

The heteromorph ammonite *Ndumuiceras variable* gen. et sp. nov. from the Albian Mzinene Formation, KwaZulu-Natal, South Africa

William James Kennedy

Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW, U.K.
E-mail: jim.kennedy@oum.ox.ac.uk

&

Herbert Christian Klinger

Natural History Collections Department, Iziko South African Museum, P.O. Box 61, Cape Town 8000 South Africa,
and

Department of Geological Sciences University of Cape Town, Private Bag, Rondebosch, 7701 South Africa.
E-mail: hklinger@iziko.org.za

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Four specimens of a micromorphic heteromorph ammonite, one from the Lower Albian Mzinene Formation in the vicinity of Ndumu, and three from the basal Middle Albian Mzinene Formation in the Mkuze Game Reserve of KwaZulu-Natal are referred to the new genus and species *Ndumuiceras variable*. Its general appearance suggests affinities with the crioceratitid representatives of the superfamily Ancyloceratoidea Gill, 1871, but the suture line points to affinities with the superfamily Turrititoidea Gill, 1871.

Key words: heteromorph, ammonite, Albian, Mzinene Formation, KwaZulu-Natal.

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INTRODUCTION

During the course of routine curation of our collections, four minute, crioconic to aspinoceratid-coiled heteromorphic ammonites from the Lower and basal Middle Albian of KwaZulu-Natal were discovered. In general appearance they seem to be minute ancyloceratids, but on closer examination, especially of the suture line, they appear more closely related to hamitid or anisoceratid genera of the family Anisoceratidae. They are here referred to a new genus and species and provisionally included in the family Anisoceratidae.

LOCALITY DATA AND REPOSITORIES OF SPECIMENS

Details of field localities are given in Kennedy & Klinger (1975). The catalogue number prefixes OUM and SAM refer respectively to collections housed in the Oxford University Museum of Natural History and the Natural History Collections Department, Iziko South African Museum.

SYSTEMATIC PALAEOLOGY

SUBORDER ANCYLOCERATINA Wiedmann, 1966
SUPERFAMILY TURRILITOIDEA Gill, 1871
?Family ANISOCERATIDAE Hyatt, 1900

Ndumuiceras gen. nov.

Type species

Ndumuiceras variable gen. et sp. nov.

Derivation of name

From Ndumu in northern KwaZulu-Natal (Zululand), South Africa.

Diagnosis

Shell small, coiling crioconic to aspinoceratid, whorls barely separated, possibly dimorphic. Phragmocone whorls with coarse, straight, recti- to prorsiradiate primary ribs

that bear spinose inner lateral and ventral tubercles. Body chamber with flexuous primary ribs, inner ventrolateral tubercles lost, outer ventrolateral tubercles persist, linked across venter by broad, transverse rib. Suture with large, bifid (A) lobe *sensu* Korn *et al.* (2003) (= L of Kullmann & Wiedmann 1970).

Occurrence

Mzinene Formation, Lower Albian *Tegoceras cammatteanum* fauna and basal Middle Albian *Lyelliceras lyelli* fauna, KwaZulu-Natal.

Ndumuiceras variable sp. nov.

Fig. 1

Types

The holotype is OUM KX9940 (Fig. 1A–D) from the Mzinene Formation, Lower Albian, *Tegoceras cammatteanum* fauna, locality 175 of Kennedy & Klinger (1975), SW of Ndumu, northern KwaZulu-Natal. Paratypes are SAM-PCZ 22283–22285 (ex H80/18, H80/15, H80/3) (Fig. 1E–H), all from loose concretions, but judging by their preservation, from the basal Middle Albian *Lyelliceras lyelli* fauna of locality 154 of Kennedy & Klinger (1975), Mkuze Game Reserve, northern KwaZulu-Natal.

Description

The holotype (Fig. 1A–D) is a slowly expanding criocone, the whorls barely separated, with a maximum preserved diameter of 36 mm. The apertural 120° sector of the shell is well preserved, retaining replaced shell. The greater part of the outer whorl is badly damaged, except for the apertural end where a short whorl section is well preserved. There are four relatively coarse, straight, prorsiradiate ribs on this section, with short, spinose, inner flank tubercles and stronger, ventral spines. The tips of the ventral spines are barely separated from the dorsum of the succeeding whorl. The damaged section of the whorl preserves indications of the presence of these spines in places to a shell diameter of 25 mm. The final 90° sector of the outer whorl appears to be, in part at least, body chamber. The whorl section is compressed, with a feebly convex dorsum, broadly rounded inner flanks, and convergent outer flanks, the ventrolateral shoulders narrowly rounded and the venter feebly convex in intercostal section. The rib index is eight. The ribs are reduced to mere striae on the dorsum, strengthen across the dorsolateral margin, and are of variable strength on the flanks, straight and prorsiradiate on the inner flank, flexed back and feebly convex on the mid-flank region, and flexed forwards and feebly concave on the outer flank. A feeble effaced lateral bulla is present on the second rib from the apical end of the fragment, but is thereafter lost. All ribs strengthen and are equal on the ventrolateral shoulder, and bear a small ventral clavus, the clavi on opposite ribs linked across the venter by a coarse, transverse rib.

Paratype PCZ 22284 (Fig. 1E,F,J,K) has a similar maximum diameter (37 mm.) to that of the holotype, but the coiling slightly aspinoceratid, with the apertural half whorl comprising the body chamber. The earliest preserved part of the phragmocone has distinct ventral clavi, but these are not as prominent as in the holotype, and the inner

flank tubercles are not as well-developed.

Paratype PCZ22285 (Fig. 1G,I) at 24 mm diameter appears to be a small adult, with distinct aspinoceratid coiling. The early part of the phragmocone is preserved at a whorl height of ca. 2 mm, and shows the same type of ornamentation as the holotype, albeit not as strongly developed. The body chamber occupies about half of the outer whorl, but in contrast to the holotype and paratype PCZ 22284, the ribs become more widely spaced and narrow, and the ventral tubercles become weak and eventually disappear at the apertural end of the outer whorl.

Paratype PCZ 22283 is still septate at a whorl height of 9.5 mm., and shows the same general type of ornament as that of the outer whorl of the holotype, but the ventral tubercles are not as well developed and the ribs are wider spaced. The suture shows a distinct, bifid adventive (A) lobe (Fig. 1H) and a smaller ?subtrifid umbilical (U) lobe.

Discussion

Even though we have only four specimens at our disposal, their general similarity in ornament indicates that we are dealing with but a single, variable species. It is possible that the small, aspinoceratid paratype (Fig. 1G,I) may represent a microconch, and the larger, crioceratid holotype and paratype (Fig. 1E,F,J,K) macroconchs.

The affinities of this new genus and species are enigmatic; even at superfamily level *sensu* Wright (1996). The coiling is reminiscent of some members of the subfamily Crioceratitinae Gill, 1871, of the superfamily Ancyloceratoidea Gill, 1871, while the ornament and suture line suggest affinities with the family Anisoceratidae Hyatt, 1900 of the superfamily Turrititoidea Gill, 1871.

The planispiral, but variable aspinoceratid and crioceratid coiling point to affinities with pre-Albian ancyloceratids. Amongst these, the only comparable genus is *Antarcticoceras* Thomson, 1974, specifically the type species *A. antarcticum* Thomson 1974 (p. 21, pl. 3, figs i–k, m, n) of probable early Albian age (but it may be older; see e.g. Aguirre-Urreta *et al.* 2007, p. 158) from southeastern Alexander Island, Antarctica. Thomson based this species on four definite and three possible specimens. These match our material both in size and in coiling. According to Thomson (1974, p. 21) the coiling is crioceratid, but may be aspinoceratid. That species, however, has distinct trituberculate ribbing, and the inner ventrolateral tubercles persist to a larger diameter than the inner lateral tubercles in our material. In addition, the suture has a distinct trifid adventive (A) lobe, in contrast to the distinctly bifid nature of that of *N. variable*. The Barremian *Antarcticoceras domeykanum* (Bayle & Coquand, 1851) is older than the present species, is much larger, with persistent inner and outer ventrolateral tubercle (see e.g. Aguirre-Urreta *et al.* 2007, fig. 8B,C) and is quite distinct from our material.

Similar small crioconic heteromorph ammonites belonging to the subfamily Leptoceratoidinae Thieuloy, 1966 (see Vašíček & Wiedmann 1994) bear some resemblance to *Ndumuiceras*, especially the genus *Karsteniceras* Royo y Gómez, 1945, but apart from the Barremian age, these have simplified suture lines and only have a single row of ventral tubercles.

We initially suspected that *Ndumuiceras variable* might

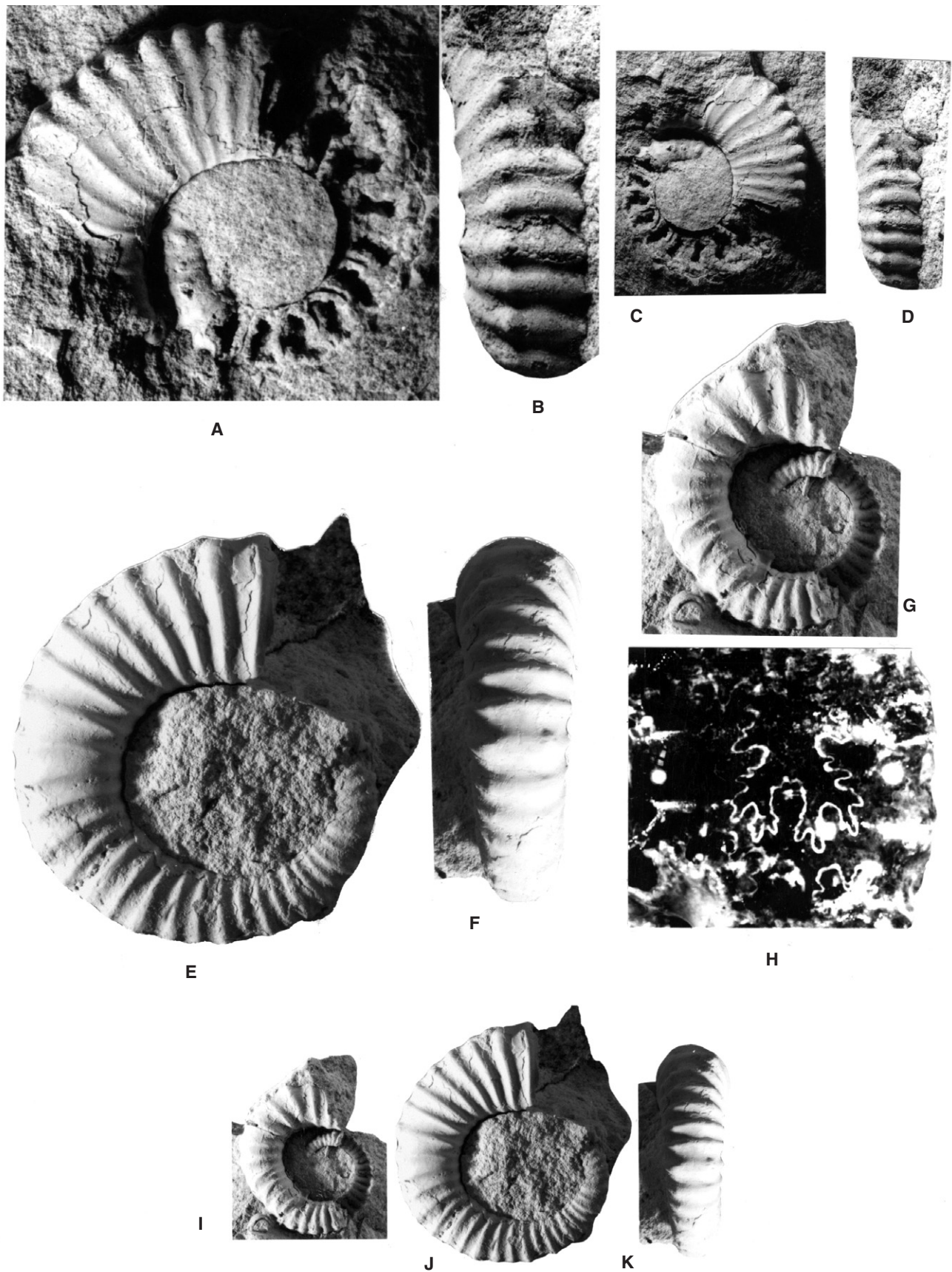


Fig. 1. *Ndumuiceras variable* gen. et sp. nov. **A–D**, The holotype, OUM-KX9940 from the Mzinene Formation, Lower Albian, *Tegoceras cammatteanum* fauna of locality 175. **E, F, J, K**, Paratype SAM-PCZ22284. **G, I**, Paratype SAM-PCZ22285; specimen with distinct aspinoceratid coiling. **H**, Partial suture of SAM-PCZ22283 to show distinct bifid adventive (A) lobe. A, B, E–G $\times 2$; C, D, I–K $\times 1$; H $\times 5$, approximately.

be related to the Labeceratidae, specifically the genera *Myloceras* Spath, 1925, and *Ellipsoceras* Collignon, 1950, and possibly ancestral to the former. Apart from the fact that the oldest representatives of *Myloceras*, *M. rotundum* Klinger, 1976 are much larger, with rounded whorl section and ventrolateral tuberculation only, the adventive lobe (A) is distinctly trifid, thus excluding that possible relationship. *Ellipsoceras* is similar in possessing ventral tubercles, but it also has a typical labeceratid suture line.

The Albian age, and bifid adventive (A) lobe of *Ndumuiceras* point rather to affinities with the superfamily Turrilitoidea, but none of the known genera matches our material. *Ndumuiceras* combines features of early hamitids and anisoceratids, specifically the genera *Eohamites* Monks, 2002 (type species *Hamites hybridus* Casey, 1961) and *Protanisoceras* Spath, 1923 (type species *Hamites raulinianus* d'Orbigny, 1842).

Eohamites hybridus (Casey 1961, p. 97, pl. 22, figs 1, 2a–c; text-figs 33d–f) has aspinoceratid coiling and incipient ventral tubercles, but is a much larger species and has a strongly asymmetrical subtrifid adventive (A) lobe. Species of *Protanisoceras* that may be compared with *Ndumuiceras* include *P. lardyi* (Pictet & Renevier, 1854) (see Casey 1961, p. 103, pl. 23, figs 5–6, text-figs 35a–c); *P. blancheti* (Pictet & Campiche, 1861) (see Casey 1961, p. 106, pl. 23, figs 8a,b; pl. 24, figs 7a–c, 8a–c, 9; text-figs 35d–i, 36c) and *P. vaucherianum* (Pictet, 1847) (see Casey 1961, p. 107, pl. 25, figs 7a–c, 8a–b; text-fig. 35m,n). All of these species are known only from fragments, but none match the crioceratid to aspinoceratid coiling and ontogenetic change in ornamentation of *Ndumuiceras*.

Spath (1930, p. 58, pl. 8, figs 14a–c) described and figured as *Protanisoceras* sp. ind. A, a specimen from Hazara, Pakistan with a single row of ventral tubercles. Unfortunately this material has never been re-examined, but judging by the faunal association, seems to be of similar age to that of locality 154. In our description of *Mkuzeiella andersoni* Klinger & Kennedy, 2008) we had already referred to the similarity between that species and the Hazara '*Metahamites*'

The genus *Aramacites* McKenzie, 1999, type species *Crioceras axonoides* Etheridge, 1909 (p. 150, pl. 32, fig. 4; pl. 44, fig. 1) from the early and middle Albian of the Artesian Basin of Australia is superficially similar in its crioceratid coiling and bifid lateral lobe, but it is much larger, and has ribs linking in groups of two or three at large ventrolateral tubercles on the inner whorls, with occasional intercalated nontuberculate ribs between, the tubercles linked across the venter by pairs of ribs on the adult body chamber.

Given the present material, we conclude that *Ndumuiceras* should be referred to the Turrilitoidea rather than Ancyloceratoidea, that it is close to the genera *Hamites* and *Protanisoceras*, and provisionally refer it to the Anisoceratidae.

Occurrence

As for types.

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