Aptian and Early Albian Douvilleiceratidae, Acanthohoplitidae and Parahoplitidae of Colombia

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Seventy nine species and subspecies of the following ammonite genera and subgenera of the families Douvilleiceratidae Parona & Bonarelli, Acanthohoplitidae Stoyanow, and Parahoplitidae Spath are described from the study area. Fourteen species are new; *Cheloniceras rectangulatum*, *Ch. guanense*, *Epicheloniceras wiedmanni*, *E. douvillei*, *E. bradleyiformis*, *Vectisites (Zambranoites) nodosus*, *V. (Z.) etayosernai*, *V. (Z.) obscurus*, *V. (Z.) grandis*, *Gargasiceras subpulcher*, *Colombiceras formosum*, *Protacanthoplites originalis*, *Riedelites latecostatus*, *R. microtuberculatus.*

Contents

Systematic palaeontology

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
Order Ammonitida Zittel, 1884
Suborder Ancyloceratina Wiedmann, 1966
Superfamily Douvilleiceratoidea Parona & Bonarelli, 1897
Family Douvilleiceratidae Parona & Bonarelli, 1897
Subfamily Cheloniceratinae Spath, 1923
Genus *Procheloniceras* Spath, 1923

1923 *Procheloniceras* Spath, p. 64.
1938 *Procheloniceras* Roman, p. 425.
1940 *Procheloniceras* Scott, p. 1002.
1952 *Procheloniceras* Basse, p. 655.
1957 *Procheloniceras* Arkell *et al.*, pp. L383-L384.
1958 *Procheloniceras* Luppov, p. 116.
1960 *Procheloniceras* Kudrjavtsev, p. 335.

1967 *Prochelonicera*s Dimitrova, p. 174-175.
1996 *Prochelonicera*s Wright *et al*., p. 267.

Type species – *Ammonites stobieckii* d'Orbigny, 1850, p. 113; lower Aptian of south-eastern France.

Diagnosis – Whorls moderately increasing in height, slightly involute, inflated and of medium thickness. Whorl section changes from wide-oval to circular-subrectangular. Venter broad, moderately convex or flattened. Umbilicus wide, step-like. Ribs strong, radial or inclined backward. On the early whorls ribs are bifurcated, later in most cases simple, bearing umbilical and lateral tubercles. Umbilical tubercles stronger than lateral ones. Short secondary ribs may be present. Suture with narrow, long, rather strongly split external lobe. Lateral asymmetric lobe divided by a high and narrow secondary saddle into two secondary lobes, which have the same length as the external lobe.

Comparison – *Prochelonicera*s Spath differs from *Chelonicera*s Hyatt in having more evolute whorls, radial or inclined backward simple ribs with two pairs of closely situated umbilical and lateral tubercles, and in the low number of intermediate ribs.

Distribution – Lower Aptian of southern England, northern Germany, Austria, Switzerland, Spain, Bulgaria, Poland, north Caucasus, Georgia, Armenia, Azerbaijan, Mangyshlak (Kazakhstan), southern and northern Africa, California, Mexico, Colombia. Uppermost? Barremian-lower Aptian of France.

*Prochelonicera*s *albrechtiaustriae* (Hohenegger *in* Uhlig, 1883)

Pl. 1, fig. 1; Pl. 2, fig. 1; Pl. 3, fig. 1; Pl. 4, fig. 1.

1883 *Acanthoceras Albrechti-Austriae* Hohenegger *in coll*.: Uhlig, p. 129, pl. 22, pl. 23, fig. 1.
non 1902 *Acanthoceras Albrechti-Austriae* Hohenegger: Koenen, p. 140, pl. 41, fig. 1.
1906 *Douvilleiceras Albrechti-Austriae* (Hohenegger): Sinzow, p. 167, pl. 4, figs. 1, 2.
1915 *Douvilleiceras Albrechti-Austriae* (Hohenegger) Uhlig: Kilian & Reboul, p. 57, pl. 1, fig. 6; *non* pl. 3, fig. 5; pl. 8, fig. 3.
1933 *Douvilleiceras Albrechti-Austriae* (Hohenegger): Rouchadzé, p. 185, fig. 8.
1958 *Prochelonicera*s *albrechti-austriae* (Hohenegger) (Uhlig): Luppov, pl. 56, fig. 1.
1960 *Prochelonicera*s *albrechti-austriae* (Hohenegger): Kudrjavtsev, p. 335, pl. 16, fig. 1.
1967 *Prochelonicera*s *albrechtiaustriae* (Hohenegger *in* Uhlig): Dimitrova, p. 175, pl. 81, fig. 4; pl. 85, fig. 5.
1972 *Prochelonicera*s *albrechtiaustriae* (Hohenegger *in* Uhlig): Vašiček, p. 67, pl. 10, fig. 6; pl. 11, fig. 2.
1995 *Prochelonicera*s *albrechtiaustriae* (Uhlig): Delanoy, pl. 7, fig. 1.
1997 *Prochelonicera*s *albrechtiaustriae* (Uhlig): Vašiček, pl. 2, fig. 7.

Lectotype – Vašiček (1972) selected the specimen figured by Uhlig (1883, pl. 22) as *Acanthoceras Albrechti-Austriae* Hohenegger *in coll.,* Uhlig collection, Geologische Bundesanstalt, Vienna, Red. 3962, lower Aptian, Malenovice, Frydek-Mistek district.

Material – Five specimens, RGM 353 811-353 813, 353 824, 353 825.

Description – Shell with inflated whorls, which slowly increase in height. Inner whorls semi-evolute, but with growth they become evolute. Whorl section wide-oval (costal section multi-angular), 1.5-1.7 times thicker than high, with the point of maximum width at the umbilical rim. Venter very broad, rounded and slightly flattened in the middle, passing gradually into low and convex flanks. Umbilicus varies from moderately to very wide. It is step-like, with moderate depth. Umbilical wall of early whorls steep, later becoming gently sloping and passing gradually into flanks.

Sculpture is very coarse and consists of rather numerous, strong, simple ribs, which are slightly inclined backward on the umbilical rim and flanks. Main ribs arise at the umbilical seam and from the umbilical margin they rapidly become strong. They bear umbilical and thorn-like lateral tubercles, which have cone-like shape on the steinkern and are situated a little above the middle of the flanks. All ribs are strongly elevated as they pass straight over the venter. Between tubercles ribs are flattened. On early whorls (rarely on the later whorls) there are rather weak, mostly non-tuberculate intermediate ribs. On the early ontogenetic stage there arises rarely a non-tuberculate branch from the umbilical tubercle of the main rib. All ribs are equal on the venter. The cross section of the rib is subcircular or rectangular, but it is sharp on the nucleus. On the first half of the last whorl the tubercles are almost equal in size, but later the umbilical tubercles gradually become stronger, whereas the lateral ones become weak and sometimes flattened. On the gerontic stage ribs become more distant.

Measurements – Key: D = diameter; H = whorl height; W = whorl thickness; U = umbilical width; h = whorl height at 180°; ribs = number of ribs per whorl at the venter; - = not measured. All ratios multiplied by 100 to give percentages. Similar abbreviations used below.

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
353 824	79.5	28.5	43.0	26.0	22.0	36	54	32	1.3	30
353 811	208.0	56.0	87.5	105.5	51.0	27	42	51	1.1	31
353 813	228.0	64.0	107.0	109.0	58.0	28	47	48	1.1	31
353 825	232.0	78.0	101.0	110.0	60.0	34	44	47	1.3	36

Comparison and remarks – Unlike the lectotype, the described specimens have somewhat broader whorls, less numerous ribs and fewer intermediate ribs, which irregularly occur between the main ribs. The distance between the umbilical and lateral tubercles is also markedly greater. The present material differs from *Procheloniceras marcomannicum* Uhlig, 1883, in having more numerous ribs, stronger lateral tubercles on the last whorl and a wider umbilicus. By the general shape of the shell and the character of the sculpture the Colombian specimens ressemble the large specimens of *Cheloniceras crassum* Spath figured by Casey (1961b, text-figs. 64, 65), but differ in the presence of more numerous simple ribs, stronger umbilical tubercles, low whorls and a wider umbilicus.

Distribution – Lower Aptian of southern France (*Deshayesites tuarkyrikus* Zone), Bulgaria, Poland, Roumania, Czechia, north Caucasus (Russia), Georgia, Armenia, Mangyshlak (Kazakhstan) and Colombia.

Occurrence – Galan, Guane; lower Aptian.

Prochelonicera **aff. *dechauxi* (Kilian & Reboul, 1915)**
Pl. 7, fig. 1; Pl. 8, fig. 1.

Material – One steinkern, RGM 353 823.

Description – Flanks strongly convex, whorls slowly increase in height and are evolute. Whorl section wide, oval, approaching a sub-trapezoidal shape, with the point of maximum thickness at the umbilical margin. Venter broadly rounded and gradually passing into weakly convex, almost flattened, low flanks. Umbilicus moderately wide, rather deep, step-like and bounded by high, gently sloping walls. Umbilical rim rounded.

The ornamentation of the last whorl consists of rather numerous, slightly differentiated ribs. The rather strong main ribs arise at the umbilical seam and are slightly inclined backward on the umbilical margin. On the flanks they are almost radial, have a crest-like shape and bear two pairs of distant, rather strong, thorn-like tubercles, with their basis elongated along the radius. The first pair is situated on the umbilical rim, whereas the second pair is situated near the ventro-lateral margin. At the end of the last whorl the lateral tubercles become weak, whereas the umbilical tubercles grow in size. From the latter spring two, almost equal, main ribs. The intermediary ribs are rather weak and arise on the umbilical wall or, rarely, on the lower part of the flanks. They appear irregularly, one between each pair of main ribs and rarely bear small, sharp lateral tubercles, which are elongated in radial direction. All ribs cross the venter in a straight line, and become significantly broader and slightly flattened. At the end of the last whorl they become more distant and thicker.

Measurements – RGM 353 823: D = 114.3; H = 42.5; W = 62.6; U = 35.0; h = 33.5; H:D = 37; W:D = 55; U:D = 1.27; H:h = 1.3; ribs = 40.

Comparison – The described specimen differs from *P. dechauxi* in having higher and broader whorls, and more numerous ribs, which frequently bifurcate from umbilical tubercles. In contrast to *P. albrechtiaustriae* Hohenegger (Uhlig, 1883, p. 129, pl. 22, fig. 1), it is characterized by more numerous ribs, more distant tubercles, less coarse sculpture and less differentiated ribbing. From the specimen described by W. Kilian (*in* Kilian & Reboul, 1915, p. 61, pl. 9, fig. 2a-b) as *Douvilleiceras seminodosum* Sinzow, it differs mainly in having a smaller number of ribs, which are broader.

Occurrence – Vélez-Chipatá, lower Aptian.

Prochelonicera **sp. A**
Pls. 5, 6.

Material – Two steinkerns, RGM 353 808, 353 809.

Description – Evolute whorls with wide-oval, coronate cross section and convex flanks. Costal section hexagonal, considerably higher than wide, with point of maximum width at the umbilical margin. Venter broad, rounded and slightly flattened in the

middle, passing gradually into low and convex flanks. Umbilicus wide, deep and step-like. Umbilical wall high and gently sloping, which merges imperceptably into flanks.

Sulpture consists of coarse, strong, simple main and intermediate ribs, which are radial or slightly inclined backward. The main ribs arise at the umbilical seam, and rapidly become strong and crest-like on the flanks. Near the umbilical rim and in the upper part of the flanks they bear very large, almost equal tubercles. Between them the ribs are flattened and saddle like. The umbilical tubercles are elongated along the radius, but the lateral tubercles are blunt, though sometimes slightly pointed. There is one rather weak, short, non-tuberculate intermediate rib between every two main ribs; they arise on the umbilical rim or in various levels of the flanks. Generally two ribs originate from one umbilical tubercle. Very rarely only one rib arises from one lateral tubercle. All ribs pass in a straight line over the venter without flattening. The whorl cross section at the ribs is trapezoidal with a rounded and broad venter. On the second half of the last whorl the number of the ribs reduces and the interspaces between them increase their width once or twice; the lateral tubercles become weak, whereas the umbilical ones become more prominent and their upper parts are curved backward.

Measurements – RGM 353 809: D = 182.0; H = 61.5; W = 109.0; U = 99.6; h = 50.4; H:D = 34; W:D = 60; U:D = 49; H:h = 1.2; ribs = 29. RGM 353 808: D = 216.0; H = 67.5; W = 126.0; U = 96.5; h = 55.4; H:D = 31; W:D = 58; U:D = 47; H:h = 1.2; ribs = 28.

Comparison – The present specimens differ from *P. albrechtiaustriae* Hohenegger, which shows the closest resemblance, in having a smaller number of ribs, a somewhat narrower umbilicus and a somewhat coarser sculpture. Unlike *P. pachystephanum* Uhlig, *Prochelonicera*s sp. A is characterized by a less coarse sculpture, more numerous ribs, stronger lateral tubercles and stronger intermediary ribs. By the general form and character of the sculpture, *Prochelonicera*s sp. A resembles *Cheloniceras crassum* Spath, 1930b, but differs in having somewhat broader whorls, a coarser sculpture, a smaller number of the simple ribs, which are thicker, and stronger umbilical tubercles.

Occurrence – Galan; lower Aptian.

Genus *Cheloniceras* Hyatt, 1903

1903 *Cheloniceras* Hyatt, p. 101.
1923 *Cheloniceras* Spath, p. 64.
1938 *Cheloniceras* Roman, p. 426.
1940 *Cheloniceras* Scott, p. 1005.
1949 *Cheloniceras* Humphrey, p. 143.
pars 1952 *Cheloniceras* Basse, p. 655.
1957 *Cheloniceras* Arkell *et al*., p. L385.
1958 *Cheloniceras* Luppov, p. 336.
1960 *Cheloniceras* Kudrjavtsev, p. 336.
1961b *Cheloniceras* Casey, p. 194.
1967 *Cheloniceras* Dimitrova, pp. 170, 171.
1971 *Cheloniceras* Kvantaliani, p. 105.
1996 *Cheloniceras* Wright *et al*., p. L269.

Type species – *Ammonites cornuelianum* d'Orbigny, 1841, p. 364, pl. 112, fig. 1-2. Lower Aptian, Paris basin.

Diagnosis – The semi-evolute whorls are moderately increasing in height. Whorl section very inflated, wide-oval (markedly wider than high), angular at the sites of tubercles. External side broad, rounded or slightly flattened passing gradually into convex flanks. Umbilicus wide, step-like, bounded by high and steep wall. Ribs strong, straight, sometimes slightly curved forward on the venter. Main ribs bear two pairs of tubercles. From the lateral tubercles arise two secondary branches. They are either equal or the adoral branch is thicker and broader than the adapical one.

Sometimes they have weak cylinder-like swellings on the venter. There are one to three non-tuberculate intermediate ribs between every two main ribs. Suture-line with a very wide lateral lobe which is asymmetrically divided into two branches. External saddle is large and asymmetric.

Comparison – Among the genera of the Cheloniceratinae the described genus is most similar to *Procheloniceras* Spath; their differences are given in the description of the latter.

Distribution – Lower Aptian, perhaps also lowermost middle Aptian, of south-eastern France, Spain, Austria, southern England, northern Germany, Roumania, Bulgaria, Crimea, north Caucasus, Georgia, Armenia, Azerbaijan, Mangyshlak (Kazakhstan), Turkmenistan, Volga region (Povoljie), Mozambic, South Africa, Madagascar, Egypt, Iran, Japan, California, Texas, Mexico, Cuba?, Colombia.

Cheloniceras gottschei (Kilian, 1902)

Pl. 7, fig. 2.

1902 *Acanthoceras (Parahoplites) martini* d'Orbigny sp. var. *gottschei* Kilian, p. 465.
1910 *Douvilleiceras martini* var. *gottschei* (Kilian): Krenkel, p. 144, pl. 17, figs. 4, 5, 8, 9.
1962 *Cheloniceras (Cheloniceras)* cf. *gottschei* (Kilian): Casey, p. 234, pl. 36, figs. 5a, b; text-fig. 81.
1975 *Cheloniceras gottschei* (Kilian): Förster, pp. 195-198, pl. 9, fig. 1, text-figs. 55, 56 (see synonymy therein).

Syntypes – Two syntypes in the Ecole National Supérieur des Mines (Paris) from the lower? Aptian deposits of South Africa (Krenkel, 1910, *loc. cit*. Casey, 1962).

Material – Two specimens, RGM 353826, 353827.

Description – Shell with rounded whorl section and semi-evolute whorls, which moderately increase in height and breadth. Whorl section wide-oval (costal section octagonal), with the point of maximum thickness at the lower third of the flank height. Venter rather wide and slightly flattened, passing gradually into the low, sub-parallel flanks. Umbilicus rather wide, moderately deep, with steep wall and rounded rim.

The ornamentation of the last whorl consists of a regular alternation of main and intermediate ribs. Main ribs arise near the umbilical seam; on the umbilical rim they are slightly bent backward, while on the flanks and venter they become radial. There

are two pairs of tubercles, umbilical and lateral. The latter are stronger and sharper. From these tubercles the main ribs sometimes bifurcate into two almost equal branches. The intermediary ribs do not bear tubercles and arise on the umbilical wall or on the lower third of the flank height. There is only one, rarely two, intermadiate rib between two main ribs. On the venter all ribs are equally strong and sometimes exhibit a faint mid-ventral depression. The number of the ribs on the venter reaches 32-34 per whorl. Tubercles disappear at about 40 mm diameter and from that diameter only strong simple ribs are present.

Measurements – RGM 353 826: D = 47.5; H = 17.6; W = 25.0; U = 17.7; h = 12.3; H:D = 37; W:D = 53; U:D = 37; H:h = 1.4. RGM 353 827: D = 47.6; H = 17.6; W = 24.1; U = 16.3; h = 12.0; H:D = 37; W:D = 51; U:D = 34; H:h = 1.5.

Comparison – By the general shape of the shell and sculpture the described species resembles *Ch. quadrarium* Casey, 1962 and *Ch. seminodosum* Sinzow, 1906. It differs from the first in having thicker whorls and stronger ribs, and from *Ch. seminodosum* in having narrower whorls and less numerous ribs. Besides, the lateral tubercles of *Ch. gottschei* disappear earlier than in the two resembling species.

Distribution – Uppermost Lower Aptian/lowermost? upper Aptian of Mozambique, south Tanzania, Zululand, Madagascar?; lower Aptian, Zones of *Deshayesites deshayesi* and *Tropaeum bowerbanki* of south England; lower Aptian of Colombia.

Occurrence – Villa de Leyva, lower Aptian.

***Cheloniceras disparile* Casey, 1961b**

Pl. 24, fig. 2.

1961b *Cheloniceras (Cheloniceras) disparile* sp. nov., Casey, p. 215, pl. 34, figs. 7a-b, 8a-c; text-figs. 67g, 68.

Holotype – Specimen figured by Casey (1961b, p. 215, pl. 34, fig. 7a, b) from the lower Aptian of southern England. British Geological Survey, Keyworth, Zm 1946, Ferruginous Sands, Lower Crioceras Beds (Group VI) (top), Whale Chine, Atherfield, Isle of Wight.

Material – Six specimens, RGM 282621-282626.

Description – An average-sized shell with very inflated, semi-evolute whorls, which moderately increase in height. Whorl section is wide-oval (costal section octagonal), with maximum thickness at mid-flank. Venter wide, rounded, with a faint depression along the medial plane; it passes gradually into the flanks. Umbilicus rather wide, step-like, moderately deep, with a steep wall; the latter gradually passes into the flanks.

Ornamentation consists of coarse ribs of different thickness. Main ribs bent forward (ten to twelve main ribs to a whorl) on early whorls, but later they become radial and

bear two pairs of tubercles. The first pair of tubercles is situated on the umbilical margin. On the early whorls they are elongated in the direction of the ribs, whereas on the last whorl they become thorn-like in shape. Lateral tubercles are stronger and thorn-like; their internal casts are mace-like in shape with radially elongated bases. Main ribs start to bifurcate from the upper lateral tubercles; branch thicker and more prominent than the posterior one, and has a tubercle-like thickening on the venter. Main ribs are surrounded by weak constrictions. The number of intermediate ribs between two main ribs decreases with growth from three to one on the last whorl. As a rule the first intermediate rib is longer and stronger than the second one counting in an adoral direction from a main rib. On the last whorl some of the ribs bear tubercle-like thickenings on the venter. Moreover, at this stage the main ribs rarely are bifurcated.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 622	40.9	14.5	21.6	15.6	10.0	35	53	38	1.6	36
282 624	41.0	17.0	23.4	13.3	10.9	41	57	32	1.6	37
282 626	54.5	17.2	28.2	21.7	14.2	32	52	40	1.2	36
282 625	54.8	20.0	31.4	21.0	14.6	36	57	38	1.4	34
282 623	60.7	18.9	32.6	24.0	15.9	31	54	40	1.2	35

Comparison and remarks – This species clearly differs from the other species of *Cheloniceras* in having ribs of different thickness. As was noted by Casey (1961b, p. 215), "it is a late development of the *cornuelianum* stock, leading to *Epicheloniceras*."

From *Ch. cornuelianum* d'Orbigny, 1841, it differs in having narrower whorls and coarser sculpture with sharply pronounced unequal ribs. In contrast to *Ch. crassum* Spath, 1930b, the described species is characterized by a less coarse sculpture, narrow whorls and the presence of rather prominent thickenings of the ribs on the venter. From *Epicheloniceras debile* Casey, 1962, it differs in having more depressed whorls and a wider umbilicus. The anterior branch of the main rib of *Ch. disparile* is stronger than the posterior one (*Cheloniceras* type), whereas the anterior branch of *E. debile* is significantly weaker than its posterior one (*Epicheloniceras* type).

Distribution – Lower Aptian, Zone of *Tropaeum bowerbanki* of southern England; lower Aptian, Zone of *Dufrenoyia furcata* of Georgia, lower Aptian of Colombia.

Occurrence – Galan, Guane, Villa de Leyva, Sáchica, Útica; lower Aptian.

***Cheloniceras cornuelianum* (d'Orbigny, 1841)**
Pl. 11, fig. 2; Pl. 13; Pl. 14, fig. 1; Pl. 15, fig. 1.

1841 *Ammonites Cornuelianus* d'Orbigny, pp. 364, pl. 112, figs. 1, 2.
1961b *Cheloniceras (Cheloniceras) cornuelianum* (d'Orbigny): Casey, p. 198, pl. 33, fig. 7; pl. 34, figs. 1, 9; pl. 35, figs. 1, 2, 3; text-figs. 60 a-c, 61, 62, 67e-f (with synonymy).
non 1995 *Cheloniceras cornuelianum*: Delanoy, p. 78, pl. 6, fig. 1.

Lectotype – The specimen figured by d'Orbigny (1841, pl. 112, figs. 1-2) from the

Argiles à Plicatules, Louremont, near Wassi (Haute-Marne), Paris Basin (Cornuel Coll.) (see Casey, 1961b, p. 198).

Material – Forty two specimens, RGM 282713-282754.

Description – Large shells with rounded, semi-evolute whorls, which moderately increase in height. Whorl section wide-oval, but in the last whorls it becomes subtrapezoidal, with its greatest thickness in the lower part of the flanks. Venter broad; on early whorls rounded, but becoming flattened in the later growth stage. It passes gradually into moderately convex flanks. Umbilicus wide, step-like, deep, with steep walls; umbilical margin rounded.

The ornamentation consists of main tuberculate and intermediate non-tuberculate ribs. Main ribs arise near the umbilical seam; rursiradiate on the umbilical wall, but become almost radial on the flanks. There are two pairs of tubercles, *viz.* small umbilical and big, thorn-like (with a mace-like internal cast) lateral tubercles. From the lateral tubercles originate two branches; in most cases the branches are equal, but in a few cases the branch is somewhat stronger than the posterior one. Two intermediate ribs occur between two main ones, but at the end of the last whorl main ribs are separated by only one rather weak intermediate rib. On the venter all ribs are equally thick and slightly angular at the shoulders. At D > 85-90 mm the lateral tubercles become flattened and bifurcations occur at weak umbilical thickenings.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 739	65.5	22.1	38.9	25.6	15.5	34	60	40	1.4	38
282 722	80.4	31.4	51.2	27.6	22.0	39	64	34	1.4	40
282 734	84.0	31.1	51.3	29.0	21.5	37	61	35	1.5	41
282 734	119.6	43.5	67.0	41.5	30.0	36	56	35	1.5	48
282 753	132.4	46.4	74.5	48.8	34.0	35	56	37	1.4	37
282 745	150.3	54.8	91.7	49.2	41.4	36	61	33	1.3	43

Comparison – The species morphologically closest to *Ch. cornuelianum* are *Ch. meyendorffi* d'Orbigny, 1845 and *Ch. crassum* Spath, 1930b. From the former it differs in having higher and less convex flanks, smaller number of ribs and more uniform ribbing. It differs from *Ch. crassum* in having a less coarse sculpture, higher whorls, more numerous ribs and the comparatively early disappearance of tubercles.

Remarks – Two groups can be distinguished in this species; the first group has rather numerous thin ribs (38-48 on one whorl), a wide trapezoidal whorl section, a flattened venter and angular ribs on the ventrolateral margin (RGM 282 734, 282 739, 282 754). The second group (RGM 282 745, 282 749, 282 748) is characterized by a small number of thick ribs, a wide-oval whorl section and a convex venter.

Distribution – Lower Aptian of western Europe, Georgia, north Caucasus (Russia), Daghestan, Mangyshlak (Kazakhstan), Turkmenistan, and Colombia.

Occurrence – Guane, Galan, Villa de Leyva, Mesa de Los Santos, lower Aptian.

Cheloniceras seminodosum (Sinzow, 1906)

Pl. 1, fig. 2; Pl. 3, fig. 2.

1906 *Douvilleiceras seminodosum* sp. nov., Sinzow, p. 165, pl. 1, figs. 3-6.
1913 *Douvilleiceras seminodosum*: Sinzow, p. 105, pl. 5, figs. 2, 2a.
1913 *Douvilleiceras seminodosum* Sinzow: Kilian, p. 34, pl. 9, figs. 1, 2.
1960 *Cheloniceras seminodosum* Sinzow: Kudrjavtsev, p. 338, pl. 16, figs. 2, 3; pl. 17, figs. 2, 3; text-fig. 134.
1964 *Cheloniceras seminodosum* Sinzow: Kemper, p. 48, pl. 6, figs. 1, 2.
1967 *Cheloniceras (Cheloniceras) seminodosum seminodosum* Sinzow: Dimitrova, p. 172, pl. 32, fig. 2; pl. 83, fig. 3.
1971 *Cheloniceras seminodosum* Sinzow: Kvantaliani, p. 105, pl. 16, fig. 2; text-figs. 62, 63.

Lectotype – The specimen figured by Sinzow (1906, p. 165, pl. 1, fig. 4a, b). Lower? Aptian, Mangyshlak (Kazakhstan).

Material – Twenty five specimens, RGM 282 627-282 651.

Description – Shell consists of rounded whorls, which rapidly increase in height. Whorl section changes with age from wide-oval up to rectangular-oval, with the point of maximum thickness in the lower part of the flanks, near the umbilical margin. Flanks are low, slightly convex, passing gradually into a wide, slightly flattened venter. Umbilicus wide, step-like, moderately deep with a steep wall, which gradually passes into the flanks.

Ornamentation of early whorls consists of numerous (42-45 to a whorl), thin main and intermediate ribs. They arise near the umbilical seam or at the umbilical margin, pass straight over the flanks with a slight forward inclination on the venter. There are weak, radially elongated thickenings on the main ribs at umbilical margins, whereas in the upper part of the flanks the main ribs bear sharp thorn-like tubercles, from which they often bifurcate into equal ribs. There are two to four intermediate ribs between two main ones; they sometimes bear weak lateral thickenings. All ribs become equal on the venter. With age the ornamentation becomes coarser; the number of the ribs increases up to 55 per whorl. On the living-chamber the sculpture gradually effaces. Ribs bifurcate from the umbilical thickenings.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h
282 627	20.5	8.9	12.5	6.7	5.2	43	61	31	1.7
282 634	27.5	10.5	16.3	9.0	7.7	38	59	33	1.4
282 635	28.8	11.2	17.9	9.4	7.5	39	62	33	1.5
282 646	28.0	11.0	17.0	11.2	7.0	39	61	40	1.6
282 632	36.0	13.2	21.9	12.2	9.3	37	61	34	1.4
282 645	45.5	15.8	24.0	16.9	11.4	35	53	37	1.5

Comparison – Our specimens differ from that described by Sinzow (1906) in having somewhat thicker and more depressed whorls. From *Ch. meyendorffi* d'Orbigny, 1845, the species differs in having slightly thinner whorls, a wider umbilicus, a regular alternation of main and intermediate ribs, and a weaker sculpture. In comparison

with *Ch. proteus* Casey, 1962, *Ch. seminodosum* has more depressed whorls, smoother sculpture, more numerous ribs and regular ribbing.

Distribution – Lower Aptian of southeastern France, north Germany, Bulgaria, north Caucasus, Daghestan, Mangyshlak (Kazakhstan), Tuarkyr, Minor Balkhan (Turkmenistan), Armenia. Lower Aptian (Zone *Deshayesites deshayesi*) of Georgia. Lower Aptian of Colombia.

Occurrence – Mesa de Los Santos, Villa de Leyva (Loma Blanca), Guane, Ubaté, Sáchica; lower Aptian.

Cheloniceras meyendorffi (d'Orbigny, 1845)

Pl. 14, fig. 2; Pl. 16; Pl. 17, fig. 1; Pl. 18, fig. 1; Pl. 19, fig. 1.

1845 *Ammonites Meyendorffi* sp. nov., d'Orbigny, p. 428, pl. 32, figs. 4, 5.
1906 *Douvilleiceras Meyendorffi* (d'Orbigny): Sinzow, p. 161, pl. 1, figs. 7-9.
1962 *Cheloniceras (Cheloniceras) meyendorffi* (d'Orbigny): Casey, p. 222, pl. 36, fig. 4; pl. 37, fig. 11; text-figs. 73, 74 (see synonymy).

Holotype – From the lower Aptian, Saratov (Russia) (d'Orbigny, 1845, p. 428, pl. 32, figs. 4, 5).

Material – Seven specimens, RGM 282 699-282 705.

Description – Shell has rounded, semi-evolute whorls with a wide-oval cross section; the whorls rapidly increase in height. Flanks are rather low, convex and gradually pass into the broad, less convex venter, which is somewhat flattened on large specimens. Umbilicus is moderately deep, rather wide, and step-like with steep walls and rounded margin.

Ornamentation consists of an irregular alternation of main and intermediate ribs. On the early whorls the main ribs (12-14 to the whorl) are stronger than the intermediate ones. They originate near the umbilical seam, then gradually become stronger, pass straight over the flanks and are sometimes slightly inclined forward on the venter. The main ribs bear weak, radially elongated umbilical thickenings and rather strong tubercles near the middle of the flanks. From these tubercles the main ribs bifurcates into more or less equal branches. There are one to three weak, non-tuberculate intermediary ribs between the main ones. On the last whorl of the adult specimen there are seven strong tuberculate ribs. Tubercles are prominent, thorn-like and radially elongated. There are one to five intermediate ribs between the main ones. At the end of the last whorl the lateral tubercles become less prominent, whereas the umbilical thickenings become more prominent; from the latter arises two ribs. There are 50 ribs on the venter of the last whorl.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h
282 700	27.2	10.7	15.8	9.0	8.0	39	58	33	1.3
282 701	47.2	18.6	30.5	14.5	13.1	39	65	31	1.4

	D	H	W	U	h	H:D	W:D	U:D	H:h
282 699	46.1	17.1	29.6	15.5	10.0	37	64	34	1.7
282 699	54.1	21.3	36.5	18.2	12.5	39	67	34	1.7
282 702	115.8	46.2	73.2	35.4	30.5	40	63	31	1.5

Comparison – Unlike *Cheloniceras crassum* Spath, 1930b, *Ch. meyendorffi* is mainly characterized by having narrower whorls, a less coarse sculpture, and a greater number of irregularly alternating main and intermediate ribs.

Distribution – Lower Aptian, Zone of *Tropaeum bowerbanki*, Subzone of *Cheloniceras meyendorffi* of southern England; Lower Aptian, Zone of *Deshayestes deshayesi* of France, Georgia and north Caucasus; Lower Aptian of Volga region (Povoljie) and Colombia.

Occurrence – Galan, Guane, Sáchica, Villa de Leyva; lower Aptian.

Cheloniceras kiliani kiliani (Koenen, 1902)

Pl. 11, fig. 1; Pl. 12, fig. 1.

1902 *Acanthoceras Kiliani* sp. nov., Koenen, p. 406, pl. 33, fig. 1.
1961b *Cheloniceras (Cheloniceras) kiliani* (Koenen): Casey, p. 213, pl. 33, figs. 3-6; text-fig. 67.
1995 *Cheloniceras kiliani* (Koenen): Delanoy, p. 80, pl. 4, fig. 2.

Holotype – The specimen figured by Koenen (1902, pl. 33, figs. 1a, b). According to Casey (1961b, p. 213) it is lost.

Material – Six specimens, RGM 282 681-282 686.

Description – Large shells with strong, convex, semi-evolute whorls, which slowly increase in height. Whorl section wide-oval (costal section trapezoidal). Venter broadly rounded and passes into low, moderately convex flanks. Umbilicus rather wide, medium depth, step-like, with low, steep wall; umbilical rim rounded.

Ornamentation consists of strong, radial ribs. There are 18-22 main ribs on the last whorl. They arise near the umbilical seam, and bear umbilical and lateral tubercles. Umbilical tubercles stronger than lateral ones and have thorn-like shape with a slightly radially elongated base. Some of the main ribs bifurcate from the umbilical tubercles; the branches are mostly equal, but in some cases the anterior branch is thicker than the posterior one. Between the main ribs there is generally one rather weak, intermediate rib. Intermediate ribs may rarely bear lateral tubercles, which are weak, thorn-like and radially elongated. On the venter of the last whorl all ribs are equal and slightly flattened in the middle.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 683	130.0	43.0	65.5	47.4	34.1	33	50	36	1.3	40
282 684	130.2	49.7	69.2	42.8	37.2	38	53	33	1.3	42
282 686	163.0	63.3	96.5	52.4	48.2	39	59	32	1.3	44

Comparison – This subspecies differs mainly from *Ch. cornuelianum cornuelianum* d'Orbigny, 1841, in having thinner whorls, a smaller number of the intermediate ribs, weaker lateral and stronger umbilical tubercles. In comparison with *Ch. parinodum* Casey, 1961a, *Ch. kiliani kiliani* has less convex flanks and weaker tubercles. Besides, bifurcation from the lateral tubercles is absent in this subspecies. It differs from *Ch. quadrarium quadrarium* Casey, 1962, in somewhat thicker whorls, a smaller number of ribs and in the irregularity of ribbing.

Distribution – Lower Aptian, zones of *Deshayesites deshayesi* (Subzone of *D. grandis*) and *Tropaeum bowerbank*i (Subzone of *Ch. meyendorffi*) of southern England; lower Aptian of Germany; lower Aptian, base of *Dufrenoya furcata* Zone of southeastern France; lower Aptian of Colombia.

Occurrence – Galan, Guane, Sáchica, Ubaté; lower Aptian.

Cheloniceras kiliani obesum Casey, 1961b

Pl. 9, fig. 2.

1961b *Cheloniceras (Cheloniceras) kiliani* (von Koenen) var. *obesum* subsp. nov. Casey, p. 215, pl. 33, fig. 6; text-fig. 67d.

1980 *Cheloniceras (Cheloniceras) kiliani obesum* Casey: Casey, p. 653, pl. 110, fig. 2.

Holotype – British Geological Survey, Keyworth, 99289, Lower Aptian, Ferruginous Sands, Group VII, Whale Chine, Atherfield, Isle of Wight (Casey, 1961b, p. 215, pl. 33, fig. 6a, b).

Material – One specimen, RGM 282 687.

Description – Shells of average sizes with very rounded, semi-evolute whorls, which moderately increase in height. Whorl section wide-oval approaching a rectangular shape with the point of maximum thickness at mid-flank. Flanks are convex, slightly flattened in the lower part passing gradually into a broadly rounded venter. Umbilicus rather wide, step-like, of medium depth and with a low, steep wall. Umbilical margin rounded.

Ornamentation consists of strong radial main and rather weak intermediate ribs. The main ribs bear rather sharp, not strong, radially elongated umbilical tubercles, and stronger lateral tubercles. Ribs arise near the umbilical seam, then curve slightly backward, but rapidly straighten and become stronger on flanks; between tubercles they are crest-like and slightly refracted on the ventrolateral margin. From the lateral tubercles they split into two unequal branches; the anterior branch is somewhat weaker than the posterior one. There are two non-tuberculate intermediate ribs between every two main ones in the early whorls, but on the last whorl only one. In the middle of the last whorl (D = 50 mm) the lateral tubercles gradually diminish in strength, whereas the umbilical ones become stronger. From the umbilical tubercles ribs bifurcate. On the venter all ribs are almost equal.

Measurements – D = 73.0; H = 26.5; W = 39.5; U = 26.3; h = 18.4; H:D = 36; W:D = 54; U:D = 38; H:h = 1.4; ribs = 38.

Comparison – This subspecies differs from *Ch. kiliani kiliani* in having more convex flanks and an earlier start of the diminution of the lateral tubercles. From *Ch. seminodosum* Sinzow, 1906, it differs in the earlier weakening of the lateral tubercles, the coarser sculpture, the smaller number of the ribs and the less convex flanks.

Distribution – Lower Aptian, Zone of *Tropaeum bowerbanki*, Subzone of *Cheloniceras meyendorffi* of southern England; lower Aptian of Colombia.

Occurrence – Villa de Leyva; lower Aptian.

***Cheloniceras* aff. *kiliani* (Koenen, 1902)**
Pl. 10, fig. 2; Pl. 12, fig. 2.

Material – Seven specimens, RGM 282 688-282 694.

Description – Shells are of average size with very convex flanks and semi-evolute whorls, which moderately increase in height. Whorl section wide-oval (costal section suboctagonal) with the point of maximum thickness at the lower third of the flanks. Venter rather broadly rounded and passing gradually into low, moderately convex flanks. Umbilicus moderately wide, step-like, with steep, moderately high walls; umbilical rim rounded.

Ornamentation consists of main and intermediate ribs. The main and some of the intermediate ribs arise near the umbilical seam; on the umbilical margin they curve backward, on the flanks they become radial, and on the venter they are less prominent and angularly refracted. At the middle of the venter of the last whorl they are slightly depressed. The main ribs bear weak umbilical thickenings and the thorn-like lateral tubercles. From the latter they fork into two equal branches. The tubercles disappear at about D = 55 mm. There are two to three, rarely four non-tuberculate, less prominent intermediate ribs between two main ones. The number of ribs on the venter of the last whorl varies from 36 up to 41.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h
282 694	53.7	20.1	29.8	19.0	13.7	37	55	35	1.5
282 688	54.2	19.3	28.4	19.1	14.6	36	52	35	1.3
282 691	55.8	23.0	31.0	18.3	13.6	41	56	33	1.7
282 689	57.4	22.2	31.0	18.9	15.0	39	54	33	1.5
282 690	67.5	23.7	32.3	24.0	19.0	35	48	36	1.3

Comparison – The general shape of the shell and the character of the sculpture of this species resembles that of *Ch. kiliani sensu lato*. It differs, however, from the latter in having a larger number of intermediate ribs, a pronounced mid-ventral depression of the main ribs and weaker umbilical thickenings, from which never two ribs originate.

The described specimens differ from *Ch. gottschei* Kilian (Krenkel, 1910, p. 144, pl. 17, figs. 8, 9) in the thicker whorls, the more numerous and more unequal ribs, and in the stronger lateral tubercles. From *Ch. quadrarium* Casey, 1962, *Ch.* aff. *kiliani* differs in having slightly more convex flanks, wide-oval whorls, irregular ribbing and weaker umbilical thickenings on the main ribs.

Occurrence – Guane, Villa de Leyva, Sáchica; lower Aptian.

***Cheloniceras parinodum* Casey, 1961a**

Pl. 26, fig. 1; Pl. 27, fig. 1.

1961a *Cheloniceras (Cheloniceras) parinodum* sp. nov., Casey, p. 594, pl. 84, fig. 1; text-fig. 14a.
1962 *Cheloniceras (Cheloniceras) parinodum* Casey: Casey, p. 219, text-figs. 70-72.
1980 *Cheloniceras (Cheloniceras) parinodum* Casey: Casey, p. 653, pl. 110, fig. 1.

Holotype – The Natural History Museum, London, C 69520, Ferruginous Sands, Group IV (top), Atherfield, Isle of Wright (Matsumoto Coll.) (see Casey, 1961a, p. 594, pl. 84, fig. 1).

Material – Twenty three specimens, RGM 282 658-282 680.

Description – Large shells consisting of rounded, semi-evolute whorls, which moderately increase in height. Cross section of early whorls wide-oval, but later becoming subtrapezoidal (costal section polygonal), with the point of maximum thickness moving during growth from the upper third of the flanks to the umbilical margin. Venter broad; on the early whorls rounded, but later becoming slightly flattened and passing gradually into moderately convex, low flanks. Umbilicus moderately wide, of medium depth and surrounded by a rather low, steep wall.

Sculpture coarse, with radial ribs on early whorls. In a later stage the ribs are slightly prorsiradiate. Up to D = 90-100 mm ribbing is uniform; the main ribs bear umbilical and lateral tubercles (at D = 50 mm there are ten main ribs on one whorl). In the mace-like lateral tubercles the main ribs bifurcate into two branches. The anterior branch is stronger than the posterior one. There are two weaker, intermediate ribs, which are simple and sometimes bear lateral tubercle-like thickenings. On the ventrolateral area all ribs are slightly angularly refracted. There are constrictions alongside (generally in front of, but sometimes also behind) the main ribs. With growth the sculpture becomes coarser. In the last ontogenetic stage the whorls are ornamented by thick, simple, crest-like ribs. After D = 90 mm bifurcation at the lateral tubercles ceases, while umbilical and lateral tubercles become equally prominent and in some cases the umbilical ones become even stronger. There is only one intermediary non-tuberculate rib between two main ones. The angular bend of the ribs on the ventrolateral margin becomes more distinct and a slight flattening at mid-venter is clearly visible.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 669	72.4	27.0	42.0	26.7	19.8	37	58	37	1.4	34
282 667	54.0	21.3	28.8	19.4	14.0	39	53	36	1.5	34

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 667	101.3	33.3	49.0	42.0	23.3	33	48	42	1.4	35
282 678	77.7	26.6	40.8	31.0	19.5	34	53	40	1.4	36
282 675	99.2	33.4	52.3	38.5	25.6	34	53	39	1.3	37
282 674	102.0	38.5	53.9	39.5	24.8	38	53	39	1.6	36
282 676	114.8	43.5	59.6	42.2	27.5	38	52	37	1.6	44

Comparison – From *Ch. cornuelianum sensu lato*, this species differs in having less thick whorls, a narrower umbilicus, a coarser sculpture and a smaller number of ribs. Unlike *Ch. cornuelianum latispinosa* Nikschitch, 1915, the described species is characterized by somewhat thicker whorls and more numerous ribs. From *Ch. crassum* Spath, 1930b, it differs in having a polygonal costal whorl section, less inflated whorls and a longer persistence of irregular ribbing.

Distribution – Lower Aptian, Zone of *Deshayesites deshayesi* (Subsone of *Cheloniceras parinodum*) of southern England, lower Aptian of Colombia.

Occurrence – Guane, Galan, Ubaté, Socorro, Sáchica; lower Aptian.

Cheloniceras crassum crassum Spath, 1930b

Pls. 20-23; Pl. 24, fig. 1; Pl. 25.

1930b *Cheloniceras crassum* sp. nov., Spath, p. 449, pl. 15, fig. 6.
1961b *Cheloniceras (Cheloniceras) crassum crassum* Spath: Casey, p. 208, pl. 34, figs. 2-6; pl. 35, fig. 4; text-figs. 64-66.
1967 *Cheloniceras (Cheloniceras) crassum* Spath: Dimitrova, p. 171, pl. 86, fig. 1.

Holotype – Manchester University Museum. L11605/A, Hythe Beds, Kent (Dixon Collection) (Spath, 1930b, p. 449, pl. 15, fig. 6).

Material – Fourty eight specimens, RGM 282 764- 282 811.

Description – Whorls with very inflated flanks. Early whorls moderately increasing in height and semi-evolute. In the middle and late growth stages whorls only slowly increase in height, and become evolute. Whorl section is wide-oval and one and a half times thicker than high, with the point of maximum thickness moving in the course of growth from the upper part of the flanks to the lower third of the flanks. Venter is broad, rounded on the early whorls, but later slightly flattened and passing gradually into low, convex flanks. Umbilicus wide, step-like, with rather high and steep walls. Umbilical margin rounded. On the gerontic stage the shell becomes slightly involute. Whorl section is broad and low, and the umbilicus tends to be funnel shaped.

The ornamentation changes significantly during the ontogeny.

(1) D = 30-110 mm: the shell is strongly sculptured. Ribs are thick, radial or slightly inclined backward. Main ribs (14-17 to a whorl) arise at the umbilical seam becoming crested on the flanks, and bearing umbilical and lateral tubercles. Umbilical tubercles weak, thorn-like or have the shape of radially elongated thickenings; they are situated on the umbilical margin. Lateral tubercles are situated on the

ventrolateral margin and are developed into very strong, thorn-like spines. Their internal casts have a cone-like shape with a slightly radially elongated basis. From this point the main ribs fork into two, rarely three, branches. The anterior branch is the strongest. The intermediate ribs are rather weak and arise singly from the umbilical wall or from the lower part of the flanks. In some places there are one or two intermediate ribs between two main ones. The main ribs and sometimes also the intemediate ribs have a slightly angular course when passing over the venter. Here all ribs are almost equal with rounded cross-section; sometimes the anterior branch of the main rib is a little stronger than the other ones. Beginning from about D = 90-100 mm umbilical tubercles become stronger. From the latter originate two ribs. The lateral tubercles are grow rather slowly.

(2) D = 110-280 mm: sculpture becomes very coarse and consists of prominent simple ribs, with flat surfaces on the flanks, whereas on the venter they have a crested shape. At the beginning of the last whorl there are intermediate ribs between the main ribs. On the second half of the last whorl all ribs become equal. The main ribs bear very large, sharp umbilical and lateral tubercles with a radially elongated basis. On the gerontic stage the sculpture becomes still coarser; the number of ribs reduces and the ribs become very thick with elevated rectangular cross-section. Umbilical tubercles are very strong with a radially elongated base and conical shape. Lateral tubercles gradually weaken and eventually disappear. In some cases the ribs and the umbilical tubercles become weaker, the latter eventually totally disappear. The adult ontogenetic stage of this species (*sensu lato*) is very similar to the species of the genus *Prochelioniceras*. However, the morphology of the inner whorls is typical of the genus *Cheloniceras*; the disposition of the main and intermediate ribs, the main ribs bearing two pairs of tubercles, the forking from the lateral tubercle, the angular passage of the ribs over the venter and the presence of tubercle-like thickenings on the venter.

The suture line is of *Cheloniceras*-type. The external saddle is narrow, high and bifid with triangular shaped branches. The lateral lobe (L) is asymmetrically bifid, with an external branch, which is wider and deeper than the internal branch. The secondary saddle (L_1/L_2) is situated where the base of the lateral tubercle is located. In this paper the terminology of Schindewolf (ELUI) is used (instead of terminology of Sharikadze –VLUID).

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 767	32.5	11.4	19.6	11.8	8.0	35	60	36	1.4	39
282 795	37.8	13.0	23.6	14.7	9.8	34	62	39	1.3	37
282 764	42.2	17.5	25.5	13.3	11.0	41	60	32	1.6	38
282 793	49.0	17.8	31.4	17.6	13.8	36	64	36	1.3	40
282 769	56.0	18.8	33.0	20.1	15.2	34	59	36	1.2	42
282 805	146.0	49.5	80.6	55.7	38.6	34	55	38	1.3	37
282 803	173.0	65.3	102.0	67.0	48.8	38	59	39	1.3	31
282 802	185.0	62.4	93.3	87.5	46.0	34	51	47	1.4	35
282 773	187.0	64.0	94.4	80.5	52.0	34	51	43	1.2	34
282 782	240.0	70.0	120.0	118.0	63.0	29	50	49	1.1	32
282 775	255.0	77.0	115.0	113.0	65.0	30	45	44	1.2	30

Comparison – From *Cheloniceras cornuelianum*, which mostly resembles *Ch. crassum crassum,* the described species differs mainly in having a coarser sculpture, a smaller number of the ribs, and slightly lower and thicker whorls. From *Ch. parinodum* Casey, 1961a, it mainly differs in the lower whorls, the coarser sculpture and the pronounced angular bending of the ribs at the ventrolateral margin. In contrast to *Ch. migliorinii* Tavani, 1949, the described subspecies is characterized by thicker and lower whorls, by a wider umbilicus, a coarser sculpture and a smaller number of ribs. From *Ch. ramadanicus* Chiriac, 1981, it differs in having slightly lower and narrower whorls, a wider umbilicus, a wide-oval (instead of trapezoidal) whorl section and in the general presence of bifurcating main ribs.

Distribution – Lower Aptian, Zones of *Deshayesites deshayesi* (Subzone of *Deshayesites grandis*) and *Tropaeum bowerbanki* of southern England; lower Aptian, Zone of *Dufrenoyia furcata* of Georgia; lower Aptian of Bulgaria and Colombia.

Occurrence – Guane, Galan, Socorro, Villa de Leyva, Sáchica; lower Aptian.

***Cheloniceras crassum impar* Casey, 1961b**

Pl. 17, fig. 2; Pl. 18, fig. 2; Pl. 19, figs. 2, 3.

1961b *Cheloniceras (Cheloniceras) crassum* Spath var. *impar* Casey, p. 209, pl. 34, figs. 3-6.

Holotype – British Geological Survey, Keyworth, 9867, Hythe Beds, Great Chart, Kent (Casey, 1961b, p. 209, pl. 34, fig. 4a, b), lower Aptian.

Material – Six specimens, RGM 282 706-282 711.

Description – Semi-evolute with very inflated whorls, which moderately increase in height. Whorl section sub-octagonal with the point of maximum thickness moving in the course of growth from the upper to the lower part of the flanks. The venter of the early whorls is wide and convex, whereas on the last whorl it is broad and slightly flattened, passing gradually into low, moderately convex flanks. Umbilicus rather wide, step-like, with moderate depth, a steep wall and a well-rounded rim.

The ornamentation consists of coarse, strong, radial or slightly opistocline ribs, which are of uneven thickness. The strong main ribs bear closely-spaced, lateral and umbilical tubercles; between them the ribs are conspicuously broad and flat. The lateral tubercles are very strong. On the early whorls they are round, but with age they significantly increase in size and elongate in the direction of the spire; they obtain the shape of a strong thorn. From the lateral tubercles arise two unequal branches, of which the anterior is stronger (thicker) than the posterior. The umbilical tubercles are less strong, but have a thorn-like shape and are elongated in the direction of the spire or the radius. There are unequal intermediate ribs, the numbers of which change during ontogeny from three to two or three between two main ribs. There are constrictions, and the secondary ribs bordering them at the posterior and anterior sides, sometimes bear umbilical and/or lateral tubercle-like swellings. On the venter all ribs become significantly stronger, form angular ventrolateral shoulders, and are sometimes slightly flattened along the mid-ventral line.

The suture line is of the *Cheloniceras*-type, with the second asymmetrically bifid saddle (L_1/L_2) and the lateral lobe (L) situated on the level of the lateral tubercles.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 711	30.3	10.0	16.0	12.5	7.9	33	53	41	1.3	34
282 708	46.8	16.5	24.2	18.1	12.0	35	52	39	1.4	38
282 709	48.0	18.2	26.5	17.4	11.5	38	55	36	1.6	37
282 710	69.1	22.0	33.7	26.9	17.7	32	49	39	1.2	27

Comparison – This species differs from *Cheloniceras crassum crassum* Spath, 1930b, in having coarser and unequal ribbing. Moreover, its tubercles are elongated in the direction of the spire, whereas in *Ch. crassum crassum* they have a rounded basis on the adult growth stage.

Distribution – Lower Aptian, Zones of *Deshayesites deshayesi* (Subzone of *Deshayesites grandis*) and *Tropaeum bowerbanki* of southern England; lower Aptian of Colombia.

Occurrence – Guane, lower Aptian.

Cheloniceras delagoense (Krenkel , 1910)

Pl. 2, fig. 2; Pl. 4, fig. 2.

1910 *Douvilleiceras delagoense* sp. nov., Krenkel, p. 147, pl. 17, figs. 6, 7.
1921 *Cheloniceras (Acanthohoplites?) delagoense* (Krenkel): Spath, p. 316, pl. 26, fig. 2.
1967 *Cheloniceras delagoense* (Krenkel): Wachendorf, p. 284, pl. 34, figs. 4, 6, 7; fig. 6.
1975 *Cheloniceras delagoense* (Krenkel): Förster, p. 194, pl. 9, fig. 2; fig. 54.

Lectotype – Aptian of Delagoa-Bai, Mozambic (Krenkel, 1910, p. 147, pl. 17, figs. 6, 7).

Material – Six specimens, RGM 282 652-282 657.

Description – Medium sized shells with inflated, semi-evolute whorls, which moderately increase in height. Whorl section wide-oval, almost subrectangular with the point of maximum thickness at the middle of the flanks. Venter rather narrow, in the early whorls convex, but on the last whorl more flattened and gradually passing down into rather high, slightly flattened flanks. Umbilicus is rather wide, rather shallow, step-like with a low, steep umbilical wall and a broadly rounded rim.

Sculpture consists of almost radial main and intermediate ribs. The main ones arise at the umbilical seam. In the lower part of the flanks they are narrow with crest-like relief. At the upper third of the flanks they bear small, rather sharp tubercles, which are elongated in the direction of the radius and from this point arises two almost equal branches. In most cases the intermediate non-tuberculate ribs originate near the umbilical margin; they are narrower and less strong than the main ribs. Between every two main ribs there are one or two intermediate ribs, but sometimes they are absent. All ribs cross the venter in a straight line, and become equally strong

and broad. Cross section of the ribs is sharply triangular; some ribs of large specimens are somewhat flattened. In the course of growth the point of bifurcation moves from the upper part of the flanks to the umbilical margin. Tubercles disappear at a diameter of about 17-24 mm. At about the middle of the last whorl bifurcation stops and on the last part of the whorl only distinct simple ribs are present, sometimes with short intermediate ribs in between them, which arise in the lower third or in the middle of the flanks.

The suture line (RGM 282 656) is of *Cheloniceras*-type with a high and broad bifid external saddle. The other saddles are markedly lower. The L/U_1 saddle is low, rather broad and almost symmetric. The lateral lobe is asymmetrically bifid (L_1L_2).

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 656	26.7	9.2	12.5	9.4	6.8	34	47	35	1.6	41
282 653	29.7	11.0	13.5	11.9	8.0	37	45	40	1.4	35
282 655	31.0	11.1	14.7	11.4	8.2	36	47	37	1.4	34
282 657	39.1	15.1	18.2	15.2	9.8	39	47	39	1.5	32
282 654	41.5	14.7	19.5	15.5	10.6	35	47	37	1.4	41
282 652	44.0	16.2	18.2	16.3	11.7	37	41	37	1.4	33

Comparison – The described species mostly resembles *Cheloniceras seminodosum* Sinzow, 1906, in general shell shape and sculpture, but differs from it in its narrower whorls, the smaller number of ribs and the weaker lateral tubercles, which in *Ch. delagoense* disappear earlier. In contrast to *Ch. minimum* Casey, 1961b, the described species is characterized by an oval whorl section, a narrower umbilicus and a smaller number of ribs.

Distribution – Upper part of lower Aptian and lower part(?) of middle Aptian of Mozambique; lower Aptian of Colombia.

Occurrence – Villa de Leyva, Guane , Sáchica, Socorro; lower Aptian.

***Cheloniceras quadrarium quadrarium* Casey, 1962**

Pl. 8, fig. 2; Pl. 9, fig. 1; Pl. 10, fig. 1.

1962 *Cheloniceras (Cheloniceras) quadrarium* sp. nov., Casey, p. 227, pl. 36, fig. 7; pl. 37, fig. 10; text-figs. 76, 77.

Holotype – British Geological Survey, Keyworth, Z2306, Hythe Beds, Jeal's Quarry, Seabrook, near Hythe, Kent, lower Aptian (Casey, 1962, p. 227, pl. 37, figs. 10a, b).

Material – Six specimens, RGM 282 758-282 763.

Description – Shell consists of very inflated, semi-evolute whorls moderately increasing in height. Whorl section wide-oval approaching an octagonal shape with the maximum thickness at the lower third of the flanks. Venter broad, flattened on the early whorls, but slightly convex on the later whorls. At first the transition from ven-

ter into flanks is gradual, but later rather abrupt. The sub-parallel flanks are rather high and flat. Umbilicus rather wide, step-like and of medium depth. In the early ontogenetic stage it has low umbilical walls, but later it has high and steep walls with a rounded rim.

Ornamentation consists of numerous, almost radial main and intermediate ribs. Main ribs arise on the umbilical rim or in the middle of the flanks, where they bear tubercle-like thickenings, which are elongated in the direction of the rib. At the ventro-lateral margin they make an angle and cross the venter along an almost straight line, occasionally making a mid-ventral depression. Some ribs split into two equal branches at the lateral thickenings. Intermediary ribs arise on the umbilical rim or slightly below the middle of the flanks. There are one to two intermediate ribs between every two main ones. They are non-tuberculate, but occasionally bear very weak thickenings, elongated in the direction of the ribs. From D = 45-60 mm the lateral thickenings become weaker. Simultaneously, the umbilical tubercles become stronger and are very prominent on the late whorls. From the umbilical tubercles arise one, but often two almost equal, ribs. Between most two main ribs there is one intermediate rib, which may be absent. On the venter all ribs are equal, and become broader and flatter.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 759	38.5	13.5	19.8	14.4	10.7	35	51	37	1.3	?
282 762	49.5	18.2	24.7	18.0	14.0	38	50	36	1.3	42
282 760	60.0	23.5	32.4	20.3	15.0	39	54	34	1.6	40
282 763	109.0	43.2	60.0	35.5	28.9	40	55	33	1.5	50

Comparison – The described subspecies differs from *Cheloniceras quadrarium dispansum* Casey, 1962, in having slightly higher and broader whorls, a narrower umbilicus, and less prominent lateral tubercles. In comparison with *Ch. seminodosum seminodosum* Sinzow, 1906, the described subspecies is characterized by narrower and less prominent tubercles on the late whorls. From *Ch. mackesoni mackesoni* Casey, 1962, it differs in having broader whorls, a smaller number of ribs and stronger umbilical tubercles.

Distribution – Lower Aptian, Zones of *Deshayesites deshayesi* (Subzone of *D. grandis*) and *Tropaeum bowerbanki* of southern England; lower Aptian of Colombia.

Occurrence – Sáchica, Guane; lower Aptian.

***Cheloniceras rectangulatum* sp. nov.**

Pl. 15, fig. 2.

Type specimens – Holotype, RGM 282 812; paratype, RGM 282 813.

Other specimens – One whorl fragment, RGM 282 814.

Type locality – Guane.

Type horizon – Lower Aptian.

Derivatio nominis – *Rectangulatus* (Latin), with right angles, referring to the almost rectangular whorl section.

Diagnosis – Shell consists of inflated, semi-evolute whorls with sub-rectangular cross section and moderately increasing in height. The coarse sculpture consists of main ribs, every two of which are separated by one intermediate rib. The main ribs bear radially elongated umbilical and thorn-like lateral tubercles; from the latter arise two, later three unequal branches. Intermediate ribs are rather weak, and bear lateral and umbilical tubercle-like thickenings. On the ventrolateral margin all ribs have a high relief, but they are flattened at mid-venter.

Description – Very inflated, semi-evolute whorls with sub-rectangular (costal section octagonal) cross section and moderately increasing in height. Venter broad and flattened passing gradually into rather high, almost flat, sub-parallel flanks with the maximum point of thickness at mid-flank. Umbilicus is rather wide, step-like, with high, steep walls and rounded rim.

The ornamentation consists of strong radial ribs. The main ribs (nine on the last whorl) bear two pairs of tubercles. The umbilical tubercles are situated on the umbilical margin, whereas the lateral ones are located a little above the middle of the flanks. Umbilical tubercles are rather weak and elongated in the direction of the radius. Lateral tubercles are much stronger and have a thorn-like internal cast. From them arise two uneven branches; the anterior branch is broader than the posterior one. Later the main ribs trifurcate. Umbilical tubercles generate only one rib. There is only one intermediate rib between every two main ribs. The former are weaker, but bear umbilical and lateral tubercle-like thickenings. All ribs make an angle at the ventrolateral shoulder and become elevated as they pass over the venter. On the ventrolateral margins there are weak tubercle-like elevations. With growth the tubercles become less pronounced and turn into tubercle-like thickenings, which are elongated in the direction of the ribs. On the venter all ribs are equally broad and they are more than twice as broad as the spaces between them.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 812	69.0	25.4	40.3	26.2	18.0	37	58	38	1.4	36
282 813	115.0	43.6	69.2	42.7	25.5	38	60	37	1.7	?
282 814	142.0	52.0	77.6	59.6	35.8	37	55	42	1.5	32

Comparison – The described new species differs from *Ch. cornuelianum*, which it resembles most, in having narrower whorls with rectangular cross section and a smaller number of ribs; it also differs in the mode of bifurcation of the main ribs. Unlike *Ch. crassum* Spath, 1930b, the new species is characterized by narrower whorls, and by having a sub-rectangular (costal section octagonal) cross section and a coarser sculpture. From *Ch. parinodum* Casey, 1961a, it differs in a smaller number of ribs, the presence of trifurcating ribs, in having a less coarse sculpture on the late whorls and

more even ribbing. The new species differs from *Ch. kiliani* Koenen, 1902, in having thicker whorls, trifurcate main ribs and a smaller number of ribs.

Occurrence – Guane, Galan; lower Aptian.

***Cheloniceras guanense* sp. nov.**
Pl. 28, fig. 1; Pl. 29, fig. 1.

Type specimens – Holotype, RGM 282 698; paratypes, RGM 282 695-282 697.

Type locality – Guane, Colombia.

Type horizon – Lower Aptian.

Derivatio nominis – The species is named after the village Guane (Colombia) near the type locality.

Diagnosis – Large, broadly inflated, evolute whorls, with an oval cross section and a wide umbilicus. The sculpture is coarse and consists of strong radial ribs. The main ribs bear weak, thorn-like umbilical tubercles and strong lateral tubercles. From the latter spring two uneven branches. There are one to three intermediate ribs between every two main ones. Of these the most adapical one is stronger than the others, and bears an umbilical and a lateral tubercle-like thickening. On the ventrolateral margin the ribs make an angle and elevate.

Description – The whorls are inflated, evolute and slightly increasing in height. The whorl section is wide-oval (costal section octagonal), markedly broader than high with the point of maximum thickness in the lower part of the flanks. The venter is broadly rounded and passes gradually into moderately convex, low flanks. The umbilicus is rather wide, step-like, with a low, gently sloping wall and a rounded rim.

The ornamentation consists of strong radial ribs. The main ribs (eight to nine on the last whorl) are crest-like, and bear rather weak umbilical and strong lateral tubercles. Up to the first half of the last whorl, umbilical thickenings are present which are radially elongated, but later they acquire a rather weak, pointed, thorn-like shape. The internal casts of the lateral tubercles have a thorn-like shape, but on the living chamber they gradually diminish in prominence. From the lateral tubercles arise two unequal branches; the anterior branch is stronger. On the early whorls there are two, rarely three intermediate ribs between two main ribs, but on the last whorl there is only one. The intermediate rib directly adoral of the main rib is stronger than the other ones, and bears an umbilical and a lateral tubercle-like thickening, which is elongated in the direction of the rib. On the ventrolateral margins the ribs make an angle and are elevated between these angles. In the middle of the venter the ribs are more or less depressed, thinner and curved backward. On the living chamber there is no bifurcation and all ribs become equal. The cross section of the ribs is sub-rectangular with a rounded, slightly flattened surface, a steep anterior wall and a gently sloping posterior wall.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 698	121.0	35.5	57.0	50.9	30.2	29	47	42	1.2	?
282 698	76.6	25.5	38.4	30.0	19.4	33	50	39	1.3	28
282 695	81.7	24.0	35.7	36.5	19.6	29	44	45	1.2	34
282 696	97.3	29.0	49.2	41.4	22.8	30	51	43	1.3	36
282 697	105.5	30.8	49.7	45.8	26.9	29	47	43	1.1	33

Comparison – The new species mostly resembles species of the group *Ch. parinodum - Ch. disparile*. It differs from *Ch. parinodum* Casey, 1961a, in having wide-oval, lower and narrower whorls, a somewhat narrow umbilicus, a smaller number of ribs and in showing an early disappearance of the lateral tubercles. From *Ch. disparile* Casey, 1961b, it differs in having narrower and lower whorls, a wider umbilicus, a coarser sculpture and a smaller number of ribs. In contrast to *Ch. cornuelianum* the new species is characterized by lower, narrower and more evolute whorls, a smaller number of ribs, a coarser sculpture and a sharply expressed, uneven ribbing.

Occurrence – Guane, Galan; lower Aptian.

***Cheloniceras* sp. A.**

Pl. 30; Pl. 31, fig. 1; Pl. 32, fig. 1.

Material – Three specimens, RGM 282 755-282 757.

Description – The shell consists of very inflated, semi-evolute whorls, which moderately increase in height. At the end of the last whorl the venter becomes very broadly rounded and the octagonal whorl section wide-oval, almost sub-rectangular. The flanks are low, moderately convex with a slight flattening in the middle and the point of maximum thickness at the umbilical margin. The ventrolateral margin is rounded. The umbilicus is rather wide, step-like and moderately deep. The umbilical wall is steep and passes gradually into the flanks.

The ornamentation consists of strong, generally simple, slanting ribs, which slightly differ in prominence. The main ribs arise on the umbilical wall, curve backward with the convex side forward at the umbilical rim, and pass over the flanks in a retroverse direction making an angle of 35° with the radius. They bear rather weak, almost equal umbilical and lateral tubercles. On the internal cast the tubercles have a triangular cross section. In a very few cases two almost equal ribs arise from the umbilical tubercles. Between every two main ribs there is only one rather weak, short intermediary rib. In the upper part of the flanks they occasionaly bear small thickenings, which are elongated in the direction of the ribs. All ribs have the same relief on the venter, with thicknesses that are greater than the space between them. On the middle of the venter they are slightly curved backward, flattened and depressed, so that the ventral margins are relatively more elevated. In the second half of the last whorl the number of ribs significantly decreases, they become distant and two to three times thicker. Moreover, the lateral and umbilical tubercles become very strong and blunt; they keep their triangular cross section. Nevertheless, the umbilical tubercles still remain weaker than the lateral ones.

Measurements – RGM 353 810: D = 158.0; H = 60.5; W = 89.8; U = 57.8; h = 40.5; H:D = 38; W:D = 57; U:D = 37; H:h = 1.5; ribs = 36. RGM 353 810: D = 200.0; H = 79.0; W = 92.0; U = 71.5; h = 55.0; H:D = 39; W:D = 46; U:D = 36; H:h = 1.4; ribs = 47.

Remarks and comparison – The described ammonite taxon clearly differs from all known representatives of the genera *Prochelonicera*s Spath, *Cheloniceras* Hyatt and *Epichelonicera*s Casey in having strongly rursiradiate ribs on the flanks, a narrow depression along the middle of the venter and weak elevations on the ventrolateral margins. The character of the ornamentation on the last whorl (simple ribs with two distantly disposed pairs of tubercles) suggests that it most probably belongs to *Cheloniceras*, but owing to inadequate preservation of the inner whorls it is impossible to make a precise identification.

Occurrence – Guane, Galan; lower Aptian.

***Cheloniceras* sp. B**

Pl. 33; Pl. 34, fig. 1.

Material – One specimen, RGM 353 810.

Description – A shell with very inflated, semi-evolute whorls, which rapidly increase in height. The whorl section at the beginning of the last whorl is sub-rectangular, but later it becomes sub-trapezoidal; the point of greatest thickness migrates in the course of growth from the upper part of the flanks to the umbilical margin. The venter is broad, slightly flattened and passes gradually into rather high, moderately convex, sub-parallel flanks. The umbilicus is moderately wide and deep, with a steep, rather low wall and a rounded umbilical margin.

The ornamentation is not homogeneous, with numerous, rursiradiate ribs of variable prominence. The main ribs arise at the umbilical seam, increase rapidly in prominence, and incline strongly backward on the umbilical margin and on the flanks. They bear two pairs of tubercles. The first pair is situated on the umbilical margin and is elongated in the direction of the ribs. The second pair is developed at the middle of the flanks. Judging from the shape of their bases they presumably have a conical shape. The lateral and umbilical tubercles have a variable prominence. The rather thick main ribs bear stronger tubercles. From the umbilical tubercles (rarely from the lateral ones) the main ribs are forking into two or tree unequal branches. In most cases the anterior branch is stronger than the other ones. At the middle of the flanks there are occasionally tubercle-like thickenings, which are elongated in the direction of the ribs. The non-tuberculate intermediate ribs alternate with the main ribs. On the upper part of the flanks all ribs become broad; they are slightly curved forward on the venter, where the thickness of the ribs is equal or somewhat less than the space between them. The imperfectly seen suture line is of the *Cheloniceras*-type, with large, bifid saddles (E/L) and an asymmetrically bifid lateral lobe (L_1/L_2).

Measurements – D = 191.0; H = 83.0; W = 107.0; U = 63.5; h = 49.2; H:D = 43; W:D = 56; U:D = 33; H:h = 1.7; ribs = 53.

Remarks and comparison – By the aspect of its suture line, general shell shape and sculpture, the described specimen belongs to the subfamily Cheloniceratinae. The weakness of its tubercles (particularly the umbilical tubercles) and the bifurcation of its main ribs indicate that it belongs to *Cheloniceras*. However, it clearly differs from all other representatives of this genus in having unequal ribbing. From *Ch. mackesoni* Casey, 1962, which it most closely resembles, it differs in having a smaller number of ribs and thicker whorls, whereas from *Ch. meyendorffi* (d'Orbigny, 1845) it differs in having narrower whorls and stronger umbilical tubercles.

Occurrence – Guane; lower? Aptian.

***Cheloniceras* sp. C**

Pl. 35, fig. 1; Pl. 36, fig. 1.

Material – One specimen, RGM 282 816, and one fragment, RGM 282 815.

Description – The whorls are inflated and evolute, and increase moderately in height. The whorl section is wide-oval, almost sub-rectangular, with the point of maximum thickness in the lower part of the flanks. The venter is broadly rounded and passes gradually into moderately convex, almost parallel flanks. The umbilicus is rather wide, not deep, step-like, with low and steep walls, and a well-rounded margin.

The sculpture is coarse, with unequal ribbing. There are ten strong tuberculate main ribs on the penultimate whorl. They arise at the umbilical seam, and rapidly become strong and crest-like on the flanks, and bear lateral tubercles. The bases of the tubercles are elongated in a radial direction. From the lateral tubercles the main ribs fork into two uneven branches; the anterior branch is more elevated and broader than the posterior one. The number of intermediate ribs between the main ribs is variable. There are two to four uneven, simple intermediate ribs between two main ribs. The first intermediate rib adorally of a main rib is stronger and longer than the other intermediate ribs, and bears an umbilical and a lateral tubercle. At the end of the last whorl the tubercles become weaker and the umbilical tubercles become the points of bifurcation. On the second half of the last whorl the lateral tubercles disappear and the ribs are simple with rather weak umbilical swellings. In the upper part of the flanks and on the venter all ribs are very strong, equal and separated by interspaces of the same breadth as the ribs on the steinkern.

Measurements – RGM 282 816: D = 116.0; H = 37.4; W = 55.5; U = 47.0; h = 27.9; H:D = 32; W:D = 48; U:D = 41; H:h = 1.3; ribs = 38.

Comparison – In contrast to *Cheloniceras kiliani* Koenen, 1902, the described specimen has a somewhat wider umbilicus, lower whorls, a greater number of intermediate ribs and more clearly expressed, uneven ribbing. From *Ch. quadrarium* Casey, 1962, it differs in having lower whorls, a wider umbilicus and a smaller number of ribs. From *Ch. cornuelianum* (d'Orbigny, 1841) it differs in having a smaller number of the ribs, a wider umbilicus and uneven ribbing.

Occurrence – Sáchica; lower Aptian.

Genus *Epicheloniceras* Casey, 1954

pars 1952 *Cheloniceras* Basse, p. 655.
1954 *Cheloniceras (Epicheloniceras*) Casey, p. 113.
1957 *Cheloniceras (Epicheloniceras*) Arkell *et al*., p. L385.
1958 *Epicheloniceras* Luppov, p. 117.
1960 *Epicheloniceras* Kudrjavtsev, p. 338.
1962 *Cheloniceras (Epicheloniceras*) Casey, pp. 235, 236.
1967 *Cheloniceras (Epicheloniceras*) Dimitrova, p. 173.
1971 *Epicheloniceras* Kvantaliani, p. 107.
1996 *Cheloniceras (Epicheloniceras*) Wright *et al*., p. L269.

Type species – *Douvilleiceras tschernyschewi* Sinzow, 1906, pl. 2, fig. 11; middle Aptian, Mangyshlak.

Diagnosis – The whorls are very inflated, semi-evolute, moderately to rapidly increasing in height with a wide-oval cross section (costal section octagonal). The venter is broad, rounded or flattened. The flanks are convex or slightly flattened. The umbilicus is rather wide, deep and step-like. The ribs are slightly inclined forward. The main ribs are strong, have three pairs of tubercles and are strongly depressed in the middle of the venter. Two unequal branches arise from the lateral tubercles. The anterior branch is much weaker than the posterior one. There are thin intermediate ribs, which sometimes bear rather weak ventrolateral tubercles. Suture line with an asymmetric lateral lobe; the rather high and wide secondary saddle is divided into two unequal, almost independent branches. The external asymmetric saddle is the largest.

Comparison – *Epicheloniceras* Casey differs from *Cheloniceras* Hyatt in having three pairs of tubercles, a weak anterior branch of the main rib and a rather pronounced mid-ventral depression of the ribs.

Distribution – Middle Aptian of southern England, north Germany, France, Spain, Austria, Bulgaria, Switzerland, north Caucasus, Daghestan, Georgia, Azerbaijan, Armenia, Mangyshlak (Kazakhstan), Turkmenistan, Volga region (Povoljie), eastern and southern Africa, Madagascar, Iran, California, Mexico and Colombia.

Epicheloniceras tschernyschewi (Sinzow, 1906)

P. 32, fig. 2; Pl. 41, fig. 1; Pl. 42, fig. 1; Pl. 43, fig. 1; Pl. 44, fig. 1.

1906 *Douvilleiceras Tschernyschewi* Sinzow, p. 182, pl. 2, fig. 11, 12; pl. 3, figs. 2-7.
1962 *Cheloniceras (Epicheloniceras) tschernyschewi* (Sinzow): Casey, p. 236, pl. 38I, fig. 6; pl. 39, figs. 6a, b, 7a, b; text-fig. 82 (see synonymy).
1964 *Cheloniceras tschernyschewi* (Sinzow): Kemper, p. 49, pl. 2, fig. 5; *non* pl. 15, fig. 3.
1968 *Epicheloniceras tscheryschewi* (Sinzow): Aliev, p. 50, figs. 8, 9.
1989 *Cheloniceras tschernyschewi* (Sinzow): Föllmi, p. 134, pl. 6, fig. 16.

Lectotype – The specimen figured by Sinzow (1906, pl. 2, fig. 11a-c) from the middle Aptian of Kysil-Kaspak, Mangyshlak (Kazakhstan), selected by Casey (1954, p. 113).

Material – Three complete specimens, RGM 283 036, 282 444, 282 446, and three incomplete specimens, RGM 282 445, 282 447, 282 448.

Description – Shell consists of strongly inflated, semi-evolute whorls which moderately increase in height. Whorl section wide and oval, almost trapezoidal (costal section octagonal) with its point of maximum thickness at the umbilical rim. Venter broadly rounded and sometimes slightly flattened along the medial line passing imperceptibly into rather low, convex flanks. The width of the umbilicus varies markedly; it is step-like, deep and bounded by high, steep walls. The umbilical margin is broadly rounded.

The ornamentation consists of numerous strong main and intermediate ribs. The main ribs originate near the umbilical seam, are inclined backward on the umbilical margin, and pass straight over the flanks and venter, rarely with a slight forward inclination; they are thickest on the venter. There are three pairs of tubercles; umbilical, lateral and external. The umbilical tubercles are weak and situated at the umbilical rim. In the early growth stage they are mere thickenings, elongated in the direction of the ribs, but later they develop into rather high and sharp tubercles. The strongest second pair of tubercles is situated in the middle of the flanks; they are long, thorn-like or flattened in the direction of the spire, but on the steinkern they have a cone-like or mace-like shape. The third pair of tubercles is situated on the ventrolateral area. From the lateral tubercles arise two uneven branches; the anterior branch is stronger than the posterior one and somewhat curved forward. Between the second and third tubercles the posterior tuberculated branches are strongly flattened. The non-tuberculate intermediate ribs are equal to the anterior branch of the main ribs; there are one to three, rarely four, intermediate ribs between two main ones. At D = 55-65 mm the external tubercles become less prominent and tend to disappear. At D = 70-90 mm the lateral tubercles disappear. On the last whorl the sculpture consists of numerous ribs which are inclined backward on the umbilical wall and on the flanks. On the venter they are markedly broad and flattened. Here, all ribs are equal and they are twice as wide as the interspaces between them.

Measurements – Key: * = half whorl

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
283 036	130.0	51.5	80.0	39.2	36.6	40	62	30	1.4	40
282 445	119.0	43.2	66.0	41.5	30.9	36	55	35	1.4	48
282 448	95.2	36.9	55.2	33.4	27.1	39	58	35	1.4	23*
282 446	51.2	21.4	33.4	15.5	15.4	42	65	30	1.4	40
282 444	45.6	18.3	27.4	14.4	12.2	40	60	32	1.5	38

Variability – One group of specimens (RGM 283 036, 282 446, 282 444) differs from the others in having fewer ribs, a coarser sculpture, somewhat broader whorls and a narrower umbilicus. Moreover, the lateral tubercles of the two opposite flanks of specimens RGM 282 448 and 282 446 are disposed in an asymmetrically zigzag manner, through which the branches of the main ribs of one flank pass over the venter to become simple and non-tuberculated ribs on the opposite flank.

Comparison – The described species differs from *Epicheloniceras subnodosocostatum* Sinzow, 1906, in having higher and broader whorls, and more numerous ribs, espe-

cially on the mature growth stage. The number of intermediate ribs between two main ones in *E. tshernyschewi* may attain four to five, whereas in *E. subnodosocostatum* there is only one intermediate, sometimes none. In contrast to *E. martinioides* Casey, 1962, the described species is characterized by a greater inflation of the last whorls, a greater number of intermediate ribs between every pair of main ribs, and by the absence of a ventral flattening on the intermediate ribs and the anterior branches of the main ribs. The differences with *E. claudii* Casey, 1962, are the more inflated wide-oval whorls, the later disappearance of the lateral tubercles and the more numerous ribs (especially the intermediate ones) in the mature growth stage.

Distribution – Middle Aptian of southern England, northwestern Germany, north Caucasus, Mangyshlak (Kazakhstan); middle Aptian, Zone of *Epicheloniceras subnodosocostatum* of Daghestan, southeast Caucasus, Turkmenistan; middle Aptian of Colombia.

Occurrence – Guane, Sáchica, Villa de Leyva, Galan; middle Aptian.

Epicheloniceras buxtorfi (Jacob & Tobler, 1906)

P. 34, fig. 2; Pl. 40, fig. 3.

1906 *Douvilleiceras Buxtorfi* Jacob & Tobler, p. 15, pl. 1, figs. 9-11.
1915 *Douvilleiceras Buxtorfi* Jacob & Tobler: Nikschitch, p. 45, pl. 6, figs. 8-10.
non 1925 *Douvilleiceras cf. Buxtorfi* Jacob & Tobler: Burckhardt, p. 35, pl. 7, figs. 22, 23.
1962 *Cheloniceras (Epicheloniceras) buxtorfi* (Jacob & Tobler): Casey, p. 253, pl. 39, fig. 8; text-fig. 88l-p.
1971 *Cheloniceras (Epicheloniceras) buxtorfi* (Jacob & Tobler): Kemper, p. 367, pl. 27, fig. 1.

Lectotype – The specimen described and figured by Jacob & Tobler (1906, p. 15, pl. 1, figs. 9a, b). Middle Aptian of Luitere Zug, Switzerland.

Material – Three specimens, RGM 282 496-282 498.

Description – The whorls are inflated, moderately increasing in height and semi-evolute. The cross section of the inner whorls is wide-oval, but at the end of the last whorl it is sub-rectangular, with the point of maximum thickness in the lower part of the flanks. The venter of the inner whorls is broad and at the end of the last whorl it is slightly flattened in the middle. The flanks of the inner whorls are convex, but on the last whorl they become flat and parallel. The umbilicus is rather wide and deep, step-like and bounded by a low, rather steep wall. The umbilical and ventrolateral margins are rounded.

The sculpture of the inner whorls is weak, and consists of an alternation of main and intermediate ribs. The main ribs are thicker and on the flanks they bear weak umbilical crest-like thickenings, elongated in the direction of the ribs. In the upper part of the flanks there are sharp, conical tubercles. Here the main rib sometimes bifurcates into two unequal branches; the posterior branch is stronger than the anterior one. On both margins of the venter the posterior branch, but also the simple main ribs, bear weak thickenings, elongated in the direction of the ribs. There is only one

non-tuberculate intermediate rib, rarely two, between every two main ribs. They are weak and in some cases hardly developed. On the venter, all ribs are slightly curved forwards. Up to the middle part of the last whorl the sculpture gradually strengthens and the lateral tubercles migrate down to the middle of the flanks. At the end of the last whorl there are only single, simple, radial ribs, becoming crested on the venter.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 498	45.6	16.2	23.5	15.7	11.0	36	52	34	1.5	26
282 497	40.8	14.9	20.4	14.5	11.0	37	50	36	1.4	29
282 496	30.4	11.4	16.1	10.3	8.9	38	52	34	1.3	32

Comparison – The described species differs from *Epicheloniceras subnodosocostatum* Sinzow, 1906, in having a sub-rectangular whorl section, a weaker sculpture, a smaller number of secondary ribs and a smaller number of forking main ribs, which become crested on the venter. In contrast to *E. martinii* (d'Orbigny, 1840), it is characterized by lower and narrower whorls, which have a sub-rectangular cross section, and by the presence of non-differentiated and non-tuberculated crest-like ribs in the mature growth stage. The differences with *E. pusillum* Sinzow, 1906, are the thinner whorls, a coarser sculpture, fewer ribs and weaker external tubercles on the inner whorls.

Distribution – Middle Aptian of Switzerland; middle Aptian, Zone of *Epicheloniceras subnodosocostatum* of north Caucasus (Russia), Turkmenistan; middle Aptian, Zone of *Epicheloniceras martinioides* (Subzone of *E. buxtorfi*) of southern England; middle Aptian of Colombia.

Occurrence – Sáchica, Villa de Leyva, Chipatá Viejo; middle Aptian.

***Epicheloniceras stoliczkanum* (Gabb, 1869)**

Pl. 45, fig. 1; Pl. 46, fig. 1; Pl. 47, fig. 1; Pl. 48, fig. 1.

1869 *Ammonites Stoliczkanus* Gabb, p. 135, pl. 23, figs. 16, 16a.
? 1928 *Cheloniceras Stoliczkanum* (Gabb): Basse, p. 141, pl. 8, fig. 2; text-fig. 18.
1938 *Cheloniceras stoliczkanum* (Gabb): Anderson, p. 176, pl. 47, fig. 2.

Holotype – The specimen figured by Gabb, 1869; Museum of the Academy of Natural Sciences of Philadelphia (see also Anderson, 1938). According to Gabb, the holotype originated from the 'Shasta Group', Cottonwood Creek, Shasta County, California. According to Anderson (1938, p. 176), however, the holotype probably originated "from the *Cheloniceras bradleyi* Zone, upper part of Horsetown Group; Hulen Creek, Shasta County."

Material – Four specimens, RGM 282 509-282 512.

Description – The whorls are moderately to strongly inflated, moderately increasing in height and semi-evolute. The cross section of the early whorls is sub-rectangular,

but later it becomes sub-trapezoidal, with the point of maximum thickness in the lower part of the flanks near the umbilical margin. The costal section is octagonal. The venter of the early whorls is broadly rounded, but later it becomes slightly flattened. The ventral area gradually passes into the moderately convex flanks, which are slightly flattened in the lower part. The umbilicus is rather wide, moderately deep, step-like with a rather high, steep wall and a rounded umbilical rim.

The sculpture is coarse. In most cases it consists of an alternation of the strong, simple tuberculated main ribs and intermediate ribs, which are sometimes also tuberculate. On the umbilical wall the main ribs are very thin and inclined backward. On the umbilical margin, however, they become thick, and on the flanks they are still stronger, straight and inclined backward, but from the upper third of the flanks they pass straight over the venter or are slightly curved forward. On the lower part of the flanks the main ribs are rather low and broad, but on the upper third part of the flanks the ribs become stronger and crest-like, especially on the ventro-lateral margins. In the middle of the ventral side the ribs are markedly depressed forming a depression along the median plane. This depression is bounded by elevated, crest-like thickenings, which are elongated in the direction of the ribs. Besides, on the umbilical rim are rather strong, tubercle-like thickenings, elongated in the direction of the ribs, and in the middle of the flanks there are very prominent, sharp, conical shape lateral tubercles. Sometimes there is one (rarely two), rather weak intermediate rib between two main ones. In most cases they appear in a late growth stage, and have different lengths and breadths. The thinner ribs are without tubercles, but the stronger ones bear small weak, sharp, triangular lateral tubercles and, in a few cases, umbilical thickenings, elongated in the direction of the ribs. On the venter at the end of the last whorl all ribs are equally thick and separated by narrower interspaces. In consequence of diminution of the external tubercle-like elevations in the interval between D = 90 and D = 110 mm, the ventral depression gradually disappears, and the ribs become broad and flattened. The umbilical tubercles of the main ribs, however, become stronger and in some cases give rise to two rather thin branches.

Measurements – Key: * = on the last half whorl.

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 512	112.0	38.4	52.4	43.0	28.0	34	47	38	1.4	35
282 511	165.0	62.0	87.4	57.3	43.0	38	53	35	1.4	25*
282 511	70.0	30.0	41.0	25.6	-	43	59	37	-	29
282 510	155.0	58.5	74.0	52.7	42.5	38.	48	34	1.4	25*

Comparison – The described species differs from *E. bradleyi* Anderson, 1938, in having narrower whorls, a coarser sculpture and a smaller number of ribs. In contrast to *E. santafecinum* Burckhardt (*in* Douvillé, 1906), the described species is characterized by thicker whorls, a narrower umbilicus, a coarser sculpture and the presence of intermediate ribs. From *E. scebelii* Tavani, 1949, it differs in having slightly more inflated and thinner whorls, a less coarse sculpture on the early whorls, more numerous ribs and a smaller number of secondary ribs in late growth stages.

Distribution – Middle Aptian (Zone of *E. bradleyi*?) of California; middle Aptian of Colombia.

Ocurrence – Guane; middle Aptian.

Epicheloniceras aff. *stoliczkanum* (Gabb, 1869)

Pl. 51.

Material – Three specimens, RGM 283 027-283 029.

Description – The shell consists of inflated, semi-evolute whorls which moderately increase in height. The whorl section is wide and oval, almost sub-rectangular, with the point of maximum thickness in the lower part of the flanks. The venter is broadly rounded, with a slight flattening at mid-venter. The transition into the flanks is gradual. The flanks are rather high, moderately convex, slightly flattened in their lower part. The umbilicus is rather wide, moderately deep, step-like with a rather steep wall and a rounded umbilical rim.

The ornamentation consists of strong, simple, tuberculate, almost radial main and intermediate ribs. The main ribs arise at the umbilical seam; on the umbilical wall they are rather broad and elevated. They pass in a straight line over the flanks and become thicker (twice as thick as the interspaces). These ribs bear rather large umbilical thickenings, and strong lateral tubercles with a rounded top (on the steinkern) and their bases elongated in the direction of the ribs. On the venter a third pair of rather strong, sharp tubercles are situated with their bases elongated in the direction of the radius. At the beginning of the last whorl they are as strong as the lateral tubercles, but later they dwindle down into thickenings, elongated in the direction of the ribs. On the venter between these thickenings the ribs are significantly flattened. On the inner whorls the number of intermediate ribs between every two main ribs is variable, but on the last whorl it is mostly one. They arise at the umbilical seam or umbilical rim, and on the flanks they are thinner than the main ribs. On the venter, however, they are equal to the main ribs and bear one pair of tubercles. Besides, some of the intermediate ribs also bear lateral thickenings, elongated in the direction of the ribs. At the end of the last whorl the ribs are very strong, elevated and thick. The lateral and external tubercles gradually diminish, but the umbilical ones become larger and blunt.

Measurements – RGM 383 029: D = 98.0; H = 36.0; W = 48.0; U = 36.4; h = 24.0; H:D = 37; W:D = 50; U:D = 37; H:h = 1.4; ribs = 34. RGM 283 027: D = 81.6; H = 27.8; W = 40.1; U = 31.3; h = 20.0; H:D = 34; W:D = 49; U:D = 38; H:h = 1.4; ribs = 30.

Comparison – These specimens differ from *E. stoliczkanum* (Gabb) in having lower whorls, a slightly wider umbilicus and peculiarities of ribbing, *viz.* the almost regular presence of one intermediate rib between every two main ribs, and the intermediate and main ribs being equal on the venter where the intermediate ribs also bear tubercles, whereas lateral tubercles are totally absent. The intermediate ribs of *E. stoliczkanum* totally lack external tubercles, but bear lateral tubercles. As to whorl shape and character of sculpture, the described specimens resemble *E.* aff. *santafecinum*, but

differ from it in having a coarser sculpture, thicker ribs, more prominent umbilical and lateral tubercles, and in having external tubercles on the intermediate ribs. From *E. camachoi* Etayo-Serna, 1979, it differs in having more depressed and thinner whorls, and in less prominent umbilical and lateral tubercles.

Occurrence – Sáchica, Guane; middle Aptian.

Epicheloniceras santafecinum (Burckhardt, 1925)

Pl. 50, fig. 1.

pars 1906 *Douvilleiceras Stoliczkanum*: Douvillé, p. 145, pl. 1, fig. 2, 2a, *non* fig. 1, 1a.
1925 *Douvilleiceras santafecinum* nom. nov. Burckhardt, p. 26.
1928 *Cheloniceras Boulei* Basse, p. 139, pl. 8, fig. 4.
1961b *Eodouvilleiceras santafecinum* (Burckhardt): Casey, p. 191 (footnote).

Holotype – The specimen figured by Douvillé (1906, p. 145, pl. 1, fig. 2, 2a). Stratigraphic position unknown. Colombia, Bogotá, Santa Fé.

Material – One specimen, RGM 282 513.

Description – Large shell consisting of inflated evolute whorls, which moderately increase in height. The whorl section is wide-oval, almost rectangular (costal section octagonal) with the point of maximum thickness near the umbilical rim. The venter is broad, moderately convex, with a slight flattening in the middle. It gradually passes into rather high, slightly flattened, almost parallel flanks. The umbilicus is rather wide with a gently sloping wall and a rounded umbilical margin.

The sculpture consists of rather strong, simple, tuberculate ribs. They arise at the umbilical seam and are slightly inclined backward on the umbilical wall. Up to the middle of the flanks they are straight, rather weak, crest-like, with trapezoidal cross-section. In the upper third part of the flanks they become markedly stronger, elevated and slightly curved forward. Their cross section here is sub-rectangular. They pass straight over the venter with a saddle-like flattening in the middle. All ribs are regularly disposed and the interspaces between them slightly exceed their thickness. On the umbilical rim they bear sharp tubercle-like elevations, elongated in the direction of the radius. Just above the middle of the flanks they bear moderately high tubercles of triangular shape, but at the margins of the venter there are elongated, tubercle-like thickenings. On the last whorl the sculpture gradually becomes stronger; the ribs are thick with large tubercles, especially the umbilical tubercles. On the penultimate and last whorl there are no intermediate or forking ribs.

Measurements – RGM 282 513: D = 101.7; H = 35.3; W = 46.3; U = 41.6; h = 22.6; H:D = 35; W:D = 46; U:D = 41; H:h = 1.6; ribs = 36. RGM 282 513: D = 74.0; H = 25.0; W = 34.6; U = 30.6; h = 16.5; H:D = 34; W:D = 47; U:D = 41; H:h = 1.5; ribs = 38.

Comparison and remarks – Burckhardt (1925, p. 26) included the specimen noted by Douvillé (1906, pl. 1, figs. 2, 2a) as *D. stoliczkanum* in *Douvilleiceras* as *Douvilleiceras*

santafecinum nom. nov. Basse (1928) described one large, insufficiently preserved specimen from Leyva (Colombia) as a new species, *Cheloniceras boulei*, including the above noted specimen of Douvillé in synonymy. There are appreciable similarities between these two specimens; both are characterized by similar simple, tuberculate ribs and the absence of intermediate ribs. Therefore, the species name *Cheloniceras boulei* Basse has to be regarded as invalid. Casey (1961b, p. 191) included *E. santafecinum* Burckhardt in *Eodouvillericeras* Casey; however, this species lacks a fourth pair of tubercles, which is diagnostic for *Eodouvilleiceras.*

The described species differs from many representatives of *Cheloniceras* Hyatt and *Epicheloniceras* Casey in its wide umbilicus, the presence of simple, non-forking ribs and the absence of intermediate ribs in the adult growth stage. However, it should be noted that the specimen described here and the one described by Douvillé (1906) are characterized by the occasional presence of one intermediate rib between two main ribs.

The specimen described here mainly differs from *E. bambucaense* Etayo-Serna *et al.*, 1994, in the character of its ribbing, the smaller number of simple ribs, the presence of a depression at mid-venter and the absence of secondary ribs in the late growth stage. In contrast to *Eodouvilleiceras?* n. sp. aff. *santafecinum* (Etayo-Serna *et al.*, 1994), the described species is characterized by the absence of intermediate ribs, a sub-rectangular whorl section, and stronger umbilical and lateral tubercles (in *E.*? n. sp. aff. *santafecinum* these diminish very rapidly at the end of the last whorl). From *E. stoliczkanum* (Gabb), it differs in the lower whorls, the wider umbilicus, the absence of intermediate ribs and the weaker tubercles in late growth stages.

Distribution – Middle Aptian of Colombia.

Occurrence – Guane, middle Aptian.

***Epicheloniceras* aff. *santafecinum* (Burckhardt, 1925)**
Pl. 42, fig. 2; Pl. 43, fig. 2; Pl. 46, fig. 2; Pl. 47, fig. 2; Pl. 52.

Material – Sixty nine specimens, RGM 282 514-282 582.

Description – The whorls are inflated, moderately increasing in height and semi-evolute or evolute. The cross section of the early whorls is wide and oval; later it becomes sub-rectangular, with the point of maximum thickness at the lower third part of the flanks. The costal section is octagonal. The venter is broadly rounded; on the early growth stage it is convex, but later it becomes flattened in the middle of the venter. The ventrolateral margins are rounded. The flanks of the early whorls are low, convex, but with growth they become rather high, flattened and almost parallel. The umbilicus is rather wide, moderately deep, step-like, but with growth the umbilical wall sometimes becomes gently sloping. The umbilical rim is rounded.

The ornamentation is variable. It is characterized by the frequent presence of one intermediate rib between every two main ribs. On the early growth stage the ribs are in most cases radial, but later they become inclined backward on the umbilical wall, straight on the lower part of the flanks and slightly curved forward on the upper part of the flanks. In most cases the main ribs are simple. They arise on the umbilical rim,

becoming low, crest-like on the flanks, and become markedly thick on the venter. In the early growth stage (up to D = 15-25 mm) they bear three pairs of weak tubercles; umbilical, lateral and ventrolateral. The umbilical tubercles have the shape of weak tubercle-like thickenings, elongated in the direction of the ribs; sometimes they are totally absent. The lateral tubercles are located at the upper third of the flanks; they are strong, sharp and have a triangular shape. On the external margins there is a third row of weak tubercles. These elevations move in the course of growth to the middle of the flanks, and gradually become sharp and thorn-like. The third pairs of tubercles situated on the ventral margins are elongated in the direction of the ribs. At about D = 25-35 mm they become reduced. On the venter the main ribs make an angle and are lowered in the middle. On the early whorls the non-tuberculate intermediate ribs are markedly thinner than the main ones. There are one to two, rarely three intermediate ribs between two main ones, but later there is only one between two main ribs. On the venter the intermediate ribs become stronger and, like the main ribs, are depressed in the middle. At the end of the last whorl the tubercles (especially the lateral tubercles) become larger and in some specimens there are only strong, distant, main ribs with three pairs of large tubercles.

Measurements –

Morph-A

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 564	86.6	30.7	41.8	32.5	20.5	35	48	38	1.5	34
282 535	73.5	26.9	36.0	28.2	18.0	37	49	38	1.5	35
282 548	70.2	23.8	33.3	28.6	15.5	34	47	41	1.5	40
282 565	56.5	18.1	24.4	24.0	13.6	32	43	42	1.3	35
282 524	54.6	18.8	25.7	21.5	13.6	34	47	39	1.4	36
282 562	48.0	16.8	23.0	19.7	11.9	35	48	41	1.4	40

Morph-B

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 575	74.4	24.2	34.5	30.9	17.1	33	46	42	1.4	36
282 574	63.4	21.3	29.4	25.3	15.3	34	46	40	1.4	28
282 572	52.3	19.5	26.5	19.0	13.4	37	51	36	1.5	26
282 580	48.6	15.9	24.2	19.5	12.2	33	50	40	1.3	32
282 571	44.3	16.0	23.0	16.8	12.0	36	52	38	1.3	25
282 579	43.0	14.0	22.3	17.0	10.0	33	52	40	1.4	31

Remarks – Two general groups can be distinguished among the very numerous specimens here identified as *Epicheloniceras* aff. *santafecinum* Burckhardt.

1) Morph-A (Pl. 42, fig. 2; Pl. 46, fig. 2; Pl. 52) is characterized by a weaker sculpture and less differentiated ribs, which show a regular alternation of main and non-tuberculate intermediate ribs. Between the weak ventrolateral tubercles there is depression on the venter.
2) Morph-B (Pl. 43, fig. 2; Pl. 47, fig. 2) is characterized by a coarser sculpture and a smaller number of thicker ribs, which become markedly distinct from each other on the last whorl. Intermediate ribs are weak and rare, and are sometimes totally

absent. The lateral tubercles are large and prominent. Sometimes there are bifurcated main ribs.

RGM 283 033 (Pl. 52, fig. 1a) exhibits signs of damage during life, probably by bite of a predatory animal at the umbilical area (D = 82 mm). In consequence of this damage, the whorl became uncoiled like an elephant's trunk of 45 mm long; afterwards it recoiled again. It is interesting that the uncoiled trunk has a concave dorsum, which is a characteristic feature of involute whorls. After the pathological change of the shell, the ribs become more distinct and more variable on the flanks, and exhibit forward-curved crest-like elevations on the venter.

Comparison – The specimens of the group Morph-A resemble *Eodouvilleiceras* n. sp. aff. *santafecinum* of Etayo-Serna *et al.* (1994), but differ from it in the weaker marginal tubercles, in the more numerous intermediate ribs and in the presence of umbilical and lateral tubercles at the end of the last whorl. *Eodouvilleiceras* aff.. *santafecinum* Morph-A differs from *E. santafecinum* Burckhardt in having intermediate ribs, a weaker ventral depression and less prominent tubercle-like ventrolateral thickenings. Morph-B differs also in having a coarser sculpture. Morph-B differs from *E. stoliczkanum* (Gabb) in having lower, less thick whorls, a narrower umbilicus, a weaker sculpture and a more regular presence of one intermediate rib between every two main ones. Morph-A differs from *E. stoliczkanum* (Gabb) in the weaker sculpture, the regular presence of one intermediate rib between two main ones and having a depression on the intermediate ribs at mid-venter.

Occurrence – Guane, Galan, Villa de Leyva; middle Aptian.

***Epicheloniceras pusillum* (Sinzow, 1906)**

Pl. 39, fig. 2.

1906 *Douvilleiceras subnodoso-costatum* var. *pusilla* Sinzow, p. 180, pl. 2, figs. 9, 10.
1906 *Douvilleiceras subnodosocostatum* var. *pusilla* Sinzow: Jacob & Tobler, p. 15, pl. 1I, figs. 12-14.
1914 *Douvilleiceras pusillum* Sinzow: Kazansky, p. 57, pl. 2, figs. 30-32.
1960 *Douvilleiceras pusillum* Sinzow: Kudrjavtsev, p. 341, pl. 22, figs. 2, 3.

Lectotype – Specimen figured by Sinzow (1906, p. 180, pl. 2, figs. 9, 10), middle? Aptian, north Caucasus, near Kislovodsk, p. Olkhova.

Material – Six specimens, RGM 282 499-282 504.

Description – The shell consists of very inflated, semi-evolute whorls which moderately increase in height. The whorl section is wide-oval with the point of maximum thickness at the upper third of the flanks. The venter is broadly rounded with a slight flattening in the middle. The flanks are low and convex, but at the end of the last whorl they are slightly flattened. The umbilicus is rather wide, moderately deep and step-like with a low, gently sloping umbilical wall. The latter gradually passes into the flanks.

The ornamentation consists of thin, generally simple, rarely forking ribs which differ slightly in strength. Among them are more or less prominent, irregularly arranged, rather thick main ribs. On the last whorl they have their highest relief on

the venter, but in some places they are even reduced. The main ribs arise in the form of thin threads at the umbilical seam and they are inclined backward on the umbilical wall. Up to upper third of the flanks they have a radial course, but beginning from the middle of the flanks they incline forward and on the venter they are curved forward with a wide arc. At the upper third of the flanks they bear small, sharp thorn-like tubercles. At the end of the last whorl weak umbilical tubercle-like thickenings appear, which are elongated in the direction of the ribs. On the external side of the inner whorl, but very rarely also on the last whorl, are also weak tubercles or tubercle-like thickenings. The ribs between these tubercles are flattened. From the lateral tubercles on the inner whorls the main ribs sometimes fork into two unequal branches. The posterior branch is markedly thicker than the anterior one. In most cases the ribs become ring-like on the last whorl. The distance between the rather strong main ribs is irregular. The number of the intermediate ribs between two main ones varies from one to four, but in most cases from one to two; the intermediate ribs lack tubercles and are clearly visible on the upper part of the flanks and on the venter.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 500	33.8	12.2	16.7	11.8	8.6	36	49	35	1.4	26
282 502	30.0	10.7	15.0	11.4	7.7	36	50	38	1.4	20
282 501	29.5	11.0	15.9	10.2	7.4	37	54	35	1.5	22
282 504	25.2	10.5	13.0	8.6	6.4	42	52	34	1.6	20

Comparison – The described species clearly differs from other representatives of *Epicheloniceras* in its smaller shells and, especially, in the weaker sculpture. With respect to its general shell shape and the character of its sculpture, it more or less resembles *E. buxtorfi* and *E. volgense* Wassiliewskyi, 1908, but differs from the former in its weaker ribs (which in some places are effaced), its smaller tubercles, and its wider umbilicus. From *E. volgense* it differs in having broader whorls, weaker ribs (which sometimes are effaced) and smaller tubercles.

Distribution – Middle Aptian of north Caucasus (Russia), Switzerland, Austria and Colombia.

Occurrence – Villa de Leyva, Chipatá Viejo, Sáchica; middle Aptian.

***Epicheloniceras* aff. *clansayense* (Jacob, 1905)**
Pl. 41, fig. 2.

Material – One specimen, RGM 282 508.

Description – The shell consists of inflated, semi-evolute whorls which slowly increase in height. The whorl section is wide and oval, and approaches a rectangular shape with the point of maximum thickness at the umbilical rim. On the inner whorls the venter is broadly rounded, but later it is flattened in the middle. The flanks are

high, flattened, but with rounded margins. The umbilicus is rather wide, moderately deep, step-like with low and gently sloping walls.

The ornamentation consists of simple, distant, tuberculate ribs. The tubercles arise at the umbilical seam, on the umbilical wall they are weak and slightly inclined backward. On the flanks they gradually become strong and radial, but at the upper third of the flanks they bend adorally and pass in a straight line over the venter. On the umbilical rim are sharp, moderately strong thickenings, which are elongated in the direction of the ribs, whereas on the upper third part of the flanks the ribs bear sharp, triangular tubercles elongated in the direction of the radius. The third pair of tubercles is situated on the external side; these are rather strong, high and sharply pointed with their bases elongated in the direction of the ribs. At mid-venter the ribs are markedly lowered and broadened. In some places on the flanks and, especially, venter there are weak, ring-like or thread-like lines. On the living chamber the ribs are strongly elevated and have large tubercles. The ribs are separated by interspaces, which are almost two times wider than the thickness of the ribs.

Measurements – D = 56.4; H = 19.0; W = 23.0; U = 21.7; h = 16.0; H:D = 34; W:D = 41; U:D = 38; H:h = 1.2; ribs = 19.

Comparison – The described specimen differs from most species of *Epicheloniceras* mainly in having narrower whorls with a subrectangular cross section and simple, equal ribs. From *E. clansayense* it differs in having a less coarse sculpture, thinner whorls, a wider umbilicus and non-branching simple ribs. In contrast to *Eodouvilleiceras(?) tequendamai* Etayo-Serna, 1979, it is characterized by narrower whorls, wider umbilicus, a stronger sculpture at the end of the last whorl and weaker tubercles (especially the external tubercles). As to the whorl shape and the distant simple ribs, the described specimen resembles *Eodouvilleiceras* aff. *planum* Rouchadzé (see below), but differs from it in having three pairs (instead of four pairs) of tubercles and a greater number of ribs.

Occurence – Sáchica; middle Aptian.

***Epicheloniceras wiedmanni* sp. nov.**
Pl. 44, fig. 2; Pl. 53; Pl. 54, fig. 1; Pl. 55, fig. 1; Pl. 56, fig. 1; Pl. 57, fig. 1; Pl. 58, fig. 1; Pl, 59; Pl. 60, fig. 1; Pls. 61, 62.

Type material – Holotype, RGM 282 603, Pl. 53, Pl. 55, fig. 1, Pl. 56, fig. 1. Paratypes, RGM 282 602, 282 604 –282620.

Type locality – Villa de Leyva.

Type horizon – Middle Aptian

Derivatio nominis – In honour and memory of Prof. Jost Wiedmann.

Diagnosis – The shell consists of strongly inflated, semi-evolute whorls of coronato-trapezoidal cross section, which moderately increase in height. The umbilicus is rather

wide, deep and step-like. The very coarse sculpture consists of radial, strongly tuberculated main ribs and weaker, simple intermediate ribs. The main ribs bear large umbilical tubercles, which are elongated in the direction of the ribs, conical external tubercles and long, flattened lateral tubercles. From the latter the main ribs fork into two, rarely three uneven branches; the anterior branch is weaker than the posterior one. There are one to two non-tuberculate intermediate ribs between every two main ones.

Description – The whorls are strongly inflated, moderately increasing in height and semi-evolute. The whorl section changes during the ontogeny from wide and oval to sub-trapezoidal, with the point of maximum thickness in the area of the lateral tubercles on the early growth stage, but in the course of growth it moves to the umbilical rim. The costal section is octagonal. The venter is broadly rounded, with a slight median flattening. It gradually passes into the flanks, which on the early growth stage are strongly convex, but which become relatively high and compressed towards of the ventrolateral margins with growth. The umbilicus is rather wide, deep, step-like, with a high and steep wall, and a rounded margin.

The sculpture is very coarse and consists of a regular alternation of very strong tuberculate main and simple, non-tuberculate intermediate ribs. At D = 25-35 mm there are seven main ribs on a whorl. They originate at the umbilical seam; on the umbilical wall they are still weak, but when passing over the flanks they become very strong. At the upper third of the flank height, near the ventrolateral margin, they bear strong tubercles, which on the steinkern have a cone-like shape with their basis elongated in the direction of the spire. From these tubercles the main ribs fork into two unequal branches; the anterior branch is markedly weaker than the posterior one. In some cases there is a third very weak and thin branch adapically of the posterior branch. On the venter there are strong tubercles, elongated in the direction of the ribs. Between these tubercles the ribs are flattened. From D = 25 mm elevations appear on the umbilical rim, which later become sharp thorn-like tubercles elongated in radial direction. The anterior branches of the main ribs also bear weak radially elongated thickenings. The intermediate ribs appear at D = 20-25 mm. At the beginning they are very thin, short and visible only on the venter, but with growth they become long and reach the umbilical rim. There is generally only one (rarely two) intermediate rib between two main ribs and, like the anterior branch of the main rib, they bear radially elongated thickenings on the venter. In a later stage the sculpture rapidly becomes very strong, especially the main ribs, and their lateral and external tubercles. The main ribs become broad and conspicuously flattened between the tubercles. The intermediate ribs are markedly weaker and there is only one between two main ones. The main ribs ceases bifurcating at the lateral tubercles between D = 70-250 mm. The blunt umbilical tubercles are radially elongated, whereas the lateral tubercles become stronger and longer. At D = 80 mm their length is 15 mm and the breadth of the basis is 11 mm (RGM 282 608). They are flattened in the direction of the spire, but in the interval D = 90-100 mm they are elongated in the direction of the radius. The external tubercles become especially large, and they have a cone-like shape, elongated in the direction of the ribs. At D = 150 mm the tubercles have 17 mm height and 25 mm width. In the late growth stage (from D = 125) there are 25-30 ribs to the whorl (among them 12-13 are main ones) on the venter. On the last whorl the sculpture becomes weaker, especially on the living chamber and the ornamentation

becomes of the *Cheloniceras* type. On the venter the ribs are weak, numerous and almost equal with a sub-trapezoidal cross section. At the end of the last whorl they are devoid of tubercles or bear weak, blunt thickenings elongated in the direction of the ribs. They pass in a straight line over the venter without any weakening.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 607	25.4	9.7	17.5	8.7	7.6	38	69	34	1.3	23
282 605	34.5	13.8	21.8	11.5	9.3	40	63	33	1.5	23
282 609	54.0	22.2	33.2	17.7	14.0	41	61	33	1.6	25
282 612	64.0	23.0	38.3	23.5	17.0	36	60	37	1.4	25
282 606	75.3	29.8	42.0	25.0	19.7	40	56	33	1.5	23
282 618	119.0	40.8	68.8	43.9	29.4	34	58	37	1.4	29
282 603	120.5	45.0	66,8	40.5	31.6	38	55	34	1.4	28
282 608	124.0	44.5	70.0	45.3	32.5	36	56	37	1.4	29
282 617	183.0	70.5	107.7	66.4	49.2	39	59	36	1.4	43
282 610	202.0	86.0	117.0	73.5	54.0	43	58	36	1.6	37
282 619	315.0	133.0	164.0	112.0	80.0	42	52	36	1.7	57

Intraspecific variation – Among the studied specimens of this new species the sculpture and the whorl shape varies rather strongly. On the basis of the sculptural peculiarities on the early whorls two groups can clearly be distinguished. The first group is characterized by numerous (16-25 to the whorl) and rather thin main ribs (RGM 282 618, 282 619), whereas the representatives of the second group have only ten to twelve (all other specimens). Moreover, the holotype and RGM 282 612 have rather strong anterior branches, as well as several intermediate ribs with larger external tubercles than the other specimens. In RGM 282 612 the main ribs fork into three branches. In some specimens (RGM 282 619, 282 616, 282 610) the external tubercles are longer up to D = 170-180 mm. In RGM 282 611 the umbilical tubercles are weaker, than they are in the other specimens. They are triangular, with sharp tops and are present up to the end of the last whorl (D = 210 mm). The coarsest ribs and the largest tubercles are observed on the RGM 282 610 and 282 616, but the RGM 282 617, 282 611 and 282 619 have a weaker sculpture. RGM 282 606 is characterized by rare bifurcations of the main ribs and by very weak intermediate ribs, which are absent in some intervals of the whorl.

Comparison – *Epicheloniceras wiedmanni* sp. nov. clearly differs from the other members of *Epicheloniceras* in having a very coarse sculpture and particularly strong external tubercles. Its early whorls are somewhat similar to those of *E. stolizkanum* (Gabb) and *E. camachoi* Etayo-Serna, 1979. From the first species it differs, however, in having lower and broader whorls, much stronger and less numerous main ribs, and larger lateral and external tubercles. From *E. camachoi* Etayo-Serna it differs in having a narrower umbilicus, a wide-oval coronate whorl section, a coarser sculpture and forked ribs. In contrast to *E. irregulare* Anderson, 1938, the described species is characterized by broader whorls, by more numerous ribs and by the presence of intermediate ribs.

Occurrence – Villa de Leyva, Sáchica, Guane, Galan; middle? Aptian.

***Epicheloniceras douvillei* sp. nov.**
Pl. 48, fig. 2; Pl. 49, fig. 2; Pl. 64, fig. 1; Pl. 65, fig. 2.

Type material – Holotype, RGM 282 584, Pl. 48, fig. 2. Paratypes, RGM 282 583, 282 585-282 601.

Type locality – Sáchica.

Type horizon – Middle Aptian.

Derivatio nominis – In honour of Robert Douvillé (French palaeontologist).

Diagnosis – Semi-evolute, strongly inflated whorls, with a wide-oval whorl section, a wide and step-like umbilicus, and a coarse sculpture. The main ribs are strong, radial and are forking in two unequal branches, which arise from the lateral tubercles; the main ribs also bear umbilical and external tubercles, which are flattened and elongated in the direction of the spire. In a late growth stage the umbilical and lateral tubercles merge into one large tubercle. There is only one rather weak intermediate rib between two main ribs; the intermediate ribs bear two to three pairs of tubercles.

Description – The whorls are strongly inflated, semi-evolute. On the early growth stage the whorls are slowly increasing in height, but later they increase moderately in height. The early whorl section is wide and oval, but in the late growth stage it becomes trapezoidal with an octagonal costal section. On the early whorls the point of maximum thickness lies at the lateral tubercles, but later it shifts towards the umbilical rim. The venter is broadly rounded, slightly flattened in the middle and gradually passes into low, convex flanks. The umbilicus is rather wide, deep, step-like with a steep, high wall and rounded rim.

The sculpture is very coarse and consists of straight, strongly tuberculated ribs, which vary in strength. The main ribs arise at the umbilical seam. On the umbilical wall they are very thin and inclined backward, but beginning from the umbilical rim they become strong, straight and pass in a straight line over the external margin, where they have their maximal thickness. Each main rib bears an umbilical, lateral and external tubercle. The umbilical tubercles are rather weak and at about D = 20 mm they are mere radially-stretched thickening of the ribs. Later they become triangular, rather high and sharp. The lateral tubercles are the strongest and probably appear earlier than the umbilical ones. On the early whorls they are thorn-shaped, elongated in the direction of the spire and situated at the external rim. With growth they quickly become strong and less pronounced. At D = 30 mm they have a length of 9 mm. As they are very large, their bases unite with the umbilical thickenings and, therefore, there is only one row of very large tubercles in the lower part of the flanks, which have their bases elongated in the direction of the radius. Later, they occupy the central part of the flanks. The third pairs of the tubercles, the external ones, are situated on the venter. They appear as weak thickenings on the posterior branch of the main ribs at about D = 10-12 mm. With growth they move towards the external rim. The tops of the thickenings are blunt. The main ribs are strongly depressed between the lateral and the external tubercles, and

at the median part of the venter. From about D = 12-13 mm they fork at the lateral tubercles into two uneven branches; the anterior branch is weaker than the posterior one and on the external side they are curved forward and bear tubercle-like thickenings, which are elongated in the direction of the ribs. There are intermediate ribs, always one between two main ribs. They appear as short riblets on the venter at D = 10-15 mm, which with growth become longer (some of them reach the umbilical wall) and almost equal to the anterior branch. The intermediate ribs bear weaker, sharper umbilical and lateral tubercles, which are elongated in the direction of the radius. There are also external radially elongated elevations. The sculpture reaches its maximal development at D = 70-100 mm. At larger diameters it diminishes in strength; at first the bifurcated ribs disappear, then the intermediate and main ribs become equal, and the tubercles loose in prominence. On the venter of the last whorl the number of the ribs varies from 19 to 40 (among them 10-15 are main ribs).

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 594	27.5	10.8	18.0	9.2	7.5	39	65	33	1.4	21
282 586	60.0	22.8	34.4	22.8	15.2	38	57	38	1.5	19
282 588	64.3	24.2	38.2	22.6	16.3	38	59	35	1.5	23
282 601	67.6	23.9	36.9	24.8	18.5	35	55	37	1.3	12 *
282 584	72.2	24.3	40.6	27.2	21.1	34	56	38	1.2	25
282 593	82.7	29.6	48.1	27.2	23.7	36	58	33	1.3	23
282 585	101.5	37.3	55.5	35.6	27.0	37	55	35	1.4	30

Variation – While the shell shape and its parameters are more or less stable, the sculpture is more variable. For example, on RGM 282 586, 282 589 and 282 593, intermediate ribs and bifurcating ribs are very rare. Unification of the umbilical and lateral tubercles is observed only in the holotype. Moreover, among the studied specimens the final simplification of the sculpture starts in slightly different growth stages.

Comparison – The described species resembles *E. wiedmanni* sp. nov. by the general shell shape and character of the sculpture of its early whorls, but differs from it in the far less coarse sculpture (which becomes weaker in earlier whorls), the stronger intermediate ribs with two to three pairs of tubercles and almost twice as many smaller tubercles. Moreover, its external tubercles are elongated in the direction of the ribs, whereas in *E. wiedmanni* they are very large and cone-shaped. *Epicheloniceras douvillei* differs from *E. clansayense* Jacob, 1905, in having somewhat broader whorls, coarser forking main ribs, and stronger intermediate ribs, bearing two to three pairs of tubercles. With respect to the coarse sculpture, the described new species resembles *E. irregulare* Anderson, 1938, but differs from it in having broader whorls, more numerous bifurcating ribs and stronger lateral tubercles, and in the shape of the external, radially-elongated tubercles. From *E. stoliczkanum* (Gabb) it differs in the lower whorls, the smaller number of ribs, the coarser sculpture, the bifurcation of the main ribs, and the regular alternation of main and intermediate ribs.

Occurrence – Sáchica, Villa de Leyva, Guane, Galan; middle Aptian.

***Epicheloniceras bradleyiformis* sp. nov.**
Pl. 63, fig. 1; Pl. 65, fig. 1.

Holotype – RGM 282 507, the only specimen known.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – After similarity with *Epicheloniceras bradleyi* Anderson, 1938.

Diagnosis – Semi-evolute, inflated whorls, which moderately increase in height and have a sub-rectangular cross section. The umbilicus is wide, moderately deep, step-like. The sculpture consists of strong, simple, radial ribs, bearing rather large umbilical, lateral and external tubercles. The weak, non-tuberculate intermediate ribs appear only at the end of the late growth stage, where one to two intermediate ribs occur between every two main ribs.

Description – The shell consists of inflated, semi-evolute whorls, which moderately increase in height. The whorl section is wide-oval, almost rectangular, with the maximum thickness at the lower third of the flanks. The venter is broadly rounded and flattened in the middle. It passes gradually into rather high, moderately convex and slightly flattened flanks. The umbilicus is wide, moderately deep, step-like with a low, gently sloping wall and a broadly rounded umbilical rim.

The sculpture is rather simple and coarse. In most cases it consists of simple, radial tuberculate ribs. They arise at the umbilical seam and incline backward on the umbilical wall; on the umbilical rim they become strong and pass in a straight line over the flanks. On the venter they attain their maximal thickness and obtain a rounded cross section. The umbilical tubercles are rather strong and radially elongated. The lateral tubercles are also strong, long and cone-like, with a radially elongated basis. On the venter the tubercles are very strong and have sub-rectangular shape with a rounded top. Their bases are elongated in the direction of the ribs. Between the tubercles the ribs are markedly depressed, especially in the upper third part of the flanks and on the venter. Intermediate ribs are absent on the inner whorls. On the penultimate whorl there are only two intermediate ribs, but they consistently occur from the middle of the last whorl and there are one to two intermediate ribs between every two main ones. The intermediate ribs are weak, non-tuberculate and pass straight over the venter without weakening. The ribs are separated by interspaces, which are equal or slightly broader than the rib thickness.

Measurements – RGM 282 507: D = 125.4; H = 45.0; W = 59.7; U = 48.2; h = 30.1; H:D = 36; W:D = 48; U:D = 38; H:h = 1.5; ribs = 31 (main: 19). RGM 282 507: D = 81.7; H = 29.5; W = 39.2; U = 31.5; h = 21.3; H:D = 36; W:D = 48; U:D = 39; H:h = 1.4; ribs = 25 (main: 23).

Comparison – As for the whorl shape and character of the sculpture, the described species resembles *E. bradleyi*, but differs in having thinner whorls, a wider

umbilicus, more elevated ribs and a sub-rectangular whorl section. From *E. stoliczkanum* (Gabb) it differs in the lower and narrower whorls, the somewhat wider umbilicus and the more numerous intermediate ribs in the mature growth stage. In contrast to *E. amazonarum* Burckhardt, the described species is characterized by its thinner whorls, sub-rectangular whorl section and by the presence of intermediate ribs only in the mature growth stage.

Occurrence – Guane; middle Aptian.

***Epicheloniceras*? aff. *nazasense* (Burckhardt, 1925)**
Pl. 40, fig. 2.

Material – Two specimens, RGM 283 030, 283 031.

Description – The whorls are very inflated, moderately increasing in height and semi-evolute. The whorl section is wide and oval, almost sub-rectangular with the point of maximum thickness at the lower third of the flanks. The venter of the inner whorls is rounded and gradually passes into low, moderately convex flanks. At the end of the last whorl the venter becomes broad and flattened. The umbilicus is rather wide, moderately deep, step-like, bounded by moderately high, gently sloping walls. The umbilical rim is rounded.

The sculpture of the inner whorls consists of slightly different main and intermediate ribs; there are one to three intermediate ribs between every two main ones. In the middle of the flanks the main ribs bear weak, triangular, sharp tubercles, which are elongated in the direction of the radius. From these tubercles the ribs fork into two uneven branches, the anterior branch being stronger than the posterior one. On the penultimate whorl, the anterior branches bear weak thickenings elongated radially and between these thickenings the ribs are markedly flattened. Adoral of the anterior branch there is a constriction-like deepening. This kind of ribbing is observed up to the first quarter of the last whorl, but the ribs significantly differ from each other; the anterior branch of the main rib is strongly elevated and becomes crest-like on the upper third of the flanks, in particular on the venter. The lateral tubercles and especially the external tubercle-like elevations become stronger, and at the umbilical rim appear weak tubercle-like thickenings on the main ribs. The intermediate rib, adoral of the constriction, is stronger than the other intermediate ribs and bears a lateral thickening elongated in the direction of the ribs. At the end of the last whorl are simple, equal, somewhat weakened ribs, which become crest-like on venter and slightly lowered at mid-venter. The suture line is characterized by a strongly divided lateral lobe; the secondary saddle is wide and rather high. The saddle E/L is asymmetric and larger than the other saddles.

Measurements – RGM 283 031: D = 41.7; H = 14.0; W = 21.1; U = 15.7; h = 11.0; H:D = 34; W:D = 51; U:D = 38; H:h = 1.3; ribs = 37.

Comparison and remarks – As for the general character of the sculpture and the whorl-shape, the described specimens approach *Cheloniceras* Hyatt (similarity of the early

growth stages), as well as *Epicheloniceras* Casey (similarity of the late growth stages). On the one hand, the type of forking of the rib, the strong differentiation of the ribs and the strong anterior branches are similar to *Cheloniceras*. In *Epicheloniceras* the ribs are generally less differentiated, whereas the anterior branch is weaker than the posterior one and does not bear tubercles. The described specimens approach *Epicheloniceras* with rather large external tubercle-like elevations and strongly differentiated ribs on the mature growth stage. In all probability this species represents an intermediary group between *Cheloniceras* and *Epicheloniceras*. Taking into account the above noted remarks, this form is conditionally attributed to the genus *Epicheloniceras* Casey.

The described specimens mainly differ from the closely resembling *E.*? *nazasense* in the forking of the main ribs and the greater number of intermediate ribs. The characteristic of the ribbing of *E.*? *nazasense* is known only from one fragment representing three quarters of the last whorl (Burckhardt, 1925, p. 30). In contrast to *Epicheloniceras martinii* (d'Orbigny, 1841), the described species is characterized by thinner and more depressed whorls, weaker external tubercles, more numerous intermediate ribs and stronger anterior branches of the main ribs. From *E. cantianum* Casey, 1962, this species differs in its stronger anterior branches of the main ribs, stronger intermediate ribs directly adapical of the main ribs and lower whorls. From *Cheloniceras cornuelianum* (d'Orbigny, 1841) it differs in having its ribs more differentiated, a thicker intermediate rib directly adapical of the main ribs, rather strong external, tubercle-like elevations and weaker umbilical tubercles.

Occurrence – Mesa de Los Santos; middle Aptian.

Epicheloniceras debile Casey, 1962

Pl. 45, fig. 2.

1962 *Cheloniceras (Epicheloniceras) debile* Casey, p. 244, pl. 37, figs. 3-7; text-figs. 85a-b, 86b.

Holotype – British Geological Survey, Keyworth, Zm 1952 (Casey, 1962, p. 244, pl. 37, fig. 3a, b, text-fig. 85a, b).

Material – Two specimens, RGM 282 505, 282 506.

Description – The whorls are strongly inflated, moderately increasing in height, and semi-evolute with a wide-oval cross section in the early growth stage and a subrectangular cross section in the late stage. The costal section is octagonal. The venter of the early whorls is very broad and convex, but later it becomes broadly rounded and flattened in the middle. The flanks of the early whorls are low and convex; with growth they become high and slightly flattened. During ontogeny the point of maximum breadth of the flanks gradually migrates from the middle of the flanks to the umbilical rim. The umbilicus is rather wide, moderately deep and step-like with a rather steep, moderately high wall.

At D = 18 mm the sculpture consists of a regular alternation of one main rib with one intermediate rib. The radial main ribs are weak on the umbilical wall, become strong on the flanks and extra strong on the venter, where they are narrow and highly

crested. At the middle of the flanks they bear strong, sharp, radially elongated tubercles from which some of the ribs may fork into two branches. The anterior branch is weaker than the posterior one. On the external margin there are rather strong tubercle-like elevations elongated in the direction of the radius. The intermediate ribs are weaker and non-tuberculate. There are one to three intermediate ribs between every two main ones. At D = 18-40 mm the external tubercle-like thickenings become less pronounced. On the main ribs appear weak umbilical thickenings elongated in the direction of the radius. The lateral tubercles become very strong, sharp, thorn-like and triangular in shape. On the umbilical wall the ribs are strongly inclined forward, but on the flanks and venter they are radial. On the venter they are only slightly elevated. Very rarely the intermediate ribs split at the umbilical rim. At D = 40-70 mm the venter becomes slightly flattened, the sculpture becomes stronger and there is only one (rarely two) intermediate rib between every two thick main ribs. The umbilical and lateral tubercles are markedly strong. Two unequal branches fork from the latter; the anterior branch is slightly weaker than the posterior one. There appear tubercle-like elevations on the ribs along the external margin. At the end of the last whorl the tubercles become less strong and all ribs pass over the venter without weakening. Here they are equally thick and their breadth is more than twice the width of the interspaces between them. Sometimes branching of the main and intermediate ribs is observed at the umbilical rim.

Measurements – RGM 282 505: D = 65.6; H = 23.0; W = 35.7; U = 21.7; h = 17.0; H:D = 35; W:D = 53; U:D = 33; H:h = 1.3; ribs = 33. RGM 282 506: D = 155.0; H = 60.0; W = 78.0; U = 55.0; h = 41.5; H:D = 39; W:D = 50; U:D = 35; H:h = 1.5; ribs = 52.

Comparison – The described species mainly differs from *E. tschernyschewi* Sinzow, 1906, in the thinner whorls, the smaller number of ribs, and the reduction of the external tubercles on the early growth stage. In contrast to *E. martinioides* Casey, 1962, it is characterized by more depressed and thinner whorls, the early disappearance of the external tubercles and the somewhat weaker, irregular ribbing.

Distribution – Middle Aptian, Zone of *Epicheloniceras martinioides* (Subzone of *Epicheloniceras debile*) of southern England; middle Aptian of Colombia.

Occurrence – Guane, Villa de Leyva; middle Aptian.

Epicheloniceras waageni (Anthula, 1899)

Pl. 49, fig. 1.

1899 *Pachydiscus*(?) *Waageni* Anthula, p. 106, pl. 9, fig. 1a-c.
1906 *Douvilleiceras meyendorffi* var. *waageni* (Anthula): Sinzow, p. 164, pl. 1, fig. 10.
1913 *Douvilleiceras meyendorffi* var. *waageni* (Anthula): Sinzow, p. 109, pl. 6, fig. 5.
1914 *Douvilleiceras waageni* (Anthula): Kazansky, p. 61, pl. 3, figs. 37, 38.
1960 *Epicheloniceras waageni* (Anthula): Kudrjavtsev, p. 342, pl. 20, figs. 1, 2; pl. 21, fig. 1; pl. 22, fig. 1.
1997 *Cheloniceras (Epicheloniceras) waageni* (Anthula): Immel *et al.*, p. 182, pl. 5, fig. 3.

Lectotype – Specimen figured by Anthula (1899, p. 106, pl. 9, figs. 1a-c). Daghestan, Aptian (middle? Aptian).

Material – Two specimens, RGM 282 817, 282 818.

Description – The whorls are semi-evolute, strongly inflated and moderately increasing in height. The cross section of the early whorls is wide and oval, but later sub-trapezoidal. The point of maximum thickness migrates in the course of growth from the middle of flanks to the umbilical rim. The flanks are rather high, moderately convex in the early whorls and slightly flattened later. The venter is broadly convex. The umbilicus is moderately wide, deep, step-like with a rather high, steep wall and rounded rim.

The sculpture is coarse, and consists of forking and tuberculate main ribs, and simple intermediate ribs. The main ribs arise at the umbilical seam, gradually becoming strong on the umbilical margin and flanks. At the umbilical rim they bear tubercle-like thickenings, but on the lower part of the flanks there are sharp, thorn-like tubercles with radially elongated bases. The main ribs fork into two, rarely three branches at these points. On the early whorls (RGM 282 817) the anterior branch is somewhat weaker than the posterior one. There are two to three weaker, non-tuberculate intermediate ribs between every two main ones. In most cases the intermediate rib directly adoral of the main rib is longer and begins at the umbilical wall, while the other ones arise on the umbilical rim or in the lower part of the flanks. All ribs are slightly inclined backward on the flanks. On the venter the main ribs make an angle and bear ventrolateral tubercle-like elevations separated by a siphonal depression. On the last whorl all ribs are equal and slightly curved forward. At D = 60 mm the lateral tubercles become less prominent, but the umbilical ones become thicker and more elevated. From the latter originate two, rarely three branches. The suture line is of the douvilleiceratoid type; the lateral lobe has a longer and complicated external branch, and the saddle E/L is high and bifid.

Measurements – RGM 282 817: D = 54.3; H = 22.9; W = 31.4; U = 14.6; h = 14.2; H:D = 42; W:D = 58; U:D = 27; H:h = 1.6; RGM 282 818: D = 88.6 (63.5); H = 39.2 (28.0); W = 51.3 (38.7); U = 23.3 (17.5); h = 24.3 (17.0); H:D = 44 (44); W:D = 58 (61); U:D = 27 (28); H:h = 1.6 (1.7); ribs = 58 (-).

Comparison and remarks – The described specimens differ from the lectotype in having more numerous ribs, a small number of intermediate ribs (two to three against three to four on the lectotype) and an oval-trapezoidal whorl section (instead of wide-oval). The latter differences, however, are probably caused by deformation of the lectotype (Anthula, 1899, pl. 9, fig. 1a-c). The shell parameters and the character of the sculpture of the described Colombian specimens are very similar to the Russian specimens described by Sinzow (1906) and Kudrjavtsev (1960). From *E. tschernyschewi* Sinzow, the described species differs in its narrower whorls, less coarse sculpture, weaker lateral tubercles and, particularly, weaker external tubercles, and in its ribs being less differentiated.

Distribution – Middle Aptian of the north Caucasus (Russia), Mangyshlak (Kazakhstan) and Colombia.

Occurrence – Guane, Anapoima-Apulo; middle Aptian.

Genus *Vectisites* Casey, 1962
Subgenus *Vectisites (Zambranoites)* Etayo-Serna, 1979

1979 *Vectisites (Zambranoites*) Etayo-Serna, p. 38.

Type species – *Vectisites (Zambranoites) zambranoi* Etayo-Serna, 1979, p. 38, pl. 6, fig. 1; middle Aptian, Colombia.

Diagnosis – The whorls are inflated, moderately increasing in height and semi-evolute. The early whorls are depressed and in the course of growth the cross section changes from wide-oval to sub-quadrate or sub-trapezoidal. The umbilicus is moderately wide, step-like, medium deep. The ribs are in most cases simple, crest-like and slightly flexuous. The main ribs bear moderately strong, sharp lateral tubercles at the middle of the flanks. At the umbilical rim there are crest-like thickenings or tubercles. On the venter all ribs are markedly depressed along the median line; on the ventrolateral shoulders the ribs are markedly elevated.

Comparison – According to Etayo-Serna (1979), this subgenus differs from *Vectisites (Vectisites)* Casey in having thicker ribs (strong extention of the ribs on the venter), in having a mid-ventral depression of the ribs and in the presence of tubercles at the both sides of the venter.

Distribution – Middle Aptian of Colombia and northeastern Brazil.

Vectisites (Zambranoites) nodosus sp. nov.
Pl. 26, fig. 2.

Type material – Holotype, RGM 354 126; paratypes, 282 887-282 889.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – *Nodosus* (Latin) = tuberculate, because of the peculiarity of the lateral tubercles.

Diagnosis – Whorls are very inflated, moderately increasing in height, and semi-evolute with trapezoidal cross section and moderately wide, moderately deep, step-like umbilicus. The ribs are simple, flexuous, S-shaped in the upper part of the flanks, and depressed in the middle of the venter. The ribs bear sharp tubercles with a triangular cross section on the adult part of the shell. There is one intermediate non-tuberculate rib between every two main ribs. The lateral lobe (L) is asymmetrically trifid, with a rather broad and high secondary saddle (L_1/L_2).

Description – The shell consists of strongly inflated, semi-evolute whorls, which moderately increase in height. The cross section of the early whorls has a wide-oval

shape, which approaches a rectangular, but later it becomes trapezoidal with the point of maximum thickness at the umbilical margin. The venter is broad and slightly convex. The flanks of the early whorls are low and moderately convex, but later they become high and flat. The ventrolateral and umbilical margins are rounded. The umbilicus is moderately wide, step-like, and moderately deep. It is bounded by a high, rather steep wall.

The sculpture most probably appears on the fourth whorl in the form of weak projected ribs, which pass over the venter with an adorally convex curve. At the beginning of the fifth whorl appears one (rarely two) weak intermediate rib between every two main ribs. They are visible only on the upper third of the flanks and on the venter. At the middle of the fifth whorl (D = 16 mm), weak, thorn-like tubercles appear just below the middle of the flanks; their bases are elongated in the direction of the radius. The ribs are crested on the flanks and S-shaped in the upper part of the flanks. They pass in a straight line over the venter. From D = 17 mm the ribs are slightly flattened in the middle of the venter; the ventral margins are therefore slightly elevated. At the beginning of the last whorl the sculpture becomes coarser. On the external side the ribs are distant and equally broad. There are umbilical elevations on the main ribs. From the middle of the last whorl the character of the sculpture changes sharply; the tubercles disappear, the intermediate ribs become longer and begin at the umbilical wall, and sometimes they split off from the main ribs at the umbilical rim.

The suture line is of the douvilleiceratoid type. The external saddle (E/L) is rather high and broad. The lateral lobe (L) is wide, asymmetrically trifid, with a broad and high secondary saddle (L_1/L_2); L_2 is more developed than lobe L_3. The lobe U_1 is situated on the umbilical wall, near the umbilical seam. The saddle L/U_1 is lower than the external one.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
354 126	57.0	26.1	28.5	15.3	15.4	46	50	27	1.7	33
282 889	36.0	15.8	20.1	9.7	10.,3	44	56	27	1.5	34
282 888	31.6	13.6	17.4	9.1	8.4	43	55	29	1.6	32
282 887	21.5	8.0	10.8	7.9	5.5	37	50	38	1.5	26

Comparison and remarks – The described new species clearly differs from all known species of the subgenus *Vectisites (Zambranoites)* Etayo-Serna in having a trapezoidal whorl section and lateral tubercles. With these features it resembles Acanthohoplitidae, from which it differs in the douvilleiceratoid type of suture line. By the type of sculpture on the second half of the last whorl it resembles *Parahoplites* Anthula, of which *Vectisites* Casey is the probable ancestor.

The described new species resembles *Vectisites (Zambranoites) cadenai* Etayo-Serna, 1979, by the character of the sculpture of the inner whorls, but differs from it in having higher whorls, more numerous ribs and lateral tubercles. From *V. (Z.) zambranoi* Etayo-Serna, 1979, it differs in having lateral tubercles, a narrower umbilicus and higher whorls with a trapezoidal cross section.

Occurrence – Guane, Villa de Leyva; middle Aptian.

***Vectisites (Zambranoites) etayosernai* sp. nov.**
Pl. 27, fig. 2.

Type material – Holotype, RGM 282 892; paratypes, RGM 282 890, 282 891, 282 893.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – In honour of the Colombian palaeontologist, F. Etayo-Serna.

Diagnosis – Strongly convex, moderately expanding, semi-evolute whorls, with wide-oval cross section. The umbilicus is moderately wide with a steep, rather high wall. The sculpture consists of slightly curved, almost radial, irregularly alternating main and intermediate ribs. Up to D = 30 mm the rather strong main ribs bear small, sharp, lateral tubercles, but in the next whorl appear crest-like umbilical elevations on the main ribs, and from these points arise two branches. There are one to three non-tuberculate intermediate ribs between every two main ones. All ribs have a slight depression at the middle of the venter.

Description – The shell consists of strongly inflated, semi-evolute whorls with a moderately increasing whorl height. The whorl section is wide-oval, slightly wider than high, with maximum breadth in the lower part of the flanks. The venter is broadly rounded and gradually passes into moderately high, slightly convex flanks. The umbilicus is deep and moderately wide, with a rather high, steep wall and a rounded umbilical rim.

The ornamentation consists of simple main and intermediate ribs, which hardly differ in strength. The main ribs arise at the umbilical seam and are rather strong. In the early whorls they are slightly curved backward and then forward in the upper part of the flanks. On the late whorls they are radiate and only curved backward at the umbilical margin. Up to D = 30 mm, the main ribs bear small, sharp, conical tubercles at the middle of the flanks. On the two last whorls of the holotype the main and intermediate ribs are irregularly distributed. There are one to three secondary ribs between two main ones. They arise on the umbilical wall or in the lower part of the flanks. On the umbilical rim of the last whorl the main ribs exhibit crest-like elevations, from which they occasionally split into two almost equal branches. All ribs pass in a straight line over the venter where they become broader; they are furnished with ventrolateral elevations, which are separated by siphonal depression. The external saddle (E/L) is broad and high. The lateral lobe (L) is also wide and asymmetrically bifid, with a small secondary saddle (L_1/L_2) and a rather short branch (L_2).

Measurements – RGM 282 890: D = 27.0; H = 12.2; W = 14.8; U = 7.0; h = 7.1; H:D = 45; W:D = 55; U:D = 26; H:h = 1.7; ribs = 35; RGM 282 892: D = 46.5; H = 20.0; W = 25.3; U = 12.9; h = 13.0; H:D = 43; W:D = 54; U:D = 28; H:h = 1.5; ribs = 36; RGM 282 893: D = 27.2; H = 12.0; W = 14.4; U = 7.5; h = ; H:D = 44; W:D = 53; U:D = 28; H:h = 1.7; ribs = 29.

Comparison – The whorl section of the new species resembles the whorl section of *V. (Z.) cruzi* Etayo-Serna, 1979, but differs in having slightly higher whorls, a narrower umbilicus, more numerous, less elevated ribs, and in the absence of adorally convex ribs on the venter. In contrast to *V. (Z.) duquesi* Etayo-Serna, 1979, the new species is characterized by a narrower umbilicus, more numerous, almost radial ribs and a wide-oval whorl section. From *V. (Vectisites) caprotinus* Casey, 1962, it differs in having thicker whorls, a narrower umbilicus and more numerous, thinner ribs.

Occurrence – Guane, Galan, Chipatá Viejo; middle Aptian.

***Vectisites (Zambranoites) obscurus* sp. nov.**
Pl. 28, fig. 2.

Type material – Holotype, RGM 282 895; paratype, 282 894.

Type locality – Barbosa.

Type horizon –Middle? Aptian.

Derivatio nominis – *Obscurus* (Latin) = concealed, unknown.

Diagnosis – Middle-sized shells with inflated, semi-evolute whorls, which are moderately increasing in height; the umbilicus is moderately deep, step-like and the whorl section wide-oval. The sculpture consists of uniform thin ribs on the early whorls. In a later stage there are rather strong, simple main ribs, between which occasionally one non-tuberculate intermediate rib is situated. All ribs are curved forward and flattened in the middle of the venter.

Description – The whorls are inflated, moderately increasing in height and semi-evolute. The whorl section is wide-oval, almost rectangular, with the point of maximum thickness at the middle of the flanks. The venter is broad, in the early whorls moderately convex, but at the end of the last whorl slightly flattened and gradually passing into slightly convex, almost parallel flanks. The umbilicus is moderately wide, step-like, moderately deep with a gently sloping wall, and a rounded umbilical margin.

The ornamentation of the last whorl is variable. There are very thin, mostly thread-like simple ribs at the beginning of the last whorl. They are inclined backward on the umbilical margin, become radial on the flanks, but in the upper part of the flanks and on the external side they are curved forward. All ribs bear two pairs of small, sharp, cone-like tubercles. The first pair is situated at the umbilical rim, the second one in the upper part of the flanks. With growth the sculpture gradually becomes stronger. The simple ribs become thick, in particular in the upper part of the flanks and on the venter, where they are crest-like elevated. In a few occasions non-tuberculate intermediate ribs appear, not more than one between two main ones. They arise from various points of the flanks or from the umbilical margin. With growth the tubercles become significantly stronger and cone-like (on the nucleus

they have mace-like shape). On the venter all ribs are slightly depressed along the middle line. The ribs are distant, so that the interspaces exceed their thickness.

Measurements – RGM 282 894: D = 37.3; H = 14.5; W = 18.2; U = 12.5; h = 10.7; H:D = 49; W:D = 34; U:D = 34; H:h = 1.4; ribs = 33; RGM 282 895: D = 42.8; H = 18.1; W = 13.0; U = 21.7; h = 12.4; H:D = 42; W:D = 52; U:D = 30; H:h = 1.4; ribs = 26.

Comparison – The described new species clearly differs from the other species of *Vectisites (Zambranoites)* in the character of the sculpture. It differs from the closely resembling *V. (Z.) duquesi* Etayo-Serna, 1979, in having higher whorls, a narrower umbilicus, a stronger sculpture on the second half of the last whorl and in the presence of more numerous ribs. It differs from *V. (Z.) cadenai* Etayo-Serna, 1979, in having a narrower umbilicus, higher whorls, more numerous ribs, and two stronger pairs of tubercles.

It mainly differs from the representatives of *V. (Vectisites)* Casey in having a narrower umbilicus, two pairs of lateral tubercles on the main ribs, a forward curvature of the ribs on the venter and in having a depression at mid-venter.

Occurrence – Barbosa, Chipatá Viejo; middle Aptian.

***Vectisites*? *(Zambranoites) grandis* sp. nov.**
Pl. 29, fig. 2; Pl. 31, fig. 2; Pl. 35, fig. 2; Pls. 37, 38.

Type material – Holotype**,** RGM 282 951, Pl. 29, fig. 2. Paratypes, RGM 282 896-282 950, 282 952-282 961.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – *Grandis* (Latin) = large; from having a large shell.

Diagnosis – Semi-evolute, convex whorls, which moderately increase in height, with sub-trapezoidal whorl section and narrow, deep, step-like umbilicus. The sculpture consists of numerous, slightly flexuouse ribs, which are curved forward on the venter. There are one to three simple, non-tuberculated, intermediate ribs between every two main ones. On the early whorls the main ribs bear lateral tubercles. All ribs are depressed on the venter.

Description – The early whorls are strongly convex, but later moderately convex; they are moderately increasing in height and semi-evolute. The cross section of the early whorls is sub-circular, but later it becomes sub-trapezoidal, with the point of maximum thickness migrating in the course of growth from the middle of the flanks to the umbilical margin. The venter is broadly rounded, but on the early whorls slightly flattened. The flanks are moderately convex, but almost flattened in later growth stages. The umbilicus is rather narrow, deep, step-like, with a high, steep wall and rounded umbilical rim.

The sculpture consists of numerous, rather weak main and intermediate ribs. At the beginning they are weak, simple, rather thick, and of equal thickness in the upper part of the flanks and on the venter. At about D = 15 mm there is only one intermediate rib between every two main ones, which are well visible only in the upper part of the flanks and on the venter. Later they become longer and arise from the umbilical rim. The main ribs are radial up to the upper part of the flanks, but in the uppermost part of the flanks and on the venter they are curved forward. On the flanks, at about D = 15-25 mm, they are elevated crest-like and occasionally bear very weak, sharp triangular tubercles, elongated in the direction of the ribs. On the venter the ribs are somewhat flattened. At D = 25-35 mm the sculpture mainly consists of a regular alternation of main and intermediate ribs. The main ribs arise from the umbilical seam, are inclined backward on the umbilical wall and become crest-like on the umbilical rim. On the flanks the ribs are radial and pass over the venter with a slight forward curve. The depression of the ribs at mid-venter gradually disappears and all ribs become equal. At about D = 35-40 mm some of the main ribs bifurcate near the umbilical rim (rarely higher). The intermediate ribs appear irregularly, one between every two main ribs. The ribs are unevenly disposed, for instance, after two to five regularly distributed ribs follow very distant ribs, and between them are furrow-like constrictions. In the late growth stage the sculpture consists of slightly differentiated, bifurcating main ribs and there is generally one intermediate rib, rarely two to three, between the main ribs. The latter arise at the umbilical seam, are rather strongly inclined backward on the umbilical wall and occasionally bifurcate from the crest-like elevations on the umbilical rim. On the flanks they are slightly flexuous and pass over the venter with a forward curve. The weaker intermediate ribs arise on the umbilical wall or sometimes at various heights on the flanks. They are rather thin. Their breadth is equal to, or somewhat exceeding that of, the interspaces between them. Up to the end of the last whorl there are slight constriction-like deepenings.

The suture line of the adult stage is weakly frilled. The external lobe (E) is narrow and long. The saddle (E/L) is rather broad, high and asymmetrically bifid. The lateral lobe (L) is very broad, almost as deep as the external lobe (E) and apparently pseudotrifid. The central branch (L_1) is narrow and long. L_2 is shorter than L_1, and it is separated from the latter by narrow and low secondary saddle. The lobe L_3 is disposed higher and it is shorter than the lobe L_2.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 937	34.3	16.0	18.3	8.6	10.2	47	53	25	1.6	29
282 902	45.3	21.2	22.1	11.4	13.1	47	49	25	1.6	38
282 952	46.0	21.2	21.0	12.2	12.5	46	46	27	1.7	41
282 955	47.2	21.1	22.3	12,2	14.5	45	47	26	1.5	31
282 924	54.2	25.6	25.7	12.5	15.2	47	47	23	1.7	40
282 938	58.5	25.6	27.0	15.2	16.2	44	46	26	1.6	43
282 944	57.8	26.9	28.3	15.,1	16.7	47	49	26	1.6	45
282 940	61.0	25.5	27.2	16.,4	17.4	42	45	27	1.5	-
282 951	74.3	32.4	35.8	19.,4	20.2	44	48	26	1.6	57
282 947	163.8	77.4	79.0	44.7	46.5	47	48	27	1.7	85
282 947	84.0	37.7	40.7	20.4	23.0	45	48	24	1.6	-

Variability – The ribbing, tuberculation and whorl section are variable. For example, RGM 282 944 is characterized by very strong, sharp, umbilical thickenings on the main ribs at the end of the last whorl. There are large shells (D > 150 mm), which on the last whorl have five, rarely six intermediate ribs of different lengths between every two main ribs. The number of intermediate ribs varies from one to five in the late growth stage. There are specimens that have very strong, crest-like, distant ribbing (e.g., RGM 282 925), whereas others (e.g., RGM 282 936, 282 950) have dense, weak ribs. RGM 282 913, 282 916 and 282 949 are characterized by having low broad whorls, but RGM 282 955, 282 960 and 282 961 have thinner and higher whorls with a quadrate cross section.

Comparison and remarks – The described species differs from the other species of *Vectisites* in having higher and thinner whorls, thinner, denser and less differentiated ribs, and in bearing rudimentary tubercles or tubercle-like thickenings. Moreover, it has a narrower umbilicus and a rather strong adoral curvature of the ribs on the venter in the late growth stage. By these features it resembles *Parahoplites* Anthula, but it differs in the character of the ribbing in the early growth stage and in the configuration of the suture line; the saddle E/L of the new species is significantly longer than the other ones, lobe L is very broad and its shape is more like in Douvilleiceratidae than in Parahoplitidae.

The morphology of the early whorls is nearly similar to the morphology of *V. (Z.) mateusi* Etayo-Serna, 1979, but differs in having more numerous ribs, higher and broader whorls (with trapezoidal cross section), and in the earlier appearance of tubercles. By general shell shape the described new species is similar to *Kazanskyella arizonica* Stoyanow, 1949, but differs in its higher and broader whorls, and in the configuration of its suture line (particularly of the lateral lobe L, which is much wider and asymmetrically divided).

The described specimens have a peculiar type of sculpture. The early whorls are similar to *Vectisites (Zambranoites)* Etayo-Serna, but in the middle and late growth stages it approaches *Parahoplites* Anthula. Its lateral lobe (L) is of cheloniceratid type, but also has parahoplitid features. We propose that this group should be regarded as an intermediary group between *Vectisites* Casey and *Parahoplites* Anthula. The above noted peculiarities of the sculpture and suture line might be a real basis for considering this group an independent genus (subgenus?), but because of the lack of sufficient material we refrain from such a conclusion and include this species conditionally in *Vectisites*? *(Zambranoites)*.

Occurrence – Guane, Villa de Leyva, Galan, Sutamarchan, Chipatá Viejo, Sáchica, Anapoima-Apulo; middle Aptian.

Subfamily Roloboceratinae Casey, 1961b
Genus *Roloboceras* Casey, 1954

1954 *Roloboceras* Casey, p. 114.
1957 *Roloboceras* Arkell *et al.*, p. L 384.
1958 *Roloboceras* Luppov, p. 117.
1961b *Roloboceras* Casey, p. 177.
1996 *Roloboceras* Wright *et al.*, p. L267.

Type species – *Ammonites hambrovi* Forbes, 1845, p. 354, pl. 13, fig. 4; lower Aptian, southeastern England.

Diagnosis – The whorls are strongly inflated, moderately increasing in height, semi-evolute, with a semi-lunar cross section. The umbilicus is wide, deep, and bounded by a high and steep wall. The ribs are coarse and thick. The main ribs bear blunt umbilical tubercles from which they bifurcate. The intermediate ribs are without tubercles. The lateral lobe is asymmetrically bifid.

Comparison – *Roloboceras* Casey differs from most similar genus *Megatyloceras* Humphrey in having a narrower and shallower umbilicus, and in having coarser ribs bearing blunt umbilical tubercles.

Distribution – Lower Aptian of southeastern England, France, Spain, Venezuela and Colombia.

***Roloboceras saxbyi* Casey, 1961b**

Pl. 39, fig. 1; Pl. 40, fig. 1.

1961b *Roloboceras saxby* Casey, p. 188, pl. 30, figs. 1, 2, text-fig. 57c, d.
1982 *Roloboceras saxbyi* Casey: Renz, p. 19, pl. 3, figs. 1, 2.

Holotype – Natural History Musem, London, 46590, Atherfield Clay Series, Lower Lobster Bed inferred, Atherfield, Isle of Wight, England (Saxby Collection) (Casey, 1961b).

Material – Three specimens and two fragments, RGM 283 021-283 025.

Description – The whorls are very inflated, coronate, semi-evolute and moderately increasing in height. The whorl section is wide-oval to sub-trapezoidal, with the point of maximum thickness at the umbilical rim. The venter is broadly rounded with a slight flattening in the middle. It passes gradually into low, convex flanks. The umbilicus is wide, deep, step-like with a high, steep wall, and a rounded umbilical rim.

On the inner whorls the sculpture consists of numerous, strong, straight ribs, which are slightly inclined backward. There are rather thick, bifurcated main ribs, which arise on the umbilical wall or in the lower part of the flanks. On the umbilical rim they bear rather strong, blunt, radially elongated tubercles. From the umbilical tubercles the main ribs split into two almost equal branches. In the penultimate whorl weak, simple intermediate ribs occur in threes between every two main ones. With growth, the number of intermediate ribs decreases to one. On the last whorl the tubercles turn into strong thickenings elongated in the direction of the ribs. The main ribs arise at the umbilical seam; on the umbilical margin they are inclined backward making an angle of 30-40^{o} with the radius; at the point of the umbilical thickenings they split into two equal branches. Between the main ribs occasionally appears an intermediate rib. On the flanks all ribs are rather narrow and crested. They pass over the venter without weakening. All ribs are equal, flattened and are two times broader on the

venter than near the umbilicus. Their adoral sides are higher than their adapical sides and their tops are slanting. The ribs are two times thicker than the interspaces. On the second half of the last whorl the ribs become rather distant and, together with the umbilical thickenings, they are very strong.

Measurements – RGM 283 022: D = 158.0; H = 61.0; W = 90.7; U = 51.0; h = 42.6; H:D = 39; W:D = 58; U:D = 32; H:h = 1.4; ribs = 43. RGM 283 023: D = 161.0; H = 61.6; W = 100.0; U = 54.0; h = 45.0; H:D = 38; W:D = 62; U:D = 34; H:h = 1.4; ribs = 40.

Comparison and remarks – This species strongly differs from others within *Roloboceras* in having thinner whorls and rather numerous, weak ribs. Consequently, it resembles *Cheloniceras* Hyatt, but differs in having a coronate whorl section and only one pair of strong umbilical tubercles. It differs from *Roloboceras hambrovi* Forbes, 1845, in having thinner whorls, a weaker sculpture, weaker umbilical thickenings and less numerous ribs.

Distribution – Lower Aptian, Zone of *Deshayesites forbesi* (subzones of *D. kiliani* and *D. callidiscus*) of southern England; upper part of the lower Aptian of Venezuela; lower Aptian of Colombia.

Occurrence – Galan; lower Aptian.

***Roloboceras* cf. *regale* Casey, 1961b**

Pl. 36, fig. 2.

Material – One specimen, RGM 283 026.

Description – The whorls are very inflated, evolute and moderately increasing in height. The whorl section changes during ontogeny from sub-rectangular to coronate, with the point of maximum thickness at the umbilical margin. On the penultimate whorl the venter rapidly becomes wider and rounded, whereas the flanks become lower and more convex. The ventrolateral transition is rounded. The umbilicus is moderately wide, funnel-shaped, deep with a high, almost steep wall and a rounded umbilical margin.

The sculpture is coarse; it consists of strong, tuberculated and bifurcated main ribs, and simple, non-tuberculate intermediate ribs. The main ribs arise near the umbilical seam; on the umbilical margin they rapidly become strong and crest-like, and on the flanks they are linked with very large, mace-like tubercles. At the beginning of the last whorl these tubercles are situated in the middle of the flanks and have a high, conical shape, but at the end of the last whorl they are located at the upper margins of the flanks and become mace-like with their bases elongated in the direction of the ribs. At the beginning of the last whorl two branches arise from these tubercles, at the end of the last whorl even three. In the case of two branches the anterior branch is somewhat weaker than the posterior one; when there are three branches, however, the middle branch is the strongest. At the same time the anterior branch is almost radial, whereas the posterior one is inclined backward. The intermediate ribs,

which are weaker and shorter than the main ones, arise at the lower third of the flanks, and there is only one intermediate rib between every two main ones. All ribs pass over the external side with a forward curve. The rib interspaces are half as wide as the ribs.

Measurements – RGM 283 026: D = 34.7; H = 14.7; W = 19.9; U = 9.9; h = 10.1; H:D = 42; W:D = 57; U:D = 29; H:h = 1.5; ribs = 31.

Comparison – The described specimen differs from those identified by Etayo-Serna *et al*. (1994) as *Roloboceras* n. sp. aff. *regale* in having thinner and more numerous ribs, a narrower umbilicus and stronger lateral tubercles from which two or three branches may fork. It differs from the small specimen of *R. saxbyi* Casey, 1961b, in having a smaller number of ribs, stronger lateral tubercles, forwardly curved ribs on the venter and a narrower umbilicus. It differs from *R. perli* Spath, 1930b, in having a narrower umbilicus and less differentiated ribs which are curved forward on the venter.

Distribution – Lower Aptian of southern England and Colombia.

Occurrence – Guane; lower Aptian.

Subfamily Douvilleiceratinae Parona & Bonarelli, 1897
Genus *Eodouvilleiceras* Casey, 1961b

1961b *Eodouvilleiceras* Casey, p. 191.
1996 *Eodouvilleiceras* Wright *et al.*, p. L269.

Type species – *Douvilleiceras horridum* Riedel, 1938, p. 29, pl. 6, figs. 1, 2; lower? Albian, Colombia.

Diagnosis – The whorls are inflated, with a wide-oval to polygonal whorl section. The venter is broadly rounded, gradually passing into convex flanks. The umbilicus is wide, deep, with a high and steep wall. The ornamentation consists of numerous ribs, which may be radial or slightly inclined backward. On the early whorls the main ribs bear three pairs of tubercles; weak umbilical, strong, thorn-like lateral and cone-like external. On the last whorl the external tubercles are divided into two, rarely three, separate tubercles. Intermediate ribs are rare and generally bear external tubercles. Between the external tubercles the ribs are strongly depressed. The lateral lobe is wide, asymmetrically bifid, the external branch being longer than the internal one. The external saddle is very high and asymmetric.

Comparison – *Eodouvilleiceras* Casey differs from *Epichelonicras* Casey in having simple radial ribs with four or five pairs of tubercles and in the rare presence of the intermediate ribs.

Distribution – France, Georgia, northwestern Caucasus, Daghestan, Turkmenistan, California, Colombia, Venezuela. Upper Aptian (Clansayesian) to lower? Albian.

Eodouvilleiceras aff. *planum* (Rouchadzé, 1933)

Pl. 55, fig. 2.

Material – One specimen, RGM 283 014.

Description – Inflated semi-evolute whorls, with sub-rectangular cross section; the whorls are moderately increasing in height. The point of maximum thickness is at the umbilical rim. The venter is broadly rounded, slightly flattened in the middle. It passes gradually into the sub-parallel and flattened flanks. The umbilicus is wide, moderately deep, step-like, with a low and gently sloping wall, and a rounded rim.

The ornamentation consists of rather strong, simple, radial, tuberculate ribs. They originate on the umbilical wall and gradually become stronger on the flanks. The ribs are wide apart having interspaces which are two to three times wider than the ribs. At the beginning of the last whorl the ribs bear three pairs of tubercles, between which the ribs are strongly depressed. The first pair is developed on the umbilical rim, the second in the upper part of the flanks near the external margin and the third is situated on the venter. They become stronger in the late ontogenetic stage. The tubercles are rather long, sharp, thorn-like, with their bases, elongated in the direction of the ribs. Near the external rim halfway up the last whorl at about D = 40 mm arises a fourth pair of small tubercles which are not independent; they remain expressed as elevations near the principal lateral tubercles.

Measurements – RGM 283 014: D = 53.4; H = 18.0; W = 23.1; U = 21.3; h = 13.4; H:D = 34; W:D = 43; U:D = 40; H:h = 1.4; ribs = 16.

Comparison – By the character of the sculpture and the narrower whorl section the described specimen resembles *E. planum* Rouchadzé (*in* Eristavi, 1955), but differs from it in the smaller number of the ribs (16 against 30-32 on the whorl) and in the early appearance of the fourth pair of tubercles. From *E. horridum* Riedel, 1938, it mainly differs in having narrower whorls of sub-rectangular cross section, and less numerous and weaker ribs. In contrast to *E. pedrocarvajai* Etayo-Serna, 1979, *E.* aff. *planum* is characterized by a narrower umbilicus, the absence of secondary ribs and the stronger umbilical tubercles. It differs from *E. trituberculatum* Sakharova, 1985, in the wider umbilicus, the absence of the intermediate ribs and in having only two pairs of tubercles on the external side instead of three.

Occurrence – Guane; upper Aptian.

Genus *Douvilleiceras* de Grossouvre, 1894

1894 *Douvilleiceras* de Grossouvre, p. 26.
1913 *Douvilleiceras* Kilian, p. 339.
1915 *Douvilleiceras* Kilian & Reboul, p. 47.
1923 *Douvilleiceras* Spath, p. 68.
1938 *Douvilleiceras* Roman, p. 423.
1940 *Douvilleiceras* Scott, p. 1007.
1952 *Douvilleiceras* Basse, p. 656.

1957 *Douvilleiceras* Arkell *et al.*, p. L387.
1958 *Douvilleiceras* Luppov, p. 117.
1962 *Douvilleiceras* Casey, p. 260.
1963 *Douvilleiceras* Collignon, p. 109-120.
1967 *Douvilleiceras* Mirzoev, p. 57.
1967 *Douvilleiceras* Dimitrova, pp. 176, 177.
1996 *Douvilleiceras* Wright *et al.*, p. L269.

Type species – *Ammonites mammillatus* Schlotheim, 1813, p. 111; lower Albian, France.

Diagnosis – The whorls are inflated, semi-evolute, with a circular-polygonal cross section. The venter is broad, rounded or slightly flattened. It passes gradually into the convex flanks. The umbilicus is wide or rather wide, step-like, deep, with a high and steep wall. The sculpture is very coarse and consists of strong radial ribs, which are depressed in the middle of the venter. They bear six to eight pairs of sharply distinct tubercles. Rather often there are rather thin, tuberculated intermediate ribs. The lateral lobe is wide, asymmetric and in a later growth stage divided into two intermediate lobes.

Comparison – *Douvilleiceras* differs from *Eodouvilleiceras* Casey in its coarser sculpture, which is represented by strong radial ribs with six to eight pairs of transversally elongated tubercles.

Distribution – Southern England, northern Germany, France, Bulgaria, Switzerland, Sardinia, Crimea, Ukrainian Carpathians, north Caucasus, Georgia, Mangyshlak (Kazakhstan), Turkmenistan, Egypt, Angola, Madagascar, India, Pakistan, Texas, Mexico, Venezuela, Colombia, Peru, northeastern Brazil. Lower Albian and rarely in the lower part of the middle Albian.

***Douvilleiceras orbignyi* Hyatt, 1903**
Pl. 57, fig. 2.

pars 1841 *Ammonites mammillaris* Schlotheim: d'Orbigny, p. 249, only pl. 73, figs. 1-3.
pars 1878 *Acanthoceras mammillare* Schlotheim: Bayle, only pl. 60, fig. 4.
1903 *Douvilleiceras orbignyi* Hyatt, p. 110.
1962 *Douvilleiceras orbignyi* Casey, p. 279, pl. 40, figs. 6-8; pl. 42, figs. 12, 13; text-figs. 99, 100, 102h *(cum synonymis).*
1965 *Douvilleiceras orbignyi* Casey: Howarth, p. 345, pl. 1, fig. 5.
1977 *Douvilleiceras orbignyi* Casey: Kotetishvili, p. 65, pl. 32, fig. 1a-c.

Neotype –The specimen figured and identified by Bayle (1878, pl. 60, fig.4) as *Acanthoceras mammillare*, now in the École Nationale Supérieure des Mines, Paris. It was so designated by Casey (1962), because the holotype of Hyatt's species (d'Orbigny, 1841, pl. 73, figs. 1-3) is lost.

Material – One specimen, RGM 283 015, and one whorl fragment (= *D.* cf. *orbignyi*), RGM 287 512.

Description – The whorls are strongly inflated, moderately increasing in height and semi-evolute. The whorl section is oval, considerably wider than high with the point of maximum thickness near the umbilical rim. The venter is broad, convex and passes gradually into moderately convex, slightly flattened flanks. The umbilicus is rather wide, moderately deep, and step-like. It has a low, steep wall and rounded margin.

The sculpture is coarse and consists of strong, simple, distant, almost radial, tuberculate ribs. They arise on the umbilical wall, gradually become strong, and elevated on the flanks and venter. At the beginning of the last whorl they are situated near to each other, but later they become distant. The ribs bear six pairs of tubercles; the sixth pair appears only at the end of the last whorl. The first pair of tubercles is situated at the umbilical margin. They are rather sharp and long, with their bases elongated in the direction of the ribs. The second pair of tubercles occupies the middle part of the flanks. These tubercles are very strong and have a triangular shape. The third pair occupies the upper third part of the flanks, are very strong, thorn-like and have a rounded basis. The other three pairs of tubercles are situated at the ventro-lateral margins and are elongated in the direction of the spire. They have flat flanks and rather sharp crest. At the end of the last whorl there are two very thin, short intermediary ribs, which alternate with the main ribs. The intermediary ribs bear six pairs of very weak tubercles.

Measurements – RGM 283 015: D = 47.0; H = 18.2; W = 27.0; U = 16.3; H = 11.6; H:D = 39; W:D = 57; U:D = 35; H:h = 1.6; ribs = 13.

Comparison – By the character of the sculpture and whorl shape the described species resembles *Douvilleiceras inaequinodum* Quenstedt, 1849, *D. alternans* Casey, 1962, and *D. magnodosum* Casey, 1962. From the first species it mainly differs in having a smaller number of secondary ribs, and a coarser sculpture. In contrast to *D. alternans*, the described species is characterized by more numerous ribs and a less coarse sculpture. From *D. magnodosum*, it differs in having more numerous and weaker main ribs, a smaller number of intermediate ribs and weaker ventral tubercles.

Distribution – Lower Albian of southern England, France, Poland, Angola, Madagascar, Georgia, and Colombia.

Occurrence – Apulo; lower Albian.

***Douvilleiceras magnodosum* Casey, 1962**

Pl. 69, fig. 1.

1962 *Douvilleiceras magnodosum* Casey, p. 284, pl. 42, fig. 4a, b; text-fig. 102k.

Holotype – British Geological Survey, Keyworth, SM 107954, Folkestone Beds, Lower Albian, *Douvilleiceras mammillatum* Zone, *Cleoniceras floridum* Subzone (bed 4), Ford Place, Wrotham, Kent, England (R.A. Milbourne Collection) (Casey, 1962).

Material – One specimen, RGM 283016.

Description – The shell consists of inflated, evolute whorls, which moderately

increase in height. The whorl section is wide and oval, with the point of maximum thickness at the umbilical rim. The venter is broadly rounded, slightly flattened in the middle. It passes gradually into moderately high, rather convex flanks. The umbilicus is rather wide, step-like, moderately deep with a steep wall, which gradually passes into the flanks.

The sculpture is very coarse, and consists of a regular alternation of one tuberculate main rib and one non-tuberculate, simple, radial intermediate rib. The main ribs are very strong and their number on half a whorl attains five. They arise at the umbilical seam, and gradually become thick and elevated on the flanks and on the ventrolateral margin. In the middle of the venter they are very depressed (low) and their shape resembles a narrow, deep saddle. Among the six pairs of tubercles the first row is situated on the umbilical margin; they have a long, moderately strong conical shape. The second pair occupies the lower third part of the flanks; they are weaker than the other tubercles and have a conical shape. The third pair of tubercles is situated not far below the middle of the flanks. They are very strong and thorn-like, elongated in the direction of the radius. The other three pairs of tubercles are situated along the ventral margin; they have the shape of very strong, elevated, curved cylinders. As a rule the first intermediate rib adapical of a main rib is stronger than the second one and also bears six pairs of rather small, sharp, conical, thorn-like tubercles. Like the main ribs, these intermediate ribs gradually become thicker and more elevated on the flanks and venter. In the middle of the venter they are interrupted and the venter, therefore, has a rather narrow, saddle-like shape. The second intermediate ribs are very weak, and lack tubercles.

Measurements – RGM 283 016: D = 89.0; H = 30.1; W = 38.6; U = 37.0; h = 20.0; H:D = 34; W:D = 43; U:D = 42; H:h = 1.5; ribs = 14 (half whorl).

Comparison and remarks – Casey (1962) established this species in spite of having only one whorl fragment, with only one main rib and several intermediate ones. He clearly identified its principal characteristic features; strong elevated main ribs on the external margin, thorn-like tubercles and the presence of a deep narrow sulcus in the middle of the venter. The described species differs from *Douvilleiceras alternans* Casey, 1962, in having lower and narrower whorls, a wider umbilicus, stronger and more elevated main ribs on the external margin, and stronger first intermediate ribs directly adapical of the main ribs.

Distribution – Lower Albian, Zone of *Douvilleiceras mammillatum*, Subzone of *Cleoniceras floridum* of southern England; lower Albian of Colombia.

Occurrence –Apulo; lower Albian.

***Douvilleiceras* cf. *pustulosum* Casey, 1962**

Pl. 66, fig. 1; pl. 67, fig. 1.

Holotype –The Natural History Museum, London, BMNH C40343, *regularis - mammillatum* nodules, Arnold's pit, Billington Crossing, Leighton Buzzard, Beds (G.W. Coles Collection) (Casey, 1962).

Material – One specimen, RGM 283 017.

Description – The shell consists of inflated, semi-evolute whorls, which moderately increase in height. The whorl section is wide and oval, almost sub-rectangular, with the point of maximum thickness at the lower third of the flanks. The venter is broadly rounded and slightly flattened in the middle. It gradually passes into rather high, moderately convex, almost parallel flanks. The umbilicus is moderately wide, rather deep, step-like, with a high and steep wall, and a rounded umbilical rim.

The sculpture consists of rather numerous, equal, simple tuberculate ribs. They arise at the umbilical seam, and are crested and inclined backward on the umbilical wall. On the umbilical rim they become strong, and remain strong and radial on the flanks. When passing over the venter they are slightly elevated on the ventral margins and strongly flattened in the middle of the venter, forming a wide, deep, saddle-like depression. They bear six pairs of tubercles. The first, rather strong pair is situated on the umbilical rim, whereas the weaker second pair is developed at the lower third of the flanks. The third pair of tubercles is situated in the upper third of the flanks and these tubercles are almost equal to the umbilical ones. The fourth pair is situated at the ventral margin, and the fifth and sixth pairs on the venter. The latter two pairs have rounded tops, and are located closer to each other than the fourth and the fifth ones. At the end of the last whorl the sculpture becomes weak. The ribs are flattened and thin, and the tubercles turn into rather strong radial thickenings. The saddle-like depression in the middle of the venter becomes significantly broader. On the early whorls the interspaces between the ribs are equal to their breadths or slightly exceed them; at the end of the last whorl the reverse is the case.

Measurements – RGM 283 017: D = 105.0; H = 41.4; W = 52.7; U = 35.1; h = 26.5; H:D = 39; W:D = 50; U:D = 33; H:h = 1.6; ribs = 40.

Comparison – The described species differs from *Douvilleiceras mammillatum* Schlotheim (Spath, 1923, p. 68, pl. 4, fig. 3) in having a sub-rectangular whorl section, a smaller number of tubercles, and less pronounced ribs on the venter and rounded (but not elongated in the direction the spire) tubercles. In contrast to *D. monile* Sowerby (*in* Sowerby & Sowerby, 1816, p. 35, pl. 117, fig. 1 only) (lectotype designated by Casey, 1962, p. 284), the described species is characterized by a coarser sculpture on the early whorls, a smaller number of ribs and tubercles, and a broader depression on the venter. It differs from *D. laightonense* Casey, 1962, in having lower whorls, a somewhat wider umbilicus, a smaller number of tubercles and a greater number of ribs on the last whorl.

Distribution – Lower Albian of southern England and Colombia.

Occurrence – Anapoima-Apulo; lower Albian.

***Douvilleiceras* aff. *tarapacaense* Etayo-Serna, 1979**

Pl. 68.

Material – Three specimens, RGM 283 018-283 020.

Description – The whorls are inflated, moderately increasing in height and evolute. The whorl section is wide-oval, with the maximum thickness at the lower third of the flanks. The venter is broadly rounded and passes into rather high, moderately convex flanks. The umbilicus is rather wide, saucer-like, and bounded by a low and gently sloping wall, which gradually passes into the flanks.

The ornamentation consists of simple tuberculate ribs, which are distant on the early whorls. At D = 40 mm their number is 14-15 to one whorl; at D = 70 mm it is 18, but at D = 100 mm their number attains 24-28. The ribs arise at the umbilical seam and on the umbilical wall they are still thin, and strongly inclined backward making an angle of almost 40° with the radius. On the umbilical rim they are straight and radial, gradually becoming elevated and thick on the flanks. They pass straight over the external side, and are strongly depressed in the middle of the venter forming a rather broad and deep saddle. There are no intermediate ribs on the early whorls and only on the last whorl (RGM 283 019) there are two weaker intermediate ribs. The main ribs bear tubercles of various sizes and shapes. At D = 33 mm there are already six pairs of tubercles, but at the end of the last whorl a seventh additional pair of tubercles appears. The first pair is situated near the umbilical rim. They are sharp, rather thick and at the end of the last whorl they become thorn-like. The second pair of tubercles is weaker and situated on the lower third of the flanks. They are conical with a radially elongated basis. The third pair is situated on the upper part of the flanks; they are generally large with a mace-like shape. The following three pairs of the tubercles are situated at the ventral margin and on the venter. Among them the tubercles of the sixth pair are the largest and have sharp tops, but are sometimes flattened and spirally elongated. The additional seventh pair appears halfway along the last whorl; these tubercles are situated on the margins of the saddle-like siphonal depression and are formed in consequence of a splitting of the tubercles of the sixth pair. Before this splitting the latter become higher and larger with a flattened top, but after division their tops become sharp again.

Measurements – RGM 283 019: D = 96.4; H = 32.3; W = 41.0; U = 40.4; h = 23.1; H:D = 34; W:D = 43; U:D = 42; H:h = 1.4; ribs = 24. RGM 283 020: D = 91.2; H = 31.5; W = 38.6; U = 36.2; h = 22.0; H:D = 35; W:D = 42; U:D = 40; H:h = 1.4; ribs = 28.

Comparison – The described species differs from the similar *D. tarapacaense* Etayo-Serna, 1979, in having a narrower umbilicus, thicker and stronger tubercles, and a deeper ventral depression of the ribs. In contrast to *D. monile* Sowerby (*in* Casey, 1962), the described species is characterized by lower whorls, a wider umbilicus, a smaller number of thick ribs, and larger and less numerous tubercles. From *D. leightonense* Casey, 1962, it differs in having lower whorls, a wider umbilicus, a smaller number of the ribs, in the character of its tuberculation, and the narrower and deeper depression on the venter. By the type of sculpture on the early whorls the described species resembles *D. orbignyi* Hyatt, 1903, but differs from it in the narrower umbilicus, the whorls being less broad, the weaker sculpture and the smaller number of ribs.

Occurrence – Anapoima-Apulo; lower Albian.

Superfamily Acanthohoplitoidea Stoyanow, 1949
Family Acanthohoplitidae Stoyanow, 1949
Subfamily Colombiceratinae Tovbina, 1979
Genus *Gargasiceras* Casey, 1954

1954 *Gargasiceras* Casey, p. 114.
1957 *Gargasiceras* Arkell *et al.*, p. L387.
1958 *Gargasiceras* Luppov *et al.*, p. 103.
1967 *Gargasiceras* Dimitrova, p. 188.
1996 *Gargasiceras* Wright *et al.*, pp. L274, L275.

Type species – *Ammonites gargasensis* d'Orbigny, 1841, p. 199, pl. 59, figs. 5-7; middle Aptian, France.

Diagnosis – The whorls are of medium thickness, semi-evolute, with a circular to sub-rectangular or sub-trapezoidal cross section. The umbilicus is moderately wide, rather shallow, step-like. The ribs are numerous, thin, straight or slightly flexuous. On the inner whorls the main ribs are raised into thin flanges, above which the ribs fork at minute tubercles. These small lateral tubercles disappear early. There are one to three non-tuberculate intermediate ribs between the main ones. In the middle of the venter the ribs are depressed; this siphonal depression is bounded at both sides by tubercle-like elevations. The lateral lobe is trifid.

Comparison – *Gargasiceras* Casey differs from most similar genus *Acanthohoplites* Sinzow in having thinner and weaker ribs, and in the earlier shift of the lateral tubercles towards the umbilical rim and their attenuation afterwards.

Distribution – France, Daghestan, Turkmenistan, Mexico, Venezuela, Peru, Colombia; middle Aptian.

Gargasiceras attenuatum (Kilian, 1913)
Pl. 71, figs. 3, 4.

1913 *Acanthoplites Gargasensis* var. *attenuata* Kilian, p. 346.
1926 *Acanthoplites gargasensis* var. *attenuata* Kilian: Roch, p. 292, pl. 18, figs. 8, 8a.

Lectotype – The specimen figured by Roch (1926, pl. 18, figs. 8, 8a), in the collection of the University of Grenoble. Middle Aptian (Gargasian), Apt, France.

Material – Six specimens, RGM 282 962-282 967.

Description – The whorls are inflated, semi-evolute and moderately increasing in height. The whorl section is sub-quadrate, slightly wider than high with the point of maximum thickness in the lower third of the flanks. The venter is moderately broad, slightly convex and all ribs have a siphonal depression. The venter passes gradually into rather high, slightly convex flanks. The umbilicus is moderately wide, step-like, rather deep, with a low and steep wall. The umbilical rim is rounded.

The ornamentation consists of numerous thin, non-tuberculate ribs. On the inner whorls they are almost equal, but later (beginning from D = 10-11 mm) they become slightly differentiated. Rather strong main ribs, which arise at the umbilical seam, are crest-like elevated and slightly bent forward at the umbilical rim. In the lower part of the flanks they fork in most cases into two equal branches. There is generally one (rarely two) weaker intermediate rib between every two main ribs; they arise on the umbilical wall or in the lower third part of the flanks. In the upper third of the flanks all ribs are slightly less prominent and slightly inclined backward; they pass in a straight line over the venter, with a depression in the middle. At the end of the last whorl the sculpture becomes somewhat stronger; crest-like, blunt elevations appear at the umbilical rim and from these points sometimes originate two branches.

Measurements – Key = * Half whorl.

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 965	145	55	66	43	34	38	45	30	1.6	64
282 967	185	75	82	58	51	40	44	31	1.5	62
282 963	188	83	86	59	53	44	46	31	1.6	30*
282 962	248	92	99	86	63	37	40	34	1.5	68

Comparison – By its general shape and the presence of numerous thin ribs, the described species resembles *Gargasiceras gargasense* (d'Orbigny, 1841), but differs from it in having thicker whorls, a narrower umbilicus and a smaller number of longer intermediate ribs. In contrast to *G. aptiense* Roch, 1926, the described species is characterized by somewhat broader whorls, a finer sculpture and more numerous ribs.

Distribution – Middle Aptian (Gargasian) of southeastern France (Alpes de Province) and Colombia.

Occurrence – Sáchica, Villa de Leyva; middle Aptian.

***Gargasiceras aptiense* (Roch, 1926)**

Pl. 72, fig. 1.

1926 *Acanthoplites gargasensis* var. *aptiensis* Roch, p. 292, pl. 18, figs. 5, 5a; text-fig. 4.
1982 *Gargasiceras aptiense* (Roch): Renz, p. 28, pl. 2, fig. 6a, b; text-fig. 16d.

Lectotype – The specimen figured by Roch (1926, pl. 18, figs. 5, 5a), in the collection of the University Grenoble. Middle Aptian (Gargasian), Apt, France.

Material – Three specimens, RGM 282 968-282 970.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The whorl section is oval to sub-rectangular with the point of maximum thickness in the lower third of the flanks. The venter passes gradually into moderately high, slightly convex flanks. The umbilicus is rather wide, step-like and moderately deep, bounded by a low, steep wall. The umbilical rim is broadly rounded.

The ornamentation consists of numerous, generally simple ribs, which only slightly differ in strength. Rather strong main ribs arise from the umbilical seam, somewhat inclined backward on the umbilical wall and passing with an adorrally convex curve over the lower part of the flanks. Up to the upper third of the flanks they are crest-like, but then diminish in prominence and pass over the venter, where they are markedly depressed in the same manner as the intermediate ribs. On the early whorls there are tubercle-like lateral elevations, from which sometimes two branches arise. Later, these elevations diminish and forking of the main ribs becomes rare. The intermediate ribs are weaker on the penultimate whorl; there are three to five intermediate ribs between every two main ribs, but on the late whorl their number reduces to one or two. On the upper third of the flanks the main ribs become low and flattened like the intermediate ones. At the end of the last whorl the ribs become slightly thicker, the main ribs become flattened on the flanks, but the intermediate ribs are strong and the siphonal depression on the venter becomes shallower.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 969	17.8	7.2	7.4	5.3	4.6	40	42	30	1.6	43
282 970	21.4	8.9	8.6	6.9	5.3	42	40	34	1.7	52
282 968	27.2	10.0	9.4	9.8	7.3	37	35	36	1.4	53

Comparison – In contrast to *Gargasiceras gargasense* (d'Orbigny, 1841), the described species is characterized by lower, thinner whorls, a smaller number of ribs and thicker main ribs bearing tubercle-like elevations on the early whorls. *Gargasiceras aptiense* differs from *G. recticostatum* Kilian, 1913, in having a wider umbilicus, a less coarse sculpture, and more numerous and non-tuberculate ribs on the adult growth stage, which only slightly differ in strength.

Distribution – Middle Aptian (Gargasian) of southeastern France (Alpes de Provence), Venezuela (Vale Grande Formation) and Colombia.

Occurrence – Mesa de Los Santos, Anapoima-Apulo, Villa de Leyva; middle Aptian.

***Gargasiceras recticostatum* (Kilian, 1913)**

Pl. 72, fig. 2.

1913 *Acanthoplites gargasensis* var. *recticostata* Kilian, p. 346.
1926 *Acanthoplites gargasensis* var. *recticostata* Kilian: Roch, p. 288, pl. 18, figs. 6, 6a, 7, 7a.
? 1982 *Gargasiceras* cf. *recticostatum* (Kilian) Roch: Renz, p. 27, pl. 2, figs. 11-13; text-fig. 16c.

Lectotype – The specimen selected and figured by Roch (1926, pl. 18, figs. 6, 6a); collection of the University of Grenoble. Middle Aptian (Gargasian), Alpes de Provence (Carniol), France.

Material – Six specimens, RGM282 971-282 976.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The whorl section is oval-subrectangular, with the point of maximum thickness approximately in the middle of the flanks. The venter is narrow and flattened in the middle, and gradually passes into rather high, moderately convex flanks. The umbilicus is rather wide, step-like, moderately deep with a low, steep wall and a rounded umbilical rim.

The sculpture is rather coarse. It consists of rather strong, tuberculate main ribs and non-tuberculate intermediate ribs. The main ribs arise on the umbilical seam, and become slightly flexuous and crest-like on the lower part of the flanks. Just above the middle of the flanks they bear very small tubercles elongated in the direction of the radius; here the main ribs fork into two uneven branches. On the early whorls there are two to three intermediate ribs between two main ones, but later their number reduces to one. On the upper third part of the flanks all ribs become broader and flattened. They pass over the venter with a rather prominent angle and become markedly lowered in the middle of it; they bear blunt, tubercle-like elevations on the ventral margins. On the venter all ribs are equal or sometimes the intermediate ribs are a little weaker than the main ribs. At the end of the last whorl the lateral tubercles are less pronounced, the ribs become stronger and distant, and the ventral depression has almost disappeared. At the umbilical rim the main ribs bear crest-like thickenings.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 975	14.8	5.7	6.2	5.2	4.0	39	42	35	1.4	36
282 973	17.4	6.3	7.4	6.3	5.0	36	43	36	1.3	44
282 974	18.2	7.7	7.0	6.0	4.9	42	38	33	1.6	48
282 972	18.6	7.3	7.1	6.0	5.3	39	38	32	1.4	45
282 971	21.1	8.2	7.2	7.4	5.4	39	34	35	1.5	43

Comparison – With respect to the general shape of the whorls and the character of the sculpture on the early growth stage, the described species resembles *Gargasiceras acutecostum* Riedel, 1938, but differs in having higher and more compressed whorls, a weaker sculpture and a deeper depression on the venter. In contrast to *G. gargasense* (d'Orbigny, 1840), the described species is characterized by a somewhat narrower umbilicus, a coarser sculpture, and the existence of slightly flexuous and more numerous tuberculate ribs. It differs from *G. pulcher* Riedel, 1938, in the somewhat broader whorls, in the smaller number of ribs and in the absence of the bunch-like grouping of the ribs.

Distribution – Middle Aptian (Gargasian) of southeastern France (Alpes de Provence), Venezuela? (Vale Grande Formation) and Colombia.

Occurrence – Villa de Leyva, Chipatá-Viejo; middle Aptian.

***Gargasiceras subpulcher* sp. nov.**
Pl. 82, fig. 2; Pl. 83, fig. 2.

Type material – Holotype, RGM 282 987, Pl. 82, fig. 2. Paratypes, RGM 282 986, 282 988 (incomplete).

Type locality – Colombia, Villa de Leyva.

Type horizon – Middle? Aptian.

Derivatio nominis – Named so because of the similarity with *Gargasiceras pulcher* Riedel, 1938.

Diagnosis – Semi-evolute whorls, which slowly increase in height. Cross section high-oval. Umbilicus wide, shallow, the main ribs are sigmoidal. The main ribs are sigmoidal on the umbilical margin and on the lower part of the flanks. In the middle of the flanks they bifurcate, rarely trifurcate; the branches are unequal. There are one to three short intermediate ribs between every two main ones. On the venter all ribs are equally strong with a slight depression along the medial plane.

Description – The whorls are of medium thickness, semi-evolute and slowly increasing in height. The whorl section is high-oval (always slightly higher than wide) with the point of maximum thickness somewhat below the middle of the flanks. The venter is narrow and convex. It passes gradually into the flanks. The latter are slightly convex. The umbilicus is rather wide, shallow with a low and gently sloping wall. The umbilical margin is rounded.

The ornamentation consists of numerous sigmoidal main and intermediate ribs. The main ribs arise at the umbilical seam; at the umbilical margin they become strong, elevated and are inclined backward. They are bent forward up to the middle of the flanks, but higher up they rather sharply incline backward. In the middle of the flanks they bifurcate, rarely trifurcate. The posterior branch is always stronger than the anterior one. At two thirds flank height the ribs are somewhat lowered. They gradually become thick and broad, and cross the venter in a straight line. There are one to three rather weak intermediate ribs, which start at different heights of the flanks. At the beginning of the last whorl there is a weak median depression on the venter. Later the sculpture becomes simpler; there are only simple, distant, strong ribs with intercalated intermediate ribs; the median ventral depression disappears.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 987	48.0	16.2	15.6	18.7	14.4	34	33	40	1.1	58
282 986	45.2	16.0	14.1	17.1	12.6	35	31	38	1.3	57
282 988	42.2	15.0	12.8	16.2	11.4	36	30	38	1.3	-

Comparison – With respect to the mode of coiling and the character of sculpture, the described species resembles *Gargasiceras pulcher* Riedel, 1938, but differs in having a slightly wider umbilicus, and stronger and less numerous ribs. In *G. pulcher* the

number of the intermediate ribs between the main ones is five to six, whereas in *G. subpulcher* it is one to three. The described species also approaches *G. interiectum* Riedel, 1938, but differs in the more numerous and stronger, forked main ribs and significantly greater number of intermediate ribs. From *G.*(?) *juanwyatti* Etayo-Serna, 1979, the described species differs in having a wider umbilicus, sigmoidal, bifurcate or trifurcate ribs, and more numerous intermediate ribs.

Occurrence – Villa de Leyva, Sáchica. middle Aptian.

***Gargasiceras* aff. *recticostatum* (Kilian, 1913)**
Pl. 72, figs. 3-5.

Material – Eight specimens, RGM282 977-282 984.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The whorl section is sub-trapezoidal, with the point of maximum thickness at the umbilical rim. The venter is narrow, almost flattened, and passes gradually into rather the high, slightly convex flanks. The umbilicus is rather wide, step-like, moderately deep with a low, steep umbilical wall and a rounded umbilical rim.

The sculpture is coarse, and consists of radial to slightly flexuous main and intermediate ribs. Strong main ribs arise at the umbilical seam; on the flanks they become crested and at the upper third of the flanks they end in blunt, triangular tubercle-like elevations. From this point they often fork into two equal or unequal branches. Rather weak intermediate ribs generally arise on the umbilical wall. On the early whorls there are two to three, rarely four intermediate ribs between every two main ones, but on the late whorls there is only one between two main ribs. They are thin and crested on the lower part of the flanks, but from the upper third of the flanks all ribs rapidly become low, broad and flattened. They pass straight over venter and are markedly depressed in the middle, bearing weak, blunt, tubercle-like elevations on the ventrolateral margins. All ribs are equal on the venter. Their cross section is sub-rectangular and the interspaces between them are narrow and deep. At the end of the last whorl the ribs become stronger and in most cases they are simple. In the course of growth the lateral tubercular elevations migrate to the middle of the flanks, but later they gradually disappear, and the main ribs become high, sharp and crested on the lower part of the flanks.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 983	16.5	6.8	6.5	4.7	4.3	41	39	28	1.6	39
282 978	20.2	7.5	7.4	6.7	4.6	37	37	33	1.6	33
282 977	21.7	8.4	8.3	7.8	5.2	39	38	36	1.6	35
282 980	23.2	9.4	9.3	8.7	5.4	41	40	37	1.7	35
282 981	26.7	9.3	9.5	10.7	6.6	35	36	40	1.4	36

Comparison – With respect to its whorl shape and the character of the sculpture, the described Colombian specimens resemble *Gargasiceras recticostatum*, but differ in having a coarser sculpture and a smaller number of ribs, which are broader and flatter

on the upper third of the flanks and venter. In contrast to *G. acutecostum* Riedel, 1938, they are characterized by a sub-trapezoidal whorl section, narrower and higher whorls, a coarser sculpture and a smaller number of ribs. By the trapezoidal whorl section, and the existence of the wide and flattened ribs, *G.* aff. *recticostatum* resembles *Colombiceras crassicostatum* (d'Orbigny, 1840), but differs from it in the less flattened ribs, which have a crest-like (not wedge-like) shape, in the greater number of intermediate ribs in the early growth stage and in the existence of a well expressed depression at mid-venter.

Occurrence – Villa de Leyva; middle Aptian.

Gargasiceras aff. *interiectum* (Riedel, 1938)

Pl. 74, fig. 2.

Material – One specimen, RGM 282 985.

Description – The semi-evolute whorls are moderately increasing in height. The whorl section is sub-trapezoidal, with the point of maximum thickness at the umbilical rim. The venter is narrow, convex and gradually passes into high, slightly convex, almost parallel flanks. The umbilicus is rather wide, step-like and moderately deep, bounded by a low, steep wall. The umbilical rim is rounded.

The ornamentation consists of numerous main and intermediate ribs. On the inner whorls the radial main ribs arise at the umbilical seam and are already elevated on the umbilical wall. In the lower part of the flanks they gradually become stronger and in the upper third part of the flanks they bear small, sharp conical tubercles. From these tubercles generally arise two equal or unequal branches. There are one to three weak, non-tuberculate intermediate ribs between two main ones and they are also crested. A little above the middle of the flanks all ribs are somewhat lowered and flattened. They pass over the venter with a rather sharp kink. In the middle of the venter the ribs are slightly depressed and their breadth exceeds twice the interspaces. The cross section of the ribs is sub-rectangular. In the course of growth the ribs become thicker and the furcation point moves to the lower part of the flanks. At about D = 18-20 mm the lateral tubercles and the ventral depression gradually disappear. Later, the branching of the main ribs only occurs at umbilical crest-like elevations. Here there is only one intermediate rib between two main ones. On the last whorl the sculpture consists of an alternation of one non-tuberculate, slightly flexuous, generally simple main rib, and a thin, non-tuberculate intermediate rib. The crested main ribs become markedly lower in the middle of the flanks, but higher up all ribs rapidly become broad, flat and pass straight over the venter. All ribs are equal on the venter.

Measurements – RGM 282 985: D = 51.1; H = 18.4; W = 19.3; U = 21.4; h = 14.1; H:D = 36; W:D = 38; U:D = 42; H:h = 1.3; ribs = 51. RGM 282 985: D = 35.2; H = 13.1; W = 13.3; U = 13.0; h = 9.2; H:D = 37; W:D = 38; U:D = 37; H:h = 1.4; ribs = 47.

Comparison – *Gargasiceras interiectum* Riedel, 1938, closely resembles the described species, but differs in having broader whorls with a sub-trapezoidal cross section,

thicker and more numerous ribs, long intermediate ribs and a coarser sculpture in the early growth stage. In contrast to *G. acutecostum* Riedel, 1938, the described species is characterized by more compressed whorls, narrower venter, a smaller number of flatter and wider ribs, and by the absence of a ventral depression of the ribs in the adult growth stage.

Occurrence – Villa de Leyva; middle Aptian.

Genus *Colombiceras* Spath, 1923

pars 1899 *Parahoplites* Anthula, p. 115.
pars 1907 *Acanthohoplites* Sinzow, p. 487.
pars 1914 *Acanthohoplites* Kazansky, pp. 70-75.
1923 *Colombiceras* Spath, p. 64.
1949 *Colombiceras* Stoyanow, pp. 121, 122.
1949 *Colombiceras* Humphrey, p. 150.
1952 *Colombiceras* Basse, p. 655.
1953 *Colombiceras* Glazunova, p. 46.
1957 *Colombiceras* Arkell *et al.*, p. L387.
1958 *Colombiceras* Luppov *et al.*, p. 103.
1960 *Colombiceras* Kudrjavtsev, p. 327.
1961 *Colombiceras* Eristavi, p. 65.
1967 *Colombiceras* Dimitrova, p. 192.
1971 *Colombiceras* Kvantaliani, pp. 60, 61.
1996 *Colombiceras* Wright *et al.*, p. L274.

Type species – *Ammonites crassicostatus* d'Orbigny, 1841, p. 197, pl. 59, figs. 1, 2; middle Aptian, France.

Diagnosis – The shell consists of semi-evolute, flattened whorls which moderately increase in height. The cross section varies from oval to circular-rectangular. The umbilicus is rather wide, moderately deep, step-like or saucer-like. The ribs are sharp, uninterrupted on the venter, coarse and distant. They are broadened and thickened in the upper part of the flanks and on the venter. The main ribs bear lateral and/or umbilical tubercle-like thickenings, from which they split into two branches. There are one to three non-tuberculate intermediate ribs between two main ones. The lateral lobe is trifid, asymmetric. The saddles are rather wide and bifid.

Comparison – Among the genera of Acanthohoplitidae, the genus *Colombiceras* Spath is most similar to *Riedelites* Etayo-Serna and to *Protacanthoplites* Tovbina; their comparative analyses is given in the characterisation of these genera.

Distribution – France, England, north Germany, Austria, Bulgaria, Switzerland, Roumania, Sardinia, Crimea, Ukrainian Carpathians, north Caucasus, Daghestan, Georgia, Mangyshlak (Kazakhstan), Turkmenistan, northern Africa, Madagascar, India, California?, Arizona, Texas, Venezuela, Mexico, Colombia. Middle Aptian and perhaps upper Aptian.

Colombiceras tobleri (Jacob & Tobler, 1906)

Pl. 63, fig. 2; Pl. 64, fig. 2.

1906 *Parahoplites Tobleri* Jacob & Tobler, p. 11, pl. 2, figs. 4a, b, 5a, b, 6a, b.
1907 *Acanthohoplites Tobleri* (Jacob & Tobler): Sinzow, p. 486, pl. 5, figs. 14, 15.
1913 *Acanthohoplites Tobleri* (Jacob & Tobler): Sinzow, p. 113, pl. 6, fig. 2.
1914 *Acanthohoplites Tobleri* (Jacob & Tobler): Kazansky, p. 70, pl. 3, figs. 49, 50.
1953 *Colombiceras tobleri* (Jacob & Tobler): Glazunova, p. 47, pl. 9, figs. 1-4.
1960 *Colombiceras tobleri* (Jacob & Tobler): Kudrjavtsev, p. 328, pl. 14, figs. 1, 2; text-fig. 119.
1968 *Colombiceras tobleri* (Jacob & Tobler): Wiedmann & Dieni, p. 92, pl. 9, fig. 14; text-fig. 65.
1989 *Colombiceras tobleri* (Jacob & Tobler): Föllmi, p. 130, pl. 6, figs. 3-5.

Lectotype – Specimen figured by Jacob & Tobler (1906, p. 11, pl. 2, fig. 4a, b); collection in the Grenoble University. Middle Aptian, Luitere Zug (Unterwalden).

Material – Seven specimens, RGM 282 989-282995.

Description – The shell consists of medium thick, semi-evolute whorls that moderately increase in height. The whorl section is sub-rectangular, slightly higher than wide with the point of maximum thickness in the middle of the flanks. The venter is narrow with rounded margins and a slight flattening in the middle. It passes gradually into high, slightly convex, sub-parallel flanks. The umbilicus is rather wide, moderately deep, saucer-like with a low, gently sloping wall.

On the early whorls the sculpture consists of non-uniform, rather strong, straight main ribs, alternating with intermediate ribs. The main ribs arise at the umbilical seam, are crest-like elevated on the lower part of the flanks, and on the upper third of the flanks they bear weak tubercle-like thickenings of conical shape, elongated in the direction of the radius. From these thickenings the main ribs fork into two, rarely three branches. The intermediate ribs are weaker, and generally originate on the umbilical wall; on the flanks they have a wedge-like cross section. Beginning from the upper third of the flanks, all ribs become strong, thick and flattened. They pass over the venter without weakening and are separated by interspaces that exceed their breadth. In the adult growth stage the ribs become distant, thick and crested. The main ribs arise from the umbilical seam; on the umbilical rim they bear weak radial thickenings and on the flanks they become slightly flexuous. The tubercles have a crest-like shape on the steinkern, whereas on the shell they are rounded. There are weak, sharp, radial, lateral elevations, from which the main ribs fork into almost equal branches. The point of bifurcation migrates in the course of growth from the lateral to the umbilical thickenings. Within the interval between D = 35 mm and D = 40 mm (rarely up to D = 50 mm) bifurcation is absent. The weaker intermediate ribs also originate at the umbilical seam and there is only one intermediate rib between every two main ones. Beginning from the upper third of the flanks and particularly on the venter all ribs are elevated and broad with a flattened surface. On the steinkern their cross section is triangular. At the end of the last whorl the intermediate ribs become shorter, so that on the lower part of the flanks they are hardly visible. All ribs have the same relief on the venter, and are separated by interspaces, which are as broad as the ribs.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 993	26.6	10.0	9.7	8.7	6.9	38	36	33	1.5	36
282 992	34.0	13.5	12.9	12.0	8.4	40	38	35	1.6	-
282 989	43.3	16.8	15.6	14.5	12.1	39	36	33	1.4	31
282 994	44.8	17.6	17.3	15.1	12.0	39	39	34	1.5	33
282 991	51.0	18.4	16.4	18.8	12.8	36	32	37	1.4	34
282 995	68.5	23.8	23.4	27.2	16.5	35	34	40	1.4	32

Comparison – The described species differs from *Colombiceras discoidalis* Sinzow, 1907, in having thicker whorls with a rounded sub-rectangular cross section, a wider umbilicus and less thick ribs. In contrast to *C. crassicostatum* (d'Orbigny, 1840), the described species is characterized by narrower whorls with sub-rectangular cross section and less uniform, thinner ribs that pass over the venter without kinks. Moreover, on the early growth stage of *C. tobleri*, the ribs fork at the upper third of the flanks, whereas on *C. crassicostatum* forking occurs in the middle or in lower part of the flanks.

Distribution – Middle Aptian of north Caucasus, Daghestan, Mangyshlak (Kazakhistan), Georgia, France, Switzerland, Austria and Colombia.

Occurrence – Sáchica, Villa de Leyva; middle Aptian.

***Colombiceras subpeltoceroides* (Sinzow, 1907)**
Pl. 70, fig. 2; Pl. 71, figs. 1, 2.

1907 *Acanthohoplites subpeltoceroides* Sinzow, p. 484, pl. 4, figs. 3, 4; pl. 5, figs. 16, 16a.
1913 *Acanthohoplites subpeltoceroides*: Sinzow, p. 112, pl. 6I, figs. 1, 1a.
1960 *Colombiceras subpeltoceroides*: Kudrjavtsev, p. 320, pl. 14V, figs. 3, 4a, b.
1961 *Colombiceras subpeltoceroides*: Eristavi, p. 67, pl. 4, fig. 11.
1967 *Acanthohoplites subpeltoceroides*: Dimitrova, p. 186, pl. 89, fig. 7.
1987 *Colombiceras* cf. *subpeltoceroides*: Leshchukh, p. 131, pl. 15, fig. 12.

Lectotype – The specimen, figured by Sinzow (1907, p. 484, pl. 4, figs. 3, 4); Aptian (middle Aptian?), Mangyshlak (here selected).

Material – Five specimens, RGM 282 996-283 000.

Description – The shell consists of compressed, semi-evolute whorls, which moderately increase in height. The whorl section is high and oval, markedly higher than wide with the point of maximum thickness slightly below the middle of the flanks. The venter is narrow, convex, and it gradually passes into high, slightly convex, almost flat flanks. The umbilicus is rather wide, moderately deep, step-like with a low, rather steep wall and a broadly rounded umbilical margin.

The sculpture is visible on the last whorl and on a part of the penultimate whorl. It consists of a regular alternation of strong, simple main ribs and weak intermediate ones. The main ribs arise at the umbilical seam, gradually become strong on the

umbilical wall, where they are strongly inclined backward; in the middle of the flanks, however, they incline forward. On the flanks they are elevated crest-like, especially in the middle of the flanks. In the upper part of the flanks they gradually become broader and flatter, and when passing over the venter they are elevated and slightly curved forward. The maximum thickness of the ribs is in the middle of the venter. The intermediate ribs appear one by one between the primary ones. At the beginning of the last whorl they arise at the lower third of the flanks and have wedge-like cross sections. Later, they become shorter arising from the middle of the flanks. On the venter all ribs are equally broad. In the lower part of the flanks of the steinkern their cross-section is triangular, but on the venter it is sub-rectangular. On the venter the breadth of the ribs somewhat exceeds that of the interspaces, but on the lower part of the flanks they are separated from each other by rather wide interspaces.

Measurements – Key: + = on the last whorl; * = on the first half of the last whorl.

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 996	65.8	25.6	20.4	22.2	17.0	39	31	34	1.5	20+
282 997	69.6	26.5	22.2	21.3	16.7	38	32	31	1.6	34
282 998	76.4	28.8	23.3	26.4	20.8	38	30	35	1.4	38
283 000	128.0	49.4	40.4	46.0	32.3	39	32	36	1.5	23*

Comparison – The described species differs from *Colombiceras tobleri* Jacob & Tobler, 1906, in having somewhat higher and more compressed whorls, a narrower and more convex venter, stronger and thicker ventral ribs, and in the absence of forking ribs on the last whorl. In contrast to *C. caucasicum* Luppov (*in* Luppov *et al.*, 1949), the described species is characterized by less convex whorls, which are markedly higher than wide, and by more numerous, less wide and inclined ribs on the flanks. From *C. spathi* Humphrey, 1949, it differs in having thicker whorls, simple ribs on the flanks and a regular alternation with one intermediate rib.

Distribution – Middle Aptian of Bulgaria, north Caucasus, Daghestan, Georgia and Colombia; upper Aptian (?) of Ukrainian Carpathians, Crimea.

Occurrence – Guane, Villa de Leyva, Galan; middle Aptian.

***Colombiceras caucasicum* Luppov (*in* Luppov *et al.*), 1949**

Pl. 67, fig. 2; Pl. 69, fig. 2; Pl. 70, fig. 1.

1949 *Colombiceras crassicostatum* d'Orbigny var. *caucasica* Luppov, p. 230, pl. 67, fig. 1; text-fig. 58.
1958 *Colombiceras caucasicum* Luppov: Luppov *et al.,* pl. 47, fig. 5.
1960 *Colombiceras caucasica* Luppov: Michailova (*in* Kudrjavtsev), p. 330, pl. 5, fig. 3; pl. 6, fig. 3; text-fig. 124.
1967 *Colombiceras caucasicum* Luppov: Dimitrova, p. 192, pl. 89, figs. 1a, 2, 2a.
1971 *Colombiceras caucasica* Luppov: Kvantaliani, p. 62, pl. 8, fig. 3; text-figs. 34, 35.
non 1989 *Colombiceras* cf. *caucasicum* Luppov: Föllmi, p. 131, pl. 6, fig. 6.

Holotype – The specimen figured by Luppov (*in* Luppov *et al*., 1949, p. 230, pl. 67, fig. 1a-c). Middle Aptian, north Caucasus (River Belaja).

Material – Six specimens, RGM 283 001-283 006.

Description – The shell consists of semi-evolute whorls of medium thickness, which moderately increase in height. The cross section of the early whorls is sub-circular, slightly wider than high, but later it becomes high and oval with the maximum thickness in the middle of the flanks. The venter is narrow and rounded. The flanks are rather high, slightly convex in the middle. The umbilicus is rather wide, saucer-like, moderately deep with a very low, gently sloping wall.

The ornamentation consists of coarse, non-uniform ribs. On the inner whorls all ribs are straight. The main ribs arise at the umbilical seam, grow in strength and on the flanks they are crested. In the middle of the flanks they bear weak, sharp, tubercle-like, triangular thickenings elongated in the direction of the radius. From this point the main ribs fork into two branches. Sometimes there are three branches. In the latter case the posterior branch arises at the umbilical rim. The anterior branch originates in the middle of the flanks and is stronger than the posterior one. There are one to two, rarely three, weaker, non-tuberculate intermediate ribs between every two main ones. In the upper part of the flanks and especially on the venter all ribs rapidly become broad and flattened. On the venter the breadth of the ribs exceeds the width of the interspaces. Adoral of the main ribs there are often rather deep and wide constriction-like furrows. With growth, the main ribs become stronger and the point of bifurcation of the ribs gradually moves to the umbilical margin. From D = 35-40 mm, rarely D = 60 mm, forking is absent. On the last whorl the sculpture consists of very strong ribs, which are slightly flexuous on the flanks. The main ribs have a high relief and are crested on the flanks of the steinkern. There is one, rarely two, intermediate rib between two main ones. Later, they gradually become shorter, so that on the second half of the last whorl they arise in the middle of the flanks. In the upper third part of the flanks, and especially on the venter, all ribs are equally thick with a flattened surface, and exceed two to two and a half times the width of the interspaces.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
283 005	33.5	11.6	12.1	13.3	8.7	35	36	40	1.3	35
283 004	39.0	13.0	13.2	16.8	9.2	33	34	43	1.4	32
283 002	67.3	23.3	21.0	25.3	16.1	35	31	38	1.5	32
283 001	77.3	26.0	23.5	31.5	17.8	34	30	41	1.5	36
283 003	87.0	30.7	28.0	34.2	21.4	35	32	39	1.4	31

Comparison – The described species differs from *Colombiceras caucasicum tyrrhenicum* (Wiedmann & Dieni, 1968) in having a high-oval whorl section, a narrower umbilicus, and thinner ribs. In contrast to *C. tobleri* (Jacob & Tobler, 1906), the described species is characterized by a slightly wider umbilicus, and stronger and thicker ribs.

Distribution – Middle Aptian, Zone of *Epicheloniceras subnodosocostatum* of the north Caucasus, Daghestan, Georgia, Turkmenistan; middle Aptian of Bulgaria and Colombia.

Occurrence – Sáchica, Villa de Leyva, Galan, Guane; middle Aptian.

Colombiceras aff. *crassicostatum* (d'Orbigny, 1841)

Pl. 56, fig. 2.

Material – One specimen, RGM 283 007.

Description – The shell consists of medium thick, evolute whorls, with a high-oval cross section (slightly higher than wide), which moderately increase in height. The costal section is sub-trapezoidal with the point of maximum thickness in the lower third of the flanks near the umbilical margin. The venter is narrow, slightly convex and almost flattened. It rapidly, though not abruptly, passes into the flanks. The upper part of the flanks are flattened, the lower part is convex. The umbilicus is rather wide, moderately deep, step-like with a low, gently sloping wall and a broadly rounded rim.

The ornamentation on the penultimate whorl consists of an alternation of main and intermediate ribs. On the lower third of the flanks the main ribs bear crest-like thickenings, elongated in the direction of the ribs. From each thickening arise two equal branches. The intermediate ribs are weaker than the main ones and are crest-like elevated on the lower part of the flanks. There are one to three intermediate ribs between every two main ribs. At the beginning of the last whorl the sculpture consists of dense straight ribs. The main ribs arise at the umbilical seam and bear rather sharp, radially elongated thickenings on the lower part of the flanks. From every thickening two branches originate. The intermediate ribs also begin at the umbilical seam, but they are weaker, and there are one to two ribs between every two strong main ones. On the last half whorl forking is absent, and all ribs are simple and equal. At first they arise at the umbilical seam, but still later they originate on the umbilical wall. In the lower part of the flanks they are narrow, crest-like and sharp. Beginning from the upper third of the flanks the ribs become very broad and flattened; they pass straight over the venter where they are still broader and flatter. Here the ribs are three times broader than the width of the interspaces. The cross section of the ribs is rectangular.

Measurements – RGM 283 007: D = 36.4; H = 12.6; W = 12.2; O = 15.0; h = 8.2; H:D = 35; W:D = 34; U:D = 41; H:h = 1.5; ribs = 35.

Comparison – The described specimen differs markedly from other species of *Colombiceras* Spath in the density of the ribbing, in the ribs being broad and flat, and in the whorl section. It differs from *C. crassicostatum* (d'Orbigny, 1841) in having a slightly wider umbilicus, denser ribbing and in the earlier disappearance of forking. Moreover, in *C.* aff. *crassicostatum*, the ribs become rapidly thick, starting from the upper third of the flanks, whereas on *C. crassicostatum sensu stricto* the process of thickening of the ribs gradually comes about, starting from the umbilical rim up to the venter. With respect to the character of ribbing, the Colombian specimen resembles *Colombiceras* aff. *caucasicum* Luppov described by Renz (1982) and *Colombiceras* sp. indet. (Renz, 1982). It differs from the first in having thinner and higher whorls, which are compressed in the area of the external margin, whereas it differs from the

second form in the presence of a flattened venter and in the absence of lateral tubercles on the inner whorls.

Occurrence – Villa de Leyva; middle Aptian.

***Colombiceras* cf. *angulatum* Egoian, 1969**
Pl. 50, fig. 2; Pl. 54, fig. 2.

Material – Two specimens, RGM 283 008, 283 009.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The cross section is sub-quadratic, with the point of maximum thickness at the lower third of the flanks. The venter is rather narrow; at the beginning of the last whorl it is rounded, but later it becomes flattened and passes rather sharply into flattened, parallel, medium high flanks. The umbilicus is moderately wide, shallow, step-like with a low, rather steep wall and a broadly rounded umbilical rim.

The sculpture consists of an alternation of rather strong main ribs and intermediate ribs. The main ribs arise at the umbilical seam, and become very elevated and crest-like at the umbilical rim and on the flanks of the steinkern. In an interval of the last half whorl the main ribs are inclined backward at the umbilical rim, whereas they are slightly bent forward in the middle of the flanks. In most cases the ribs are simple, but very rarely they bifurcate at weak umbilical thickenings, which are elongated in the direction of the ribs. There is generally only one intermediate rib between every two main ribs. They originate at various heights on the flanks and sometimes at the umbilical rim. On the venter all ribs are equally thick and flattened having a rectangular cross section, whereas on the flanks their cross section is triangular. On the venter of the last whorl the intermediate ribs are somewhat weaker than the main ones, but on other parts of the whorls all ribs are equal. The width of the interspaces is equal to the breadth of the ribs, or slightly less. On the last whorl there are 15 main ribs.

Measurements – RGM 283 009: D = 35.9; H = 14.0; W = 14.2; U = 11.8; h = 10.3; H:D = 39; W:D = 39; U:D = 33; H:h = 1.4; ribs = 34. RGM 283 008: D = 43.3; H = 14.6; W = 14.5; U = 14.0; h = 11.0; H:D = 35; W:D = 35; U:D = 34; H:h = 1.3; ribs = 35.

Remarks – We consider two morphologically similar taxa, *viz*. *Riedelites* Etayo-Serna, 1979, and *Colombiceras (Egoianiceras)* Avram, 1973. According to Avram and Etayo-Serna, one of the principal features of these two taxa is the absence of tubercles, in which they differ from *Colombiceras (Colombiceras)* Spath. In such closely related taxa the presence or absence of the tubercles is not a stable diagnostic feature. For example, many specimens of *C. (Egoianiceras*), collected from the middle Aptian along the River Khokodz from where the type species of *Egoianiceras* comes, bear tubercle-like thickenings on the early whorls. Egoian (1969, p. 163) pointed out this feature. Therefore, we consider that the presence or absence of tubercles has no particular significance in the diagnosis of *Colombiceras (Egoianiceras).* Moreover, sometimes it is difficult to distinguish whether one is dealing with real tubercles or tubercle-like thickenings. On the other hand, neither Avram (1973) nor Etayo-Serna (1979) investigated the ontogeny of any

representative of these generic groups. As to *Riedelites*, we described in this paper *R. microtuberculatus* sp. nov., which bears lateral tubercles and umbilical tubercle-like thickenings on the late whorls. Nevertheless, the other species of this genus are characterized by flattened, non-tuberculate ribs. If, after all, the question would rise about the taxonomic significance of the presence or absence of tubercles in ammonites exhibiting a *Colombiceras*-like shell shape, then the name *Colombiceras (Egoianiceras*) Avram, 1973, has príority above *Riedelites* Etayo-Serna, 1979. We refrain from giving a definitive solution, because the material necessary to solve this question is still insufficient.

Comparison – The described species differs from *Colombiceras crassicostatum* (d'Orbigny, 1841) in the absence of tubercles on the early growth stage and in the presence of weaker flexuous ribs. It differs from *C. tobleri* (Jacob & Tobler, 1906) in the absence of the tubercles on the early whorls, having a sub-quadratic whorl section and the smaller number of ribs. It differs from *C. tobleri discoidalis* (Sinzow, 1907) in having a lower sub-quadratic whorl section and a somewhat wider umbilicus. In contrast to *Colombiceras (Egoianiceras) multicostatum* Avram, 1973, the described species is characterized by a considerably smaller number of ribs (almost less than twice), a somewhat wider umbilicus and by lower whorls.

Distribution – Middle Aptian (Gargasian) of the northern Caucasus and Colombia; upper part of the middle Aptian of eastern Carpathians.

Occurrence – Sáchica; middle Aptian.

***Colombiceras formosum* sp. nov.**
Pl. 58, fig. 2; Pl. 60, fig. 2; Pl. 65, fig. 3; Pl. 66, fig. 2.

Type specimens – Holotype, RGM 283 011, Pl. 58, fig. 2. Paratypes, RGM 283 010, 283 012, 283 013.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – *Formosum* (Latin) = beautiful.

Diagnosis – The whorls are convex, semi-evolute, with a sub-rectangular cross section and a moderate increment in height. The umbilicus is wide, step-like. The sculpture consists of strong, radial, slightly unequal ribs. The main ribs bear tubercle-like thickenings in the lower part of the flanks and from these points the ribs split into two uneven branches of which the anterior branch is stronger. There are one to three simple, long, intermediate ribs between every two main ones. All ribs have a triangular cross section on the flanks, and on the venter they become broad and flattened with a rectangular cross-section. Adorally along the main ribs there are constriction-like furrows.

Description – The shell consists of convex, semi-evolute whorls with a sub-rectangular cross section (wider than high) and a moderately increasing height. The point

of the maximum thickness is in the middle of the flanks. The venter is broadly rounded, almost flattened and passes rather sharply into high, slightly convex flanks. The umbilicus is rather wide, moderately deep with a steep wall and a rounded umbilical rim.

The ornamentation consists of strong, radial, slightly unequal ribs. The main ribs arise at the umbilical seam. On the umbilical wall they are still weak and backwardly inclined, but they become straight on the flanks, where they are elevated, wedge-like and gradually broaden towards the upper part of the flanks. In the middle of the flanks they bear tubercle-like thickenings and from this point arise two uneven branches; the anterior branch is markedly stronger than the posterior one. In the course of growth the point of forking gradually migrates to the umbilical margin. On the inner whorls there are two to three (but later one to two) intermediate ribs between every two main ones. They are weaker than the main ribs, especially on the flanks. They arise on the umbilical seam or on the umbilical rim, become wedge-like on the flanks and lack tubercle-like thickenings. All ribs pass straight over the venter and become very broad, elevated and flattened on the top. Up to one third of the flanks the cross section of the ribs is triangular, but on the venter it is rectangular. The breadth of the ribs exceeds twice the width of the interspaces. There are deep constriction-like furrows adoral along the main ribs, separating the anterior branch of the main rib from adorally following intermediate rib. At the end of the last whorl between D = 35 mm and D = 50 mm there are only simple main and intermediate ribs, which are equal on the venter.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
283 012	44.0	15.6	17.9	16.8	11.5	35	41	38	1.4	34
283 011	56.4	19.9	24.4	22.1	13.5	35	43	39	1.5	35
283 010	76.5	27.5	33.6	28.3	19.0	36	44	37	1.5	34

Comparison – The described species differs from *Colombiceras caucasicum* Luppov in having a rectangular whorl section, a broad and flattened venter, less unequal and more numerous ribs, and a wider umbilicus. In contrast to *C. tobleri* (Jacob & Tobler, 1906), the described species is characterized by broader ribs with sub-rectangular cross section on the venter, coarser, thicker, straighter and less unequal ribs, and the presence of constriction-like furrows adoral of the main ribs. The morphology of the early whorls of the described species is somewhat similar to *C. crassicostatum* (d'Orbigny, 1840), but differs from the latter in having thicker whorls, a wider umbilicus, stronger main ribs and more numerous intermediate ribs.

Occurrence – Guane, Villa de Leyva; middle? Aptian.

Genus *Protacanthoplites* Tovbina, 1970

pars 1899 *Parahoplites* Anthula, p. 109.
pars 1907 *Acanthohoplites* Sinzow, p. 478.
pars 1960 *Acanthohoplites* Kudrjavtsev, p. 319.
1970 *Protacanthoplites* Tovbina, p. 57.

Type species – *Parahoplites abichi* Anthula, 1899; upper? Aptian (Clansayesian), Daghestan.

Diagnosis – The shell consists of slightly involute whorls, which moderately increase in height. It has a wide umbilicus. The whorl section is oval or circular-subquadrate and always thicker than high. The ribs are strong, rather distant and flattened on the venter. The main ribs bear lateral tubercles at the forking place; the anterior branch of the fork is the strongest. Adorally of the main ribs constriction-like furrows are often present. There are one to three, rarely four to five intermediate ribs between two main ones. The lateral lobe is asymmetric and has the same length or is shorter than the external lobe. The saddles are broad with a circular to sub-rectangular outline.

Comparison – *Protacanthoplites* Tovbina differs from *Acanthohoplites* Sinzow in the thicker anterior branches of the forking ribs and the presence of furrow-like constrictions, which are situated between the anterior branch and posterior intermediate rib. Further, the ribs of *Protacanthoplites* are more flattened. The described genus differs from *Colombiceras* Spath in having a narrower umbilicus and less flattened ribs on the venter. In the mature stage the lateral tubercles of *Protacanthoplites* are flattening later than in *Colombiceras*.

Distribution – Bulgaria, north Caucasus, Daghestan, Georgia, Armenia, Mangyshlak (Kazakhstan), Turkmenistan, Colombia; middle Aptian-lowermost? upper Aptian.

***Protacanthoplites abichi* (Anthula, 1899)**
Pl. 81, figs. 1, 2.

1899 *Parahoplites abichi* Anthula, p. 118, pl. 9 (8), fig. 2a, b, c.
1907 *Acanthohoplites abichi* (Anthula): Sinzow, p. 491, pl. 6, figs. 1-3.
1955 *Acanthoplites abichi* (Anthula): Eristavi, p. 100, pl. 4, fig. 5.
1960 *Anthohoplites abichi* (Anthula): Kudrjavtsev, p. 321, pl. 8, fig. 3a, b.
1961 *Acanthoplites abichi* (Anthula): Eristavi, p. 58, pl. 4, fig. 2.
1965 *Acanthohoplites abichi* (Anthula): Egoian, p. 130, pl. 5, fig. 4.
1967 *Acanthohoplites abichi* (Anthula): Dimitrova, p. 187, pl. 89, figs. 6, 6a.
1969 *Acanthohoplites abichi* (Anthula): Egoian, p. 162, pl. 23, fig. 31.
1971 *Acanthohoplites abichi* (Anthula): Kvantaliani, p. 47, pl. 5, fig. 2.
1982 *Protacanthoplites abichi* (Anthula): Tovbina, p. 64, pl. 1, fig. 3a, b.

Lectotype – Specimen figured by Anthula, 1899, p. 118, pl. 9 (8), figs. 2. Upper Aptian?, Daghestan, River Akusha.

Material – Four specimens, RGM 282 853-282 856.

Description – The whorls are inflated, slowly or moderately increasing in height, with a wide-oval cross section of the early whorls. Later, the cross section becomes circular (slightly wider than high). The venter is broadly rounded, slightly flattened and gradually passes into the flanks. The flanks of the early whorls are convex, but on the

last whorl they are slightly flattened. The umbilicus is rather wide, moderately deep, with a steep, low wall and a rounded umbilical rim.

The ornamentation consists of strong, radial main and weaker intermediate ribs. The main ribs arise at the umbilical seam and they are crest-like elevated on the lower part of the flanks. In the upper third of the flanks they bear rather strong, high, sharp tubercles, which are radially elongated. From this point in most cases originate three branches. On the inner whorls the branches are equal, but from the last whorl onward the anterior branches becomes thicker than the posterior one. On the second half of the last whorl, the point of forking migrates to the middle of the flanks. On the early whorls there are three, rarely four, non-tuberculate intermediate ribs between every two main ones. They arise at the umbilical seam. All ribs pass over the venter and become slightly flattened. At the end of the last whorl the anterior branch becomes significantly broader and flattened. The cross section of the ribs is sub-rectangular on the venter. The ribs are separated by deep, furrow-like interspaces. The interspace between the anterior branch and intermediate rib is rather deep. In the mature growth stages the ribbing becomes coarser, and the number of the intermediate ribs between every two main ones reduces down to two, and at the end of the last whorl down to one. After D = 25 mm the lateral tubercles disappear, forking ribs are absent and intermediate ribs become stronger (they arise at the lower third of the flanks).

Measurements – RGM 282 855: D = 29.6; H = 10.4; W = 14.2; U = 11. 3; h = 7.9; H:D = 35; W:D = 38; U:D = 35; H:h = 1.3; ribs = 33. RGM 282 854: D = 35.0; H = 11.8; W = 13.3; U = 12.6; h = 9.8; H:D = 34; W:D = 38; U:D = 36; H:h = 1.2; ribs = 30.

Comparison – The described species differs from *Protacanthoplites bogdanovae* Tovbina, 1982, in having a circular to sub-rectangular whorl section, the early disappearance of the lateral tubercles and, associated with this, the cessation of the branching of the main ribs. In contrast to *P. multinodosus* Tovbina, 1982, the described species is characterized by trifurcating ribs in the inner whorls and the weaker development of lateral tubercles, which become weak earlier than in *P. multinodosus*. It differs from *Acanthohoplites bigoureti* (Seunes, 1887) in having more numerous intermediate ribs, stronger anterior branches of the main ribs, flattened ribs on the venter, and in the presence of deeper interspaces between the anterior branch and intermediate rib.

Distribution – Upper part of the middle Aptian of the north Caucasus, Daghestan, Mangyshlak (Kazakhstan), Turkmenistan, Georgia, Colombia?; upper Aptian of Bulgaria.

Occurrence – Villa de Leyva, Chipatá Viejo; middle? Aptian.

***Protacanthoplites*? *originalis* sp. nov.**
Pl. 81, figs. 3-5.

Type specimens – Holotype, RGM 282 857, Pl. 81, fig. 3. Paratypes, RGM 282 858-282 872.

Type locality – Útica.

Type horizon – Middle Aptian.

Derivatio nominis – *Originalis* (Latin) = original, primary.

Diagnosis – The shell consists of evolute whorls which moderately increase in height and have convex flanks in the early, but flattened, flanks (sub-quadrate cross section) in later growth stages. The umbilicus is very wide, saucer-like. The ornamentation consists of numerous straight, crested ribs. From the lateral tubercles the main ribs split into bunches of two to five branches (in most cases three branches). There are also two to five (commonly two to four) simple, non-tuberculate intermediate ribs between every two main ones. In addition there are deep, wide, constriction-like furrows.

Description – In the early growth stage (D = 15-30 mm) the whorls are medium thick, moderately increasing in height, evolute or slightly involute. The whorl section is sub-circular, slightly narrowing towards the external side. The venter is rather narrow, rounded and gradually passes into low, moderately convex flanks. The umbilicus is wide, shallow, step-like with low, steep walls. The umbilical rim is broadly rounded. In a later growth stages (D > 85 mm) the whorls become compressed, moderately increasing in height, and more evolute. On the last whorl there is only a shallow concavity on the dorsal side. The whorl section is sub-quadrate. The venter is narrow, rounded and gradually passes into slightly convex, almost flattened flanks. The umbilicus is very wide, shallow, saucer-like, and bounded by a low and gently sloping wall, which rounds evenly into the flanks.

Up to D = 10 mm the ornamentation consists of numerous (40-60 on the venter), very thin, slightly unequal ribs, which arise at the umbilical seam or on the umbilical wall. They are radial and weak on the flanks, but when passing over the venter are sharp and crested. After D = 5-6 mm they become differentiated; on the flanks some of them are stronger and crested, with constriction-like furrows on their apical sides. Simultaneously (or later) the main ribs bear crested thickenings in the upper part of the flanks, which are elongated in the direction of the ribs and which may grow into rather sharp, conical tubercles. From the latter the main ribs fork into two almost equal branches. In some cases the anterior branch is somewhat stronger than the posterior one and forwardly inclined. The intermediate ribs are non-tuberculate and there are in most cases two of them between every two main ribs. In the middle growth stage between D = 15-25 mm the sculpture becomes stronger, and the constriction-like interspaces become wider and deeper. At the lateral tubercles the main ribs split into three branches; the anterior branch is slightly stronger than the other ones. Later there are more branches. In some places the main ribs bifurcate at the lateral tubercles, whereas the fourth branch arises from the lower part of the flanks and the fifth one (which is the strongest) branches off in the upper third part of the flanks. The number of intermediate ribs between every two main ones varies from two to six. In addition to simple intermediate ribs there are forking ribs arising from umbilical thickenings. On the venter all ribs are high, crested and somewhat unequal; the frontal branch of the main rib is somewhat stronger than the other

ones. At D = 32 mm the sculpture becomes coarser, especially the main ribs, which become strongly crested on the flanks; on the upper third of the flanks they bear rather sharp, triangular tubercles. In the upper part of the flanks they are split into three or four branches. The anterior branch is flat and stronger than the others. The constrictions become wider and deeper on the venter. Between two main ribs there are three to four rather weak intermediate ribs. They arise at the umbilical seam and rarely divide into two branches in the middle of the flanks. At D = 85 mm the whorls become somewhat compressed. The sculpture consists of numerous, sharp, almost radial ribs separated by deep interspaces. The main ribs arise at the umbilical seam and are straight or slightly flexuous. From the crest-like lateral thickenings they split into two, rarely three equal branches. Adapically along the main ribs there are wide, deep constrictions, which are somewhat narrowing towards the venter; ten constriction were counted on the last whorl. There are two to three intermediate ribs between every two main ribs. The former arise at the umbilical seam or, rarely, from different heights on the flanks. All ribs are sharp and elevated on the flanks and on the venter, where they become slightly broader. The cross section of the ribs is triangular. On the second half of the last whorl the tubercle-like thickenings of the main ribs and constrictions are diminishing, and the ornamentation generally consists of simple equal ribs.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 859	15.2	4.7	5.7	6.8	3.2	31	38	45	1.5	44
282 860	19.6	6.2	7.1	7.9	5.0	32	36	40	1.2	?
282 961	22.9	6.9	6.9	10.8	4.9	30	30	47	1.4	43
282 862	31.2	9.4	11.1	14.2	7.0	30	36	46	1.3	47
282 875	81.2	19.6	19.1	43.4	17.1	24	24	53	1.2	51

Comparison and remarks – In contrast to *Protacanthoplites abichi* (Anthula, 1899), the new species has a wider umbilicus, more depressed and thinner whorls, a bunch-like splitting of the main ribs, more numerous, crested ribs, and wider and deeper constriction-like furrows. It differs from *Acanthohoplites bigouretiforme* Etayo-Serna, 1979, in having wider and deeper constrictions, more numerous intermediate ribs and bunch-like splitting of the main ribs. The new species differs from *Acanthohoplites bigoureti* (Seunes, 1887) in having more numerous, crested ribs, a greater number of intermediate ribs, a wider umbilicus and deeper constrictions, which are situated adorally of the main ribs. Thus, by the character of the splitting of the main ribs, by the great number of secondary ribs, by the constriction-like furrows and by the rounded-subquadrate whorl section, the described species closely resembles members of *Protacanthoplites*. However, it differs from them in having a very wide umbilicus, a bunch-like splitting of the main ribs into four to five branches and elevated, sharp, crest-like ribs on the venter. It is these differences that make the systematic position of the described new species doubtful.

Occurrence – Útica, Guane; middle Aptian.

Genus *Riedelites* Etayo-Serna, 1979

1979 *Riedelites* Etayo-Serna, p. 70.

Type species – *Riedelites esthersernae* Etayo-Serna, 1979; middle? Aptian (Gargasian), Colombia.

Diagnosis – The shell consists of evolute whorls, which slowly increase in height and have a sub-quadrate cross section. The umbilicus is wide, rather shallow and step-like. The ribs are simple, strong, with a flattened top on the venter. In one case the main ribs bear small, sharp lateral tubercles and tubercle-like umbilical thickenings. In some intervals there are intermediate ribs, but there is only one between every two main ribs.

Comparison – Etayo-Serna (1979, p. 70) noted that *Riedelites* differs from *Colombiceras* Spath in the absence of tuberculation and the changes in the character of ribbing in the course of ontogeny. The study of new material showed that there are specimens that exhibit all characteristic features of the genus *Riedelites* Etayo-Serna, but that in some cases they exhibit small lateral tubercles and umbilical tubercle-like thickenings. We considered this new feature to be a variation within the genus.

Distribution – Colombia, middle Aptian (Gargasian).

Riedelites latecostatus sp. nov.

Pl. 75, figs. 2, 3.

Type specimens – Holotype, RGM 282 823, Pl. 75, fig. 2. Paratypes, RGM 282 819-282 822. RGM 282 819 is a fragment only.

Type locality – Guane.

Type horizon – Middle Aptian.

Derivatio nominis – *Latus* (Latin) = broad and *costatus* (Latin) = ribbed.

Diagnosis – The shell consists of evolute whorls which slowly increase in height and have a sub-quadrate cross section. The umbilicus is wide and step-like. The sculpture consists of numerous simple, non-tuberculate, almost radial main ribs, which are very broad and flattened on the venter. Rarely there is one intermediate rib between two main ribs.

Description – The whorls are evolute and slowly increase in height; they have a rounded sub-quadrate cross section. The venter is rather broad and slightly convex. It passes rather sharply into the flanks, but without making an angle. The flanks are slightly convex, almost flattened, and sub-parallel. The umbilicus is wide, rather shallow, step-like with a low, gently sloping wall and a rounded umbilical rim.

The sculpture is simple and coarse; it consists of simple, mostly uniform, distant, almost radial, strong, very broad, non-tuberculate main ribs. Very rarely there is one rather weak intermediate rib between two main ribs. The latter originate at the umbilical seam; on the umbilical wall they are weak and inclined backward, but they become crest-like on the lower part of the flanks. In the upper third part of the flanks they become very broad and flattened. As they pass over the venter, they attain their maximum breadth; here they are three times broader than in the middle of the flanks. On the flanks of the early whorls they are radial, but beginning from the middle of the last whorl they become slightly flexuous. In the lower part of the flanks the cross section of the ribs is triangular, but on the venter it becomes rectangular. The maximal development of the sculpture is situated in the middle of the last whorl; after that the ribbing gradually attenuates. In the middle of the last whorl the breadth of the ribs exceeds three times the interspace.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 819	25.9	9.1	9.0	9.9	7.2	35	35	38	1.3	?
282 822	39.8	12.8	13.2	16.5	9.2	32	33	41`	1.4	28
282 823	42.0	13.0	13.2	17.2	11.1	31	31	41	1.2	26
282 821	45.8	14.6	14.3	19.5	11.1	32	31	43	1.3	28
282 820	67.4	21.6	20.2	26.5	17.0	32	30	39	1.3	36

Variability – On the holotype the ribs appear at the beginning of the penultimate whorl. The holotype and RGM 282 822 have a smaller number of ribs than other specimens. The ribs are rather broad on the venter. Moreover, there are no intermediate ribs on the holotype and RGM 282 822, whereas there are numerous ribs on RGM 282 820, repeatedly only one between every two main ribs.

Comparison – The described new species differs from *Riedelites esthersernae* Etayo-Serna, 1979, in its wider umbilicus, and its more equal and wider ribs. In contrast to *Colombiceras*? *foreroi* Etayo-Serna, 1979, the new species is characterized by a wider umbilicus, the presence of simple, broader and less numerous non-tuberculate ribs, and the sub-quadrate whorl section. The new species resembles *C. caucasicum* Luppov (*in* Luppov *et al.*, 1949) by the presence of broad and flattened ribs on the venter, but differs in having a wider umbilicus and simple, almost equal, non-tuberculate ribs.

Occurrence – Guane, Villa de Leyva; middle Aptian.

***Riedelites microtuberculatus* sp. nov.**
Pl. 76, fig. 2; Pl. 77, fig. 2.

Type specimens – Holotype, RGM 282 825, Pl. 76, fig. 2. Paratypes, 282 824, 282 826-282 830.

Type locality – Útica.

Type horizon – Middle Aptian.

Derivatio nominis – *Mikros* (Greek) = small, and *tuberculatus* (Latin) = having small tubercles.

Diagnosis – Evolute whorls with a sub-quadrate cross section. The umbilicus is wide and shallow. The ribs are generally radial. On the early whorls they are thin and numerous, on the last whorl they are strong, distant and slightly flattened on the venter. The rather strong main ribs bear small, sharp umbilical and lateral tubercles. Two main ribs are generally separated by one long, non-tuberculate intermediate rib. In a few cases a weak branch arises from a main rib at the umbilical margin.

Description – The shell consists of semi-evolute to evolute whorls which moderately increase in height. The whorl section is circular to sub-quadrate and in some cases slightly thicker than high; the point of maximum thickness is in the middle of the flanks. The venter is rather narrow, rounded and passes rapidly into flattened, parallel flanks. The umbilicus is wide, shallow, step-like with a low and rather steep wall, and a rounded umbilical rim.

The ornamentation consists of strong, slightly unequal, radial or somewhat prorsiradiate ribs. On the inner whorls the ribs are weak and dense, but on the last whorl they are strong and simple. The rather thick, long main ribs arise at the umbilical seam; on the umbilical wall they are still weak, but on the flanks they become crested and pass in a straight line over the venter, where they are elevated, broad and slightly flattened. At the beginning of the penultimate whorl tubercle-like lateral thickenings appear, which are stronger than the umbilical ones, and elongated in the direction of the ribs. There are distinct tubercles on the last whorl. There is generally only one intermediate rib between two main ribs. They arise at the umbilical seam or near the umbilical rim, and are sometimes united with the primary ribs at the umbilical rim of the inner whorls. On the venter all ribs are equal. In the early growth stage and at the beginning of the last whorl they are dense and separated by interspaces, which are equal to their breadth. Beginning from the second half of the last whorl the ribs become stronger and more distant, so that their thickness exceeds twice the width of the interspaces.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 829	30.0	11.1	10.9	10.4	7.7	37	36	35	1.4	38
282 824	35.6	11.5	12.4	14.5	9.1	32	35	41	1.3	34
282 826	38.3	13.2	14.1	15.0	9.4	34	37	39	1.4	35
282 825	50.7	17.0	17.8	20.6	11.3	34	35	41	1.5	32
282 830	52.4	16.3	16.4	21.1	13.5	31	31	40	1.2	31

Variability – In contrast to the stable parameters of the shell, the described species is characterized by a wide range of intraspecific variability in sculpture. For example, the umbilical and lateral tubercles are very distinct on the holotype, especially on the last whorl, but the intermediate ribs are not regularly distributed among the main ribs. In contrast, in some specimens, such as RGM 282 826, 282 829

and 282 830, lateral tubercles are rather rare and the ribbing less uniform than on other specimens.

Comparison and remarks – The described new species clearly differs from the other representatives of *Riedelites* in the presence of lateral tubercles; therefore, its assignment is somewhat conditional. From *R. esthersernae* Etayo-Serna, 1979, it differs in having lateral tubercles, a sub-quadrate whorl section, and a slightly wider umbilicus. From *R. inconstans* (Riedel, 1938), the new species differs in having lateral tubercles, lower whorls, and a regular alternation of main and relatively long intermediate ribs. From *R. obliquus* (Riedel, 1938), it differs in having lateral tubercles and a coarser sculpture.

Occurrence – Útica, Anapoima-Apulo; middle Aptian.

***Riedelites*? sp**.

Pl. 73; Pl. 74, fig. 1; Pl. 75, fig. 1; Pl. 76, fig. 1; Pl. 77, fig. 1; Pls. 78-80.

Material – Fifteen specimens, RGM 282 831-282 843, 282 845-282 846, and one fragment, RGM 282 844.

Description – The shell consists of convex, semi-evolute whorls which on the early growth stage moderately increase in height, but later slowly. The whorl section is wide-oval, almost sub-rectangular with the point of maximum thickness slightly below the middle of the flanks. The venter is wide, moderately rounded and slightly flattened in the middle; it gradually passes into rather high, slightly convex, almost parallel flanks. The umbilicus is rather wide, of medium depth, step-like with a low, steep wall and broadly rounded umbilical rim.

The ornamentation consists of simple, non-tuberculate, mostly radial, rather strong ribs. The main ribs are rather thick. They arise at the umbilical seam, are slightly inclined backward on the umbilical wall and umbilical rim, and gradually become stronger on the flanks, where they are radial. Sometimes they are slightly flexuous, but pass in a straight line over the venter. At D = 55 mm some of main ribs split into two equal branches in the middle of the flanks. There are no forking ribs at D > 55 mm. There is one thin intermediate rib between every two main ribs. They are crest-like on the flanks. Between D = 30-90 mm the cross section of the ribs is sub-rectangular. Their breadth exceeds more than twice the width of the interspaces. Beginning from D = 90 mm the ribs are disposed in a tile-like manner, and have a triangular cross section on the venter and in the upper part of the flanks. The surface of the ribs is flattened and their width exceeds three times that of the interspaces between them. On the latest growth stage the ribbing becomes very distant and strong. The intermediate ribs become shorter and in most cases they arise at the middle of the flanks.

The suture line is fragmentarily preserved on the late whorl. The external saddle (*E/L*) is almost symmetrically bifid and much higher than the other saddles. The lateral lobe (*L*) is asymmetric, apparently pseudo-trifid.

Measurements –

	D	H	W	U	h	H:D	W:D	U:D	H:h	ribs
282 939	77.4	29.8	37.1	26.2	19.3	39	48	34	1.5	42
282 939	144.0	53.8	65.0	51.0	36.8	37	45	35	1.5	47
282 837	129.3	45.0	65.2	47.4	34.0	35	50	37	1.3	43
282 838	155.0	54.5	69.0	55.4	40.0	35	45	36	1.2	47
282 832	158.0	60.0	69.4	58.1	42.6	38	44	37	1.4	50
282 833	188.0	61.0	77.6	79.3	49.2	32	41	42	1.2	42
282 846	197.0	63.3	75.6	87.2	52.7	32	38	44	1.2	31
282 831	236.0	82.5	97.0	99.2	61.0	35	41	42	1.4	42
282 835	217.0	73.0	90.0	89.0	59.4	34	41	41	1.2	-

Comparison and remarks – Shell shape, sculpture and suture line morphology of the described species resembles the Acanthohoplitidae Stoyanow and Cheloniceratinae Spath, particularly *Cheloniceras* Hyatt in shell shape, convexity of the whorls, strength of the ribs and the dominant external saddle (*E/L*). However, it differs from the latter genus in the absence of tubercles, in the flattening of the ribs on the venter and in the less pronounced bifid lateral lobe (*L*). By the existence of simple, non-tuberculate ribs (with flattening on the venter), the described species resembles *Riedelites*, but differs from it mainly in having broader whorls, and in the shape of the external saddle (*E/L*) and lateral lobe (*L*). *Riedelites*? sp. resembles *Parahoplites*(?) *hubachi* Etayo-Serna, 1979, in the type of sculpture, but differs in having a wider umbilicus, lower whorls and flattened ribs on the venter, and in the shape of the suture line.

Occurrence – Villa de Leyva, Galan, Guane; middle Aptian.

Subfamily Acanthohoplitinae Stoyanow, 1949
Genus *Acanthohoplites* Sinzow, 1907

1907 *Acanthohoplites* Sinzow, p. 478.
1913 *Acanthoplites* Kilian, p. 346.
1914 *Acanthohoplites* Kazansky, p. 66.
1923 *Acanthohoplites* Spath, p. 64.
1938 *Acanthoplites* Roman, p. 348.
1940 *Acanthohoplites* Scott, p. 1052.
1949 *Acanthohoplites* Stoyanow, p. 106.
1949 *Acanthohoplites* Luppov *et al*., p. 229.
1949 *Acanthoplites* Humphrey, p. 138.
1952 *Acanthohoplites* Basse, p. 655.
1957 *Acanthohoplites* Arkell *et al*., p. L386.
1958 *Acanthohoplites* Luppov *et al*., p. 103.
1953 *Acanthoplites* Glazunova, p. 31.
1960 *Acanthohoplites* Kudrjavtsev, p. 319.
1961 *Acanthoplites* Eristavi, p. 55.
1967 *Acanthohoplites* Dimitrova, p. 184.
1971 *Acanthohoplites* Kvantaliani, p. 27.
1988 *Acanthohoplites* Khalilov, p. 351.
1996 *Acanthohoplites* Wright *et al.*, p. L275.

Type species – *Parahoplites aschiltaensis* Anthula, 1899; Aptian, Daghestan.

Diagnosis – Slightly convex to compressed whorls. The whorl section varies from wide and oval to high oval; sometimes sub-rectangular-circular. The venter is slightly flattened or rounded. The main ribs are furnished with umbilical thickenings and most species bear lateral tubercles. From the latter arise two or three branches. There are one to six non-tuberculate intermediate ribs between every two main ribs. In some cases they originate in the lower part of the flanks, but sometimes they are longer or shorter. Rather often some of the intermediate ribs are united with the main rib at the umbilical margin. All ribs cross the venter in a straight line or with a slight forward curve. Later, the sculpture becomes simpler; the tubercles disappear and there are only main ribs between every two of which one or two short intermediate ribs are intercalated.

The suture line is characterized by rather intense frilling and the lobes have a more or less symmetric shape. The lateral lobe is almost symmetric, trifid and in most cases wider than the external one. The dorsal lobe is bifid. The saddles are asymmetrically bifid.

Comparison – *Acanthohoplites* Sinzow differs from *Diadochoceras* Hyatt and *Paracanthohoplites* Stoyanow in the absence of tubercles on the venter. Comparisons with the genera *Gargasiceras* Casey and *Parahoplites* Anthula are given in the description of these genera.

Distribution – England, France, Germany, Roumania, Bulgaria, Sardinia, Crimea, north Casucasus, Daghestan, Georgia, Armenia, Azerbaijan, Mangyshlak (Kazakhstan), Turkmenistan, Iran, northern Africa (Algeria, Tunisia?), Madagascar, Mozambic, Japan, California, Arizona, Mexico, Venezuela, Colombia. Middle Aptian (Gargasian)-upper Aptian (Clansayesian).

Acanthohoplites nolani (Seunes, 1887)

Pl. 85, fig. 2.

1887 *Hoplites nolani*, p. 564, pl. 13, fig. 4.
pars 1907 *Acanthohoplites nolani* (Seunes): Sinzow, p. 503, pl. 8, fig. 1 (*non* figs. 2, 3, 5).
1953 *Acanthoplites nolani* (Seunes): Glazunova, p. 32, pl. 4, figs. 1-3.
pars 1955 *Hypacanthoplites nolani* (Seunes): Eristavi, p. 104, pl. 5, fig. 1 (*non* pl. 4, fig. 8).
pars 1960 *Acanthohoplites nolani* (Seunes): Kudrjavtsev, p. 326, pl. 13, figs. 1-3 (*non* fig. 4).
1961 *Acanthoplites nolani* (Seunes): Eristavi, p. 56, pl. 2, fig. 8.
1961a *Nolaniceras nolani* (Seunes): Casey, p. 598.
1965 *Nolaniceras nolani* (Seunes): Casey, pp. 455, 456.
1965 *Acanthohoplites nolani* (Seunes): Egoian, p. 131, pl. 7, figs. 2-6, pl. 8, figs. 1-5.
1968 *Acanthohoplites nolani* (Seunes): Wiedmann & Dieni, p. 88, pl. 9, figs. 10, 17.
1969 *Acanthohoplites nolani* (Seunes): Egoian, p. 154, pl. 10, figs. 3, 4, pl. 11, figs. 2-5, pl. 23, figs. 28, 29.
1971 *Acanthohoplites nolani* (Seunes): Kvantaliani, p. 31, pl. 3, fig. 5.
1982 *Acanthohoplites nolani* (Seunes): Renz, p. 29, pl. 2, fig. 5; text-fig. 18.
1987 *Acanthohoplites nolani* (Seunes): Leshchukh, p. 125, pl. 14, figs. 2-15; pl. 15, figs. 3, 4.

Holotype – Specimen figured by Seunes (1887, p. 564, pl. 13, fig. 4); Upper Aptian (Clansayesian), Drôme, France.

Material – Three specimens, RGM 282 873-282 975.

Description – The shell consists of medium thick, semi-evolute whorls, which moderately increase in height. The cross section is high and oval, with the point of maximum thickness in the lower part of the flanks. The venter is narrow; in the early whorls it is rounded, but later it becomes slightly flattened. It gradually passes into rather high, slightly convex flanks. The umbilicus is moderately wide, shallow and step-like with steep, low walls. The umbilical rim is rounded.

The ornamentation consists of numerous thin, dense ribs, which are in most cases bent like a crescent on the flanks. In the early whorls the ribs are almost radial, but later they become slightly projected on the venter. There are 32 ribs on the umbilical rim. The rather strong and elevated main ribs bifurcate at the umbilical rim. There is also one (rarely two) intermediate rib between every two main ones. They arise in the lower part of the flanks. On the venter all ribs are equally thick and the space between them is equal to their breadth. In the middle of the venter of RGM 282 873 the ribs are weak and bear weak, marginal, tubercle-like elevations.

Measurements – RGM 282 875: D = 26.4; H = 10.1; W = 9.3; U = 8.9; h = 7.5; H:D = 38; W:D = 35; U:D = 34; H:h = 1.4; ribs = 72.

Comparison – The described species approaches *Acanthohoplites bigoti* (Seunes, 1887) by character of ornamentation, but differs from it in its less convex whorls, the more numerous thin ribs and the flattened venter in the late whorls. *Acanthohoplites nolani* (Seunes) differs from *A. lautus* Glazunova, 1953, in having lower and thinner whorls, an oval cross section, and more numerous ribs. From *A. anthulai* Kazansky, 1914, it differs in having radial, more numerous main ribs, and a small number of intermediate ribs.

Occurrence – Anapoima-Apulo (RGM 282 874), Villa de Leyva (RGM 282 873), Útica (RGM 282 875); upper Aptian.

Distribution – This is the index-species of the lower zone of the upper Aptian (Clansayesian) Zone of *Acanthohoplites nolani* in France, England, northern Germany, Crimea, north Caucasus, Daghestan, Georgia, Mangyshlak (Kazakhstan), Kopetdag (Turkmenistan), Madagascar, Sardinia and Venezuela. According to Egoian (1969, p. 158) this species is also distributed in the upper part of the Clansayesian (*Hypacanthoplites jacobi* Zone) in the northwestern Caucasus. Upper Aptian of Colombia.

Acanthohoplites cf. *teres* Stoyanow, 1949

Pl. 86, fig. 2.

Material – One specimen, RGM 282 876.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The cross section is oval, slightly higher than wide with the point of the maximum thickness in the middle of the flanks. The venter of the early whorls is

narrow and rounded; at the beginning of the last whorl it becomes slightly flattened; it gradually passes into flanks, which are slightly convex. The umbilicus is rather wide, shallow, step-like with low, gently sloping walls and rounded umbilical rim.

The ornamentation consists of a rather small number of distant, simple ribs. The main ribs (13 on the last whorl) arise on the umbilical wall. They are radial on the flanks. They bear very small, radially elongated thorns a little above the middle of the flanks. In the upper third part of the flanks the ribs slightly incline backward, and become broader and flattened. The intermediate ribs are weaker and do not bear tubercles; they generally arise at the umbilical wall and alternate (one to one) with the main ribs. At the end of the last whorl they become significantly weaker. All ribs become broader and slightly flattened along the mid-ventral line.

Measurements – RGM 282 876: D = 48.7; H = 17.5; W = 16.5; D = 18.3; h = 12.9; H:D = 36; W:D = 34; U:D = 38; H:h = 1.4; ribs = 25.

Comparison – The described species differs from *Acanthohoplites erraticus* Stoyanow, 1949, in the longer intermediate ribs, in the strengthening of the ribs in the middle of the flanks, and in the presence of prorsiradiate, simple main and intermediate ribs. Unlike *A. impetrabilis* Stoyanow, 1949, *A. teres* is characterized by a narrower venter, thinner whorls and by more numerous ribs.

Distribution – Arizona, upper Aptian, Zone of *Acanthohoplites nolani*. Colombia, middle?/upper Aptian.

Occurrence – Villa de Leyva, upper Aptian.

***Acanthohoplites* ex gr. *aschiltaensis* (Anthula, 1899)**
Pl. 84, fig. 2.

Material – One specimen, RGM 282 877.

Description – The shell consists of semi-evolute whorls, which moderately increase in height. The cross section is ellipsoidal, slightly higher than wide, with the point of maximum thickness at the lower third of the flanks. The venter is narrow, convex and gradually passes into rather high, slightly convex flanks. The umbilicus is rather wide, step-like with low, steep walls. The umbilical rim is broadly rounded.

The ornamentation consists of an alternation of strong, curved, tuberculated main ribs and weaker, non-tuberculated intermediate ribs. The main ribs arise at the umbilical seam, rapidly become strong and elevated, and at the umbilical margin they are inclined backward. On the flanks they are almost radial. In the middle of the flanks some of the ribs bear fine, thorn-like tubercles, from where they fork into two equal, slightly rursiradiate branches. On the early whorls there are two to three weak intermediate ribs between every two main ribs. However, on the second half of the last whorl there is only one weak intermediate rib between every two main ones. Some of intermediate ribs are united with the main rib at the umbilical margin. All ribs cross over the venter in a straight line, and are equally broad and elevated. From the middle

of the last whorl onward the tubercles gradually disappear and the point of forking shifts towards the umbilical margin. At the end of the last whorl there is an irregular alternation of the simple, thick, curved, distant main ribs and weaker intermediate ribs.

Measurements – RGM 282 877: D = 56.2; H = 21.0; W = 18.4; U = 20.9; h = 13.7; H:D = 37; W:D = 33; U:D = 37; H:h = 1.5; ribs = 45. RGM 282 877: D = 23.9; H = 9.9; W = 8.6; U = 8.2; h = 5,9; H:D = 41; W:D = 34; U:D = 34; H:h = 1.7.

Comparison – The described specimen resembles *A. aschiltaensis*, in its general shell-shape and character of sculpture, but differs in the smaller number of the intermediate ribs, the irregularity of the lateral tubercles and the less frequent forking of the main ribs. *Acanthohoplites* ex gr. *aschiltaensis* differs from *A. aplanatus* Sinzow, 1907, in having a wider umbilicus, weaker main ribs which irregularly bear lateral tubercles above mid-flank and umbilical thickenings in the early whorls.

Occurrence – Anapoima-Apulo, upper Aptian.

Genus *Hypacanthoplites* Spath, 1923

1923 *Hypacanthoplites* Spath, p. 64.
1940 *Hypacanthoplites* Scott, p. 1038.
1949 *Hypacanthoplites* Humphrey, p. 141.
1949 *Hypacanthoplites* Luppov *et al.*, p. 230.
1949 *Hypacanthohoplites* Stoyanow, p. 119.
1952 *Hypacanthoplites* Basse, p. 655.
1953 *Hypacanthoplites* Glazunova, p. 48.
1957 *Hypacanthoplites* Arkell *et al.*, p. L387.
1958 *Hypacanthoplites* Lupov *et al.*, p. 103.
1960 *Hypacanthoplites* Kudrjavtsev, p. 331.
1965 *Hypacanthoplites* Casey, p. 421.
1967 *Hypacanthoplites* Dimitrova, p. 187.
1996 *Hypacanthoplites* Wright *et al.*, p. L275.

Type species – *Acanthoceras milletianum* (d'Orbigny) var. *plesiotypica* Fritel, 1906, p. 245, fig. 2 *(pars);* upper Aptian (*Hypacanthoplites jacobi* Zone), northern Germany.

Diagnosis – The shell is discoidal, with semi-involute to semi-evolute whorls. The whorl section varies from oval to trapezoidal. The venter is rounded in the early whorls, but later it becomes flattened, and the junction with the flanks becomes rather abrupt. On the early ontogenetic stage the shell is smooth, but provided with small lateral tubercles. Later, the sculpture consists of main and intermediate ribs. The main ribs bear umbilical thickenings and sometimes also the lateral tubercles. There are one to two, rarely three intermediate ribs between every two main ribs. All ribs make an angle at the ventrolatral shoulders and pass over the venter, where they have the same thickness.

The suture line is more or less symmetric. The external lobe is shorter than the lateral one. The latter is trifid and wide. The dorsal lobe is bifid. The outer saddle is wide and bifid.

Comparison – *Hypacanthoplites* Spath differs from its morphologically closest genus *Acanthohoplites* Sinzow in its flattened venter, which sharply passes into the flanks, having (in most cases) a median depression on the venter and having marginal tubercles in the early ontogenetic stages.

Distribution – England, France, northern Germany, Bulgaria, Crimea, north Caucasus, Daghestan, Georgia, Mangyshlak (Kazakhstan), Turkmenistan, Tajikistan, Iran, northern Africa (Algeria, Tunisia?), Madagascar, USA (California, Texas), Mexico, Colombia; uppermost Aptian (Clansayesian) – lowermost Albian.

***Hypacanthoplites sigmoidalis* Casey, 1965**

Pl. 87, fig. 2.

pars 1960 *Hypacanthoplites jacobi* Collet: Kudrjavtsev, p. 331, pl. 15, fig. 1 only.
1965 *Hypacanthoplites sigmoidalis* Casey, p. 429, pl. 73, fig. 8, pl. 74, fig. 9.

Holotype – British Geological Survey, Keyworth, GSM 71058, described by Casey (1965, p. 429, pl. 73, fig. 8a, b); upper Aptian, Zone of *Hypacanthoplites jacobi* (Subzone of *Hypacanthoplites rubricosus*), southeast England.

Material – One specimen, RGM 282 878.

Description – The shell consists of moderately increasing whorls. The cross section is subtrapezoidal-oval (distinctly higher than wide) having the point of maximum thickness at the lower third of the flanks. The venter is narrow and slightly convex (almost flattened). It rather sharply passes into high, slightly convex flanks. The umbilicus is moderately wide, not deep, step-like with a low vertical wall. The latter sharply passes into the flanks.

The ornamentation consists of numerous, sigmoidal, non-tuberculate ribs. The main ribs arise at the umbilical seam and become somewhat stronger on the umbilical margin. Then they abruptly incline forward, but from the upper third of the flanks they incline backward. At the beginning of the last whorl the ribs bifurcate in the area of the umbilical margin. Later, the point of forking migrates towards the middle of the flanks. Rarely there is only one intermediate rib between every two main ones. At the end of the last whorl there is only one short intermediate rib between two simple main ribs. All ribs become stronger and elevated on the venter, but exhibit a slight mid-ventral depression in the first half portion of the last whorl.

The suture line is characterized by rather elaborate frilling. The ventral lobe (E) is narrow and short, whereas the lateral lobe (L) is longer than the ventral one; it is symmetrically trifid. The lobe U_1 is short and trifid. There are two small secondary lobes at the umbilical margin. The E/L saddle is rather broad and asymmetrically bifid.

Measurements – RGM 282 878: D = 41.1; H = 16.9; W = 12.8; U = 11.7; h = 12.2; H:D = 41; W:D = 31; U:D = 28; H:h = 1.4; ribs = 44.

Comparison – The described species differs from *Hypacanthoplites jacobi* Collet, 1907, in having higher and narrower whorls, less flexuous ribs, and weakly pronounced

umbilical and ventrolateral thickenings. *Hypacanthoplites sigmoidalis* Casey differs from *H. rubricosus* Casey, 1965, in having stronger and more elevated sigmoidal ribs on the venter.

Distribution – Daghestan, Upper Aptian. Southern England, Upper Aptian, *Hypacantoplites jacobi* Zone (*H. rubricosus* Subzone). Upper Aptian of Colombia.

Occurrence – Guane, upper Aptian.

***Hypacanthoplites* sp.**
Pl. 87, fig. 3.

Material – One specimen, RGM 282 879.

Description – The shell consists of semi-evolute whorls which slowly increase in height. The whorl section is ellipsoidal, but through the rib it is hexagonal (slightly higher than wide), with the point of maximum thickness at the lower third of the flanks. The venter is narrow and slightly flattened in the middle. It gradually passes into the slightly convex flanks. The umbilicus is wide, shallow with a low, steep wall and rounded umbilical rim.

The ornamentation consists of strong, bifurcated ribs. The ribs originate at the umbilical seam; at the umbilical margin they are elevated and slightly bent backward. In the lower part of the flanks they incline forward, but in the upper part of the flanks they incline backward again. At the umbilical margin they bifurcate. Intermediate ribs are absent. All ribs become broad and flattened in the upper part of the flanks, and they pass straight over the venter, making an angle at the ventrolateral shoulders. The mid-ventral depression is very clear. On the venter most of ribs have the same thickness, only in some cases the posterior branch is somewhat weaker than the anterior one.

Measurements – RGM 282 879: D = 38.0; H = 14.6; W = 14.2; U = 11.5; h = 11.0; H:D = 38; W:D = 37; U:D = 30; H:h = 1.3; ribs = 16.

Comparison – The described specimen is incomplete. It resembles *Hypacanthoplites milletianus* (d'Orbigny, 1841) in its general shell shape at the corresponding diameter, but differs in having more inclined, bifurcated ribs and in the absence of intermediate ribs. It differs from *H. jacobi* Collet, 1907, in having broader whorls and thicker, less numerous ribs.

Occurrence – Guane, upper Aptian.

Superfamily Parahoplitoidea Spath, 1922
Family Parahoplitidae Spath, 1922
Genus *Parahoplites* Anthula, 1899

1899 *Parahoplites* Anthula, p. 109.
1905 *Parahoplites* Jacob, p. 406.

1907 *Parahoplites* Jacob, p. 48.
1907 *Parahoplites* Sinzow, p. 456.
1913 *Parahoplites* Kilian, p. 344.
1915 *Parahoplites* Kilian & Reboul, p. 36.
1925 *Parahoplites* Spath, p. 25.
1930b *Parahoplites* Spath, p. 437.
1938 *Parahoplites* Roman, p. 346.
1940 *Parahoplites* Scott, p. 1028.
1949 *Parahoplites* Stoyanow, p. 99.
1949 *Parahoplites* Luppov *et al.*, p. 227.
1949 *Parahoplites* Humphrey, p. 137.
1952 *Parahoplites* Basse, p. 654.
1953 *Parahoplites* Glazunova, p. 24.
1957 *Parahoplites* Arkell *et al.*, p. L385.
1958 *Parahoplites* Luppov *et al.*, p. 103.
1960 *Parahoplites* Kudrjavtsev, p. 313.
1965 *Parahoplites* Casey, p. 400.
1996 *Parahoplites* Wright *et al*., p. L276.

Type species – *Parahoplites melchioris* Anthula, 1899; Aptian, Daghestan.

Diagnosis – The whorls are semi-evolute and have oval or sub-trapezoidal cross sections. The venter is rounded. The umbilicus varies from narrow to moderately wide. The ribs are strong and dense. The main ribs bear umbilical thickenings and are crescent-shaped on the flanks. There is one (rarely two) comparatively short intermediate rib between each pair of main ribs. Some of them are united with the main ribs at the umbilical thickenings. On the venter all ribs are equally thick and adorally convex. In the early ontogenetic stage (on the first and second whorls) there are often tubercle-like lateral thickenings, which disappear in the late ontogenetic stage. The lateral lobe is narrower than the external one and asymmetrically trifid. The inner lobe is generally simple. The saddles are wide, and asymmetrically bifid.

Comparison – *Parahoplites* Anthula differs from *Acanthohoplites* Sinzow in its non-tuberculate, rarely forking ribs, and in having a clearly distinct, asymmetrical lateral lobe and a simple inner lobe.

Distribution – North Caucasus, Daghestan, Mangyshlak (Kazakhstan), Turkmenistan; middle Aptian, zone of *Parahoplites melchioris*. England, northern Germany; middle Aptian, zone of *Parahoplites nutfieldiensis*; France, Mexico, USA (California, Arizona), Colombia, Chile, Peru, Iran, Algeria, Madagascar, Zululand; middle Aptian (rarely? upper Aptian).

***Parahoplites maximus* Sinzow, 1907**

Pl. 84, fig. 1; Pl. 85, fig. 1.

1907 *Parahoplites maximus* Sinzow, p. 464, pl. 1, figs. 1-3.
1960 *Parahoplites maximus* Sinzow: Kudrjavtsev, p. 315, pl. 3, fig. 4, pl. 5, fig. 4, text-fig. 102.
1965 *Parahoplites maximus* Sinzow: Casey, p. 408, pl. 67, fig. 5, pl. 79, figs. 1, 2, text-fig. 148.

Lectotype – Specimen figured by Sinzow, 1907, pl. 1, fig. 1 (selected by Casey, 1965, p. 409); Mangyshlak (Kazakhstan), middle? Aptian.

Material – Two specimens, RGM 282 880, 282 881.

Description – The planar spiral consists of semi-evolute whorls of medium thickness which moderately increase in height. The cross section is sub-trapezoidal-oval (slightly higher than wide) with the point of maximum thickness at the umbilical margin. The venter is moderately broad and rounded. The flanks are slightly convex. The umbilicus is moderately wide, rather deep, step-like with a low, steep wall and rounded umbilical rim.

The ornamentation consists of rather numerous, slightly differentiated ribs. On the umbilical wall, and especially at the umbilical rim, the main ribs are very elevated, closely spaced and inclined backward, whereas in the middle of the flanks they are weaker, slightly inclined or almost radial. There are one or two weaker intermediate ribs between every two main ribs. They arise in the lower part or at the middle of the flanks. Some of them unite with the main ribs at the umbilical thickenings. In the upper third of the flanks all ribs gradually become stronger and cross the venter with a weak forward curve. On the venter all ribs are equal. On the second part of the last whorl the ribs become flattened and weak, especially in the middle of the flanks.

The suture line is fragmentarily preserved. The lateral (L) lobe is rather narrow, rather short, and asymmetrically trifid. The outer saddle is high and also asymmetric.

Measurements – RGM 282 881: D = 100.0; H = 42.0; W = 38.1; U = 28.2; h = 27.4; H:D = 42; W:D = 38; U:D = 28; H:h = 1.5; Ribs = 75. RGM 282 880: D = 115.0; H = 45.5; W = 42,4; U = 34.5; H = 32.6; H:D = 40; W:D = 37; U:D = 30; H:h = 1.4; Ribs = 63.

Comparison – The described species differs from *P. subcampischei* Sinzow, 1907, in having lower and thicker whorls, and differentiated and weaker ribs. It differs from *P. cunningtoni* Casey, 1965, in the narrower whorls, wider umbilicus, more distant ribs and in the somewhat weaker ribs in the late ontogenetic stage.

Distribution – Daghestan, Mangyshlak (Kazakhstan), middle Aptian. England, middle Aptian, *Parahoplites nutfieldiensis* Zone (*Tropaeum subarcticum* Subzone). Middle Aptian of Colombia.

Occurrence – Apulo-Anapoima, Guane; middle Aptian.

***Parahoplites macfarlandi* Anderson, 1938**

Pl. 82, fig. 1; Pl. 83, fig. 1.

1938 *Parahoplites macfarlandi* sp. nov., Anderson, p. 170, pl. 35, fig. 1.

Holotype – Specimen figured by Anderson (1938, pl. 35, fig. 1), in the Californian Academy of Science (type collection). Middle Aptian (Gargasian), Alderson Creek, Shasta County, California.

Material – One specimen, RGM 282 882.

Description – The shell consists of medium thick, semi-evolute whorls, which moderately increase in height. The cross section is high and oval with the point of maximum thickness a little below the middle of the flanks. The venter is narrow, convex and gradually passes into high, slightly convex flanks. The umbilicus is moderately wide, shallow, step-like with a low vertical wall. The umbilical rim is rounded.

The ornamentation consists of numerous, rather strong ribs. The main ribs arise at the umbilical seam; they rapidly increase in strength and incline backward on the umbilical wall. At the umbilical margin they become rather elevated and broad; they become almost radial on the flanks. In some cases the ribs are slightly bent and flattened in the middle of the flanks. The intermediate ribs (one, rarely two, between every two main ribs) appear in the middle of the flanks, but mostly arise at the umbilical margin branching off from the main ribs. Beginning from the upper third of the flanks the ribs gradually become stronger and pass over the venter with a slight forward curve. All ribs are equally broad and elevated on the venter. The interval between the ribs is less than the thickness of the ribs.

Measurements – RGM 282 882: D = 153.0; H = 63.0; W = 52.0; U = 44.0; h = 44.2; H:D = 41; W:D = 34; U:D = 29; H:h = 1.4; ribs = 76.

Comparison – The described species differs from *P. maximus* in having a wider umbilicus, lower whorls and an oval cross section. Moreover, in the mature stage the ribs of *P. macfarlandi* do not become weak and distant as in *P. maximus*. From *P.? hubachi* Etayo-Serna, 1979, Anderson's species differs in its wider umbilicus, in having bifurcating ribs, and in its weaker and more numerous ribs, which make a forward curve on the venter.

Distribution – Middle Aptian of California and Colombia.

Occurrence – Anapoima-Apulo, middle Aptian.

***Parahoplites* cf. *nutfieldiensis* (J. Sowerby *in* Sowerby & Sowerby, 1815)**

Pl. 86, fig. 1.

1815 *Ammonites nutfieldiensis* sp. nov., J. Sowerby *in* Sowerby & Sowerby, p. 11, pl. 108.
1930a *Parahoplites nutfieldiensis* (Sowerby): Spath, p. 437, text-fig. b.
1965 *Parahoplites nutfieldiensis* (Sowerby): Casey, p. 404, pl. 67, fig. 5, pl. 68, figs. 2-4, pl. 69, fig. 4, pl. 70, fig. 3, text-figs. 147, 149a, b, 150a (*cum synonymis*).

Lectotype – The Natural History Museum, London, 43882, Sandgate Beds, Nutfield, Surrey (J. Sowerby Collection). Spath (1930a, p. 437) cosidered this specimen to be the holotype. Middle Aptian, *Parahoplites nutfieldiensis* Zone, southern England.

Material – One specimen, RGM 282 883.

Description – The shell consists of moderately thick whorls, which moderately increase in height. The cross section of the last whorl is high and oval with the point of maximum thickness at the lower third of the flanks. The venter is moderately broad, rounded and gradually passes into slightly convex flanks. The umbilicus is rather wide, shallow, step-like with a steep, low wall.

The ornamentation consists of numerous, rather strong main and intermediate ribs. The main ribs are mostly simple. They arise at the umbilical seam and become rather strong already on the umbilical margin. On the flanks they are almost radial, but they become projected in the upper third of the flanks. They bifurcate at the umbilical rim. There are also intermediate ribs between the main ribs; they alternate irregularly with the main ribs. They arise in the middle or slightly below the middle of the flanks. In some cases a main rib on the one flank becomes an intermediate rib on the other flank. All ribs are equally strong, thick and inclined forward when approaching the venter. There are 28 main ribs on the umbilical rim.

Measurements – RGM 282 883: D = 85.4; H = 38.2; W = 31.3; U = 23.8; h = 24.7; H:D = 45; W:D = 37; U:D = 28; H:h = 1.5; ribs = 51.

Comparison – The whorls of the described species differ from *Parahoplites melchioris* Anthula, 1899, in having a high-oval (but not trapezoidal) cross section, and more numerous and weaker ribs. From *P. grossouvrei* Jacob, 1905, it differs in having a narrower, high-oval cross section and in having a smaller number of ribs. Moreover, *P. grossouvrei* is characterized by fascicules of two or three ribs arising from the umbilical thickenings of the main ribs. *Parahoplites* cf. *nutfieldiensis* differs from *P. subcampischei* Sinzow, 1907, in having a somewhat wider umbilicus and a less convex venter. In *P. nutfieldiensis*, forking of ribs takes place at the umbilical margin, whereas in *P. subcampischei* this forking occurs in the middle of the flanks.

Distribution – Middle Aptian, Zone of *Parahoplites nutfieldiensis* of England. Middle Aptian of Colombia.

Occurrence – Guane, middle Aptian.

***Parahoplites* cf. *shoupi* Anderson, 1938**

Pl. 87, fig. 1.

Material – One specimen, RGM 282 884.

Description – The whorls are of medium thickness, moderately increasing in height and semi-evolute. The cross section of the last whorl varies from sub-trapezoidal-oval to high-oval with the point of the maximum thickness in the lower third of the flanks. The venter is rather narrow and rounded. The flanks are high and slightly convex. The umbilicus is moderately wide, shallow, step-like, with a steep wall. The umbilical rim is rounded.

The ornament consists of numerous, rather strong, flexuous, simple, bifurcating

ribs. The main ribs arise at the umbilical seam; on the umbilical wall they are inclined backward, and at the umbilical margin they become rather strong. On the flanks they are flexuous; on the lower third of the flanks the ribs incline forward, but higher up they become radial. The amount of intermediate ribs is irregular, but mostly there is only one intermediate rib between every two main ribs. Some of the intermediate ribs arise in the lower part of the flanks, others at the umbilical margin, branching off from the main ribs. All ribs are equally strong and slightly curved forward on the venter.

Measurements – RGM 282 884; D = 108.0; H = 43.8; W = 37.3; U = 33.3; h = 28.3; H:D = 41; W:D = 35; U:D = 31; H:h = 1.5; ribs = 62.

Comparison – The described species differs from *Parahoplites transitans* Sinzow, 1907, in its less inflated whorls, narrower umbilicus, narrower venter, and in the greater inclination and flexuosity of the ribs in the lower part of the flanks. From *P. vectensis* Casey, 1965, it differs in its thicker whorls, wider umbilicus and in the small number of strong flexuous ribs. The described species differs from *P. umbilicostatus* Scott, 1940, in having a wider umbilicus and a smaller number of ribs, which bear less pronounced umbilical thickenings. Moreover, in *P. umbilicostatus* the ribs are inclined backward in the upper part of the flanks, whereas in *P. shoupi* the ribs become radial in the upper part of the flanks.

Distribution – Middle Aptian of California and Colombia.

Occurrence – Guane, middle Aptian.

Undescribed, but determined in the collection

The following list contains species that were identified, but not described.

Acanthoplites pluricostatus Etayo-Serna
Colombiceras tobleri discoidalis Sinzow
Douvilleiceras mammillatum (Schlotheim)
Douvilleiceras solitae (d'Orbigny)
Douvilleiceras tarapacaense Etayo-Serna
Eodouvilleiceras horridum Riedel
Epicheloniceras bambucaense Etayo-Serna *et al*.
Epicheloniceras barreroi Etayo-Serna
Epicheloniceras camachoi Etayo-Serna
Epicheloniceras coahuilensis Humphrey
Epicheloniceras jimenoi Etayo-Serna
Epicheloniceras martini (d'Orbigny)
Epicheloniceras subnodosocostatum Sinzow
Epicheloniceras tequendamai Etayo-Serna
Gargasiceras acutecostatum Riedel
Gargasiceras pulcher Riedel
Gargasiceras? *interiectum* Riedel
Parahoplites sjoegreni Anthula
Riedelites esthersernae Etayo-Serna
Riedelites obliquus Riedel
Riedelites obliquus remota Riedel
Riedelites? *alexandrinum* (d'Orbigny)
Riedelites? *quebradanegra* Etayo-Serna
Vectisites (Zambranoites) cadenai Etayo-Serna
Vectisites (Zambranoites) cruzi Etayo-Serna
Vectisites (Zambranoites) mateusi Etayo-Serna
Vectisites (Zambranoites) zambranoi Etayo-Serna

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Explanation of plates

Plate 1
Fig. 1. *Prochelonicerasalbrechtiaustriae* (Hohenegger), lower Aptian, Galan. RGM 353 811. Left-lateral view. × 0.67.
Fig. 2. *Cheloniceras seminodosum* (Sinzow), lower Aptian, Mesa de Los Santos. RGM 282 627. a, left-lateral view. b, ventral view. × 1.

Plate 2
Fig. 1. *Prochelonicerasalbrechtiaustriae* (Hohenegger), lower Aptian, Galan. RGM 353 811. a, apertural view, b, ventral view. × 0.67.
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Plate 4
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All figures × 1.

Plate 5
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Plate 6
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Plate 7
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All figures × 1.

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All figures × 1.

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Plate 21
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Plate 22
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All figures × 1.

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All figures × 1.

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All figures × 1.

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All figures × 1.

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Plate 31
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Plate 32
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Plate 33
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Plate 34
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All figures × 1.

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Plate 38
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All figures × 1 unless stated otherwise.

Plate 41
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All figures × 1.

Plate 42
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All figures × 1.

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All figures × 1.

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Plate 46
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All figures × 1.

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All figures × 1.

Plate 48
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All figures × 1.

Plate 49
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All figures × 1.

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Plate 54
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Plate 55
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All figures × 1.

Plate 56
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All figures × 1.

Plate 57
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Plate 58
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All figures × 1.

Plate 59
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Plate 60
Fig. 1. *Epicheloniceras wiedmanni* sp. nov., middle Aptian, Sutamarchan Land of Francisco Castillo. RGM 282 610, paratype. a, apertural view. b, ventral view. × 0.67.
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Plate 61
Fig. 1. *Epicheloniceras wiedmanni* sp. nov., middle Aptian, Guane. RGM 282 617, paratype. Left-lateral view. × 0.8.

Plate 62
Fig. 1. *Epicheloniceras wiedmanni* sp. nov., middle Aptian, Guane. RGM 282 617, paratype. Apertural view. × 0.8.

Plate 63
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Plate 64
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Plate 65
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All figures × 1.

Plate 67
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Plate 69
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Plate 70
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Plate 71
Figs. 1, 2. *Colombiceras subpeltoceroides* (Sinzow), middle Aptian.
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Fig. 3. RGM 282 962, Anapoima-Apulo. a, right-lateral view. b, apertural view. c, ventral view.
Fig. 4. RGM 282 967, Villa de Leyva. a, left-lateral view. b, ventral view. × 2.

All figures × 1 unless stated otherwise.

Plate 72
Fig. 1. *Gargasiceras aptiense* (Roch), middle Aptian, Mesa de Los Santos. RGM 282 968. a, right-lateral view. b, apertural view. c, ventral view. × 1.
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Figs. 3-5. *Gargasiceras* aff. *recticostatum* (Kilian), middle Aptian, Villa de Leyva.

Fig. 3. RGM 282 979. a, right-lateral view. b, apertural view. c, ventral view.
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Fig. 5. RGM 282 978, a, left-lateral view. b, apertural view. c, ventral view.

All figures × 2 unless stated otherwise.

Plate 73
Fig. 1. *Riedelites*? sp., middle Aptian, Guane. RGM 282 846. Right-lateral view. × 0.67.

Plate 74
Fig. 1. *Riedelites*? sp., middle Aptian, Guane. RGM 282 846. a, apertural view. b, ventral view. × 0.67.
Fig. 2. *Gargasiceras* aff. *interiectum* (Riedel), middle Aptian, Villa de Leyva. RGM 282 985. a, right-lateral view. b, apertural view. c, ventral view. × 1.

Plate 75
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All figures × 1.

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Fig. 1. *Riedelites*? sp., middle Aptian, Galan. RGM 282 839. a, apertural view. b, ventral view.
Fig. 2. *Riedelites microtuberculatus* sp. nov., middle Aptian, Útica. RGM 282 825, holotype. a, right-lateral view. b, apertural view. c, ventral view.

All figures × 1.

Plate 77
Fig. 1. *Riedelites*? sp., middle Aptian, Guane. RGM 282 833. Right-lateral view. × 0.83.
Fig. 2. *Riedelites microtuberculatus* sp. nov.; middle Aptian, Útica. RGM 282 826, paratype. × 1.

Plate 78
Fig. 1. *Riedelites*? sp., middle Aptian, Guane. RGM 282 833. a, apertural view. b, ventral view. × 0.83.

Plate 79
Fig. 1. *Riedelites*? sp., middle Aptian, Villa de Leyva. RGM 282 832. Left-lateral view. × 0.86.

Plate 80
Fig. 1. *Riedelites*? sp., middle Aptian, Villa de Leyva. RGM 282 832. a, apertural view. b, ventral view. × 0.86.

Plate 81
Figs. 1, 2. *Protacanthoplites abichi* (Anthula), middle Aptian, Villa de Leyva.
Fig. 1; RGM 282 854. a, left-lateral view. b, apertural view. c, ventral view.
Fig. 2. RGM 282 855. a, left-lateral view. b, apertural view. c, ventral view.
Figs. 3-5. *Protacanthoplites*? *originalis* sp. nov., middle Aptian.
Fig. 3. RGM 282 857, holotype. Útica. a, right-lateral view. b, apertural view. c, ventral view.
Fig. 4. RGM 282 862, paratype. Guane. a, right-lateral view. b, apertural view. c, ventral view.
Fig. 5. RGM 282 861, paratype. Guane. a, left-lateral view. b, apertural view. c, ventral view.

All figures × 1.

Plate 82
Fig. 1. *Parahoplites macfarlandi* Anderson, middle Aptian, Anapoima-Apulo. RGM 282 882. Right-lateral view.
Fig. 2. *Gargasiceras subpulcher* sp. nov., middle Aptian, Villa de Leyva. RGM 282 987, holotype. a, right-lateral view. b, apertural view. c, ventral view.

All figures × 1.

Plate 83
Fig. 1. *Parahoplites macfarlandi* Anderson, RGM 282 882. middle Aptian, Anapoima-Apulo. a, apertural view. b, ventral view.
Fig. 2. *Gargasiceras subpulcher* sp. nov., middle Aptian, Sáchica. RGM 282 986, paratype. a, left-lateral view. b, apertural view.

All figures × 1.

Plate 84
Fig. 1. *Parahoplites maximus* Sinzow, middle Aptian, Anapoima-Apulo. RGM 282 881. a, left-lateral view. b, ventral view.
Fig. 2. *Acanthohoplites* ex gr. *aschiltaensis* (Anthula), upper Aptian, Anapoima-Apulo. RGM 282 877. a, right-lateral view. b, apertural view. c, ventral view.

All figures × 1.

Plate 85
Fig. 1. *Parahoplites maximus* Sinzow, middle Aptian, Guane. RGM 282 880. a, left-lateral view. b, apertural view.
Fig. 2. *Acanthohoplites nolani* (Seunes), upper Aptian, Útica. RGM 282 875. a, right-lateral view. b, apertural view. c, ventral view.

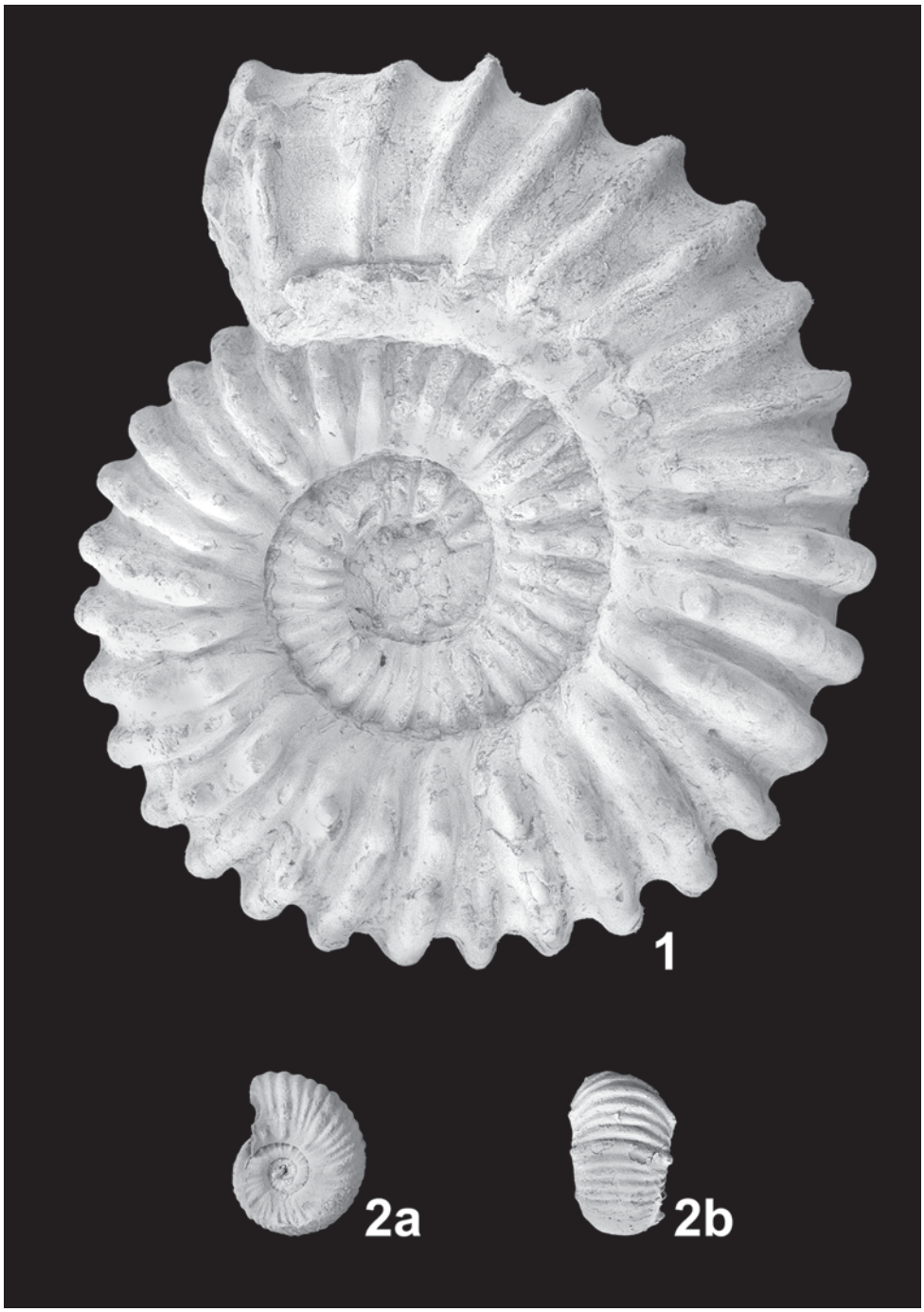
All figures × 1.

Plate 86
Fig. 1. *Parahoplites* cf. *nutfieldiensis* (J. Sowerby), middle Aptian, Guane. RGM 282 883. a, left-lateral view. b, ventral view.
Fig. 2. *Acanthohoplites* cf. *teres* Stoyanow, upper Aptian, Villa de Leyva. RGM 282 876. a, right-lateral view. b, apertural view.

All figures × 1.

Plate 87
Fig. 1. *Parahoplites* cf. *shoupi* Anderson, middle Aptian, Guane. RGM 282 884. a, right-lateral view. b, apertural view.
Fig. 2. *Hypacanthoplites sigmoidalis* Casey, upper Aptian, Guane. RGM 282 878. a, right-lateral view. b, apertural view. c, ventral view.
Fig. 3. *Hypacanthoplites* sp., upper Aptian, Guane. RGM 282 879. a, right-lateral view. b, ventral view.

All figures × 1.



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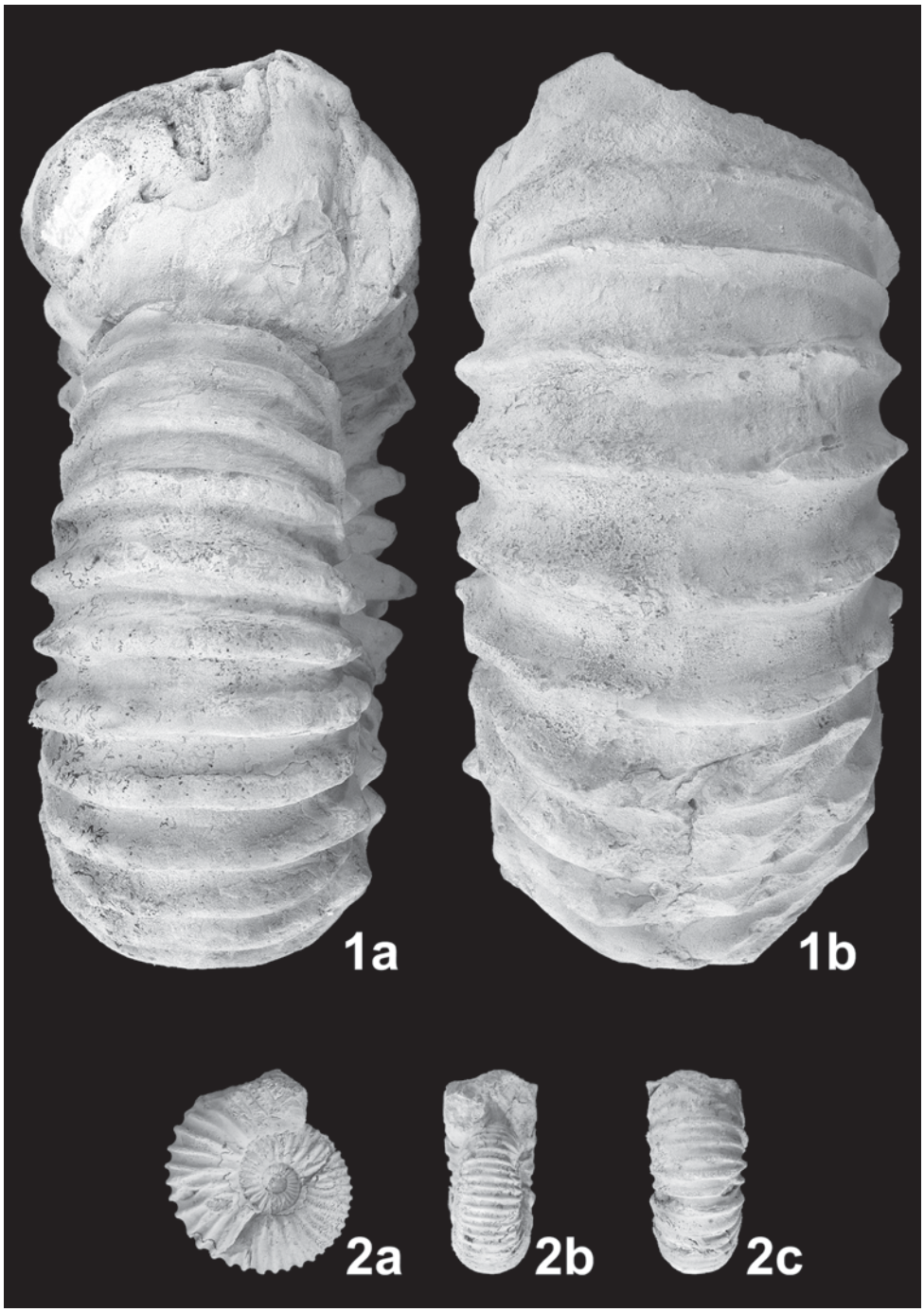

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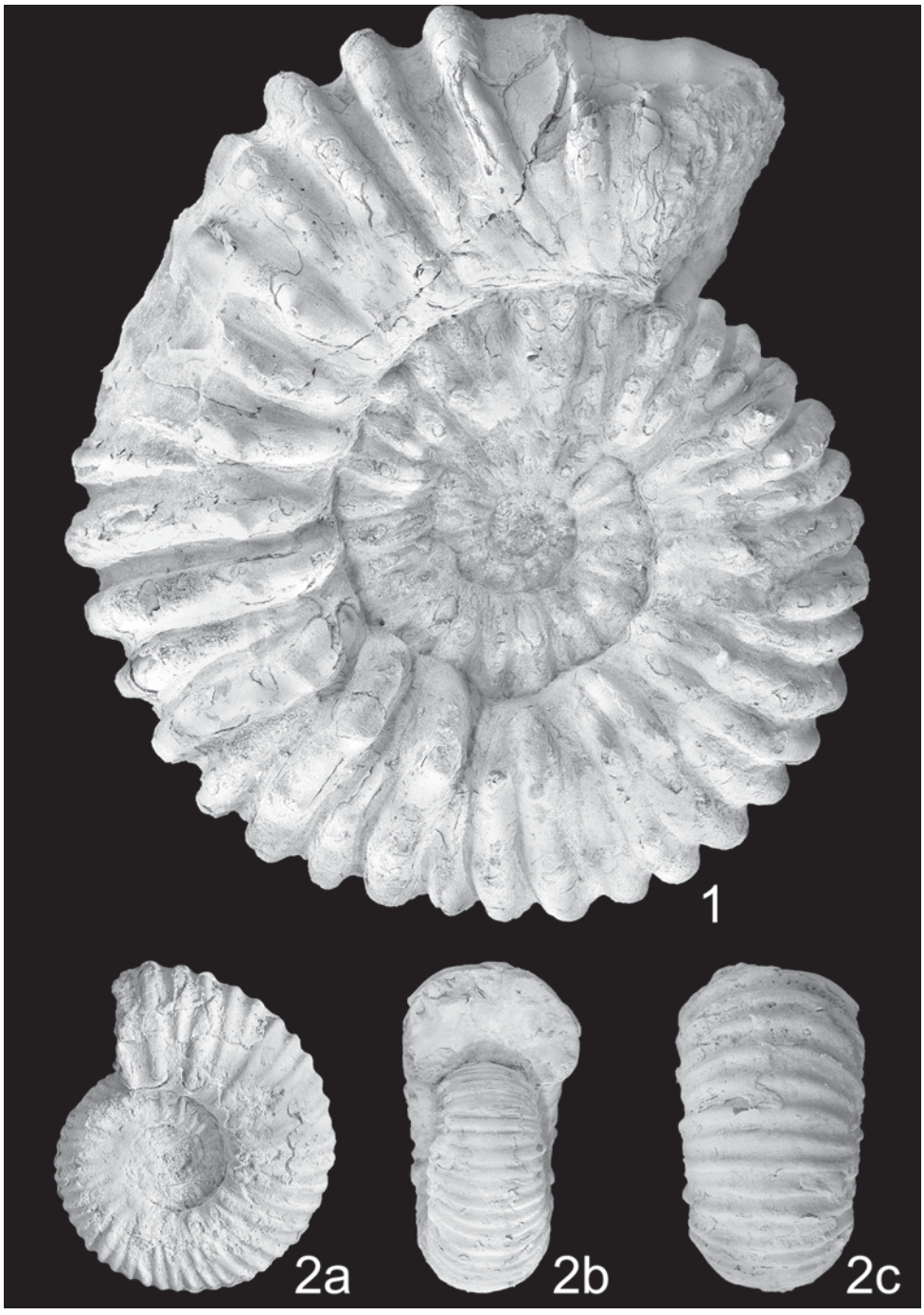

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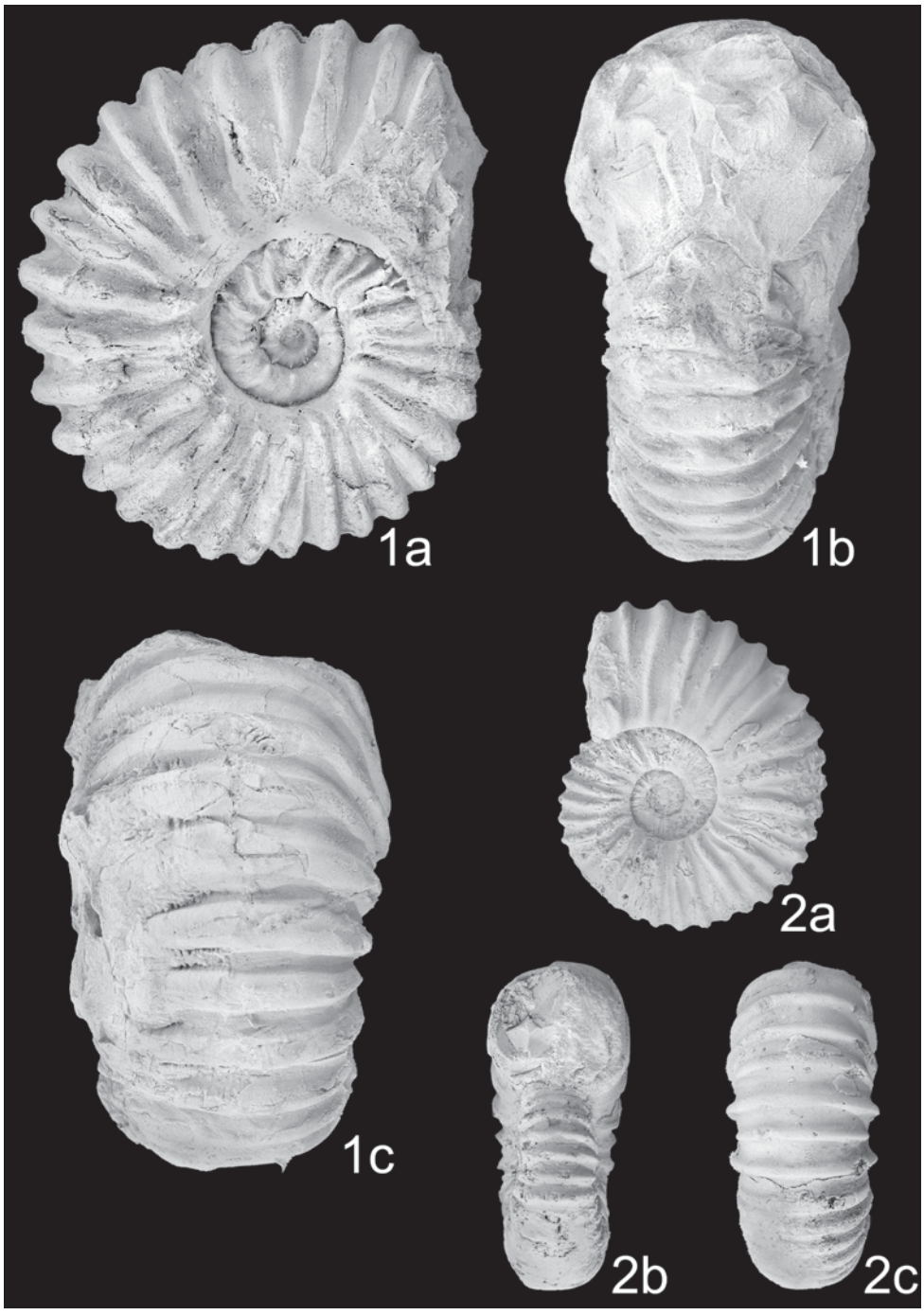
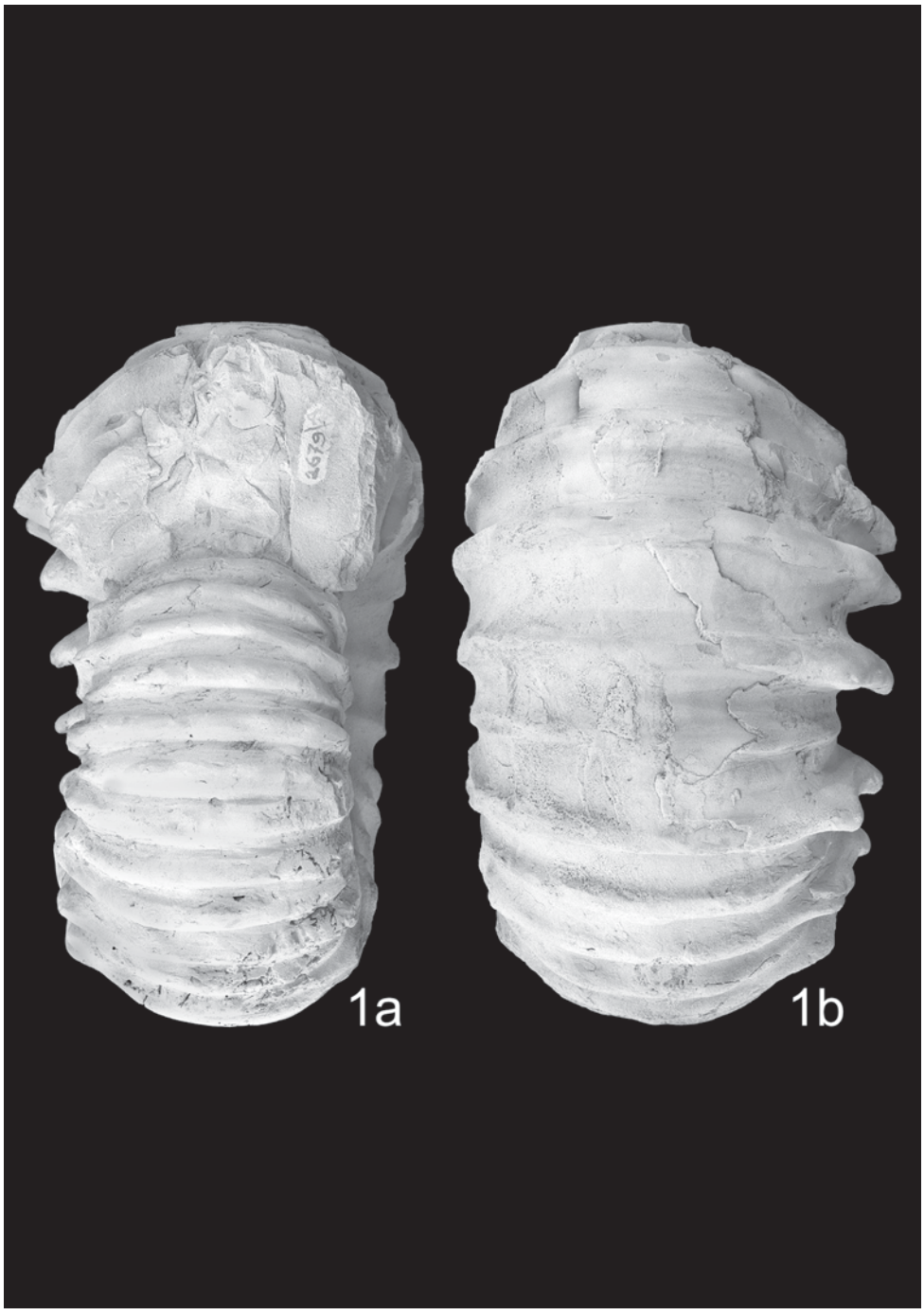


Plate 4

Plate 5



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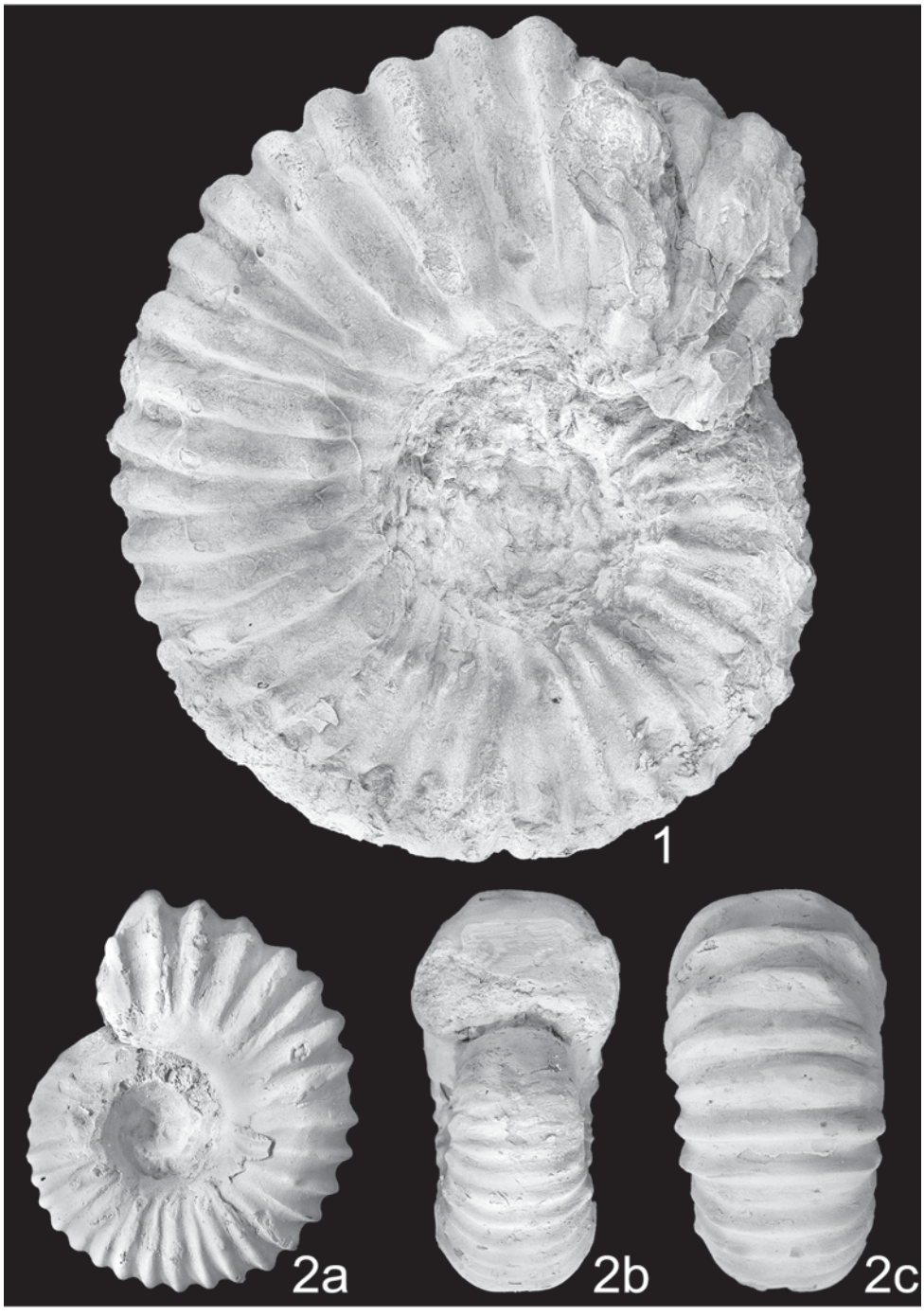

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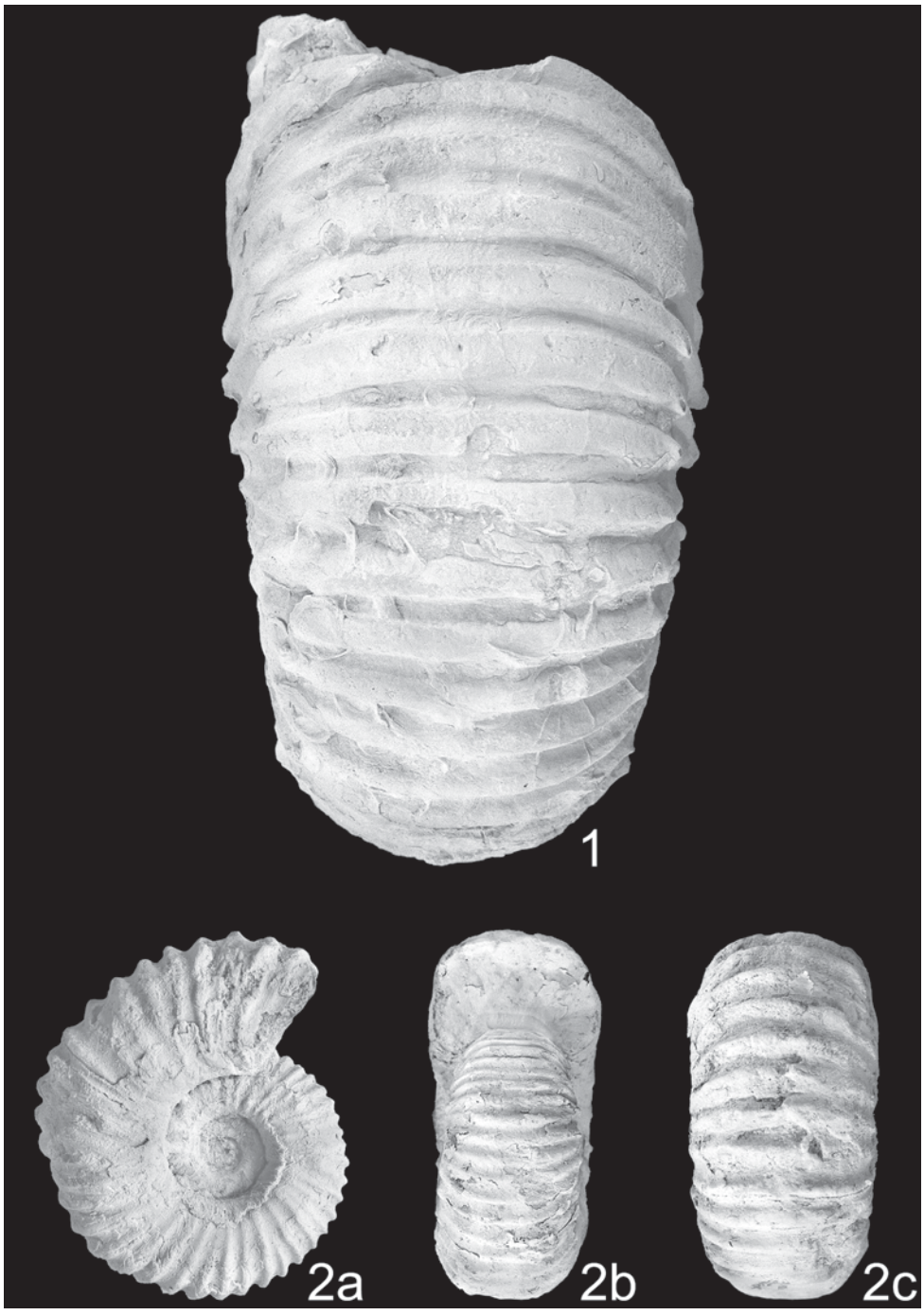

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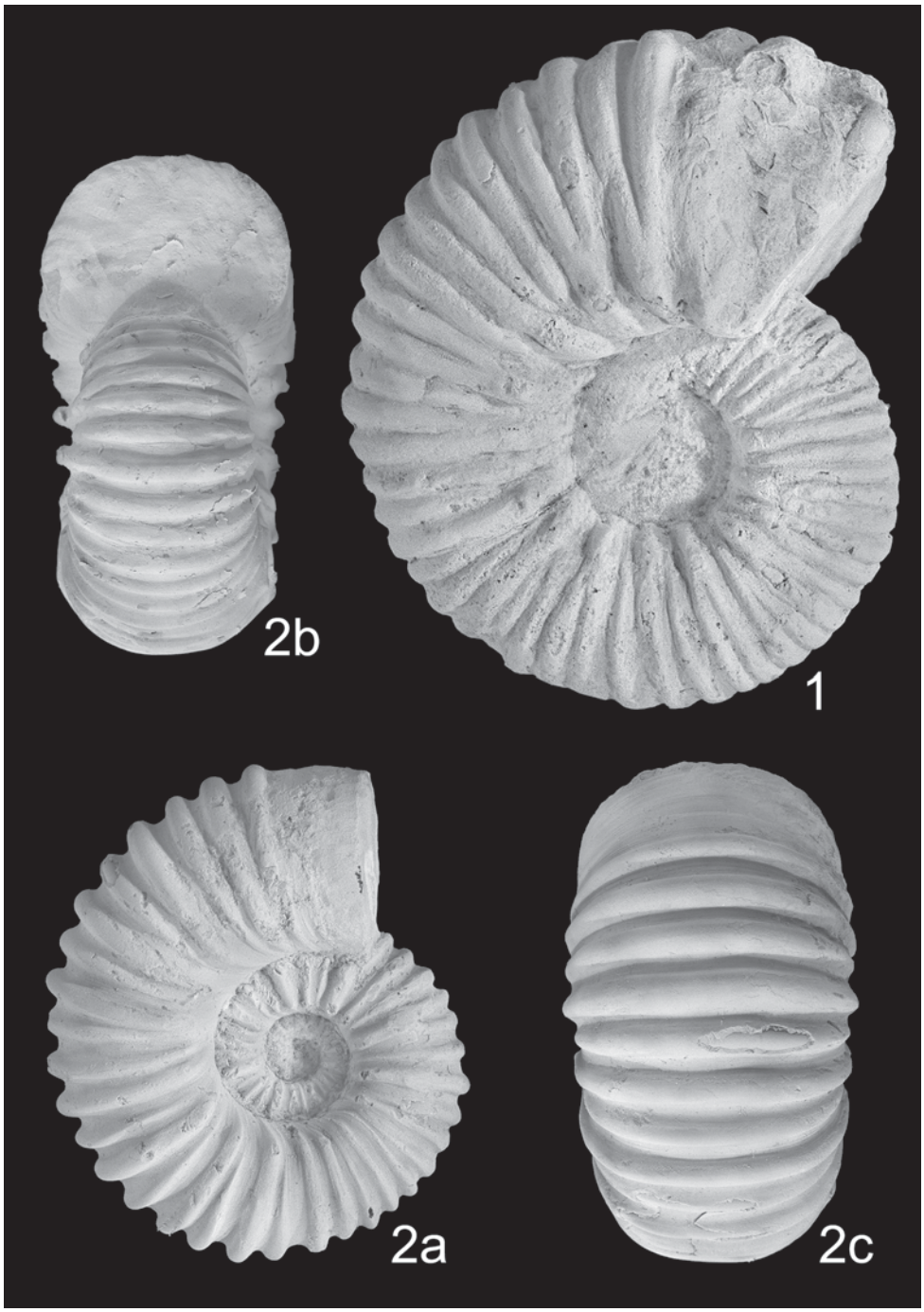

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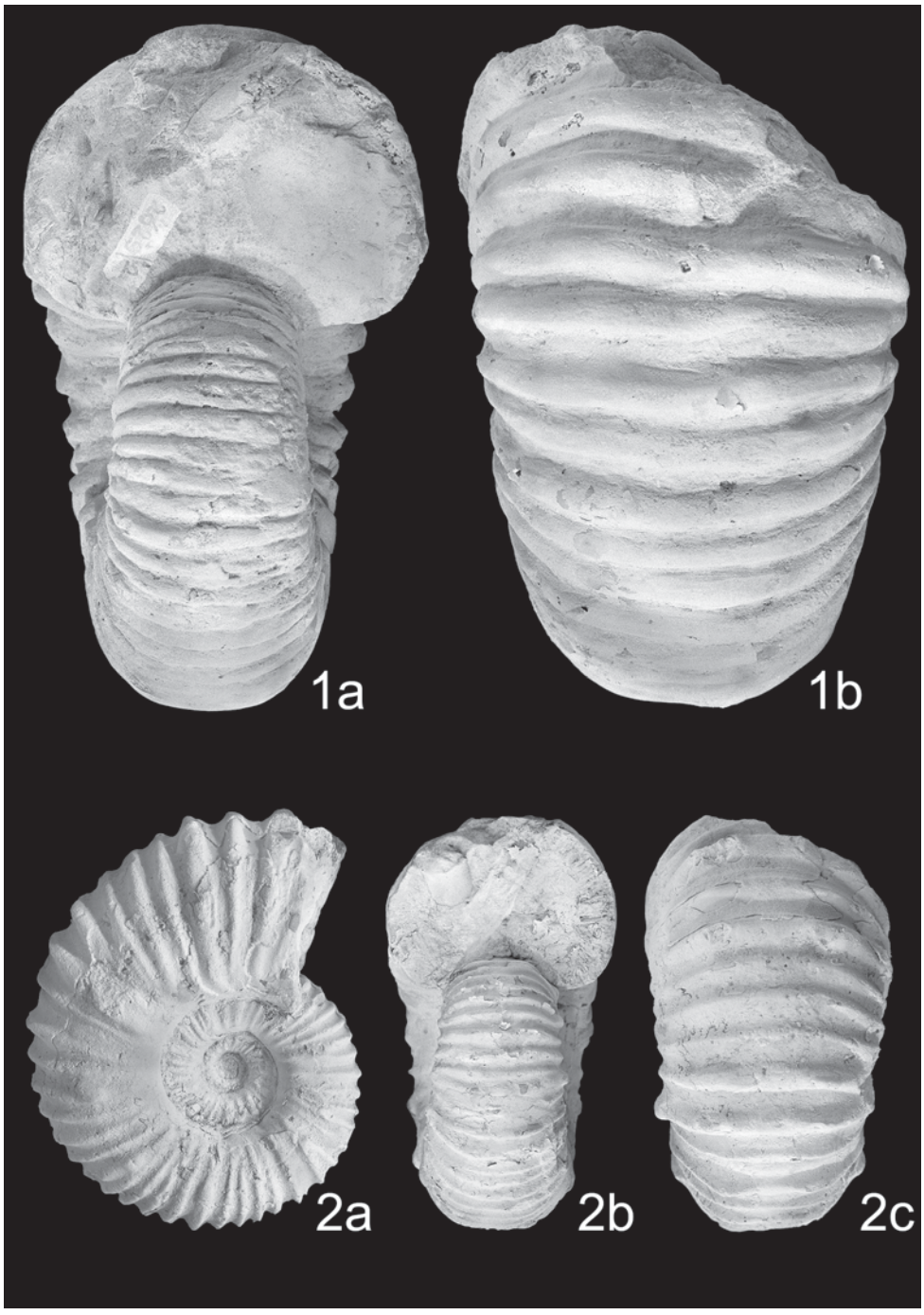

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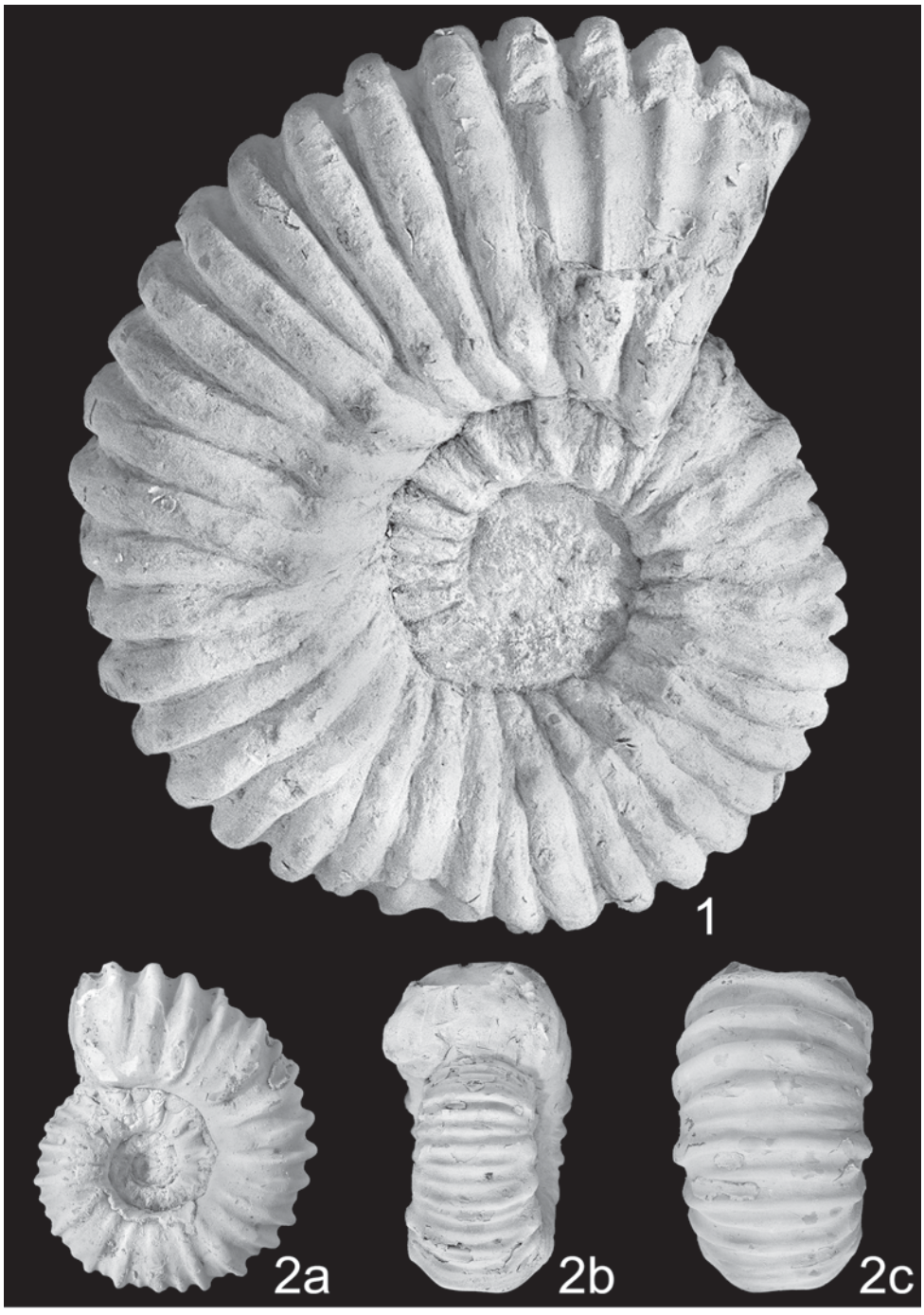

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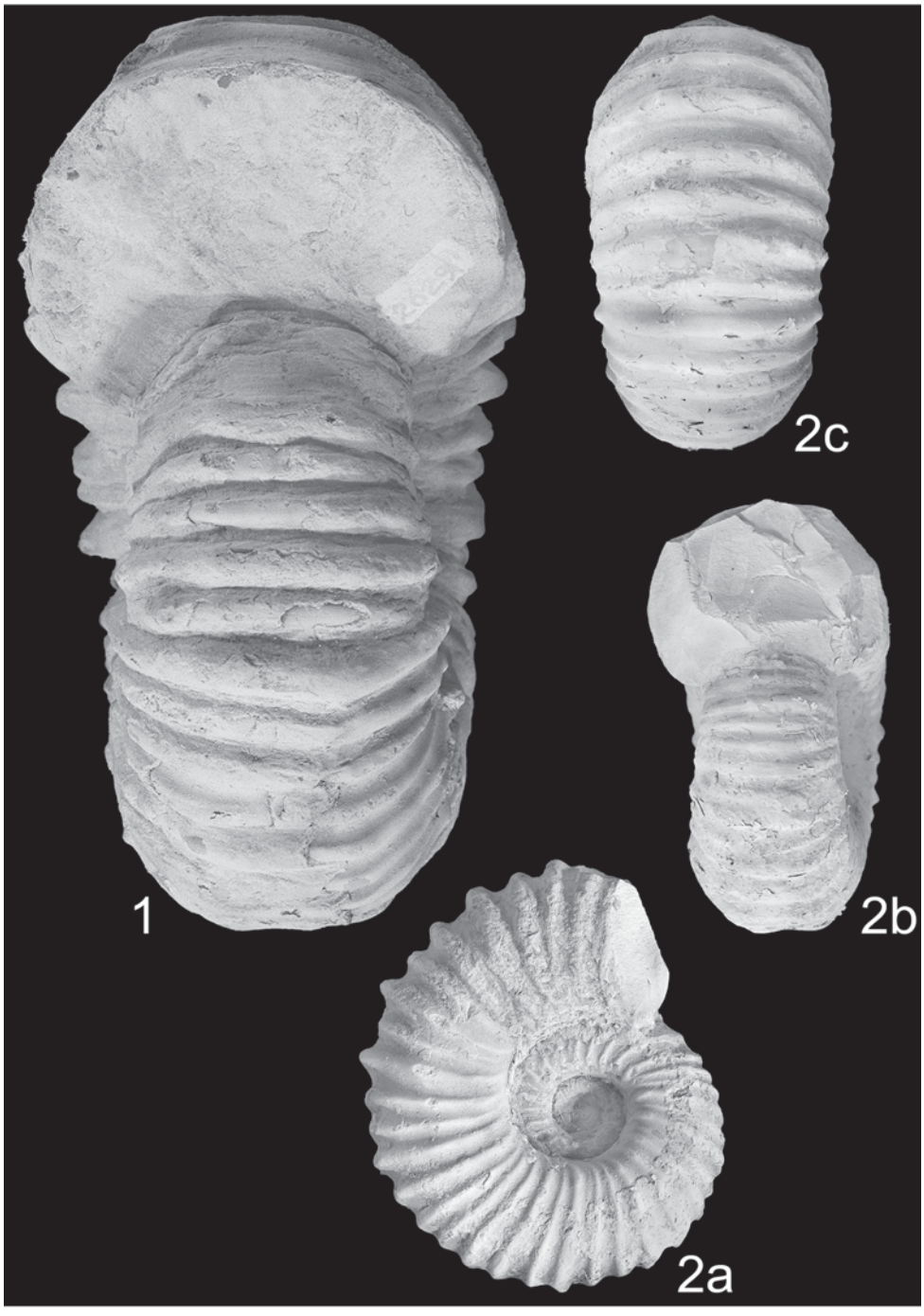

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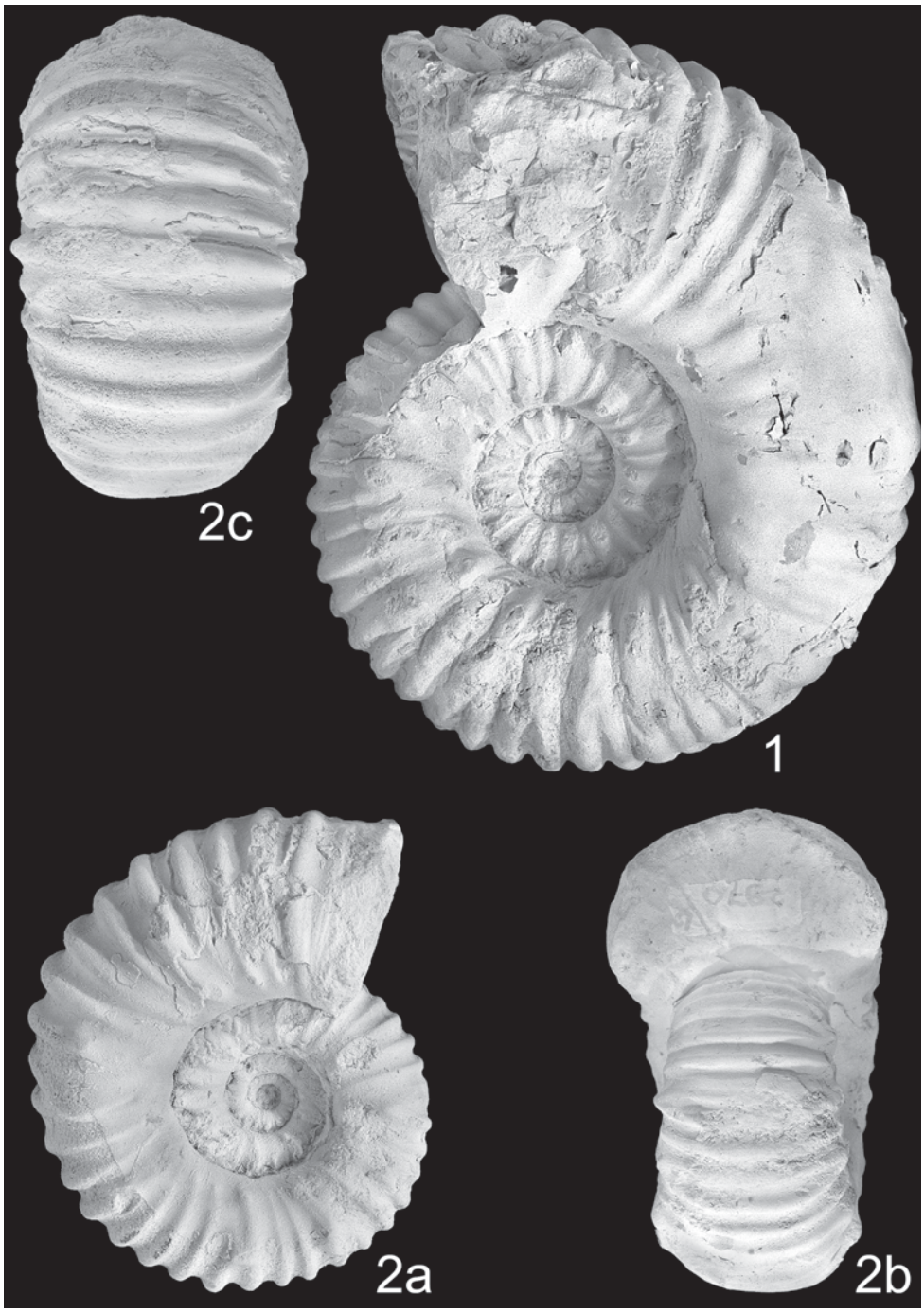

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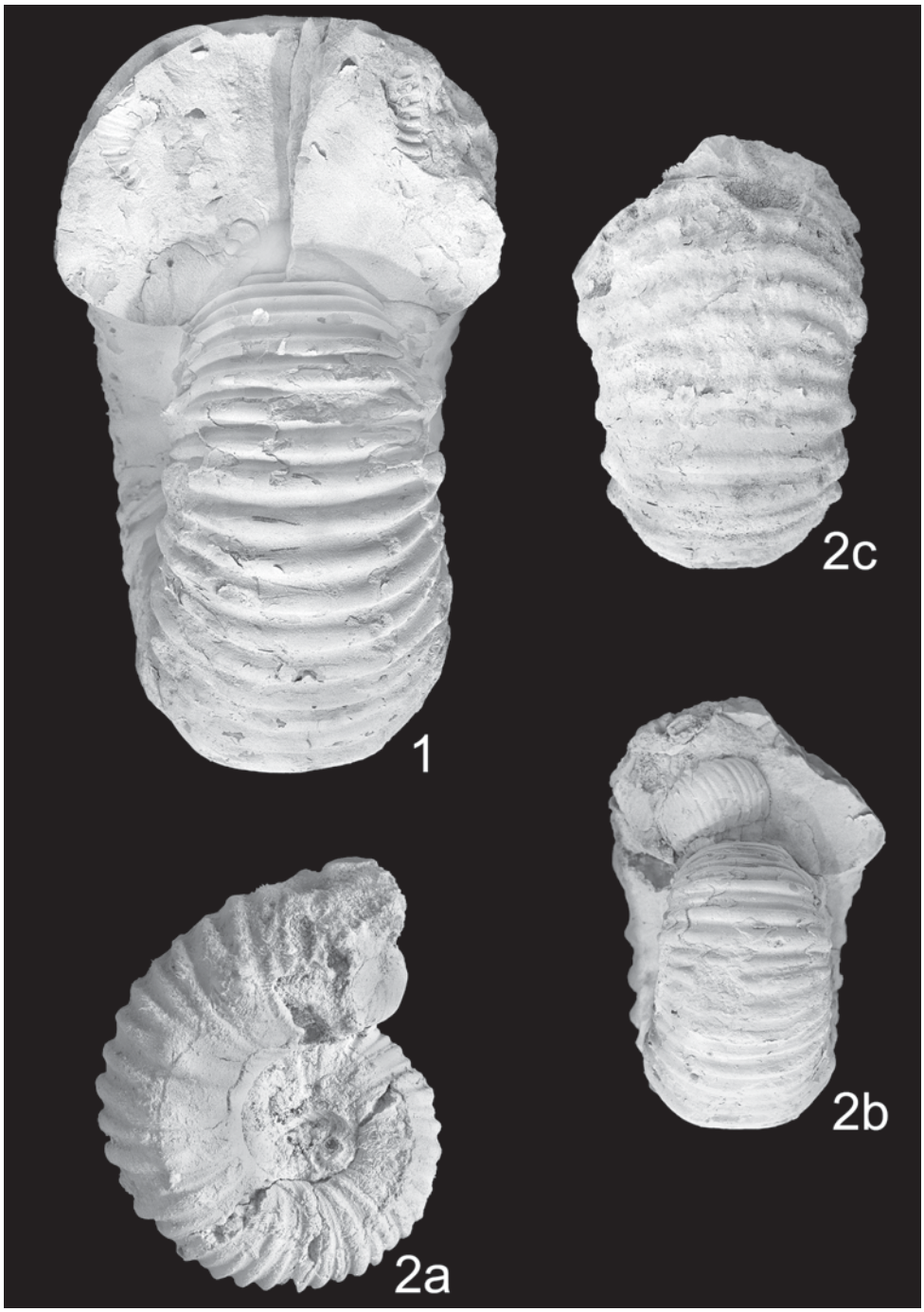

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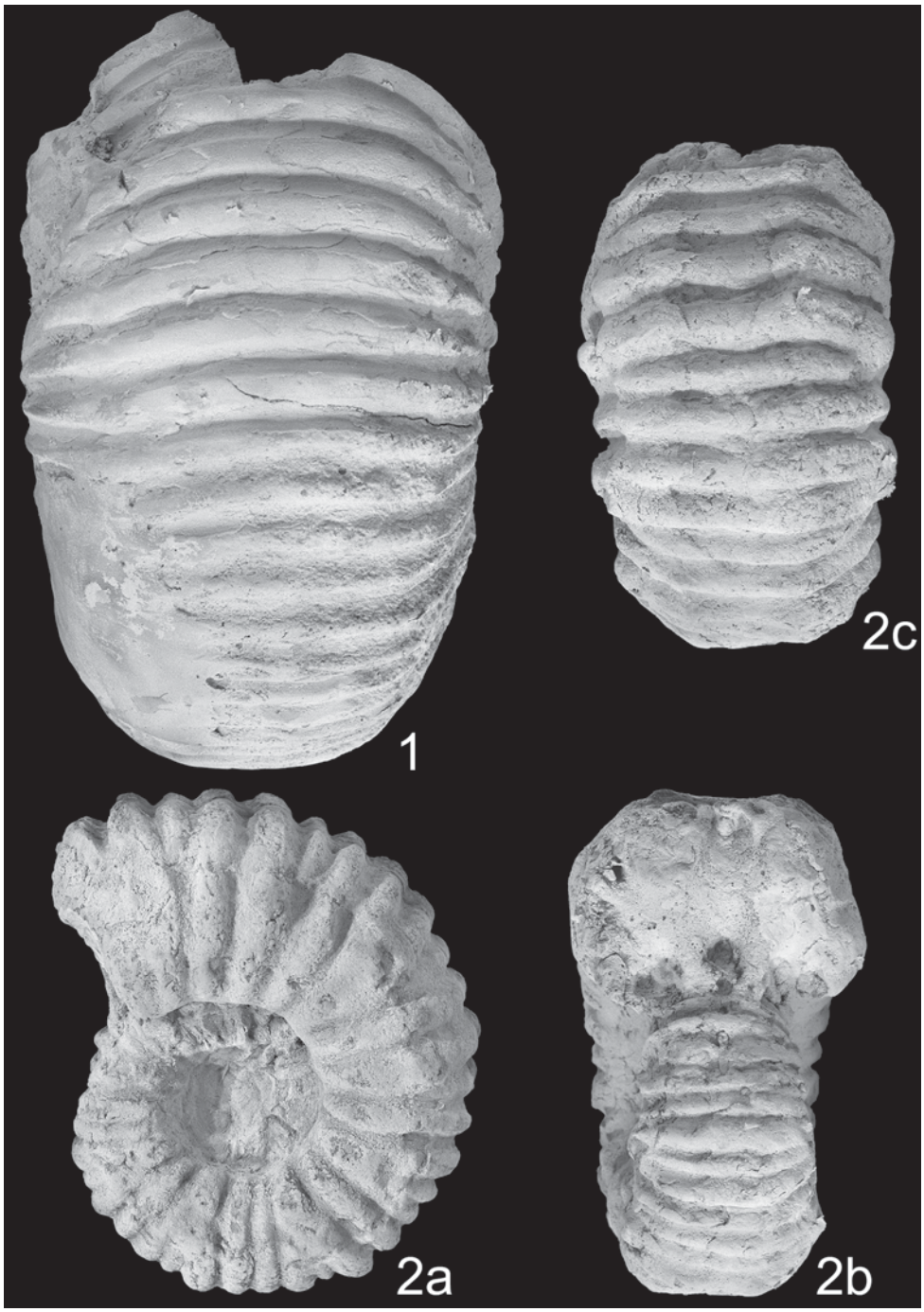

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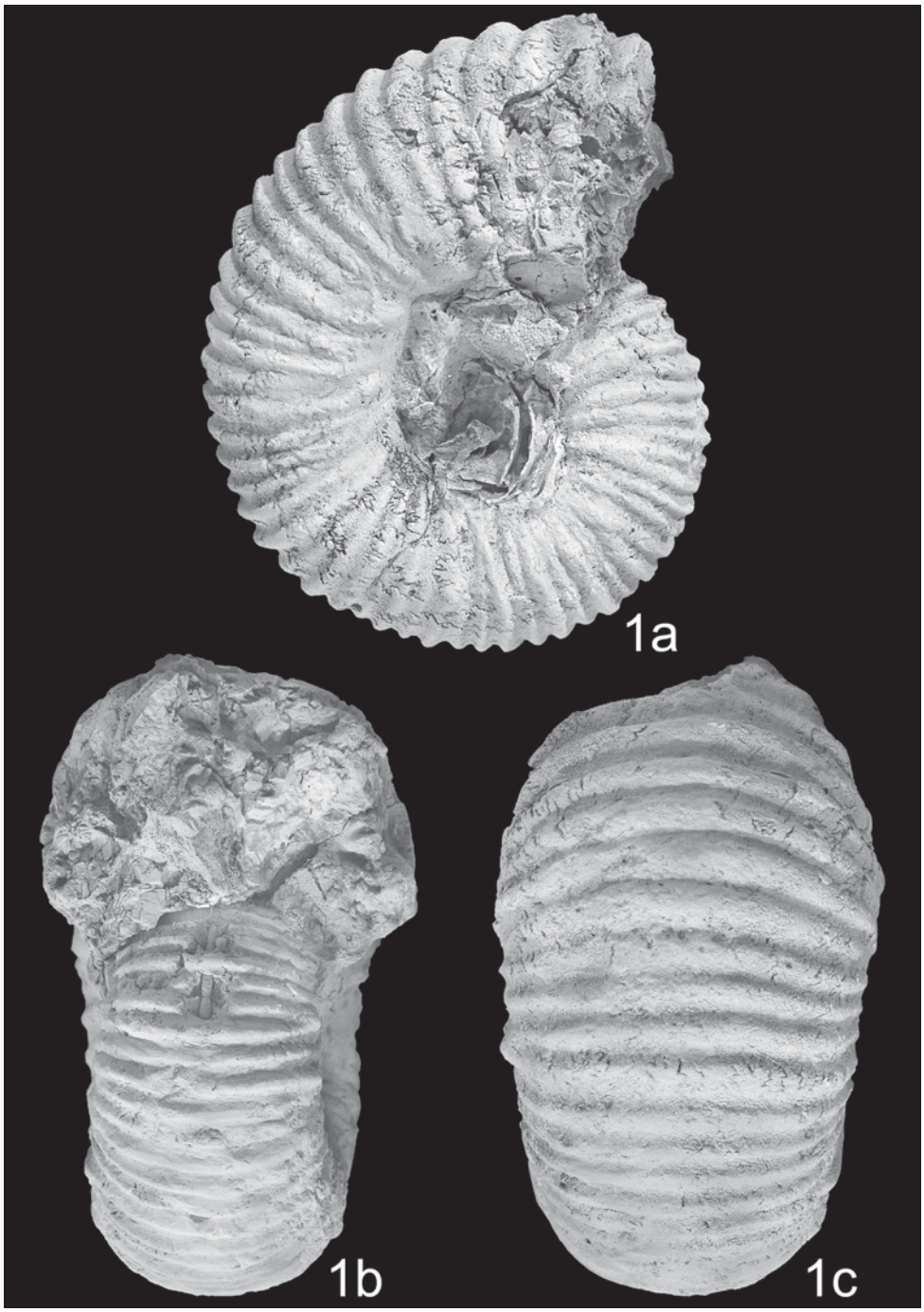


Plate 16

Plate 17

Plate 18

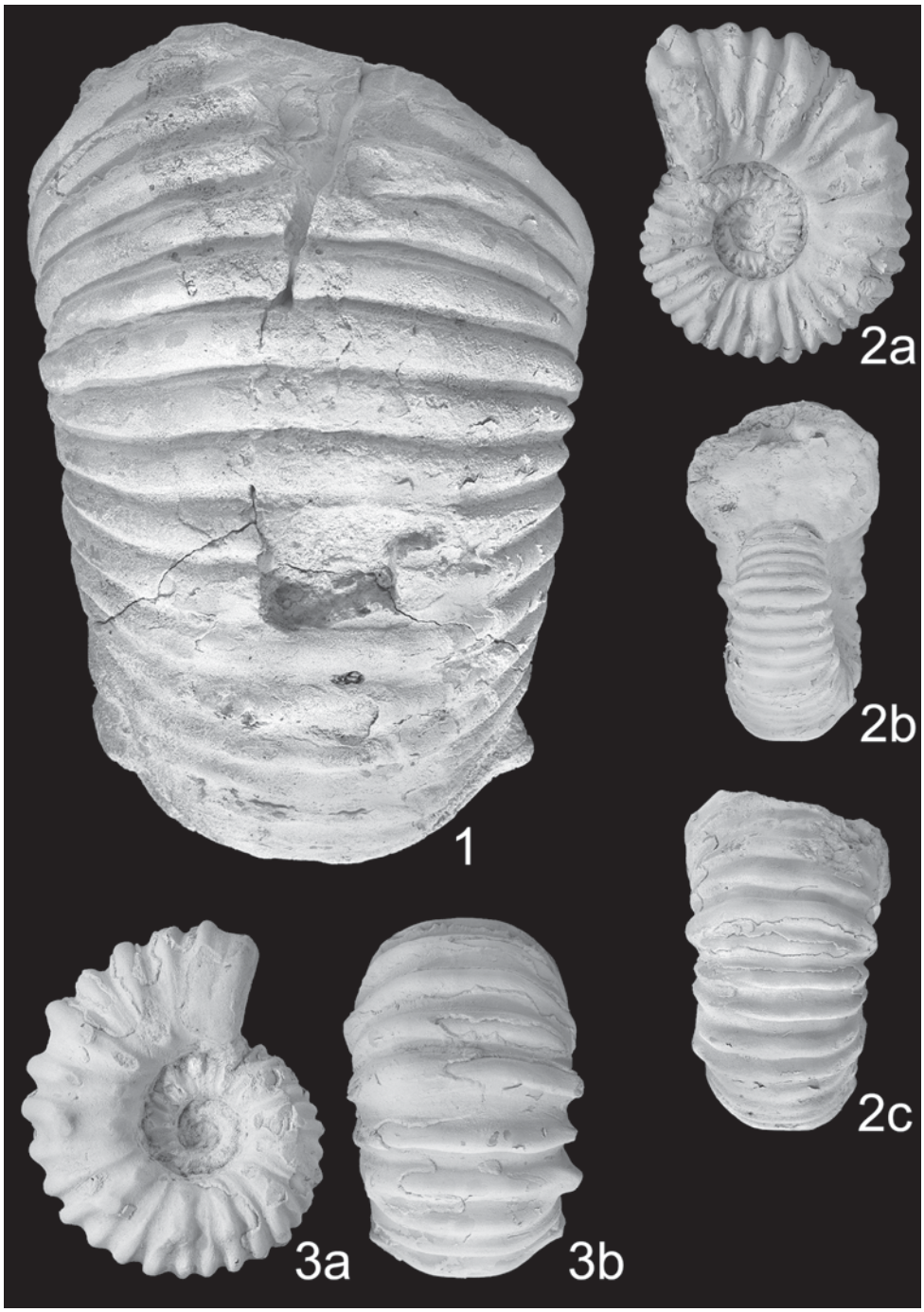


Plate 19

Plate 20

Plate 21

Plate 22

Plate 23

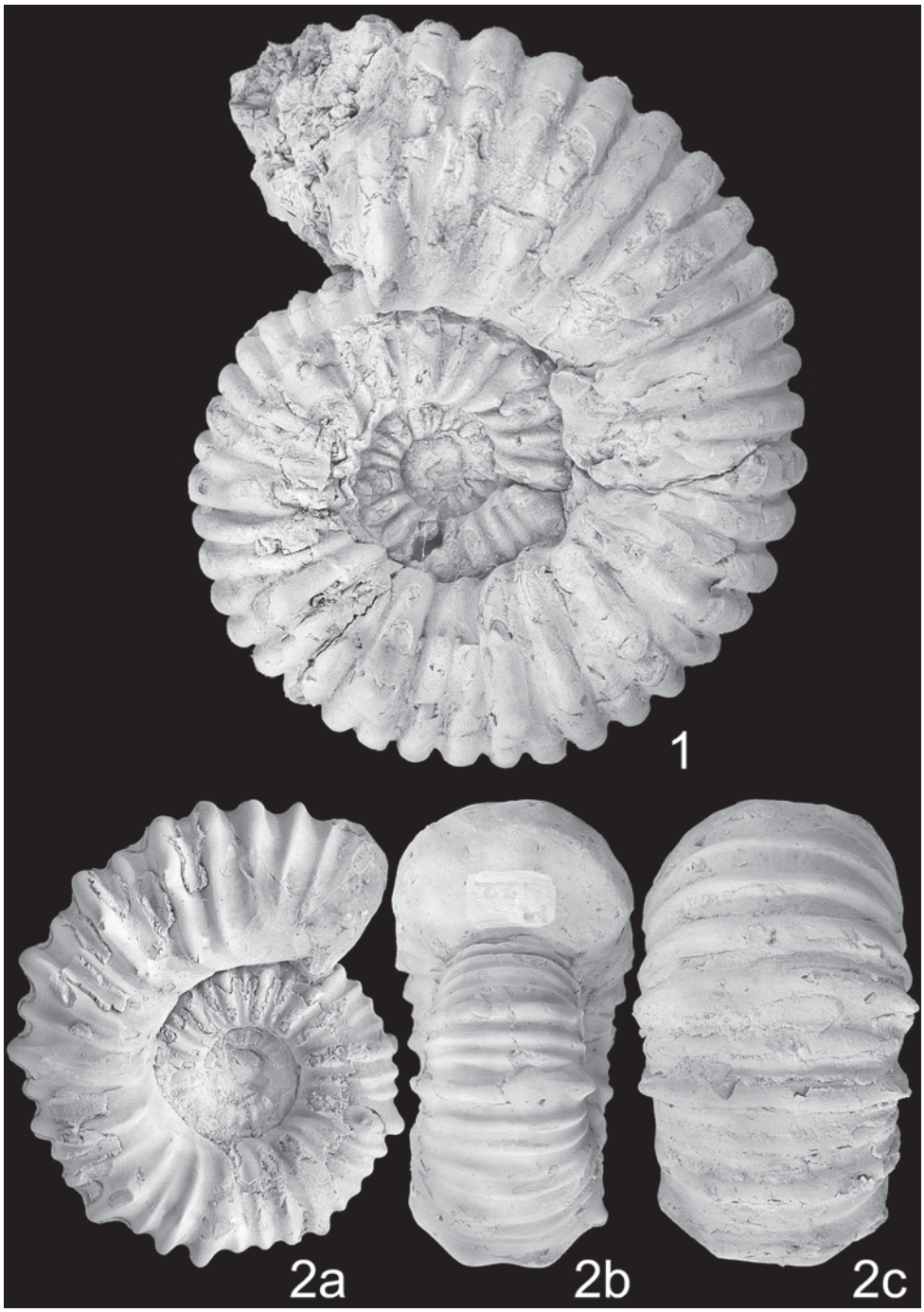
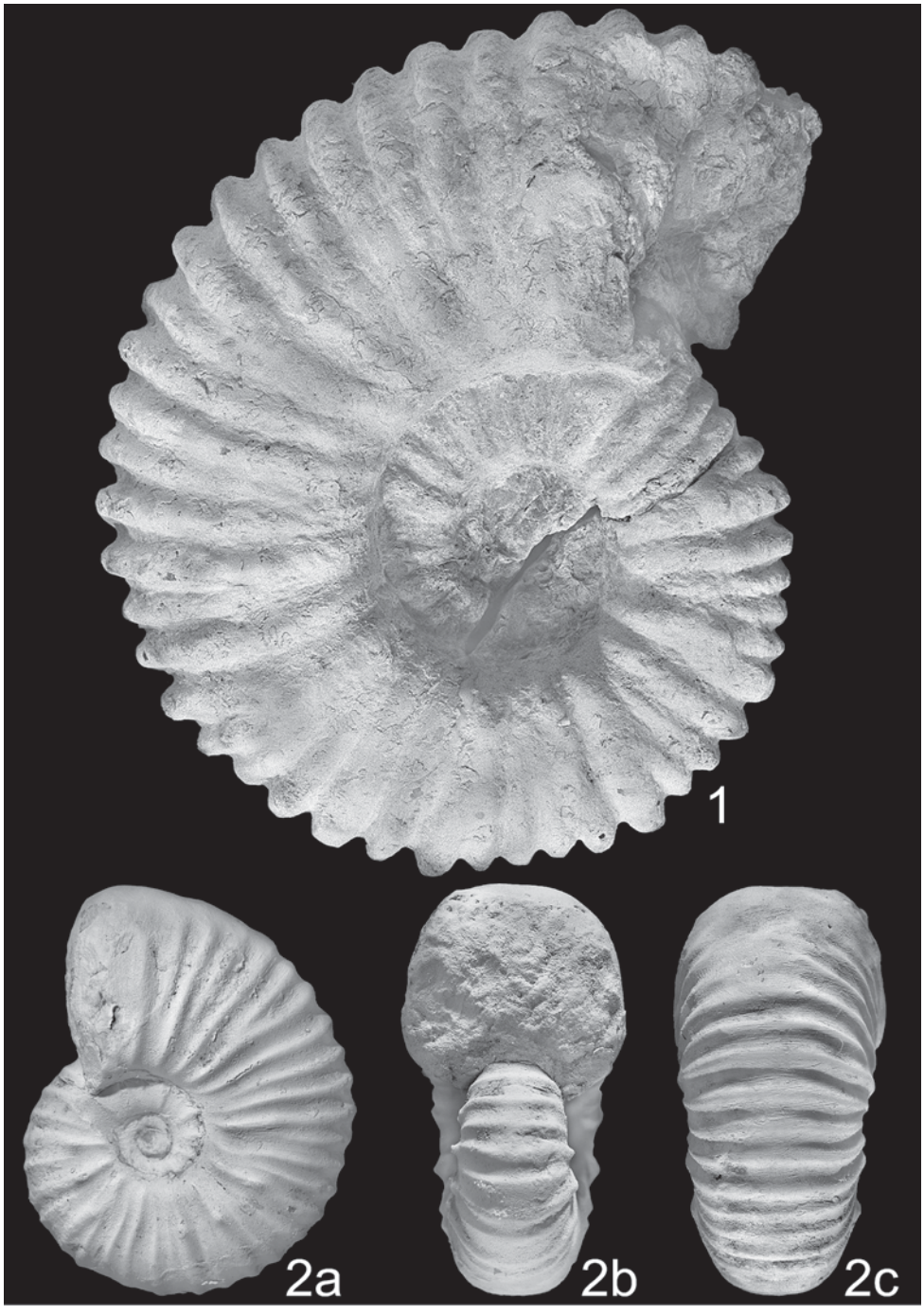


Plate 24

Plate 25



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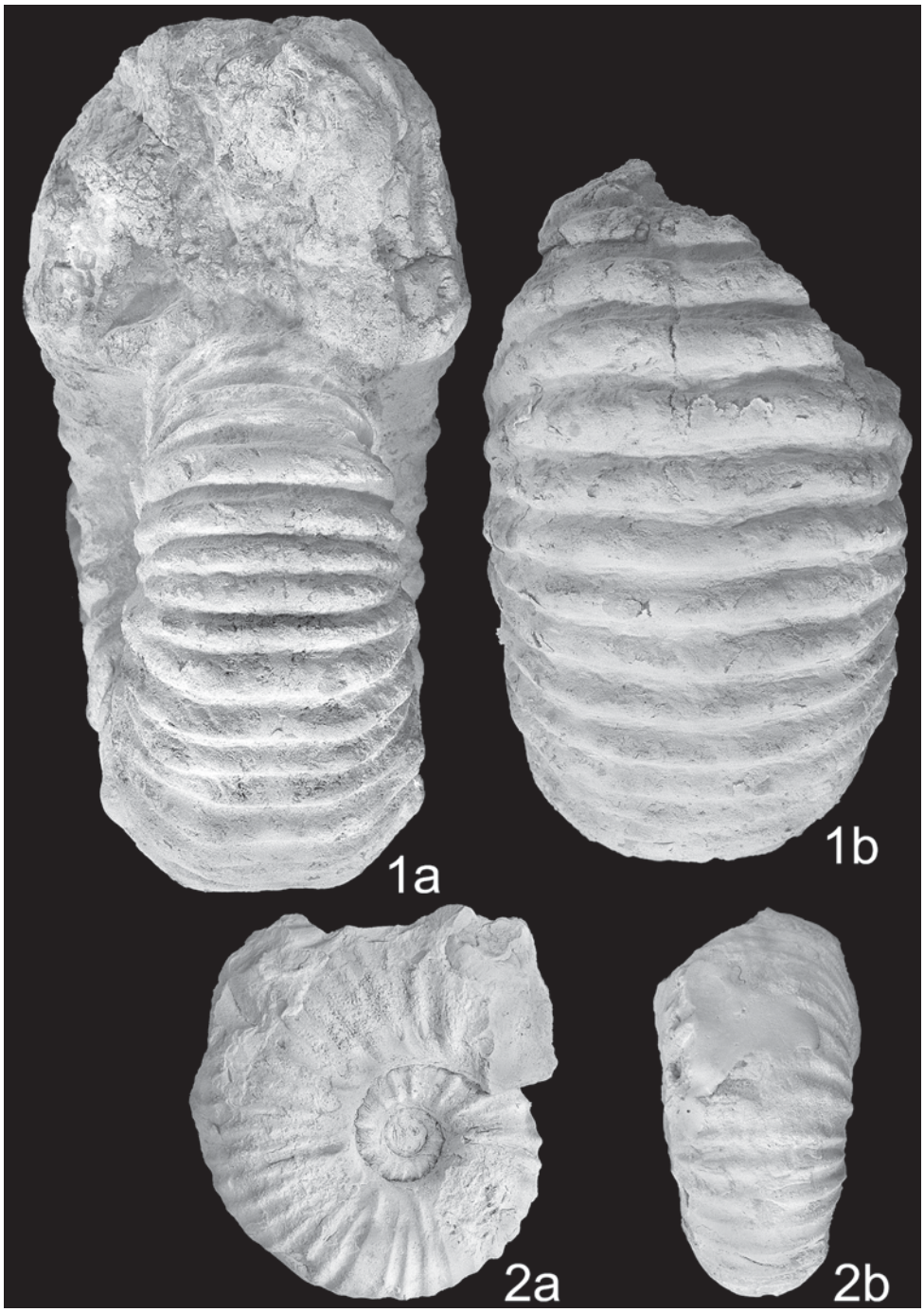


Plate 27

Plate 28

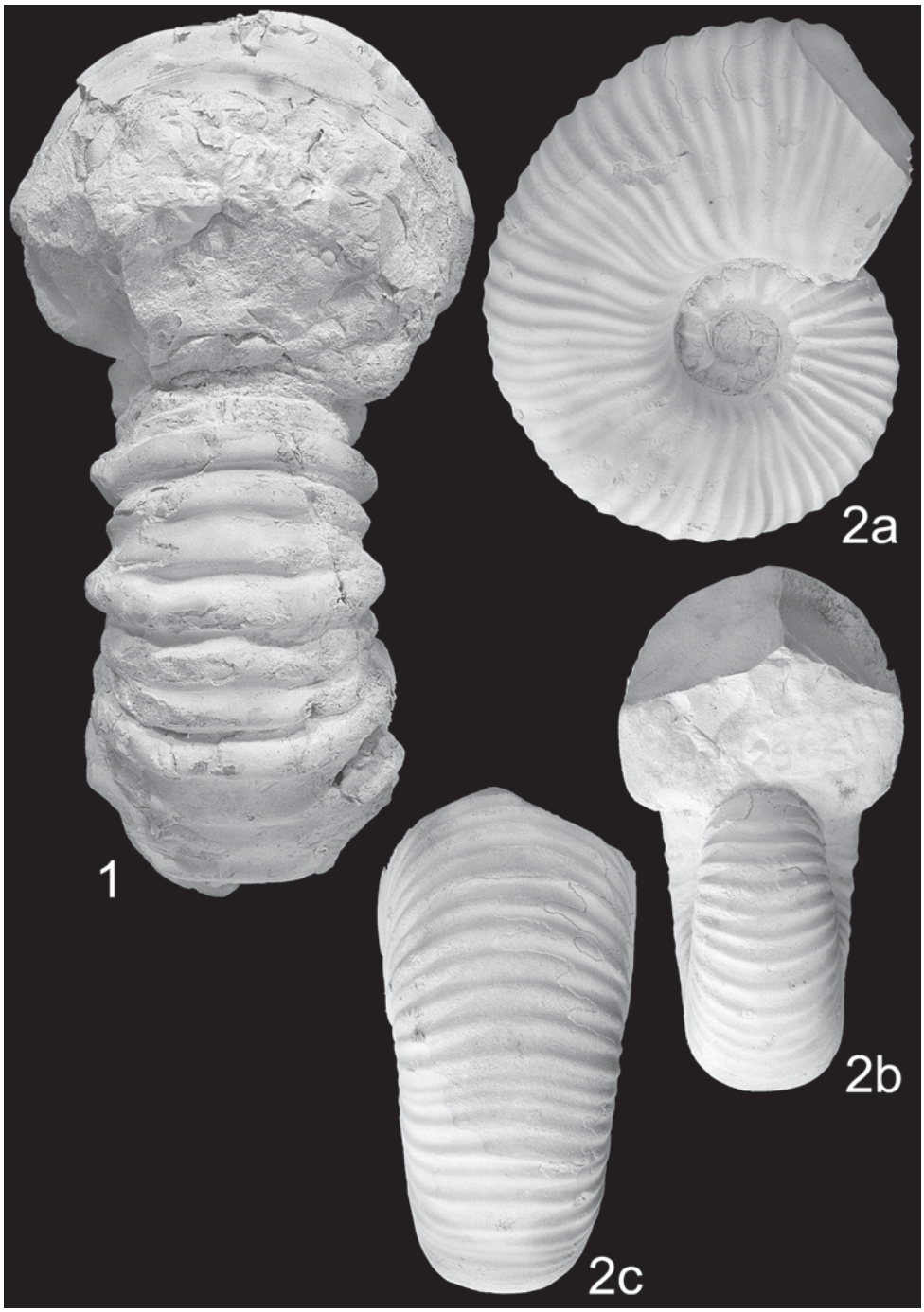
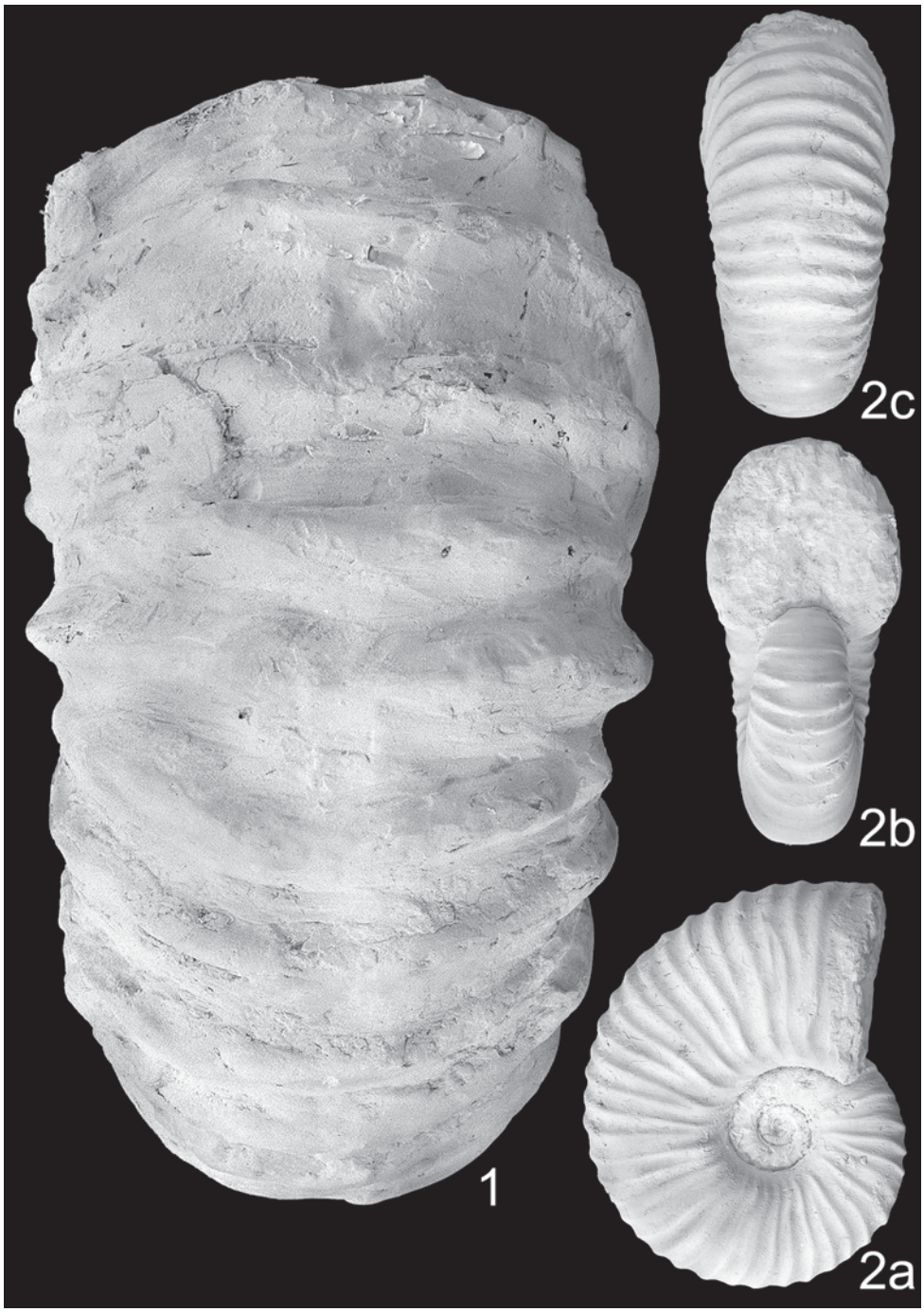


Plate 29

Plate 30



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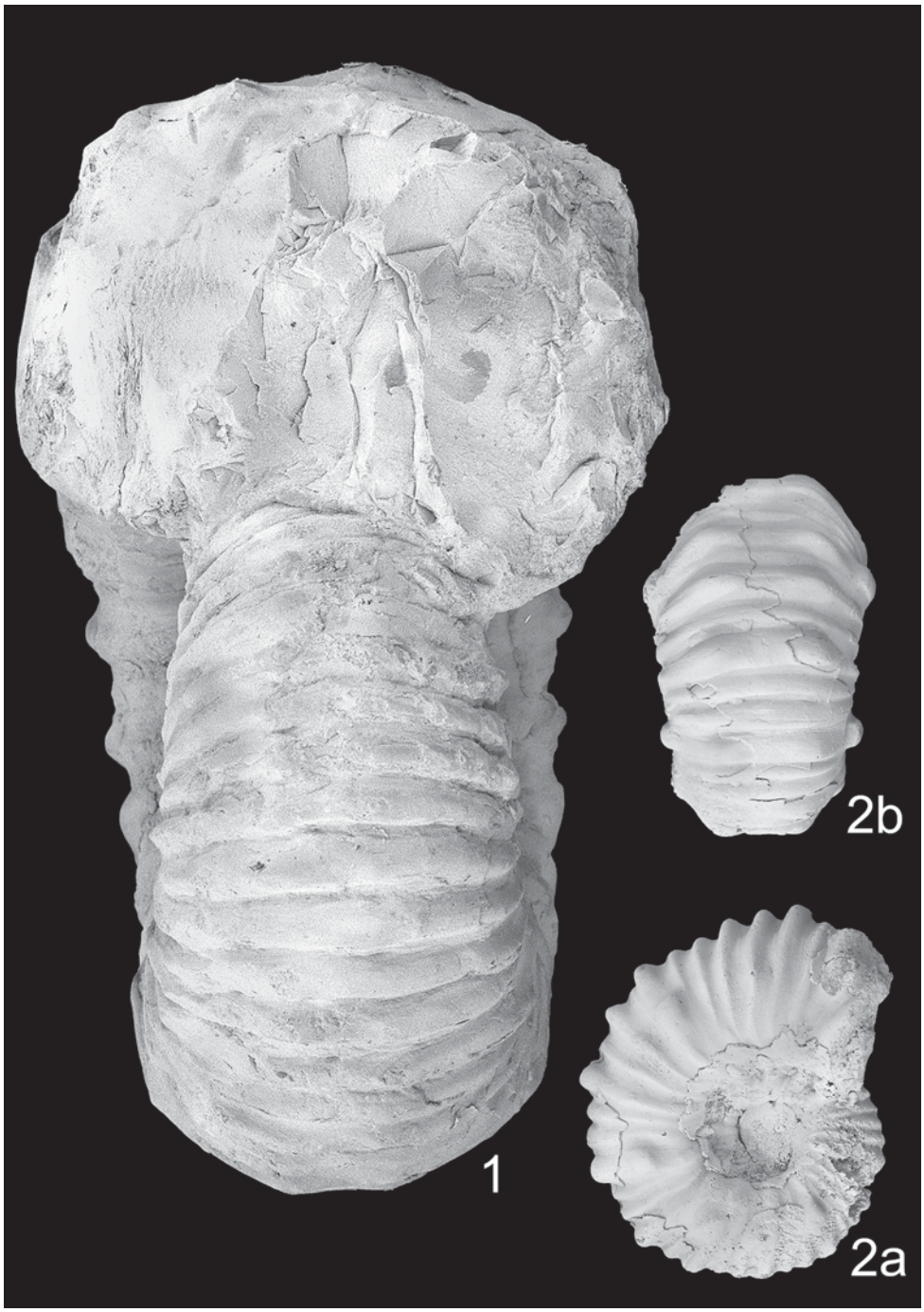


Plate 32

Plate 33

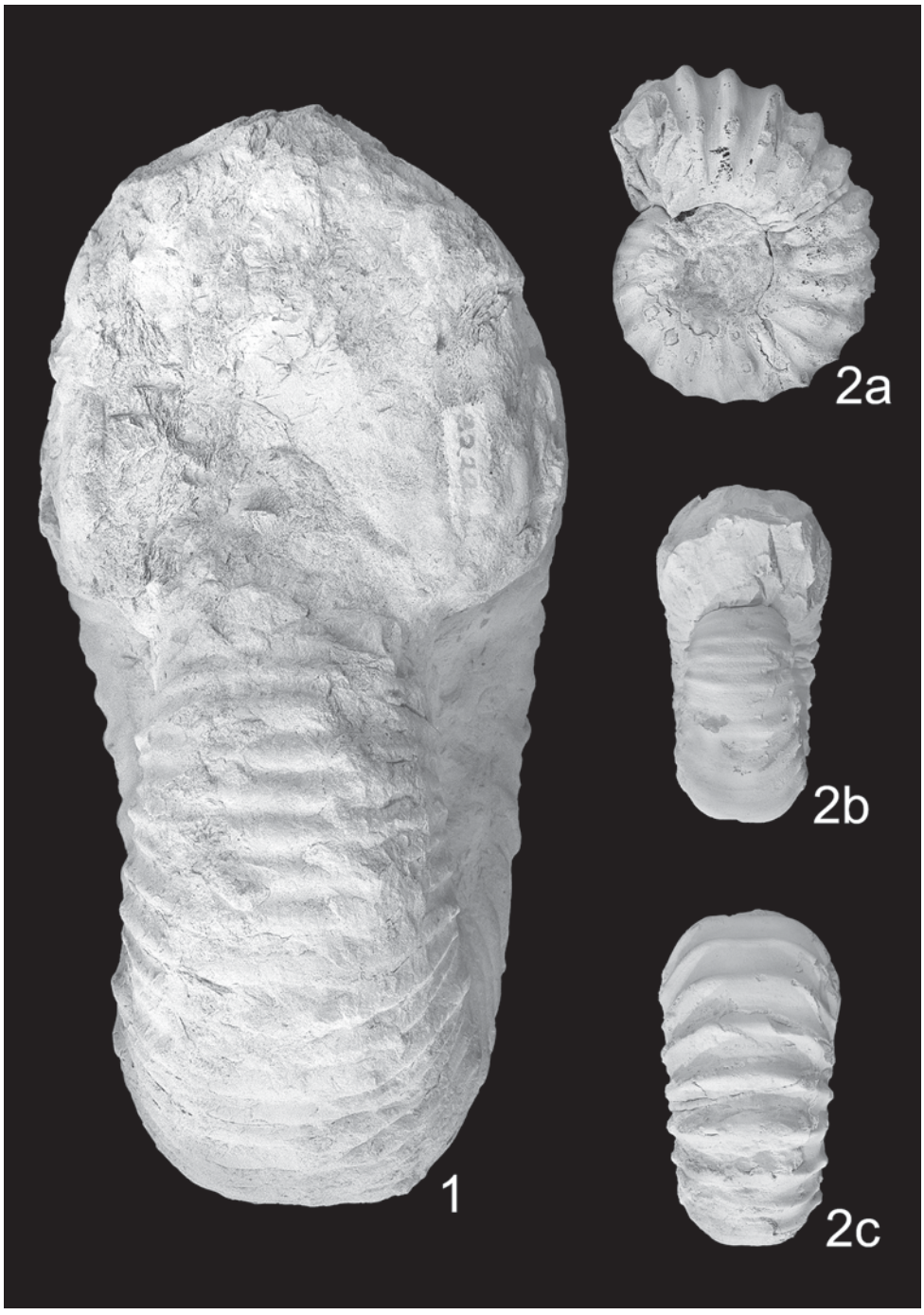


Plate 34

Plate 35

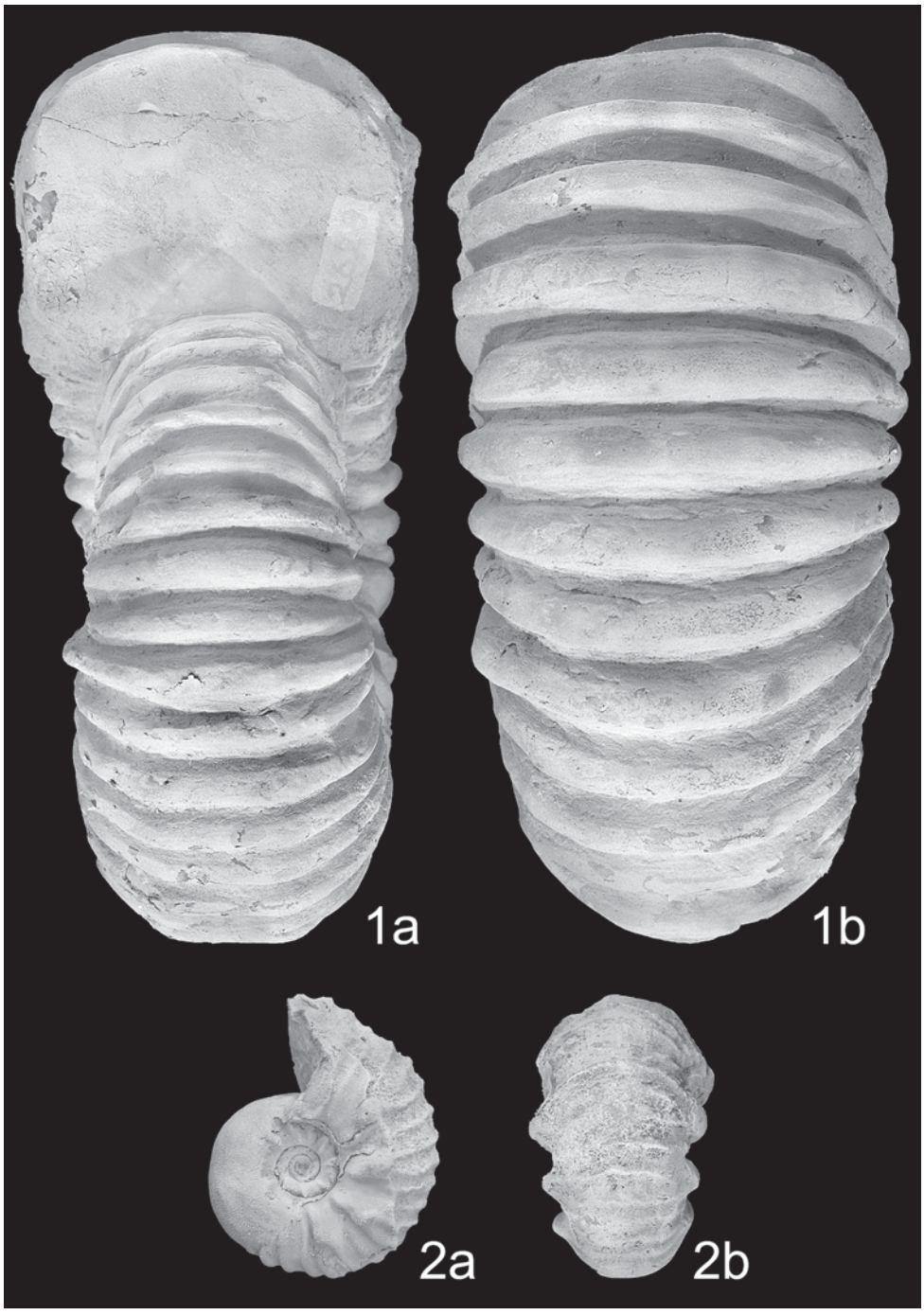


Plate 36

Plate 37

Plate 38

Plate 39

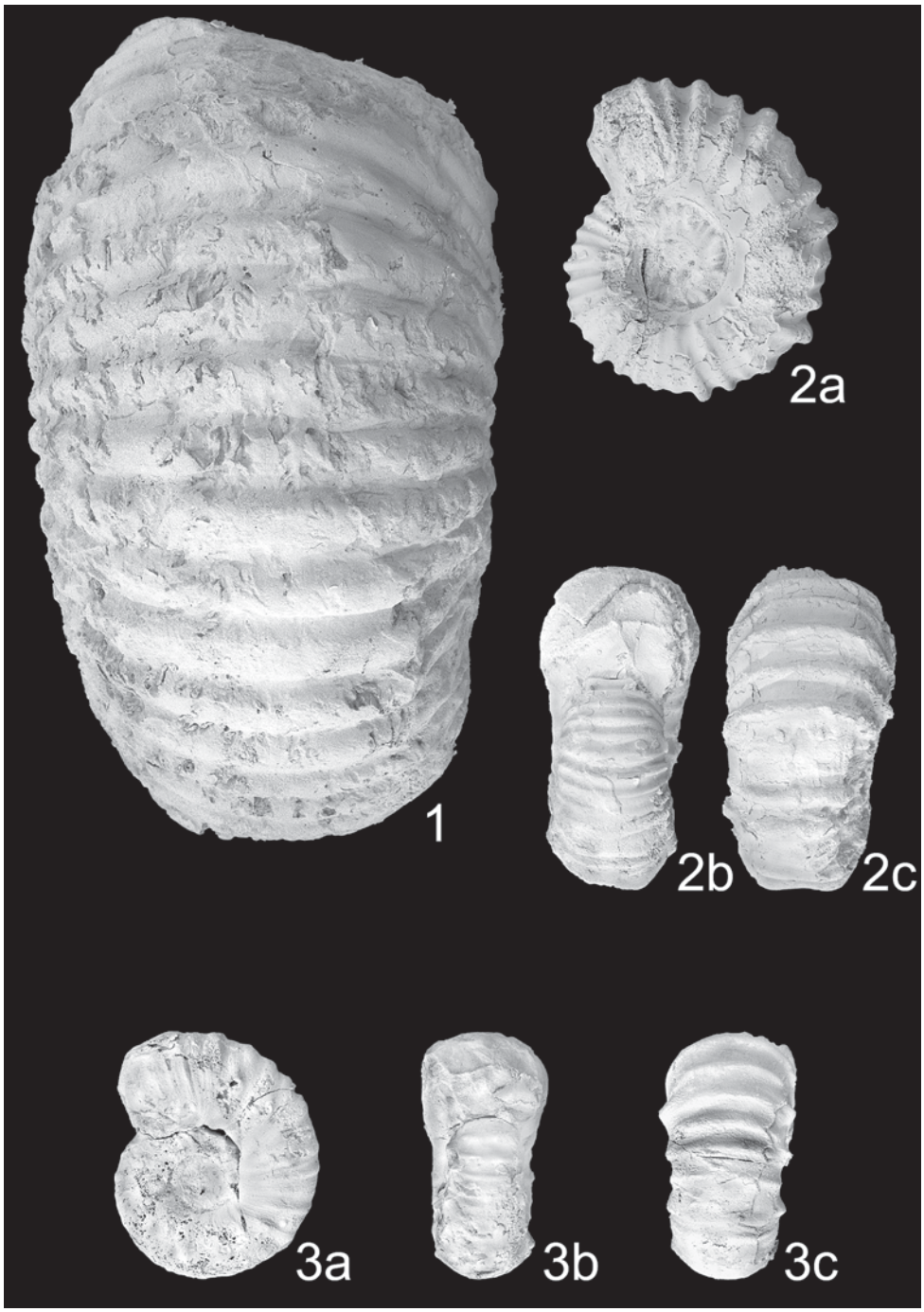
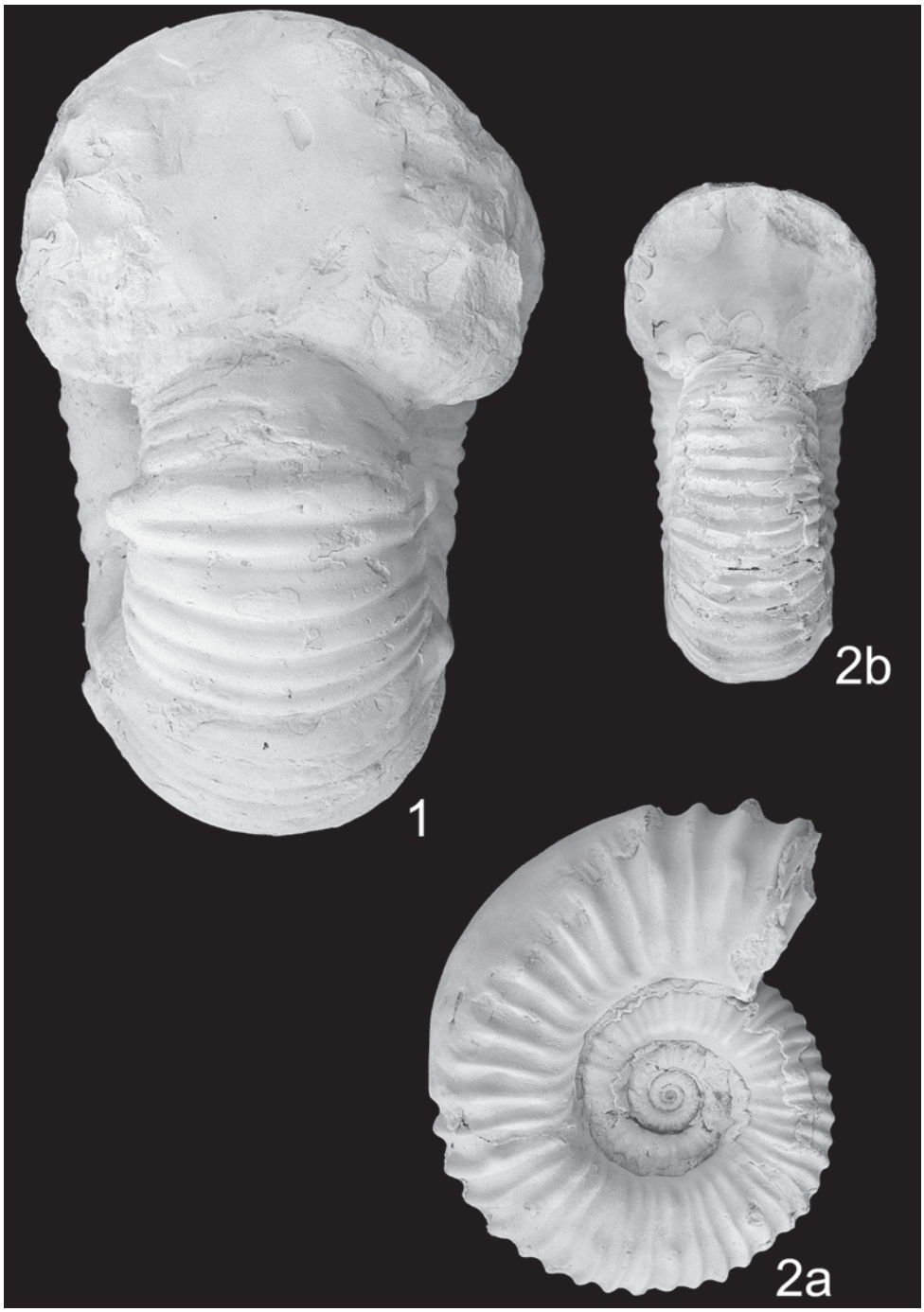


Plate 40

Plate 41



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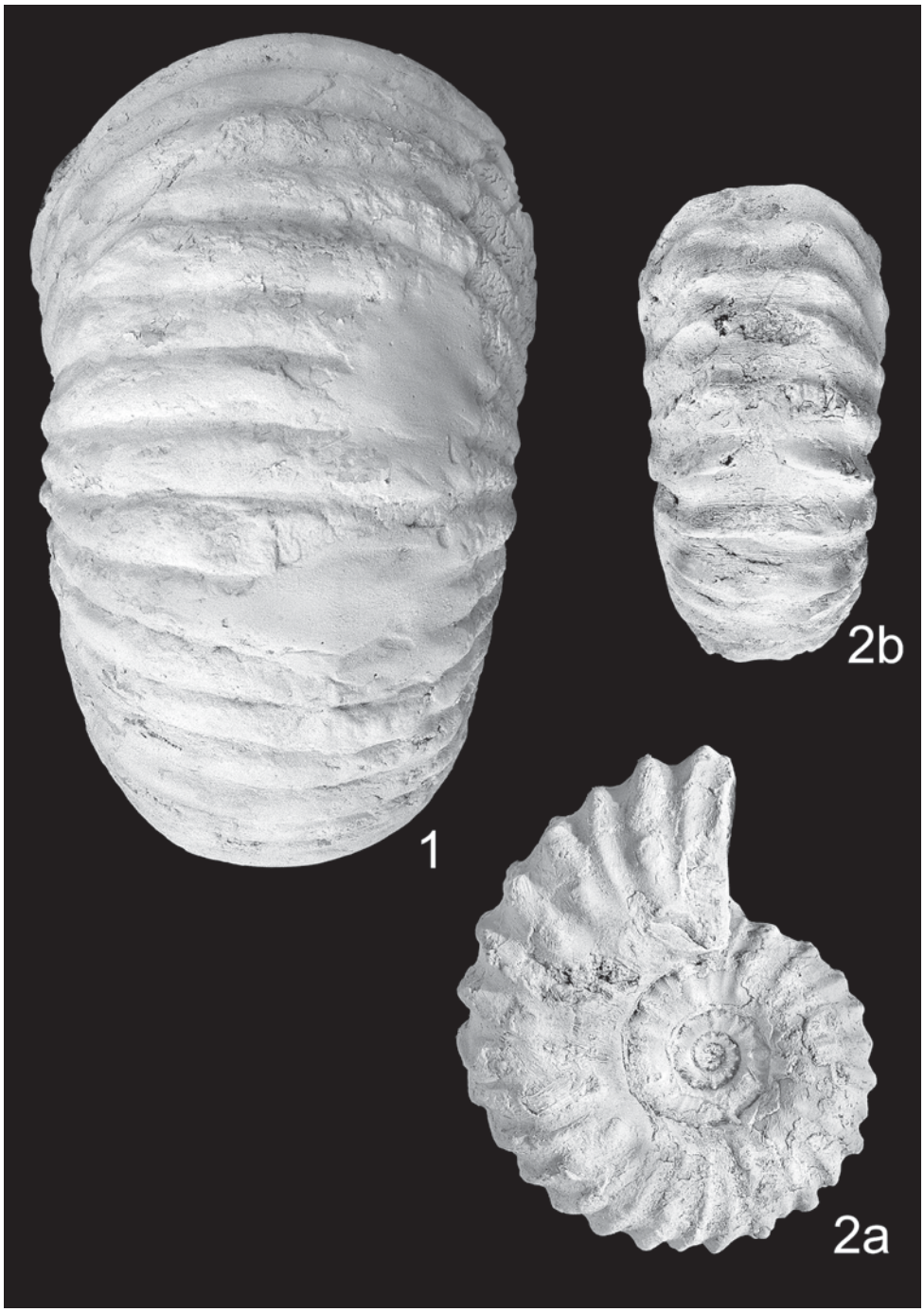
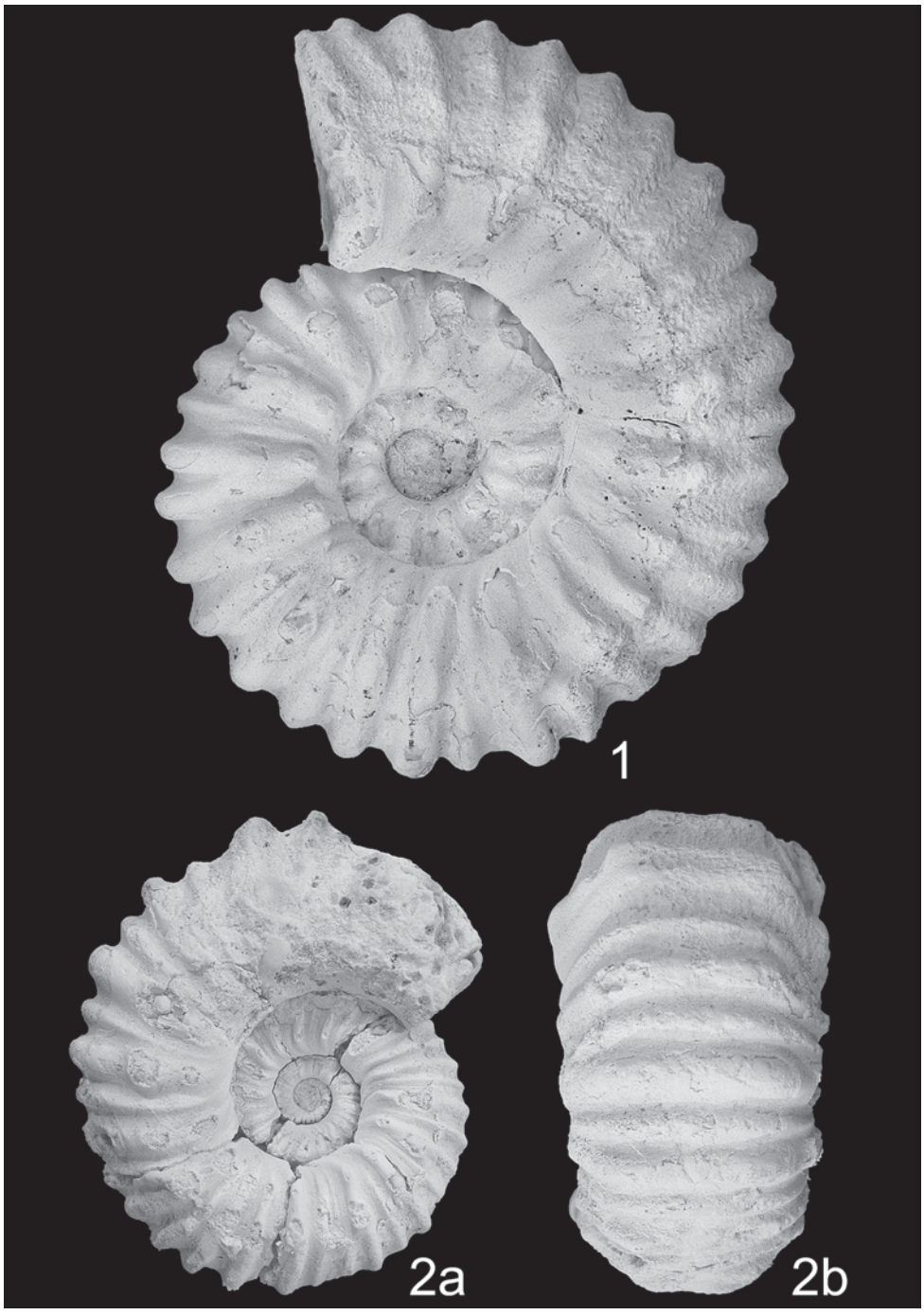


Plate 43

Plate 44



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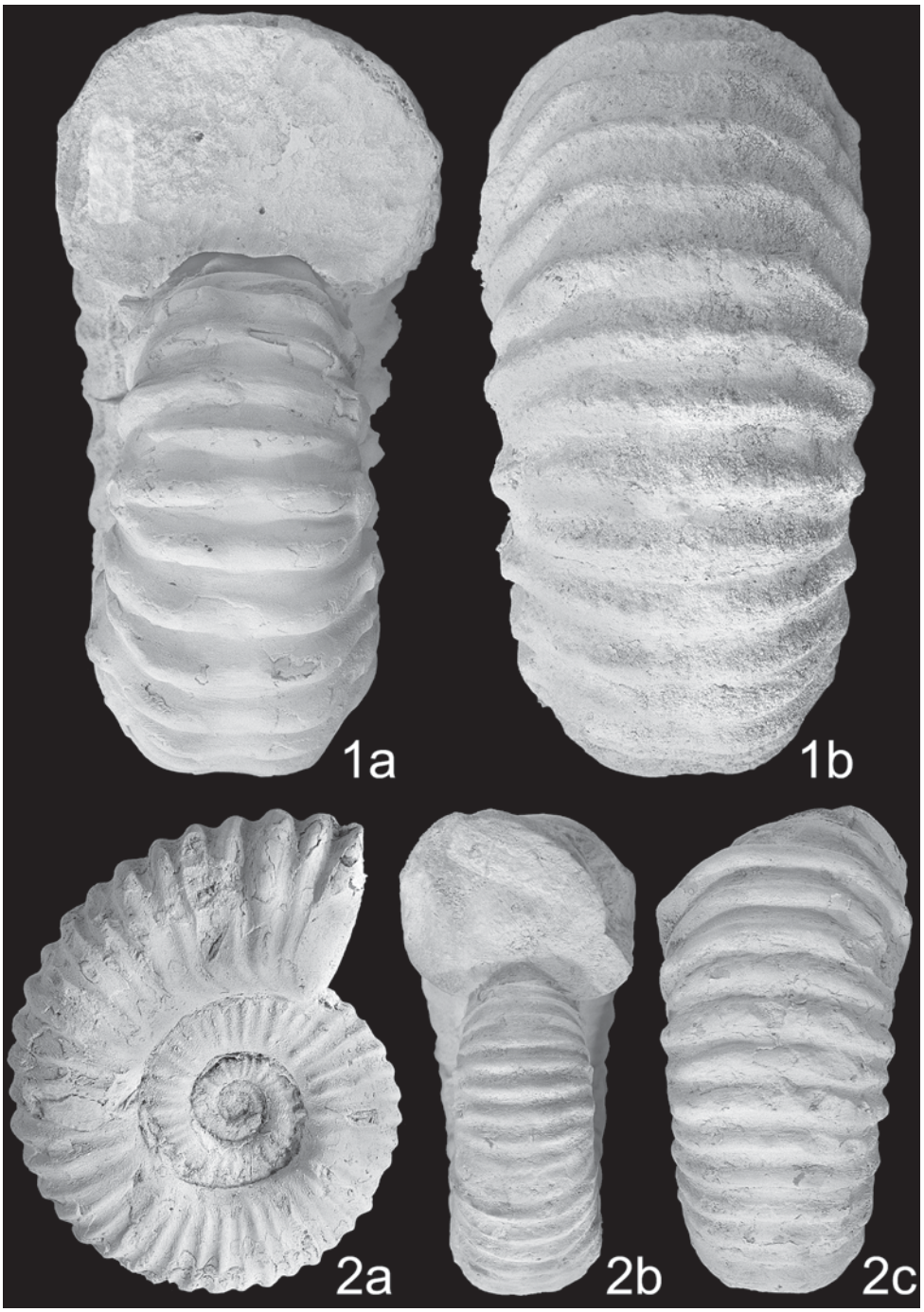

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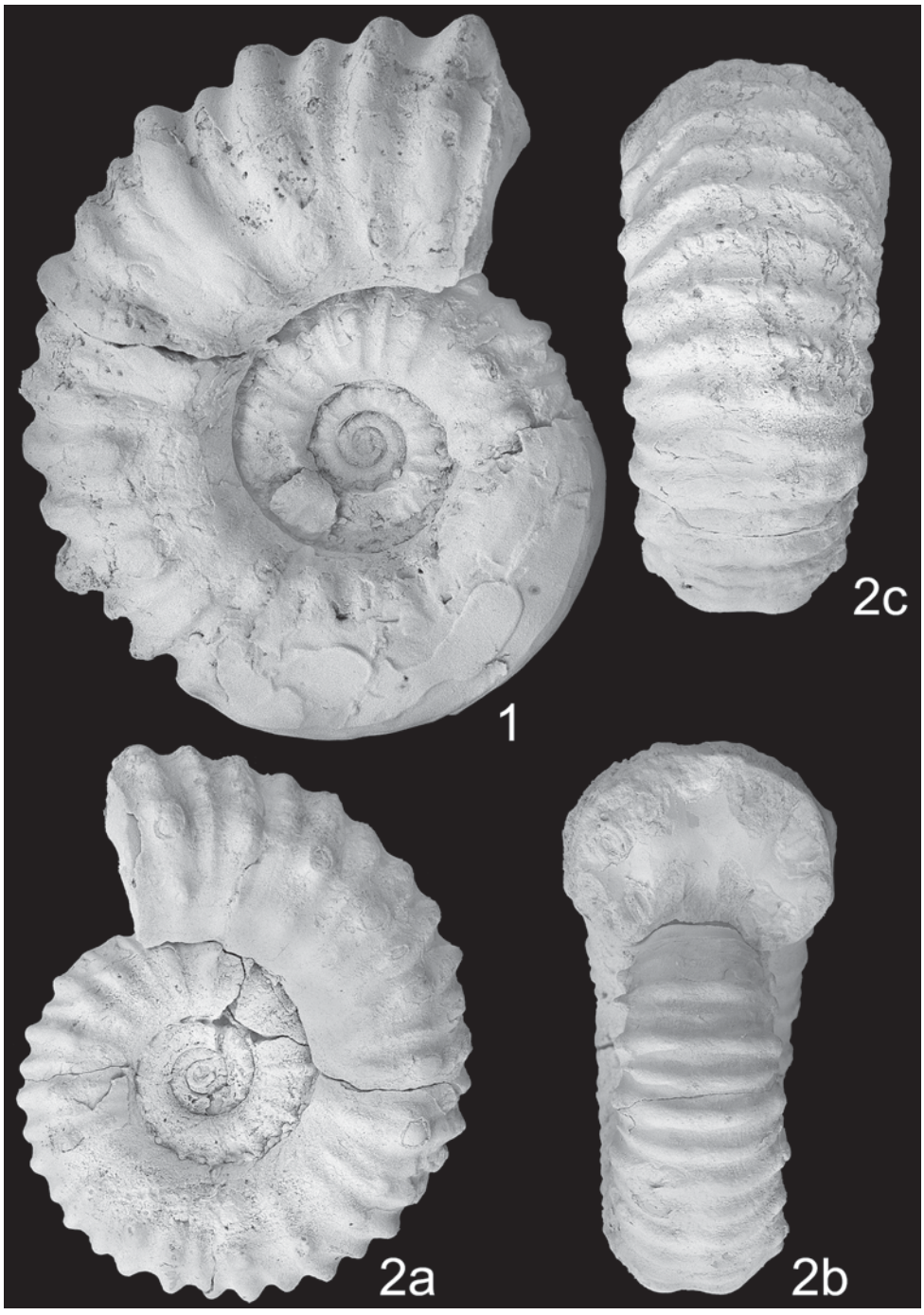

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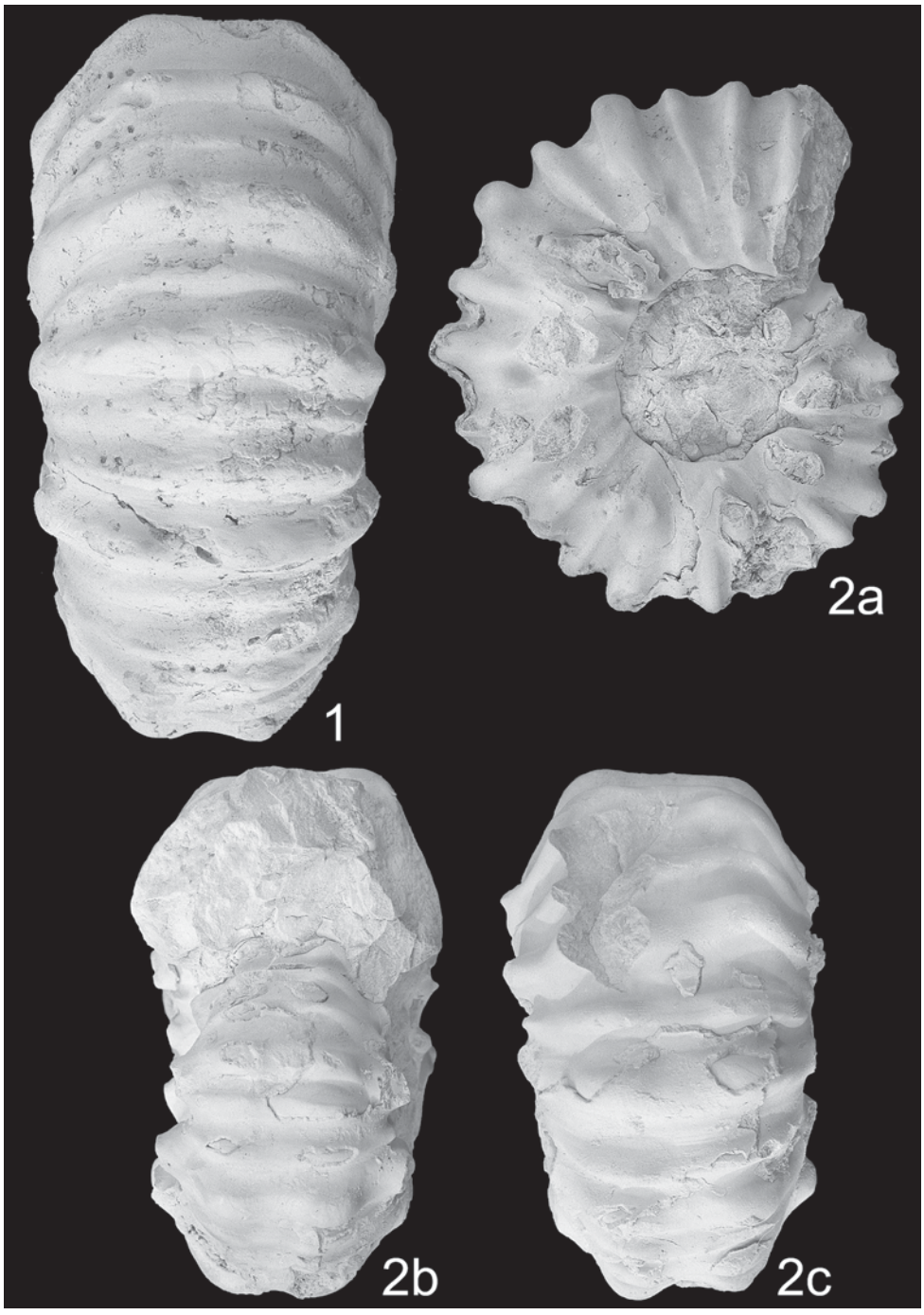

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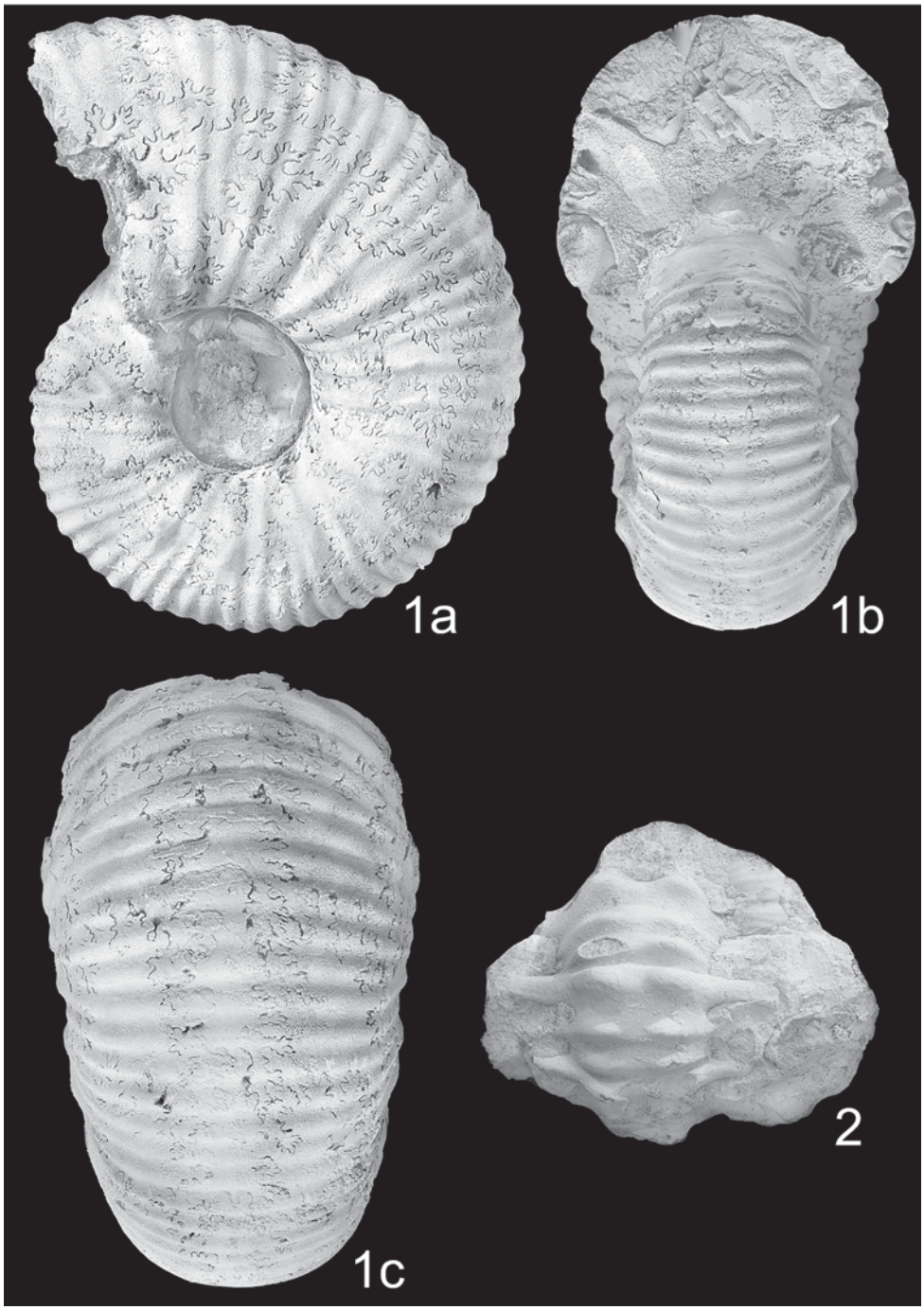

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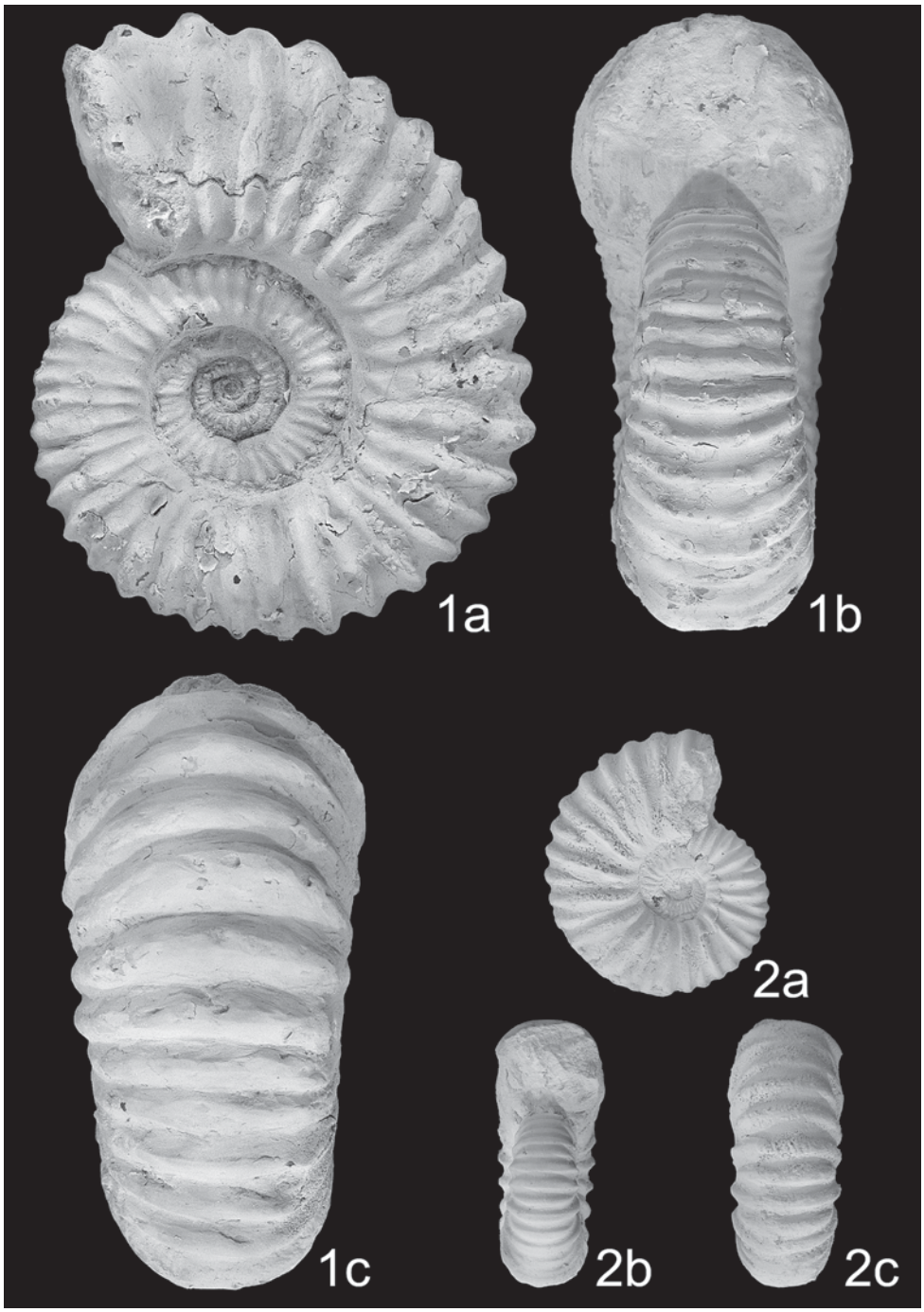

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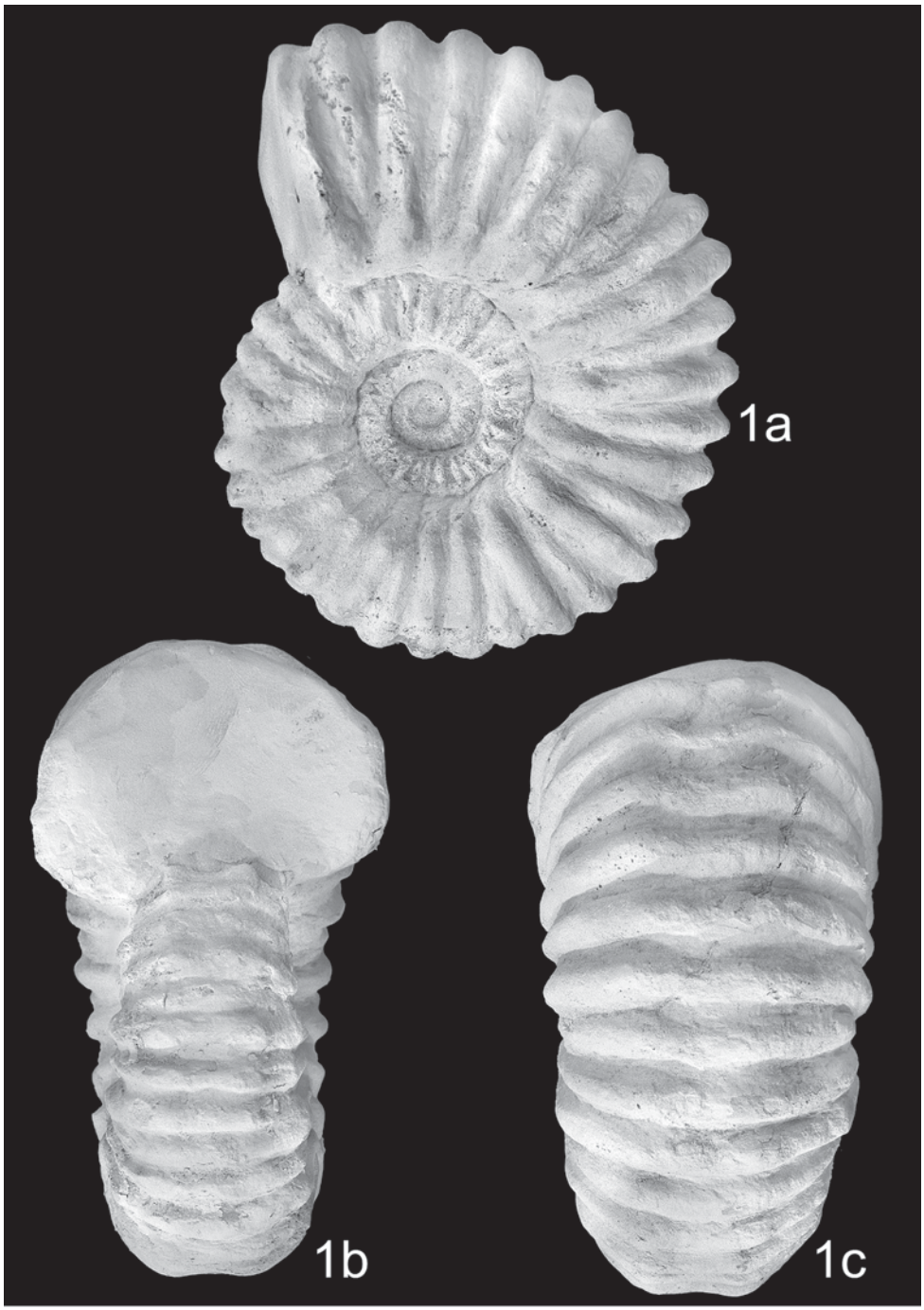

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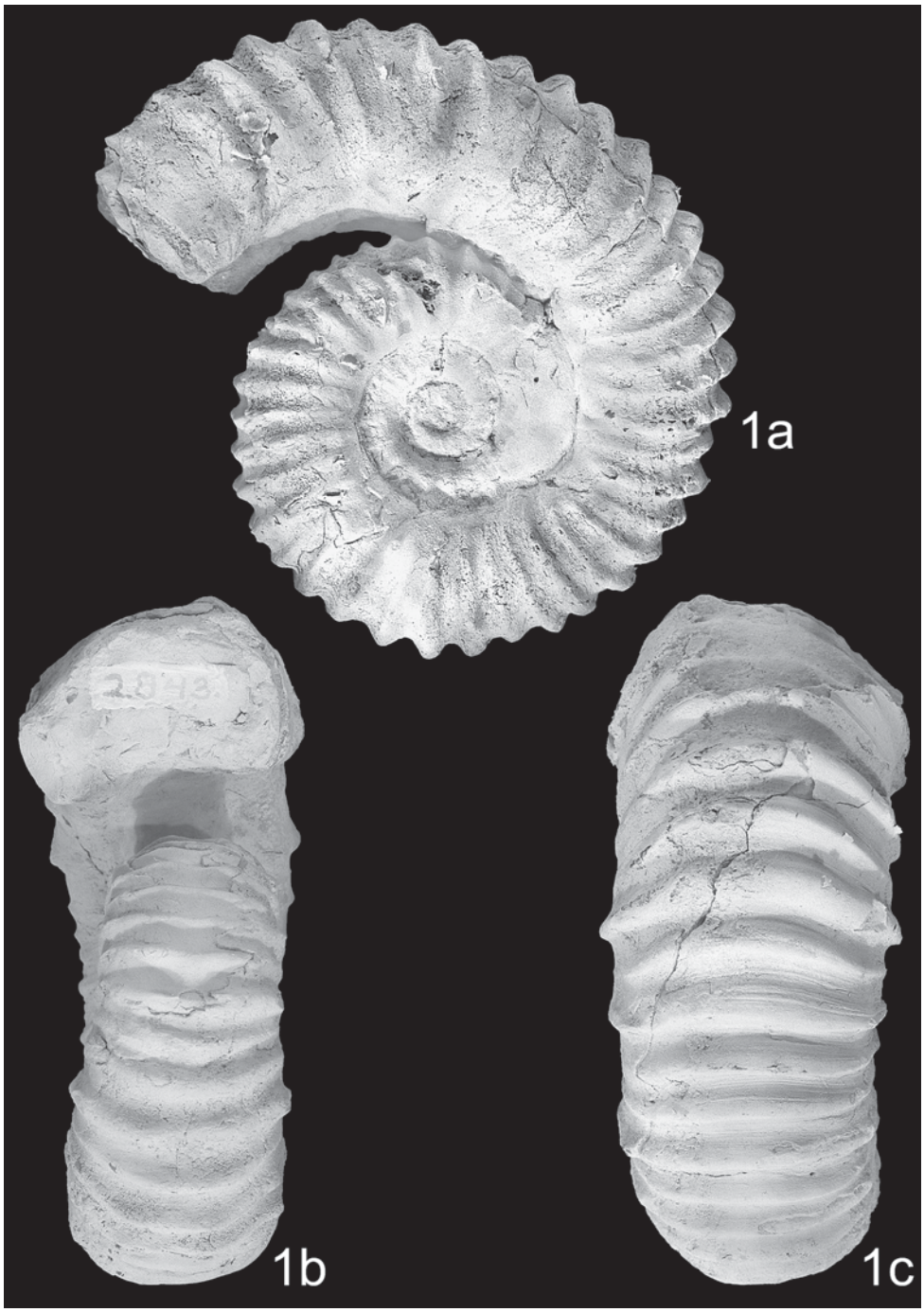
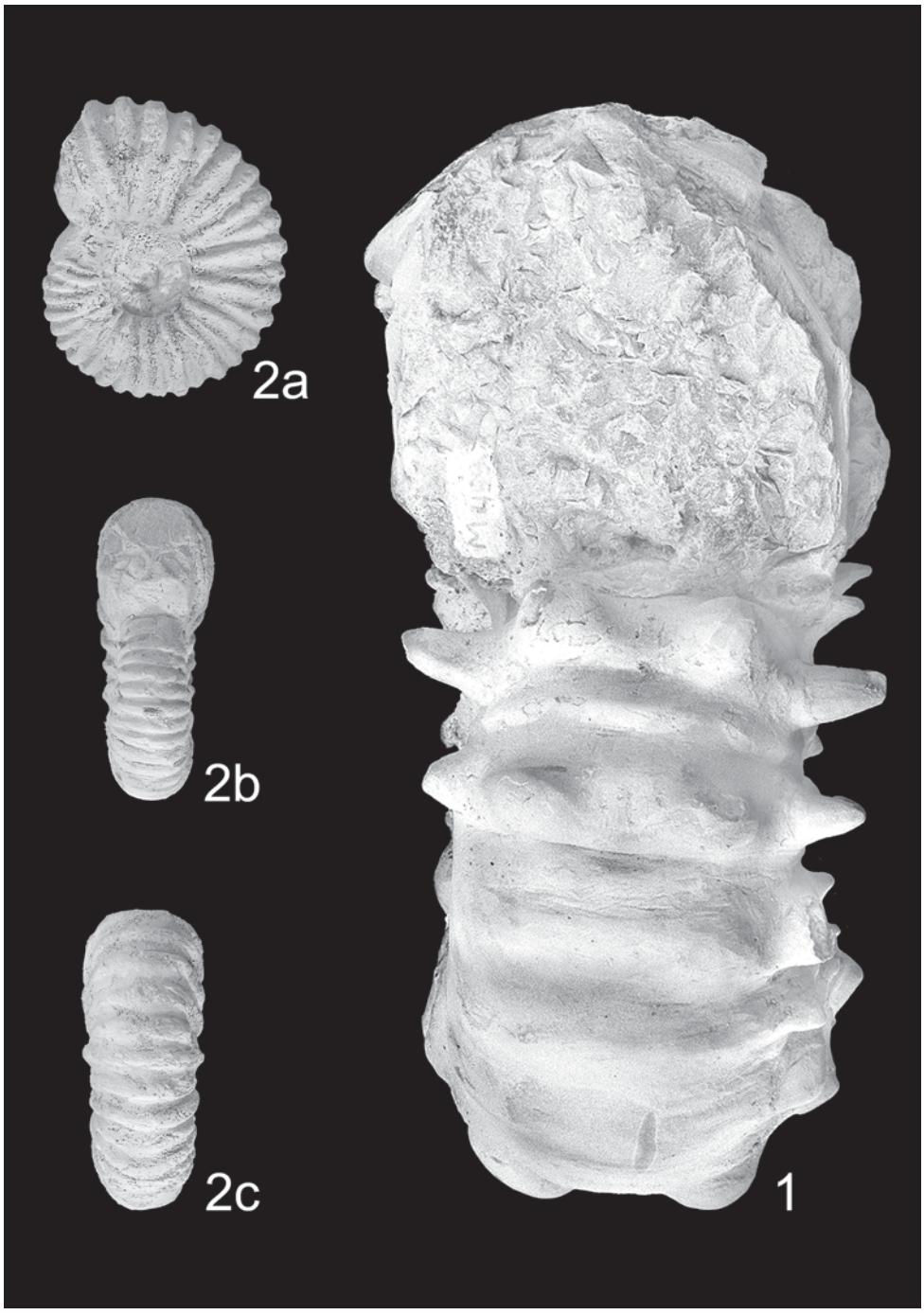


Plate 52

Plate 53



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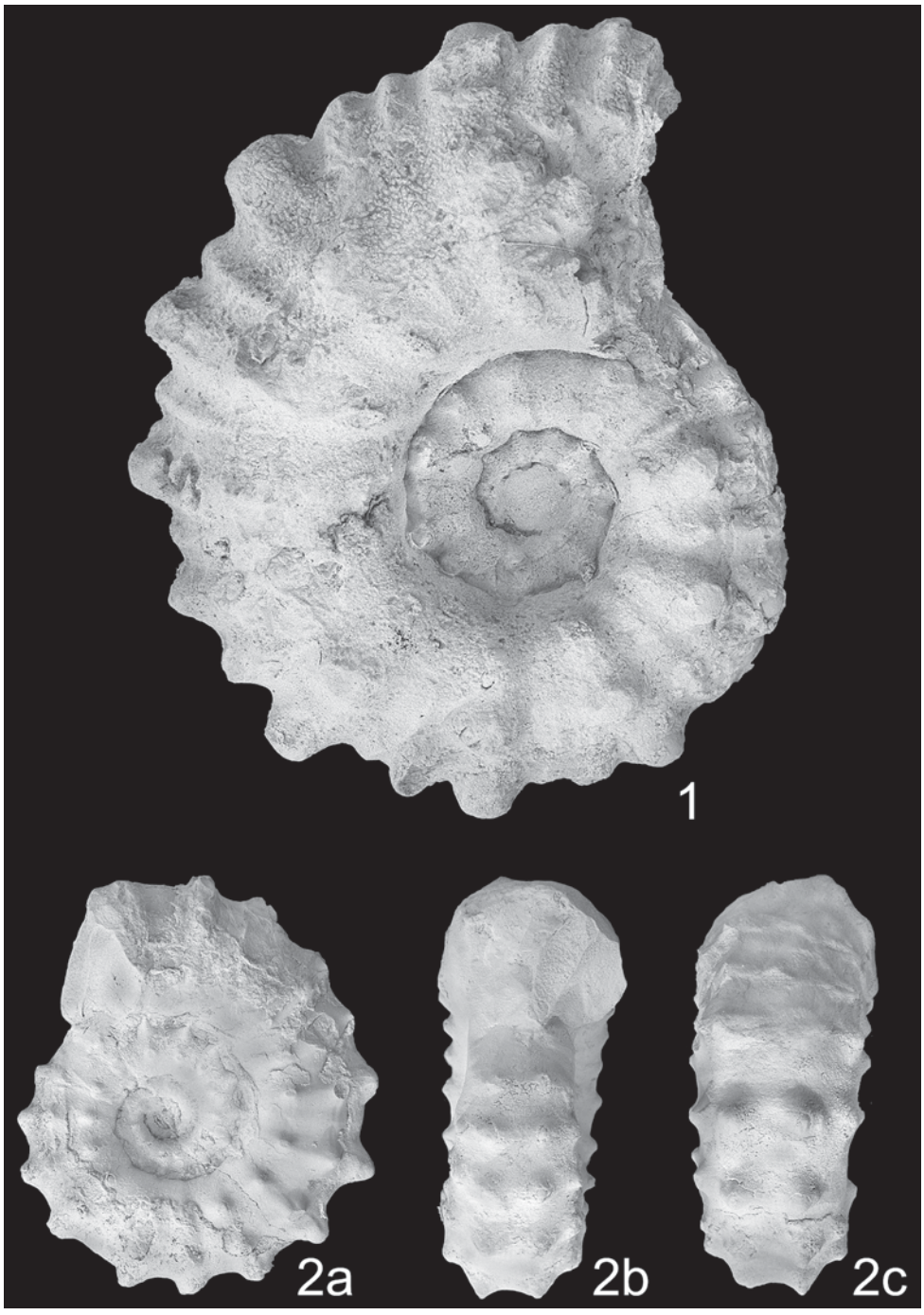

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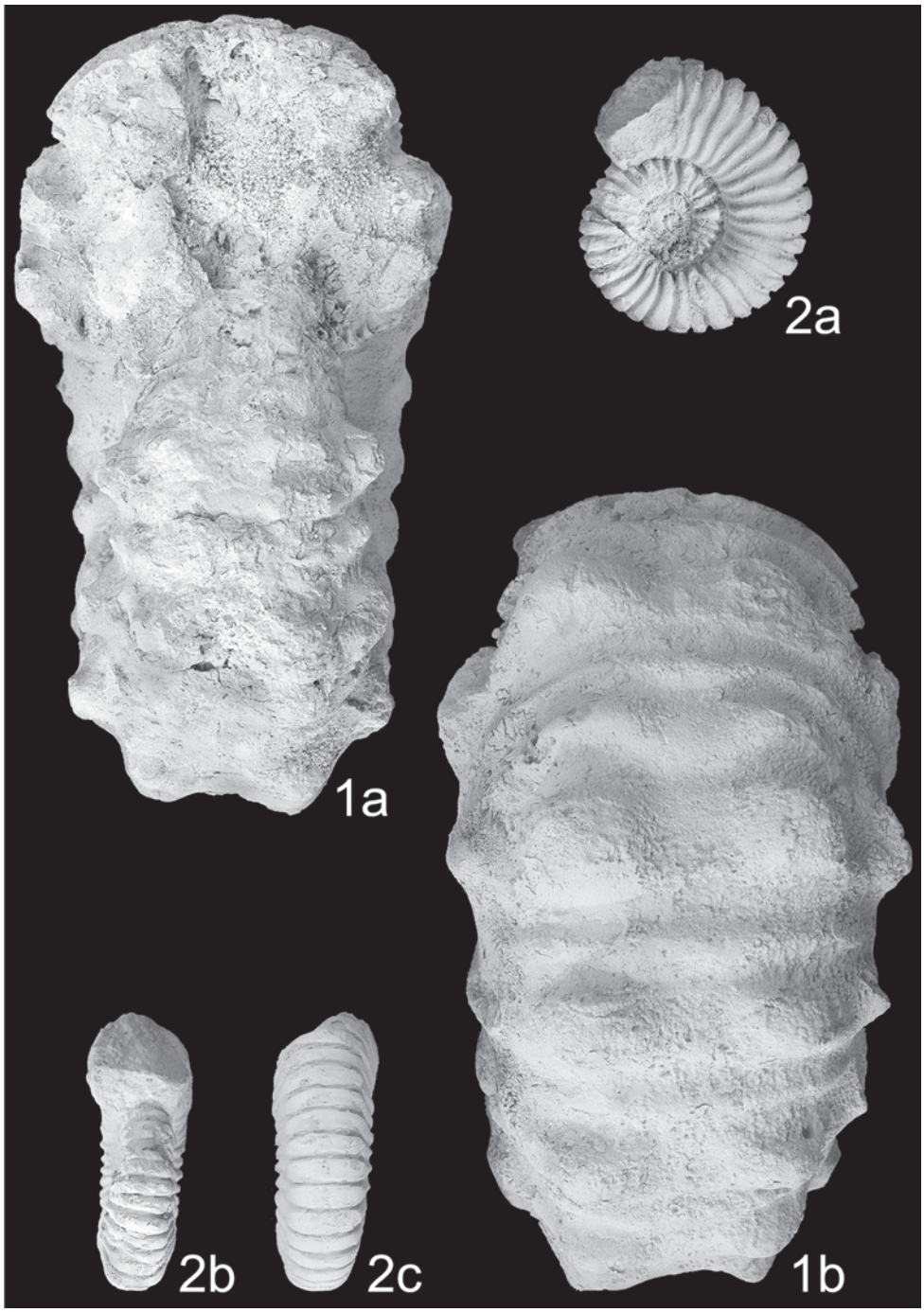

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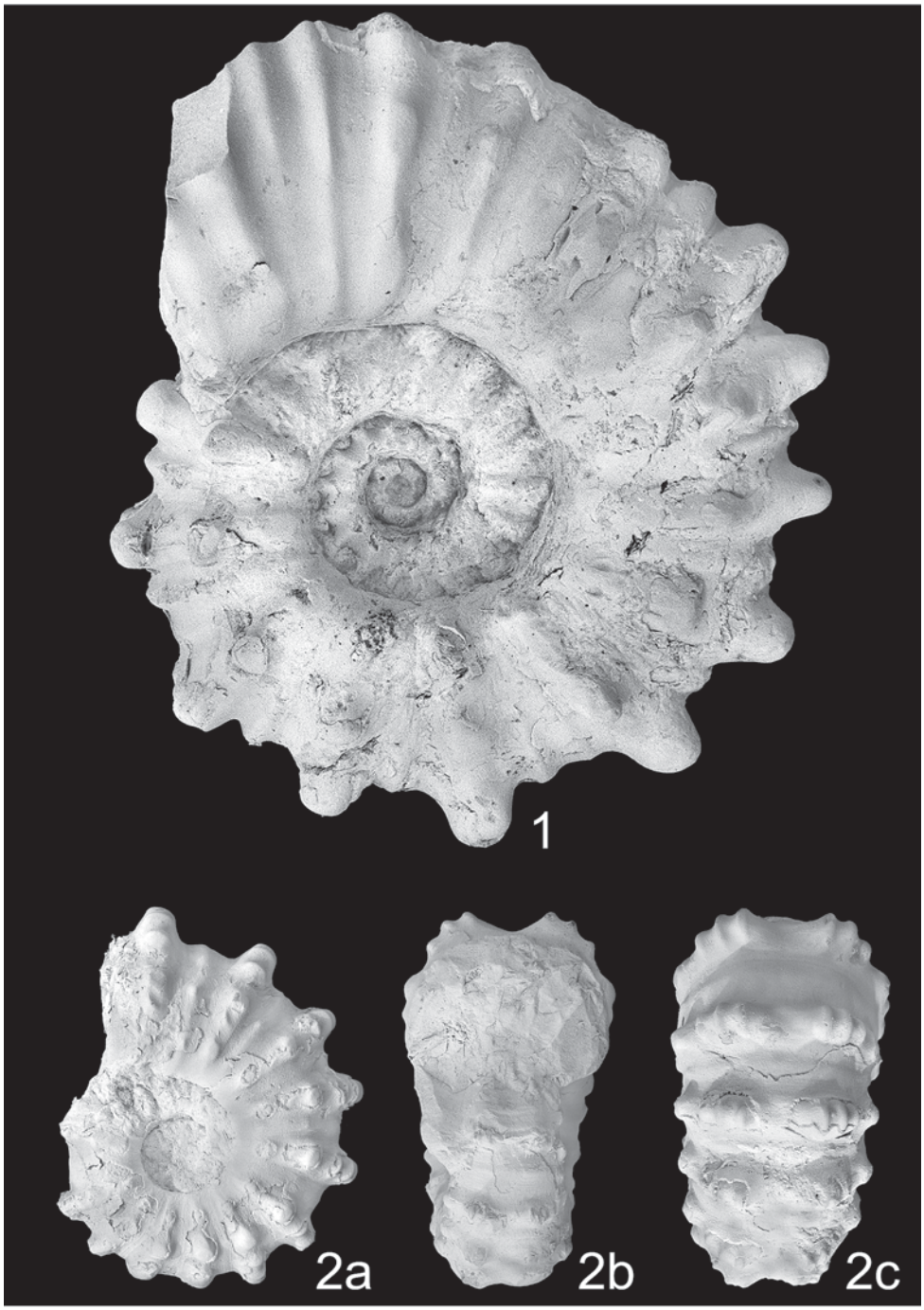

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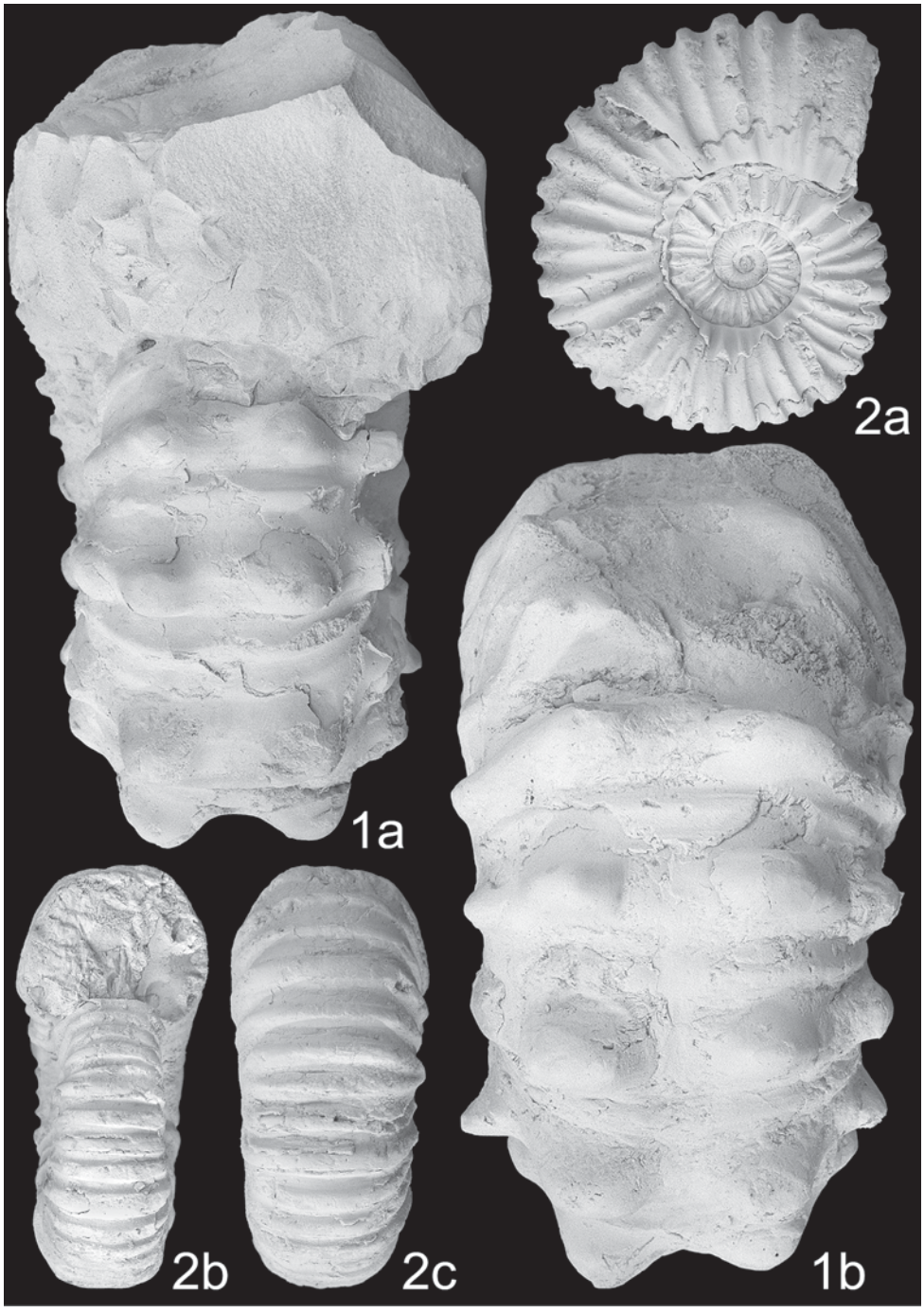


Plate 58

Plate 59

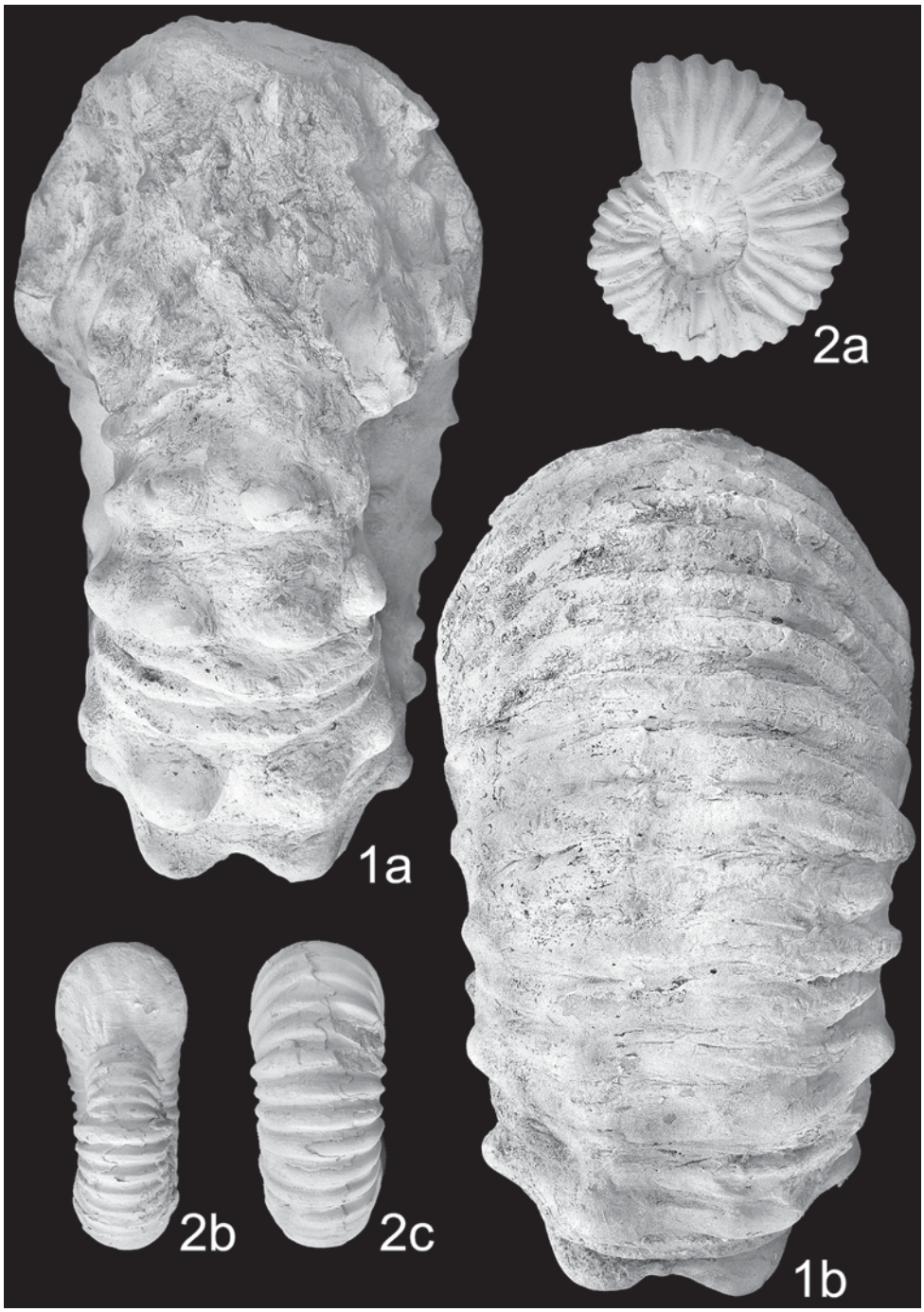
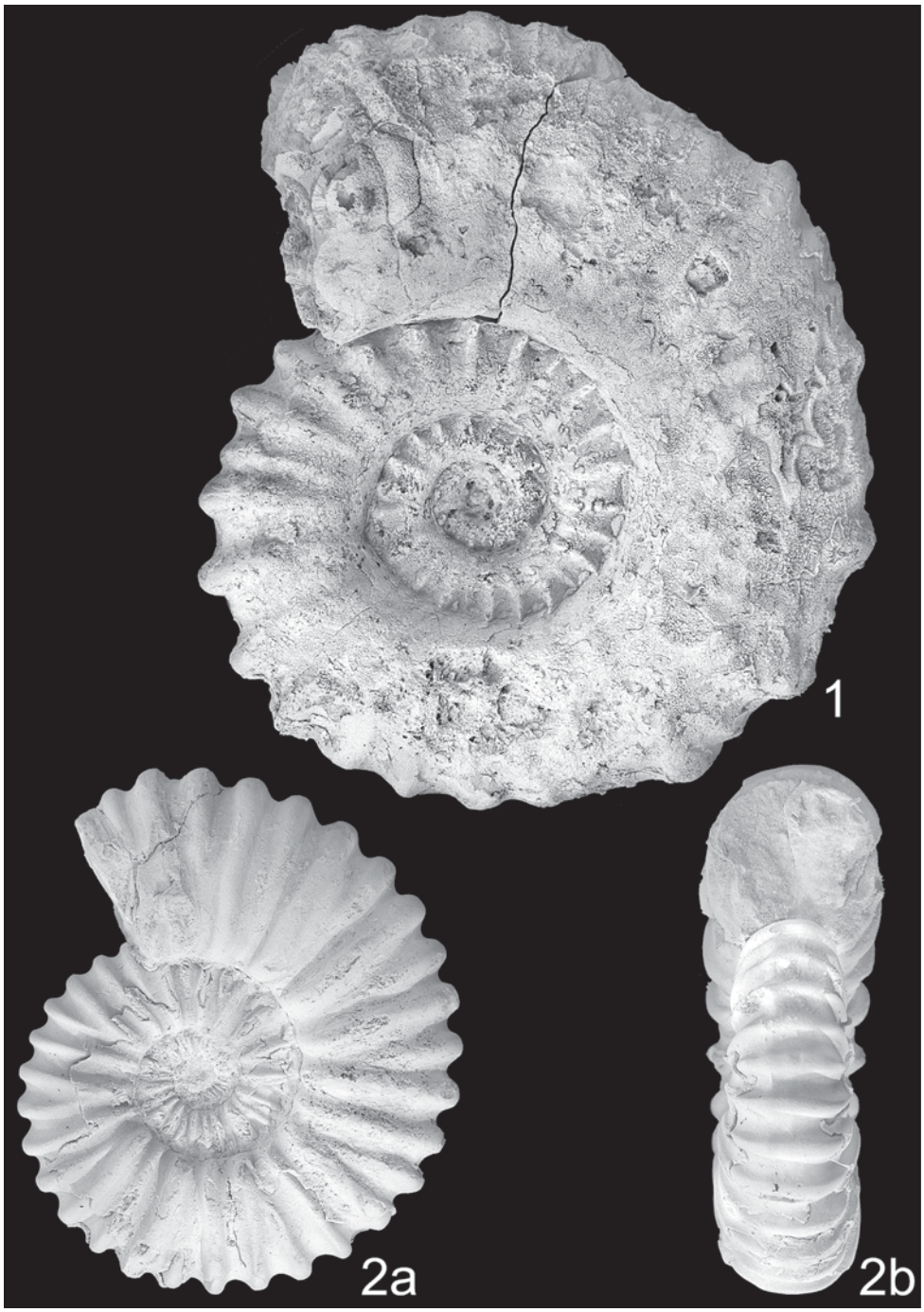


Plate 60

Plate 61

Plate 62



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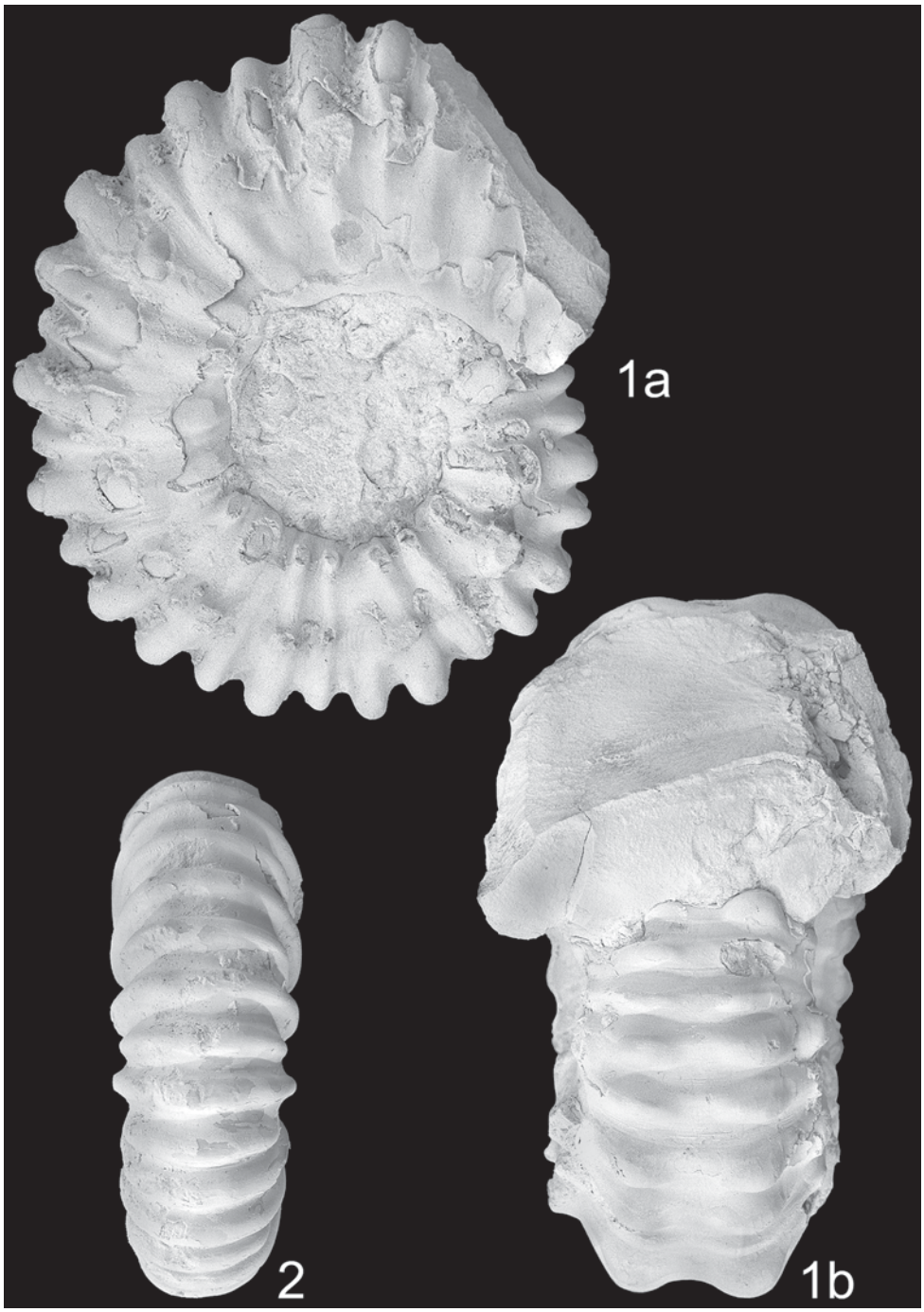

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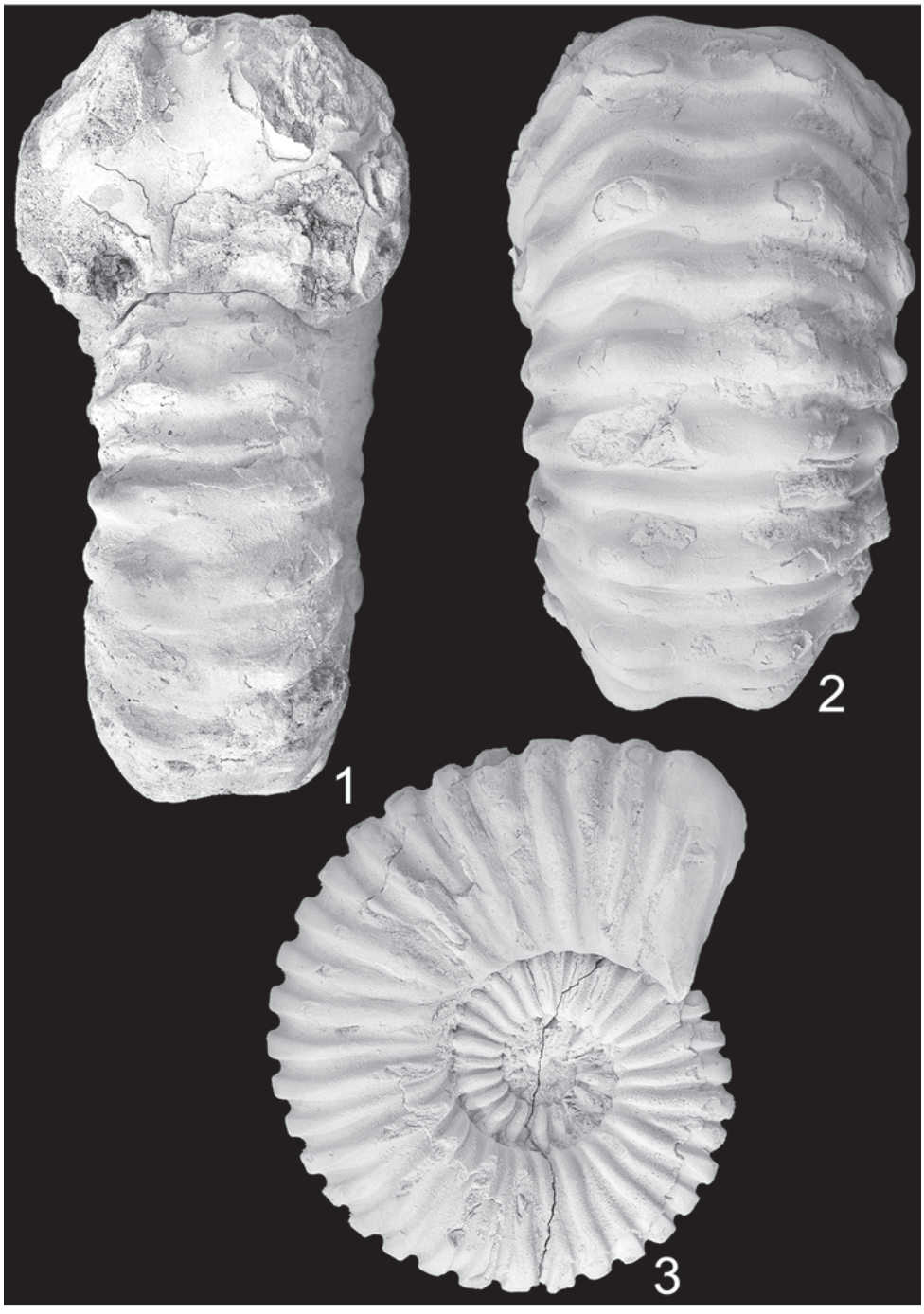

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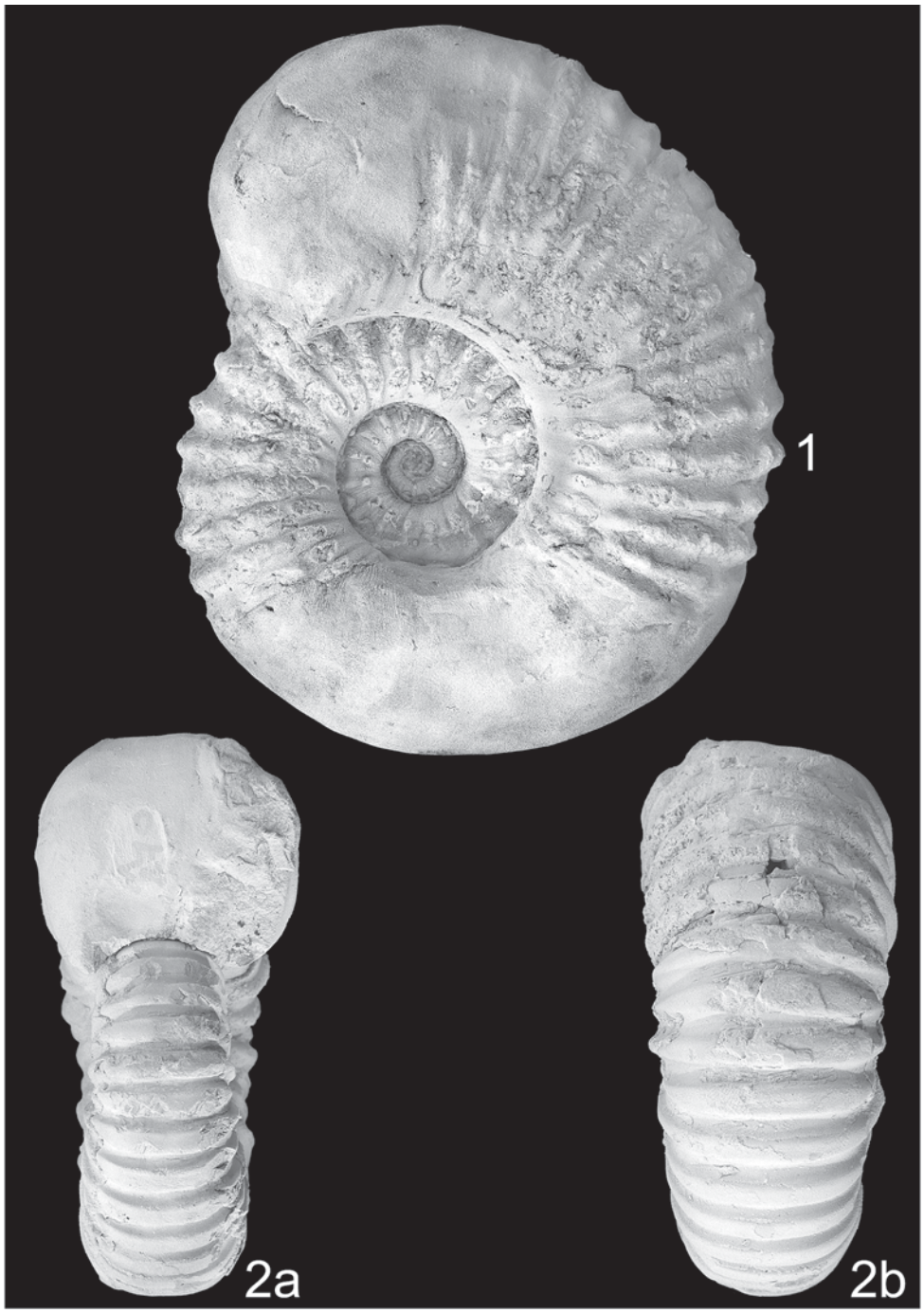

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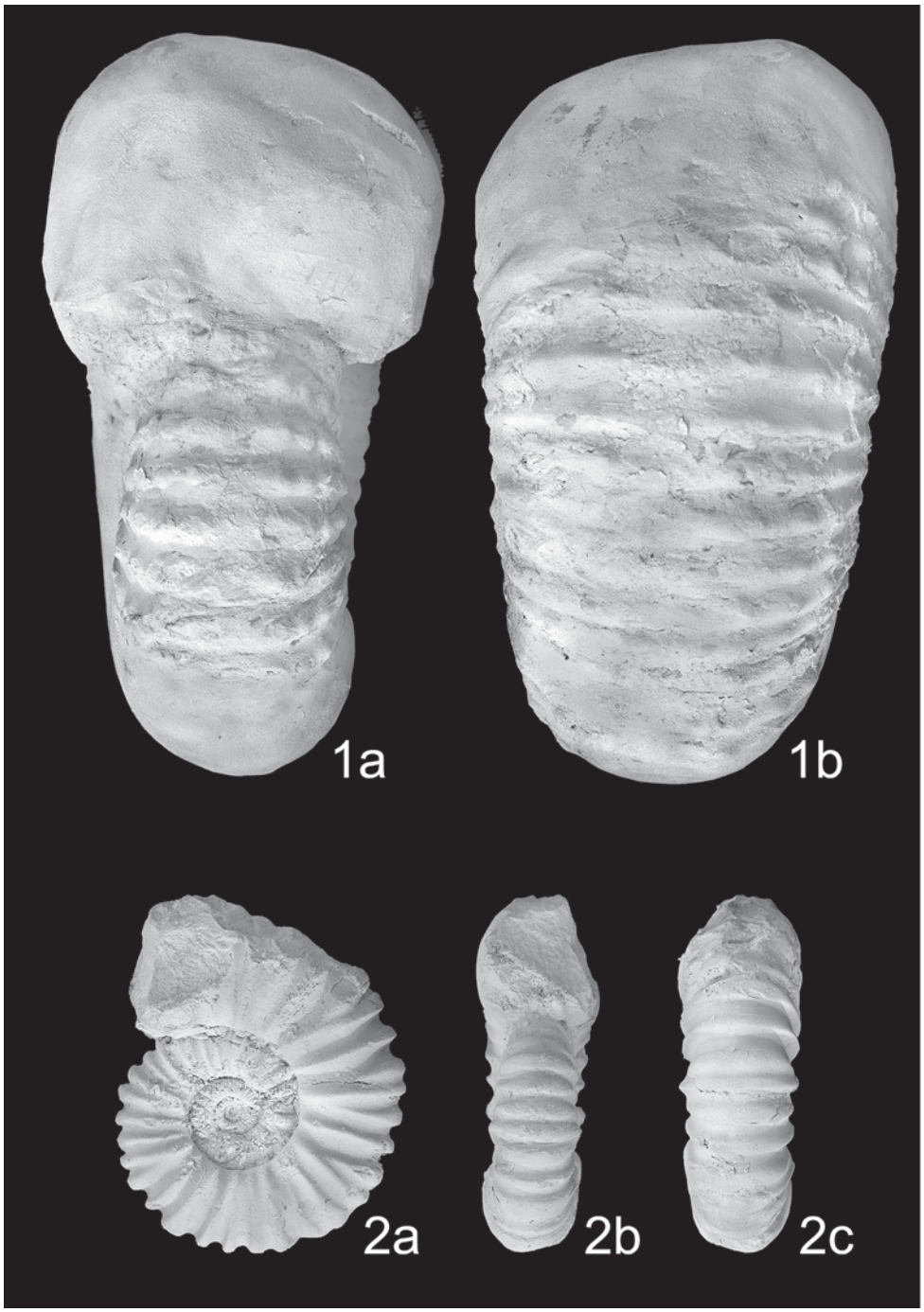

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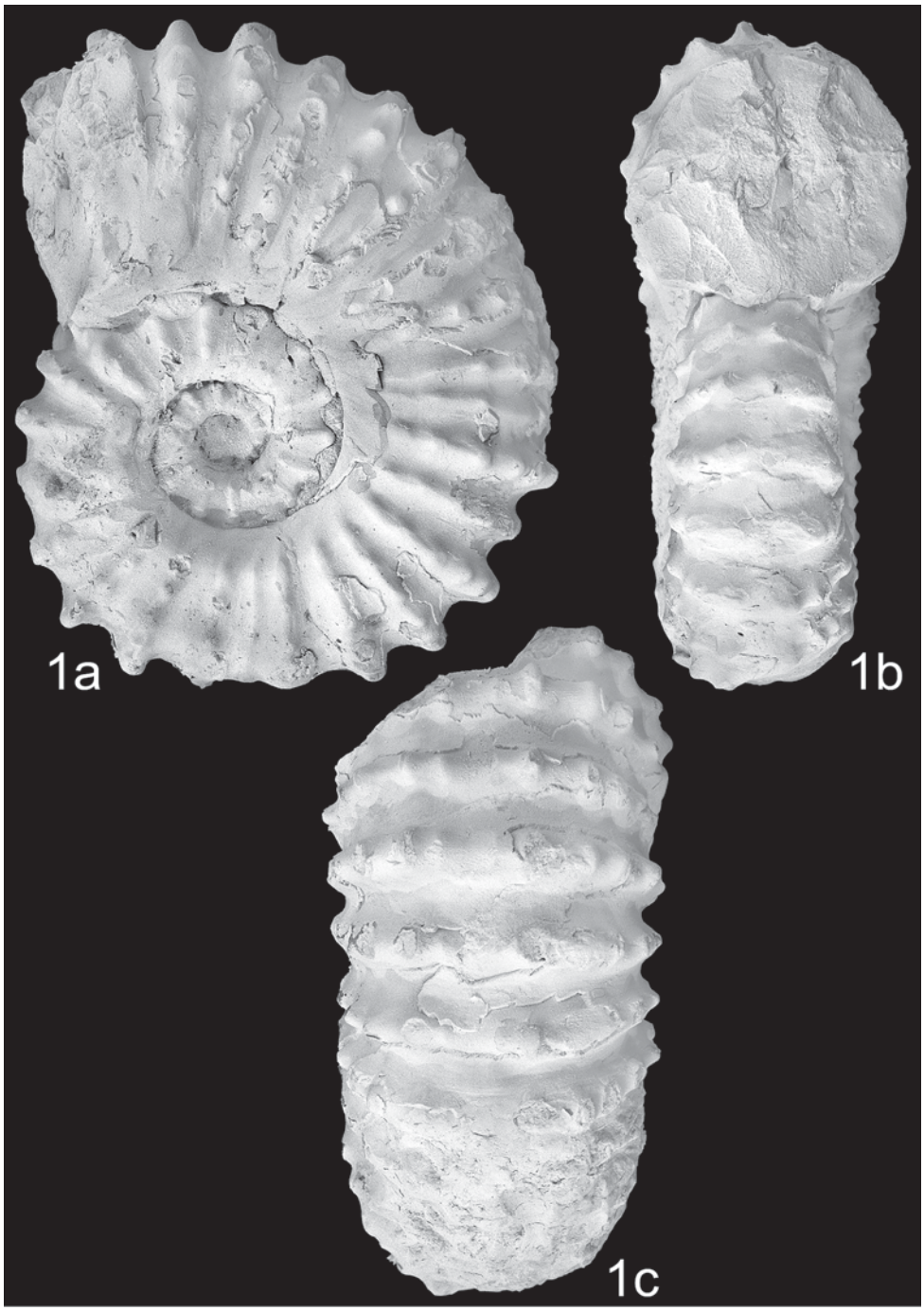

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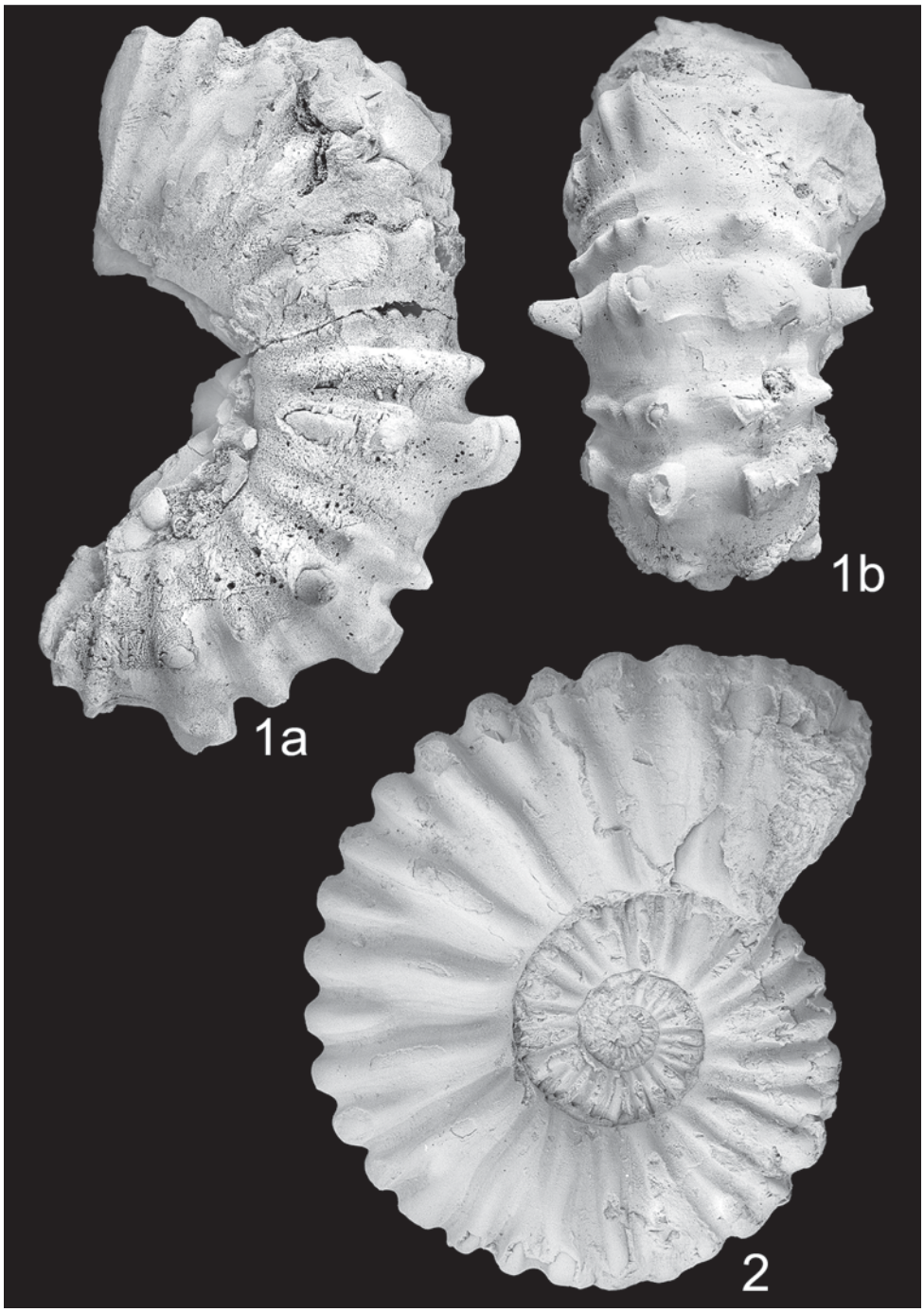

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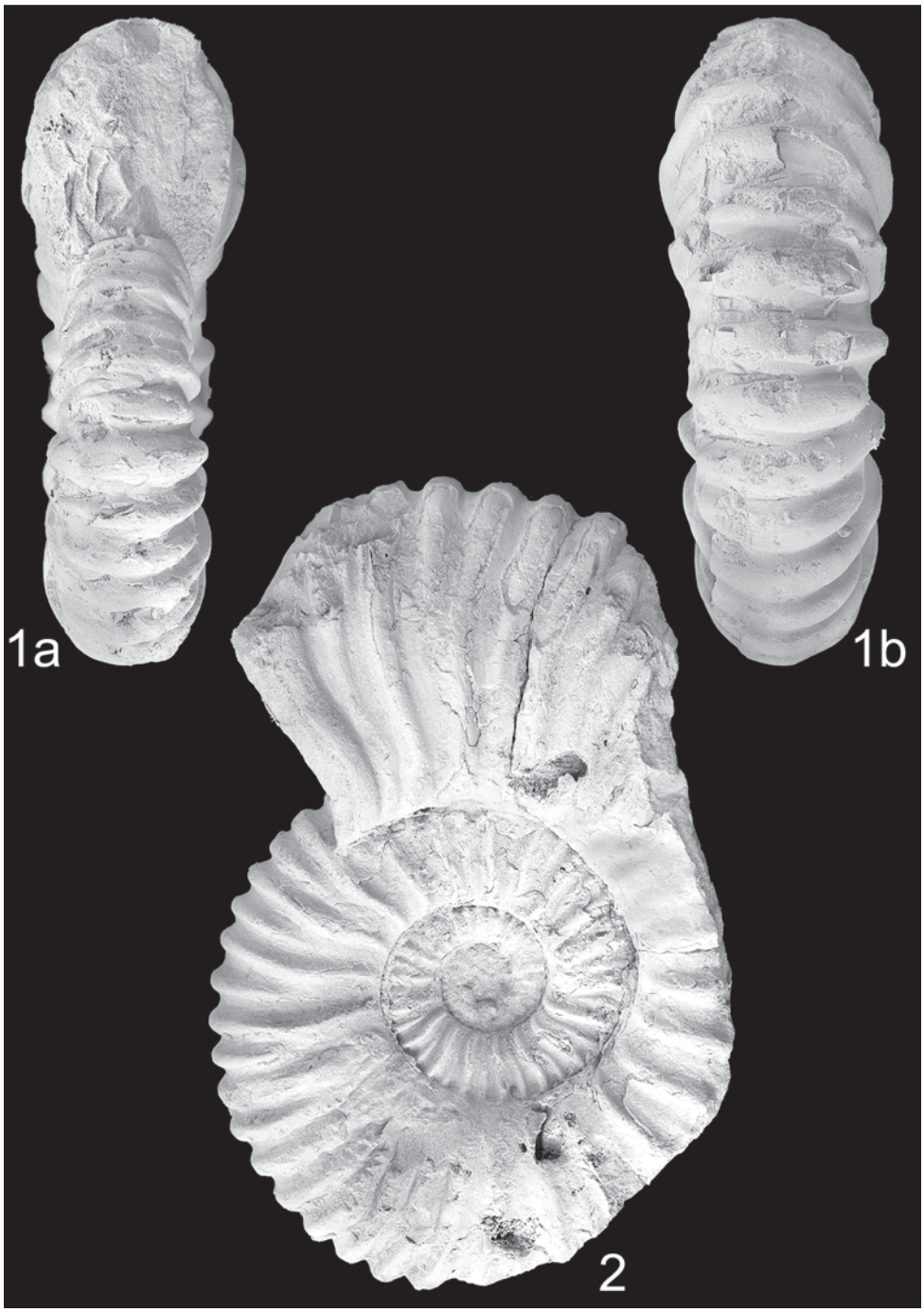

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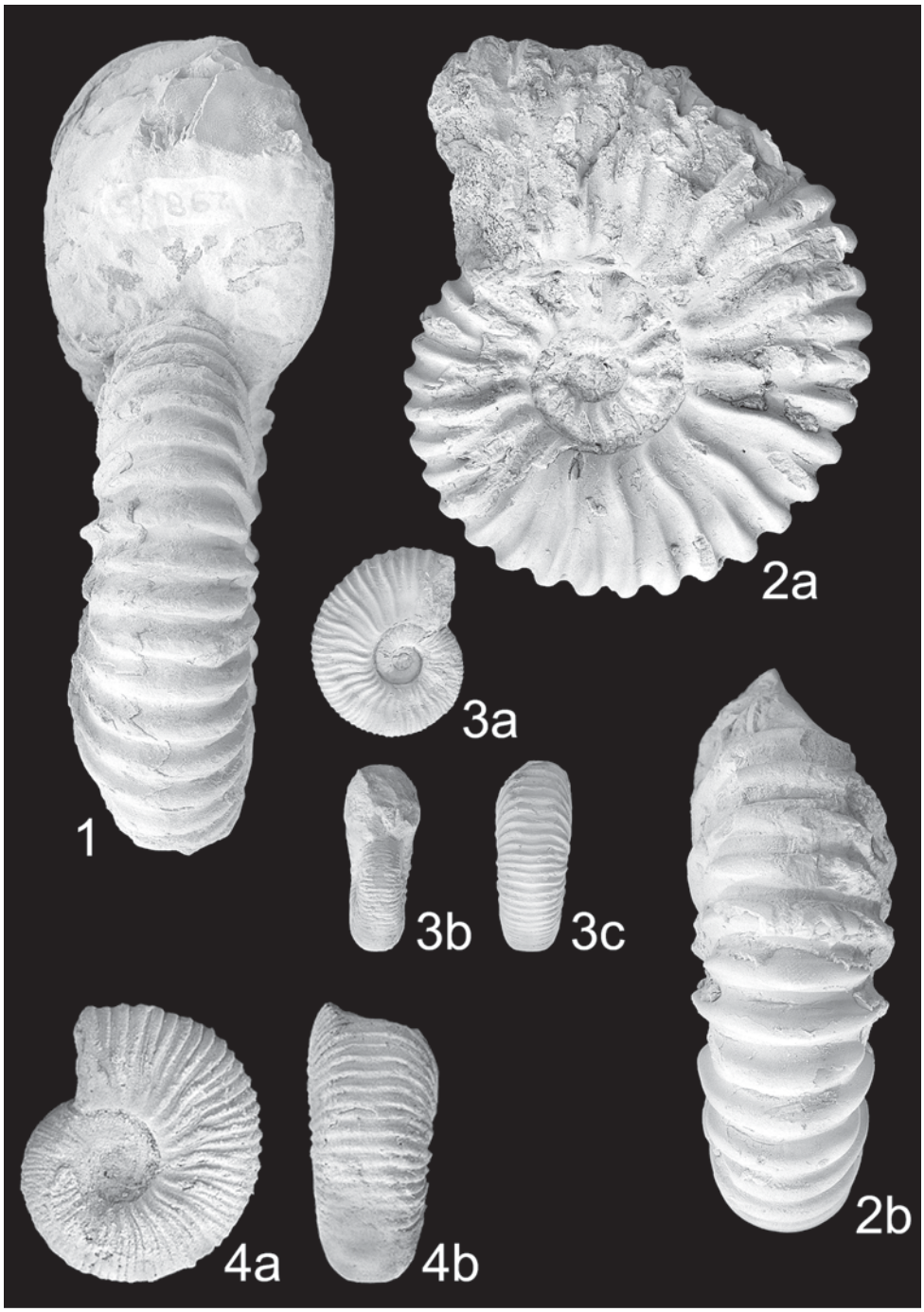

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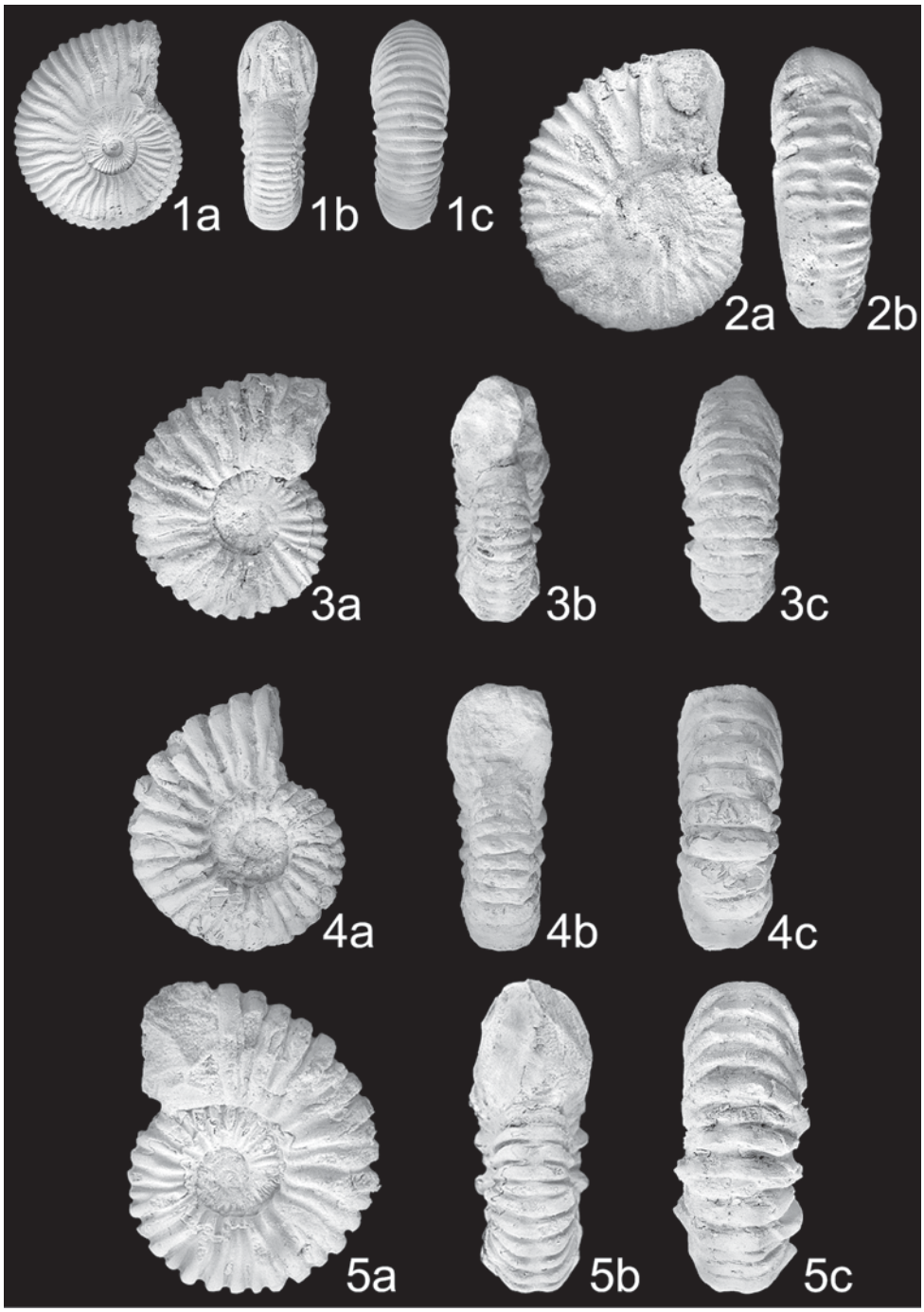

Plate 72

Plate 73

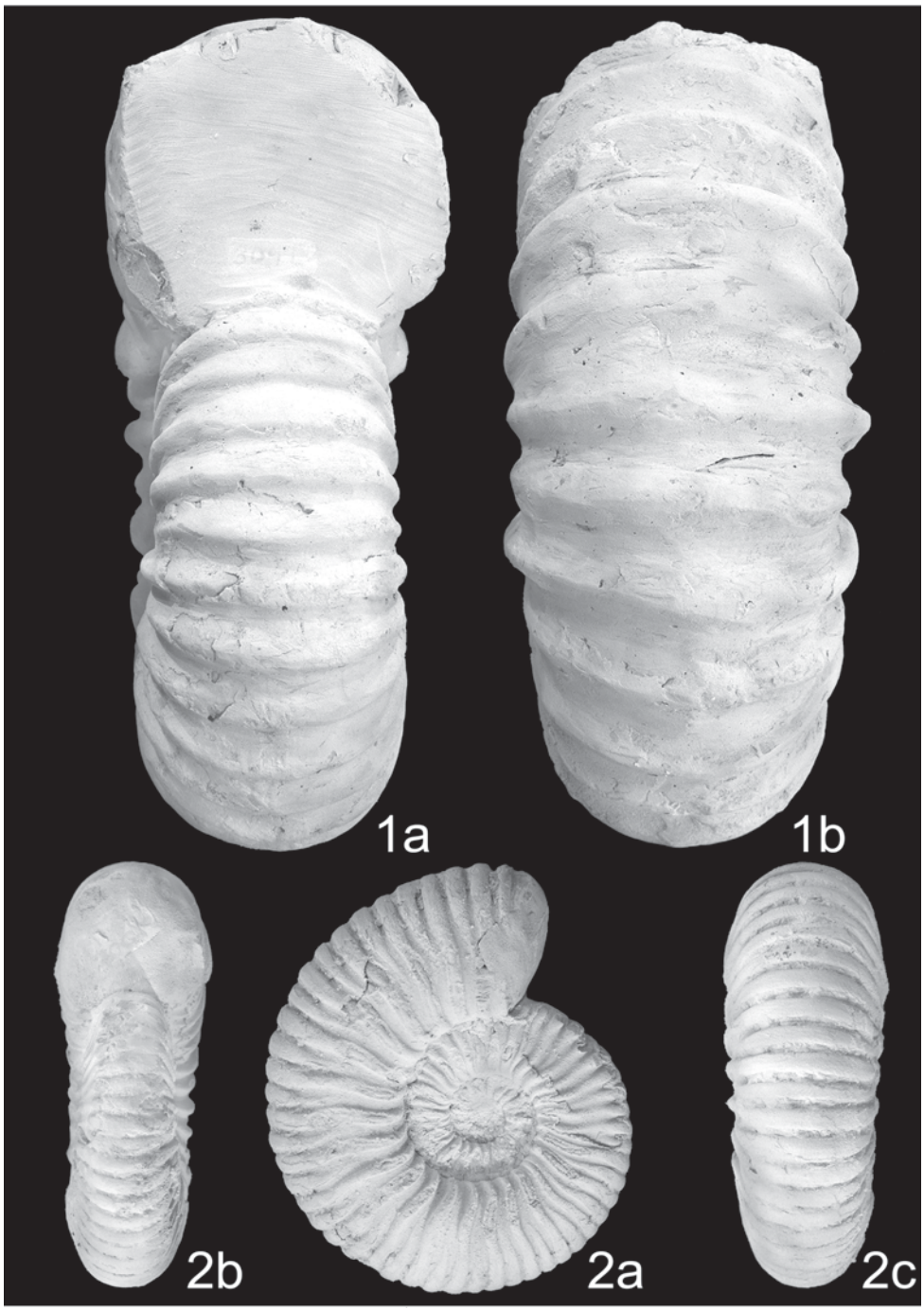

Plate 74

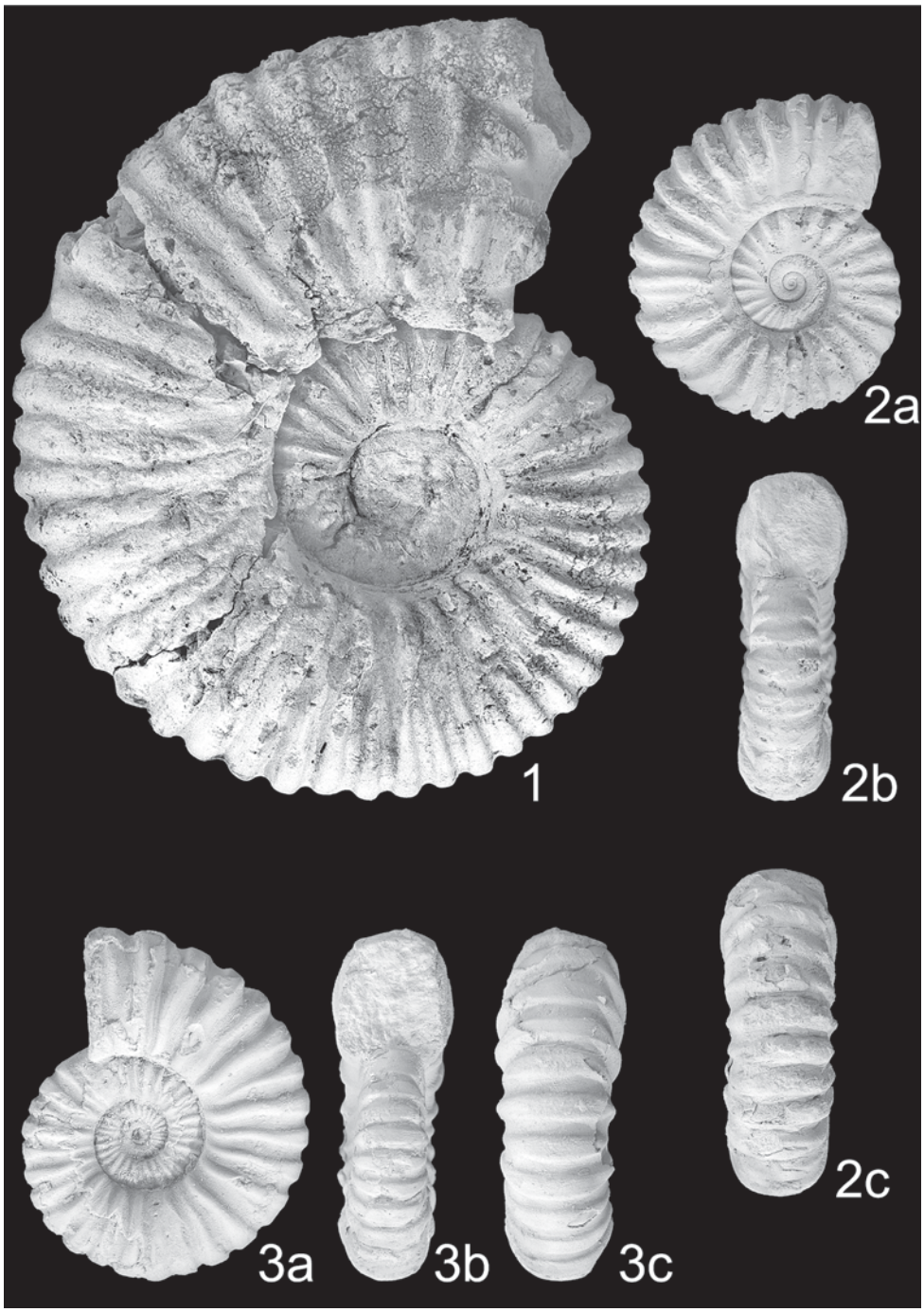

Plate 75

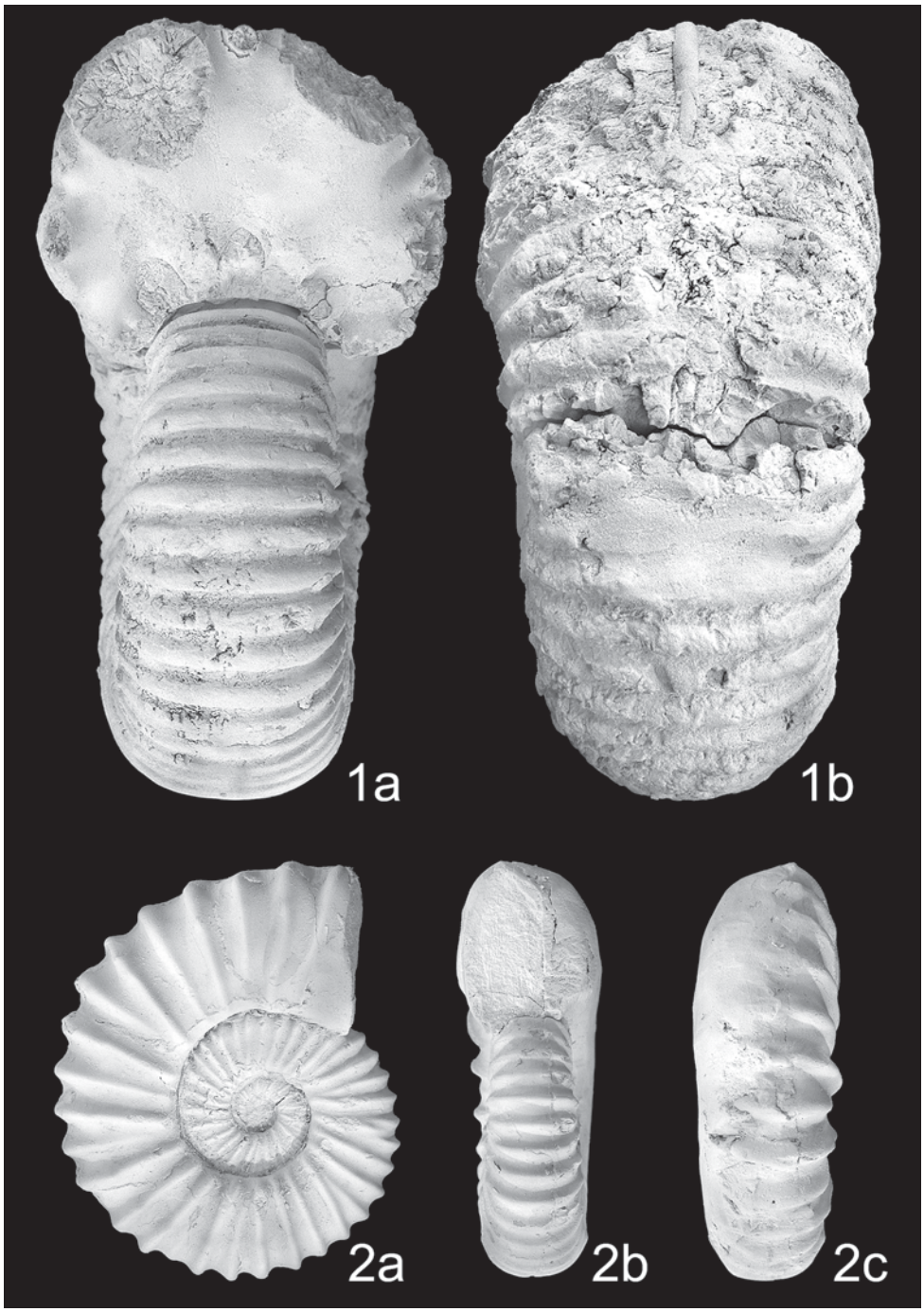

Plate 76

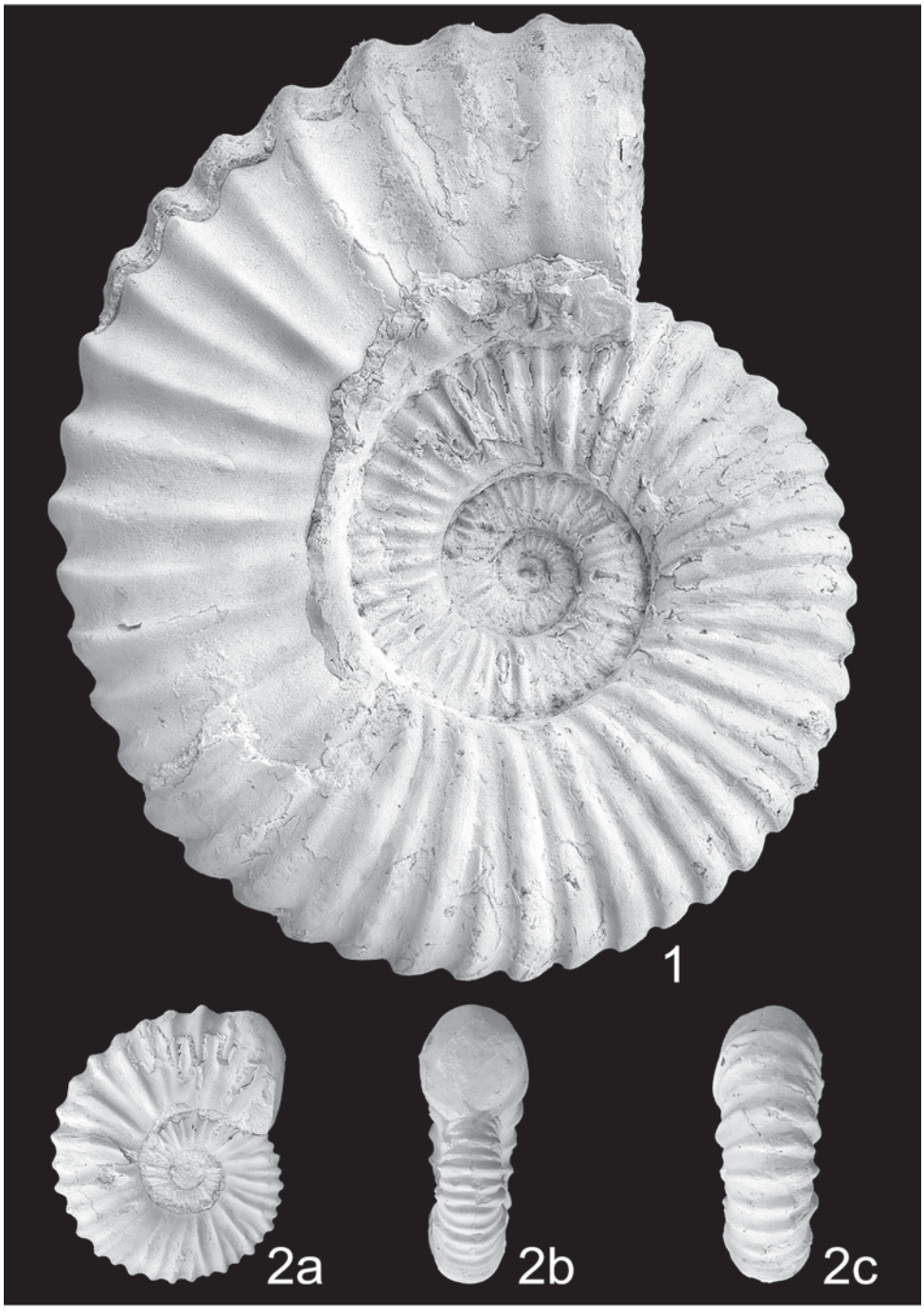

Plate 77

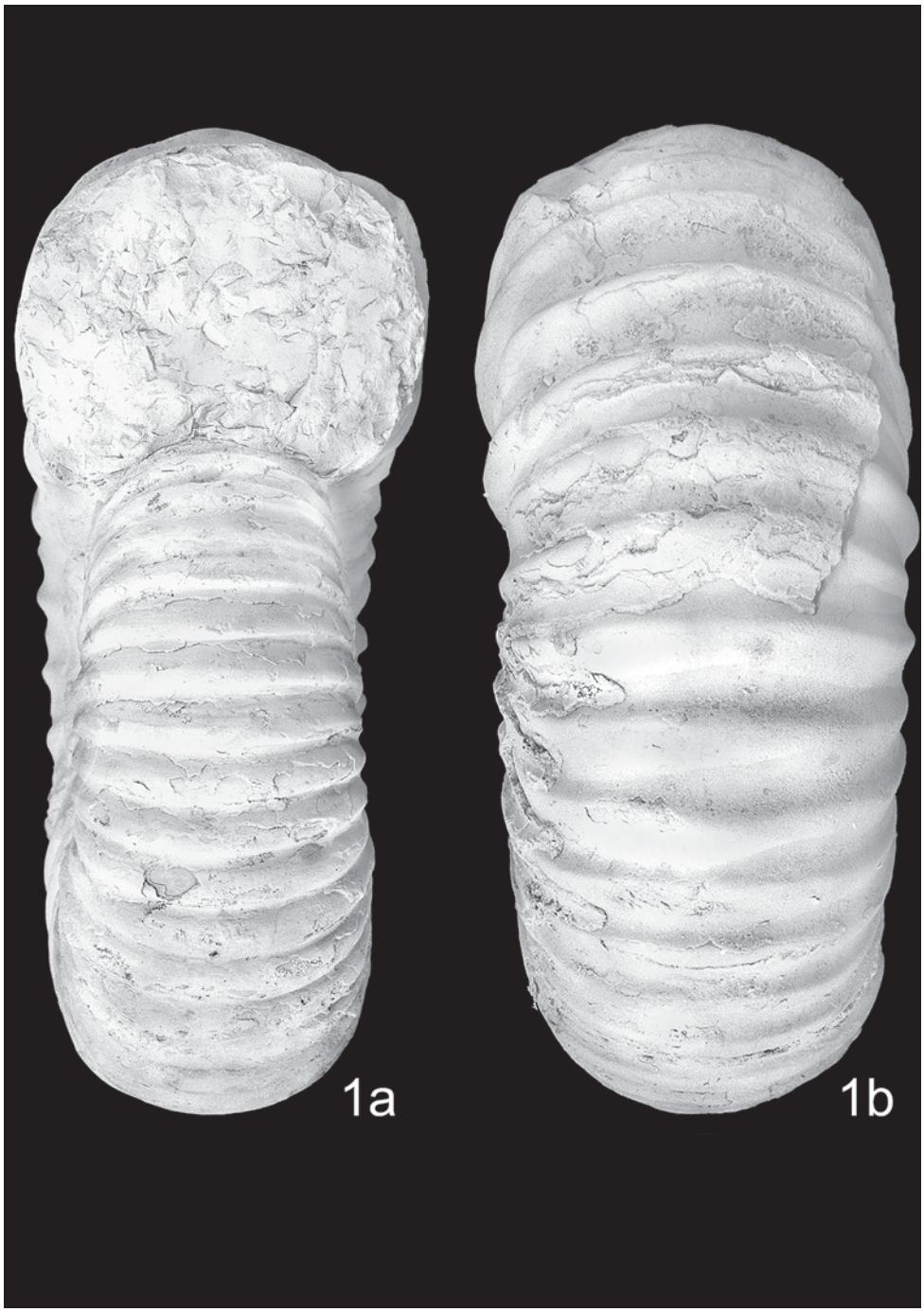

Plate 78

Plate 79

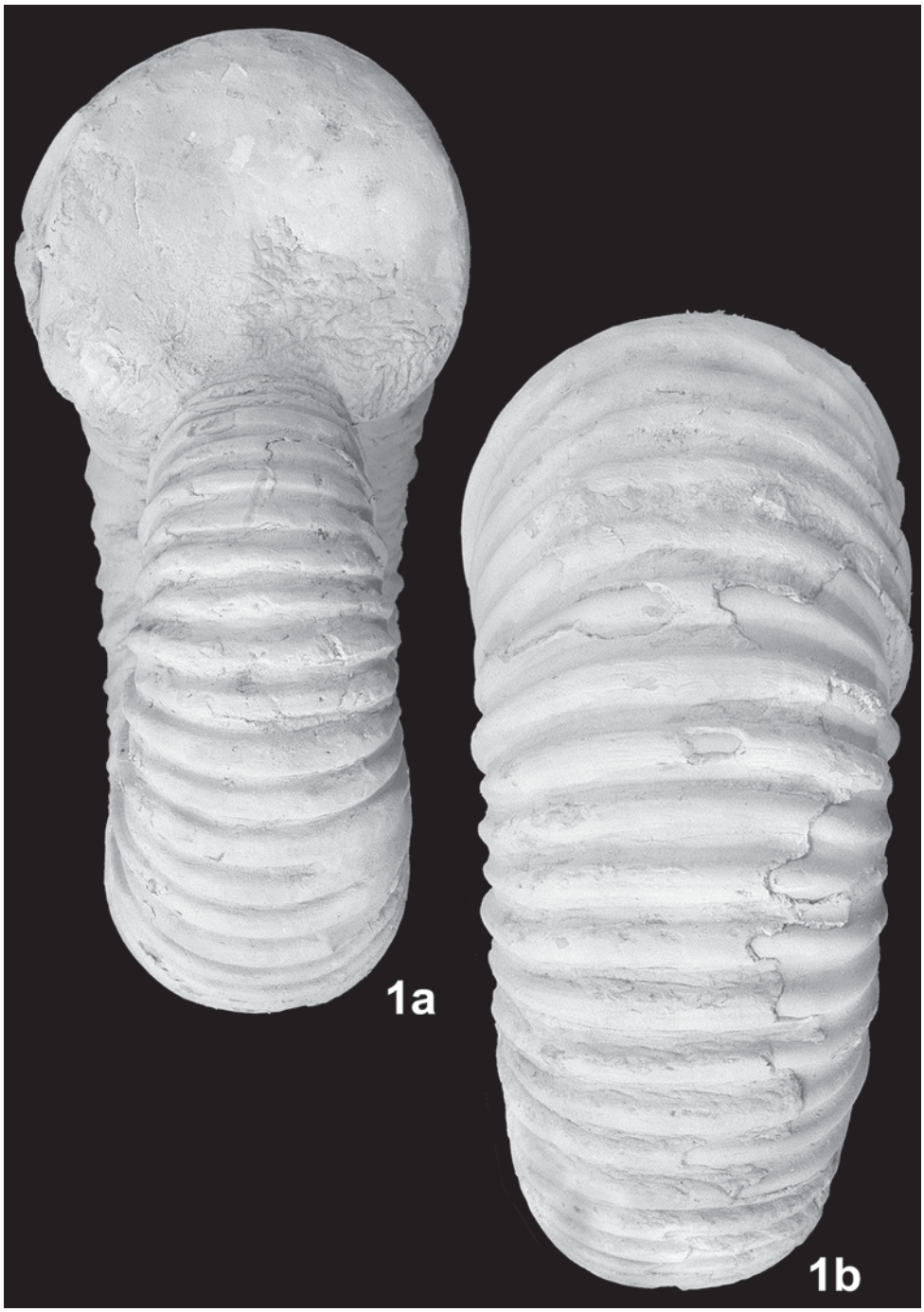

Plate 80

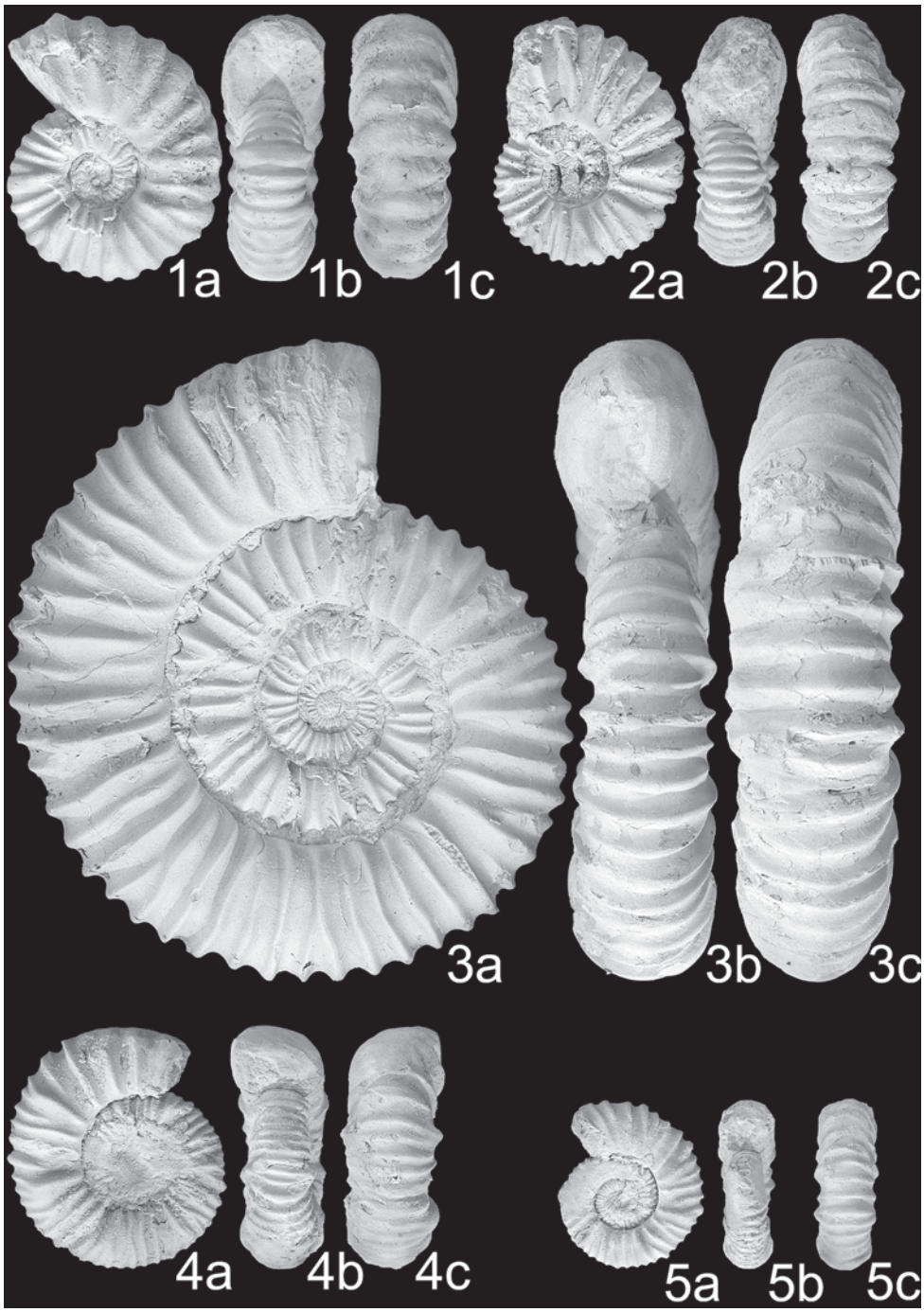

Plate 81

Plate 82

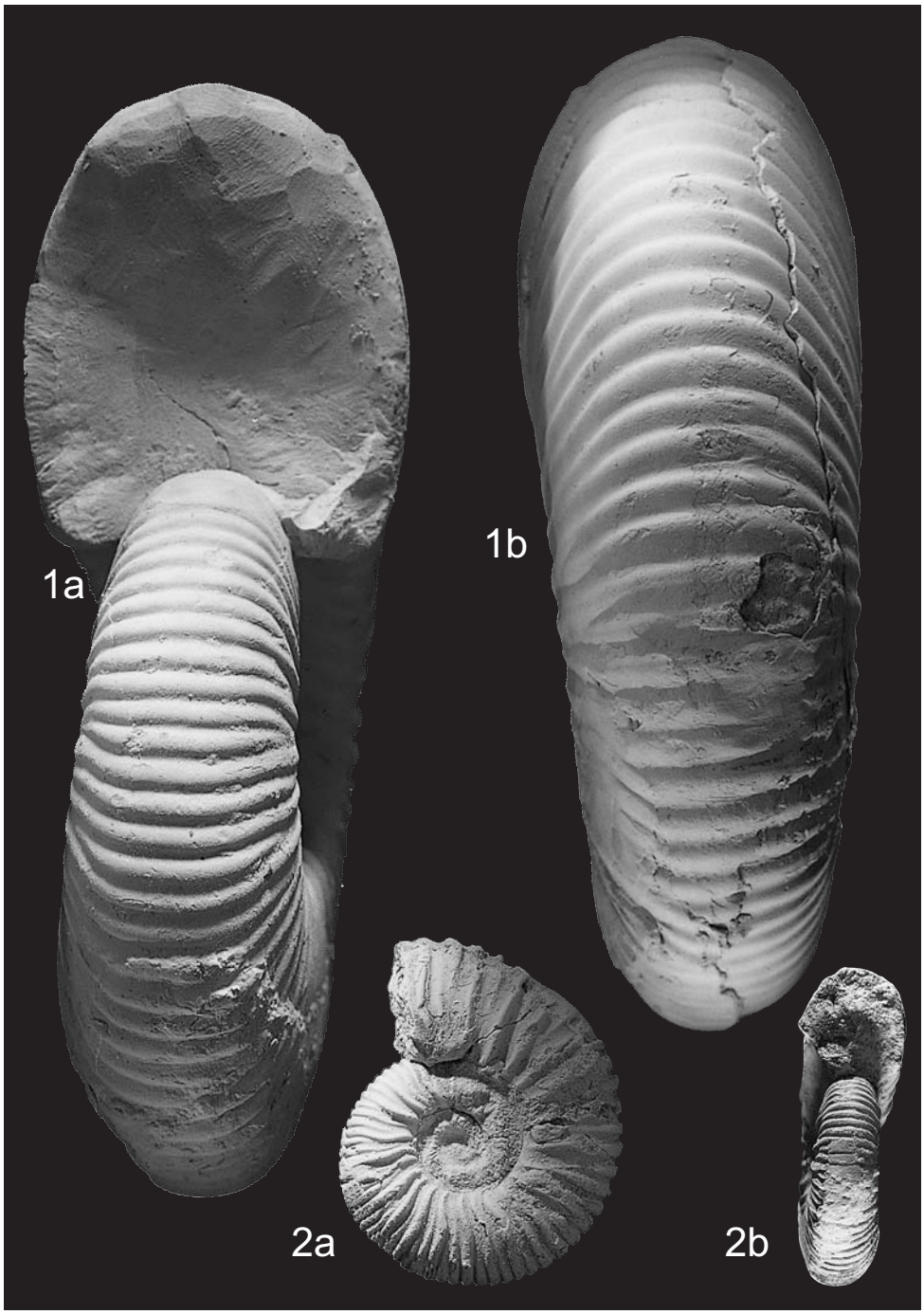

Plate 83

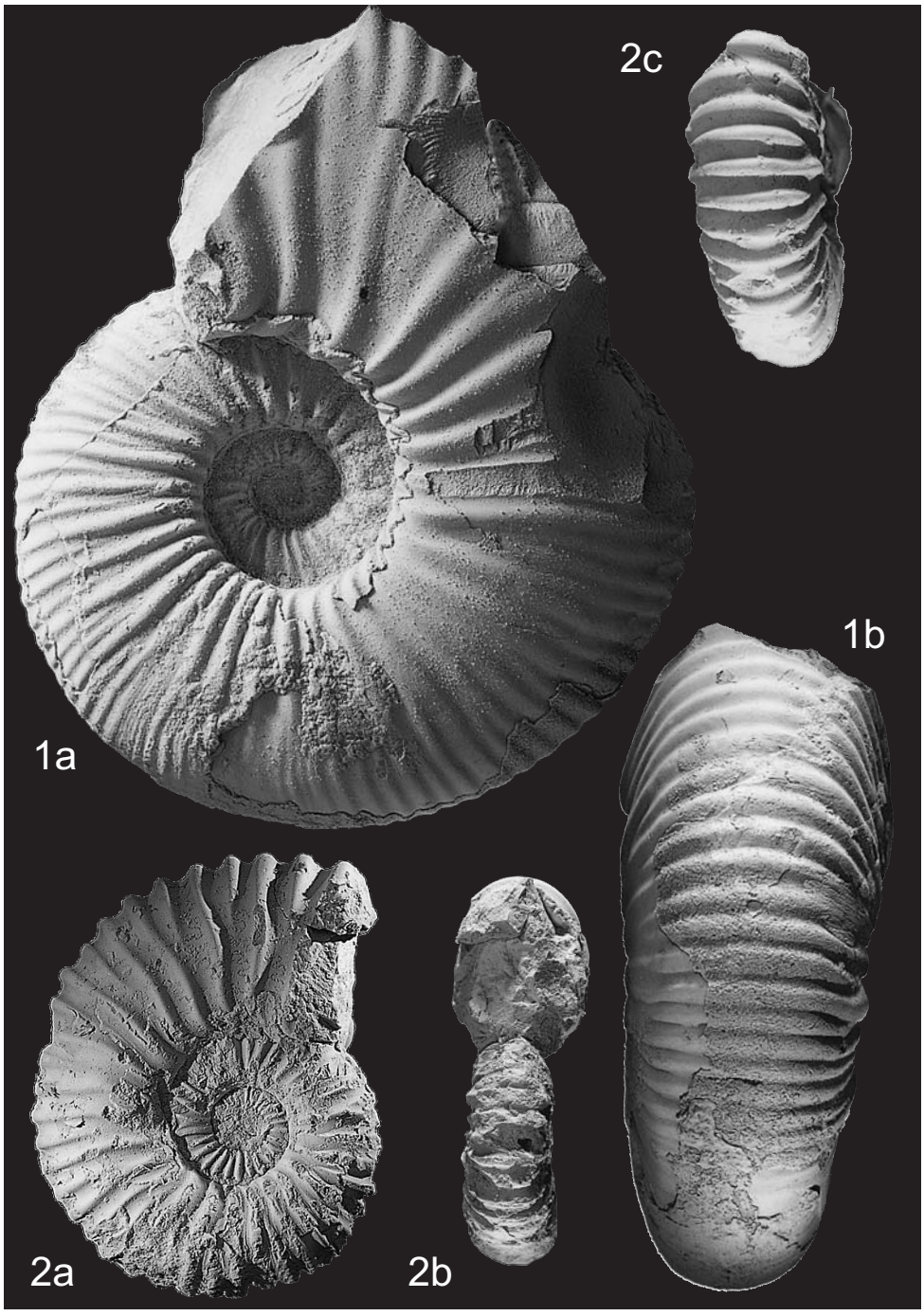

Plate 84

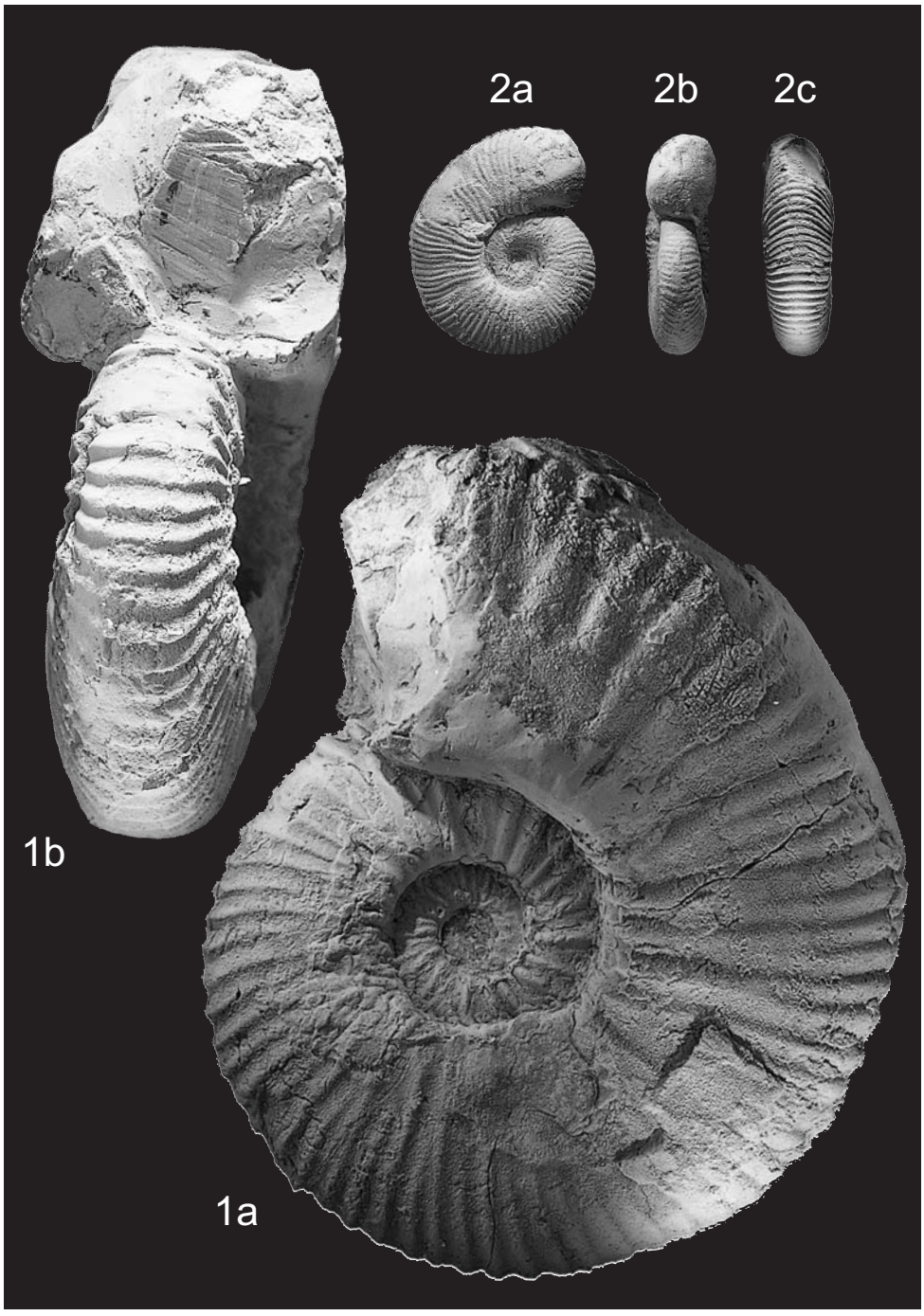

Plate 85

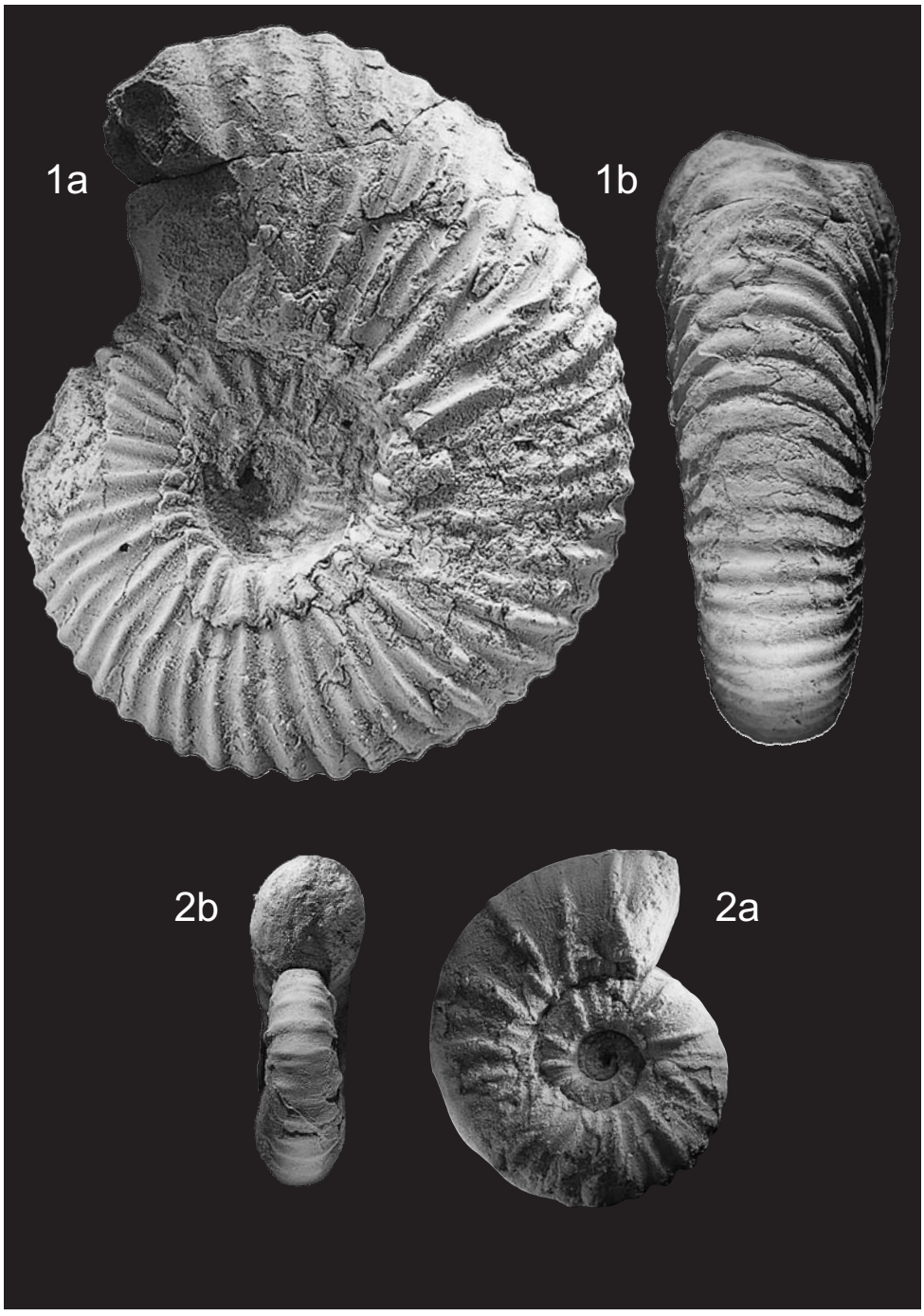

Plate 86

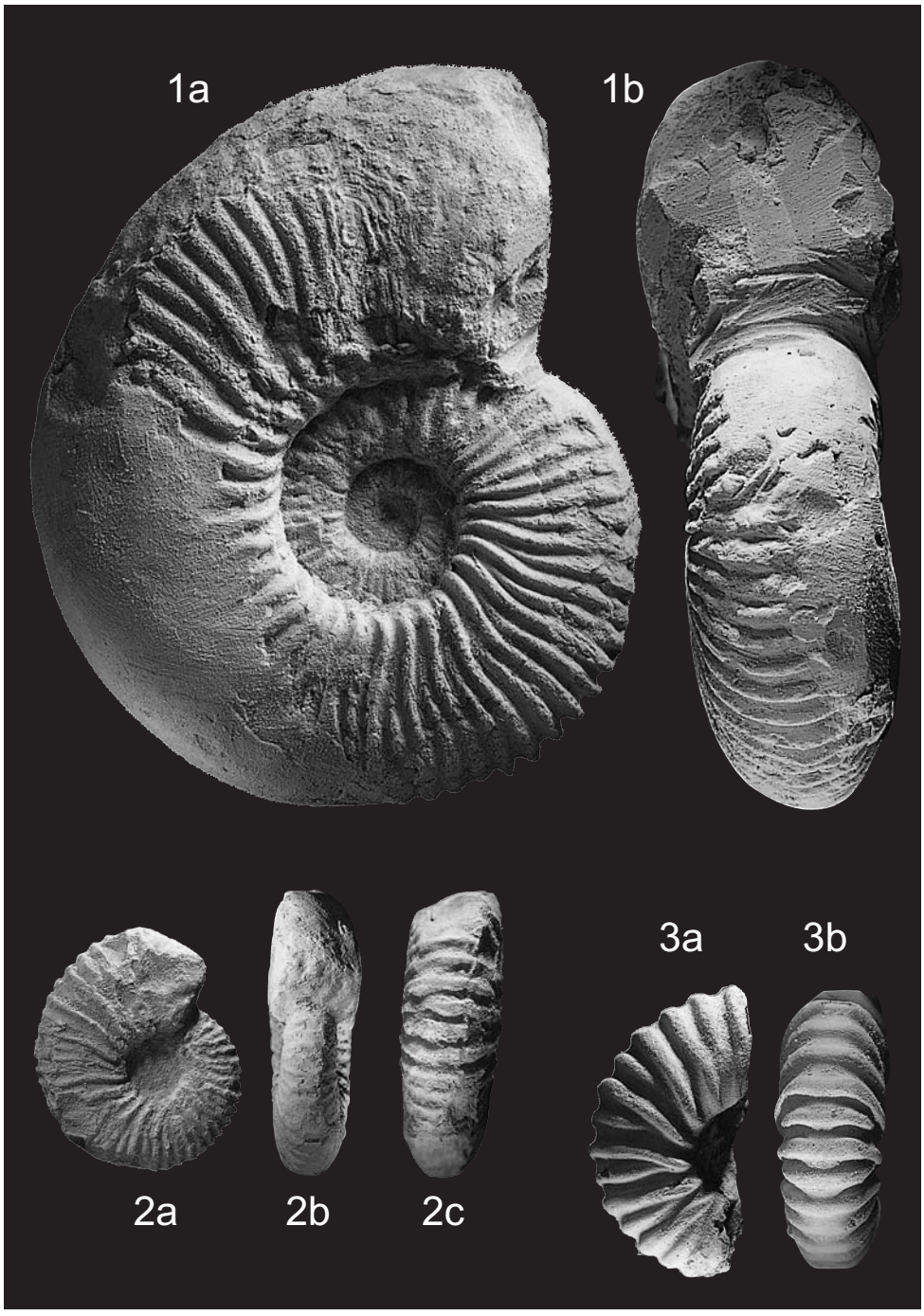

Plate 87