

# Plates

## Explanation

In plates 1–20, certain abbreviations, annotations and conventions are adopted.

### Stratigraphy:

Ug-1 – Ug-4: Pelion Formation, local members 1–4.

Fb-1 – Fb-4: Fossilbjerget Formation, local units (see text).

*U*-1 – *U*-10: Ugleelv, unnamed faunal horizons.

### Ammonites:

[M], [m]: macroconch/microconch anti-dimorphs, respectively.

Arrows mark the last septum of the phragmocone and onset of the final body chamber in adult specimens.

All figures are shown at natural size, unless indicated otherwise.

### Specimen affiliations:

Four-digit numbers prefixed JHC refer to a catalogue by the first author.

MGUH are registration numbers at the Geological Museum at the Natural History Museum of Denmark.

Six-figure numbers prefixed GGU are Geological Survey of Greenland field numbers.

## Plate 1 Borealis Standard Zone, faunal horizons Bo-1, Bo-2

Figs 1–7. *Cranocephalites borealis* (Spath 1932) *sensu stricto*, trans  $\alpha$ , horizon Bo-1.

Figs 1–5: mature adults [M]; figs 6, 7: mature adults [m]. All from Ugleelv, section E2 (section 22 of Callomon 1993), Pelion Formation, Ug-1 (top), bed 12 (Fig. 28A).

**Fig. 1a, b:** JHC 1367, above average diameter and inflation: note bullate primary ribbing persisting on the body chamber.

**Fig. 2a, b:** JHC 1366, slightly incomplete and more compressed variant.

**Fig. 3a, b:** JHC 1368, ‘stand-in’ type (*typus substituens*) of the transient.

**Fig. 4a, b:** JHC 1370, the largest specimen.

**Fig. 5a, b:** JHC 1365, small variant.

**Fig. 6a, b:** JHC 5298, [m].

**Fig. 7a, b:** JHC 1363, presumed [m], allo type.

Figs 8–13. *Cranocephalites borealis* (Spath 1932) trans  $\beta$ , horizon Bo-2.

Figs 8–10: mature adults, [m]; figs 11–13: mature adults [M]. All from Ugleelv, Pelion Formation, Ug-2.

**Fig. 8a:** JHC 1281, Statuebjerg (SW), section B4, bed 5.

**Fig. 8b:** as fig. 8a but enlarged  $\times 2$ .

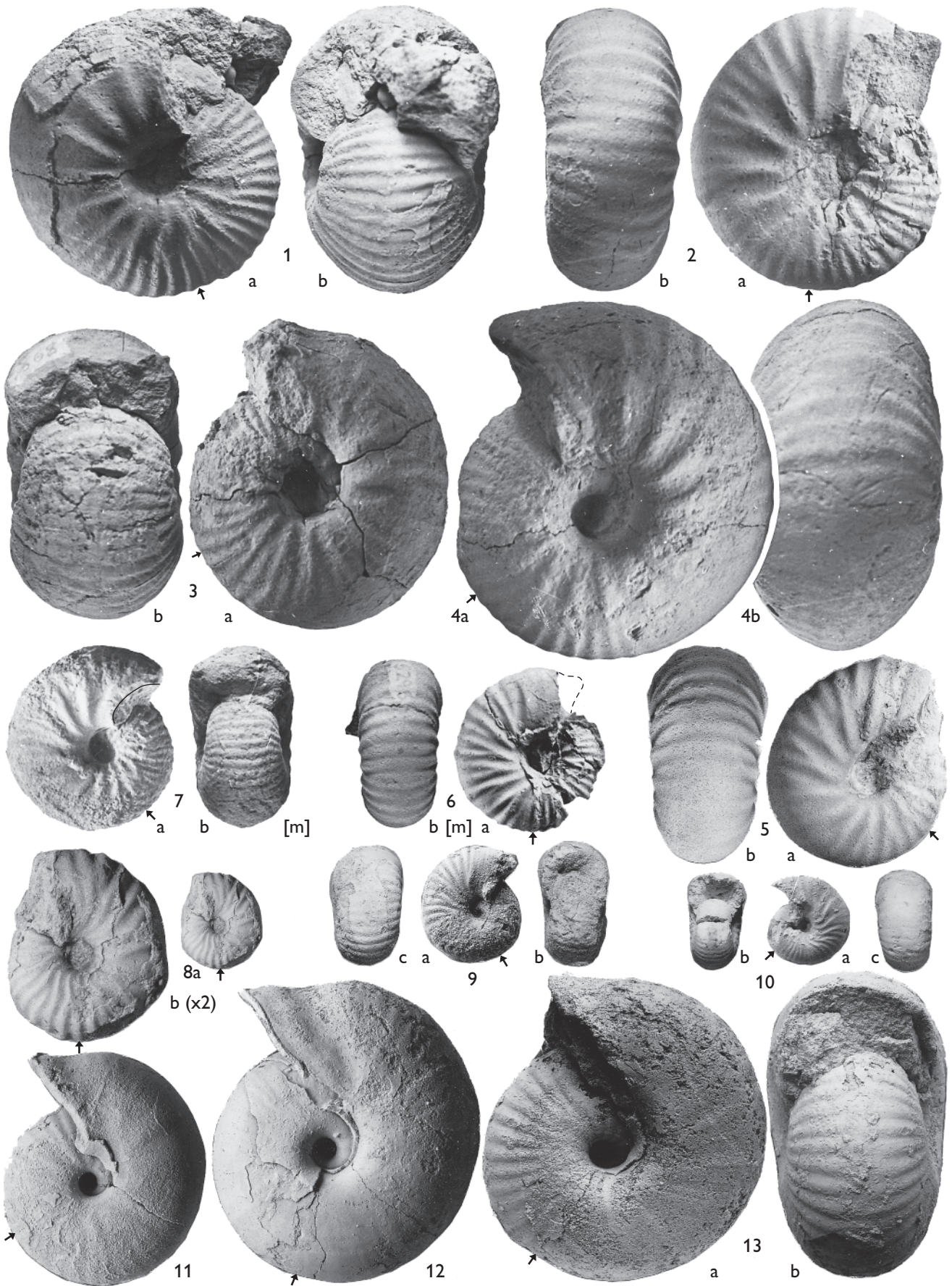
**Fig. 9a–c:** JHC 1206a, Teebjerg, section C1, bed 18, reference collection.

**Fig. 10a–c:** JHC 1206b, Teebjerg, section C1, bed 18.

**Fig. 11:** JHC 1285, Statuebjerg (SW), section B4, bed 5.

**Fig. 12:** MGUH 22255 (ex JHC 1144), representative specimen of trans  $\beta$ , Teebjerg, section C1, bed 18.

**Fig. 13a, b:** JHC 1210, Teebjerg, section C1, bed 18.



## Plate 2 *Borealis* Standard Zone, faunal horizons Bo-2, Bo-3

Figs 1–10. *Cranocephalites borealis* (Spath 1932) trans  $\beta$  and  $\gamma$  [M], (horizons Bo-2, Bo-3) to show the ranges of variability.

**Fig. 1a, b:** JHC 1204, trans  $\beta$ , reference collection, section C1, bed 18; the most inflated, depressed large variant.

**Fig. 2a, b:** JHC 1170, trans  $\beta$ , section C1, bed 18, one of the smallest variants.

**Fig. 3a, b:** JHC 1171, trans  $\beta$ , section C1, bed 18, to show the inner whorls, essentially identical in all three transients  $\alpha$ – $\gamma$ .

**Fig. 4a, b:** JHC 1471, trans  $\gamma$ , section C2, bed 21, wholly septate, a large, densely-ribbed inflated variant with subtriangular whorlsection.

**Fig. 5a, b:** JHC 1464, trans  $\gamma$ , section C2, bed 21, less inflated, more rounded section.

Figs 6–10: variability of cross-sections.

**Fig. 6:** JHC 1458, trans  $\gamma$ , section C2, bed 21.

**Fig. 7:** JHC 1452, trans  $\gamma$ , section C2, bed 21.

**Fig. 8:** JHC 1167, trans  $\beta$ , section C1, bed 18.

**Fig. 9:** JHC 1220, trans  $\beta$ , section C1, bed 18.

**Fig. 10:** JHC 1457, trans  $\gamma$ , section C2, bed 21.

Figs 11–14. *Cranocephalites borealis* (Spath 1932) trans  $\beta$  [m], horizon Bo-2.

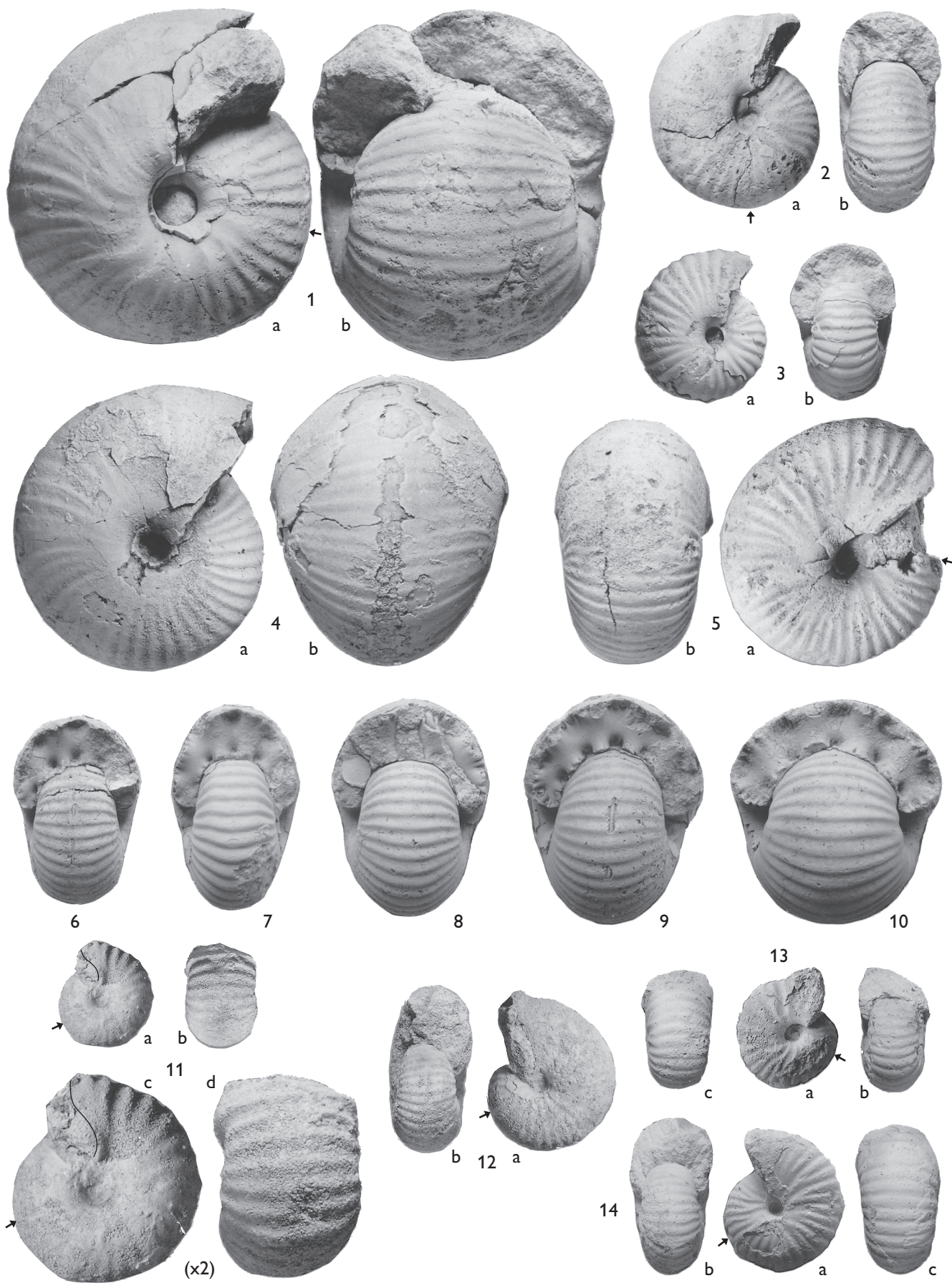
**Fig. 11a, b:** JHC 4031, section D9, bed 9.

**Fig. 11c, d:** JHC 4031, section D9, bed 9, but enlarged  $\times 2$ . Note the rejuvenation of the ribbing near the aperture.

**Fig. 12a, b:** JHC 4028, section D9, bed 9.

**Fig. 13a–c:** GGU 135887b, section D9, bed 9; body chamber only just beginning.

**Fig. 14a–c:** GGU 135887a, representative specimen [m], section D9, bed 9.



### Plate 3 *Borealis* Standard Zone, faunal horizon Bo-3

Figs 1–6. *Cranocephalites borealis* (Spath 1932) trans  $\gamma$ , horizon Bo-3. Mature [M].

**Fig. 1:** JHC 1001, reference collection, Brinkmann Fjeld, Hurry Inlet, section 8, bed 3.

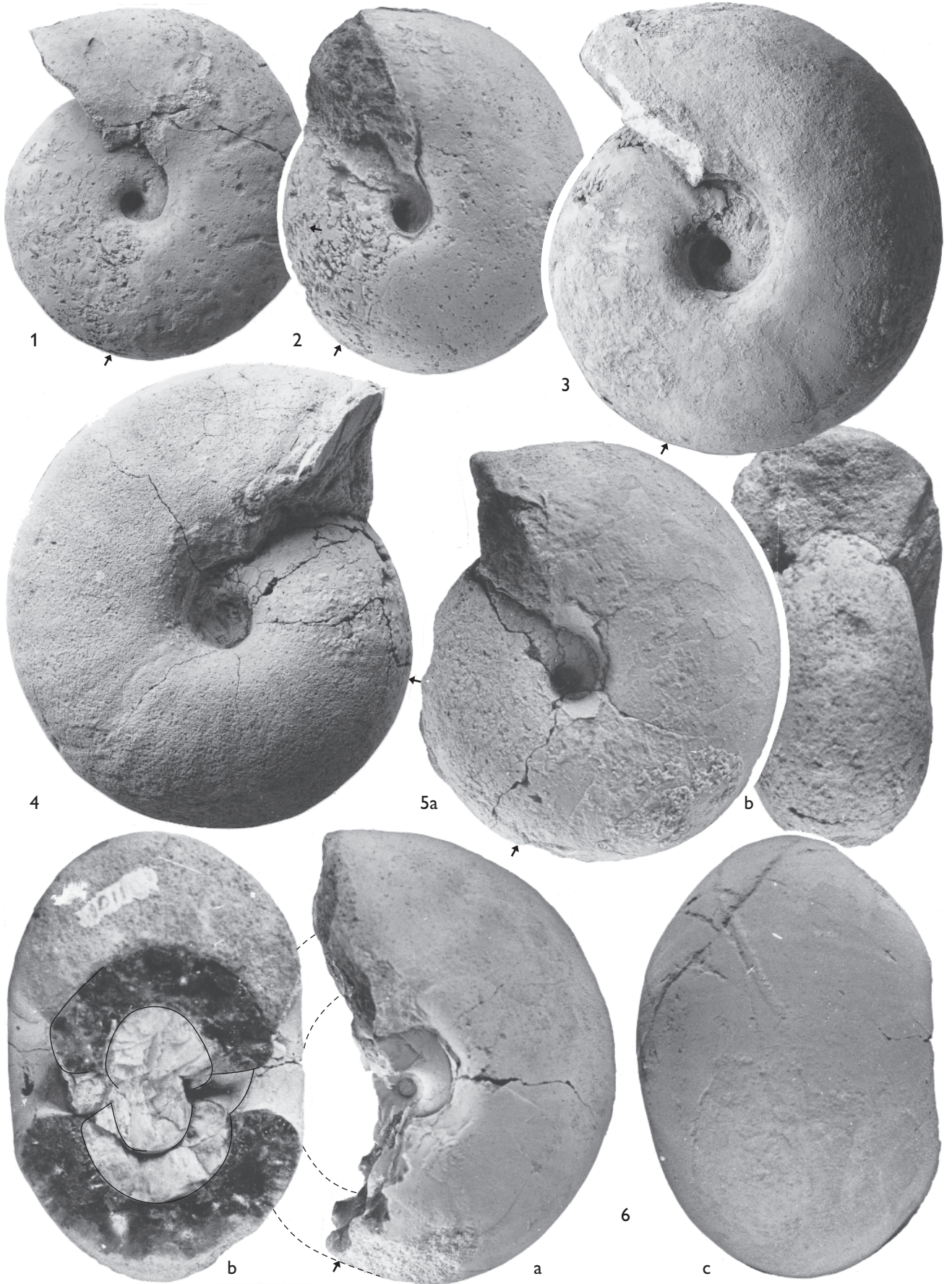
**Fig. 2:** JHC 1004, Brinkmann Fjeld, Hurry Inlet, section 8, bed 3.

**Fig. 3:** JHC 1303, Ugleelv, Statuebjerg, section B3, top of Ug-1, bed 14.

**Fig. 4:** GGU 135888.40, Ugleelv, section D9, bed 9, top.

**Fig. 5a, b:** JHC 1007, Brinkmann Fjeld, Hurry Inlet, section 8, bed 3.

**Fig. 6:** JHC 1011 (representative specimen), Brinkmann Fjeld, Hurry Inlet, section 8, bed 3.



## Plate 4 Indistinctus Standard Zone, faunal horizons In-1 – In-3

### Ugleelv, Pelion Formation, Ug-3

Fig. 1. *Cranocephalites* sp. (U-1), horizon In-1.

**Fig. 1a, b:** JHC 5306, Katedralen, section D2, bed 4 (Fig. 22); representative specimen, nearly complete mature [M].

Figs 2–6. *Cranocephalites* sp. (U-2), horizon In-2, section D2, bed 5 (Fig. 22).

**Fig. 2a, b:** JHC 5314, representative specimen, complete phragmocone, [M].

**Fig. 3a, b:** JHC 5317.

**Fig. 4a, b:** JHC 5319.

**Fig. 5:** JHC 6457.

**Fig. 6:** JHC 6456, [m]

Figs 7–14. *Cranocephalites indistinctus* Callomon 1993 trans  $\alpha$ , horizon In-3.

**Fig. 7:** JHC 5323, [m], Katedralen, section D2, bed 6 (Fig. 22).

**Figs 8–10:** JHC 5349, JHC 5356, JHC 5350, respectively, all out of a single concretion, section D2, bed 6.

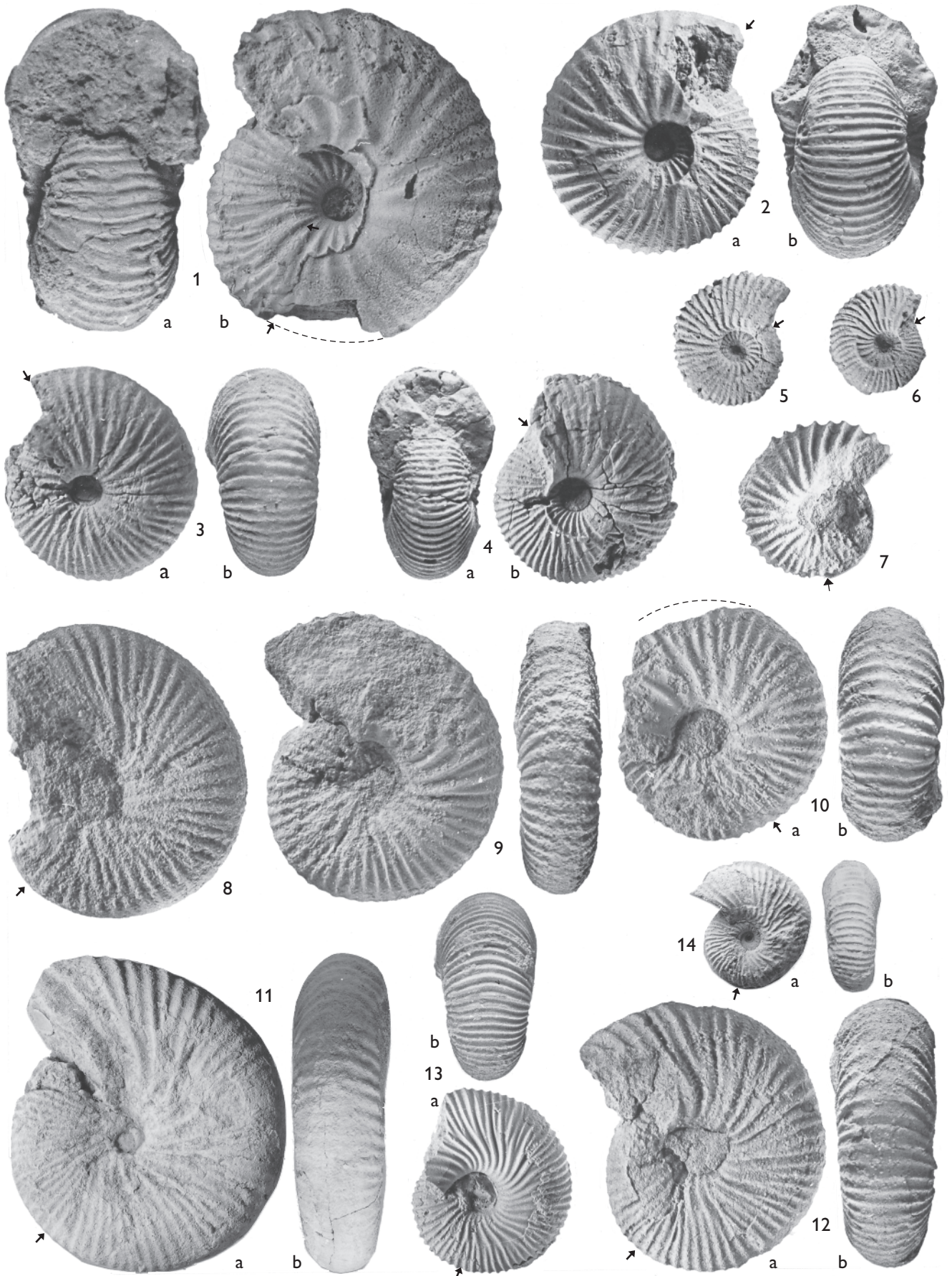
**Fig. 11a, b:** MGUH 22258 (ex JHC 1306), representative specimen [M] of trans  $\alpha$ , Statuebjerg, section B3, bed 20.

**Figs 12, 13:** JHC 5359, JHC 5364, respectively, section D2, bed 6 (Fig. 22).

**Fig. 14a, b:** JHC 1248, representative specimen [m] of trans  $\alpha$ , Statuebjerg, section B1, bed 24.



Plate 4



## Plate 5 Indistinctus Standard Zone, faunal horizons In-4, In-6

### Ugleelv, Pelion Formation, Ug-3

Figs 1–3. *Cranocephalites indistinctus* trans  $\alpha'$ , horizon In-4, complete adults, [M]. Statuebjerg, section B2, bed 12 (Fig. 19).

**Fig. 1a, b:** JHC 6017, representative specimen.

**Fig. 2a, b:** JHC 6020.

**Fig. 3:** JHC 6021.

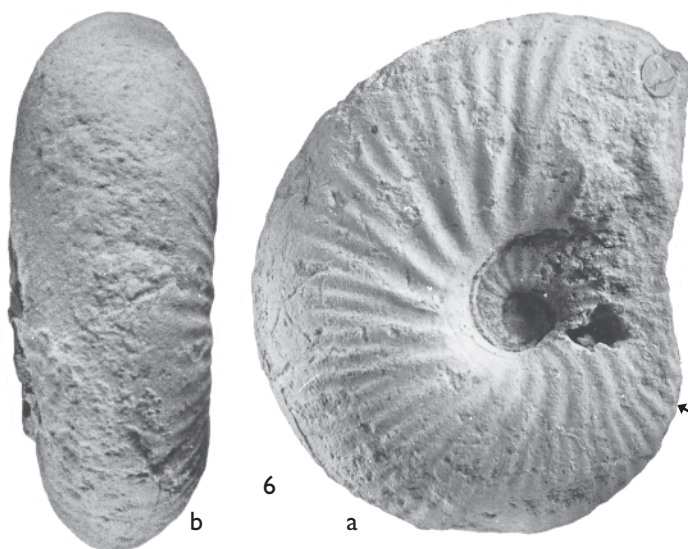
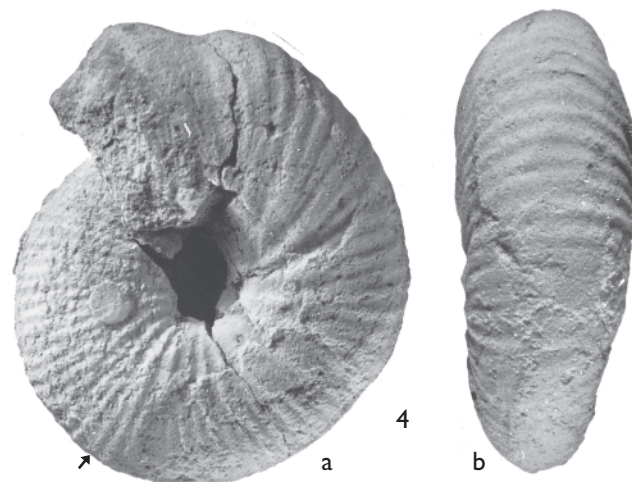
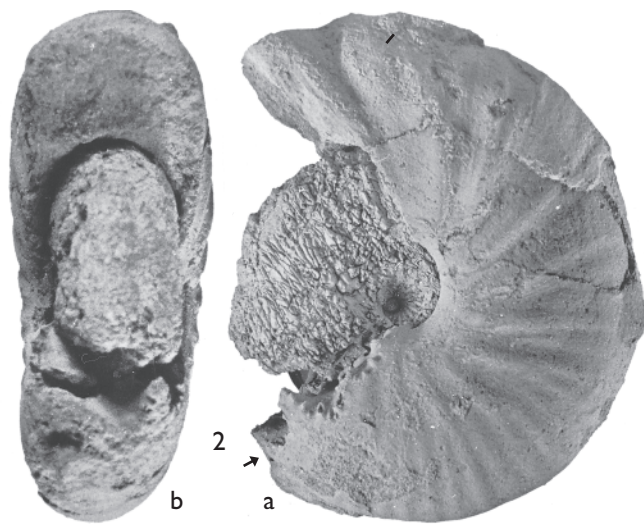
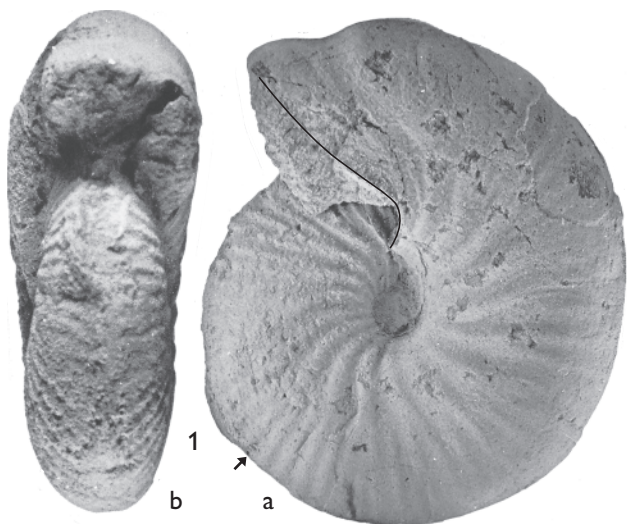
Figs 4–6. *Cranocephalites indistinctus* Callomon 1993 *sensu stricto*, trans  $\beta$ , horizon In-6, complete mature [M]. Teebjerg, section C2, bed 28.

**Fig. 4a, b:** MGUH 22259 (ex JHC 1435), holotype.

**Fig. 5:** JHC 1438, paratype I.

**Fig. 6a, b:** JHC 1439, paratype II.

(For figures of two more paratypes, see Plate 8, figs 1, 2).



## Plate 6 Pompeckji Standard Zone, Intermisus Subzone, faunal horizon Po-1

### Ugleelv, Teebjerg, Pelion Formation, Ug-3

Figs 1–4. *Cranocephalites carolae* sp. nov. *sensu stricto*, trans *a*, [M], section C4, bed 12b (Fig. 21).

**Fig. 1a, b:** JHC 5205, holotype.

**Fig. 2a, b:** JHC 5234, paratype I.

**Fig. 3a, b:** JHC 5229, paratype II.

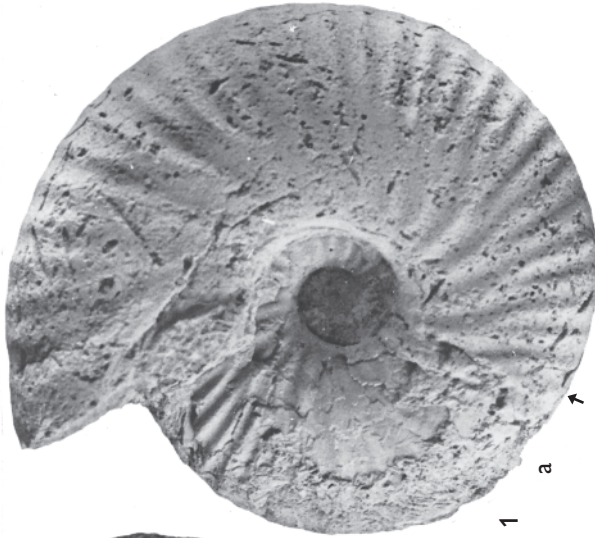
**Fig. 4a, b:** JHC 5215, paratype III.

(See also Plate 8, fig. 3).

**Plate 6**



b



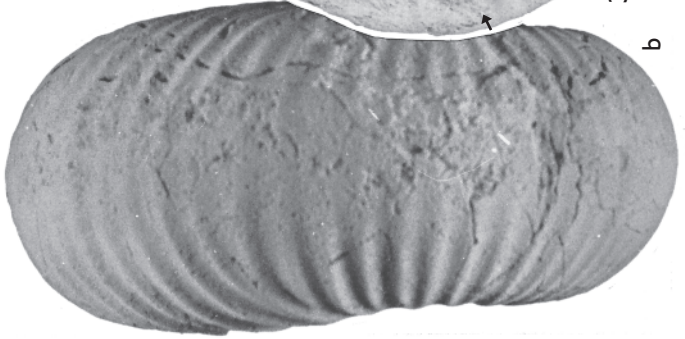
a



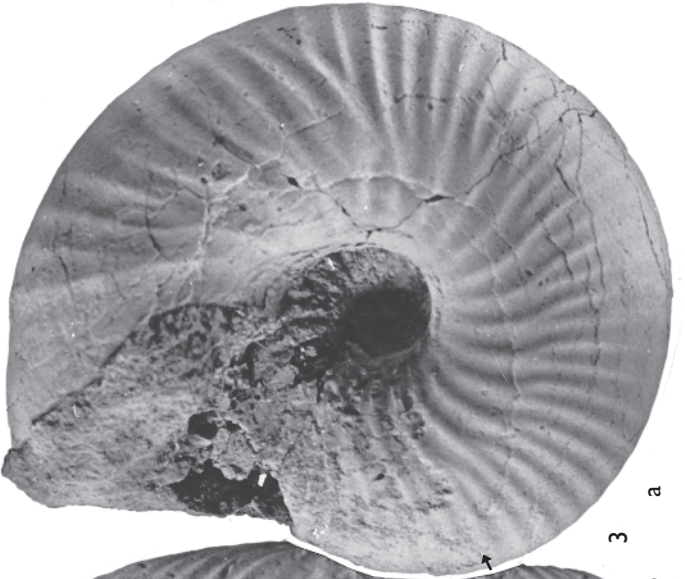
b



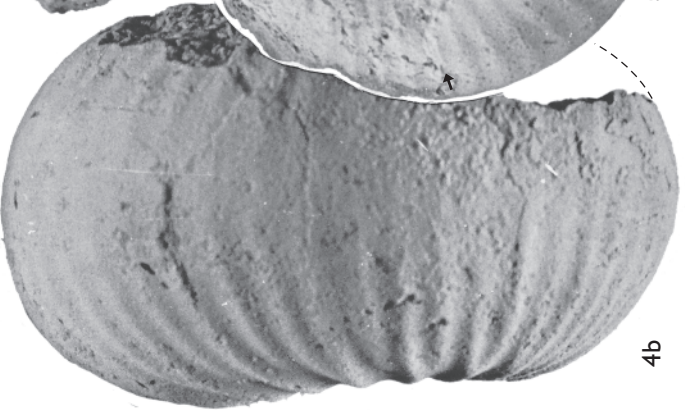
a



b



a



4b



a

## Plate 7 Pompekji Standard Zone, Intermissus Subzone, faunal horizon Po-2

Ugleelv, Katedralen, Pelion Formation, Ug-3

Figs 1–9. *Cranocephalites carolae* sp. nov. trans  $\beta$ , [M]. Figs 1, 4, 6, 7, 9, section D3; figs 2, 3, 5, 8, section D2, bed 7 (Fig. 22).

**Fig. 1:** JHC 6432, secondary representative specimen.

**Fig. 2:** JHC 5336, secondary representative specimen.

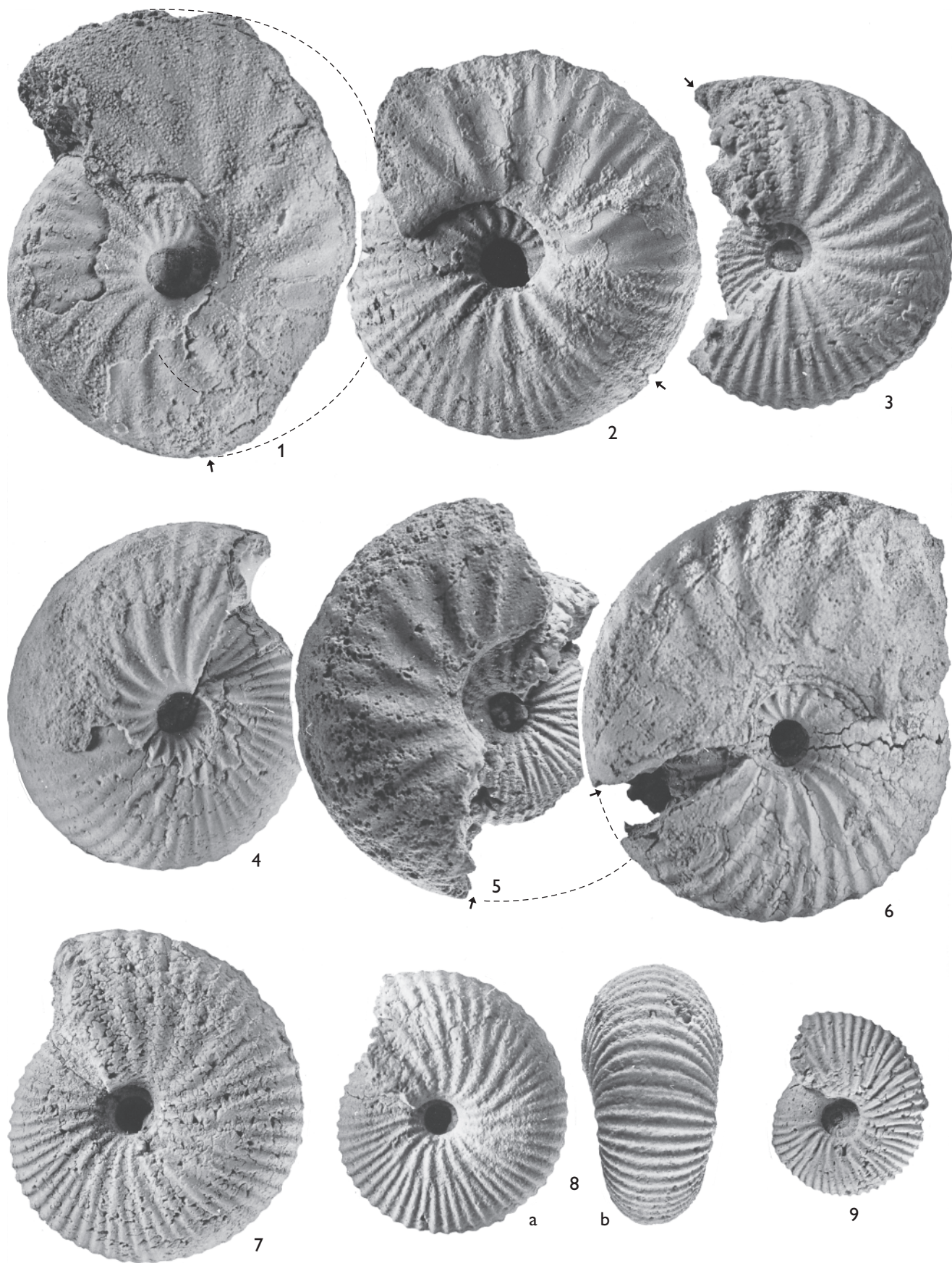
**Fig. 3:** JHC 5334, wholly septate.

**Fig. 4:** JHC 6436, wholly septate.

**Fig. 5:** JHC 5327.

**Fig. 6:** JHC 6430, primary representative specimen.

**Fig. 7-9:** JHC 6437, JHC 5333, JHC 6446 respectively, all wholly septate nuclei.



**Plate 8 Indistinctus Standard Zone, faunal horizon In-6, and Pompeckji Standard Zone, faunal horizons Po-1, Po-3**

Figs 1, 2. *Cranocephalites indistinctus* Callomon 1993 *sensu stricto*, trans  $\beta$ , horizon In-6. Inflated variants, [M]. Teebjerg, section C2, bed 28 (see also Plate 5).

**Fig. 1a, b:** JHC 1440.

**Fig. 2:** JHC 1442.

Fig. 3. *Cranocephalites carolae* sp. nov. *sensu stricto*, trans  $\alpha$ , horizon Po-1, section C4, bed 12b (Fig. 21).

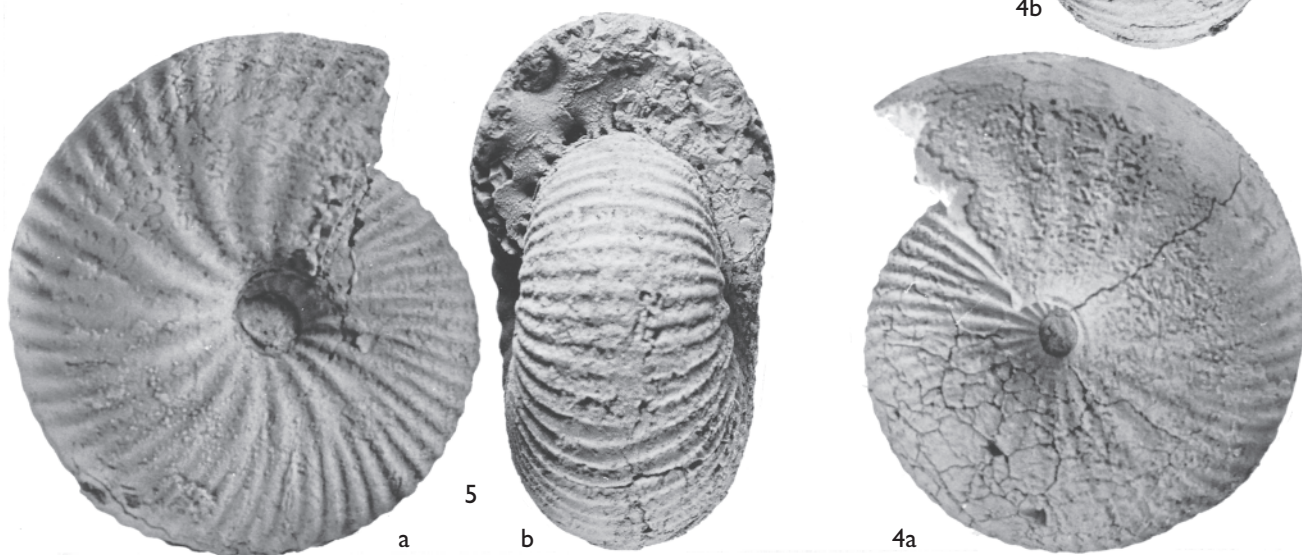
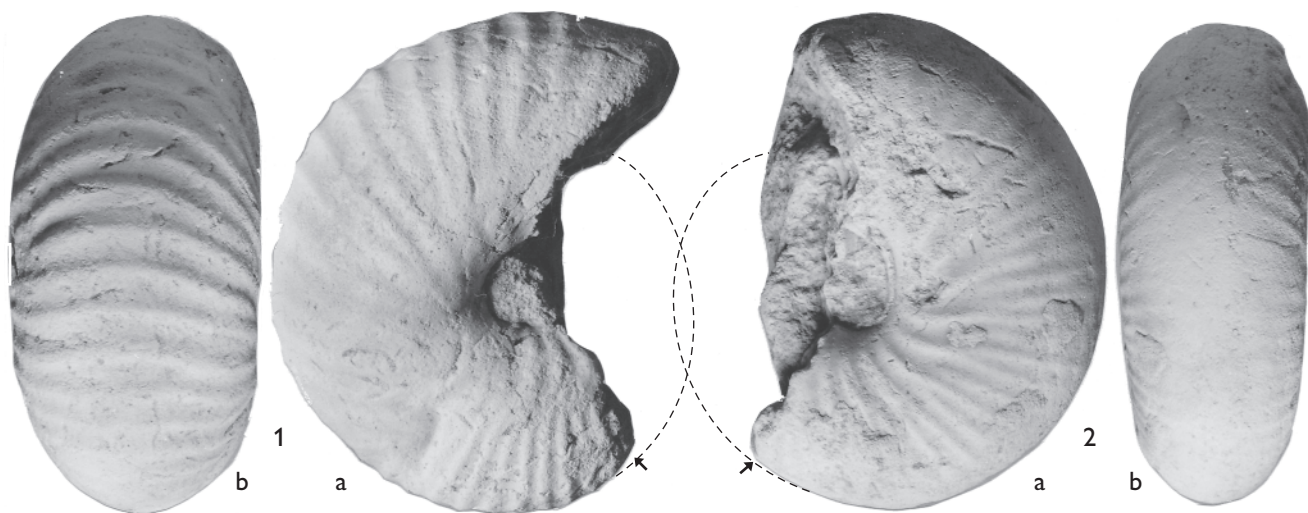
**Fig. 3a–c:** JHC 5223, wholly septate [M] to show ribbing and coiling of inner whorls.

Figs 4, 5. *Cranocephalites intermissus* sp. nov. trans  $\alpha$ , [M], horizon Po-3, section C3, bed 5 (Fig. 20).

**Fig. 4a, b:** JHC 6512, secondary representative specimen of trans  $\alpha$ , finely-ribbed variant, wholly septate.

**Fig. 5a, b:** JHC 6510, primary representative specimen of trans  $\alpha$ , wholly septate, ribbing of average strength.





**Plate 9 Pompeckji Standard Zone, Intermissus Subzone, faunal horizon Po-4**

**Ugleelv, Pelion Formation, Ug-4**

Figs 1–4. *Cranocephalites intermissus* sp. nov. *sensu stricto*, trans  $\beta$ , [M]. Figs 1–3, section D9, bed 15, collected by T. Birkelund and C. Heinberg in 1974; Fig. 4, section D8, bed 17b–d (Fig. 25).

**Fig. 1a, b:** GGU 139115a, holotype.

**Fig. 2a:** GGU 139115c, paratype.

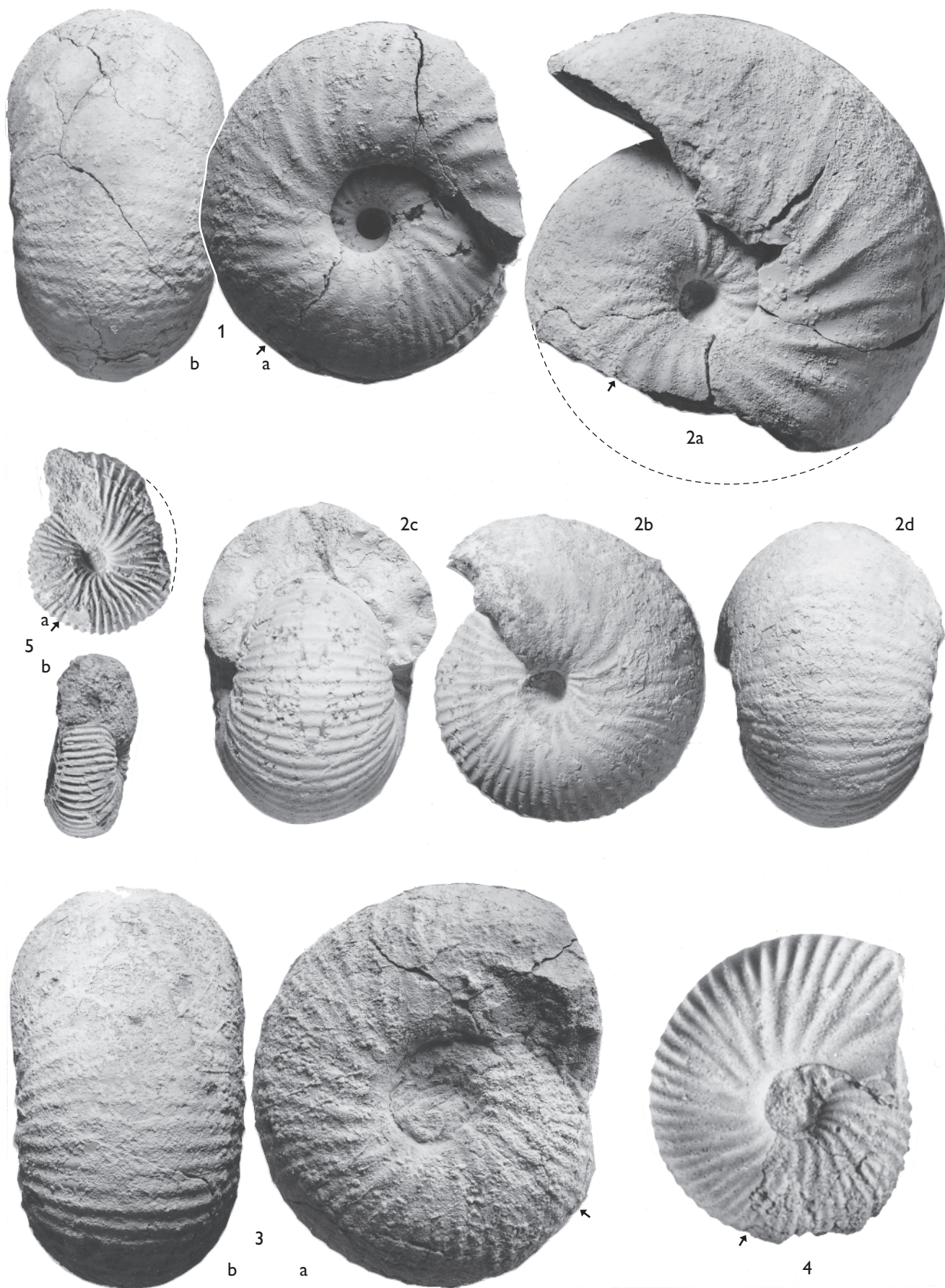
**Fig. 2b–d:** GGU 139115c, with body chamber removed to show the inner whorls.

**Fig. 3a, b:** GGU 139115b.

**Fig. 4:** JHC 5115, an adult but unusually small variant.

Fig. 5. *Cranocephalites intermissus* sp. nov. *sensu stricto*, trans  $\beta$  [m],

**Fig. 5:** JHC 5119, section D8, bed 17, a complete adult with traces of the peristome on the obverse side.



**Plate 10 Pompeckji Standard Zone, Carlsbergensis Subzone, faunal horizon Po-8**

**Ugleelv, Fossilbjerget Formation, Fb-1**

Figs 1–6. *Cranocephalites pompeckji* (Madsen 1904) [M].

**Fig. 1a, b:** JHC 4087, section D5, loose, variant from among a large collection most closely matching the (incomplete) lectotype.

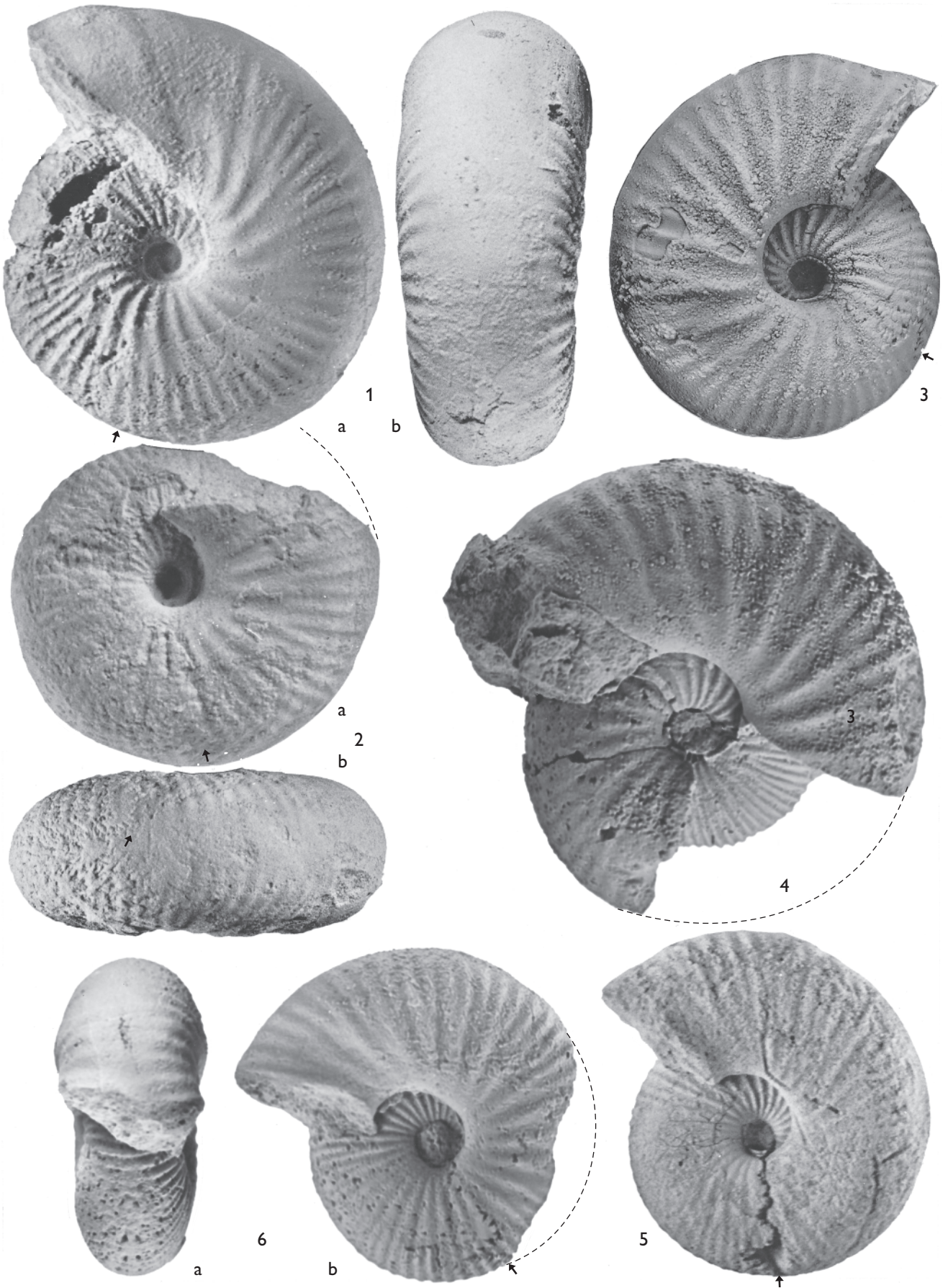
**Fig. 2a, b:** MGUH 297, lectotype (cast), with only half the adult body chamber preserved; Amdrup expedition, 1900, refigured from Madsen (1904, plate 8, fig. 6), allegedly from 'Ammonite Mountain', 5 km NE of section D5.

**Fig. 3:** GGU 137958, section D5, variant of average size, coarsely ribbed body chamber.

**Fig. 4:** JHC 4612, section D5, large, coarsely ribbed.

**Fig. 5:** JHC 4099, section D5, small, densely ribbed.

**Fig. 6a, b:** JHC 4107, section D5, showing the form of the typical adult peristomal constriction on the internal cast and relatively compressed whorl-section.



**Plate 11 Pompeckji Standard Zone, Carlsbergensis Subzone,  
faunal horizons Po-8, Po-9**

Figs 1–3. *Cranocephalites pompeckji* (Madsen 1904), faunal horizon Po-8, section D5, loose.

**Fig. 1a–c:** JHC 4110, large, inflated [M].

**Fig. 2a–c:** JHC 4119, [M], septate inner whorls.

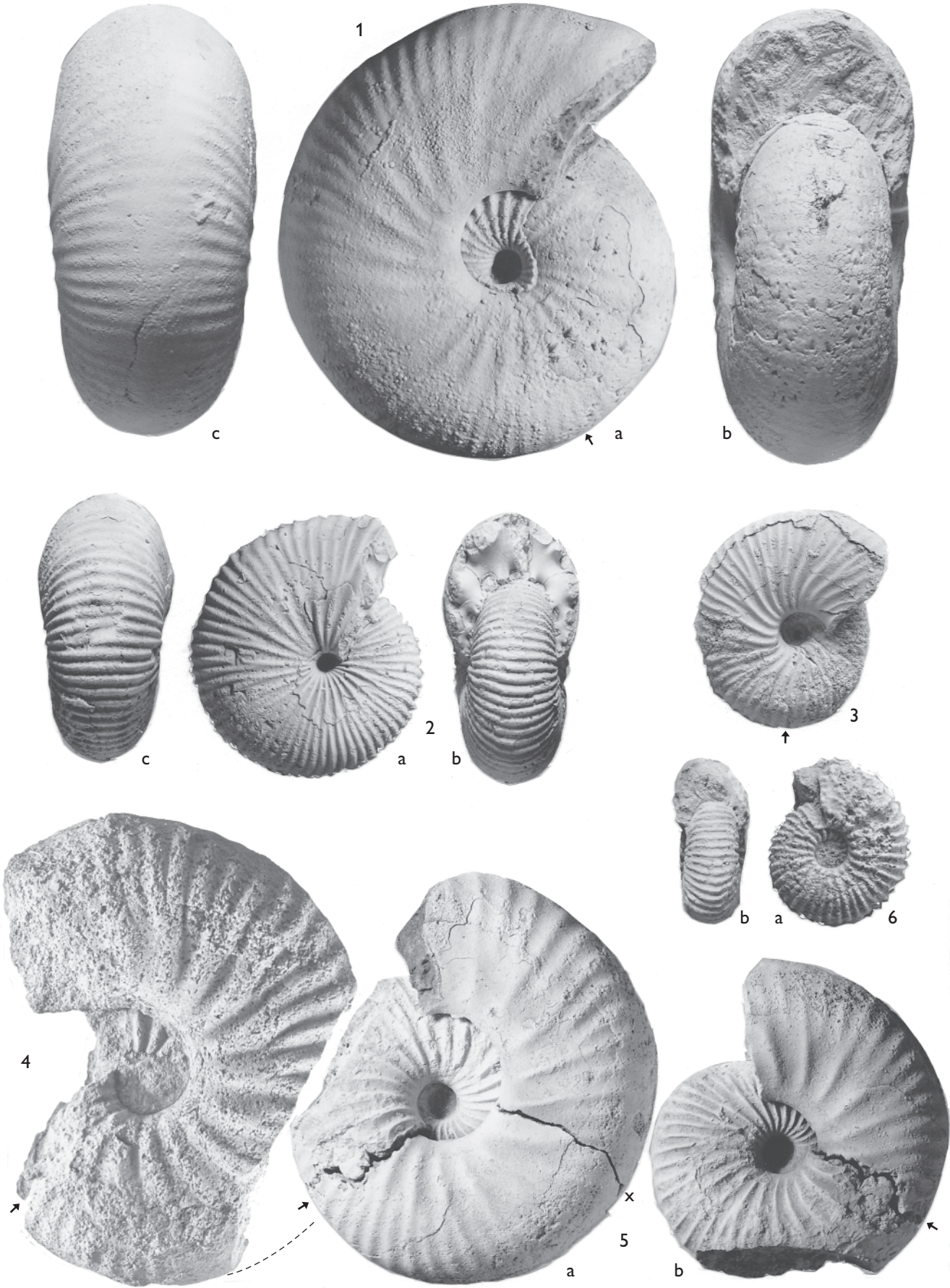
**Fig. 3:** JHC 4170, [m].

Figs 4–6. *Cranocephalites furcatus* Spath 1932, faunal horizon Po-9.

**Fig. 4:** MGUH 9191, holotype [M], A. Rosenkrantz 1926 collection. Hjørnefeldet, central Jameson Land; figured in Spath (1932, plate 6, fig. 1).

**Fig. 5a, b:** JHC 4172 [M], Centralbjerg, section 35, bed 5, topotype (?); outer body chamber removed in 5b (from **x** in 5a) to show inner whorls.

**Fig. 6a, b:** JHC 4181, [m], Centralbjerg, section 35, bed 5.



**Plate 12 Pompeckji Standard Zone, Carlsbergensis Subzone,  
faunal horizons Po-9, Po-11**

**Central and northern Jameson Land**

Figs 1–4. *Cranocephalites furcatus* Spath 1932, horizon Po-9, [M].

**Fig. 1a, b:** JHC 1782, Centralbjerg, section 34, bed 2, extremely inflated variant.

**Fig. 2a, b:** GGU 118729c, R.G. Bromley collection 1969, 'Depot Elv, S of Olympen' (west of Centralbjerg, central Jameson Land), showing the characteristic subquadrate whorls-section and mid-ventral fading of the ribbing.

**Fig. 3:** GGU 101081, T. Birkelund and S. Perch-Nielsen 1968 collection, Mikael Bjerg, section 29.

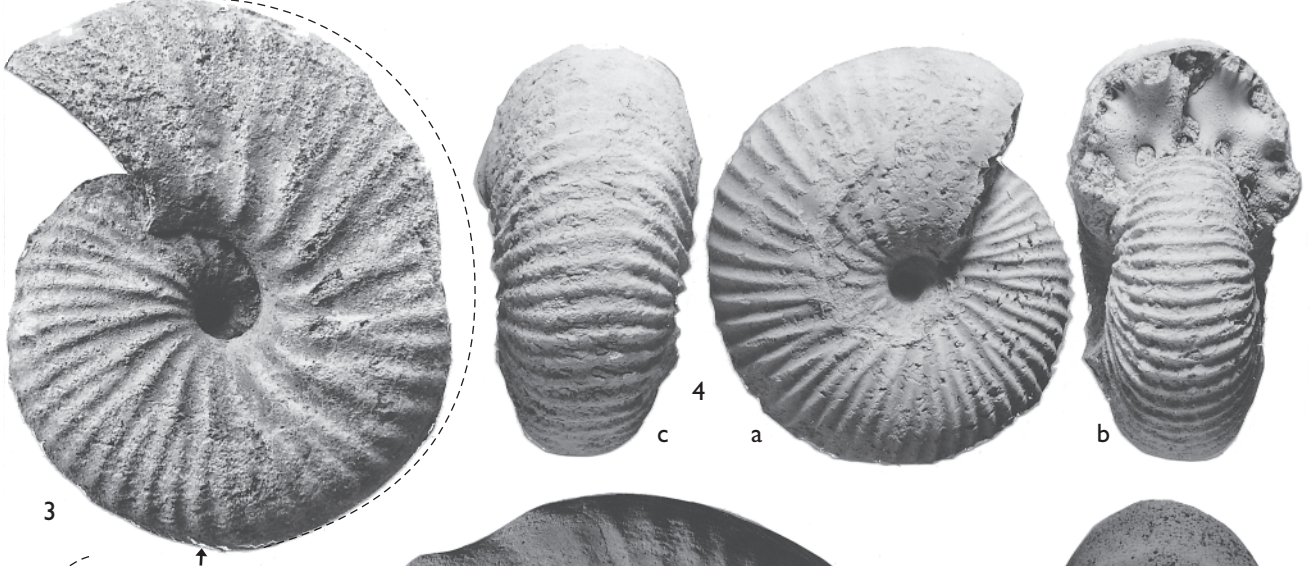
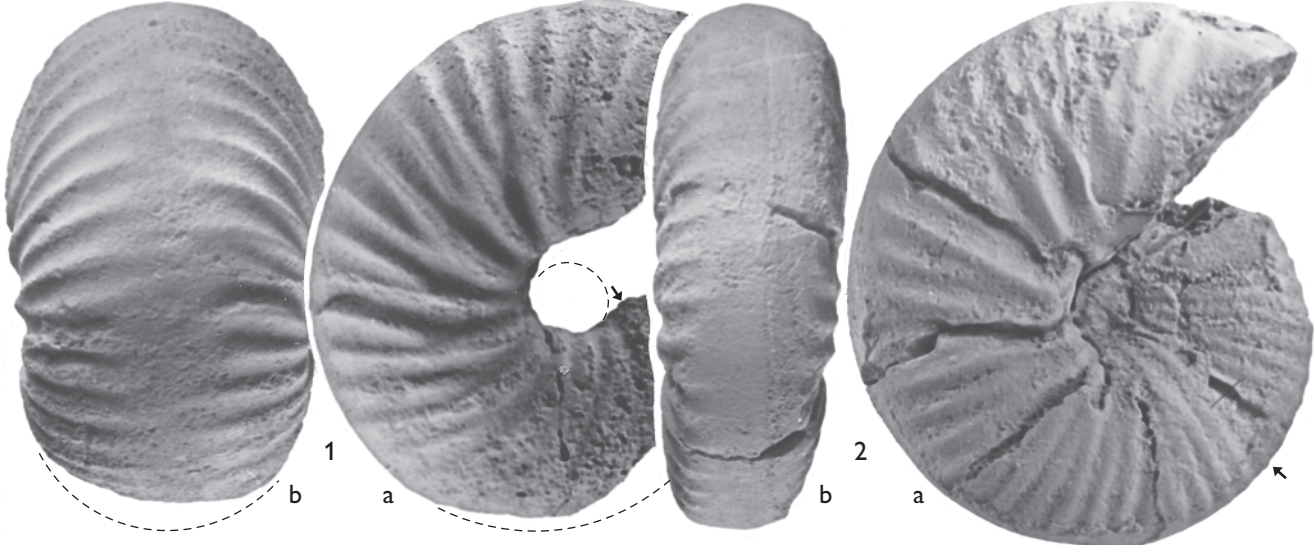
**Fig. 4a–c:** JHC 4175, Centralbjerg, section 35, bed 5, phragmocone of a large variant.

Figs 5, 6. *Cranocephalites carlsbergensis sensu stricto*, trans  $\beta$ , horizon Po-11, topotypes, Trefjord Bjerg, northern Jameson Land.

**Fig. 5a, b:** GGU 139128, T. Birkelund and C. Heinberg 1974 collection, section 39a, bed 25, a compressed, fine-ribbed variant.

**Fig. 6:** JHC 1745, section 39b, bed 11 (Fig. 29; same horizon as bed 25 in section 39a), a naturally broken, typical variant showing the inner whorls in cross-section.





**Plate 13 Pompeckji Standard Zone, Carlsbergensis Subzone, faunal horizon Po-11**

**Carlsberg Fjord, Trefjord Bjerg, Pelion Formation**

Figs 1–5. *Cranoccephalites carlsbergensis sensu stricto*, trans  $\beta$ , Trefjord Bjerg, section 39b, bed 11 (Fig. 29).

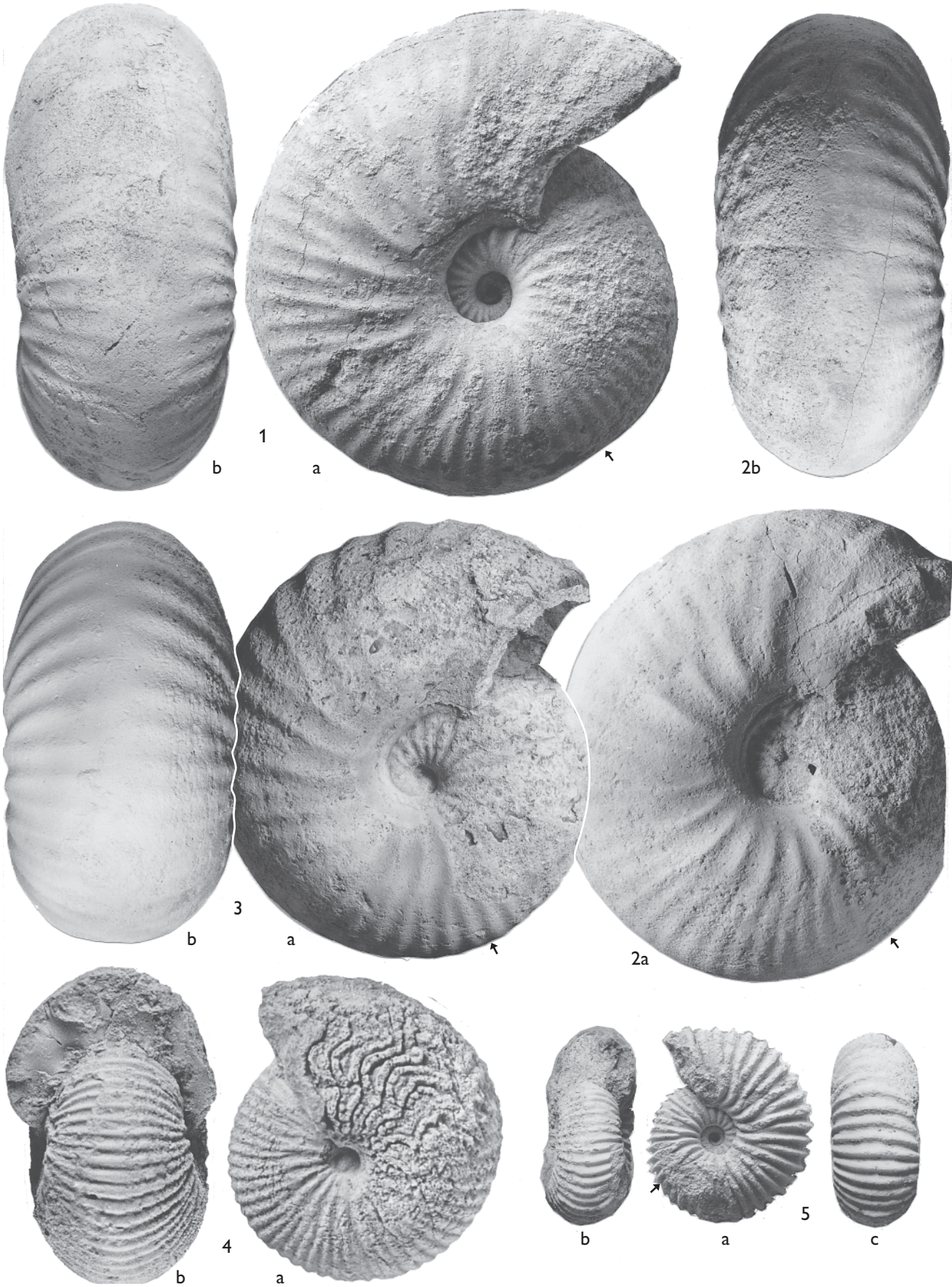
**Fig. 1a, b:** JHC 1754, paratype I.

**Fig. 2a, b:** JHC 1737, topotype, showing the peristomal broad constriction.

**Fig. 3a, b:** JHC 1731, topotype, smaller, more inflated and coarsely ribbed than average.

**Fig. 4a, b:** JHC 1741, topotype, septate inner whorls.

**Fig. 5a–c:** JHC 1768, allotype, [m].



**Plate 14 Pompeckji Standard Zone, Carlsbergensis Subzone,  
faunal horizons Po-13, Po-15**

**Ugleelv, Fossilbjerget Formation, Fb-1**

Figs 1–4. *Cranocephalites tvaerdalensis* Alsen 2015, [M], horizon Po-13. See also Appendix 1.

**Figs 1a, b:** JHC 6088, JHC 6093, Katedralen, section D4, bed 12b (Fig. 23).

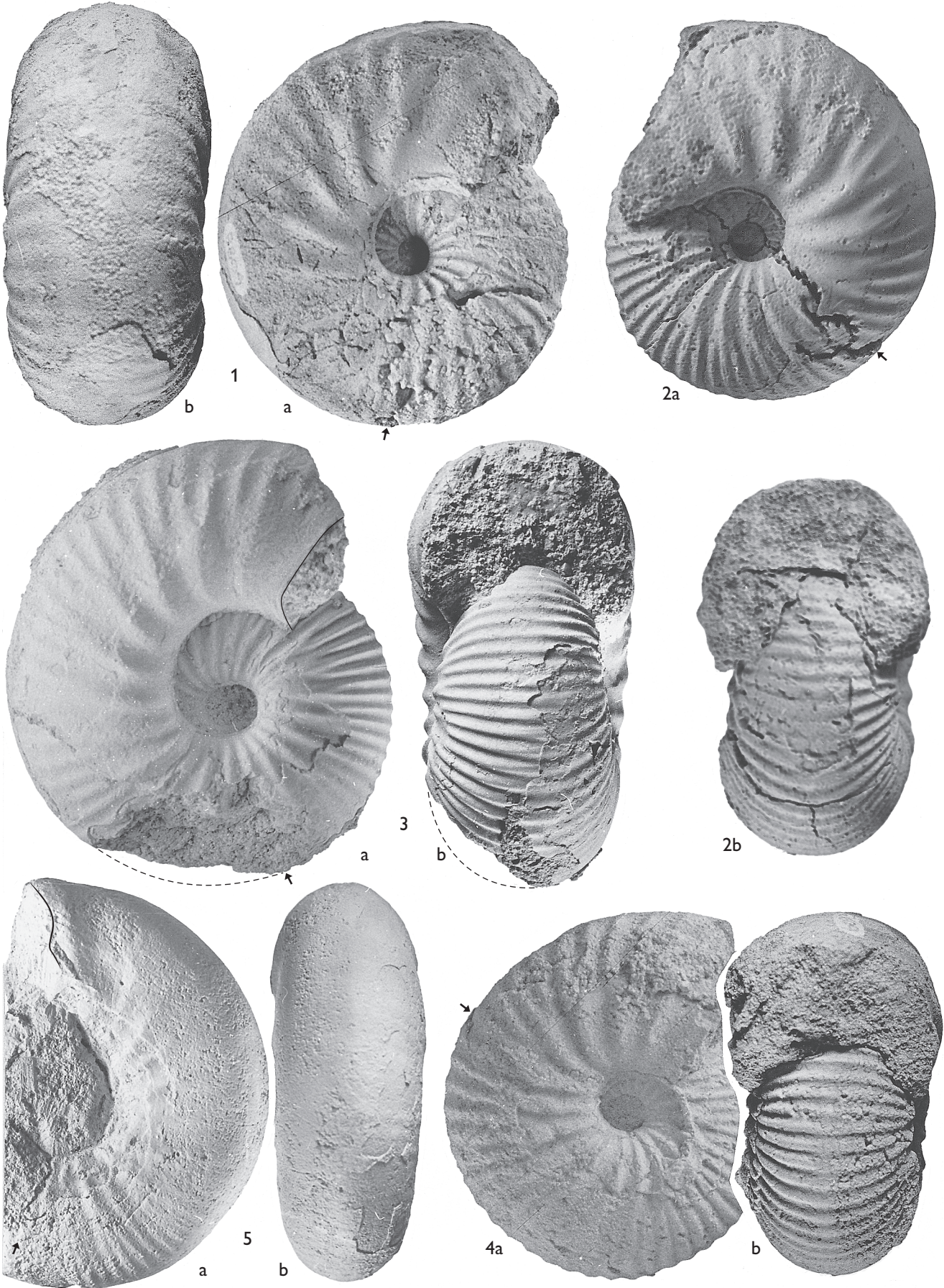
**Fig. 2a, b:** JHC 4152, Katedralen, section D5, loose.

**Fig. 3a, b:** CASP 5098, topotype, Tværdal, Geographical Society Ø.

**Fig. 4a, b:** JHC 6093, Katedralen, section D4, bed 12b (Fig. 23).

Fig. 5. *Cranocephalites gracilis* Spath 1932 [M], horizon Po-15.

**Fig. 5a, b:** GGU 137963a, small variant, F. Surlyk 1970 collection, Katedralen, section D5, loose.



**Plate 15 Pompeckji Standard Zone, Gracilis Subzone, faunal horizons Po-15, Po-17**

**Ugleelv, Fossilbjerget Formation, Fb-1**

Figs 1–5. *Cranocephalites gracilis* Spath 1932 [M], horizon Po-15.

**Fig. 1a, b:** MGUH 9166, holotype, T.M. Harris 1926 collection, Katedralen, cleaned and refigured from Spath (1932, plate 3, fig. 1a, b).

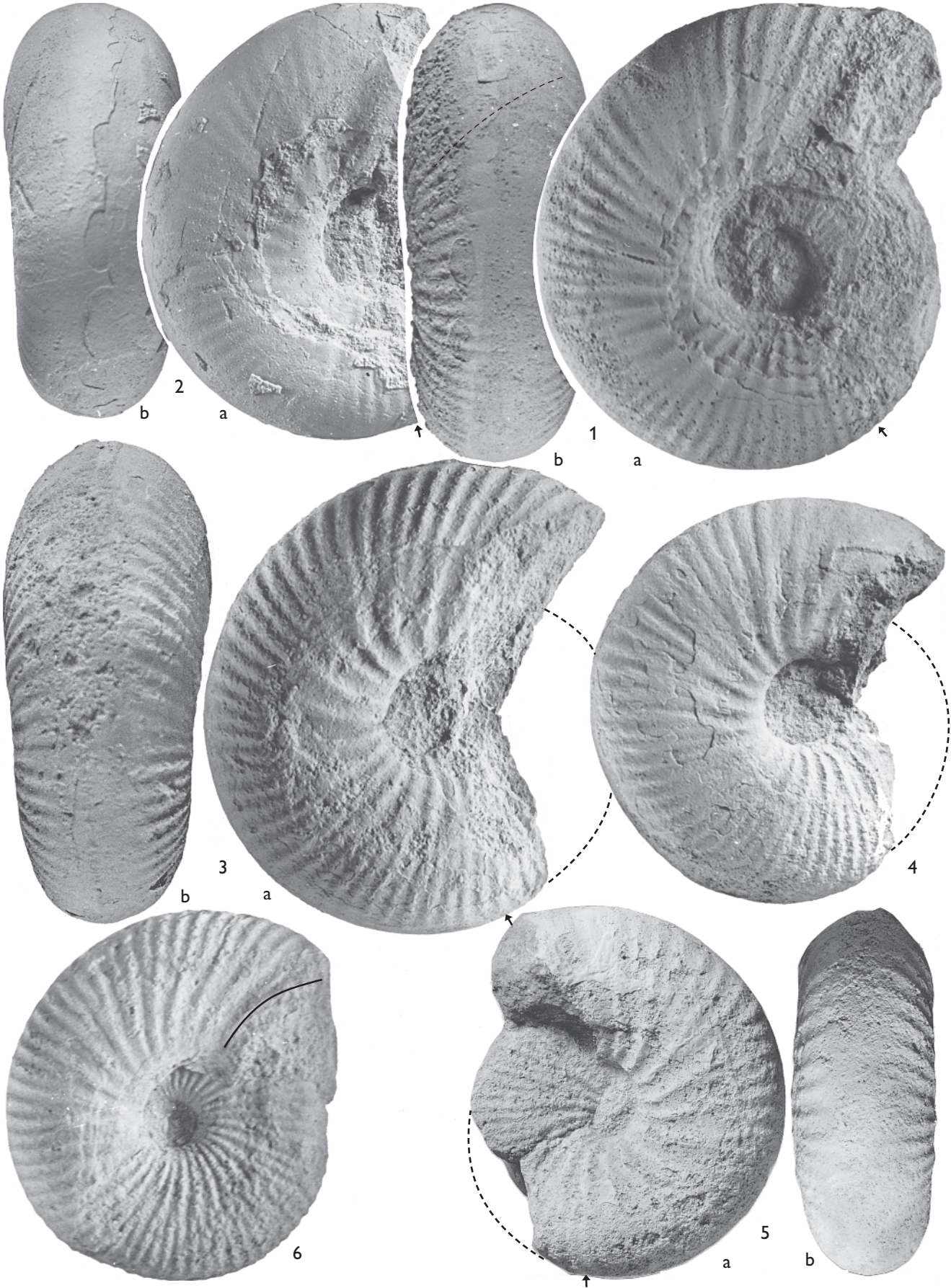
**Fig. 2a, b:** JHC 4147, topotype (?), closely resembling the holotype, Katedralen, section D5, loose.

**Fig. 3a, b:** JHC 6270, Ræveelv, section E3, bed 8 (Fig. 35B).

**Figs 4, 5a, b:** JHC 4049, JHC 4053, Katedralen, section D9, bed 19.

Fig. 6. *Cranocephalites transitorius* (Spath 1932) trans  $\alpha$  [M], horizon Po-17.

**Fig. 6:** JHC 6294, holotype, Ræveelv, section E3, bed 9b (Fig. 35B).



**Plate 16 Pompeckji Standard Zone, Gracilis Subzone, faunal horizons Po-12, Po-16**

**Ugleelv, Fossilbjerget Formation, Fb-1**

Figs 1–5. *Cranoecephalites* sp. aff. *gracilis* Spath 1932, [M] (*U-9*), faunal horizon Po-16, Katedralen, section D1, bed 6.

**Fig. 1a, b:** JHC 1339.

**Fig. 2a, b:** JHC 1328, primary representative specimen (*U-9*).

**Fig. 3a, b:** JHC 1351.

**Fig. 4a, b:** JHC 1350.

**Fig. 5a, b:** JHC 1340, secondary representative specimen (*U-9*).

Fig. 6. *Cranoecephalites carlsbergensis* trans  $\gamma$ , [M], horizon Po-12, section B1, bed 27 (Fig. 18).

**Fig. 6a–c:** JHC 1275, wholly septate. (Compare with Plate 13, fig. 4 of horizon Po-11, *C. carlsbergensis*  $\beta$ ).





**Plate 17 Pompeckji Standard Zone, Gracilis Subzone, faunal horizons Po-18, Po-19**

**Ugleelv, Fossilbjerget Formation, Fb-1**

Figs 1–3. *Cranocephalites transitorius* (Spath 1932) *sensu stricto*, trans  $\beta$ , [M], horizon Po-18.

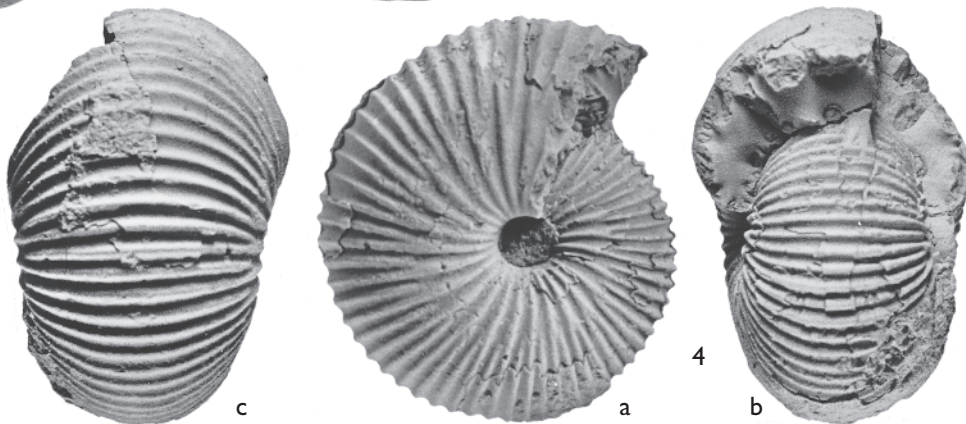
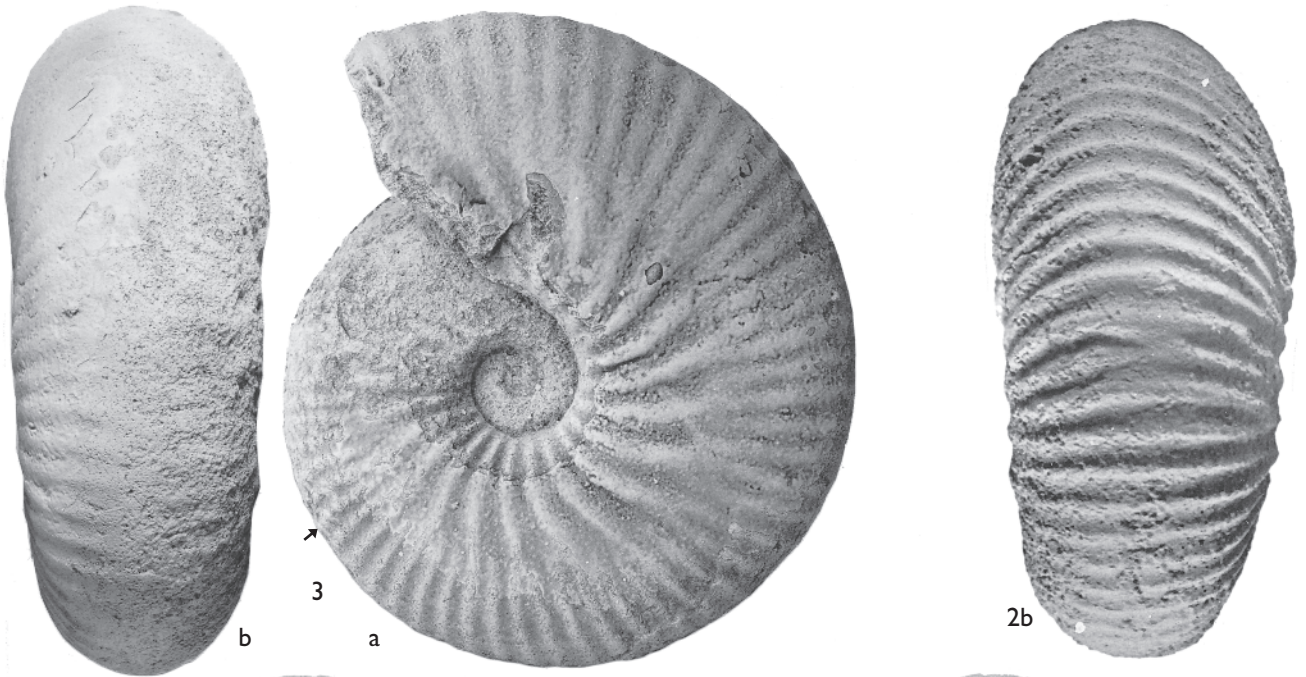
**Fig. 1a, b:** JHC 4050, section D9, bed 19.

**Fig. 2a, b:** MGUH 9170, holotype of *Cranocephalites maculatus* var. *transitoria* Spath 1932 (refigured from Spath 1932, plate 3, fig. 6a, b.)

**Fig. 3a, b:** JHC 4039, Katedralen, section D9, bed 19, variant with smooth venter.

Fig. 4. *Cranocephalites maculatus* Spath 1932 [M], horizon Po-19.

**Fig. 4a–c:** JHC 6219, Katedralen, section D5, bed 5 (Fig. 24), wholly septate inner whorls.



**Plate 18 Pompeckji Standard Zone, Gracilis–Episcopalis Subzones,  
faunal horizons Po-19 – Po-21**

Figs 1, 2. *Cranocephalites maculatus* Spath 1932, [M], horizon Po-19.

**Fig. 1a, b:** MGUH 9154, holotype. T.M. Harris 1926 collection, Katedralen, figured by Spath (cleaned and refigured from Spath 1932, plate 1, fig. 1a, b), umbilicus since developed.

**Fig. 2a, b:** GGU 137957a, F. Surlyk 1970 collection, Katedralen, section D5, loose.

Figs 3, 4. *Cranocephalites ornatus* (Spath 1932), [M], horizon Po-20.

**Fig. 3a, b:** MGUH 9165, holotype of *Cranocephalites gracilis* var. *ornata* Spath 1932 (cleaned and refigured from Spath 1932, plate 2, fig. 6a, b), umbilicus since developed, T.M. Harris 1926 collection, Katedralen,

**Fig. 4:** JHC 5147, Katedralen, section D8, bed 18 (Fig. 25).

(For another specimen, see Plate 20, fig. 4a, b).

Fig. 5. *Cranocephalites episcopalis* sp. nov. *sensu stricto*, trans  $\alpha$ , [M], horizon Po-21.

**Fig. 5a, b:** JHC 4185, Pelion, northern Jameson Land, section 58, bed 35, Pelion Formation. A small adult variant.

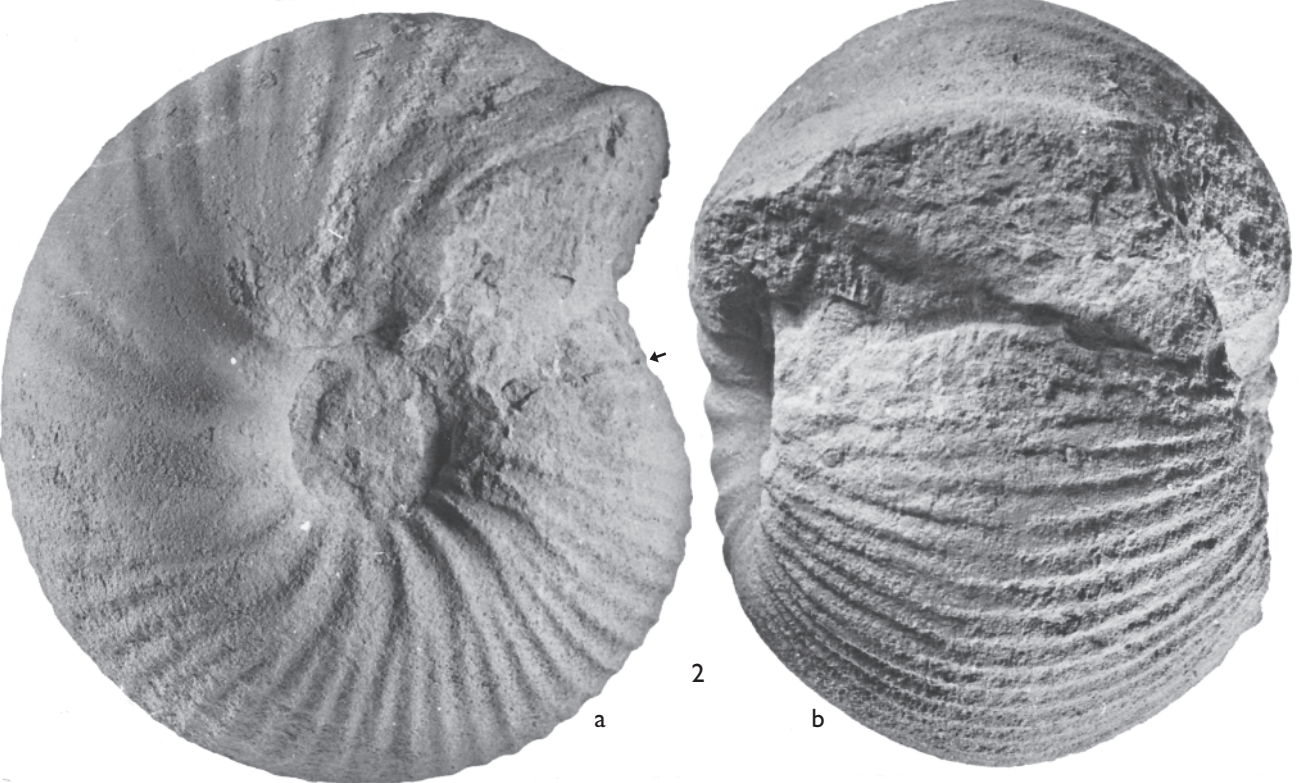
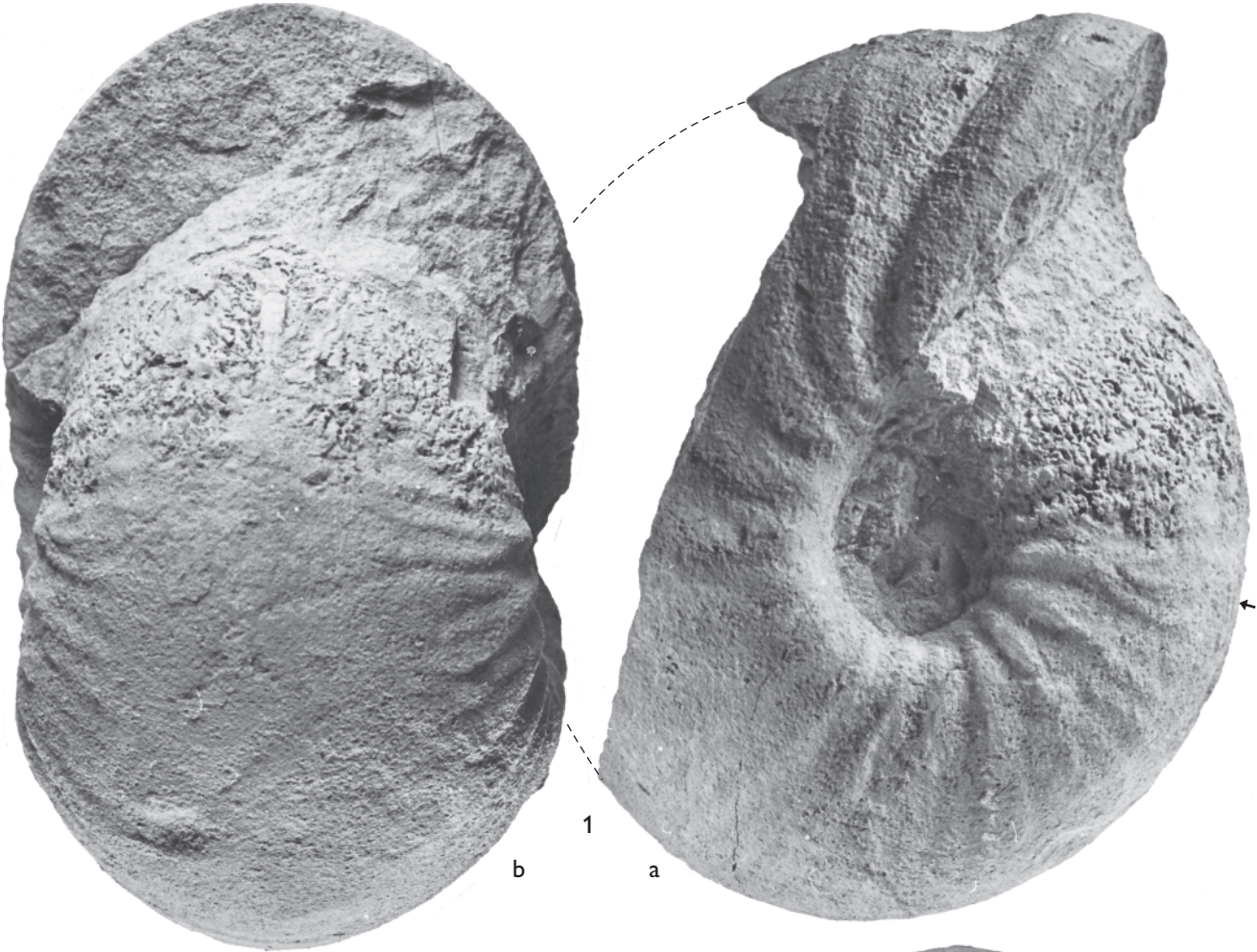


## Plate 19 Pompeckji Standard Zone, Episcopalis Subzone, faunal horizon Po-21

Figs 1, 2. *Cranocephalites episcopalis* sp. nov. *sensu stricto*, trans  $\alpha$ , [M], horizon Po-21.

**Fig. 1a, b:** JHC 4091, Katedralen, section D9, bed 22, Fossilbjerget Formation, Fb-I. Very large variant, ribbing fading.

**Fig. 2a, b:** FS-91, F. Surlyk 1991 collection, Pelion, northern Jameson Land, section 58, bed 35, Pelion Formation. A large, inflated variant retaining strong ribbing; for other ventral view, see Plate 20, fig. 3. (For an example at the other extreme of variability, see Plate 18, fig. 5).



## Plate 20 Pompeckji Standard Zone, faunal horizons Po-20, Po-21

Figs 1–3. *Cranocephalites episcopalis* sp. nov. *sensu stricto*, trans  $\alpha$ , [M], horizon Po-21.

**Fig. 1:** JHC 4061, holotype, Katedralen, section D9, bed 22, Fossilbjerget Formation, Fb-1.

**Fig. 2a, b:** JHC 4188, Pelion, section 58, bed 35, Pelion Formation; wholly septate.

**Fig. 3:** FS-91, F. Surlyk 1991 collection, Pelion, northern Jameson Land, section 58, bed 35, Pelion Formation. Ventral view of specimen also figured in Plate 19, fig. 2.

Fig. 4. *Cranocephalites ornatus* (Spath 1932) [M], horizon Po-20.

**Fig. 4a, b:** JHC 5153, Katedralen, section D8, bed 18 (Fig. 25).



