

Mkuzeiella andersoni gen. et sp. nov. (Cephalopoda, Ammonoidea) from the Albian Mzinene Formation of KwaZulu-Natal, South Africa

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Abstract

In northern KwaZulu-Natal, numerous specimens of a new Albian heteromorph ammonite genus and species, *Mkuzeiella andersoni*, occur in the Mzinene Formation in association with abundant normally coiled middle Albian ammonite species, as well as the inoceramid genus *Actinoceramus* MEEK, 1864. The precise phylogenetic affinities of the new genus and species are uncertain but we suspect that it may be a late derivative of Aptian Helicancylinae rather than a middle Albian hamitid, anisoceratid or ancestral labeceratid.

Keywords: Cephalopoda, Ammonoidea, Albian, Mzinene Formation, KwaZulu-Natal, new taxa.

Résumé

Dans le nord du KwaZulu-Natal, de nombreux spécimens d'un nouveau genre, nouvelle espèce d'une ammonite hétéromorphe albienne, *Mkuzeiella andersoni*, sont recueillis dans la Formation Mzinene, en association avec d'abondantes espèces d'ammonites de l'Albien moyen à enroulement normal ainsi qu'avec le genre d'inocérame *Actinoceramus* MEEK, 1864. Les affinités phylogénétiques précises du nouveau genre, nouvelle espèce restent incertaines, mais nous supposons qu'ils peuvent représenter un rameau tardif dérivé des Helicancylinae aptiens, plutôt qu'un Hamitidae ou un Anisoceratidae albien moyen, ou un Labeceratidae ancestral.

Mots-clefs: Cephalopoda, Ammonoidea, Albien, Formation de Mzinene, KwaZulu-Natal, taxons nouveaux.

Introduction

About two metres of silts with levels of concretions are exposed in a small, abandoned, road metal quarry in the Mkuze Game Reserve of northern KwaZulu-Natal, at locality 154 of KENNEDY & KLINGER (1975). These strata have yielded abundant specimens of a new Albian heteromorph, in association with common representatives of the ammonite genera *Douvilleiceras* DE GROSSOUVRE, 1894 and *Lyelliceras* SPATH, 1921, plus rare *Oxytropidoceras* STIELER, 1920, *Brancoceras* STEINMANN, 1881 and *Pseudobrancoceras* KENNEDY, 2004. A conspicuous co-occurring bivalve is the inoceramid genus *Actinoceramus*. Preservation of these faunas is exceptional and numerous specimens retain part of the original shell in a rust-brown layer. In many douvilleiceratids, the delicate, septate-based spines are preserved. This is the same faunal assemblage as recorded at KENNEDY & KLINGER's (1975) locality 176 near Ndumu, from where CRAMPTON (1996, pl. 1, figs q-r) recorded his South African representatives of *Actinoceramus concentricus* (PARKINSON, 1819). The only difference between the two localities is that the faunas in the former are concentrated in a small quarry exposing about two metres of sediment, whereas the latter occur over a wide area in scattered concretions in the fields and hillsides on the northern side of Quotho Pan, and so far only two specimens of the new heteromorph are known from locality 176. In addition, we refer a specimen from the Mzinene River, described as *Hamites* (?) sp. by ETHERIDGE (1907, p. 88, pl. 5, fig. 3), to this species.

To denote the repositories of specimens illustrated and/or referred to in the text, the following abbreviations are used: NM – Natal Museum, Pietermaritzburg; OUM – Oxford University Museum of Natural History; SAM PCZ – Natural History Collections Department, Iziko, South African Museum.

Systematic palaeontology

Order Ammonoidea VON ZITTEL, 1884
 Suborder Ancyloceratina WIEDMANN, 1966
 Superfamily Ancyloceratoidea GILL, 1871
 Family ?Ancyloceratidae GILL, 1871
 Subfamily ?Helicancylinae HYATT, 1894
 Genus *Mkuzeiella* gen. nov.

Type species: Mkuzeiella andersoni sp. nov.

Etymology

Named after the type locality, the Mkuze Game Reserve in KwaZulu-Natal.

Diagnosis

Coiling of whole shell planispiral aspinoceratid; early whorls coiled in an open criocone, followed by a curved shaft, ending in a distinct ancyloceratid hook. Ornament on phragmocone consisting of prorsiradiate, sharp ribs, with a sharp ventrolateral edge, suggesting incipient tuberculation. On internal moulds these ribs appear broad and flat, suggesting that the ribs on the phragmocone are hollow, possibly with a basal septum. Towards the body chamber ribs become more widely spaced, solid and prominently flared, with angular ventrolateral edges. Aperture constricted. Suture with asymmetrically trifid L.

***Mkuzeiella andersoni* sp. nov.**

Fig. 1; Pls 1-3

- 1907 – *Hamites* (?) sp. – ETHERIDGE, p. 88, pl. 5, fig. 3.
 1976 – *Protanisoceras* (P.) sp. cf. *Metahamites* sp. nov. SPATH
 – KLINGER, p. 27, text-fig. 5m; pl. 7, fig. 4a, b.
 1976 – *Labeceras* sp. nov. aff. *L. crassicosatum* – KLINGER, p. 41,
 text-figs 7i, j, 8a; pl. 12, figs 3, 4, 6.
 1989 – Gen. et sp. indet (*Hamites*?) – KLINGER, p. 192, fig. 1.

Type

Holotype is SAM-PCZ22107 from locality 154, an abandoned road metal quarry in the Mkuze Game Reserve, KwaZulu-Natal; Mzinene Formation, Albian III (?IV).

Etymology

Named after William Anderson, the one-man Geological Survey of Natal and Zululand, who discovered the original specimen described by ETHERIDGE (1907).

Material

Paratypes are SAM-PCZ7431, 7442, 9897, 19574,

17976, 22108-22116; OUM KX9306-9311 and OUM KX4272, all from the same locality and horizon, plus SAM-PCZ17941 and OUM KX10014 from locality 176, Ndumu, Mzinene Formation, Albian III, Natal Museum no. 351, the specimen described and illustrated by ETHERIDGE (1907, p. 88, pl. 5, fig. 3) from the Mzinene River (see 'Occurrence and age' below).

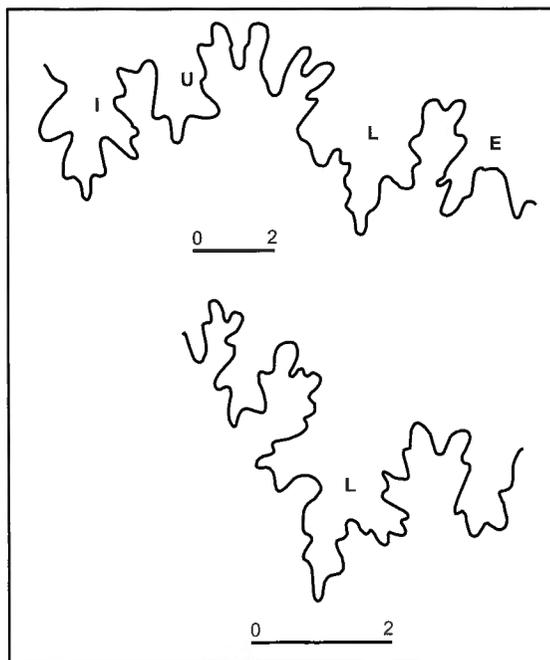


Fig. 1 – *Mkuzeiella andersoni* gen. et sp. nov.; suture line of SAM-PCZ17976. Scale bar in millimeters.

Description

None of the specimens is complete, but the numerous individuals suggest that the earliest coils may be in an open criocone, followed by a curved shaft and ending in an ancyloceratid hook resulting in an aspinoceratid shell shape. Ornament is extremely variable. This is in part determined by intraspecific variation, but also due to ontogenetic changes and mode of preservation. On the phragmocone, ornament consists of prorsiradiate, non-tuberculate ribbing. Towards, and in the body chamber hook, these ribs become more prominent, more widely spaced and flared. Well-preserved specimens and moulds show that the ribs on the phragmocone are extremely sharp and narrow on the flanks, and in crossing the venter, form a distinct edge, creating the impression of incipient ventro-lateral tubercles. These ribs appear to be hollow, with a flat, basal septum. As a consequence of this, on internal moulds, the ribs are much wider and have flattened tops. Towards the body chamber hook, the ribs become flared and more widely spaced, with angular ventrolateral edges, and appear to be solid, rather than hollow, and thus do

not have the flattened surfaces on internal moulds as those on the phragmocone. These differences in the appearance of the ribbing due to ontogenetic changes and as preservational artefacts are clearly shown in the illustrated specimens (Pls 1-3).

In terms of density of ribbing, the specimens can be arranged from the most coarsely ribbed holotype, PCZ22107 (Pl. 1, figs 1-6), through PCZ19574 (Pl. 1, Figs 7, 8) to the most finely ribbed PCZ22108a, b (Pl. 2, Figs 1-3). In addition, the latter (part and counterpart) show the differences in appearance of ribbing on internal moulds and shelly preservation (on external moulds). The latter also clearly shows the ontogenetic changes in ornament on the body chamber hook.

The aperture is preserved in only one specimen, PCZ22116 (Pl. 3, Fig. 1) and is constricted with fine, concentric striations and apparently lacks lappets.

Discussion and comparison with other genera

It is difficult to refer this species to any of the existing Albian heteromorph genera or even subfamilies with confidence as can be seen from KLINGER's (1976, 1989) erratic treatment. The species combines features of *Metahamites* SPATH, 1930, *Hamites* PARKINSON, 1811, specifically its subgenus *H. (Eohamites)* MONKS, 2002, *Protanisoceras* SPATH, 1923, *Labeceras* SPATH, 1925 and *Idanoceras* HENDERSON & MCKENZIE, 2002, and, in general appearance of coiling and ontogenetic change in ornament, resembles the Aptian helicancyline genera *Tonohamites* SPATH, 1924, *Toxoceratoides* SPATH, 1924 and *Volgoceratoides* MIKHAILOVA & BARABOSHKIN, 2002.

Comparison with the genus Metahamites

The strongly ribbed body chamber hooks find their closest match in specimens from the middle Albian of Hazara (Pakistan) referred by SPATH (1930, p. 57) to his new genus *Metahamites*, as suggested previously by KLINGER (1976, p. 27, text-fig. 5m; pl. 7, figs 4a, b), who described one of the specimens as *Protanisoceras* (*P.*) sp. cf. *Metahamites* sp. nov. SPATH. Unfortunately, it appears that the features of the Hazara material which SPATH had at his disposal, and his cryptic diagnosis of *Metahamites* are two different concepts. SPATH (1930, p. 57) merely stated that, 'The genus METAHAMITES gen. nov. (for *Hamites sablieri*, d'Orbigny, 1842, p. 543, pl., cxxxiii, fig. 6) however, is now included in Anisoceratidae'. In addition to the type species, SPATH (1930, pp. 61, 62) referred several specimens

from Hazara to the genus, namely *Metahamites* aff. *elegans* (D'ORBIGNY) (his pl. 9, fig. 5), *M. flexuosus* (D'ORBIGNY) (not figured), *M. aff. sablieri* (D'ORBIGNY) (his pl. 8, fig. 15), *M. sp. nov.* (his pl. 8, fig. 13) and *M. sp. ind.* D'ORBIGNY'S species referred to *Metahamites* by SPATH include both tuberculate and non-tuberculate forms, but none of the body chamber hooks figured by SPATH bear close resemblance to D'ORBIGNY'S species.

This has led to widely divergent interpretations of the genus; see, for instance, SPATH (1939, p. 565), COLLIGNON (1949, 1963), CASEY (1961, p. 99), WIEDMANN (1962, p. 103), WIEDMANN & DIENI (1968, p. 58), SCHOLZ (1968, p. 17), MARCINOWSKI & WIEDMANN (1990, p. 37), WRIGHT (1957, p. L220; 1997, p. L235) and MONKS (1999, p. 919). Unfortunately, the original Hazara specimens have never been re-examined and the genus *Metahamites*, if it is to be retained at all, has to be interpreted in terms of the type species.

Three of D'ORBIGNY'S syntypes were illustrated by WIEDMANN & BOESS (1984, fig. 4a-e) and a lectotype was designated (fig. 4a, b) (see also KENNEDY *in* KENNEDY *et al.*, 1997, p. 467, pl. 11, figs 1-10 and KENNEDY & JUIGNET, 2006, p. 159, pl. 42, figs 3a-d, 4a-c, 5a-d). These all consist of part of the penultimate shaft, hook and straight final shaft. On the penultimate shaft ribbing is markedly differentiated, with up to three delicate, prorsiradiate ribs separating one or two similar ones that are borne on distinct swellings, reminiscent of the ornament of *Hemiptychoceras* SPATH, 1925. Near the final hook, the ribs become coarser and single, and recti- to rursiradiate. Topotype material from Clars described by GEBHARD (1979, p. 53, text-fig. 29; pl. 2, figs 1-3) confirms these observations and includes the suture line, which has a bifid lateral lobe (L) and a small trifid umbilical lobe (U). The specimen from the Albian of Spain figured by WIEDMANN & BOESS (1984, fig. 4i) shows the differentiated ribbing on the penultimate shaft, but has distinct, flared ribs on the shaft of the hook, unlike those of the lectotype which are broad and rounded over the flanks and venter. In contrast, the two crushed specimens referred to the species by KENNEDY (*in* KENNEDY *et al.*, 1997, pl. 10, fig. 8; pl. 11, fig. 11) appear to lack the differentiated ribbing on the penultimate shaft.

Mkuzeiella andersoni differs from the type and topotype material of *Metahamites sablieri* in having uniform ribbing on the shaft, much coarser ribbing on the hook and in its overall mode of coiling, with a curved shaft, rather than apparently straight parallel

shafts. In addition, the lateral lobe (L) is distinct, albeit somewhat asymmetric, trifid, in contrast to that of *Metahamites sablieri* which is bifid and has a large trifid internal lobe, which, by definition of MARCINOWSKI & WIEDMANN (1990, p. 37) is small in *Metahamites*. These authors also included in *Metahamites* the species *Hamites passendorferi* (MARCINOWSKI & WIEDMANN, 1990), which has periodic marginal tubercles. These all seem to indicate that the present material does not belong to the genus *Metahamites* as interpreted in terms of the type species and of MARCINOWSKI & WIEDMANN's (1990) definition of the genus.

Comparison with hamitid genera

Several hamitids, specifically those referred by MONKS (2002, p. 701) to his new subgenus *H. (Eohamites)* (type species: *Hamites hybridus* CASEY, 1961, p. 97, text-fig. 33d-f; pl. 22, figs 1, 2a-c), resemble our material in terms of coiling and ornament, but none fit the description completely. According to MONKS (2002, p. 701), *H. (Eohamites)* consists of, 'Aspinocoques with simple annular ribs and no apertural collars. Suture lines with large, subtrifid lateral lobes, smaller trifid umbilical lobe. The internal lobe bears an elongate, bifid median lobule'. Apart from the type species, MONKS included *H. dixonii* CASEY, 1961 (p. 96, text-fig. 33c; pl. 12, fig. 6a-c), *H. praegibbosus* SPATH, 1941 (p. 627, text-fig. 227a-e; pl. 70, figs 13, 14; see also CASEY, 1961, p. 94, text-fig. 33a, b; pl. 22, figs 4a, b, 5a-c) and *H. pseudattenuatus* CASEY, 1961 (p. 96, pl. 22, fig. 3a-c) in the subgenus. On account of the aspinoceratid, planar coiling and suture line, MONKS regarded *Eohamites* as a group of 'primitive' hamitids. Unfortunately, complete specimens of these species are unknown, and CASEY'S (1961, text-fig. 33d) reconstruction of *H. hybridus* does not show the body chamber. Apart from the planar coiling and asymmetrically trifid lateral lobe, the ornament of *H. (Eohamites)* is typically hamitid, and none of the known specimens referred to this subgenus shows the ontogenetic change in ornament which is characteristic of *Mkuzeiella andersoni*.

Hamites compressus J. SOWERBY, 1814 (p. 138, pl. 61, figs 7, 8; see also SPATH, 1941, p. 617, text-fig. 222; pl. 68, figs 10-13), the type species of *Planohamites* MONKS, 2002, has a similar compressed whorl section but also lacks the change in ornament and has a bifid lateral (L) lobe. *Hamites fueleopi* SZIVES & MONKS, 2002 (p. 147, text-fig. 6f-i) has similar prorsiradiate ribbing on the phragmocone, but is based on too poorly preserved material for detailed comparisons.

Hamites gardneri SPATH, 1941 (p. 624, text-fig. 225;

pl. 7, figs 3-5) has a similar early criocone stage, but lacks the U-shaped final hook and change in ornament towards the latter, while *H. (Stomohamites) funatus* BRONGNIART, 1822 (see SPATH, 1941, p. 650, text-fig. 237; pl. 72, figs 1-3, 23) has similar, widely spaced, prorsiradiate ribs, but also lacks the change in ornament on the body chamber hook. A closer match is probably to be found in the specimen figured by GEBHARD (1985, pl. 1, fig. 4) as *Hamites (Hamites) aff. funatus*.

Comparison with the genus Protanisoceras

The incipient ventrolateral tuberculation of *Mkuzeiella andersoni* suggests superficial similarities to the genus *Protanisoceras* SPATH, 1923, but tuberculation in the latter usually is more prominent and may consist of spines with a basal septum. *Hamites (Hamites) (?)* sp. (MCKENZIE, 1999, p. 65, fig. 4f-h) from the middle Albian of South Australia resembles the body chamber of *Mkuzeiella andersoni*, but has small ventrolateral tubercles and was regarded by MCKENZIE (1999, p. 65) as being intermediate between *Hamites* and *Protanisoceras*; it is too poorly preserved for further discussion. *Protanisoceras gracile* MCNAMARA, 1980 (p. 151, figs 6a, 7, 9d, e), from the middle Albian of South Australia, has a similar mode of coiling and prorsiradiate ribbing, with irregularly spaced, minute tubercles on the phragmocone, but it lacks the strong ornament on the body chamber hook of *Mkuzeiella andersoni*.

Comparison with the genera Labeceras and Idanoceras

Similarities are also found to the genus *Labeceras* SPATH, 1925 as initially suggested for phragmocones of the species by KLINGER (1976, p. 41). Ornament and whorl section on the phragmocone are similar to those of *Labeceras crassicoatum* COLLIGNON, 1950 (p. 79, pl. 13, fig. 5, 5a), of which *L. hourcqi* COLLIGNON, 1950 (p. 78, pl. 13, fig. 4, 4a; pl. 14, fig. 1, 1a) probably is a synonym. However, now that we know that the coarsely ornamented body chamber hooks which initially were tentatively identified as *Metahamites* belong to these phragmocones, differences with *Labeceras* become obvious. They are distinguished both in coiling and details of ornament. In the oldest known species of *Labeceras*, *L. crassetuberculatum* KLINGER, 1976, the initial whorls are slightly asymmetrical, suggesting a low helix (compare KLINGER, 1989, figs 2, 15), in contrast to the apparent planispiral crioconic early whorls of *Mkuzeiella andersoni*. Also, the ribbing on the phragmocone is already distinctly (rounded) hamitid. In *Labeceras*, the body chamber hook tends to

curve inwards, with the aperture facing inwards, and in cases is very close to the dorsum of the earlier part of the shell (see e.g., *Labeceras crassetuberculatum* and *L. plasticum* SPATH, 1925 in KLINGER, 1989, figs 2a-j, 3a). *Labeceras singulare* (LEANZA, 1970) (see AGUIRRE URRETA & RICCARDI, 1988, p. 606, figs 5.3-5.22, 6.1) has similar fine ribbing on the phragmocone, albeit more rounded on the flanks and over the venter. Apart from *L. crassicostatum*, *L. bryani* WHITEHOUSE, 1926 (p. 227, pl. 39, fig. 4a, b) and *L. compressum* WHITEHOUSE, 1926 (p. 228, pl. 36, fig. 5; pl. 39, fig. 5a, b), ornament in *Labeceras* usually changes towards and in the recurved hook, with the appearance of umbilico-lateral tubercles and forked ribbing. In contrast, in *Mkuzeiella andersoni* ribbing becomes more widely spaced and distinctly flared and single, without, however, the slightest tendency towards the formation of umbilico-lateral tubercles. Thus, ornament on the body chamber hook in *Labeceras* and *Mkuzeiella andersoni* is totally different. In *Labeceras* the aperture is constricted and has lateral lappets. Only one specimen of *Mkuzeiella andersoni* (see Pl. 3, fig. 1) has the aperture preserved, and it appears to be merely constricted, lacking lappets. The suture in *Labeceras* has distinct trifid lateral (L) umbilical (U) and internal (I) lobes, but the early forms may have asymmetrically trifid lateral (L) lobes, similar to those of *Mkuzeiella andersoni*.

Idanoceras HENDERSON & MCKENZIE, 2002 (type species: *I. klingerii* HENDERSON & MCKENZIE, 2002, p. 908, figs 1.1-1.10, 2) is a monospecific labeceratid genus which is known only from the upper Albian of Western Australia where it co-occurs with *Labeceras compressum*. The early ontogenetic stage consists of an open crioconic coil, followed by a long, curved shaft which apparently does not end in a recurved hook. Apart from the apparent different modes of coiling in the adult stage, ornament in *I. klingerii* consists of prorsiradial, rounded ribbing that is compatible with that of contemporary *Labeceras*, thus differing from *Mkuzeiella andersoni*.

Comparison with helicancyline genera

As mentioned above, even though *Mkuzeiella andersoni* resembles some contemporary Albian hamitid and protanisoceratid species, and later (i.e., late Albian) labeceratids, as tentatively suggested by KLINGER (1976, 1989), the mode of coiling, sutural similarities and distinctive progressive change in ornament from the phragmocone to the recurved body chamber hook are reminiscent of some late Aptian representatives of the subfamily Helicancylinae, specifically the genera

Toxoceratoides SPATH, 1924 and *Tonohamites* SPATH, 1924, which are both known to occur in the upper Aptian of KwaZulu-Natal (KLINGER & KENNEDY, 1977) (see also AGUIRRE URRETA, 1986 for a discussion of the subfamily). To this group we may possibly also add the micromorphic genus *Volgoceratoides*.

Toxoceratoides generally has trituberculate ribbing on the phragmocone, followed by a distinct coarsening of ornament on the body chamber hook, whereas *Tonohamites* may be trituberculate to only weakly bituberculate (or even non-tuberculate) on the phragmocone, and differs from *Toxoceratoides* mainly by the non-tuberculate and more rounded ribbing on the body chamber hook. *Mkuzeiella andersoni* seems to combine features of both genera. The simple, non-tuberculate ribbing on the phragmocone is reminiscent of that of *Tonohamites koeneni* CASEY, 1961, described by KLINGER & KENNEDY (1977, p. 320, figs 66a, c, d, 67c, d, 73a, 81f) from the upper Aptian at locality 152 in the Mkuze Game Reserve, while the coarsening of ornament on the body chamber, although not tuberculate, resembles that of *Toxoceratoides*, e.g., *T.?* *haughtoni* KLINGER & KENNEDY, 1977 (p. 310, figs 59a-d, 60a-i, 62a-d, 63, 64a-c, 65a, b, 66b, 79a, b) or *T. krenkeli* FÖRSTER, 1975 (p. 160, text-fig. 33a, b; pl. 4, figs 1, 2) (see also especially HAUGHTON & BOSHOFF, 1956, p. 13, pl. 2, fig. 3; as cf. *Tonohamites royerianum* (D'ORB.) from Mozambique). Species of *Toxoceratoides* with similar flared ribbing are also known from the lower Aptian of California, e.g., *T. corae* MURPHY, 1975 (p. 33, pl. 5, figs 1, 5) and *T. greeni* MURPHY, 1975 (p. 33, pl. 5, figs 2, 3, 6).

At this stage it should be pointed out that all the European occurrences of *Tonohamites* and *Toxoceratoides* discussed by CASEY (1961) are dated as early Aptian, whereas the same genera are recorded from the upper Aptian of KwaZulu-Natal and adjacent Mozambique (HAUGHTON & BOSHOFF, 1956), Madagascar (COLLIGNON, 1962) and Patagonia (AGUIRRE URRETA, 1986). As far as the occurrence of *Tonohamites koeneni* is concerned, we are quite confident of its age; it occurs immediately below the line of hiatus concretions marking the Aptian/Albian boundary in KwaZulu-Natal (KENNEDY & KLINGER, 1972, 1975).

The micromorphic and monospecific genus *Volgoceratoides* is similar to *Toxoceratoides*, but is smaller, bituberculate on the shaft, and has bifurcating ribbing on the hook. It is thus far only known from the lower Aptian of the Volga Region. The genus was introduced in two different publications bearing the

same date (BARABOSHKIN & MIKHAILOVA, 2002; MIKHAILOVA & BARABOSHKIN, 2002) and the same sequence of authors.

FÖRSTER (1975, p. 172) suggested that the origins of the subfamily Labeceratinae SPATH, 1925 with trifold lobes may be found in the subfamily Ancyloceratinae rather than in the Anisoceratidae (with predominantly bifid lobes) (see also FÖLLMI, 1989, p. 129). It is tempting to consider the middle Albian *Mkuzeiella andersoni* as a link between the late Aptian representatives of *Toxoceratoides* and *Tonohamites* as discussed above, and the late Albian Labeceratinae, as was also suggested by KLINGER (1989, p. 190). However, as pointed out by KLINGER (1989, p. 190), the earliest known *Labecerat* from KwaZulu-Natal, *L. crassetuberculatum*, already has distinct rounded hamitid ribbing on the phragmocone and slightly asymmetric coiling of the early whorls which is difficult to reconcile with that of *Mkuzeiella andersoni*. For the present, the affinities of the latter remain obscure.

Occurrence and age

As mentioned above, *Mkuzeiella andersoni* occurs at locality 154, an abandoned road metal quarry in the Mkuze Game Reserve, and at locality 176, hillside and slopes north of Quotho Pan, Ndumu in northern KwaZulu-Natal in the Mzinene Formation, Albian III (?IV). The precise locality of Anderson's 'Umsinene River Deposit' is unknown. The fauna from this locality described by ETHERIDGE (1907) is identical to that of locality 154 with *Douvilleiceras*, *Lyelliceras* and *Actinoceramus*. However, none of the localities recorded by KENNEDY & KLINGER (1975) on the Mzinene River show this faunal association, especially with *Actinoceramus*, but we assume it to be near to our localities 35 and 36, both now flooded due to damming of the river.

Locality 154 yields *Lyelliceras lyelli* (D'ORBIGNY, 1841) and forms transitional to *L. pseudolyelli* (PARONA & BONARELLI, 1897), indicating the basal middle Albian *Lyelliceras lyelli* Subzone of the northwest European sequence (LATIL, 1995) or the transition to the *L. pseudolyelli* Subzone at the top of the middle Albian there. Also present is *Pseudobrancoceras versicostatum* (MICHELIN, 1838), a species restricted to the *L. lyelli* Subzone. The conclusion is that *Mkuzeiella andersoni* is basal middle Albian in age.

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Explanation of the plates

PLATE 1

Mkuzeiella andersoni gen. et sp. nov. from locality 154, Mzinene Formation (Albian), KwaZulu-Natal; Figs 1-4 are x 2, while Figs 5-8 are x 1.

- Figs 1-6 – Holotype (SAM PCZ 22107); the most coarsely ribbed specimen, showing the transition in ornament towards the body chamber hook, as well as the flat-topped ribbing on internal moulds of the phragmocone.
 Figs 7-8 – Paratype (SAM PCZ 19574), the specimen figured by KLINGER (1989, fig. 1) as *Hamites?* gen. et sp. indet.

PLATE 2

Mkuzeiella andersoni gen. et sp. nov. from the Albian of KwaZulu-Natal.

- Figs 1-3 – Paratype (SAM PCZ 22108a, b), illustrating difference in appearance of ribbing between internal and external moulds.
 Fig. 4 – Paratype (SAM PCZ 7442).
 Fig. 5 – Paratype (SAM PCZ 22110); dorsal view of crioconic early section.
 Fig. 6 – Paratype (SAM PCZ 22109).
 Figs 7-8 – NM-351, the original of ETHERIDGE'S (1907, p. 88, pl. 5, fig. 3, as *Hamites* (?) sp. in the collections of the Natal Museum, Pietermaritzburg.
 Figs 9-11 – Paratype (SAM PCZ 22111); a small specimen showing transition from phragmocone to body chamber hook.
 Fig. 12 – Paratype (SAM PCZ 17976).
 Figs 13-14 – Paratypes (SAM PCZ 22115 and SAM PCZ 7431), showing transition from phragmocone to body chamber.
 Fig. 15 – Paratype (SAM PCZ 7750).

Figs 1-6 and 12-15 are from locality 154, Mzinene Formation; Figs 7, 8 are from an unknown locality on the Mzinene River. Figs 2, 3, 5-8 and 14 are x 1, while 1 and 15 x 2 and 12 and 14 are x 1,5.

PLATE 3

Mkuzeiella andersoni gen. et sp. nov. from locality 154, Mzinene Formation (Albian).

- Fig. 1 – Paratype (SAM PCZ 22116), the only specimen with the aperture preserved.
 Figs 2-4 – Paratype (SAM PCZ 22113), internal mould of phragmocone.
 Figs 5-8 – Paratype (SAM PCZ 22112), part of phragmocone showing flat-topped ribbing on internal mould, and incipient ventrolateral tuberculation in shelly preservation.
 Figs 9-10 – Paratype (SAM PCZ 9897), the smallest preserved part of the early crioconic whorls.
 Figs 11-12 – SAM PCZ 8946, *Actinoceramus* sp. associated with *Mkuzeiella andersoni* gen. et sp. nov.
 Fig. 13 – Paratype (SAM PCZ 22108).

Fig. 1 is x 2, while Figs 2-8 are 1,5 x and I-M are x 1.



1



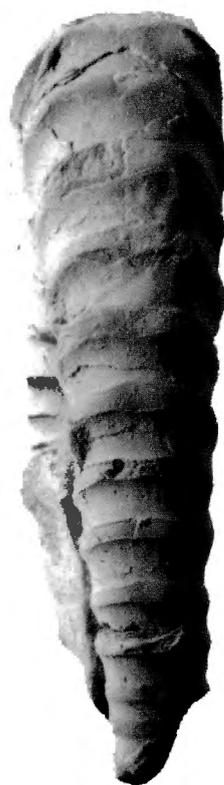
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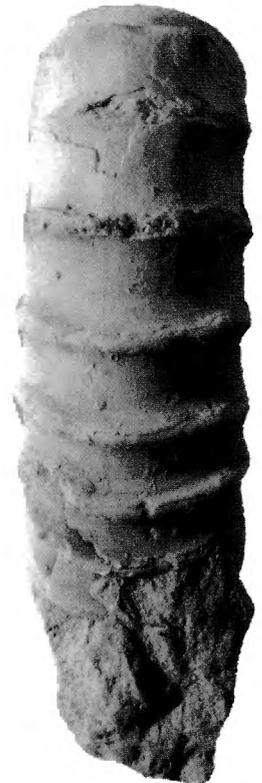
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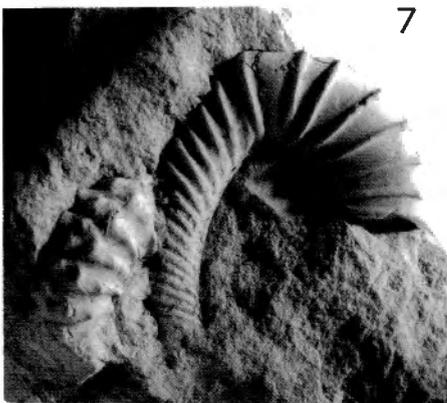
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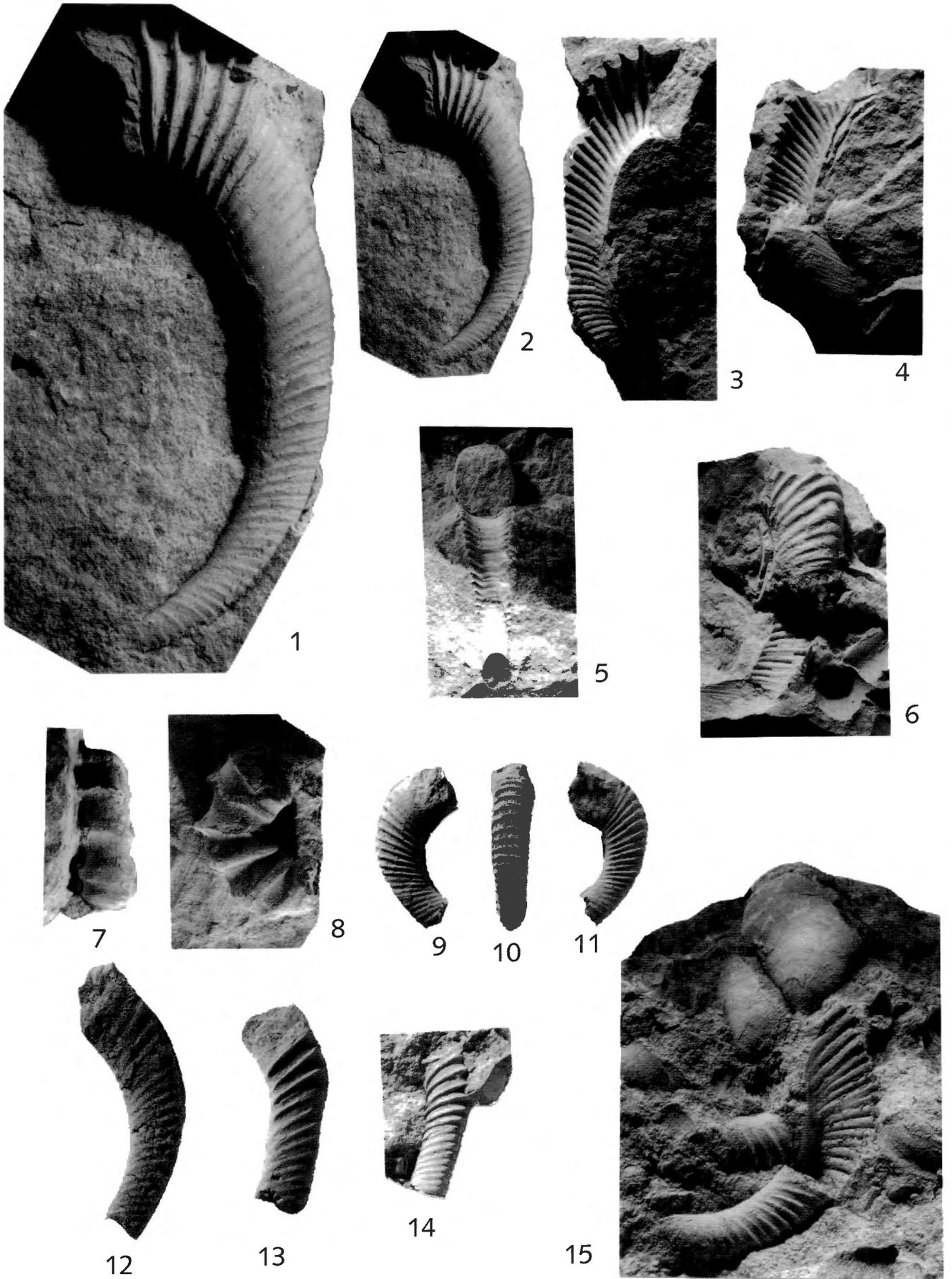


PLATE 2



1



2



3



4



5



6



7



8



9



10



11



12



13

