A NEW CARINATE PHYLLOCERATID AMMONITE FROM THE EARLY ALBIAN (CRETACEOUS) OF ZULULAND, SOUTH AFRICA

by H. C. KLINGER, J. WIEDMANN *and* W. J. KENNEDY

ABSTRACT. The early Albian sediments of Zululand yield abundant specimens of a keeled phylloceratid, *Carinophylloceras collignoni* gen. et sp. nov., superfically homeomorphous with the desmoceratid *Damesites*. Investigation of the suture line confirms the phylloceratid affinities of the genus, which is an independent Cretaceous relative of the *P.* (*Hypophylloceras*) *velledae* (d'Orbigny) group, and unrelated to the keeled Jurassic phylloceratids *Harpophylloceras* Spath, 1927 and *Meneghiniceras* Hyatt, 1900.

THE early Albian deposits of Zululand (Kennedy and Klinger 1972, 1974) yield rich ammonite faunas consisting of abundant douvilleiceratids, *Lyelliceras lyelli* (d'Orbigny), *L. pseudolyelli* (Parona and Bonarelli), *Neosilesites*, *Phylloceras* (*Hypophylloceras*) '*Beaudanticeras*', '*Cleoniceras*', and '*Sonneratia*' species, *Rosallites*, *Ammonoceratites*, abundant *Anagaudryceras sacya* (Forbes), *Eubrancoceras* aff. *aegoceratoides* (Steinmann), and *Oxytropidoceras* species. Accompanying this assemblage are abundant specimens of a keeled oxyconic ammonite resembling the desmoceratid genus *Damesites* Matsumoto, 1942, and referred to as such in a previous publication (Kennedy and Klinger 1975).

Subsequent investigation of the external and internal suture of this form revealed it to be more appropriately referable to the ammonite subfamily Phylloceratinae, as a new genus and species, *Carinophylloceras collignoni*.

Location of specimens. The following abbreviations indicate repositories of specimens:

SAS—South African Geological Survey Collections, Pretoria.
UPE—University of Pretoria (Boschoff Collection).
BMNH—British Museum (Natural History).

Full details of locality numbers cited are given by Kennedy and Klinger (1975).

SYSTEMATIC DESCRIPTION

Subclass AMMONOIDEA Zittel, 1884
Order PHYLLOCERATIDA Arkell, 1950
Superfamily PHYLLOCERATACEAE Zittel, 1884
Family PHYLLOCERATIDAE Zittel, 1884
Subfamily PHYLLOCERATINAE Zittel, 1884
Genus CARINOPHYLLOCERAS gen. nov.

Type species. Carinophylloceras collignoni gen. et sp. nov.

Diagnosis. Phylloceratid ammonites with fastigate to distinctly keeled venters. Whorl section ovoid, higher than wide, with maximum width at umbilical margin;

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narrowly umbilicated. Ornament typically phylloceratid, consisting of biconcave striae. Suture phylloid, with lituid I, trifid L, saddles E/L asymmetrically diphyllic, L/U_2 asymmetrically tetraphyllic. Saddles in U_3 asymmetrically diphyllic.

Carinophylloceras collignoni sp. nov.

Plate 76, fig. 1*a–b*; Plate 77, figs. 1–3; text-figs. 1–3

Derivation of name. The species is named for General Maurice Collignon.

Holotype. SAS A1577 from the Mzinene Formation, Stream Cliff section along the Mzinene River 1200 m NE. of the Farm Amatis, north of Hluhluwe, Zululand, South Africa, 27° 58′ 03″ S., 32° 18′ 34″ E. Locality 35 of Kennedy and Klinger (1974).

Paratypes. Thirty-nine specimens: SAS UMS/2, SAS A1133, and BMNH C78639, C78644, C78647–C78648, C78767, C78769, C78770 from Locality 35, on the Mzinene River; BMNH C78640–C78643, C78645–C78646, C78651, C78768 from Locality 36, also on the Mzinene River. SAS H 93D/1, SAS H 93/1, SAS H93/2, SAS H93/3, SAS H 93/5 from Locality 142, Nxala Estate, southern part of Mkuze Game Reserve, Zululand. SAS EM 91, SAS EM 92, SAS EM 77 from the Msunduzi Pan at 26° 57′ 25″ S., 32° 12′ 40″ E.; UPE B 33 from the same area at 26° 57′ 10″ S., 32° 12′ 45″ E. SAS EM 245a, b, c, SAS EM 93, SAS EM 244, SAS EM 114 from the Ndumu region, northern Zululand at 26° 55′ 55″ S., 32° 12′ 55″ E. SAS LJE 134A, UPE B 463, UPE B 464, UPE B 411, and BMNH C78649–C78650 from Locality 174; BMNH C78766 and C78771 from Locality 171, Mlambongwenya Spruit, northern Zululand. UPE B 23 from Aloe Flats Estate, northern Zululand at 26° 59′ 50″ S., 32° 11′ 50″ E.

All specimens are from the Mzinene Formation of late early Albian age, Albian III of Kennedy and Klinger (1975).

Dimensions. All measurements are in millimetres; figures in parentheses are percentages of total diameter. D = diameter, Wb = whorl breadth, Wh = whorl height, U = umbilical diameter.

	Specimen	D	Wb	Wh	Wb/Wh	U
Holotype	SAS A1577	149	60·5(41)	88·5(59)	0·68	8·5(6)
Paratypes	SAS EM24c	123·5	44·5(36)	68·0(55)	0·65	8·0(6·5)
	SAS H98/1	77·5	32·5(41)	44·5(58)	0·73	6·0(8)
	SAS H93/3	108	40·5(37)	63·5(58)	0·64	7·5(7)
	SAS UMS/2	132·5	47·0(36)	77·5(58)	0·60	9·0(6·8)

Description. Coiling is moderately involute with a narrow funnel-shaped umbilicus (6–8% of diameter). Whorl section is subtrigonal with a fastigate to distinctly keeled venter. Maximum width is at the umbilical edge. In juvenile stages the venter is fastigate, but in the adult a distinct keel is developed. The keel is of the floored type, and, depending on the mode of preservation, may either be present or absent on internal moulds.

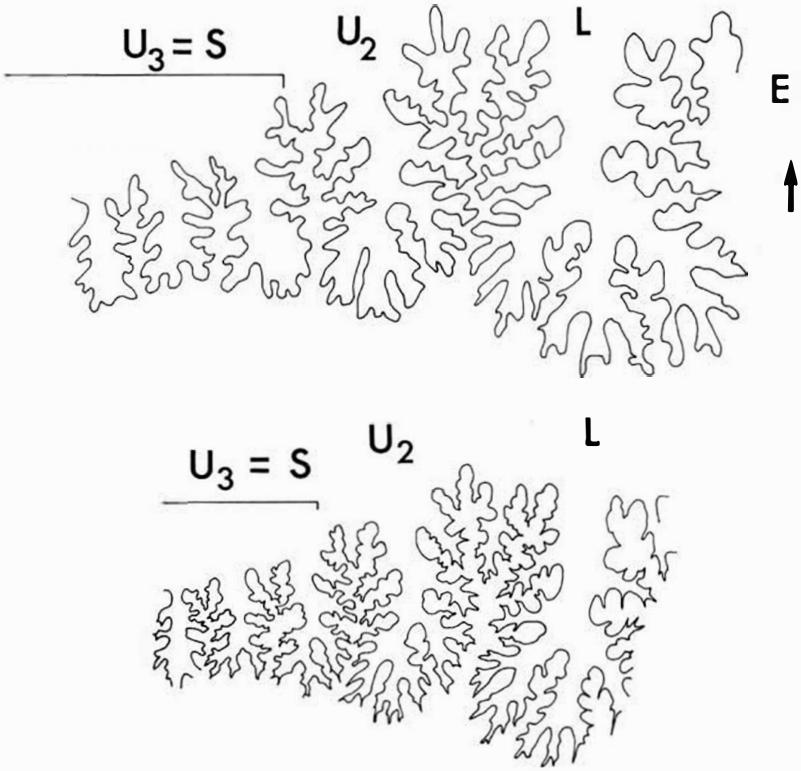
Ornament consists of pronounced biconcave striae which arise at the umbilical wall, are bent forwards at first, then sweep gently backward near the middle of the flanks, finally being strongly projected on the outer part of the flanks. They are bundled at their origin, and much stronger on the outer part of the whorls and venter, producing a chevron-like ventro-lateral and ventral ornament. On internal moulds the ornamentation is still present, though very much subdued.

Suture line as for genus. Auxiliary saddles in U_3 are triphyllic.

EXPLANATION OF PLATE 76

Fig. 1*a–b*. *Carinophylloceras collignoni* gen. et sp. nov. Holotype, SAS A1577.

KLINGER *et al.*, *Carinophylloceras*



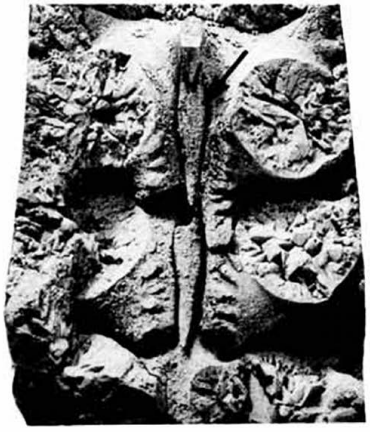
TEXT-FIG. 1. Sutures of *Carinophylloceras collignoni* gen. et sp. nov. *a*, external suture of UPE B464, ×2. *b*, external suture of UPE B33, ×2.

Discussion. In the description of the stratigraphy of Natal and Zululand (Kennedy and Klinger 1975), the present specimens were referred to the desmoceratid genus *Damesites* because of the presence of a ventral keel. Homeomorphy with *Damesites* is, indeed, very close. Not only the whorl section and the presence and shape of the keel, but also the degree of shell involution, the course of the ornamentation, and even the external suture line show such similarities that the genera can scarcely be distinguished. Examination of the suture line, especially the internal part, reveals that

EXPLANATION OF PLATE 77

Figs. 1–3. *Carinophylloceras collignoni* gen. et sp. nov. 1*a–b*, paratype BMNH C78644, showing details of ornament and keel and deep lituid internal lobe in section (arrowed). 2, paratype SAS EM 114, showing lituid internal lobe, ×2. 3*a–b*, paratype BMNH C78768, showing juvenile ornament and fastigate venter.

1a 1b



2

3a

3b

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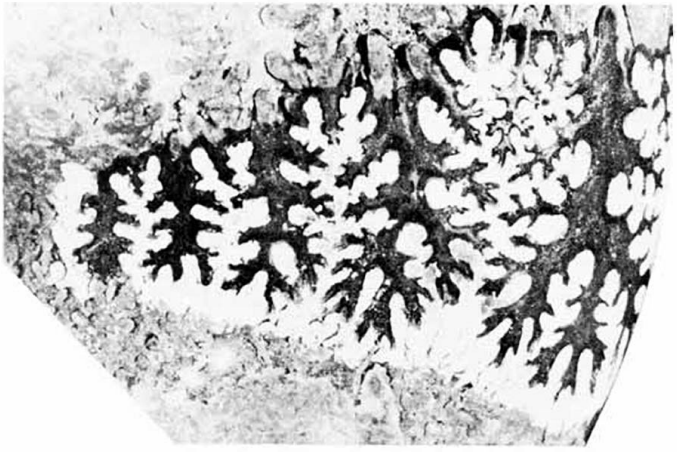
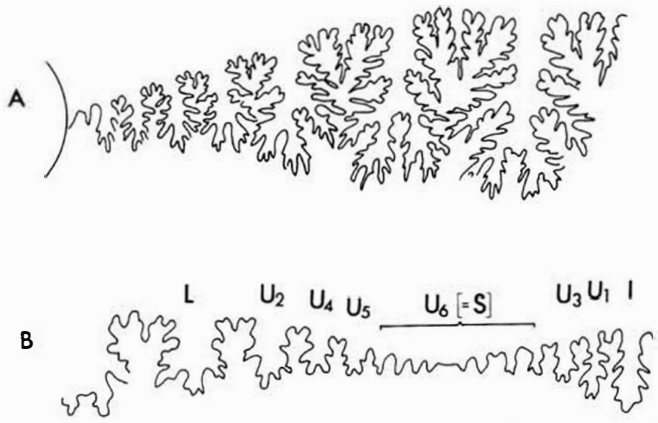


TEXT-FIG. 2. *Carinophylloceras collignoni* gen. et sp. nov. External suture of UPE B33, ×2.

TEXT-FIG. 3. *Carinophylloceras collignoni* gen. et sp. nov. Internal sutures of SAS EM114, showing overlapping lituid lobes, ×12·5.

it is typically phylloid with a lituid internal lobe, characteristic of all phylloceratinids (Wiedmann 1968, p. 115; Kullmann and Wiedmann 1970, pp. 11–14). The internal lobe of *Damesites* as figured by Matsumoto (1954, fig. 11, reproduced here as text-fig. 4*b*), is intensively frilled, and of desmoceratid type; indeed, no desmoceratids known possess a lituid internal lobe. Text-fig. 4 shows *Damesites* sutures for comparative purposes.



TEXT-FIG. 4. *a*, external suture lines of *Damesites damesi* (Jimbo), after Matsumoto 1954, fig. 10. ×4. *b*. external and internal sutures of a juvenile *D. damesi* at D = 8·5 mm. After Matsumoto 1954, fig. 11.

Keeled phylloceratids occur in the Jurassic, i.e. *Harpophylloceras* Spath, 1927 and *Meneghenicerias* Hyatt, 1900. There are, however, no Cretaceous taxa referable to these genera and affinities of *Carinophylloceras* with these forms may be ruled out.

The suture line of *Carinophylloceras*, with an asymmetrical diphyllic saddle E/L and asymmetrical tetraphyllic L/U_2, the ornamentation, degree of evolution, and to a lesser extent whorl section point to affinities with the Albian/Cenomanian *Phylloceras* (*Hypophylloceras*) *velledae* (sensu Wiedmann 1964), and to the Albian/Aptian *Ph.* (*H.*) *cypris cypris* Fallot and Termier (Wiedmann 1964, fig. 50, pl. 13, fig. 3, etc.). Apart from the keel, the whorl section is intermediate between *Ph.* (*H.*) *velledae velledae* and *Ph.* (*H.*) *velledae morelianum*. The presence of a keel, however, clearly separates *Carinophylloceras collignoni* from these forms.

It is interesting to note that within the Tetragonitaceae an analogous development of a keel occurs in *Carinites* Wiedmann, 1973, thus also mimicking a desmoceratid exterior to a certain extent.

Carinophylloceras provides a further example of homeomorphy within the Ammonoidea, and demonstrates how consideration of the sutural formula can clarify relationships which are obscure when only external features are taken into account.

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