Ammonites hopkinsi* Forbes: Karsten, p. 112, pl. 5, figs. 2, 3.

1886 *Ammonites hopkinsi* Forbes: Karsten, p. 112, pl. 5, figs. 2, 3.

non 1958 *Puzosia hopkinsi* (Forbes): Bürgl, p.136, pl. 10, fig. 1.

*Holotype* – *Ammonites hopkinsi* Forbes, 1845, p. 176, fig. 9, designated here, deposited in the Natural History Museum, London, registration number C 53229.

*Material* – Twenty nine specimens, RGM 353 779-353 807.

*Description* – Medium-sized, semi-involute shells with whorls of medium thickness, which moderately increase in height. Flanks are evenly convex, diverging to

umbilicus. Umbilicus deep with steep wall and rounded rim.

The sculpture consists of constrictions, collars and ribs between the constrictions. Ammonites with a diameter smaller than 30 mm are covered with dense striae; only on the venter of the shell just before reaching this diameter there are some flared ribs. On the steinkerns the constrictions are rather narrow; they begin at the umbilical wall on which they are prorsiradiate; on the flanks they are slightly sigmoidal. On the shell the constrictions are shallow, rather wide and distinct only on venter. The collars begin on the lower third or half of the flanks and are distinctly sigmoidal. The ribs between the constrictions are rather weak and of different length, but all begin near the middle of the flanks. There is no difference between main and secondary ribs. All ribs are sigmoidal. The lower parts of the flanks are covered with fine, but distinct, striae around the umbilical border. The constrictions, collars and ribs between them are crossing the venter with a wide forward curve.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 782	25.7	5.8	11.5	7.0	10.3	22.5	44.7	1.64	40.0	1.11
RGM 353 787	38.5	8.0	18.3	12.7	15.5	20.7	47.5	1.44	40.7	1.18
RGM 353 791	43.1	9.3	18.8	13.0	16.1	21.5	43.6	1.44	37.3	1.16
RGM 353 795	44.6	10.8	19.0	13.2	18.3	24.2	42.6	1.43	41.0	1.03
RGM 353 802	49.3	14.0	21.5	14.6	21.2	28.3	43.6	1.47	43.0	1.
RGM 353 788	71.8	20.0	30.6	20.6	27.3	27.8	50.1	1.48	38.0	1.12

*Comparison – Pseudohaploceras hopkinsi* differs from *P. matheroni* (d'Orbigny, 1841, p. 148, pl. 48, fig. 1-2) in having finer, shorter ribs between two constrictions, in the absence of a differentiation of these ribs in main and intermediate ones, and in the absence of bifurcations among these ribs.

*Distribution –* Colombia; Aptian.

*Occurrence –* Aptian of Sáchica, Villa de Leyva (Loma Blanca, Sutamarchan, opposit to Loma la Asomada), Galan.

***Pseudohaploceras douvillei* (Fallot, 1920)**

Pl. 33, figs. 1-5; Pl. 34, fig. 1.

1916 *Puzosia matheroni* (d'Orbigny): Douvillé, p. 103, pl. 13, figs. 1-7.

1920 *Puzosia douvillei* Fallot, p. 258, pl. 1, fig. 4.

1952 *Pseudohaploceras douvillei* (Fallot): Luppov, p. 187, pl. 4, fig. 3.

1998 *Pseudohaploceras douvillei* (Fallot): Avram & Melinte, p. 1122, pl. 1, fig. 6.

*Lectotype –* Specimen, figured by Douvillé (1916, pl. 13, fig. 3), designated herein, deposited in the École des Mines, Paris.

*Material –* Hundred and seven specimens, RGM 212 245-212 272, 353 770, 353 855-353 905, 353 907-353 932, 354 128.

*Description* – Medium and large sized shells with medium thick whorls, which moderately increase in height. Flanks slightly and evenly convex; venter rather narrow, rounded; ventrolateral margins indistinct. Umbilicus changes during growth from rather narrow to moderately wide and has a high steep wall; umbilical border rounded, but rather distinct.

Sculpture consists of constrictions, collars and intermediate ribs between the collars. On steinkerns the constrictions are very distinct, rather wide, and begin on the umbilical wall; on the flanks they are sigmoidal and prorsiradiate. One strong rib divides the constriction into two unequal parts; the posterior part is wider than the anterior part. This strong rib disappears at the lower third of the flank, approaching the border of the anterior constriction. On specimens covered with shell material these ribs are collars. On specimens smaller than  $D=20$  mm the collars are absent. At first they appear only on the venter, but successively reach farther down on the flanks. Still later in the ontogeny they originate near the umbilical border or a little above it, and rapidly widen and strengthen towards the venter; they are distinctly sigmoidal. Up to  $D=20$  mm there are indistinct bands between every two collars; later these bands change into real ribs. At  $D=30-40$  mm there are eight to eleven ribs between each pair of collars; these ribs begin near the umbilical rim or a little higher. After  $D=40$  mm, ribs differentiate into main and intermediate ones. Two or three main ribs originate at the umbilical border, sometimes bifurcate, rarely trifurcate. After  $D=50$  mm the umbilical ends of the bifurcating ribs are rather strong, and may reach the same strength as the collars. After  $D=60$  mm, ribbing is irregular; there are simple and bifurcated main ribs and secondary ribs of different length. Collars and ribs cross the venter with a wide forward curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 921	33.7	8.8	14.7	9.5	12.5	26.1	43.6	1.54	37.0	1.17
RGM 354 128	33.5	8.8	15.7	10.8	13.5	26.2	46.8	1.45	40.0	1.16
RGM 353 873	39.8	11.1	16.5	12.0	15.5	27.8	41.4	1.37	38.9	1.06
RGM 353 895	44.8	12.0	18.4	13.9	18.0	26.7	41.0	1.32	40.1	1.02
RGM 353 923	48.0	12.2	19.6	15.4	19.1	25.4	40.8	1.20	39.7	1.02
RGM 353 919	49.0	12.5	21.2	16.0	18.6	25.5	43.2	1.32	37.9	1.13
RGM 353 875	50.5	14.0	22.1	16.0	21.8	27.7	43.7	1.38	43.1	1.01
RGM 353 878	55.0	14.8	23.5	17.0	21.9	26.9	42.7	1.38	39.8	1.07
RGM 353 902	56.0	16.6	22.8	16.5	23.6	29.6	40.7	1.38	42.1	0.96
RGM 353 859	62.8	17.6	27.6	19.4	23.5	28.0	43.9	1.42	37.4	1.17
RGM 353 877	65.3	18.0	27.0	18.6	24.8	27.5	41.3	1.45	37.9	1.08
RGM 353 903	65.8	17.7	27.6	18.8	24.0	26.8	41.9	1.46	36.4	1.12
RGM 353 856	70.3	19.0	30.6	21.4	26.9	27.0	43.5	1.42	38.0	1.13
RGM 353 905	80.3	21.3	33.9	22.7	28.5	26.5	42.2	1.49	35.4	1.18

*Comparison* – This species differs from *P. matheroni* in having a thicker whorl section, flatter whorl sides, stronger ribs on the later whorls, but weaker ribs on the early whorls. It differs from *P. liptoviense* in having weaker ribs on the early whorls. It differs from *P. hopkinsi* in exhibiting a differentiation into main and intermediate

ribs between each pair of constrictions, and in having stronger ribs on the early whorls.

*Distribution* – Barremian of the Sinai, lower Aptian of north Caucasus, Roumanian Carpathians, middle Aptian (Gargasian) of southeast France; Barremian-Aptian of Colombia.

*Occurrence* – Barremian of Villa de Leyva (Santo Ecce Homo, Loma de la Yuca, Loma Blanca), Vélez-Chipatá, Santa Sofia; Barremian/Aptian of Guane; Aptian of Villa de Leyva (Loma la Asomada, Loma Catalina, Loma Blanca), Sáchica, Utica, Chipatá Viejo-Chipatá, Guane (Vereda Chaguete).

***Pseudohaploceras leivaense* Etayo-Serna, 1979**

Pl. 32, fig. 6; Pl. 34, figs. 2-4; Pl. 35; Pl. 36, figs. 1-3; Pl. 37, fig. 1; Pl. 42, fig. 5.

1979 *Pseudohaploceras leivaense* Etayo-Serna, p. 25, pl. 3, fig. 4, text-fig. 3U, 3Ü.

*Holotype* – VI-10-17 (Museo de Historia Natural de la Universidad Nacional de Colombia, Bogotá: U.N.C.M.H.N.C.P.Ht. N.10).

*Material* – Forty six specimens, RGM 212 178-212 188, 353 933, 353 936-353 955, 353 957-353 966, 353 999, 354 034, 354 117-354 118.

*Description* – Large, semi-involute shells with whorls of medium thickness which moderately increase in height. Whorl sides are evenly convex, slightly diverging from venter. The latter is distinctly rounded, rather narrow; the ventrolateral margins are indistinct. The umbilicus changes with growth from rather narrow (especially when the shell is still preserved; Pl. 34, fig. 3) to moderately wide; the umbilical wall is high and steep, the umbilical border rounded but distinct. The whorl section is on the whole a little compressed, or depressed oval.

The sculpture consists of constrictions, collars and ribs between the collars. On the steinkerns the constrictions are wide, begin on the umbilical wall and are distinctly sigmoidal on the flanks. As usual, they are divided by a strong, flared rib into two parts; an anterior part, which is narrow and deep, and a posterior part, which is wide and shallow. On the shell the constrictions are shallow with strong collars, which begin at the umbilical rim and are distinctly sigmoidal on the flanks. The ribbing in the sectors between the collars is strong and consists of main and intermediate ribs. The number of ribs in the sectors between the collars is commonly about eight to ten, but there are also sectors with only four to five ribs. The main ribs (one to three per sector) originate near the umbilical rim and bifurcate, rarely trifurcate, at mid-flank. On the lower third of the flanks they form swellings, which look like broad flattened bullae. The umbilical bullae have the same strength as the ends of the collars. The intermediate ribs (one to four per sector) are of different length, but all begin near mid-flank and remain simple. The number of intermediate ribs between two main ribs varies. The collars and ribs cross the venter in a straight manner or with a weak forward curvature. The collars are very strong and look like broad, flattened bands.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 952	38.7	10.3	16.8	11.6	16.9	26.2	43.4	1.47	43.6	0.99
RGM 353 999	45.7	12.0	19.4	14.0	15.8	26.0	42.0	1.38	34.5	1.22
RGM 353 951	52.3	10.0	24.6	16.8	20.4	19.1	47.0	1.46	39.0	1.20
RGM 353 950	54.8	13.7	24.3	16.4	24.5	25.0	44.3	1.48	44.7	0.99
RGM 353 962	73.3	23.8	29.3	21.1	26.7	32.4	39.9	1.38	36.4	1.09
RGM 353 943	80.5	25.9	31.4	22.6	28.6	32.2	39.0	1.38	35.5	1.09
RGM 354 117	86.6	24.0	34.8	25.8	32.3	27.7	40.1	1.34	37.2	1.07
RGM 353 966	87.5	26.0	36.4	24.8	34.0	29.7	41.6	1.46	38.8	1.07
RGM 353 964	88.2	28.5	35.9	24.6	35.6	32.3	40.7	1.45	40.0	1.00
RGM 353 944	91.1	30.3	34.2	25.0	33.0	33.2	37.5	1.36	36.2	1.03
RGM 353 946	104.8	35.2	38.4	27.7	40.0	33.5	36.6	1.38	38.1	0.96

*Comparison* – This species belongs to the *P. liptoviense* group; strong main ribs in the sectors between the collars, of which the umbilical ends are similar to the bulla-like ends of the collars. It differs from *P. liptoviense* in the smaller number of intercalated ribs, and in having thinner and higher whorls than Uhlig's (1883, p. 229) specimens. It differs from *P. matheroni* in the smaller number of main ribs, which are stronger and bifurcating. Some specimens of *P. douvillei* are rather similar to those specimens of *P. leivaense* that have a small umbilicus. However, the main difference between these two species is that the latter has a smaller number of intermediate ribs, which are straighter. *Pseudohaploceras leivaense* looks like a 'hoop' with its whorls slowly increasing in height.

*Distribution* – Barremian – middle/upper Aptian (Paja Formation) of Colombia.

*Occurrence* – Barremian of Velez–Chipatá; Barremian or Barremian/Aptian of Villa de Leyva (Santo Ecce Homo, Loma La Yesera); Aptian of Villa de Leyva (Loma Catalina, Loma Blanca, Loma Catalina, Loma La Asomada), Utica, Socorro, Galan, Guane (Vereda Chaguete), Sáchica, Sutamarchan, Pte. Nacional – Jesus Maria, Río Suarez.

***Pseudohaploceras gerhardti* sp. nov.**

Pl. 37, figs. 3, 4; Pl. 38, fig. 1; Pl. 39, fig. 1; Pl. 46, fig. 2; Pl. 47, figs. 1, 2; Fig. 1.

1897 *Desmoceras* sp. Gerhardt, p. 163, pl. 4, fig. 2.

*Holotype* – RGM 353 752.

*Paratypes* – Forty specimens, RGM 212 194-212 202, 212 204-212 220, 212 238, 353 738, 353 743-353 750, 353 758-353 759, 353 762, 353 968.

*Type locality* – Guane, Vereda Chaguete.

*Type horizon* – Barremian/Aptian.

*Derivatio nominis* – Named after the German palaeontologist K. Gerhardt.

*Diagnosis* – Large shells with high whorls of medium thickness. Whorl section is high-oval. Umbilicus rather narrow with high, steep wall. Venter rather narrow and rounded. Constrictions begin on umbilical wall and are slightly sigmoidal. Short collars disappear a little below mid-flank. Seven to thirteen ribs between the collars. Main ribs bifurcating, the intermediate ones simple.

*Description* – Large semi-involute shells with high whorls of medium thickness which moderately increase in height. Flanks slightly convex and very slightly diverging towards the umbilicus. The venter is narrow, convex and strongly rounded. Umbilicus changes during ontogeny from rather narrow to moderately wide and to rather narrow again near the body-chamber; it has a high vertical wall and a distinctly angular border. The whorl section is high oval or slightly trapezoidal.

Up to a diameter of 30 mm the surface of the specimens is practically smooth. Then appear distinct constrictions and hardly visible ribs between the constrictions. The space between each pair of constrictions has an almost triangular outline; the peri-umbilical parts of the constrictions are very close to each other and these parts of the flanks are a little swollen. On steinkerns of a diameter greater than 50 mm there are seven to eight rather narrow constrictions, which originate just above the umbilical seam (on the shell at the umbilical wall), and are slightly sigmoidal and prorsiradiate on the flanks. Collars appear at the middle of the flanks. They indistinctly branch off from the anterior border, and divide the constriction into a narrow and deep anterior part, and a wide and shallow posterior part. On the shell the anterior border is sharp and high, and begins a little above the umbilical rim. Between each pair of constrictions there are nine to eleven ribs, two to three of them long and visible from the umbilical rim. These main ribs are as a rule bifurcating near mid-flank. The umbilical parts of these main ribs are thickened. The intermediate ribs between the main ones are short

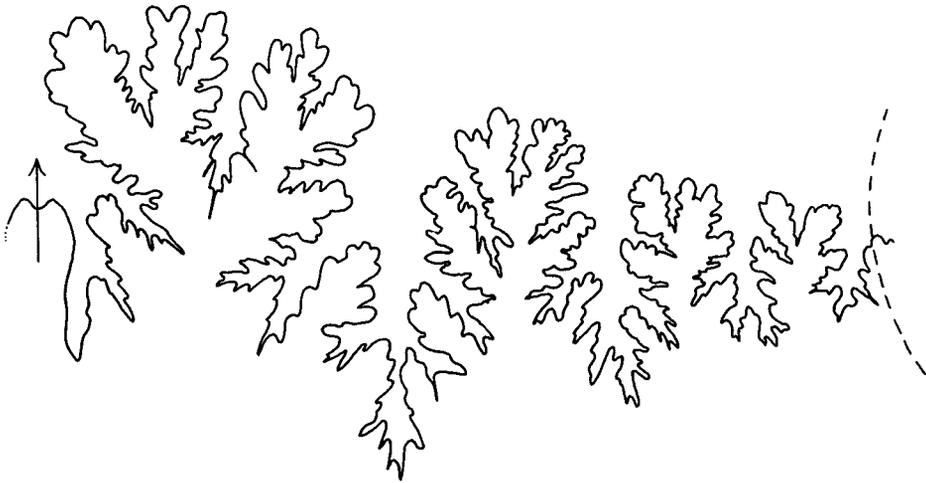


Fig. 1. Suture line of *Pseudohaploceras gerhardti* sp. nov. at a diameter of 64 mm, whorl height of 28 mm. RGM 353 246.

and begin below or above the middle of the flanks. On the venter the constrictions are distinct; the collars and ribs pass over the venter with a weak forward curvature. On large specimens of diameter about 200 mm the body chamber is clearly visible, which occupies a little less than one whorl. On the body chamber only the salient constrictions remain; the ribs between the constrictions disappear before the body chamber.

The suture line is typical for the genus. The lateral lobe is rather narrow, deep and slightly asymmetrical; the lateral saddle is high and asymmetrically divided; the umbilical saddles are symmetrically divided (Fig. 1).

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 212 195	39.3	7.8	19.0	13.5	12.8	19.8	48.3	1.40	32.5	1.48
RGM 212 213	52.4	11.6	25.0	16.4	16.3	22.1	47.7	1.52	31.1	1.53
RGM 212 196	62.9	14.5	30.4	18.6	20.0	23.0	48.3	1.63	28.9	1.52
RGM 353 746	71.0	17.0	32.7	22.5	27.0	23.9	46.0	1.45	38.0	1.21
RGM 353 762	94.0	26.3	41.4	27.5	29.2	27.9	44.0	1.50	31.0	1.41
RGM 353 745	100.0	25.9	43.4	29.3	34.3	25.9	43.4	1.48	34.3	1.26
RGM 353 748	102.2	26.5	44.0	30.6	~32.6	25.9	43.0	1.43	~31.8	~1.35
RGM 353 747	102.4	27.0	44.7	29.8	33.4	26.3	43.6	1.50	32.6	1.33
RGM 353 749	107.2	23.8	50.5	33.9	42.0	22.2	47.1	1.48	39.1	1.20
RGM 353 752	147.0	35.2	60.0	44.0	46.8	23.9	40.8	1.36	31.8	1.28
RGM 212 220	203.0	43.7	86.0	64.0	59.0	21.5	42.3	1.34	29.0	1.45
RGM 212 238	240.0	50.0	101.0	76.0	70.0	20.8	42.0	1.32	29.1	1.44

*Comparison – Pseudohaploceras gerhardti* differs from the high-whorled *P. matheroni* (d'Orbigny, 1841) in the smaller number of ribs between each pair of collars and, therefore, also in a smaller number of bifurcating ribs. It differs from *P. liptoviense* (Zeuschner, 1856) in the smaller number of ribs between each constriction and from *P. douvillei* Fallot, 1920 (Douville, 1916, p. 103, pl. 13, figs. 1-7), which has a similar ribbing between constrictions, in the high whorl section.

*Occurrence –* Barremian/Aptian of Guane (Quebrada Barichara); Barremian/Aptian of Villa de Leyva (Santo Ecce Homo), Guane (Vereda Chaguete up to 'Brasil'); Aptian? of Puente Nacional – Jesus María, Rio Suarez; Aptian of Payande (Río Cobre), Mesitas del Colegio (Río Bogotá), Galan (left bank of the Río Suarez), Chipatá Viejo - Chipatá, Guane (Vereda Chaguete), Villa de Leyva (Loma Blanca, Loma La Yesera).

***Pseudohaploceras* aff. *ramosum* Bogdanova, 1993**

Pl. 36, fig. 4; Pl. 37, fig. 2.

*Material –* Six specimens, RGM 353 773-353 778.

*Description –* Mainly small, semi-involute shells of which the whorls vary from medium thickness to inflated and only moderately increase in height. The thickness of the whorls increases with the growth of the shell. The flanks are convex, diverging a little towards the umbilicus. The venter is rather wide, arched, rounded, with indistinct

ventrolateral margins. The umbilicus is moderately wide, and has a high, almost vertical wall and an evenly rounded umbilical border. The whorl-section is almost circular.

The sculpture consists of constrictions, collars and ribs in the sectors between the collars. The constrictions are wide, begin at the umbilical wall, and are slightly sigmoidal on the flanks. The flared collars divide the constrictions into two parts, of which the posterior part is wider than the anterior. The collars begin at the umbilical border, and are prorsiradial and slightly sigmoidal on the flanks. Between every two collars there are six to twelve ribs. One to three main ribs begin on the umbilical border; on the lower half of the flanks they have the same thickness as the collars. About mid-flank they bifurcate or trifurcate. Between every two main ribs there are two to three short intermediate ribs. The alternation of main and secondary ribs is irregular. In the upper part of flanks all ribs have the same thickness. The collars and the ribs pass straight or with a weak forward curvature over the venter; the main and intermediate ribs do not differ from each other.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 775	23.7	~5.9	9.7	-	9.2	~24.8	40.9	-	33.6	1.05
RGM 353 777	27.7	6.8	12.2	8.0	11.4	24.5	44.0	1.52	41.1	1.07
RGM 353 773	33.0	9.1	13.8	9.4	15.0	27.5	41.8	1.46	45.4	0.86
RGM 353 778	35.2	8.7	15.8	11.1	15.2	24.7	44.8	1.42	47.5	1.03

*Comparison –* This species belongs to *P. liptoviense* group; strong main ribs in the sectors between the constrictions, which have the same thickness as the collars. The Colombian *Pseudohaploceras* aff. *ramosum* differs from the morphologically closest species *P. ramosum* Bogdanova in its narrower umbilicus and more sigmoidal collars. The ribs of the described species pass over the venter in a wide curve and not straight as in *P. ramosum*. It differs from *P. liptoviense* in its thicker whorls and in the smaller number of ribs.

*Occurrence –* Aptian of Sáchica; Villa de Leyva (Loma Blanca, Loma Cabrera).

***Pseudohaploceras yucaense, sp. nov.***

Pl. 40, figs. 2, 3; Pl. 41, fig. 1; Fig. 2.

*Holotype –* RGM 353 768.

*Paratypes –* Nine specimens, RGM 212 273, 353 763-353 767, 353 769, 353 771-353 772.

*Type locality –* Villa de Leyva (Loma de La Yuca).

*Type horizon –* Barremian.

*Derivatio nominis –* The species is named after its type locality, Loma de La Yuca.

*Diagnosis –* Large involute shells with rather thick, rectangular whorl section. Umbilicus narrow and stepped. Collars and the very fine ribs between them are

sinuous; number of ribs between every two successive collars great, up to 26; at the lower part of flanks some ribs join into bundles.

*Description* – Large involute shells with whorls of medium thickness, which moderately increase in height; flanks slightly convex, nearly parallel. Venter broad and rounded; ventrolateral margins indistinct. Umbilicus rather narrow, deep with a high, steep wall; the umbilical rim rounded but distinct. Whorl section rectangular or low trapezoidal.

Six prominent, sigmoidal collars begin at the umbilical rim. In the upper part of the flanks they become more prominent. Each collar is flanked on both sides by the shallow posterior and anterior parts of a constriction. On the shell the width of both parts is almost equal; on the steinkern, however, the anterior is deeper and narrower than the posterior part. In the sectors between the constrictions there are 19-26 fine ribs of various lengths. On the whole these ribs are distinct only on the upper half of the flanks. Three to four ribs are longer and begin at the umbilical rim, where they bifurcate or trifurcate. Occasionally, there is a second bifurcation in the upper part of the flanks. The collars and ribs are slightly rursiradiate near the ventrolateral margins; they cross the venter in a straight manner or with a faint forward curvature.

On one of the specimens the suture line is visible on the flank. It is typical for the genus (Fig. 2).

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 767	24.4	5.0	11.9	7.7	9.9	20.4	49.5	1.54	40.5	1.20
RGM 353 768	64.4	16.5	27.2	18.0	24.0	25.6	42.2	1.51	37.2	1.13
RGM 353 769	80.7	20.2	36.2	24.4	30.6	25.0	44.8	1.48	37.9	1.18
RGM 353 763	84.9	22.7	37.5	24.6	36.2	26.7	44.1	1.52	42.6	1.03
RGM 353 764	101.5	26.0	46.0	29.3	43.6	25.6	45.3	1.56	42.9	1.05

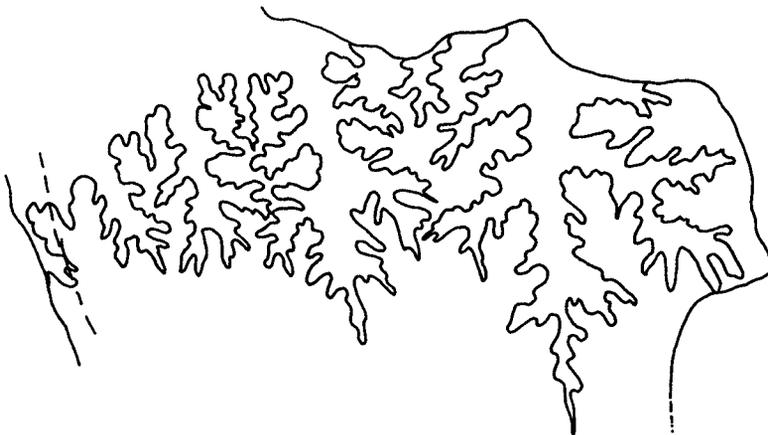


Fig. 2. Suture line of *Pseudohaploceras yucaense* sp. nov. at a diameter of 51 mm, whorl height of 24 mm. RGM 353 771.

*Comparison* – This species is similar to *P. liptoviense* (Zeuschner, 1856) in the large number of ribs between every two constriction and the presence of long bifurcating ribs, but differs in the ribs being finer and being distinct only in the upper part of the flanks. The French specimens of *P. liptoviense* (Fallot, 1920, pl. 1, figs. 5, 6; Thomel, 1980, p. 121, fig. 242) have coarser ribs. *Pseudohaploceras matheroni* (d'Orbigny, 1841, pl. 48, fig. 1, 2) has a smaller number of ribs, which are distinct from the umbilical rim up to the venter.

*Remarks* – This species is rather similar to *P. quenstedti* (Parona & Bonarelli, 1897) in having slightly convex flanks, fine and numerous ribs between collars, and in its narrow and stepped umbilicus. *Pseudohaploceras yucaense* differs from *Puzosia* on the whole in having a smaller size, not having the linguiform projections of the collars on the venter and in the absence of a clear suspensive lobe.

*Occurrence* – Barremian of Villa de Leyva (Loma de La Yuca, Loma La Yesera), along road between Vélez to Chipatá; Barremian/Aptian of Villa de Leyva (Santo Ecce Homo), Guane, Puente Nacional, Jesus Maria; Aptian? along the Río Suarez.

***Pseudohaploceras(?) yeseraense* sp. nov.**

Pl. 45, figs. 5-7.

*Holotype* – RGM 212 285.

*Paratypes* – Twenty six specimens, RGM 212 279, 212 280, 212 283, 212 284, 212 286-212 305, 354 060, 354 062.

*Type locality* – Pte. Nacional-Jesus María, Río Suarez.

*Type horizon* – Aptian?

*Derivatio nominis* – Named after the Loma la Yesera, a hill near Villa de Leyva.

*Diagnosis* – Medium-sized, semi-involute shells with whorls of medium thickness which moderately increase in height. The whorl section is trapezoidal-oval. The venter is narrow and steeply arched. The umbilicus is rather narrow with a steep wall and rounded, indistinct rim. The six to seven collars are strong; the numerous intermediate ribs between the collars are thin, but distinct.

*Description* – Semi-involute shells of medium size; the whorls are of medium thickness and moderately increase in height. The flanks are evenly convex, slightly diverging to the umbilicus. The venter is narrow, steeply arched. The umbilicus is rather narrow with steep walls and rounded indistinct rim. Whorl section is on the whole trapezoidal-oval.

Up to a diameter of 20 mm the shell is almost smooth with very weak striae. Later, collars appear. They are broad, almost straight, rather sturdy. Behind and in front of the collars there are constrictions, the anterior wider than the posterior one. On the

steinkern the collar is situated closer to the anterior side of the constriction, but rather rapidly cross the constriction and runs close to the posterior side on the venter. Between the diameters of 20 and 30 mm intermediate ribs appear. The about ten to twelve intermediate ribs are closely spaced, rather feeble, but one or two longer ribs can be discerned, which begin in the lower part of the flanks above the umbilical rim; the other ribs are shorter and originate at the middle of the flanks. The collars and ribs cross the venter with a very slight forward curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 212 293	21.0	4.0	9.9	7.0	8.0	19.0	47.1	1.41	38.0	1.23
RGM 354 060	24.1	4.7	12.7	7.8	10.9	19.5	52.6	1.62	45.2	1.16
RGM 212 295	27.0	5.2	12.9	9.3	10.0	19.2	47.7	1.38	37.0	1.29
RGM 212 298	33.2	6.0	15.5	11.3	12.5	18.0	46.6	1.37	37.6	1.24
RGM 212 287	34.3	6.3	16.1	11.9	11.4	18.3	46.9	1.35	33.2	1.41
RGM 212 286	37.5	8.1	17.4	12.2	12.1	21.6	46.4	1.42	32.2	1.43
RGM 212 285	40.5	9.0	18.8	13.3	14.8	22.2	46.4	1.41	36.5	1.27
RGM 212 284	45.8	9.9	21.2	14.3	16.8	21.6	46.2	1.48	36.6	1.26
RGM 212 300	46.0	8.2	21.9	14.7	16.2	17.8	47.6	1.48	35.2	1.35

*Comparison* – *Pseudohaploceras yeseraense* differs from *P. douvillei* in its finer ribs (almost striae) between each pair of collars, in its smaller whorl thickness and in its narrower umbilicus. *Pseudohaploceras yucaense* has also thin ribs between collars, but the ribs of *P. yeseraense* are less numerous and almost disappear with the growth of the ammonite. The umbilicus of the latter is deep with an indistinct rim.

*Remarks* – On account of its medium thickness and feeble ribbing *P. yeseraense* is rather similar to representatives of the genus *Zuercherella*, but the ribbing of *Zuercherella* occupies only the upper part of its flanks. However, these similarities do not allow these genera to be put in synonymy.

*Occurrence* – Barremian of Villa de Leyva (Loma La Yesera); Aptian? of Puente National - Jesus Maria (Río Suarez), Sáchica, Villa de Leyva (Loma Blanca), Anapoima-Apulo.

***Pseudohaploceras simile*, sp. nov.**

Pl. 46, figs. 1, 3, 4.

*Holotype* – RGM 212 277.

*Paratypes* – Eleven specimens, RGM 212 274-212 276, 212 278, 354 056-354 057, 354 059, 354 061, 354 064-354 065, 354 068.

*Type locality* – Villa de Leyva (Loma Blanca), Colombia.

*Type horizon* – Aptian.

*Derivatio nominis* – from the latin word ‘similis’, meaning similar.

*Diagnosis* – Medium-sized shells with high whorls, which moderately increase in height. The flanks are almost flat. The venter is rather narrow and slightly rounded. The umbilicus is narrow with a steep wall and a distinct, angular rim. The early whorls are almost smooth; real ribs appear late in the ontogeny.

*Description* – Medium-sized to large shells with medium thick whorls, which moderately to rapidly increase in height. The flanks are practically flat and diverge very slightly to the umbilicus. The venter is slightly convex, rather narrow with indistinct ventrolateral shoulders. The umbilicus is rather narrow, stepped, with a steep wall and a very distinct angular (about 90°) rim. The whorl section is high trapezoidal.

The early whorls (up to a diameter of about 50 mm) are almost smooth. There are thin, almost straight collars in the upper part of flanks. These collars cross the venter with a distinct forward curve. There is a narrow, rather shallow depression (constriction on the steinkern) bordering the posterior side of each collar. There are sigmoidal or crescent-shaped striae between the collars. At diameters > 50 mm real ribs appear in the upper third or upper quarter of the flanks. Some ribs bifurcate at this flank height. These ribs go down to the umbilical rim as broad, inflated ribs covered with feeble striae. There are about eight ribs between every two collars. The collars are broad, inflated and slightly flexuous. The ribs and collars become stronger on the venter, which they cross with a wide forward curve.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 056	24.5	4.1	12.2	7.0	11.2	16.7	49.7	1.74	45.7	1.08
RGM 212 276	26.6	5.1	12.8	8.0	10.0	19.1	48.1	1.6	37.5	1.28
RGM 354 065	27.5	5.2	13.2	8.3	9.7	19	48	1.6	35	1.36
RGM 212 275	34.3	7.9	16.0	10.2	11.3	23.0	46.6	1.56	32.9	1.41
RGM 212 278	38.2	7.9	18.9	11.7	13.7	20.6	49.4	1.61	35.8	1.37
RGM 354 057	40.1	5.7	21.7	12.1	13.3	14.2	54.1	1.79	33.9	1.63
RGM 354 064	44.0	10.6	20.0	14.3	14.7	24.0	45.0	1.39	33.4	1.36
RGM 212 277	52.4	11.0	26.2	18.8	18.6	20.9	50.0	1.39	35.4	1.40
Same specimen	74.0	14.3	36.0	24.1	24.3	19.3	48.6	1.49	32.8	1.48

*Comparison and remarks* – The early whorls of this species are very similar to those of *P. gerhardti*, viz. a very long stage with almost sculptureless sectors between the collars. However, *P. gerhardti* has real ribs in this stage, very feeble, but real, whereas *P. similis* has only striae. The late whorls of these two species have a very similar sculpture; in *P. similis*, however, the sculpture is weaker and begins at a diameter of about 50 mm. In general, the described specimens are reminiscent of *Barremites* in having narrow, high, flat and almost smooth early whorls, and a narrow umbilicus with a steep wall and a distinct angular rim. However, the late whorls of *Barremites* do not have the same sculpture as *P. similis*, in particular, or *Pseudohaploceras* in general. The feeble sculpture of *P. similis* is also reminiscent of *Zuercherella*, but in *Zuercherella* there is no sculpture on the umbilical part of the flanks, and the umbilicus has a gently sloping wall and indistinct border. Moreover,

the real ribs of *P. similis* begin in a later stage than in the species of the genus *Zuercherella*.

*Occurrence* – Barremian of Villa de Leyva (Loma La Yesera), Vélez-Chipatá; Aptian of Mesitas del Colegio-La Mesa, Villa de Leyva (Loma Blanca), Anapoima-Apulo.

### Genus *Kennicottia* Imlay, 1959

*Type species* – *Kennicottia bifurcata* Imlay (1959, p. 183, pl. 30, figs. 8, 9, 11-13) by original designation; lower Albian of Alaska.

*Diagnosis* – The genus *Kennicottia* is characterized by being fairly involute, the umbilicus having vertical walls rounded rims, the presence of flexuous ribs that generally split into two at midflank and of weak constrictions which each are bordered by slightly stronger rib (collar); ribs and constrictions curve strongly forward on the rounded venter and weaken at mid-venter.

*Remarks* – *Kennicottia* resembles *Pseudohaploceras* Hyatt, 1900, but differs from it in having a more subquadrate whorl section, vertical umbilical walls, flatter flanks, weaker constrictions and collars, and more regularly bifurcating ribs. It differs from *Valdeorsella* Breistroffer, 1947, in its subquadrate instead of a round whorl section and by the presence of bifurcating ribs.

*Distribution* – Alaska, Colombia?

#### *Kennicottia?* sp.

Pl. 30, fig. 3.

*Material* – RGM 354 035.

*Description* – Small-sized, semi-involute shell with whorls of medium thickness, which moderately increase in height. Whorl sides flattened; venter broad and rounded; umbilicus moderately wide with high vertical wall and rounded, but distinct umbilical rim. Whorl section rectangular.

Ribbing dense; ribs begin at the umbilical rim and bifurcate a little above the latter. They broaden towards the venter and some of them are split by a fine furrow near the venter. Constrictions and collars are indistinct. The collars and ribs are of the same thickness. Ribs cross the venter in a straight manner.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 035	26.1	7.3	10.7	7.0	8.4	27.9	40.9	1.52	32.1	1.22

*Comparison* – The specimen from Sutamarchan differs from *K. bifurcata* Imlay (1959) in being less involute, having less distinct constrictions and collars, and having less sigmoidal ribs on the flanks and straight ribs on the venter.

*Occurrence* – Aptian of Sutamarchan, opposite Loma La Asomada.

### ***Melchiorites Spath, 1923***

*Type species* – *Ammonites Melchioris* Tietze, 1872, p. 135, pl. 9, fig. 9a, b.

*Diagnosis* – Usually rather small shell; whorl section wide-oval, often depressed, whorls increase very slowly in height; flanks strongly convex; umbilicus wide, umbilical rim rounded, indistinct; venter broad; ventrolateral shoulders indistinct. Constrictions wide, deep, from straight to strongly sigmoidal; intercalated ribs distinct, repeat the outlines of constrictions. Ribs and constrictions cross venter with a wide forward curve.

*Comparisons* – *Melchiorites* differs from *Valdedorsella* in having thinner whorls, weaker and denser ribs between the constrictions, and small linguiform projections of the constrictions on the venter. *Pseudohaploceras* has much coarser ribs between the constrictions, a trapezoidal instead of a subquadrate whorl section and shallow constrictions on the venter instead of linguiform ones. The latter feature brings *Melchiorites* close to the genus *Puzosia*, from which it differs in usually having a smaller size, more feeble intermediate ribs and a less frilled suture line.

*Distribution* – Upper Barremian-Lower Albian of Europe, northern Africa, Madagascar, North and South America.

### ***Melchiorites media* Riedel, 1938**

Pl. 41, fig. 3; Pl. 42, figs. 1-3.

1938 *Melchiorites emerici* var. *media* Riedel, p. 17, pl. 4, figs. 9-11.

1958 *Melchiorites emerici medius* Riedel: Bürgl, p. 134, pl. 8, fig. 7.

1979 *Melchiorites media* Riedel: Etayo-Serna, p. 23, pl. 3, fig. 9; text-fig. 3Q, R.

*Lectotype* – Specimen figured by Riedel (1938, Pl. 4, figs. 10, 11) (selected by Etayo-Serna, 1979).

*Material* – Eighteen specimens, RGM 354 005-354 022.

*Description* – Medium-sized, involute, depressed shells with inflated whorls, which moderately increase in height. Whorl sides convex, venter broad, rounded. Umbilicus moderately wide, deep, with high almost vertical wall; umbilical border rounded, but distinct. Whorl section subrectangular, broader than high.

On shells smaller than 23 mm diameter there are five to six deep, narrow, almost straight, radial constrictions, which begin just above the umbilical seam. On specimens of 23 mm diameter (Pl. 42, fig. 1) there are broad, flat, short ribs adapically of the two last constrictions; these ribs suddenly disappear at mid-flank. These ribs probably form collars on the shell. The whorls are smooth up to a diameter of about 15 mm. Later, fine ribs appear between each pair of constrictions. These ribs begin at the umbilical border

and are interrupted at mid-venter. Later, ribs gradually strengthen, shorten and become more numerous. From a diameter of 30 mm the constrictions are deep and narrow, distinctly sigmoidal, passing the venter with a wide forward curvature. There are about 15 fine, sigmoidal ribs per segment, which originate about mid-flank and cross the venter without interruption, forming a wide forward curvature.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 013	14.5	4.7	5.8	4.3	7.5	27.5	40.0	1.34	51.7	0.77
RGM 354 020	18.5	-	6.9	-	9.6	-	37.2	-	51.8	0.71
RGM 354 019	22.8	6.2	9.7	7.0	11.8	27.1	45.2	1.38	51.7	0.82
RGM 354 011	30.1	9.7	11.7	8.4	14.6	2.2	38.8	1.39	48.5	0.80
RGM 354 016	30.7	9.0	12.8	9.7	15.2	29.3	41.6	1.36	49.5	0.84
RGM 354 012	33.9	10.0	14.2	9.2	15.0	29.4	41.8	1.54	44.2	0.94
RGM 354 017	44.5	10.7	19.0	14.0	21.0	24.0	42.6	1.35	47.1	0.90

*Comparison –* The described specimens differ from *M. media* in their greater thickness, but are in this respect similar to the specimens figured by Etayo-Serna. They differ, however, from the latter in the finer ribbing on the early whorls. This species differs from the majority of the species of *Melchiorites* in the greater thickness of the whorls.

*Distribution –* Middle/upper Aptian of Colombia.

*Occurrence –* Middle/upper Aptian along the road between Vélez to Chipatá; Aptian of Anapoima-Apulo, Sáchica, Utica, Villa de Leyva (Loma Blanca; opposite to Loma la Asomada), San Joaquin.

***Melchiorites palmeri* Etayo-Serna, 1979**

Pl. 40, figs. 4, 5; Pl. 41, figs. 4, 5.

1979 *Melchiorites palmeri* Etayo-Serna, p. 23, pl. 6, figs. 6, 10, text-fig. 35.

*Holotype –* C-223 (Universidad Nacional de Colombia Museo de Historia Natural C.P.Ht. N° 8); Etayo-Serna, 1979, pl. 6, fig. 6.

*Material –* Twenty specimens, RGM 212 226-212 235, 354 010-354 012, 354 023-354 029.

*Description –* Medium-sized involute shells with whorls, which may be inflated or of medium thickness, and which slowly to moderately increase in height. Whorl sides convex, venter broad and rounded. Umbilicus moderately wide with low, steep wall, and rounded border. Whorl section oval to circular.

Up to a diameter of 15 mm, there are five to six short collars on the venter and on the upper part of the flanks. On both sides alongside the collars there are shallow depressions, which on the steinkerns appear to be constrictions. These are well developed in the lower part of the flanks, at the umbilical border, and on the umbilical wall. At a diameter of 20-25 mm the constrictions become well developed on the flanks. They begin at the umbilical seam, are slightly sigmoidal and have very distinct borders. A

broad, prominent rib branches off at mid-flank from the posterior border of the constriction; on the external shell this appears to be the collar. Up to a diameter of 20-25 mm there are fine ribs on the upper half of the flanks; they have a variable length and cross the venter without interruption.

At a diameter of 30 mm there are five to eight collars per whorl, which are broad and swollen on the upper half of the flanks, but quickly weaken and disappear near the umbilical border. The anterior and posterior depressions alongside the collars are very shallow. The ribs become rather strong and have a variable length. Long ribs originate a little distance above the umbilical border and some of them indistinctly bifurcate. Collars and ribs cross the venter with a distinct forward curvature.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 026	12.1	3.5	5.1	-	5.5	28.9	42.1	-	45.4	0.92
RGM 354 024	23.6	6.0	10.6	-	10.6	25.4	44.9	-	44.9	1.00
RGM 354 027	25.1	7.0	9.7	7.8	10.0	27.8	38.6	1.24	39.8	0.97
RGM 354 023	27.5	7.7	12.0	8.1	11.6	28.0	43.6	1.48	42.1	1.03
RGM 354 029	29.2	7.5	13.3	9.3	10.2	25.6	45.5	1.43	34.9	1.30
RGM 354 010	30.6	9.5	12.0	8.8	13.5	31.0	39.2	1.36	44.1	0.88
RGM 354 012	32.0	10.5	12.3	8.5	12.7	32.8	38.4	1.44	39.6	0.96

*Comparison* – This species differs from *M. media* in the smaller thickness of the whorls, in the absence of a ventral interruption of the ribs on the early whorls, and in the stronger ribbing at comparable diameters.

*Occurrence* – Middle/upper Aptian of Villa de Leyva (Loma La Yesera), along the road from Vélez to Chipatá, Villa de Leyva (Santo Ecce Homo), Utica, Mesitas del Colegio-La Mesa, Villa de Leyva (Loma Blanca), Anapoima-Apulo, Guane.

*Distribution* – Barremian/Aptian of Colombia.

***Melchiorites colombianus* sp. nov.**

Pl. 42, fig. 4; Pl. 43, fig. 1.

*Holotype* – RGM 354 003.

*Paratype* – RGM 354 004.

*Type locality* – Villa de Leyva (Loma la Yuca).

*Type horizon* – Barremian.

*Derivatio nominis* – The species is named after Colombia.

*Diagnosis* – Large semi-involute shells with high-oval whorl sections, whorl sides flattened, venter rounded, umbilicus moderately wide. About eight falcate or slightly sigmoidal constrictions, six to eleven ribs between each pair of constrictions.

*Description* – Large semi-involute shells with whorls of medium thickness, which moderately increase in height. Whorl sides flattened, slightly diverging to umbilicus. Venter rather broad, convex; ventrolateral shoulders indistinct. Umbilicus moderately wide, shallow in young specimens, with a low, gently sloping wall and indistinct umbilical rim; later, the umbilical wall becomes higher and steeper with a rounded, distinct umbilical rim. Whorl section high-oval.

There are about eight constrictions on the shell; on small specimen they are falcate, on large specimens slightly sigmoidal. Constrictions begin at umbilical seam and curve forwards on the umbilical wall; on the flanks they are slightly prorsiradiate. There are six to eleven intermediate ribs between every two constrictions. On small steinkerns, they are visible only on the upper half of the flanks and on the venter. On large specimens some of the intermediate ribs begin at the umbilical rim and probably bifurcate, since their umbilical parts are slightly swollen. Some ribs on the anterior side of the constriction split off from the anterior border of the rursiradiate, umbilical part of the constriction. On the venter the constrictions and ribs are strongly curved forward.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/D
RGM 354 003	80.3	24.0	34.0	23.5	28.7	29.0	42.3	1.44	35.7	1.18
RGM 354 004	103.5	30.7	43.2	29.0	35.4	29.6	41.7	1.48	34.2	1.22

*Comparison* – *Melchiorites colombianus* differs from many species of *Melchiorites* in having a high-oval whorl section and rather strong ribs.

*Occurrence* – Barremian of Villa de Leyva (Loma La Yuca), Aptian of Utica.

### **Genus *Puzosia* Bayle, 1878**

*Type species* – *Ammonites planulatus* J. de C. Sowerby, 1827, p. 136, pl. 570, fig. 5.

*Diagnosis* – The shells are usually of large size; whorl section oval, round, trapezoidal, subrectangular. Constrictions and intermediate ribs are flexuous and parallel to each other. Intermediate ribs rather strong and numerous. Sculpture changes during the growth of shell. Constrictions and intermediate ribs cross the venter forming distinct linguiform projections. Suture line is complicately frilled.

*Comparison* – By its size *Puzosia* is rather similar to *Pseudohaploceras*, but *Puzosia* differs in the change of sculpture during growth; the large whorls very often have very rough, simple intermediate ribs, which are set wide apart, while *Pseudohaploceras* loses intermediate ribs and only constrictions stay. *Puzosia* differs from *Pseudohaploceras* in usually having a larger number of short, simple intermediate ribs. Constrictions or collars in *Puzosia* cross the venter with a distinct linguiform projection; the ribbing of *Puzosia* is closely spaced and highly curved instead of widely spaced and slightly curved as in *Pseudohaploceras*. The suture line of the latter is less serrated.

*Distribution* – Lower Cretaceous (upper Aptian?- lower Albian) – Upper Cretaceous (upper Campanian) of Europe, Asia, Africa, North and South America.

***Puzosia quenstedti* (Parona & Bonarelli, 1897)**

Pl. 40, fig. 1; Pl. 43, fig. 2; Pl. 44.

- 1897 *Desmoceras Quenstedti* Parona & Bonarelli, p. 81, pl. 11, fig. 3.  
 1949 *Puzosia quenstedti* (Parona & Bonarelli): Luppov *et al.*, p. 215, pl. 62, fig. 1a, b.  
 1950 *Puzosia quenstedti* (Parona & Bonarelli): Collignon, p. 44, pl. 9 (7), fig. 1.  
 1958 *Pseudohaploceras hopkinsi* (Forbes): Bürgl, p. 136, pl. 10, fig. 1.  
 1958 *Puzosia* nov. spec. aff. *mayoriana* (d'Orbigny): Bürgl, p. 136, pl. 11, fig. 4.  
 1968 *Puzosia quenstedti* (Parona & Bonarelli): Wiedmann & Dieni, pl. 10, fig. 11, pl. 12, fig. 3, text-fig. 72-73.  
 1975 *Puzosia quenstedti* (Parona & Bonarelli): Lillo Beviá, p. 685, pl. 4, figs. 1, 2, pl. 8, fig. 4.  
 1980 *Puzosia quenstedti* (Parona & Bonarelli): Thomel, p. 122, fig. 244.  
 1982 *Puzosia quenstedti* (Parona & Bonarelli): Renz, p. 34, pl. 4, fig. 8a, b.  
 1989 *Puzosia quenstedti* (Parona & Bonarelli): Föllmi, p. 136, pl. 9, figs. 4-7.

*Holotype* – *Desmoceras Quenstedti* Parona & Bonarelli, 1897, pl. 11, fig. 3; refigured by Wiedmann & Dieni (1968, pl. 10, fig. 11; pl. 12, fig. 3, text-fig. 72, 73).

*Material* – Three specimens, RGM 212 239, 353 971, 353 972.

*Description* – Large semi-involute shells of which the early whorls slowly increase in height, whereas the later whorls do this more rapidly. The whorls are of medium thickness. The height of the whorls changes during ontogeny. The umbilicus is rather narrow, and has a high and steep wall; the umbilical rim is rounded, but distinct. The whorl section changes during ontogeny from wide-trapezoidal (in the early whorls) to high-oval.

The sculpture consists of collars, constrictions and ribs. The collars of the early whorls are prominent only on the upper half of the flanks. They are broad and low with shallow constrictions along both sides. On the specimen figured by Bürgl (1958, pl. 11, fig. 4) the constrictions are narrow, deep, sigmoidal and slightly rursiradiate. On the adult whorls the collars are thin, slightly sigmoidal and begin just above the umbilical rim. The constrictions at the anterior and posterior sides of the collars are narrow and shallow. The ribbing in the sectors between the constrictions is dense (up to 26 ribs per sector). The very fine ribs begin at the umbilical rim, where some of them bifurcate. Occasionally there is a second bifurcation at mid-flank. On the early whorls the collars and ribs cross the venter with a strong forward curvature, on later whorls with a weak forward curvature.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 971	34.0	7.7	15.2	11.4	12.8	22.6	44.7	1.33	37.6	1.18
RGM 212 239	93.0	22.8	41.9	27.8	30.4	24.5	45.0	1.50	32.6	1.48
RGM 353 972	190.0	44.2	84.0	55.5	64.6	23.2	44.2	1.51	34.0	1.30

*Remarks* – This species is very similar to *Puzosia mayoriana* d'Orbigny (1841), especially the whorls between 50 and 70 mm diameter. Luppov (1949) identified specimens from the Albian of Crimea as *Puzosia quenstedti*. In a later manuscript he identi-

fied the same specimens as *P. sp. nov. aff. mayoriana*. Small specimens of the described species differ from *P. mayoriana* in their greater thickness. Specimens of medium size (about 50-60 mm diameter) are very similar to those from Madagascar, identified by Collignon (1963) as *Puzosia aff. mayori* (fig. 1145), *P. mayori var. ambarimangingensis* (fig. 1146) and *Puzosia provincialis* (fig. 1155). Large specimens of *P. quenstedti* differ from *P. mayori* in their stronger ribs.

*Distribution* – Albian of France, Spain, Austria, Crimea, Angola, Madagascar, Colombia, Venezuela.

*Occurrence* – Lower? Albian of Anapoima-Apulo.

### ***Carloscaceresiceras Etayo-Serna, 1979***

*Type species* – *Carloscaceresiceras caceresi* Etayo-Serna, 1979, p. 25, pl. 3, fig. 2, by original designation.

*Diagnosis* – Large shell with rather thick whorls of oval or rectangular-oval section. Umbilicus deep with a high vertical wall and distinct, angular rim. Feeble striae occur on the early whorls and wide, shallow constrictions in the late stage of growing, especially on the flanks of body-chamber.

*Comparison and remarks* – Wright *et al.* (1996) included this genus as a junior synonym of *Anadesmoceras* Casey, 1954. However, the genus of Etayo-Serna differs from *Anadesmoceras* in its early whorls; these are much thicker, bear striae instead of ribs on the flanks and bundles of ribs are absent on the inner lateral area. Only the sculpture and thickness of the later whorls are reminiscent of *Anadesmoceras*. The features of adult whorls bring *Carloscaceresiceras* in closer relation to beudanticeratine species, but the early whorls of the Colombian genus have a different lateral ribbing and a greater thickness. The ribbing of young *Caloscaceresiceras*, their whorl thickness and whorl section are close to the ribbing of *Puzosia*. *Carloscaceresiceras* is an independent genus and should be included in the subfamily Puzosiinae. Etayo-Serna did not include *Carloscaceresiceras* in one of the subfamilies of the Desmoceratidae, but merely indicated the family Desmoceratidae.

*Distribution* – Lower Albian of Colombia.

### ***Carloscaceresiceras caceresi Etayo-Serna, 1979***

Pl. 46, fig 5; Pl. 47, fig. 3; Pl. 48.

1979 *Carloscaceresiceras caceresi* Etayo-Serna, p. 26, pl. 10, fig. 1; text-figs. 4A, 4B, 10.

*Holotype* – C 170-20 (U.N.C.M.H.N.C.P. Ht. N11) Universidad Nacional de Colombia Museo de Historia Natural, Bogotá.

*Paratypes* – C – 13 – 1, 2, 3 – (U.N.C.M.H.N.C.P. Pt. 8, 9, 10) Instituto de Ciencias Naturales Museo de Historia Natural of the Universidad Nacional de Colombia, Bogotá

*Material* – Three specimens, RGM 212 242-212 244.

*Description* – Large and very large semi-involute shells with whorls of medium thickness or even swollen, which are moderately increasing in height. The flanks are slightly convex, almost parallel, or slightly diverging. The venter is rather broad and evenly rounded, the ventrolateral shoulders are indistinct. The umbilicus is rather narrow, stepped, with a steep flat wall and a rounded, but distinct, umbilical rim.

On the shell the first collar appears at about a diameter of 60 mm, and occurs only on the venter and the ventrolateral shoulders; the collar is low, and passes over the venter with a forward curve. On the test there are wide, shallow, slightly sigmoidal constrictions. Between the collars or constrictions, there are dense, thin, distinctly sigmoidal striae. They begin at the umbilical rim and on the venter they repeat the shape of the collars. The sculpture does not change with the growth of the whorls.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 212 243	72.0	16.2	37.3	27.0	28.4	22.5	51.8	1.38	39.4	1.31

*Comparison and remarks* – Etayo-Serna described three species of his genus *Carloscaceresiceras*, of which *C. monteroi* and *C.? chimuense* (Benavides-Cáceres) are each represented by only one specimen. It is, therefore, difficult to get an idea about the latter two species and the differences with the described species. The differences mentioned by Etayo-Serna are so insignificant that all three nominal taxa may well belong to one biological species.

*Occurrences* – Lower Albian of Anapoima-Apulo, Utica.

*Distribution* – Lower Albian of Colombia.

**Subfamily Beudanticeratinae Breistroffer, 1953**  
**Genus *Zuercherella* Casey, 1954**

1979 *Cortesiceras* Etayo-Serna, p. 28.

*Type species* – *Desmoceras zuercheri* Jacob & Tobler, 1906, p. 9.

*Diagnosis* – Medium-sized shell with high-oval or trapezoidal whorls, venter nearly always narrow and rounded; constrictions shallow, sinuous; between the constrictions are several ribs. Main ribs begin a little above the umbilical rim; intermediate ribs are very short and occur only in the upper third of the flanks.

*Comparison and remarks* – According to many authors *Zuercherella* is very similar to its descendant, *Uhligella* Jacob, and differs from the latter in having a less inflated shell and finer ribs without umbilical bullae. Some species of *Zuercherella* are very similar to *Pseudohaploceras* of the subfamily Puzosiinae. Our Colombian material shows that the ribs of *Z. latecostata* are very similar to those of *P. leyvaense*. It is possible that *Zuercherella* and *Pseudohaploceras*, which coexist, had a common ancestor.

*Distribution* – Europe, North, Central and South America, central Asia (Trans-caspian area), eastern Africa.

***Zuercherella latecostata* (Riedel, 1938)**

Pl. 38, figs. 2-4; Pl. 39, figs. 2-4.

1938 *Uhligella zürcheri* Jacob & Tobler: Riedel, p. 20, pl. 4, figs. 12, 13.

1938 *Uhligella latecostata* Riedel, p. 21, pl. 5, figs. 1-3.

1958 *Uhligella zürcheri* Jacob & Tobler: Bürgl, p. 135, pl. 8, fig. 8.

? 1975 *Zürcherella zürcheri* Jacob: Lillo Bevia, p. 686, pl. 4, figs. 3, 4.

1979 *Cortasiceras cortesi* Etayo-Serna, p. 27, pl. 3, fig. 2, 7; text-fig. 4C.

1979 *Cortasiceras latecostata* (Riedel): Etayo-Serna, p. 28, pl. 4, fig. 6, text-fig. 4F.

*Holotype* – *Uhligella latecostata* Riedel, 1938, pl. 5, fig. 1, 2, 3; designated by Etayo-Serna (1979, p. 29).

*Material* – Thirteen specimens, RGM 212 221, 353 973-353 984; three specimens, *Zuercherella* cf. *latecostata*, RGM 354 000-354 002.

*Description* – Medium-sized semi-involute shells with whorls of medium thickness, which moderately increase in height. Whorl sides flattened or weakly convex, venter narrowly rounded, without distinct ventrolateral margins. Umbilicus shallow, moderately wide with low, gently sloping wall; umbilical rim indistinct. Whorl-section high-rectangular in the early whorls, low-rectangular later whorls.

Up to a diameter of 25 mm the collars and constrictions are hardly marked. The ribs between the collars are very weak. The venter is smooth. At a diameter of 25 mm distinct, but weak, ribs originate at one quarter of the flank height. Ribs are simple, sigmoidal and weakened on the venter. Collars cross the venter with a wide forward curvature. From a diameter of 30 mm constrictions become apparent; they are shallow and wide. The collars begin just above the umbilical seam. The ribs between the constrictions have a variable length; some of them originate near the umbilical rim, where they bifurcate. Some ribs bifurcate at mid-flank or a little higher. The number of short ribs between the long ones is variable. At this stage the ribs cross the venter without weakening and shallow constrictions can be discerned at the anterior side of the collars.

*Measurements* –

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 976	26.9	7.0	11.7	7.7	9.8	26.0	43.4	1.51	36.4	1.19
RGM 353 981	29.8	7.8	13.1	8.5	10.6	26.1	44.6	1.54	35.5	1.23
RGM 353 979	29.8	7.2	13.5	9.2	10.6	24.1	45.3	1.46	35.5	1.27
RGM 353 978	33.0	9.8	13.7	9.4	12.5	29.6	41.5	1.45	37.8	1.09
RGM 353 975	39.6	12.3	16.8	11.7	14.5	31.0	42.4	1.43	36.6	1.15
RGM 353 982	52.5	12.7	23.0	5.7	16.8	24.1	43.8	1.46	32.0	1.36
RGM 353 973	60.5	18.6	25.5	17.8	21.0	30.7	42.1	1.43	34.7	1.21

*Comparison and remarks* – There are only a few species in the genus *Zuercherella*. *Zuercherella latecostata* differs from *Z. zuercheri* in having very strong ribs. French specimens of *Z. zuercheri* resemble the Colombian ones in the rather coarse ribbing between the constrictions (Jacob & Tobler, 1906; Fallot, 1920; Thomel, 1980). However, *Z. zuercheri* from Germany (Kemper, 1964, 1976) and the north Caucasus (Egoian, 1969) differ from Colombian specimens in their almost smooth whorl sides, covered only with faint striae. "*Cortasiceras*" *cortesi* (Etayo-Serna, 1979, p. 28, pl. 3, fig. 7) differs from *Z. zuercheri* only in having strong ribs on the early and late whorls. We believe it to be the same species as *Z. latecostata* (Riedel, 1938).

*Distribution* – Middle/upper Aptian of Colombia, Spain?

*Occurrence* – Middle/upper Aptian of Utica, Villa de Leyva (Loma Cabrera), Sáchica.

***Zuercherella etayosernai* sp. nov.**

Pl. 28, fig. 7; Pl. 29, fig. 3; Pl. 45, figs. 3, 4.

? 1979 *Cortasiceras*(?) nov. sp. Etayo-Serna, p. 29, pl. 3, only fig. 6, non fig. 2 (= *Zuercherella latecostata*); text-fig. 3E.

*Holotype* – RGM 353 988.

*Paratypes* – Nineteen specimens, RGM 212 222-212 225, 353 985-353 987, 353 989-353 998, 354 063, 354 067, plus one specimen *Zuercherella* cf. *etayosernai*, RGM 354 058.

*Type locality* – Villa de Leyva (Loma La Yesera).

*Type horizon* – Aptian.

*Derivatio nominis* – The species is named in honour of the Colombian palaeontologist Fernando Etayo-Serna.

*Diagnosis* – Medium-sized shell with whorls of medium thickness, moderately increasing in height; whorl section high-oval; umbilicus narrow to rather narrow. Constrictions and collars very feeble; striae or very feeble ribs occur between the constrictions.

*Description* – Medium-sized semi-involute shells with whorls of medium thickness, which moderately increase in height. Whorl sides weakly convex, venter narrowly rounded, without distinct ventrolateral margins. Umbilicus shallow, rather narrow with a rather high, steep, almost perpendicular wall; umbilical rim rounded, but distinct. Whorl section high-oval in the early whorls; later whorls are low-oval or trapezoidal.

Up to a diameter of 30 mm the collars and constrictions are not marked. There are very weak striae, which cross the venter, on the surface of the shell. These striae originate at the umbilical rim, where they are indistinctly fasciculated or bifurcated or trifurcated; they are feebly sigmoidal on the flanks, and cross the venter. They are

numerous, but so feeble that it is impossible to count them. The collars and constrictions are practically not developed. The ribs, which are very low, indistinct and broader than the striae, are visible on the flanks of specimens that have a diameter greater than 50 mm (RGM 212 225). These ribs are not visible near the umbilicus; higher on the flanks they are sigmoidal; they cross the venter with a strong forward curve.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 353 986	13.0	1.5	7.7	4.6	6.5	11.5	59.2	1.67	50.0	1.18
RGM 353 987	18.7	3.5	9.0	5.0	7.0	18.7	48.1	1.8	37.4	1.28
RGM 353 998	25.5	4.5	12.2	7.7	10.0	17.6	47.8	1.58	39.2	1.22
RGM 353 997	27.4	5.3	2.7	7.6	9.5	19.3	46.3	1.67	37.2	1.33
RGM 353 989	30.5	6.1	14.7	9.5	12.0	20.0	48.1	1.54	39.3	1.22
RGM 353 988	36.8	6.7	18.4	11.9	2.9	18.2	50.0	1.54	35.0	1.42
RGM 212 222	36.8	6.9	18.0	12.0	14.8	18.7	48.9	1.50	40.2	1.21
RGM 212 225	58.4	8.6	30.6	20.1	23.2	14.7	52.3	1.52	39.7	1.31

*Comparison and remarks –* This species differs from other species of this genus in having only striae instead of ribs on its flanks. Some of the small, inflated specimens of *Z. etayosernai* look like haploceratids. However, *Z. etayosernai* differs from haploceratids and *Zuercherella* in the presence of feeble striae or ribs on medium-sized shells, whereas haploceratids are smooth at this stage.

*Occurrences –* Aptian of Villa de Leyva (Loma La Yesera, Loma Blanca, opposite to Loma La Asomada), Sáchica, Vélez-Chipatá, Utica; Albian? of Anapoima-Apulo.

***Zuercherella cf. zuercheri* (Jacob & Tobler, 1906)**

Pl. 41, fig. 2.

*Material –* One specimen, RGM 354 033.

*Description –* Medium-sized shell with high, rather thick whorls which rapidly increase in height. Whorl section high-oval with flattened sides and a narrow, rounded venter. The umbilicus is not visible. There are nine collars on the last half whorl. They originate at the umbilical rim and gradually strengthen towards the venter; they are bordered by indistinct anterior and posterior constrictions. There are five to six ribs of different length in each sector between two constrictions. In some sectors there is one stronger rib, which indistinctly bifurcate. On the venter the ribs and collars are weakly convex forward.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 354 033	55.0	~14.0	26.0	~15.0	~19.0	~25.4	47.2	~1.73	~34.5	~1.36

*Comparison –* The described specimen has weaker and more irregularly distributed ribs between the collars than *Z. latecostata*. These features just bring this specimen

closer to the European species *Z. zuercheri*. However, because of insufficient material it is difficult to be sure of this identification.

*Occurrence* – Aptian of Villa de Leyva (Loma Blanca).

*Distribution* – Upper Aptian of France, Germany, Spain, Colombia, Venezuela, Tunisia, north Caucasus.

**Family Silesitidae Hyatt, 1900**  
**Genus *Miyakoceras* Obata, 1967**

*Type species* – *Miyakoceras tanohatense* Obata, 1967, p. 130.

*Diagnosis* – Small and evolute shell. Sides and venter convex and rounded. Whorl section oval or rounded. Umbilicus wide. Ribs numerous, rectiradiate or feebly flexuous, mostly simple or bifurcated, becoming low on the venter. Some ribs bear small ventrolateral tubercles. Suture line very simple.

*Comparison* – Obata compared his new genus with each of the other genera of this family. *Neosilesites* Breistroffer is morphologically closest to *Miyakoceras*. The latter differs from *Neosilesites* in its sculpture on the venter. The venter of *Neosilesites* is almost smooth with rare, faint constrictions; ‘nodules’ or ‘ridges’ on the ventrolateral shoulders are absent. *Miyakoceras* differs from *Silesites* Uhlig in having a different sculpture on the flanks and venter.

*Distribution* – Upper Aptian of Japan; Aptian of Colombia.

***Miyakoceras* sp. (ex gr. *tanohatense* Obata, 1967)**

Pl. 31, fig. 3.

*Material* – Two specimens, RGM 212 236-212 237.

*Description* – Small, semi-evolute shell with whorls of medium thickness, which increase slowly in height. The flanks and venter are flattened. The umbilicus is wide, shallow with a low sloping wall and rounded, indistinct umbilical rim.

The sculpture consists of constrictions and ribs between them. The constrictions are wide, shallow, slightly flexuous. In the middle of some constrictions are ribs, which begin at the umbilical rim and disappear in the middle of the flanks. The ribs (up to five per interval) appear at the umbilical rim and are weak on the flanks. All ribs are long, but some of them become weak on the lower part of the flanks. On the ventrolateral shoulders weak swellings or clavi can be discerned on the ribs and in the middle of the venter the ribs become weak. On one of the specimens a part of the suture line is visible, i.e., a broad, low, outer lateral saddle with asymmetrical branches, the outer branch higher than the inner one, and a broad, rather short slightly asymmetrical lateral lobe.

*Measurements –*

	D	U	H	h	W	U/D	H/D	H/h	W/D	H/W
RGM 212 236	19.5	8.4	6.6	4.8	6.0	43.0	34.0	1.33	30.7	1.1
RGM 212 237	19.7	6.8	6.3	4.7	6.3	34.5	32.0	1.34	34.5	1.0

*Comparison and remarks* – These specimens are similar to the Japanese genus *Miyakoceras* of the family Silesitidae and more similar to *M. tanohatense* Obata. The Colombian species differs from the latter in having fewer ribs, which are straight and only rarely bifurcate, and a smooth band on the venter. The specimens are too small to identify the species exactly.

*Occurrence* – Middle/upper Aptian, on the road near the land of San Joaquin (Santander), Villa de Leyva (Loma la Catalina), Colombia.

*Distribution* – Upper Aptian of Japan.

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## Explanations of plates

### Plate 1

Fig. 1. *Neodeshayesites cf. karsteni* (Marcou, 1875), Albian, Anapoima-Apulo. RGM 283 030.

Figs. 2-6. *Neodeshayesites columbianus* (Riedel, 1938), Albian, Anapoima-Apulo.

Fig. 2. RGM 212 098. a, right-lateral view. b, apertural view.

Fig. 3. RGM 212 101. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 212 108. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 5. RGM 212 078. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 6. RGM 212 123. Right-lateral view.

All figures  $\times 1$ .

### Plate 2

Figs. 1-3. *Neodeshayesites columbianus* (Riedel, 1938), Albian, Anapoima-Apulo.

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Fig. 2. RGM 212 142. a, right-lateral view. b, apertural view.

Fig. 3. RGM 212 094. a, left-lateral view. b, apertural view.

All figures  $\times 1$ .

### Plate 3

Fig. 1. *Neodeshayesites columbianus* (Riedel, 1938), Albian, Anapoima-Apulo. RGM 212 154. a, right-lateral view. b, apertural view.

Fig. 2. *Neodeshayesites ex gr. nodosus* (Riedel, 1938), Aptian, Utica.. RGM 291 848. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. *Neodeshayesites aff. rotundus* (Riedel, 1938), Aptian, Mesitas del Colegio, Río Bogotá. RGM 291 881. a, right-lateral view. b, apertural view. c, ventral view.  $\times 2$ .

All figures  $\times 1$  unless stated otherwise.

### Plate 4

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Figs. 2, 3. *Neodeshayesites albertoalvarezii* Etayo-Serna, 1979.

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Fig. 4. *Neodeshayesites striatus* sp. nov., Albian, Anapoima-Apulo. RGM 291 843, holotype. a, right-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 5**

Fig. 1. *Neodeshayesites biplicatus* sp. nov., Aptian, Villa de Leyva, Loma Blanca. RGM 291 841, holotype. a, right-lateral view. b, apertural view. c, ventral view.

Figs. 2, 3. *Neodeshayesites buergli* sp. nov., Aptian, Utica.

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**Plate 6**

Fig. 1. *Neodeshayesites longicostatus* sp. nov., Aptian, Guane Vereda Chaguete. RGM 211 892, holotype. a, left-lateral view. b, apertural view.  $\times 1$

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Figs. 1-3. *Neodeshayesites stutzeri* (Riedel, 1938)

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Fig. 2. RGM 291 878. Aptian, Guane. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 291 856. Aptian, Villa de Leyva (Loma Catalina).

All figures  $\times 1$  unless stated otherwise

**Plate 8**

Figs. 1-3. *Neodeshayesites stutzeri* (Riedel, 1938), Aptian, Villa de Leyva.

Fig. 1. RGM 291 850. a, left-lateral view. b, apertural view.

Fig. 2. RGM 291 849. Sutamarchan. a, right-lateral view. b, apertural view.

Fig. 3. RGM 291 859. Loma Catalina.

All figures  $\times 1$ .

**Plate 9**

Figs. 1, 2. *Neodeshayesites stutzeri* (Riedel, 1938), Aptian, Villa de Leyva (Loma Catalina).  $\times 1$ .

Fig. 1. RGM 291 856.

Fig. 2. RGM 291 859.

Figs. 3-7. *Neodeshayesites* aff. *cingulatus* Etayo-Serna, 1979, Aptian.

Fig. 3. RGM 291 899. Mesitas del Colegio-La Mesa.  $\times 3$ .

Fig. 4. RGM 291 947. Anapoima-Apulo.  $\times 3$ .

Fig. 5. RGM 291 951. Villa de Leyva, opposit to land of Francisco Castillo. a, right-lateral view. b, apertural view.

Fig. 6. RGM 212 035. Chipatá Viejo-Chipatá. a, right-lateral view. b, apertural view.

Fig. 7. RGM 291 895. Villa de Leyva (Loma Catalina). a, left-lateral view. b, apertural view.

All figures  $\times 2$  unless stated otherwise.

**Plate 10**

Figs. 1-7. *Neodeshayesites* aff. *cingulatus* Etayo-Serna, 1979, Aptian.

Fig. 1. RGM 291 894. San Joaquin. Left-lateral view.  $\times 2$

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Fig. 3. RGM 212 033. Chipatá Viejo-Chipatá. a, left-lateral view. b, apertural view. c, ventral view.

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All figures  $\times 1$  unless stated otherwise.

**Plate 11**

Fig. 1. *Neodeshayesites* aff. *cingulatus* Etayo-Serna, 1979, Aptian, Barbosa-Vélez. RGM 354 130. a, right-lateral view. b, apertural view.

Fig. 2. *Neodeshayesites multicostatus* sp. nov., Aptian, Villa de Leyva (Loma Blanca). RGM 212 051, paratype.

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All figures  $\times 1$ .

**Plate 12**

Figs. 1, 4. *Neodeshayesites tuberculatus* sp. nov.

Fig. 1. RGM 291 825, paratype. Aptian, San Joaquin. a, right-lateral view. b, ventral view.

Fig. 4. RGM 291 839, paratype. Aptian, Villa de Leyva (opposite to land of Francisco Castillo). a, right-lateral view. b, apertural view. c, ventral view.  $\times 2$ .

Figs. 2-3. *Neodeshayesites euglyphoides* sp. nov.

Fig. 2. RGM 291 891, paratype. Aptian, Villa de Leyva (Loma Blanca).

Fig. 3. RGM 291 889, holotype. Aptian, Guane.

All figures  $\times 1$  unless stated otherwise.

**Plate 13**

Fig. 1. *Neodeshayesites biplicatus* sp. nov., Aptian, Utica. RGM 291 842, paratype.  $\times 1$ .

Fig. 2. *Neodeshayesites tuberculatus* sp. nov., Aptian, San Joaquin. RGM 291 833, holotype. A, right-lateral view. b, apertural view. b, ventral view.  $\times 1.5$ .

**Plate 14**

Figs. 1, 2. *Neodeshayesites multicostatus* sp. nov.

Fig. 1. RGM 212 043, holotype. Villa de Leyva (Loma La Yuca).

Fig. 2. RGM 212 046, paratype. Aptian, Anapoima-Apulo. a, left-lateral view. b, apertural view.

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All figures  $\times 1$ .

**Plate 15**

Fig. 1. *Neodeshayesites multicostatus* sp. nov., Villa de Leyva (Loma La Yuca). RGM 212 043, holotype.  $\times 1$ .

**Plate 16**

Figs. 1-3. *Dufrenoyia codazziana* (Karsten, 1858), Aptian.

Fig. 1. RGM 282 410. Villa de Leyva (Loma Blanca). a, left-lateral view. b, apertural view.  $\times 2$ .

Fig. 2. RGM 282 407. Sáchica. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 282 415. *Dufrenoyia codazziana* (Karsten, 1858), Aptian, Guane (Vereda Chaguete). a, left-lateral view. b, apertural view.

Figs. 4, 5. *Dufrenoyia* ex gr. *lurensis* (Kilian, 1888), Aptian.

Fig. 4. RGM 282 420. Guane.  $\times 2$ .

Fig. 5. RGM 282 421. Villa de Leyva (Loma Blanca). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 6. *Dufrenoyia justinae* (Hill, 1893), Aptian, Guane. RGM 282 289. a, left-lateral view. b, apertural view.  $\times 2$ .

All figures  $\times 1$  unless stated otherwise

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Figs. 1-4. *Dufrenoyia justinae* (Hill, 1893), Aptian.

Fig. 1. RGM 282 322, Guane (Vereda Chaguete). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 282 258. Chipatá Vieja-Chipatá. a, right-lateral view. b, apertural view.

Fig. 3. RGM 282 264. Guane. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 282 311. Guane (Vereda Chaguete). a, right-lateral view. b, ventral view.

Fig. 5. *Dufrenoyia sanctorum* Etayo-Serna, 1979, Aptian, Guane (Vereda Chaguete). RGM 282 389. a, left-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 18**

Figs. 1-3. *Dufrenoyia justinae* (Hill, 1893), Aptian.

Fig. 1. RGM 282 277. Socorro. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 282 280. Villa de Leyva (Loma Blanca). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 282 326. Aptian, Chipatá Vieja-Chipatá. a, left-lateral view. b, ventral view.

All figures  $\times 1$ .

**Plate 19**

Fig. 1. *Dufrenoyia justinae* (Hill, 1893), Aptian, Villa de Leyva (Loma Blanca). RGM 282 285. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. *Dufrenoyia* ex gr. *boesei* (Humphrey, 1949), Aptian, Guane (Vereda Chaguete). RGM 282 405. a, left-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 20**

Fig. 1. *Dufrenoyia* ex gr. *boesei* (Humphrey, 1949), Aptian, Villa de Leyva (Loma Catalina). RGM 282 404. a, right-lateral view. b, ventral view.

Figs. 2-5. *Dufrenoyia sanctorum* Etayo-Serna, 1979, Aptian.

Fig. 2. RGM 282 393. Guane (Vereda Chaguete). a, left-lateral view. b, ventral view. c, apertural view.  $\times 2$ .

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Fig. 4. RGM 282 336. Aptian, Villa de Leyva (Loma Blanca). a, right-lateral view. b, ventral view.

Fig. 5. RGM 282 399. Aptian, Guane (Vereda Chaguete). Right-lateral view.

All figures  $\times 1$  unless stated otherwise.

**Plate 21**

Figs. 1-4. *Dufrenoyia sanctorum* Etayo-Serna, 1979, Aptian.

Fig. 1. RGM 282 381. Guane (Vereda Chaguete). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 282 383. Villa de Leyva (Loma Blanca). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 282 343. Villa de Leyva (Loma Blanca). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 282 335. Guane. a, right-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 22**

Figs. 1-4. *Dufrenoyia sanctorum* Etayo-Serna, 1979, Aptian.

Fig. 1. RGM 282 394. Guane (Vereda Chaguete). a, right-lateral view. b, ventral view.

Fig. 2. RGM 282 357. Aptian, Galan. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 282 369. Aptian, Galan. Right-lateral view.

Fig. 4. RGM 282 364. Aptian, Galan. a, right-lateral view. b, apertural view. c, ventral view.

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All figures  $\times 1$ .

**Plate 23**

Fig. 1. *Dufrenoyia* aff. *coddaziana* (Karsten, 1858), Aptian, Galan. RGM 282 416. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 2. *Dufrenoyia boteroi* Etayo-Serna, 1979, Aptian, Chipatá Vieja-Chipatá. RGM 282 433. a, left-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$

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Figs. 1, 2. *Dufrenoyia boteroi* Etayo-Serna, 1979, Aptian.

Fig. 1. RGM 282 436. Guane. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 282 427. Villa de Leyva (Loma Catalina). a, left-lateral view. b, apertural view. c, ventral view.

Figs. 3-5. *Dufrenoyia renzi* sp. nov., compressed morph, Aptian, Guane.

Fig. 3. RGM 212 382, holotype. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 212 371, paratype. Left-lateral view.

Fig. 5. RGM 212 372, paratype. a, right-lateral view. b, apertural view.

All figures  $\times 1$ .

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Figs. 1-5. *Dufrenoyia renzi* sp. nov., compressed morph, Aptian.

Fig. 1. RGM 212 371, paratype. Guane. Ventral view.

Fig. 2. RGM 212 363, paratype. Guane (Finca Butaragua). a, right-lateral view. b, apertural view. c, ventral view.

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Fig. 4. RGM 212 369, paratype. Guane. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 5. RGM 212 383, paratype. Socorro. a, right-lateral view. b, apertural view.

All figures  $\times 1$ .

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Figs. 1-5. *Dufrenoyia renzi* sp. nov., inflated morph, Aptian.

Fig. 1. RGM 282 256, paratype. inflated morph, Villa de Leyva (Loma Blanca). a, left-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 212 385, paratype. inflated morph, Villa de Leyva (Loma Blanca). a, left-lateral view. b, apertural view.

Fig. 3. RGM 282 249, paratype. inflated morph, Guane (Vereda Chaguete). a, left-lateral view. b, ventral view.

Fig. 4. RGM 212 384, paratype. morph with intercalated ribs, Socorro. a, right-lateral. b, apertural view. c, ventral view.

Fig. 5. RGM 212 398, paratype. inflated morph, Galan. a, right-lateral. b, apertural view.

All figures  $\times 1$ .

**Plate 27**

Figs. 1-3. *Dufrenoyia renzi* sp. nov., morph with intercalated ribs, Aptian, Guane.

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Fig. 2. RGM 212 377, paratype. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 212 381, paratype. a, right-lateral view. b, apertural view.

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All figures  $\times 1$ .

**Plate 28**

Figs. 1, 2. *Pseudosaynella bicurvata* (Michelin, 1838), Aptian, Villa de Leyva (Loma Blanca).

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Fig. 2. RGM 353 739. a, left-lateral view. b, apertural view. c, ventral view.

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Figs. 4, 5. *Valdedorsella* ex gr. *getulina* (Coquand, 1880), Barremian, Villa de Leyva.

Fig. 4. RGM 353 760. a, right-lateral view. b, ventral view.

Fig. 5. RGM 353 755. a, right-lateral view. b, apertural view.

Fig. 6. *Valdedorsella* ex gr. *akuschensis* (Anthula, 1899), Aptian, Sáchica. RGM 353 761. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 7. *Zuercherella etayosernai* sp. nov., Aptian, Villa de Leyva. RGM 353 987, paratype. Right-lateral view.  $\times 2$ .

All figures  $\times 1$  unless stated otherwise.

**Plate 29**

Figs. 1, 2. *Valdedorsella inca* (Forbes, 1845), morpha inflata, Barremian, Villa de Leyva (Loma La Yesera).

Fig. 1. RGM 354 089. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 354 070. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 3. *Zuercherella etayosernai* sp. nov., Aptian, Villa de Leyva. RGM 353 988, holotype. a, left-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 30**

Figs. 1, 2. *Valdedorsella inca* (Forbes, 1845), Barremian.

Fig. 1. RGM 354 086. *Morpha planata*, Villa de Leyva (Loma La Yesera). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 354 109. *Morpha inflata*, Barremian, Pte. Nacional, Jesus Maria, Río Suarez. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. *Kennicottia?* sp., Aptian of Sutamarchan. RGM 353 988. a, right-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 31**

Figs. 1, 2. *Valdedorsella inca* (Forbes, 1845), Barremian, Villa de Leyva (Loma La Yesera).

Fig. 1. RGM 354 090. *Morpha normal*. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 354 070. *Morpha inflata*. Right-lateral view.

Fig. 3. *Miyakoceras* sp. (ex gr. *tanohatense* Obata, 1967), Aptian, San Joaquin. RGM 212 237. a, right-lateral view. b, ventral view.  $\times 2$ .

All figures  $\times 1$  unless stated otherwise.

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1. *Valdedorsella inca* (Forbes, 1845), *morpha planata*, RGM 354 036, Barremian, Santa Sofía. a, right-lateral view. b, apertural view. c, ventral view.

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Fig. 5. RGM 353 788. Villa de Leyva. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 6. *Pseudohaploceras leivaense* Etayo-Serna, 1979, Aptian, Villa de Leyva. RGM 353 999. a, left-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 33**

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Fig. 2. RGM 353 892. *Sáchica*. a, right-lateral view. b, ventral view.

Fig. 3. RGM 353 875. Villa de Leyva. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 353 902. Villa de Leyva. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 5. RGM 353 878. *Sáchica*. a, left-lateral view. b, apertural view.

Fig. 6. *Pseudohaploceras hopkinsi* (Forbes, 1845), Aptian, *Sáchica*. RGM 353 787. a, right-lateral view. b, ventral view.

All figures  $\times 1$ .

**Plate 34**

Fig. 1. *Pseudohaploceras douvillei* (Fallot, 1920), Aptian, Villa de Leyva. RGM 353 905. a, right-lateral view. b, apertural view. c, ventral view.

Figs. 2-4. *Pseudohaploceras leivaense* Etayo-Serna, 1979.

Fig. 2. RGM 353 952. Aptian, Sutamarchan. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 353 951. Barremian, Villa de Leyva. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 353 950. Barremian, Villa de Leyva. a, right-lateral view. b, ventral view.

All figures  $\times 1$ .

**Plate 35**

Figs. 1, 2. *Pseudohaploceras leivaense* Etayo-Serna, 1979.

Fig. 1. RGM 353 943. Aptian, Galan. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 353 946. Barremian/Aptian, Guane. a, right-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 36**

Figs. 1-3. *Pseudohaploceras leivaense* Etayo-Serna, 1979.

Fig. 1. RGM 353 946. Barremian/Aptian, Guane. Ventral view.

Fig. 3. RGM 353 962. Barremian/Aptian, Guane. a, right-lateral view. b, ventral view.

Fig. 4. *Pseudohaploceras* aff. *ramosum* Bogdanova, 1993, Aptian, Sáchica. RGM 353 773. a, right-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 37**

Fig. 1. *Pseudohaploceras leivaense* Etayo-Serna, 1979, Aptian, Villa de Leyva. RGM 353 966. Ventral view.

Fig. 2. *Pseudohaploceras* aff. *ramosum* Bogdanova, 1993, Aptian, Sáchica. RGM 353 778. a, right-lateral view. b, apertural view. c, ventral view.

Figs. 3, 4. *Pseudohaploceras gerhardti* sp. nov., Aptian, Guane. a, left-lateral view. b, ventral view.

Fig. 3. RGM 353 746, paratype. a, left-lateral view. b, ventral view.

Fig. 4. RGM 353 762, paratype. a, right-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 38**

Fig. 1. *Pseudohaploceras gerhardti* sp. nov., Barremian/Aptian, Guane. RGM 353 752, holotype. Left-lateral view.

Figs. 2-4. *Zuercherella latecostata* (Riedel, 1938), Aptian.

Fig. 2. RGM 353 976. Utica. a, left-lateral view. b, ventral view.

Fig. 3. RGM 353 978. Utica. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 354 002. Villa de Leyva (Loma Cabrera). a, right-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 39**

Fig. 1. *Pseudohaploceras gerhardti* sp. nov., Barremian/Aptian, Guane. RGM 353 752, holotype. a, apertural view. b, ventral view.

Figs. 2-4. *Zuercherella latecostata* (Riedel, 1938), Aptian, Utica.

Fig. 2. RGM 353 982. a, left-lateral view. b, ventral view.

Fig. 3. RGM 353 975. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 353 973. a, left-lateral view. b, apertural view.

All figures  $\times 1$ .

**Plate 40**

Fig. 1. *Puzosia quenstedti* (Parona & Bonarelli, 1897), Albian, Anapoima-Apulo. RGM 353 971. a, left-lateral view. b, ventral view.

Figs 2, 3. *Pseudohaploceras yucaense* sp. nov., Barremian.

Fig. 2. RGM 353 768, holotype. Villa de Leyva (Loma de la Yuca). a, left-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 353 769, paratype. Villa de Leyva (Loma La Yesera). a, right-lateral view. b, apertural view. c, ventral view.

Figs. 4, 5. *Melchiorites palmeri* Etayo-Serna, 1979.

Fig. 4. RGM 354 027. Aptian/Albian?, Anapoima-Apulo. a, right-lateral view. b, ventral view.

Fig. 5. RGM 354 026. Barremian, Villa de Leyva (Loma La Yesera).  $\times 3$ . a, left-lateral view. b, ventral view.

All figures  $\times 1$  unless stated otherwise.

**Plate 41**

Fig. 1. *Pseudohaploceras yucaense* sp. nov., Barremian, Vélez – Chipatá. RGM 353 763, paratype. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. *Zuercherella* cf. *zuercheri* (Jacob in Jacob & Tobler, 1906), Barremian, Villa de Leyva. RGM 354 033. Left-lateral view.

Fig. 3. *Melchiorites media* (Riedel, 1938), Barremian, Vélez-Chipatá. RGM 354 019. a, left-lateral view. b, apertural view. c, ventral view.

Figs. 4, 5. *Melchiorites palmeri* (Etayo-Serna, 1979).

Fig. 4. RGM 354 010. Barremian, Vélez-Chipatá. a, right-lateral view. b, apertural view.

Fig. 5. RGM 354 012. Aptian, Mesitas de Colegio-Mesa. a, right-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

**Plate 42**

Figs. 1-3. *Melchiorites media* (Riedel, 1938).

Fig. 1. RGM 354 011. Aptian/Albian, Anapoima-Apulo. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 354 016. Aptian, Utica. Right-lateral view.

Fig. 3. RGM 354 017. Aptian, Utica. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 4. *Melchiorites columbianus* sp. nov., Aptian, Utica. RGM 354 004, paratype. a, left-lateral view. b, apertural view.

Fig. 5. *Pseudohaploceras leivaense* Etayo-Serna, 1979, upper Barremian, Villa de Leyva (Loma Blanca). RGM 354 034, left-lateral view.

All figures  $\times 1$ .

**Plate 43**

Fig. 1. *Melchiorites columbianus* sp. nov., Barremian, Villa de Leyva. RGM 354 003, holotype. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. *Puzosia quenstedti* (Parona & Bonarelli, 1897), Albian, Anapoima-Apulo. RGM 353 972. Apertural view.

All figures  $\times 1$ .

**Plate 44**

Fig. 1. *Puzosia quenstedti* (Parona & Bonarelli, 1897), Albian, Anapoima-Apulo. RGM 353 972. Right-lateral view.  $\times 1$ .

**Plate 45**

Figs. 1, 2. *Aconeceras nisoides* (Sarasin, 1893), Aptian.

Fig. 1. RGM 212 191. Villa de Leyva (Loma Blanca). a, right-lateral view. b, ventral view.

Fig. 2. RGM 212 189. Villa de Leyva (Loma La Asomada). a, right-lateral view. b, ventral view.

Figs. 3, 4. *Zuercherella etayosernai* sp. nov., Albian?, Anapoima-Apulo.

Fig. 3. RGM 212 222, paratype. a, left-lateral view. b, apertural view.

Fig. 4. RGM 212 225, paratype. a, left-lateral view. b, apertural view. c, ventral view.

Figs. 5-7. *Pseudohaploceras yeseraense* sp. nov.

Fig. 5. RGM 212 297, paratype. Barremian, Villa de Leyva (Loma La Yesera). a, left-lateral view. b, ventral view.

Fig. 6. RGM 212 285, holotype. Aptian?, Pte. Nacional-Jesus Maria (Río Suarez). a, right-lateral view. b, ventral view.

Fig. 7. RGM 212 284, paratype. Aptian?, Pte. Nacional-Jesus Maria (Río Suarez). a, left-lateral view. b, ventral view.

All figures  $\times 1$ .

**Plate 46**

Figs. 1, 3, 4. *Pseudohaploceras simile* sp. nov.

Fig. 1. RGM 212 278, paratype. Barremian/Aptian, Villa de Leyva (Loma Blanca). a, right-lateral view. b, apertural view.

Fig. 3. RGM 354 064, paratype. Barremian, Velez-Chipatá. a, right-lateral view. b, apertural view. c, ventral view.

Fig. 4. RGM 212 277, holotype. Barremian/Aptian, Villa de Leyva (Loma Blanca). a, left-lateral view. b, apertural view. c, ventral view.

Fig. 2. *Pseudohaploceras gerhardti* sp. nov., Barremian/Aptian, Guane (Vereda Chaguete up to "Brasil"). RGM 212 195, paratype. Left-lateral view.

Fig. 5. *Carloscaceresiceras caceresi* Etayo-Serna, 1979, Barremian, Utica (Quebrada negra). RGM 212 243. Ventral view.

All figures  $\times 1$ .

**Plate 47**

Figs. 1, 2. *Pseudohaploceras gerhardti* sp. nov.

Fig. 1. RGM 212 196, paratype. Barremian/Aptian, Guane (Vereda Chaguete up to "Brasil"). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 212 213, paratype. Aptian, Guane (Vereda Chaguete). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 3. *Carloscaceresiceras caceresi* Etayo-Serna, 1979, uppermost Aptian/lower Albian, Utica (Quebrada negra). RGM 212 243. Right-lateral view.

All figures  $\times 1$ .

**Plate 48**

Fig. 1. *Carloscaceresiceras caceresi* Etayo-Serna, 1979, lower Albian, Anapoima-Apulo. RGM 212 244. Left lateral view.  $\times 1$ .

**Plate 49**

Figs. 1-3. *Juandurhamiceras juandurhami* Etayo-Serna, 1979, Aptian.

Fig. 1. RGM 212 323. Guane (Vereda Chaguete up to "Brasil"). a, right-lateral view. b, apertural view. c, ventral view.

Fig. 2. RGM 212 320. Anapoima-Apulo. a, left-lateral view. b, apertural view. c, ventral view.

Fig. 3. RGM 212 319. Anapoima-Apulo. a, left-lateral view. b, apertural view. c, ventral view.

All figures  $\times 1$ .

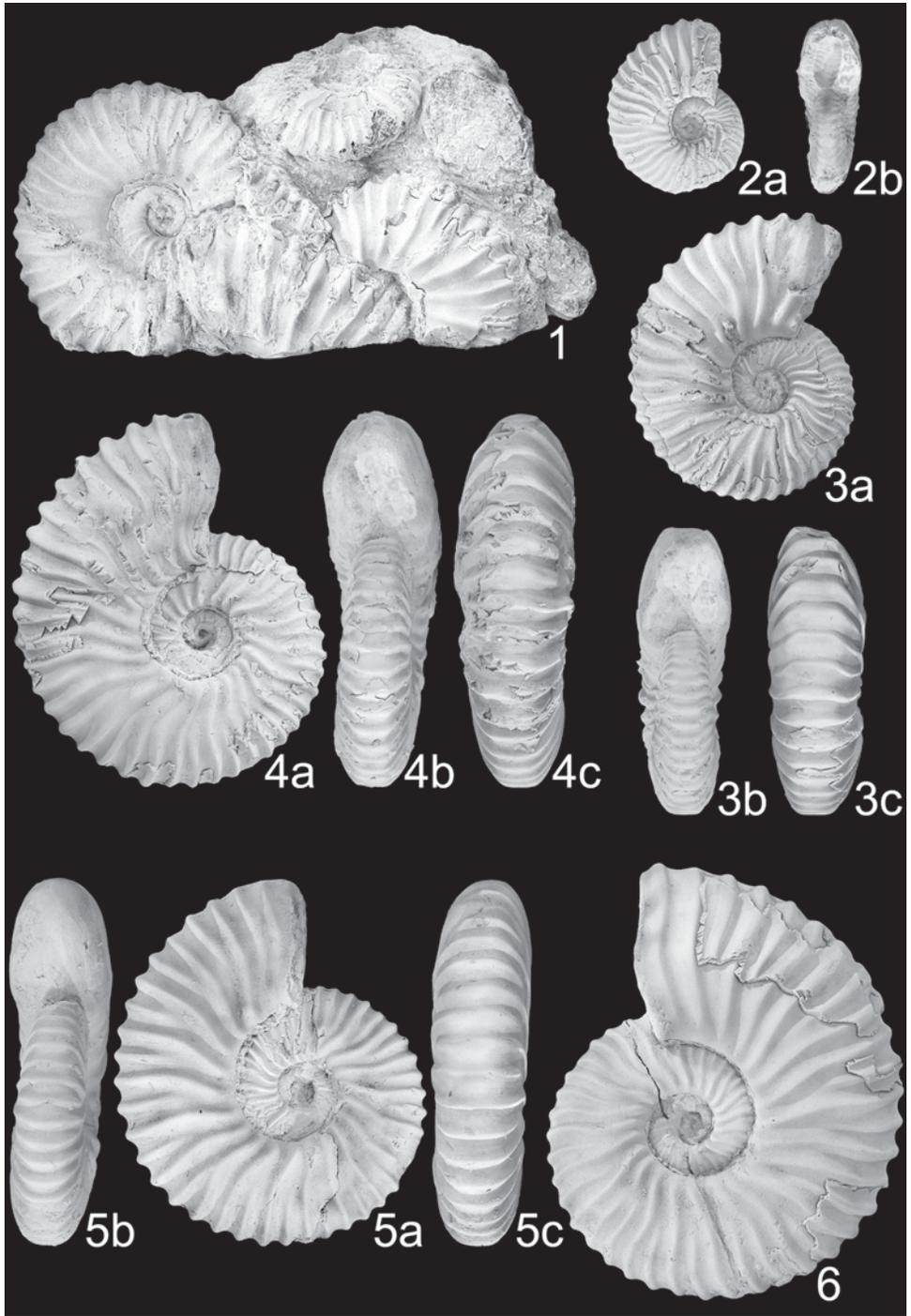


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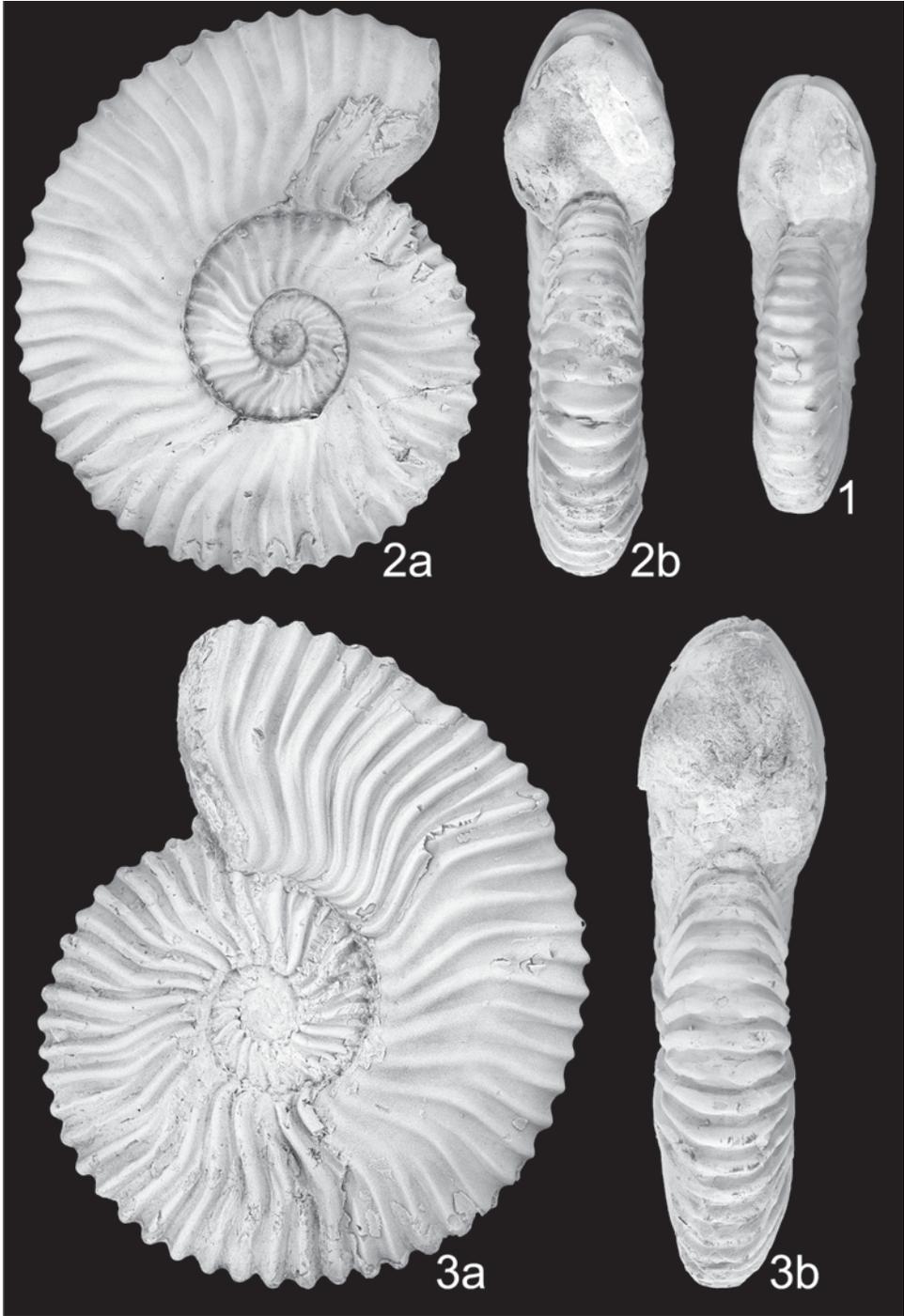


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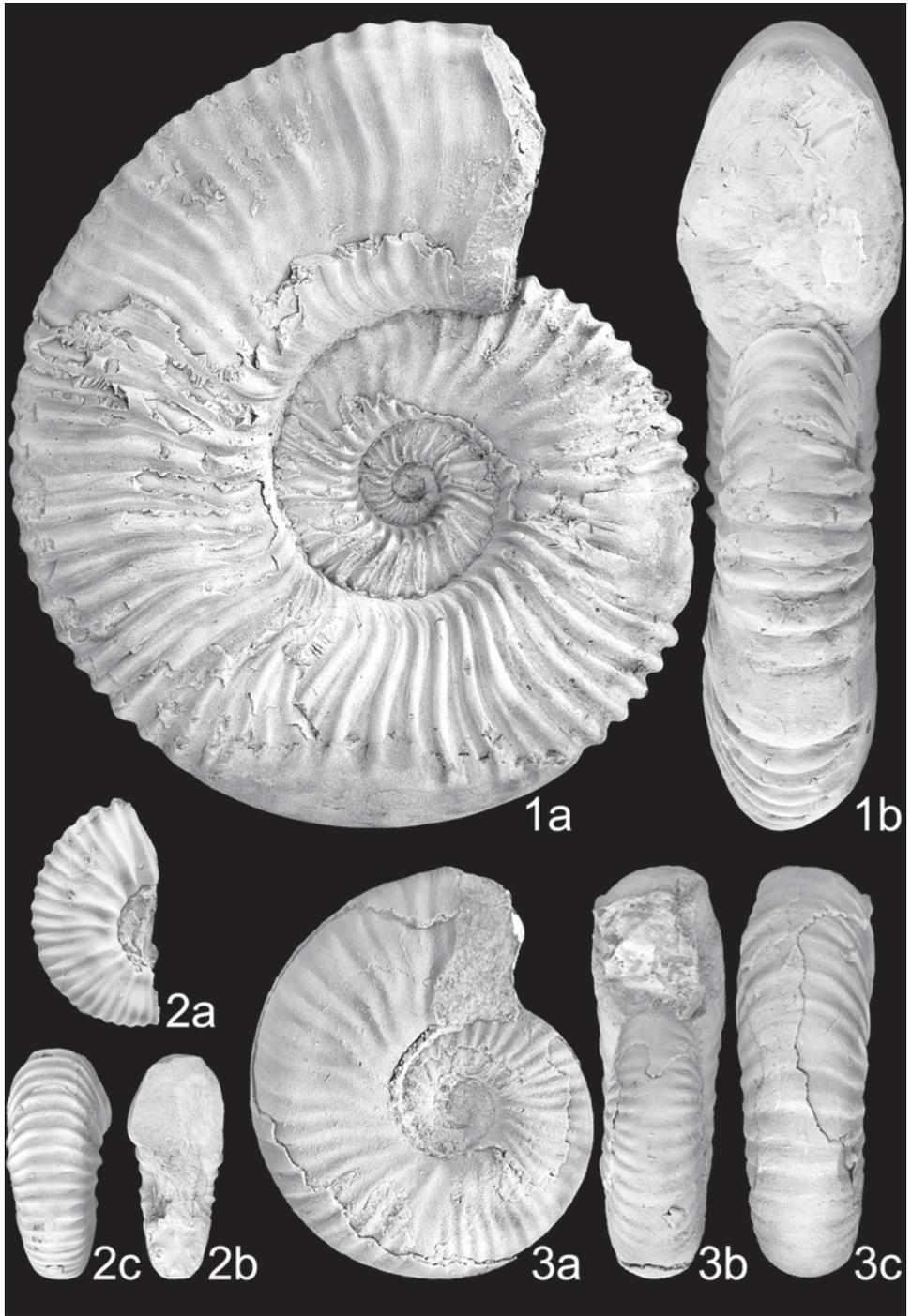


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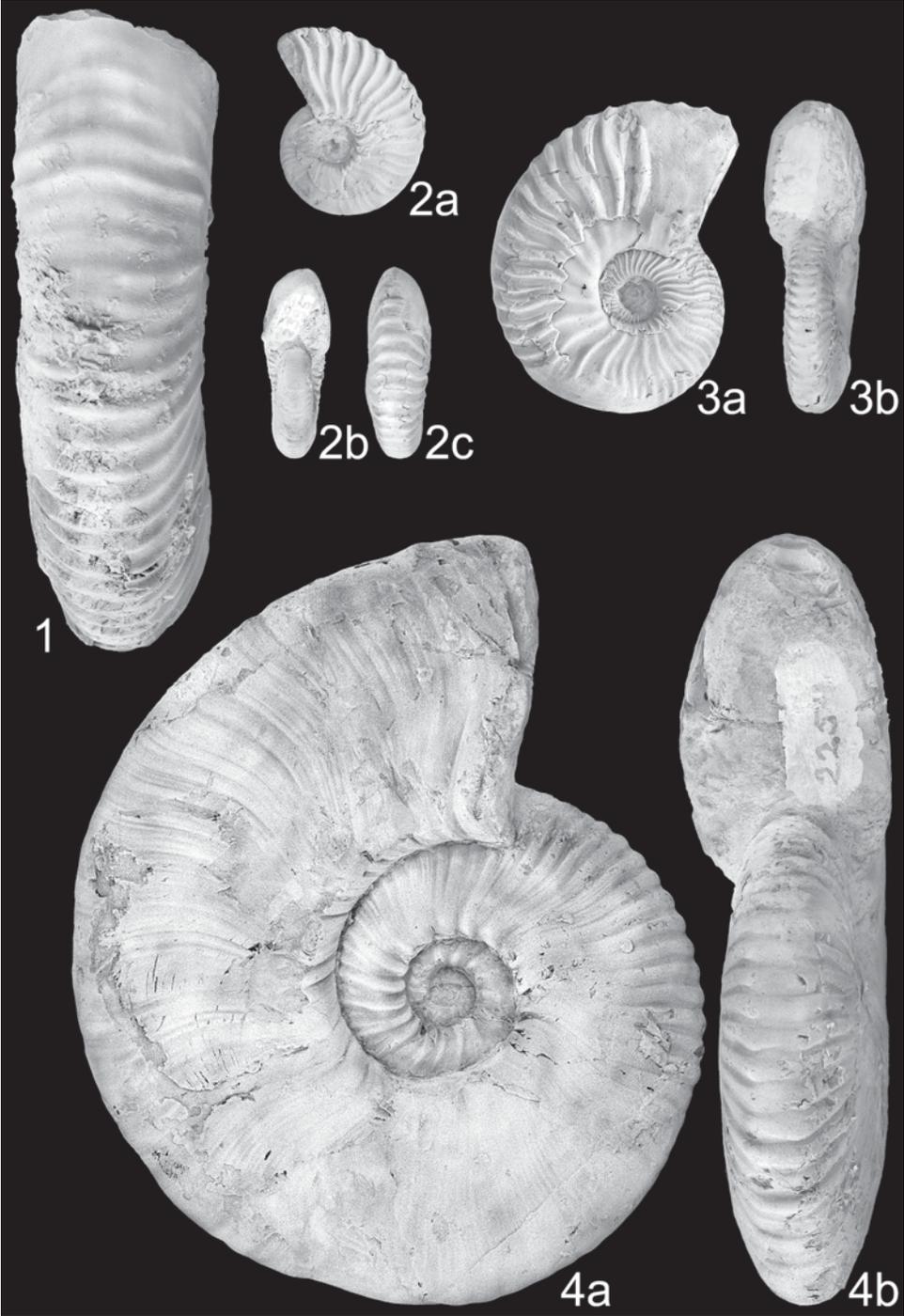


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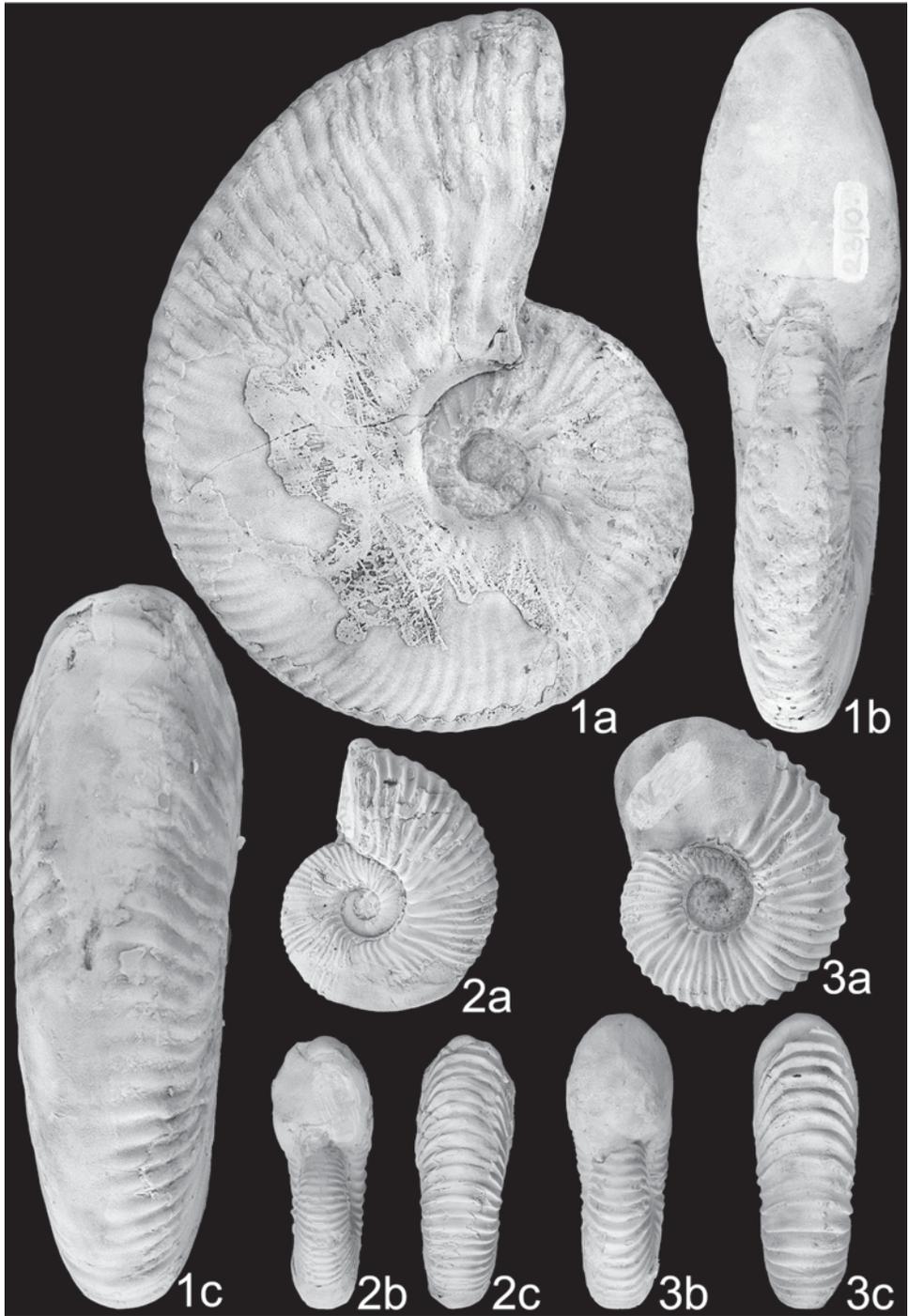


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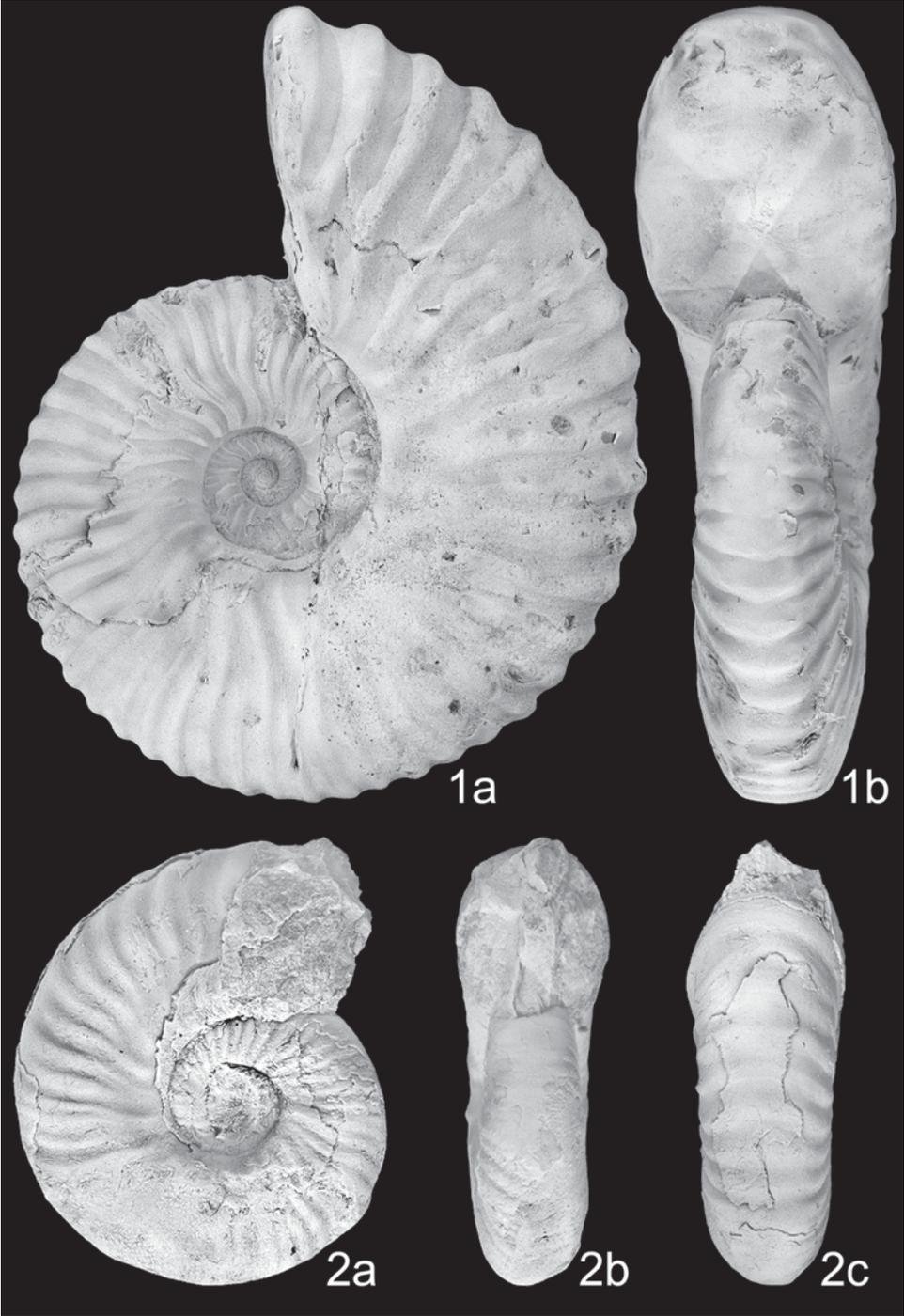


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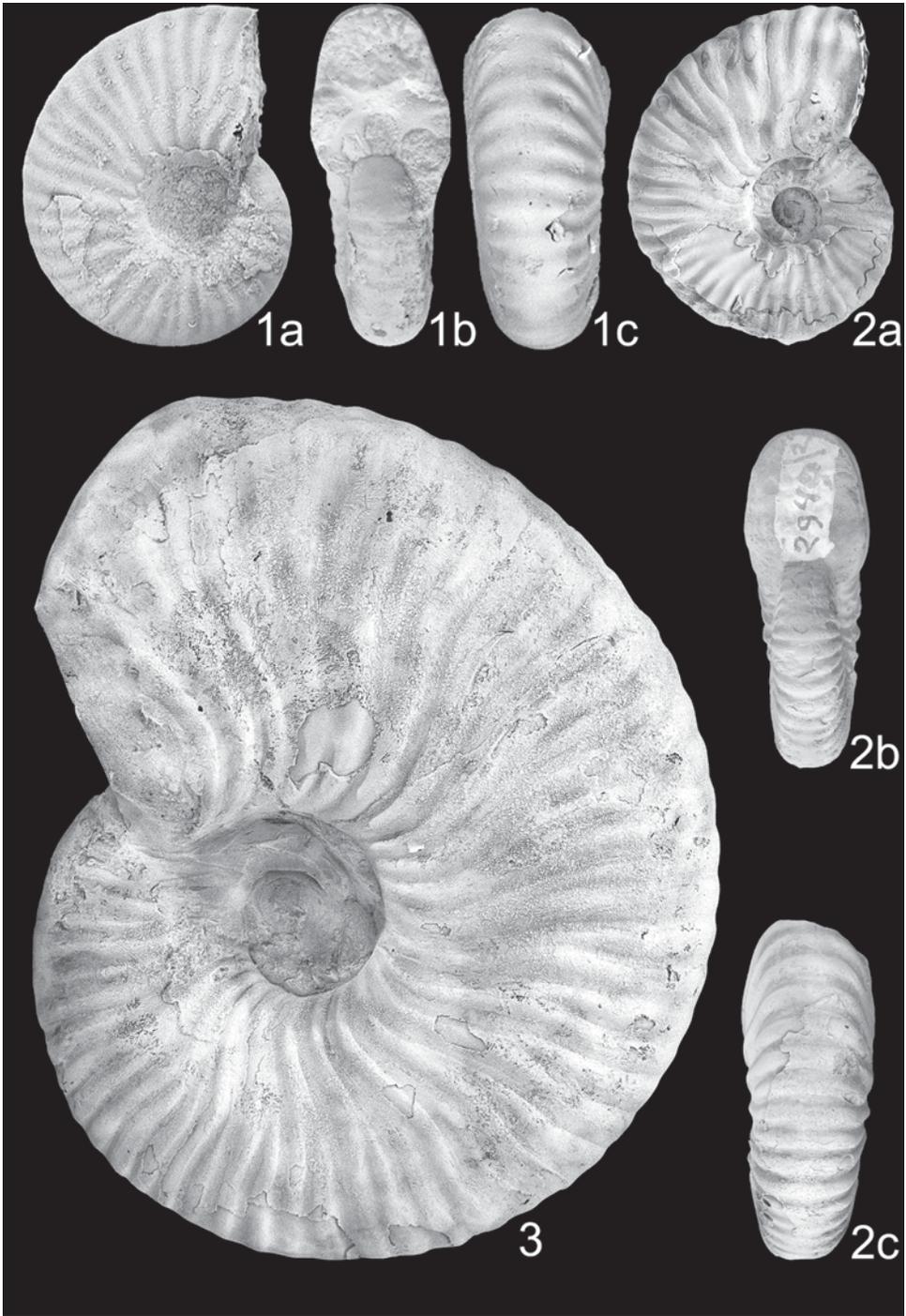


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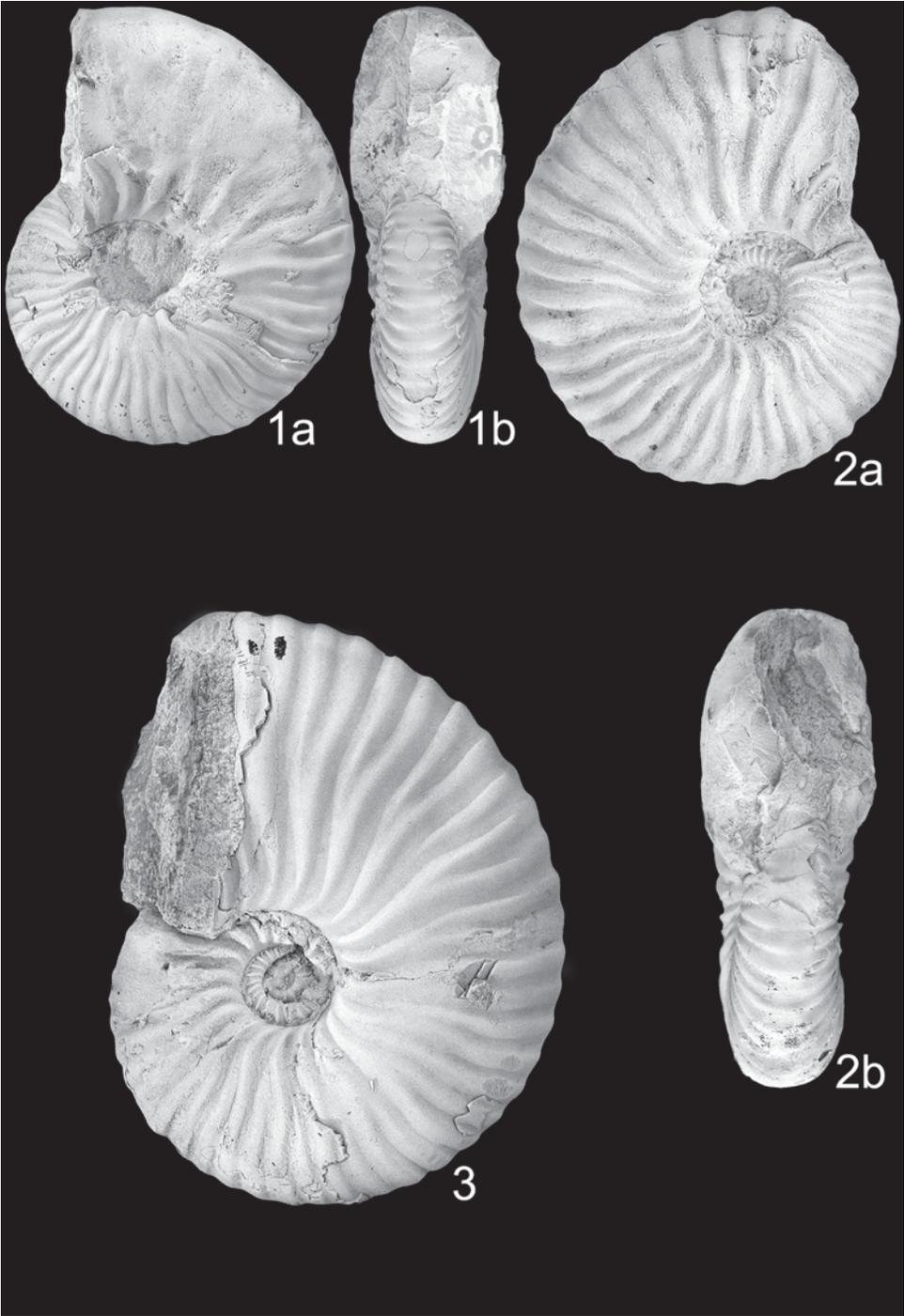


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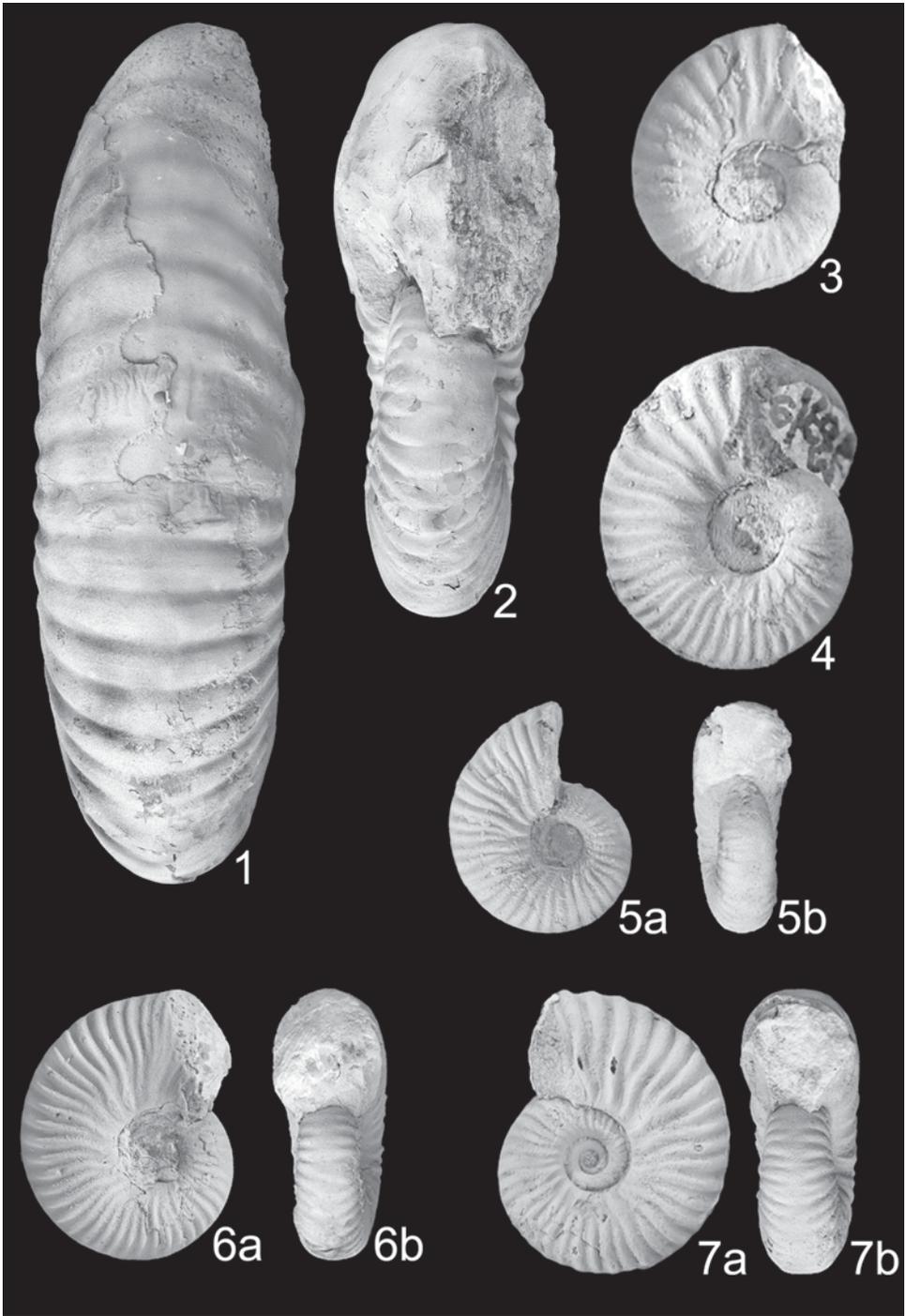


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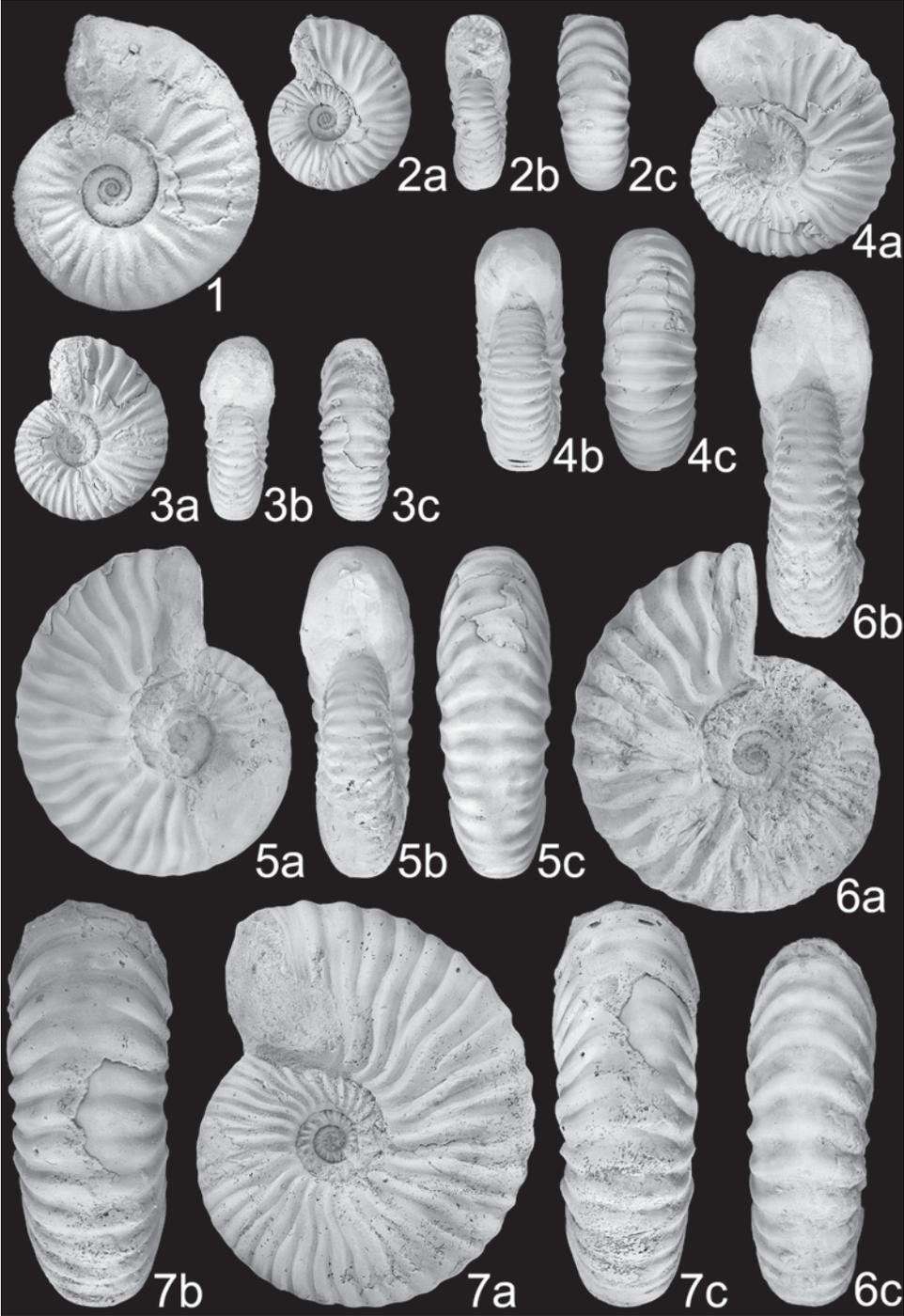


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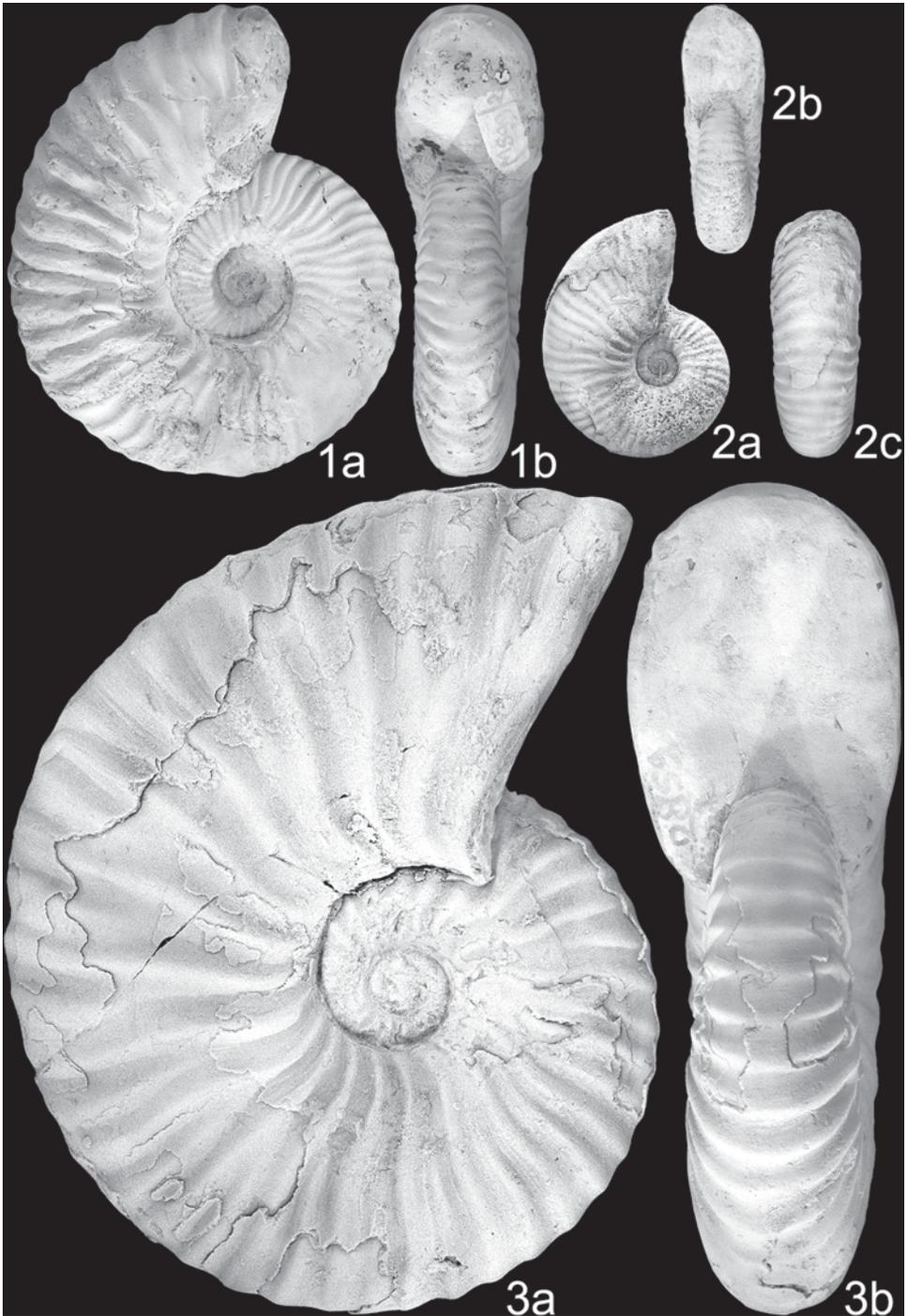


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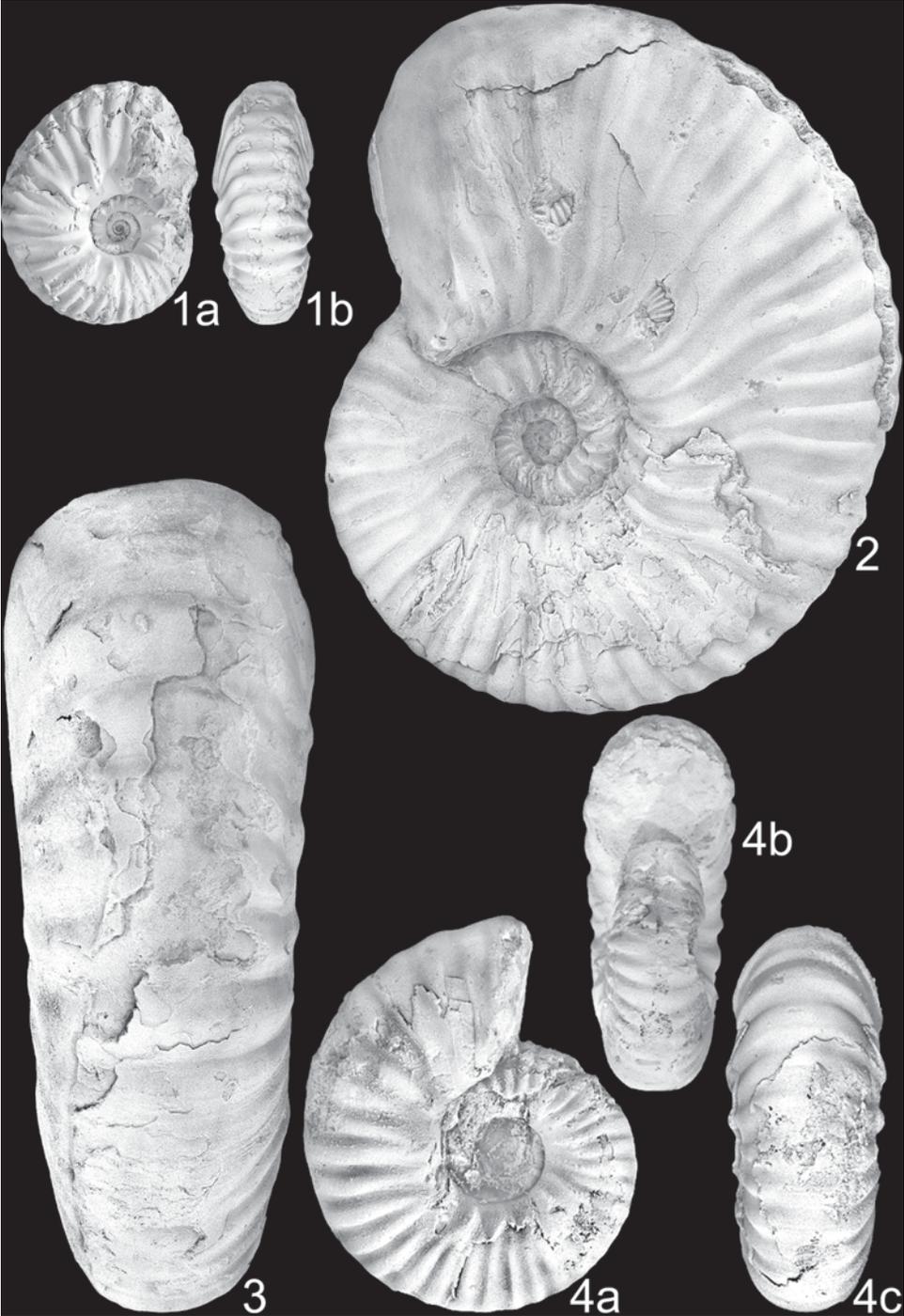


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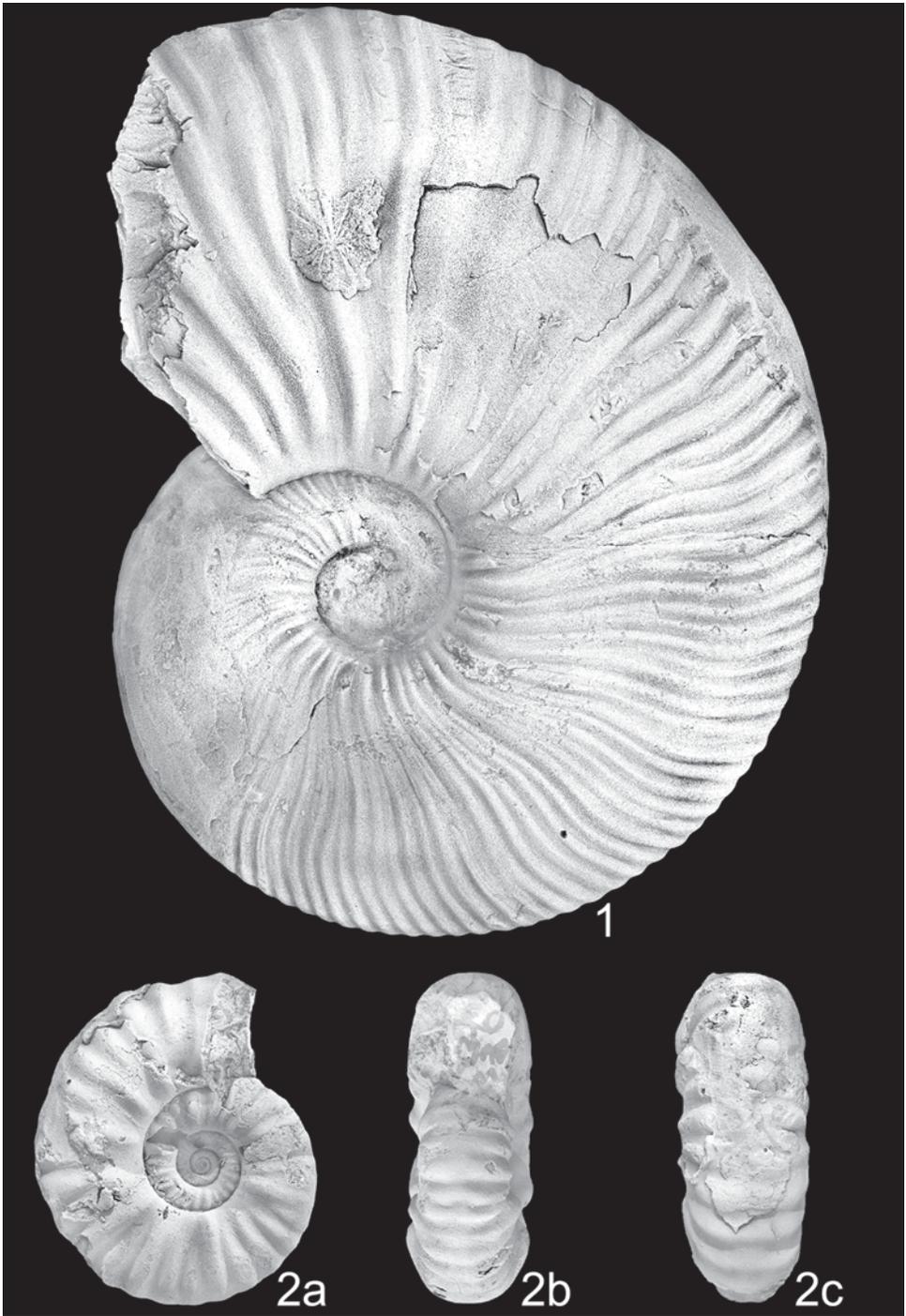


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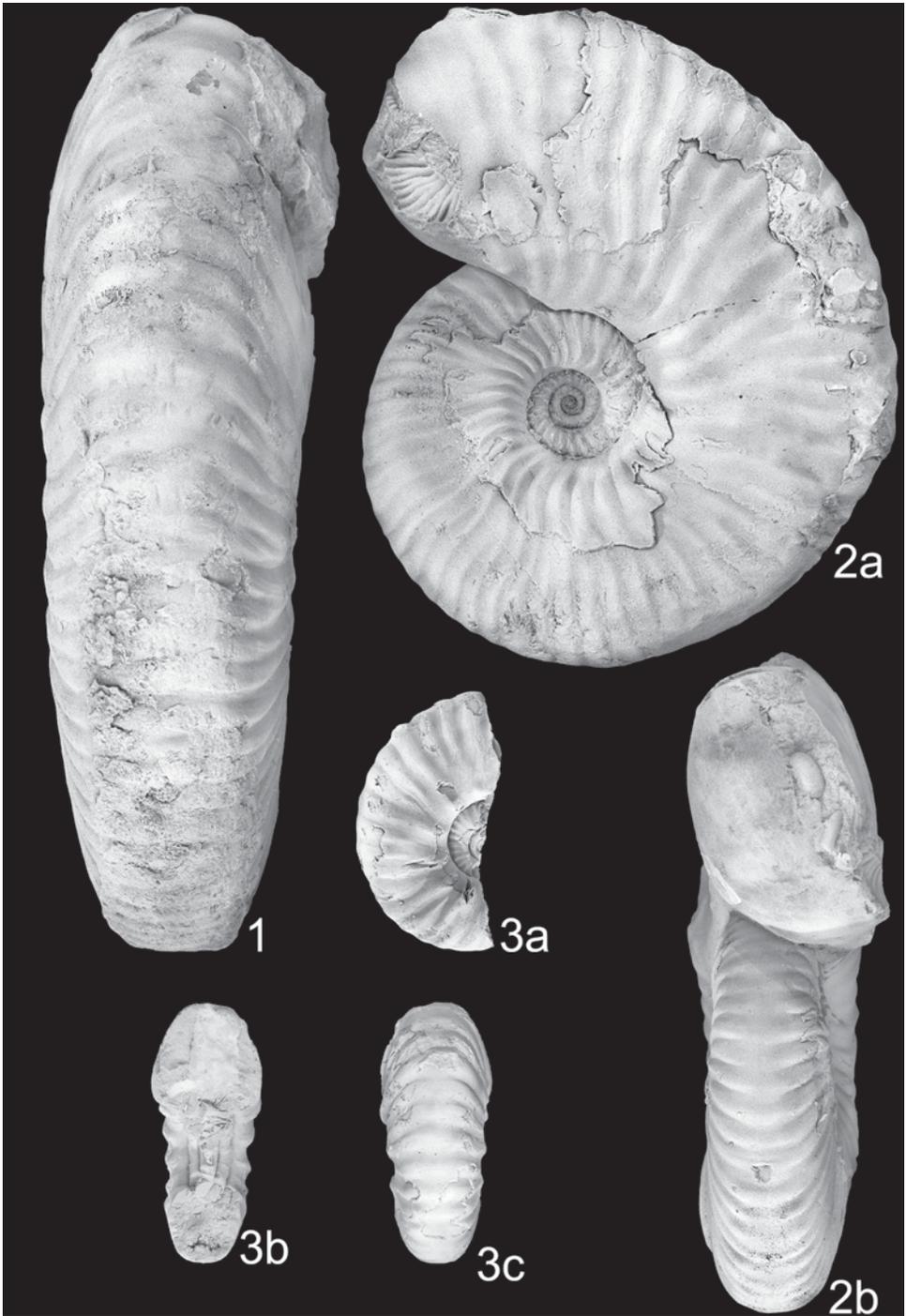


Plate 14



Plate 15

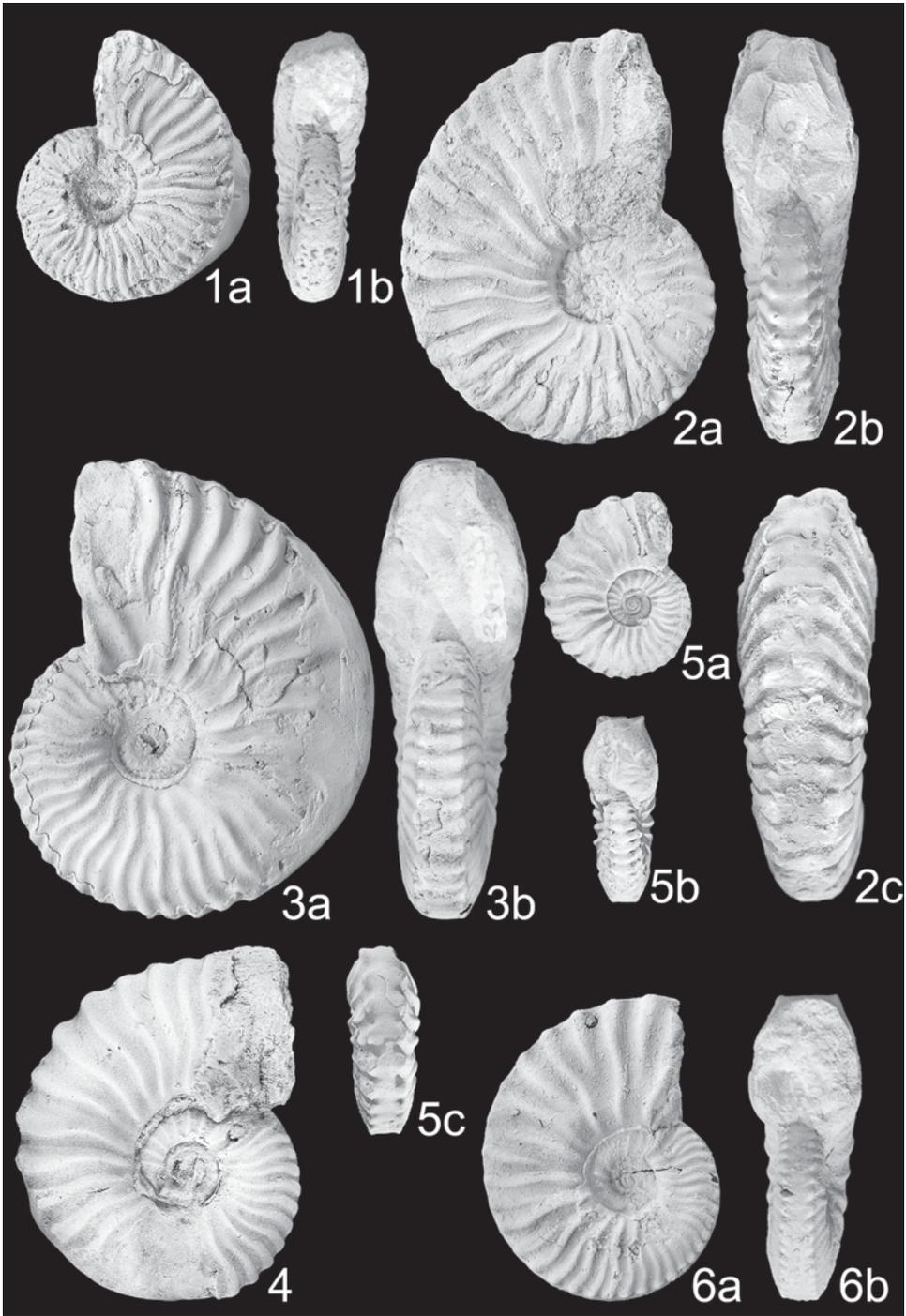


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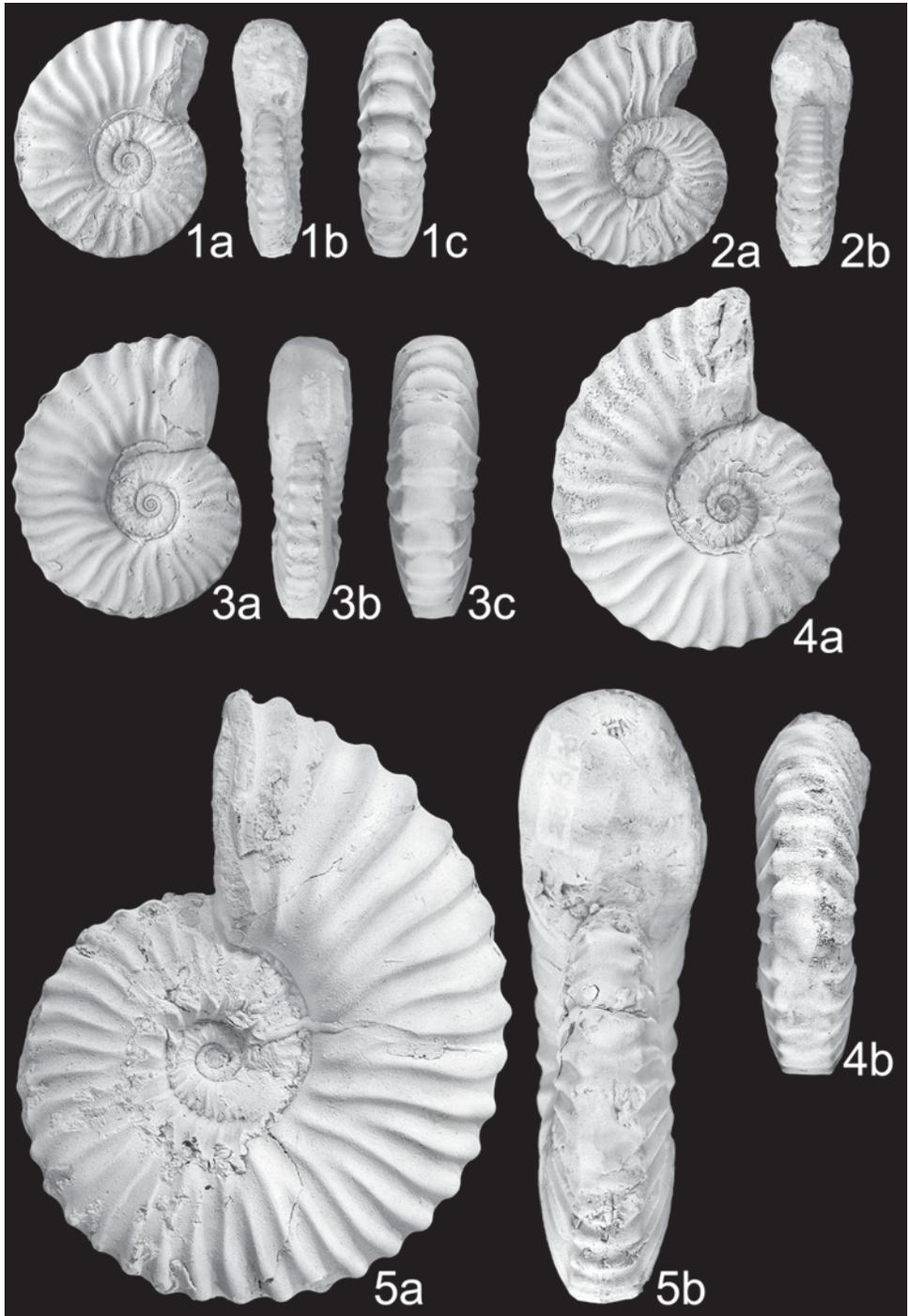


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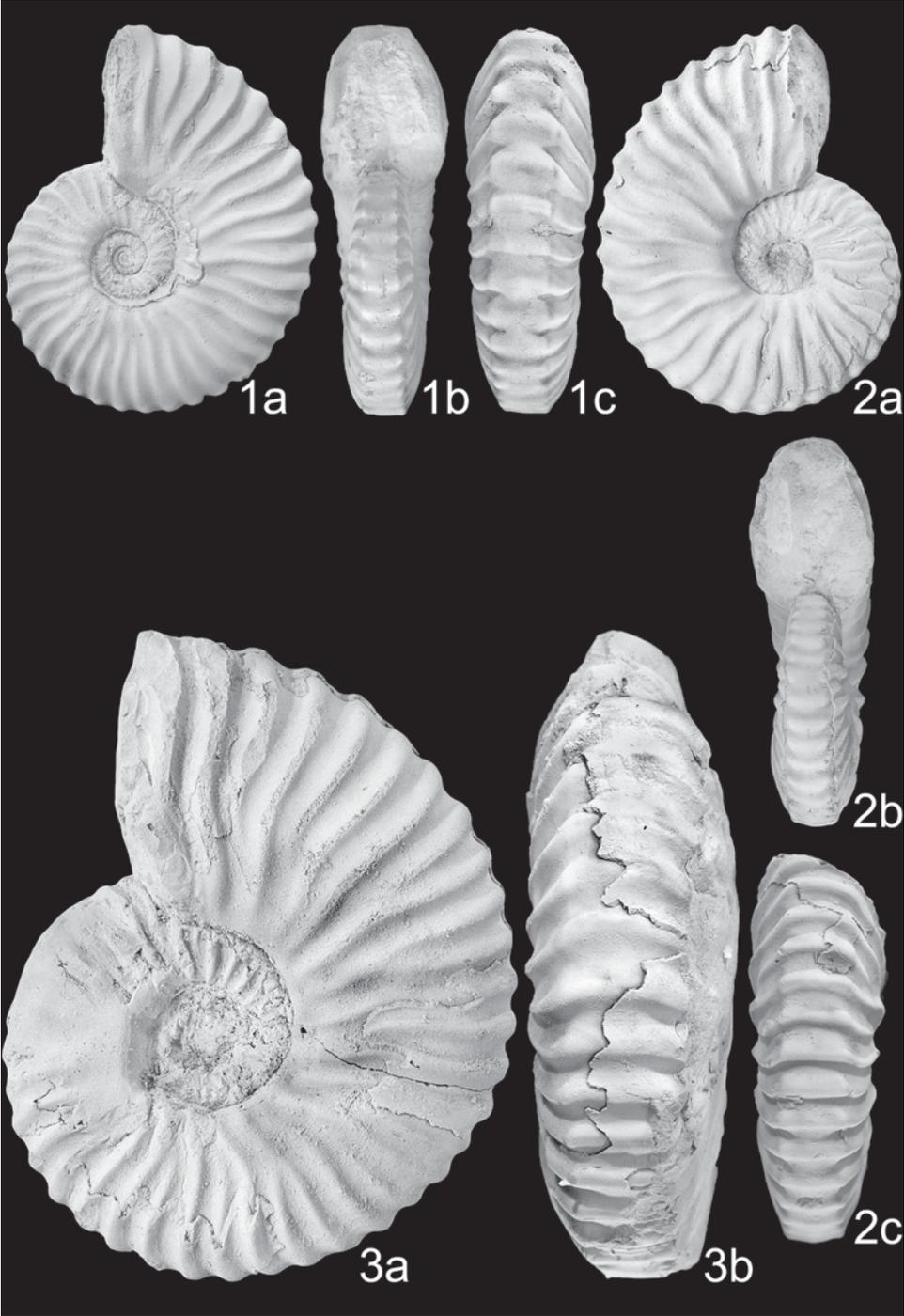


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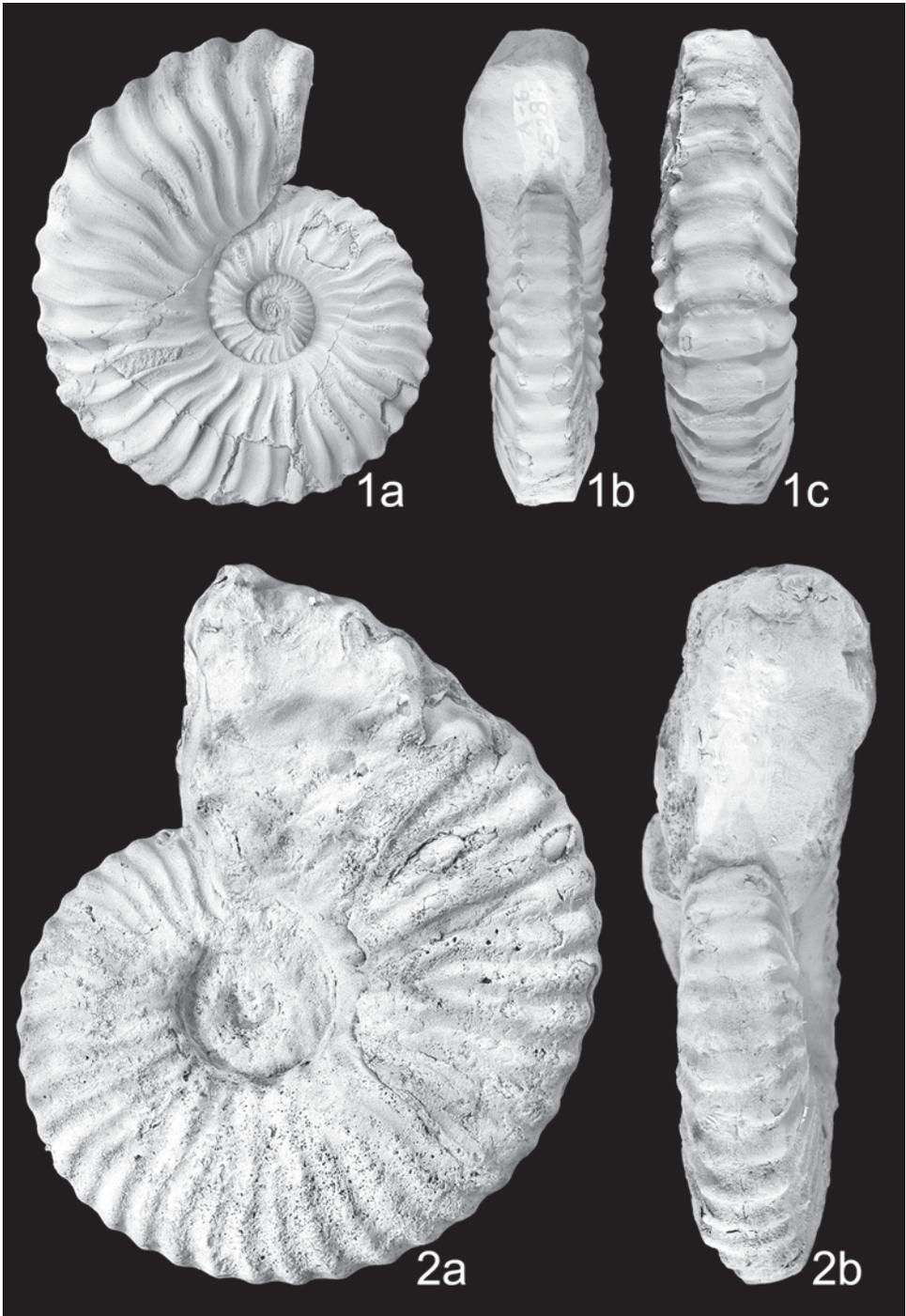


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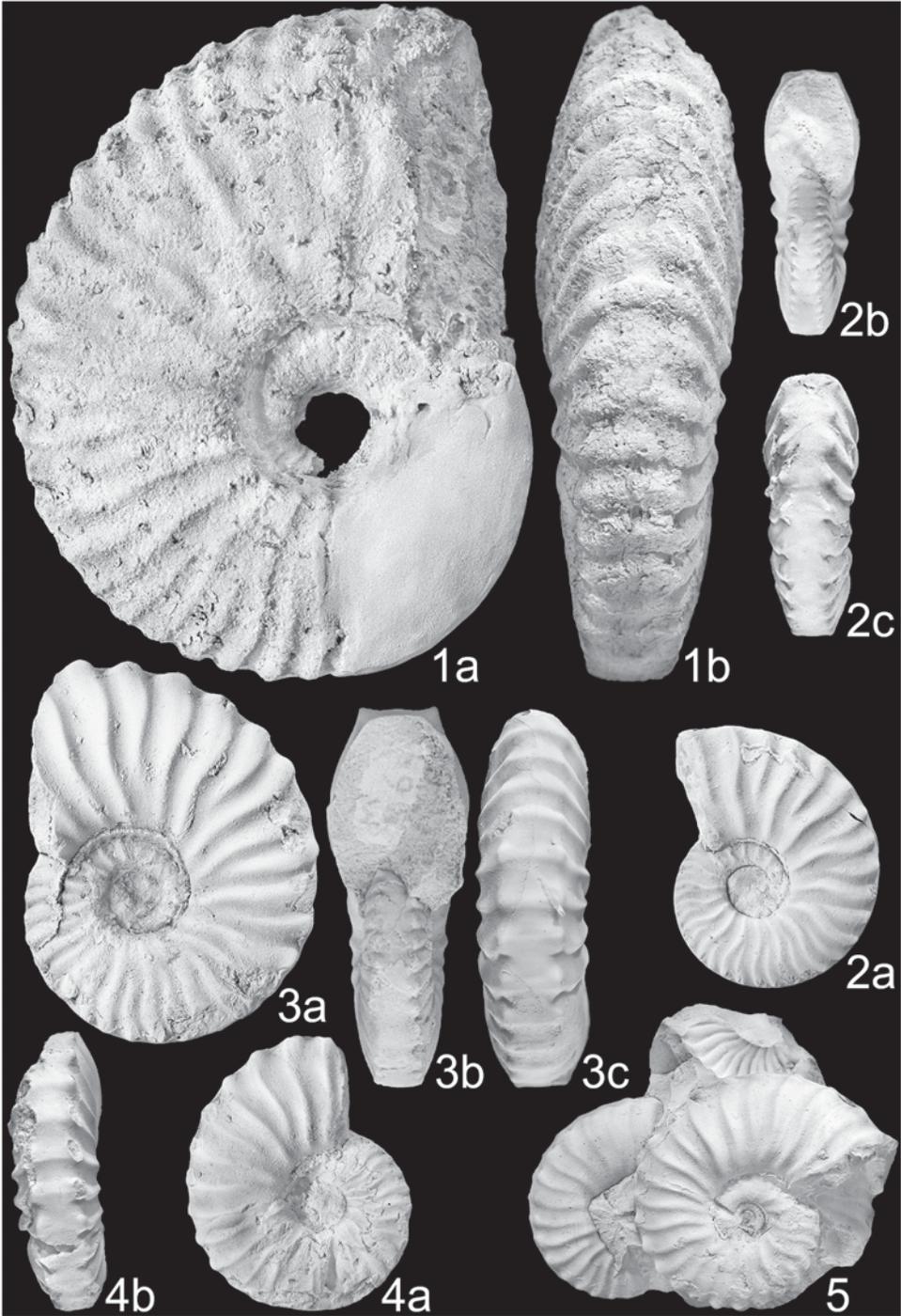


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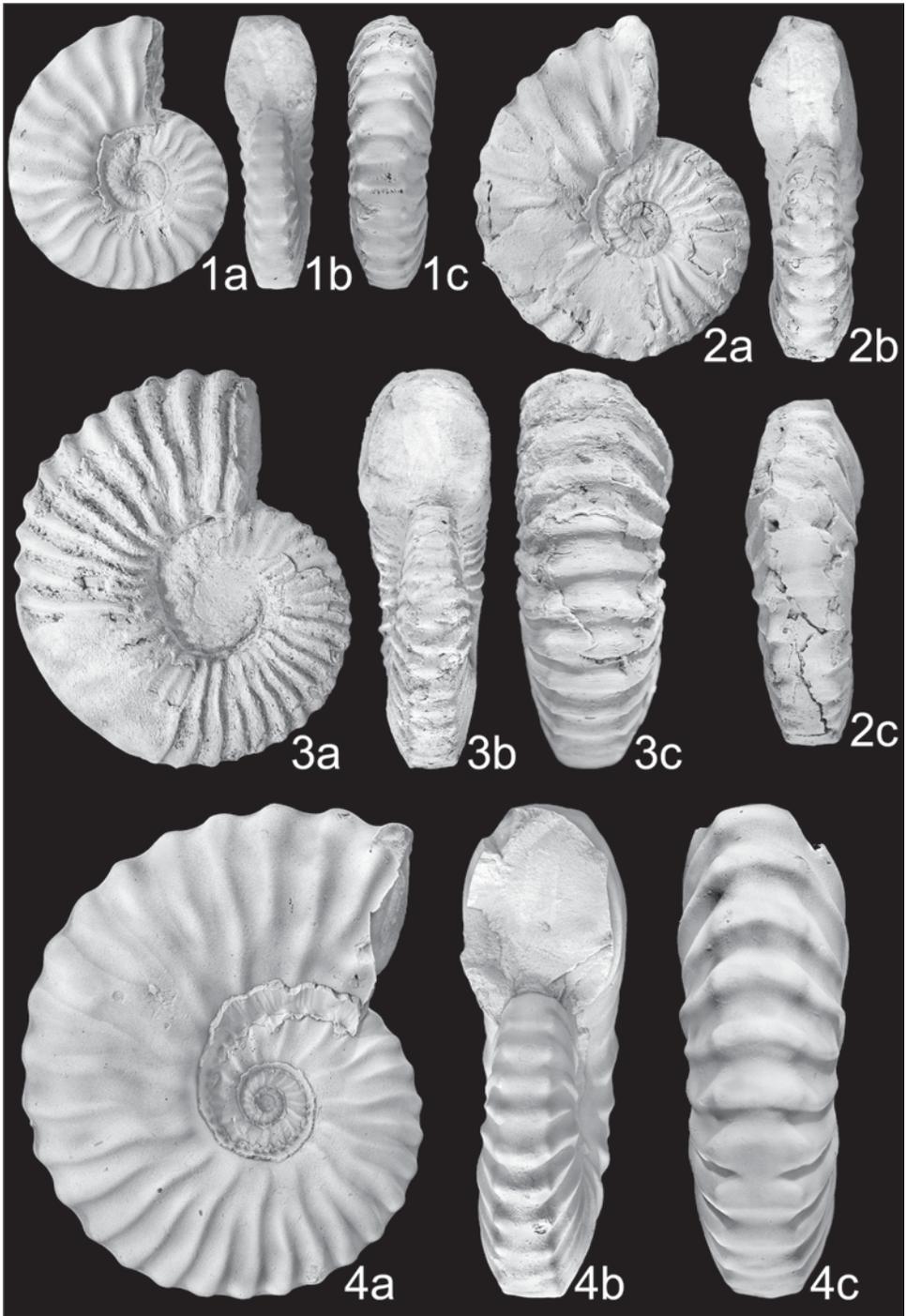


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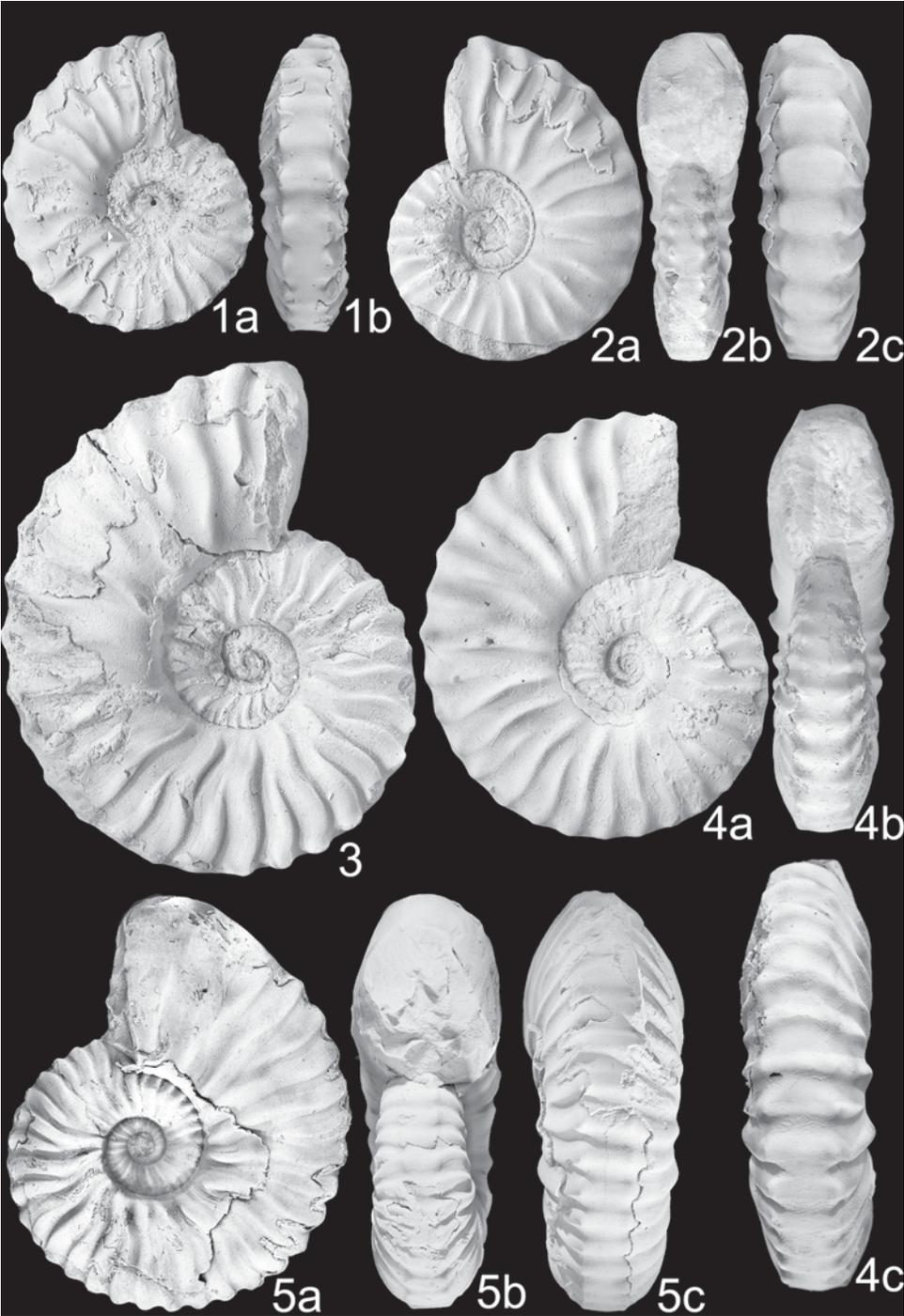


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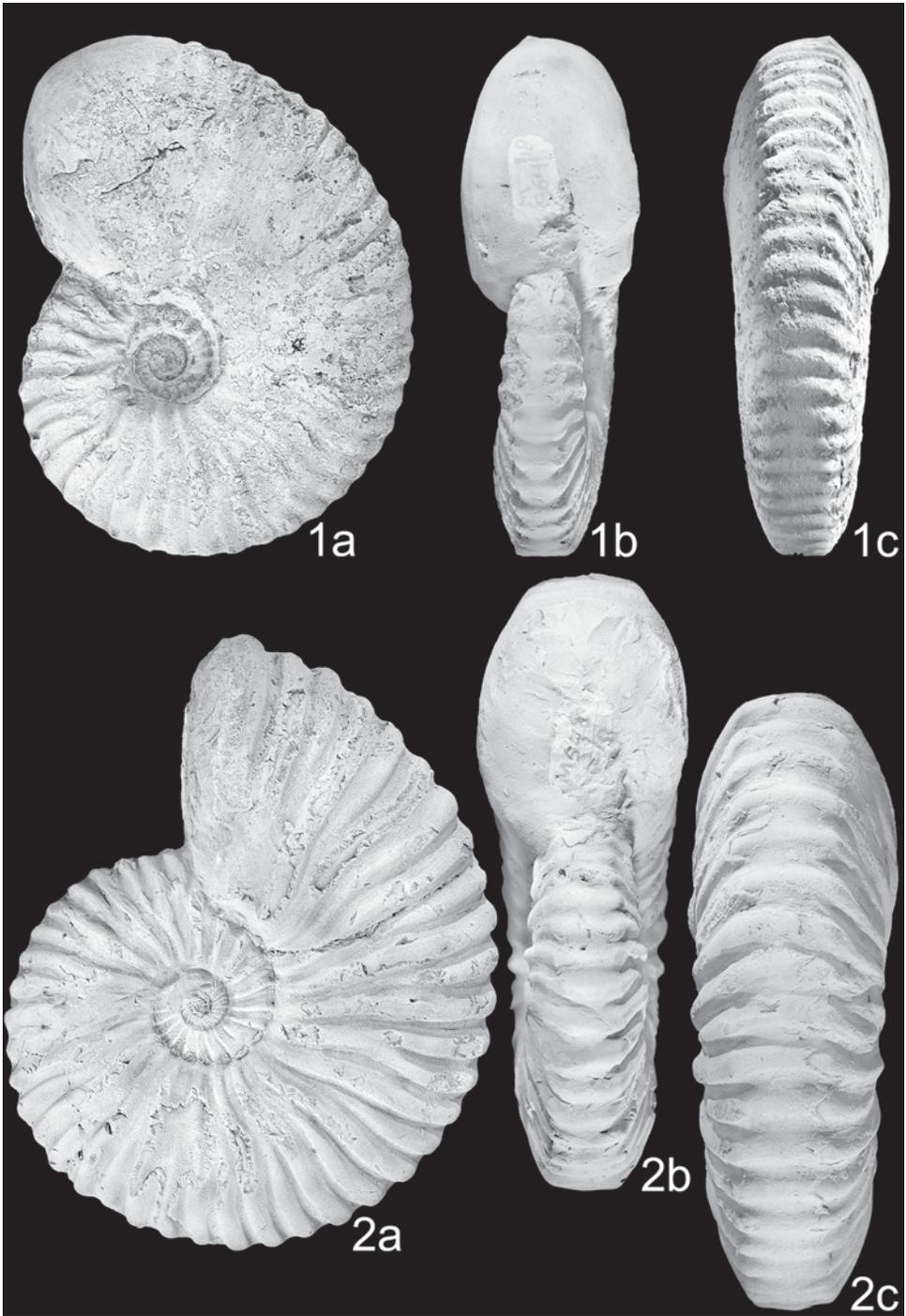


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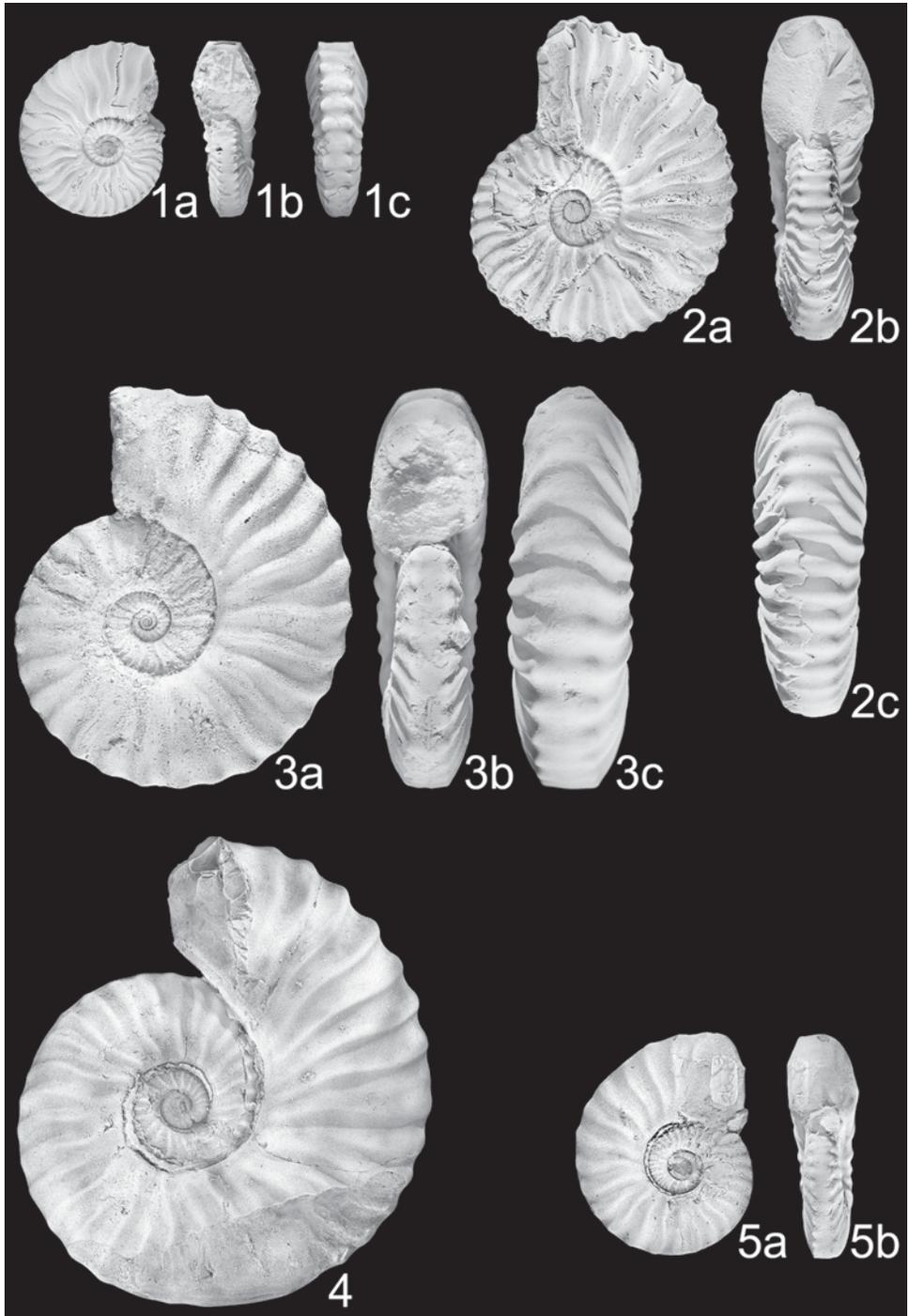


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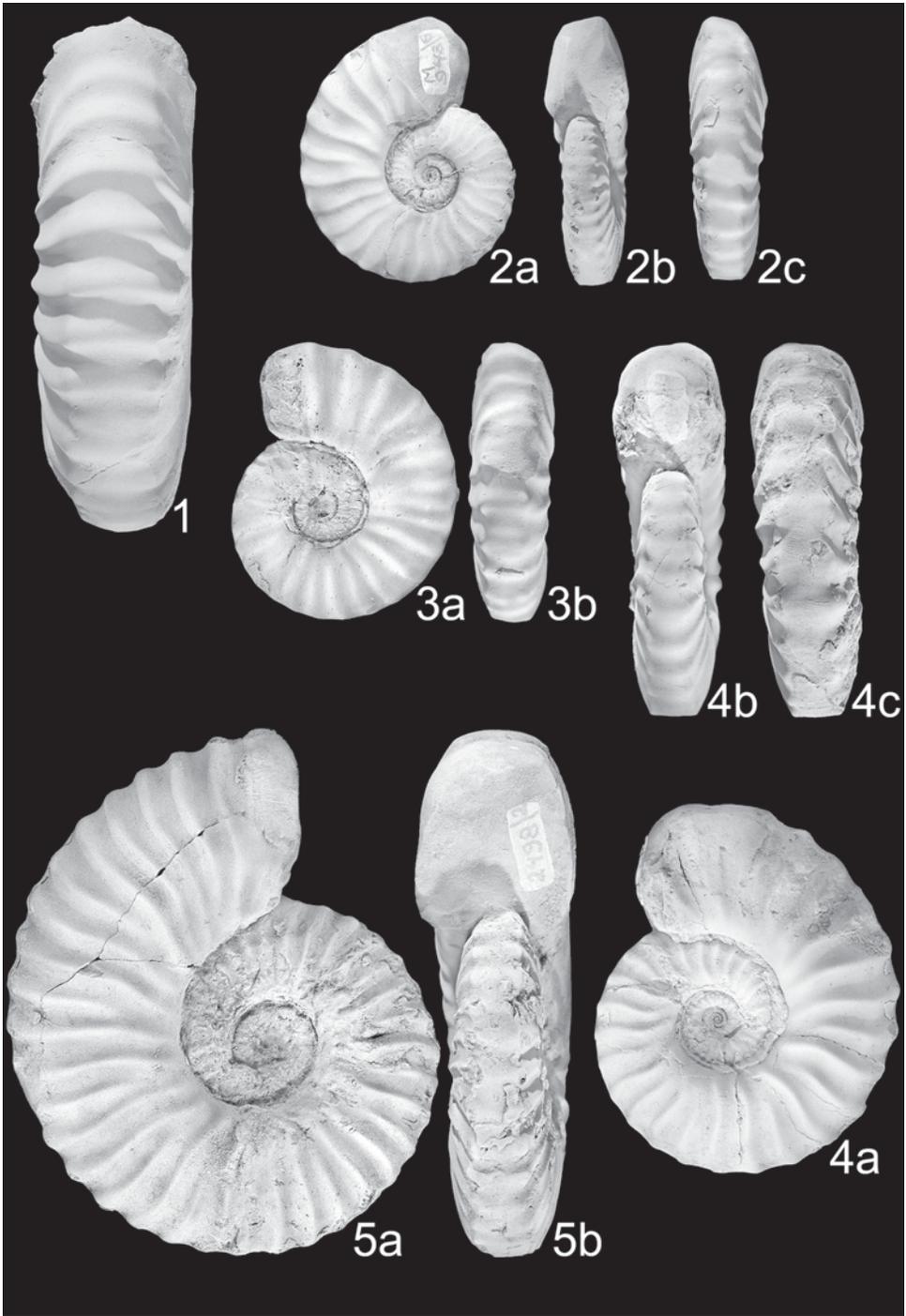


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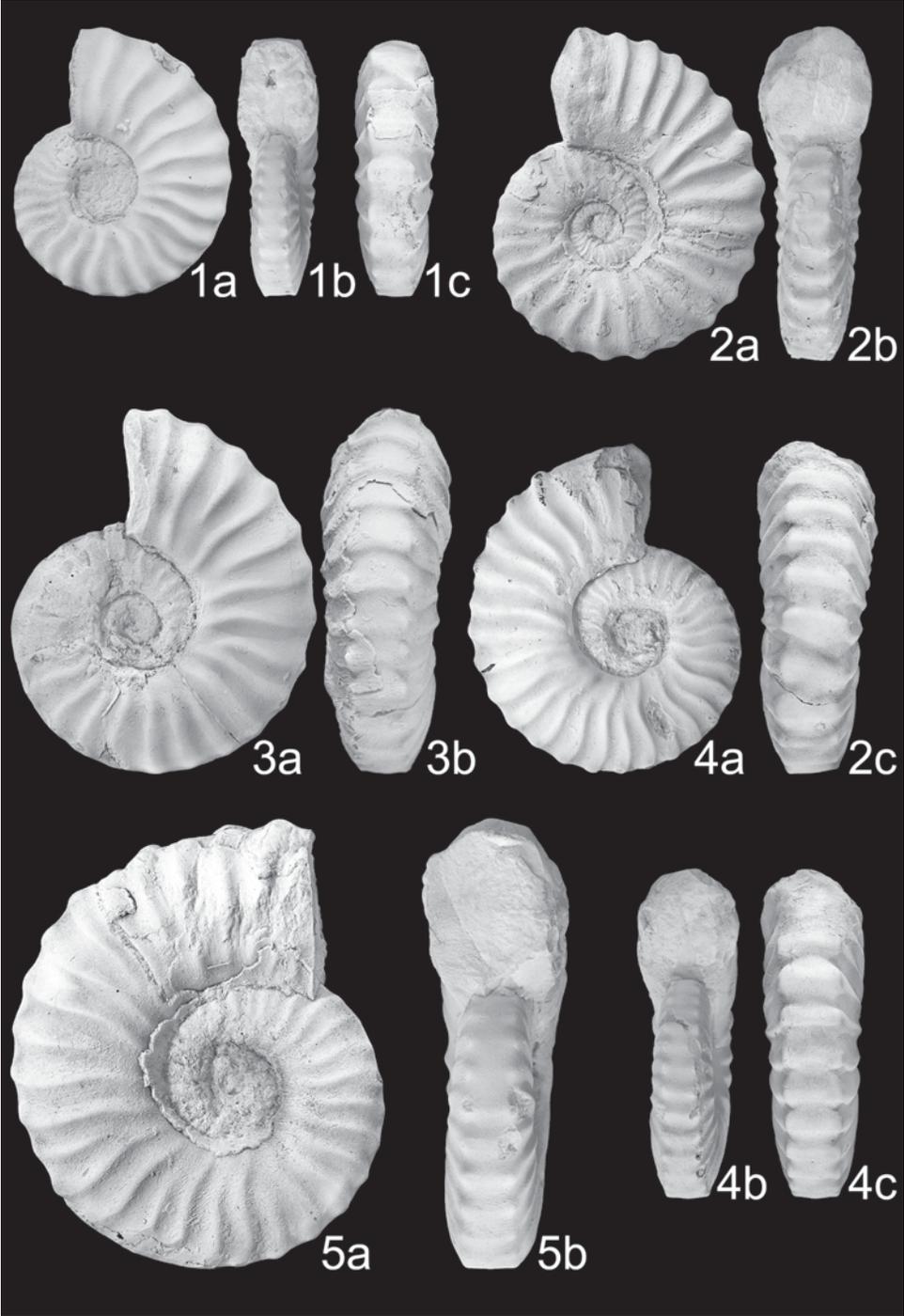


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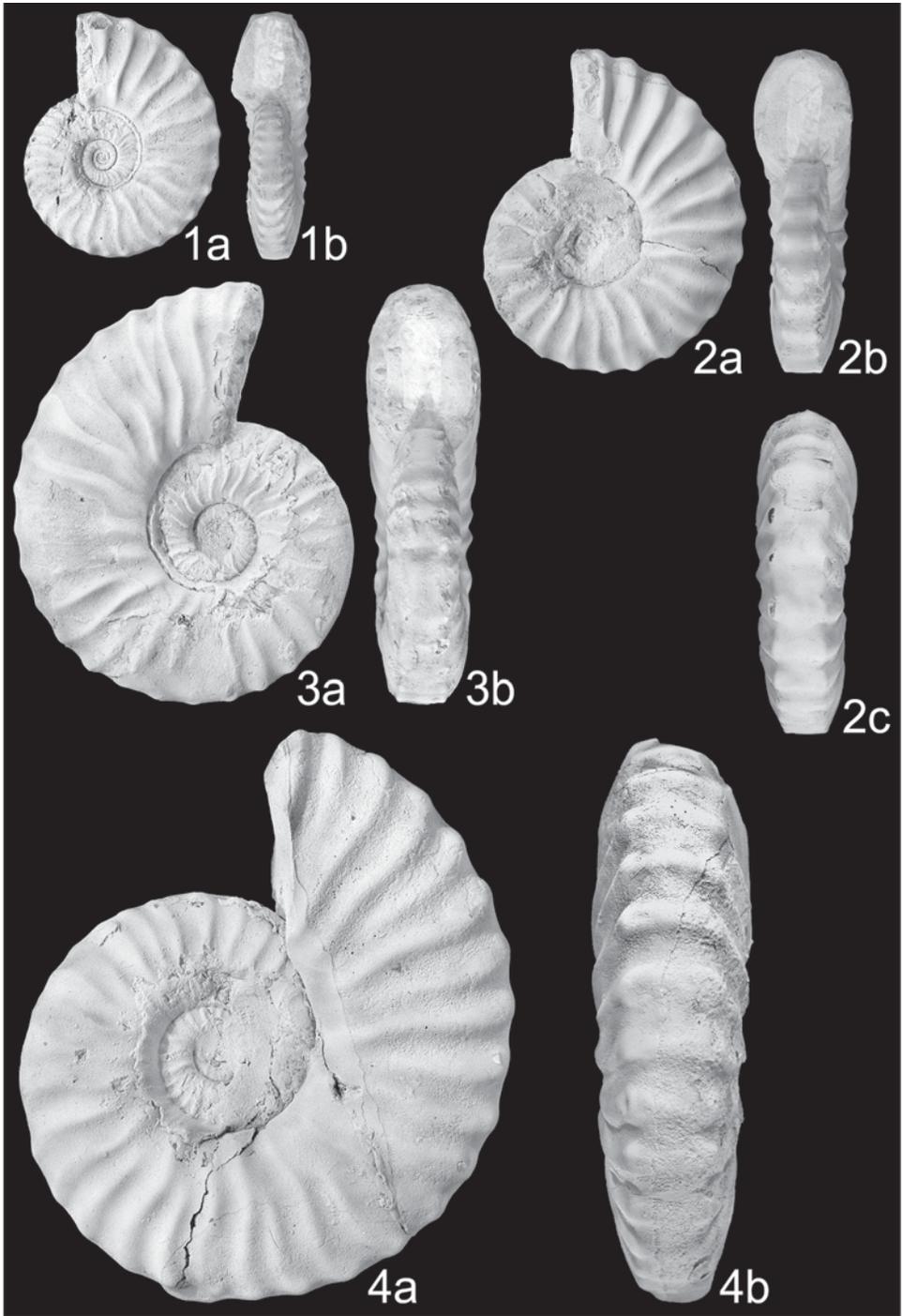


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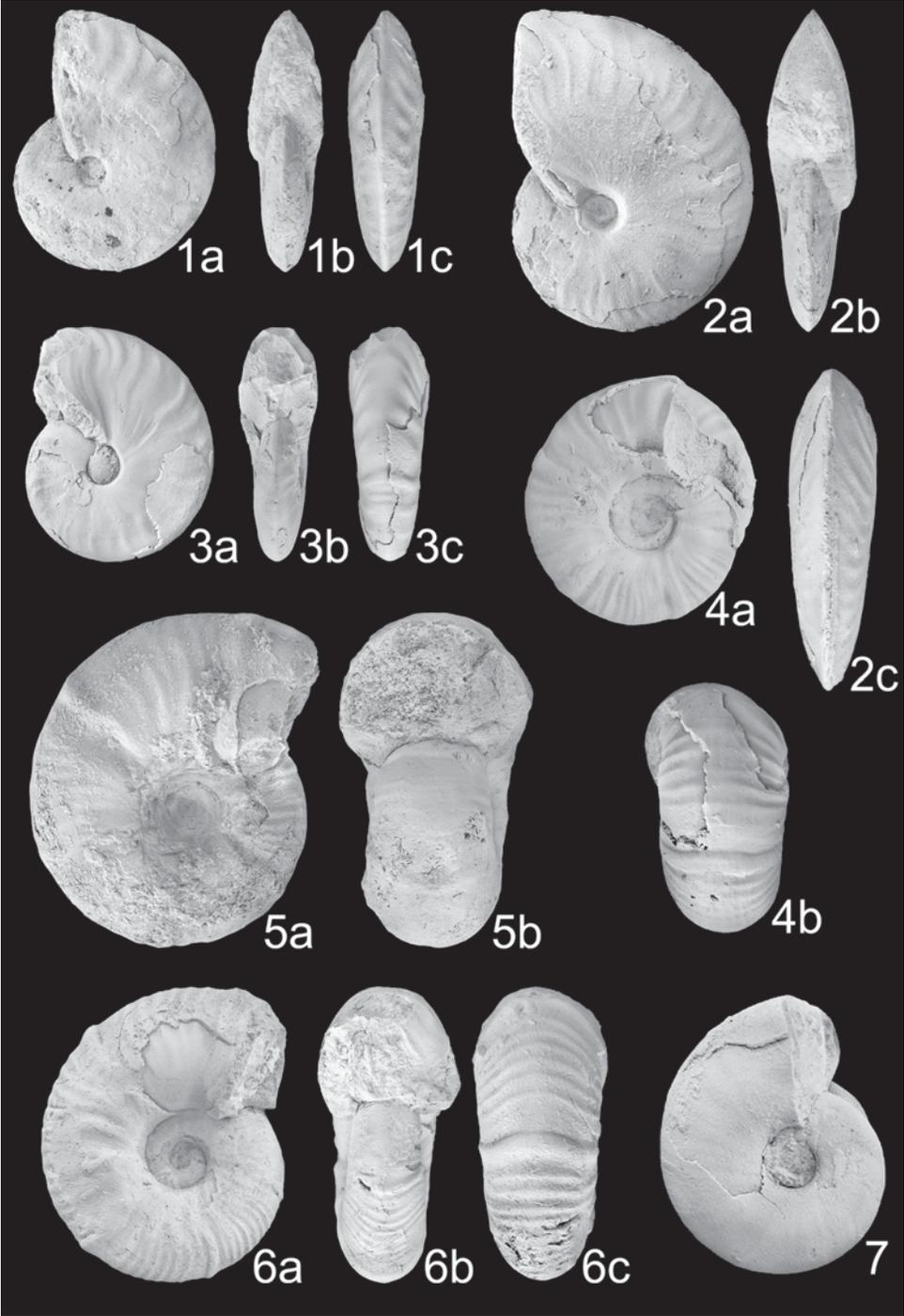


Plate 28

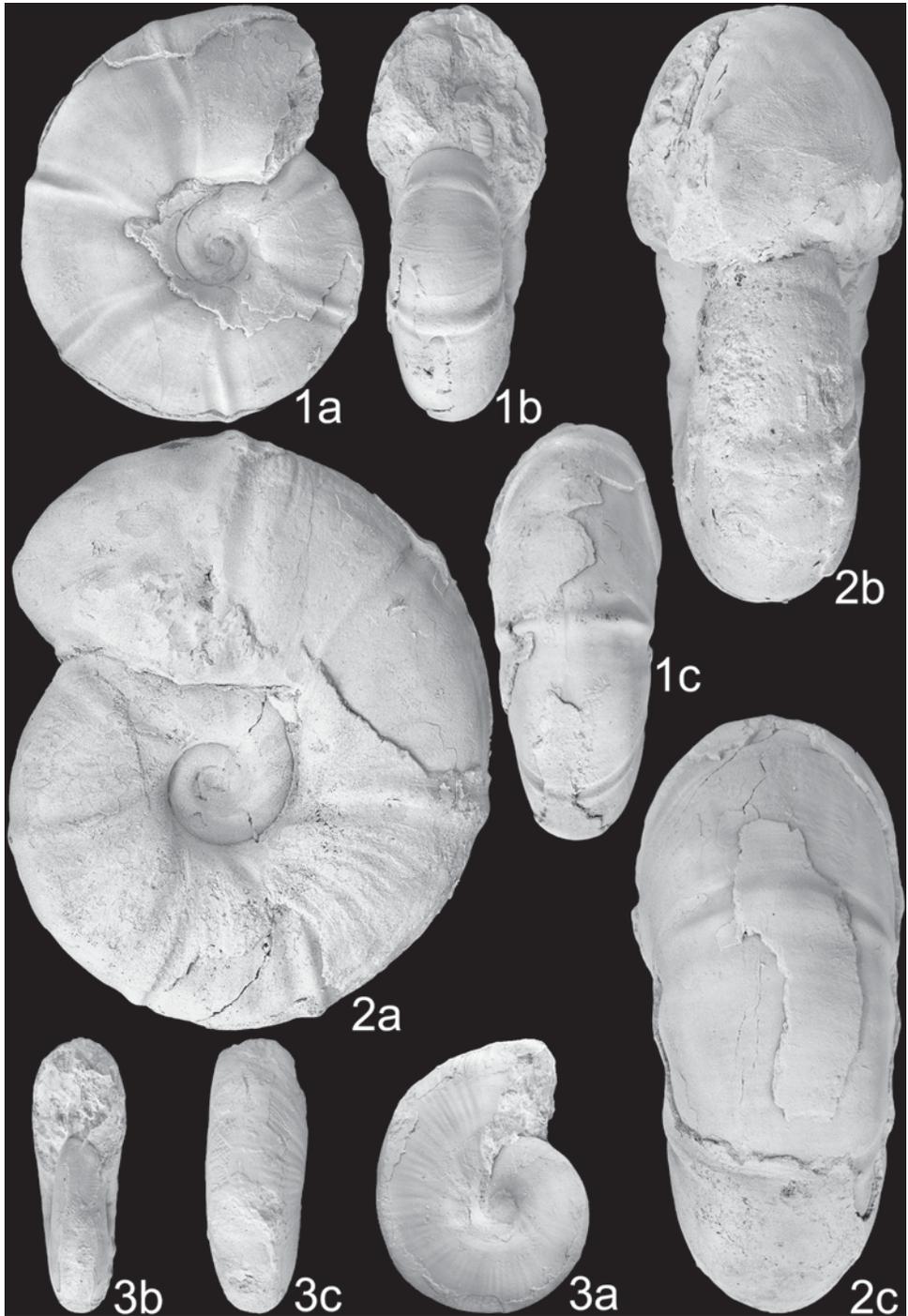


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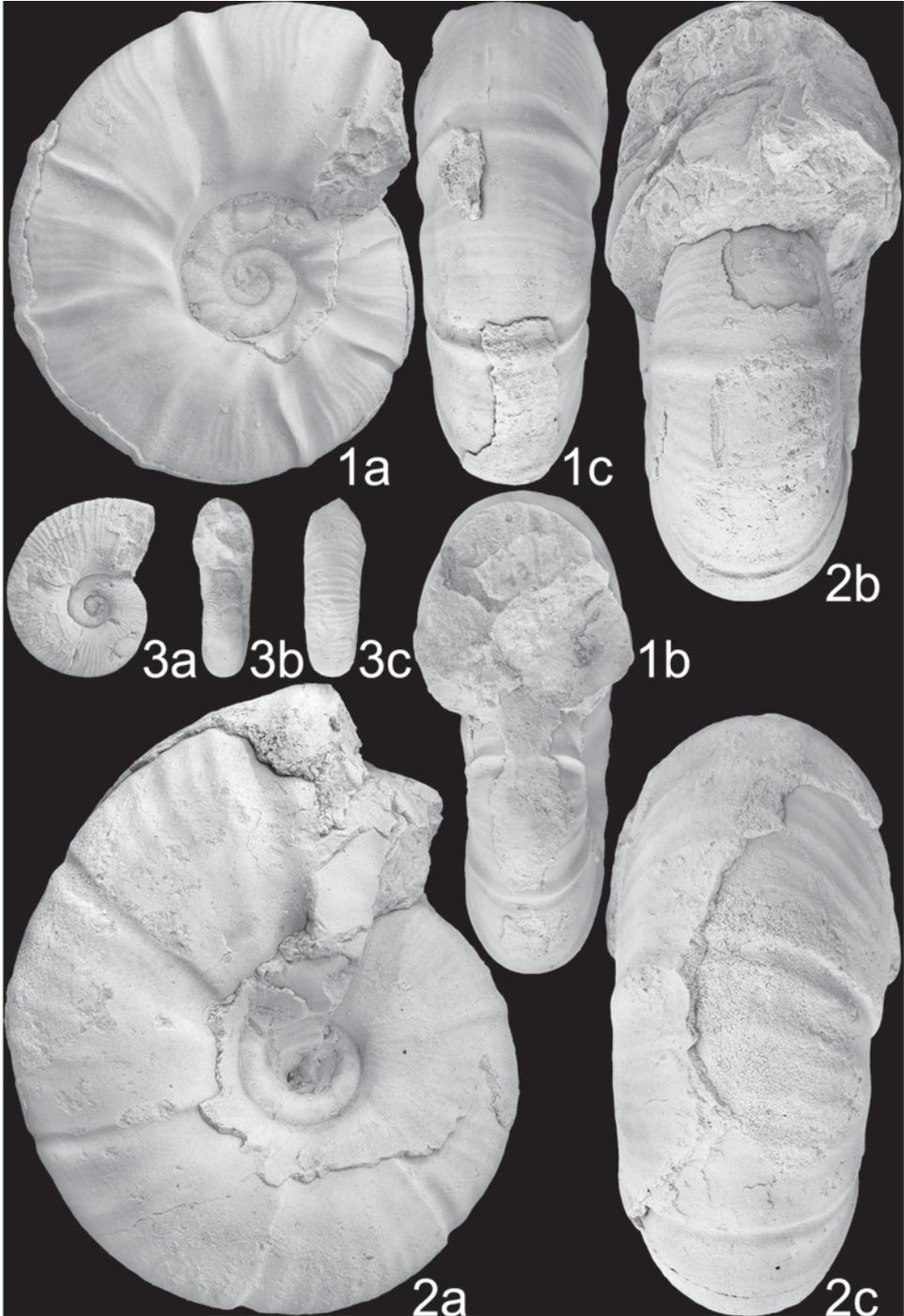


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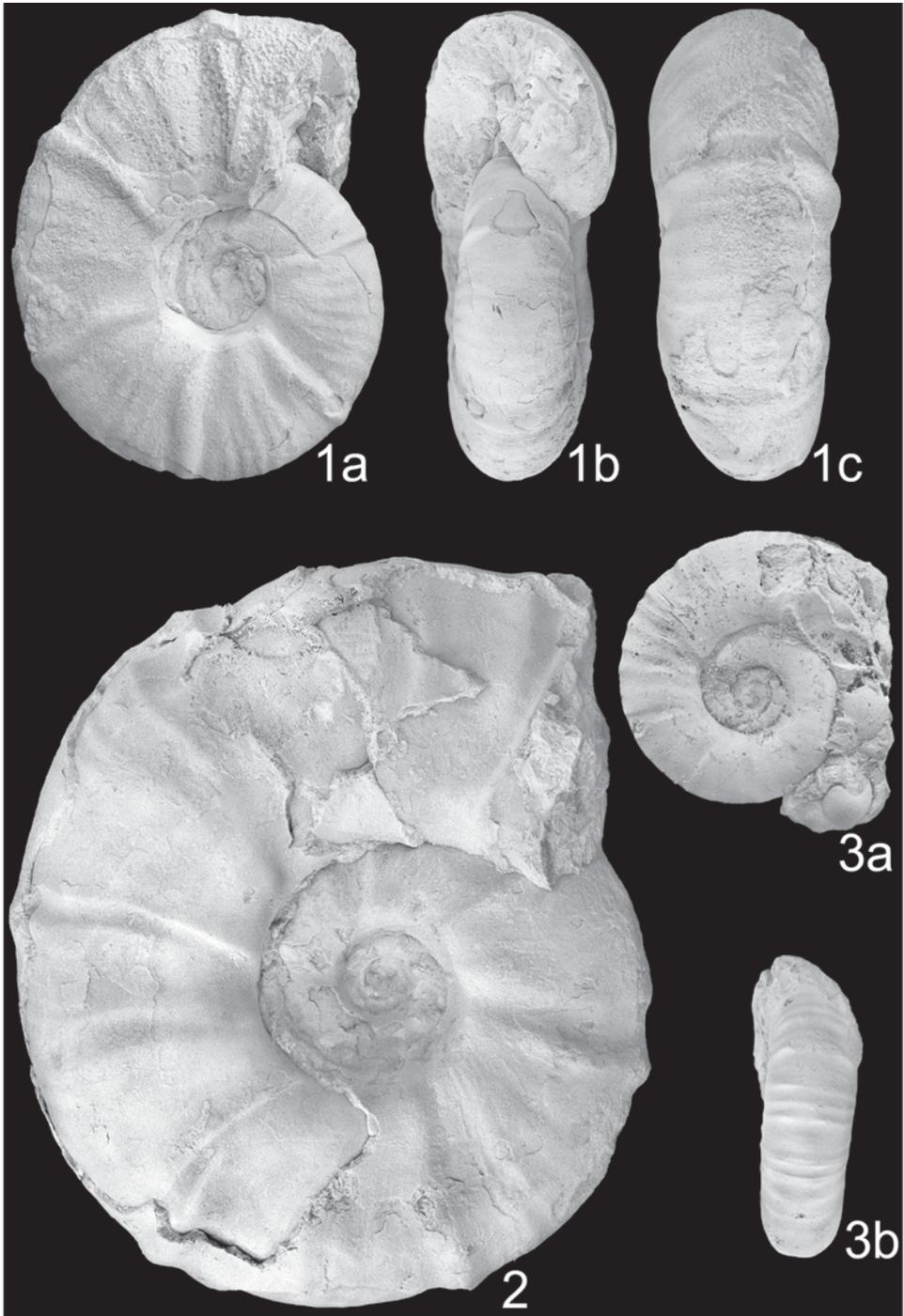


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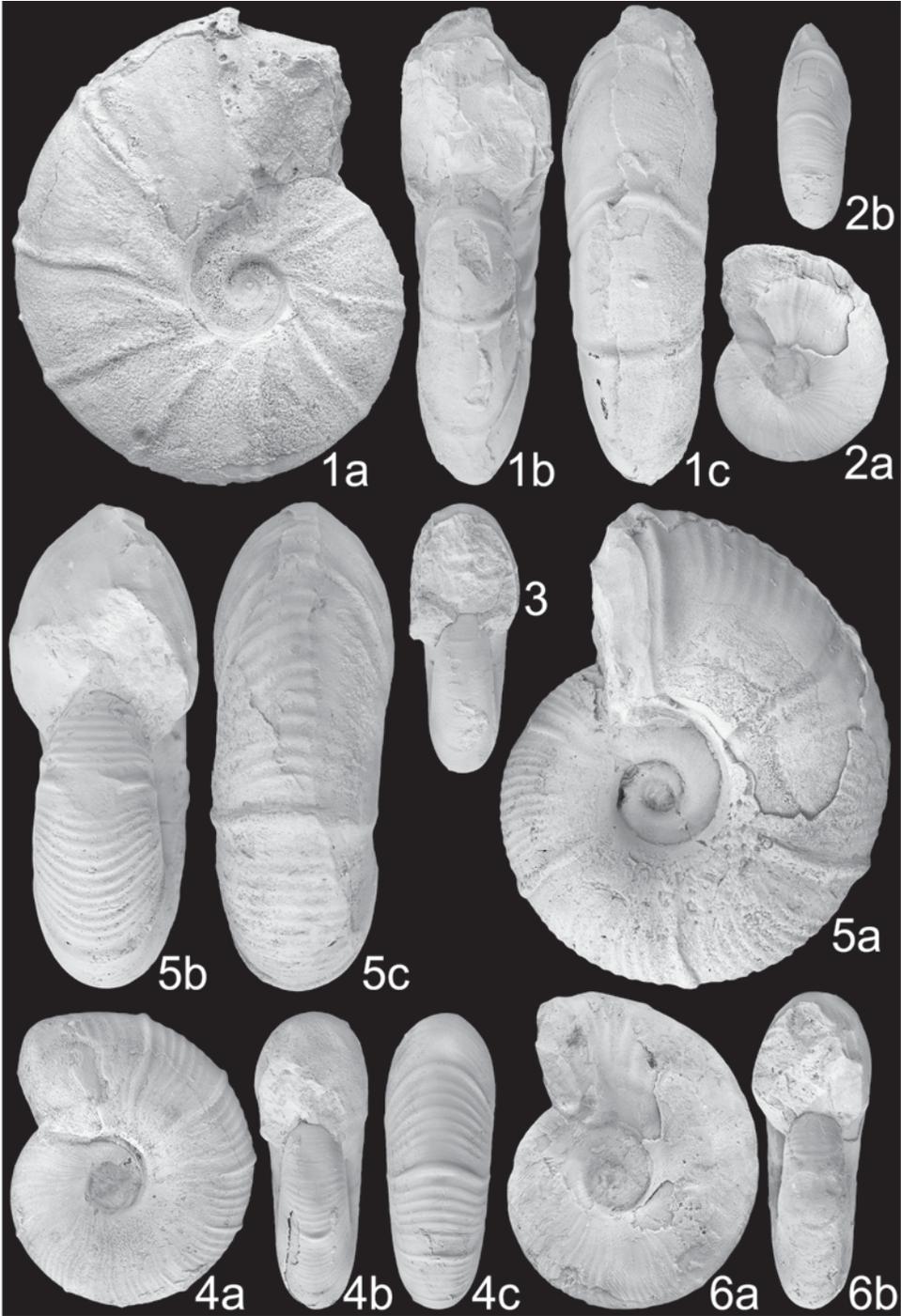


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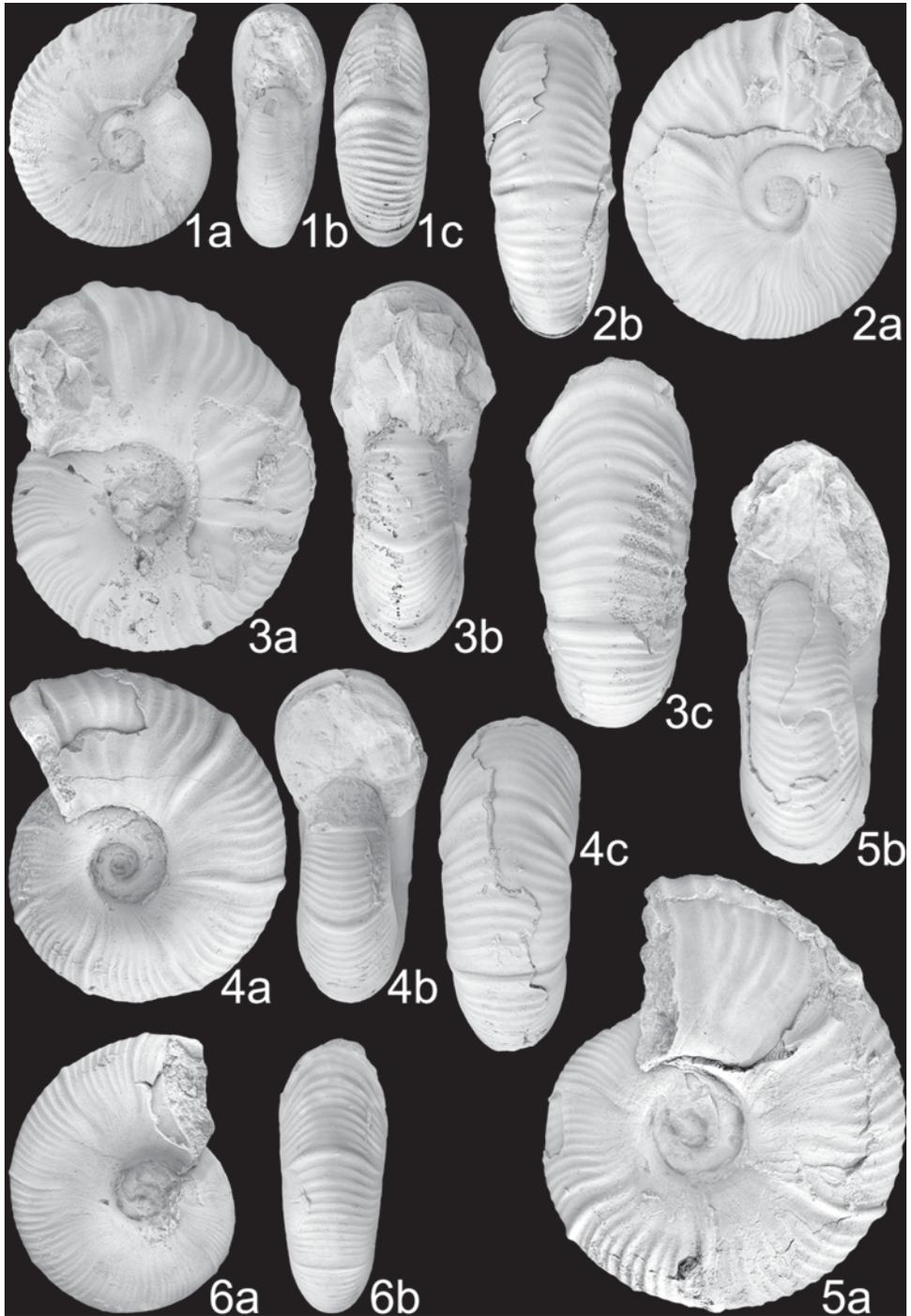


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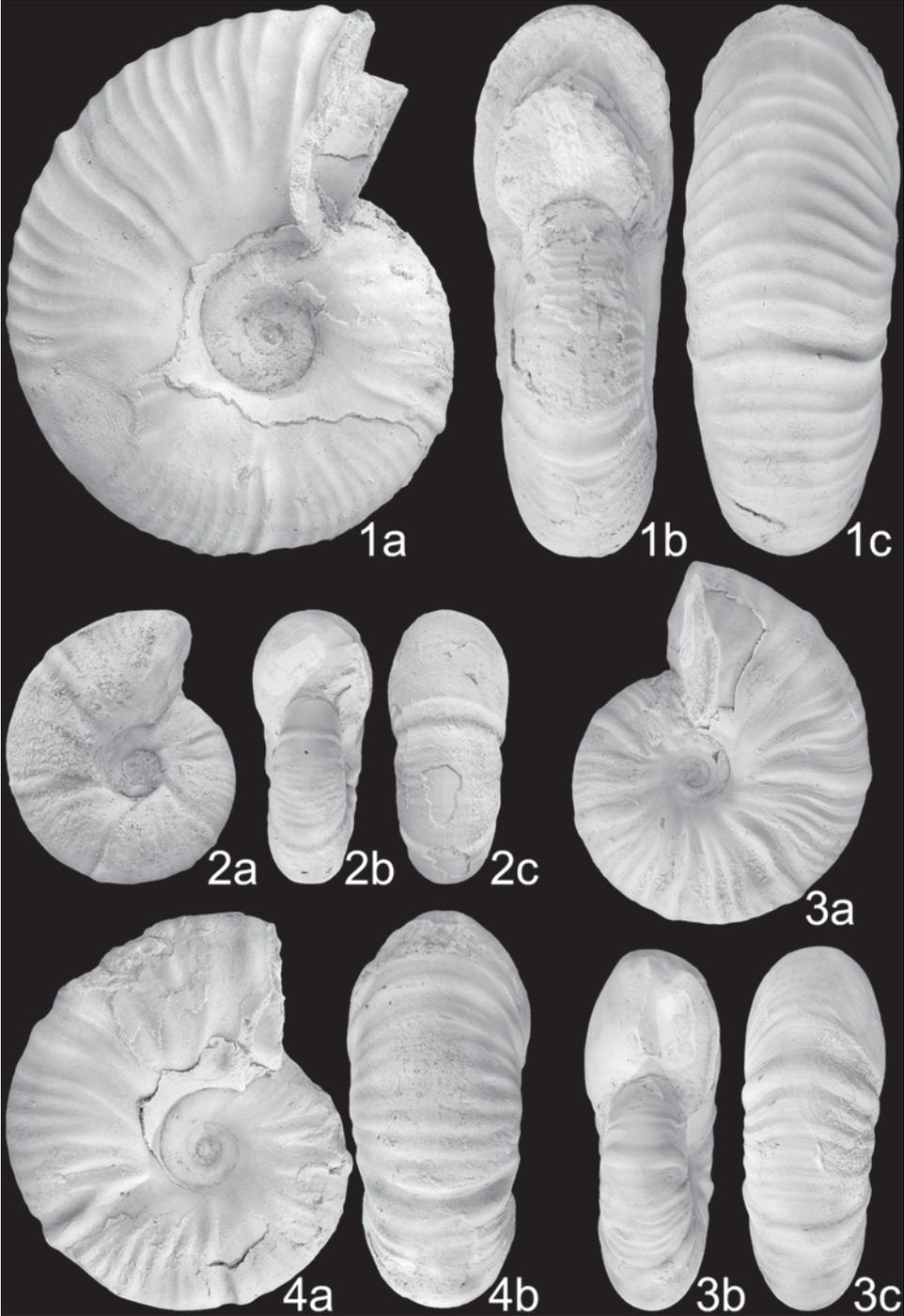


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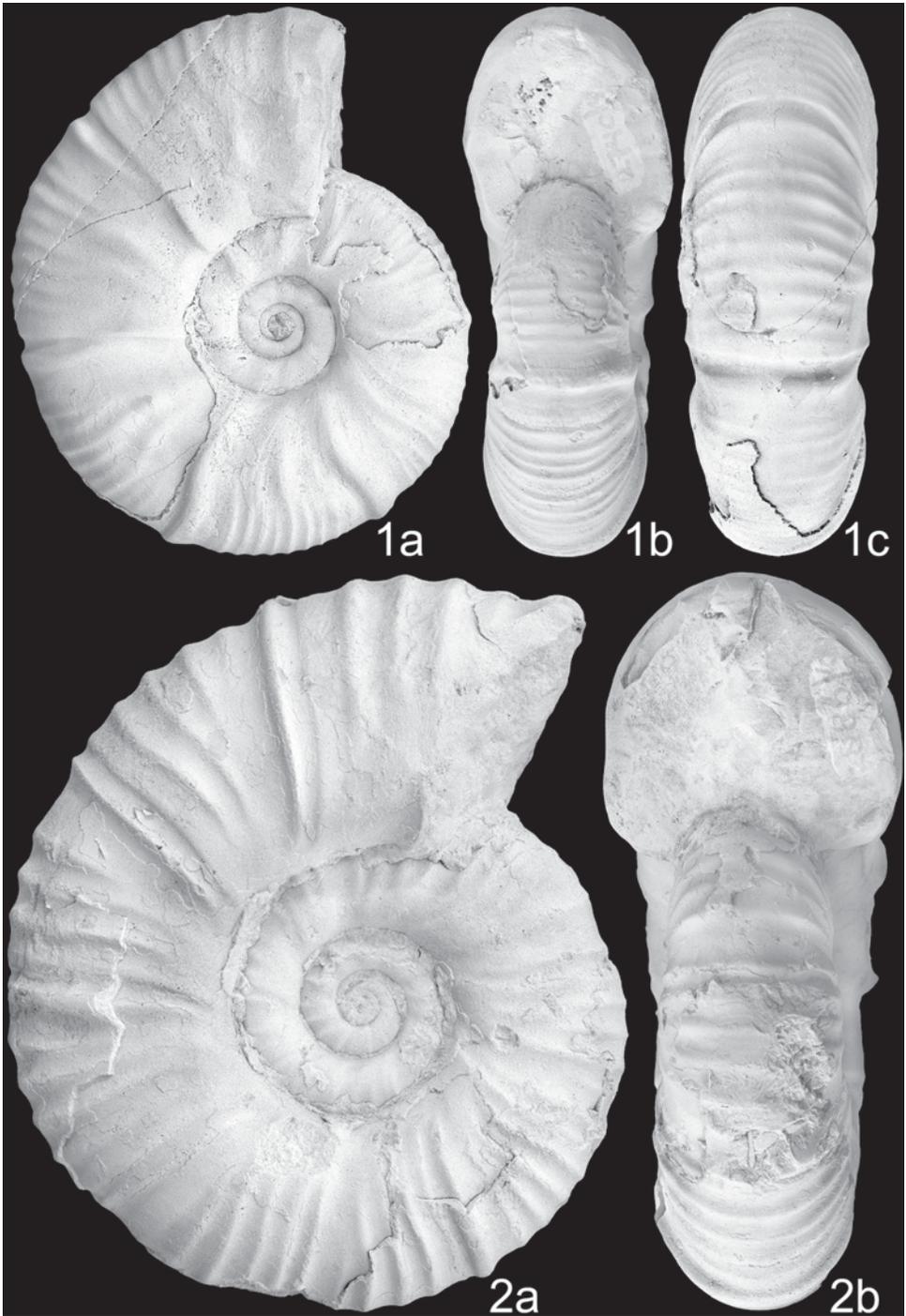


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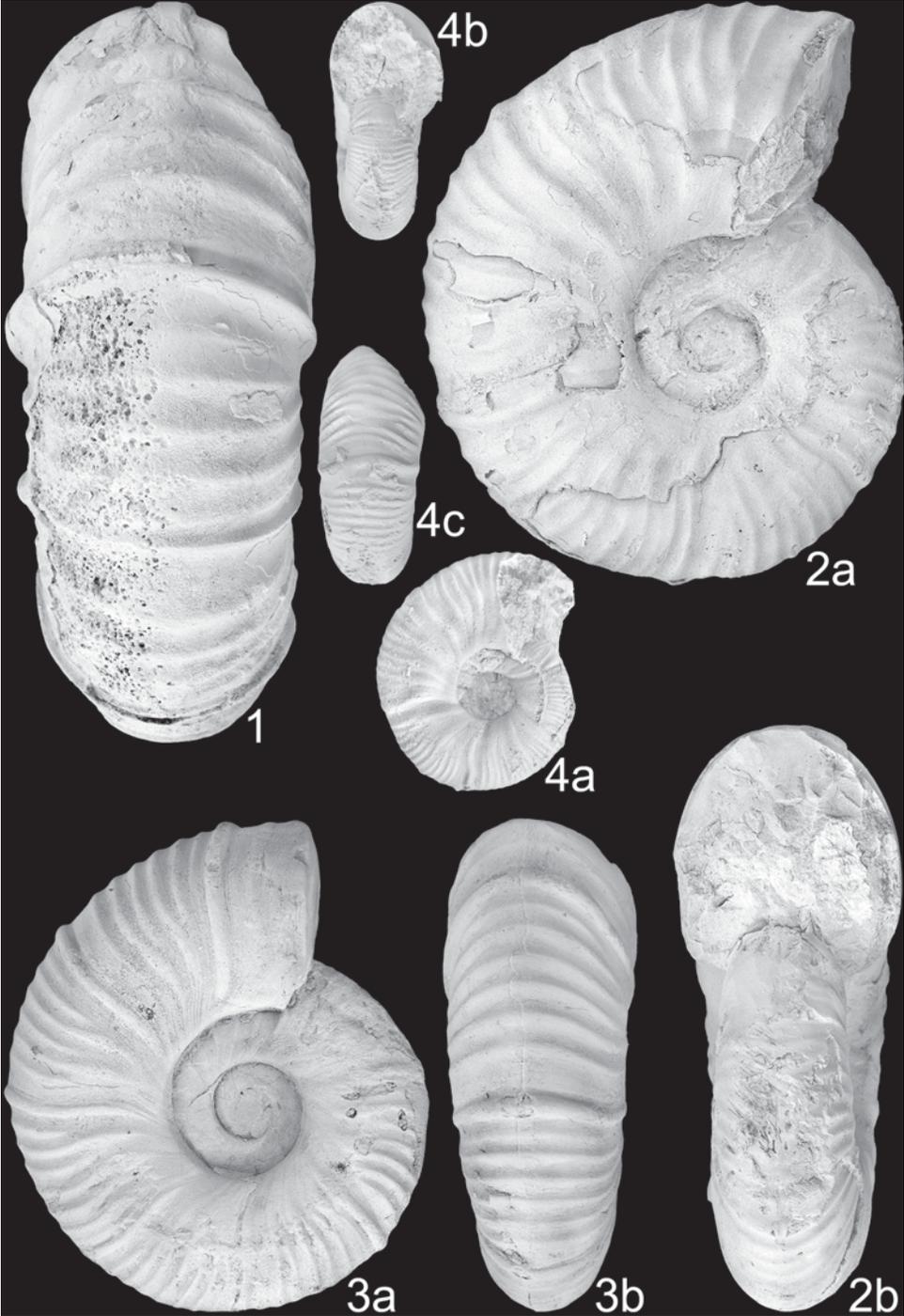


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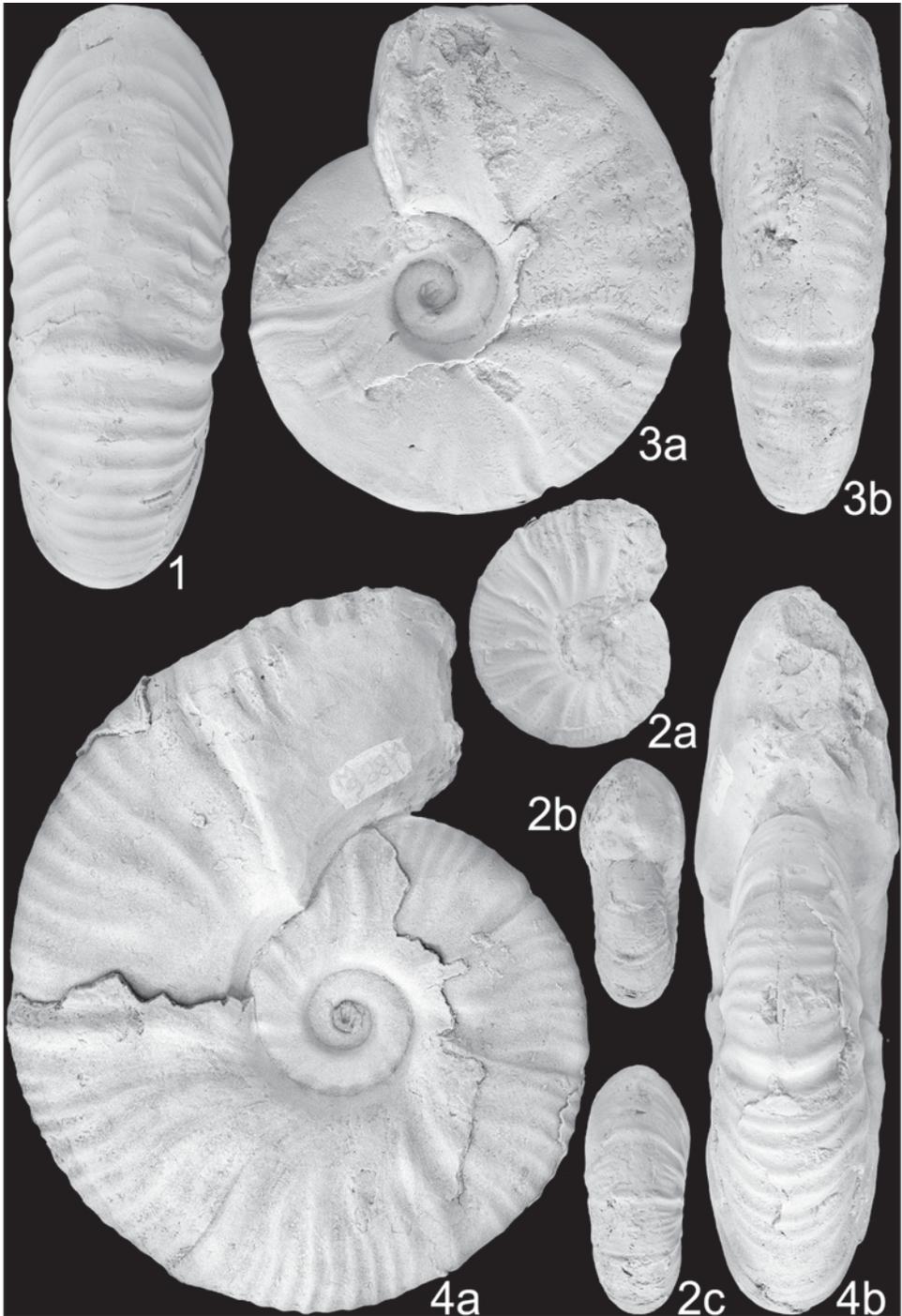


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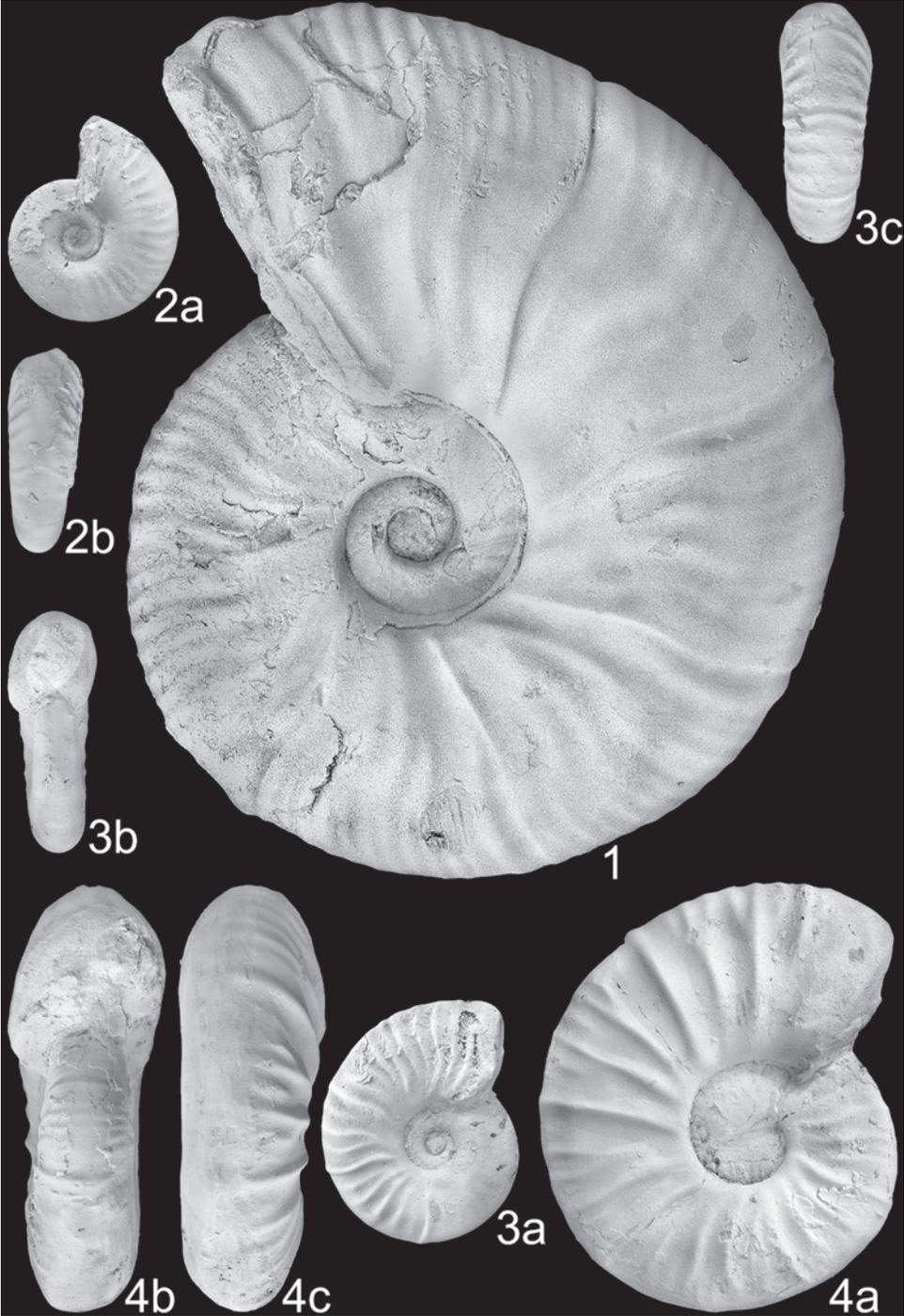


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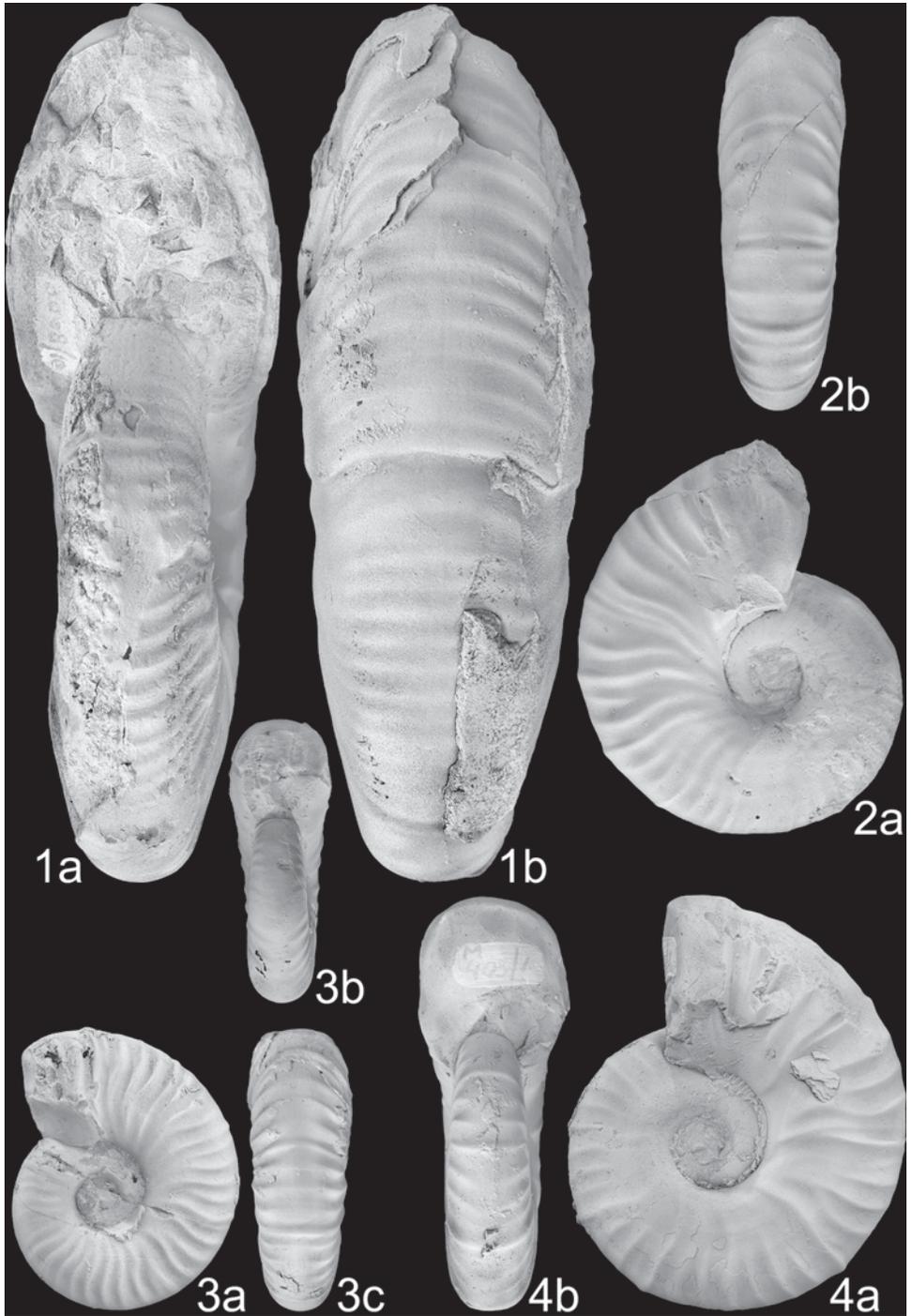


Plate 39



Plate 40

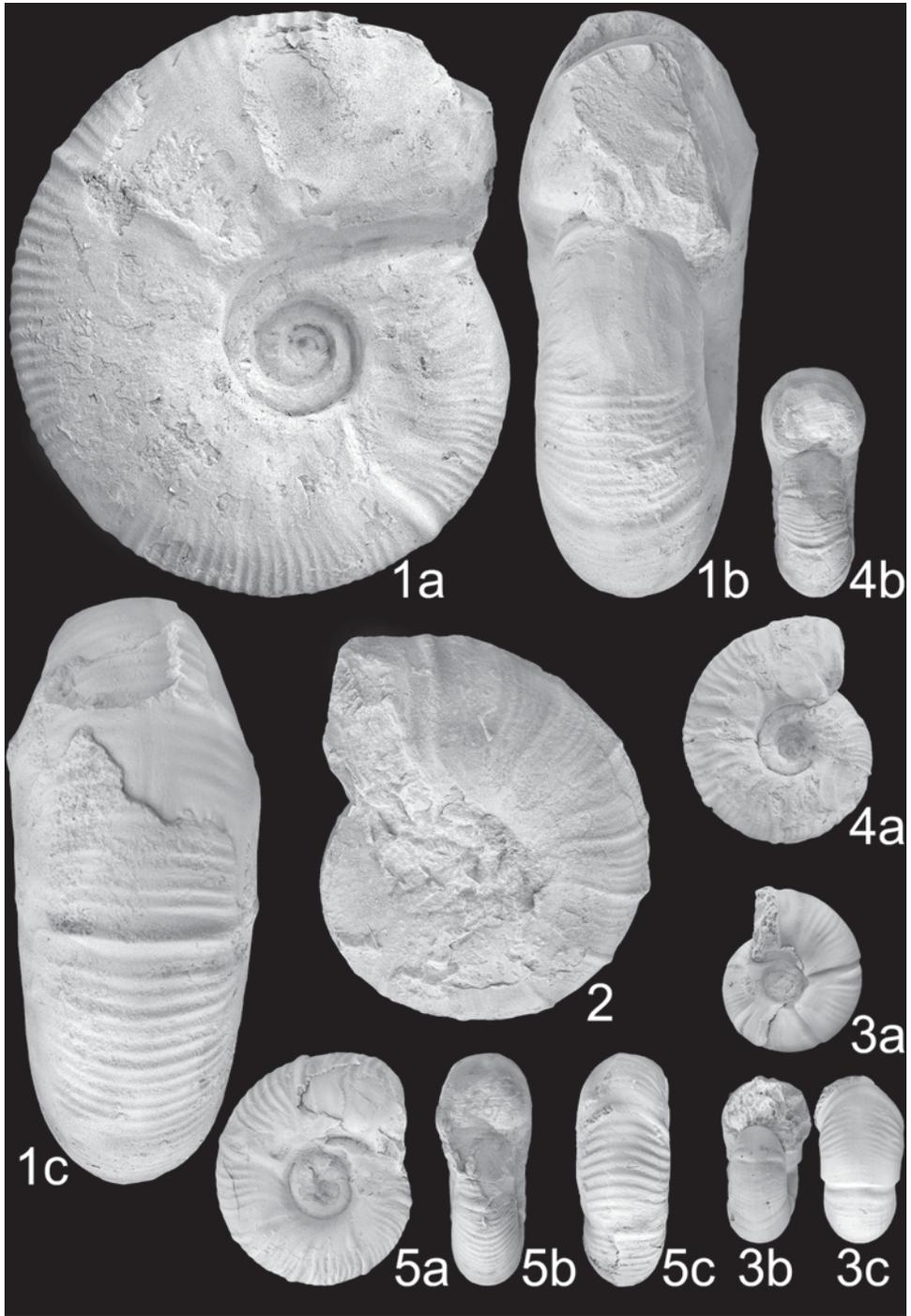


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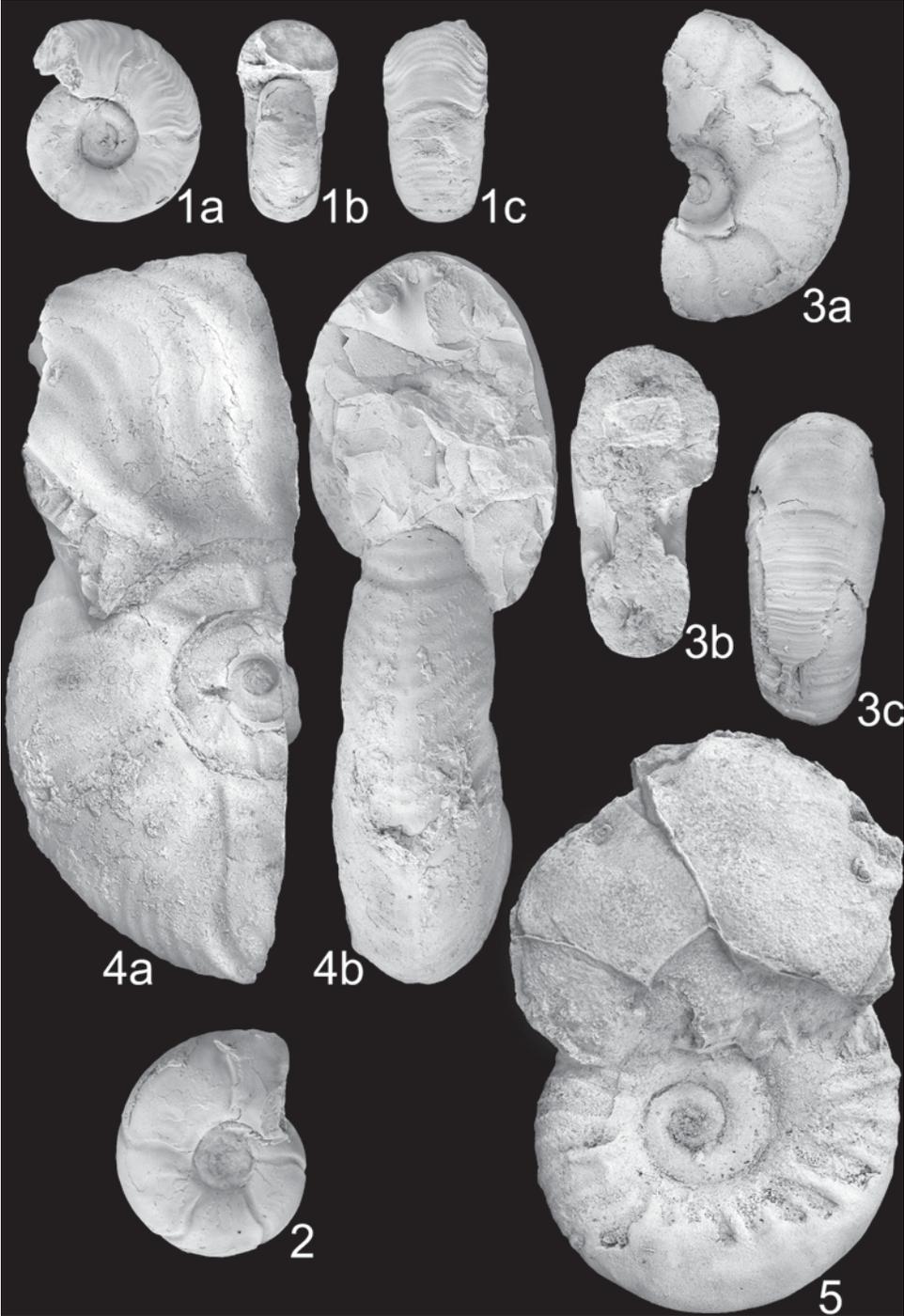


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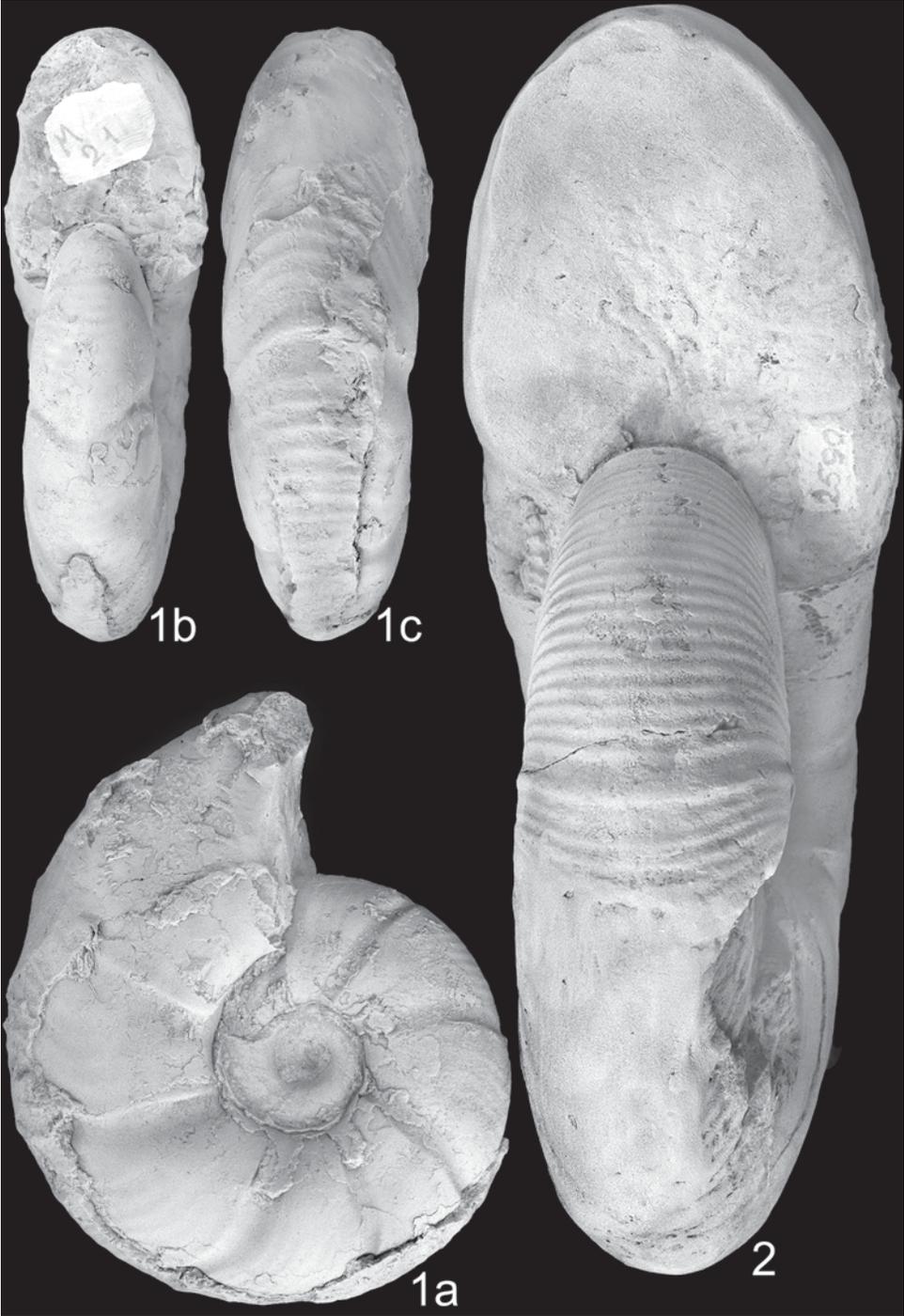


Plate 43



Plate 44

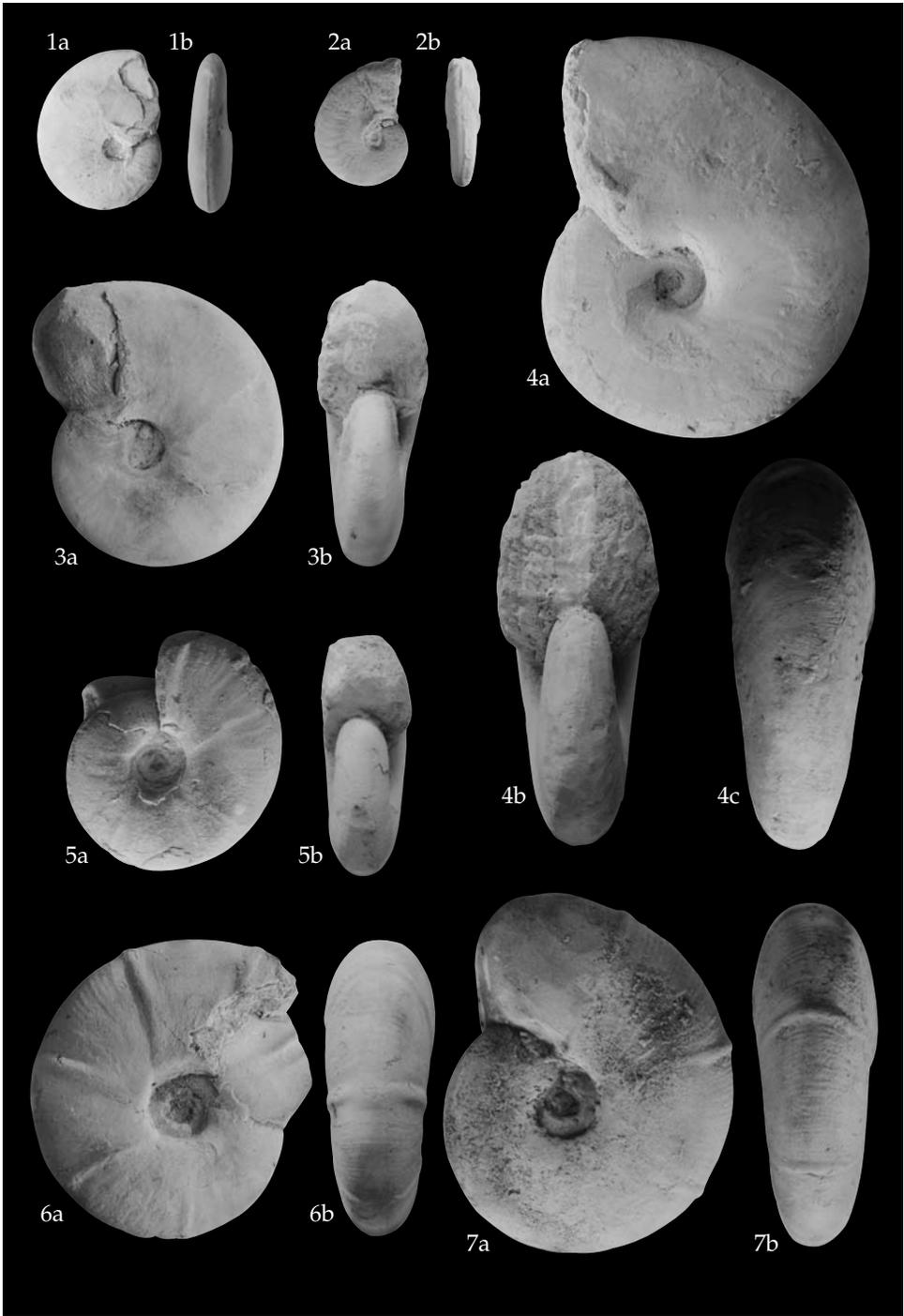


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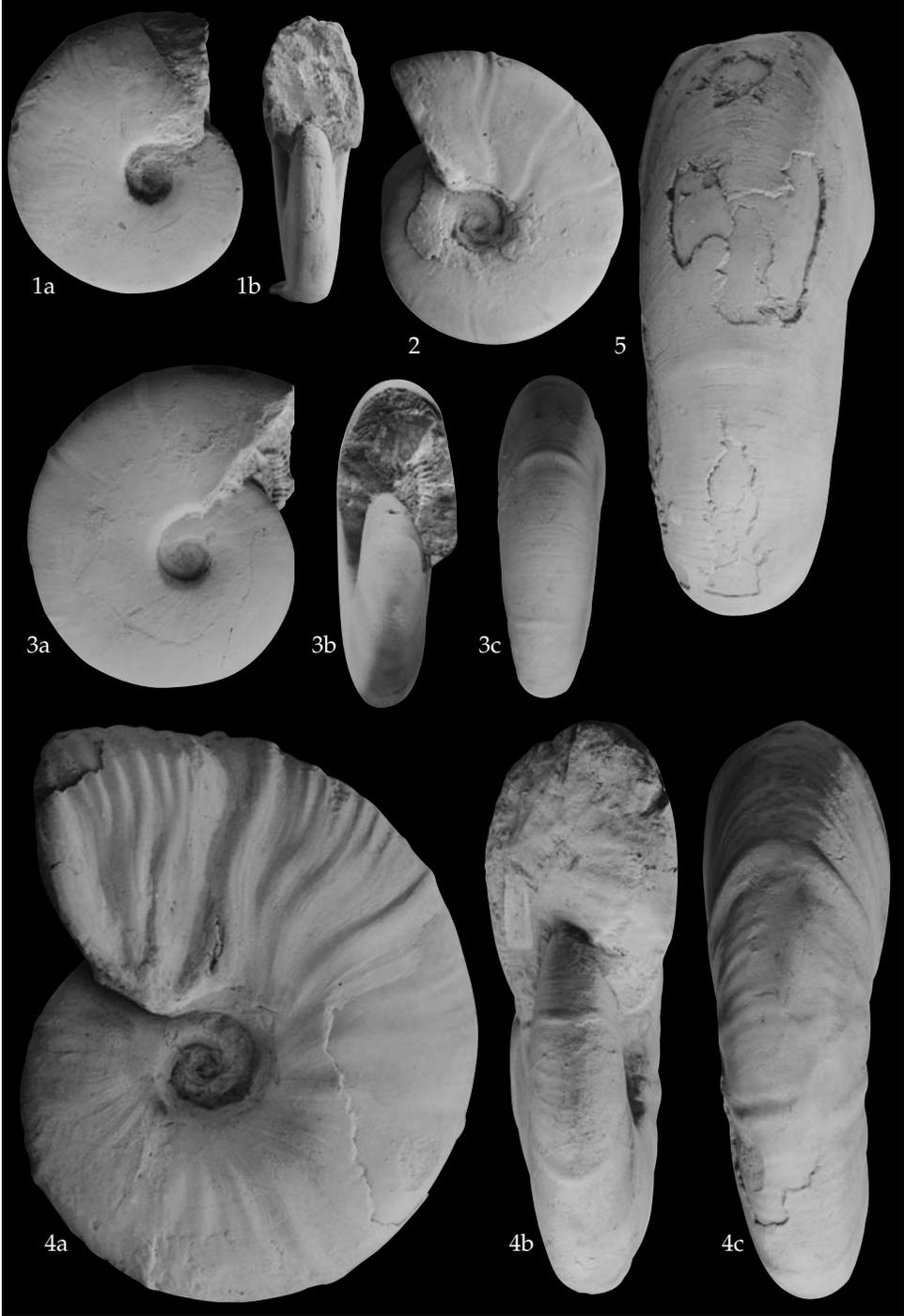


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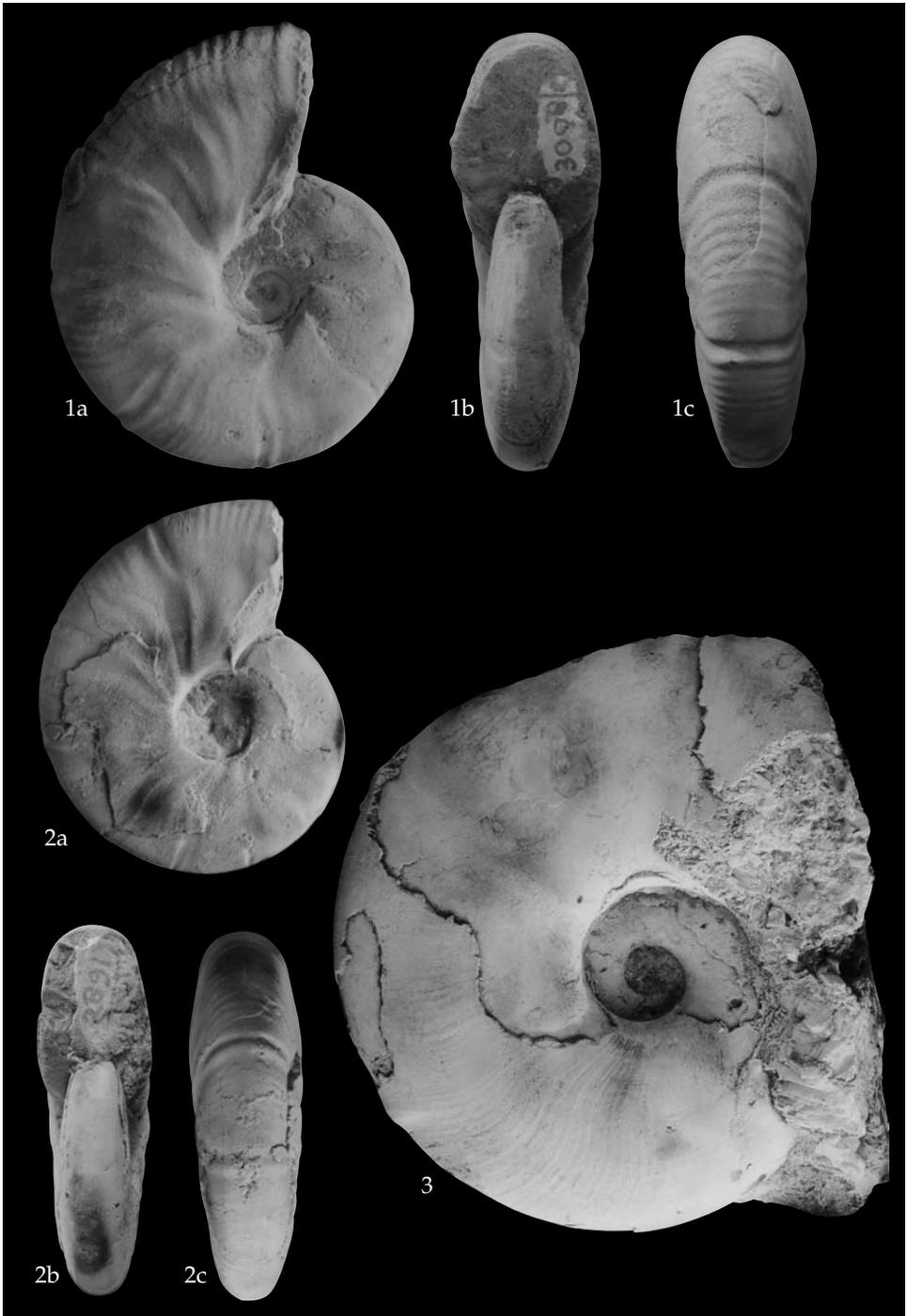


Plate 47



Plate 48

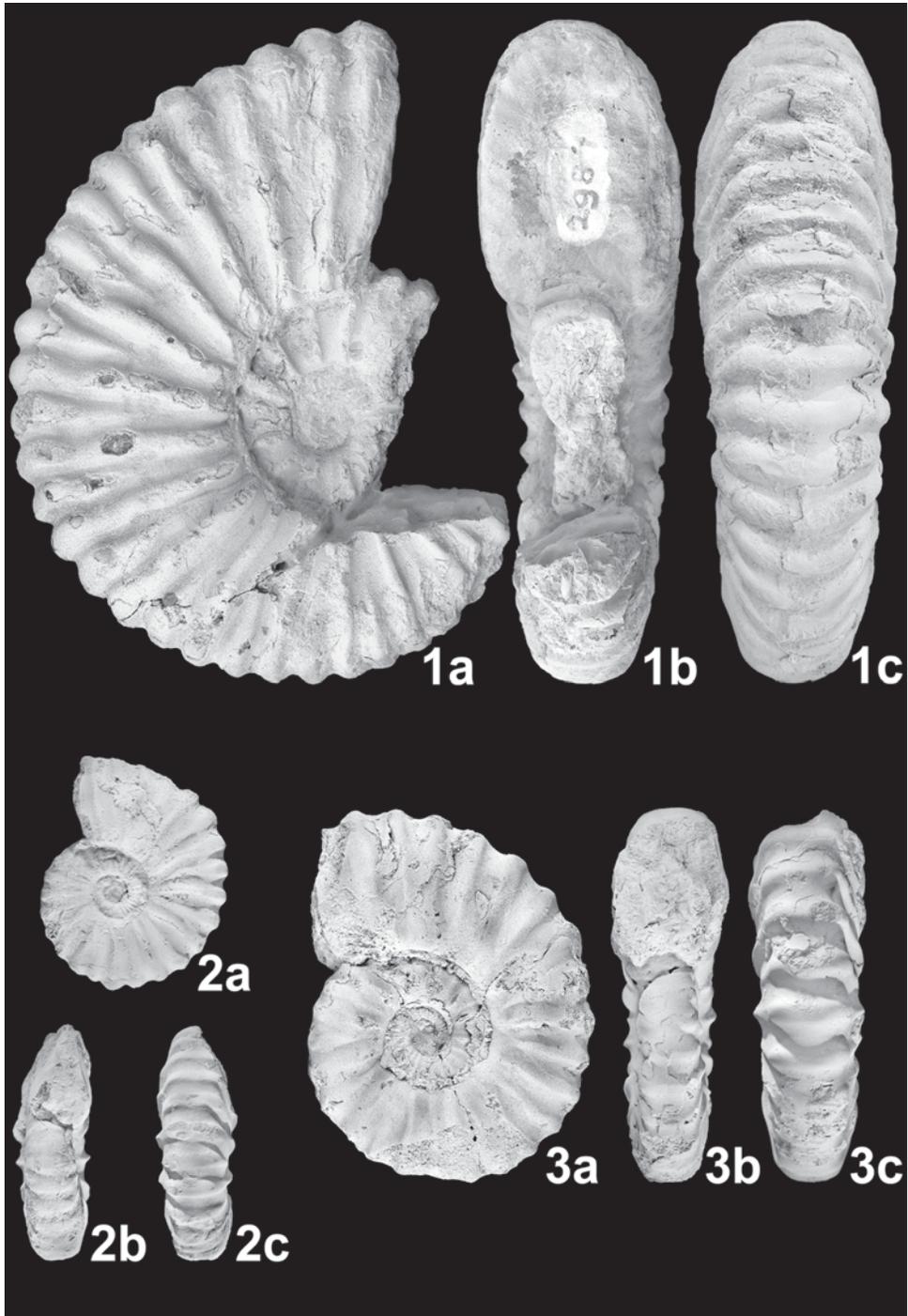


Plate 49