

# Hypermorphosis in *Salaziceras*, a Cretaceous ammonite, from Madagascar

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(with 2 figures)

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An enigmatic ammonite from Mont Raynaud, Madagascar, originally referred to the Upper Cenomanian *Calycoceras* (*Calycoceras*) *naviculare* (Mantell, 1822) is associated with an exclusively upper Upper Albian fauna. It is interpreted as a new, hypermorphous giant species of *Salaziceras* Breistroffer, 1936, *S. lemoinei*.

**Keywords:** Cretaceous, ammonite, *Salaziceras*, Hypermorphosis, Albian, Madagascar.

## CONTENTS

Abstract ······ 113	Genus <i>Salaziceras</i> ······ 114	References ······ 115
Introduction ······ 113	<i>Salaziceras lemoinei</i> sp. nov. ··· 115	
Systematic palaeontology ··· 114	Acknowledgements ······ 115	

## INTRODUCTION

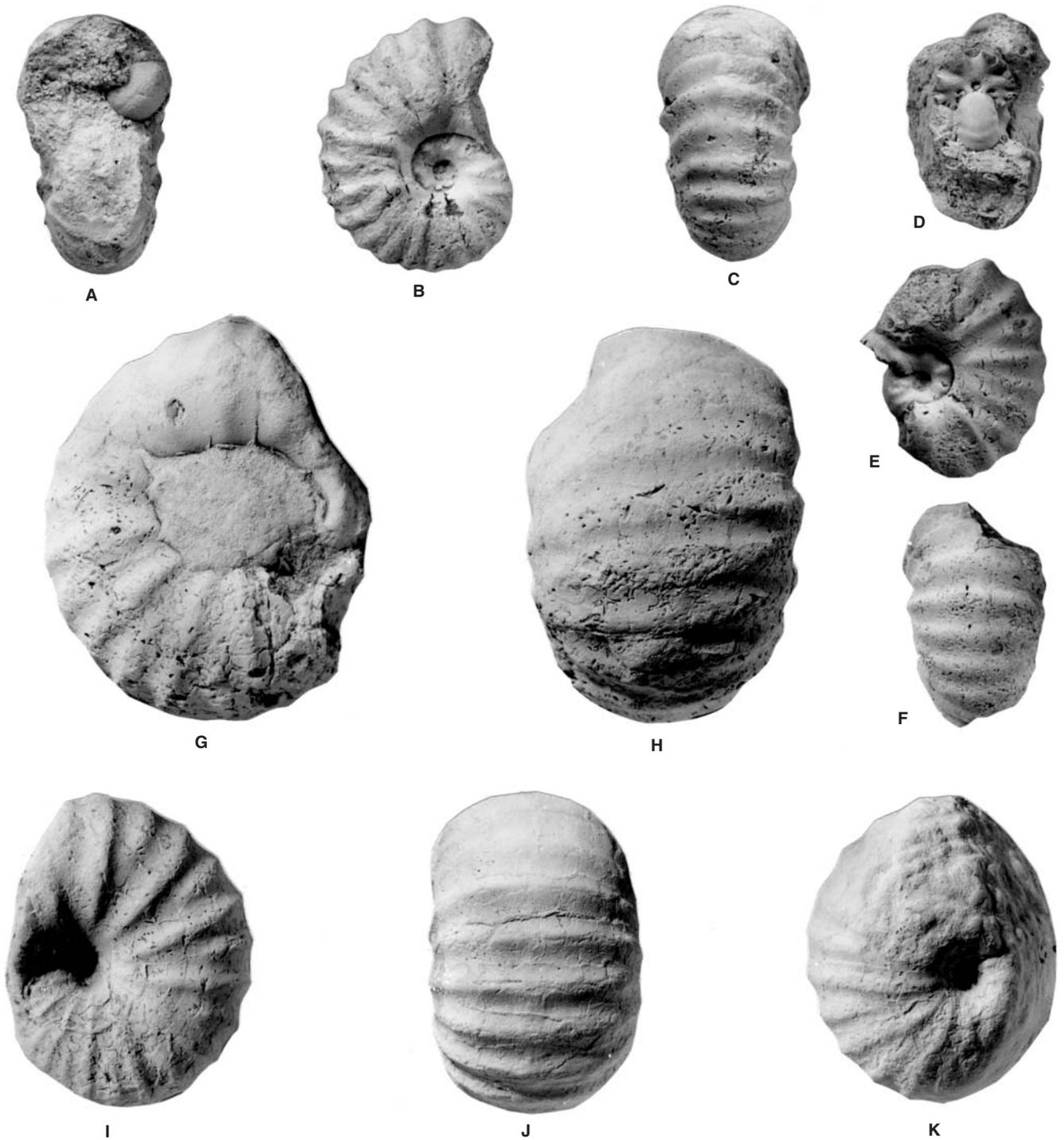
The publication of *Céphalopodes Crétacés des environs de Diego-Suarez* by Marcellin Boule, Paul Lemoine and Armand Thévenin (1906–7) marked the beginning of the monographic descriptions of the incredibly rich Cretaceous ammonite faunas of Madagascar. Most of the specimens described and figured by those authors survive in the collections of the Muséum National d'Histoire Naturelle in Paris, and in the Sorbonne Collections, currently being transferred to the former institution. Among the taxa described by Boule *et al.*, and certainly the most cryptic, is the specimen figured as *Acanthoceras naviculare* Mantell, from the 'Cénomanien' of Mont Raynaud (Boule *et al.* 1907, p. 30 (10), pl. 1(8), fig. 1), illustrated here as Fig. 1G–H. It is certainly not a *Calycoceras*: it has been suggested previously that it might be a vascoceratid (Kennedy 1971, p. 73; Wright & Kennedy 1981, p. 34). The chance juxtaposition of the original specimen and enlarged prints of the Upper Albian ammonite *Salaziceras salazacense* (Hébert & Munier-Chalmas, 1875) (p. 114, pl. 5, fig. 6; see revision in Wright & Kennedy 1979, p. 686, pl. 87, figs 3–9; text-figs 1a,b; 3a–c) led to the conclusion that it was a large species of *Salaziceras*, while a reappraisal of the age of the material is compatible with this view. This specimen, and a second individual, were regarded as 'Cénomanien inférieur' by Boule *et al.* (1907, p. 175 (2)). The material occurs in a distinctive preservation: 'les fossiles ont, en partie, conservé leur test; ils 'sont englobés dans des nodules calcaires à surface souvent recouverte de moulages

d'empreintes cylindriques ramifiées'. On trouve dans ce gisement:

*Phylloceras Velledae* Mich., *Lytoceras epigonum* Kossm. (= *L. Timotheanum* Stol. non Mayor), *Turrilites circumtaeniatus* Kossm., *T. Gresslyi* P. et C., *Acanthoceras naviculare* Mantell, *Schloenbachia inflata* Sow., *Puzosia planulata* Sow., *P. compressa* Kossm., *Placenticeras Warthi* Kossm., *Anisoceras armatum* Sow., etc.'

The dating of the assemblage as Early Cenomanian appears to be based on the supposed presence of *Acanthoceras naviculare*; the stratigraphically significant elements in the assemblage (notably the *Mortonicerases* [= *Schloenbachia inflata*]) are upper Upper Albian.

A comparison of Fig. 1A–F (figured  $\times 2$ ) and Fig. 1G–K illustrate the remarkable similarity between the *Acanthoceras naviculare* of Boule *et al.* and *Salaziceras salazacense*, apart from their size. The latter reach diameters of up to 30 mm, the larger of the present specimens is still incomplete at a diameter of 65 mm (Fig. 1G,H). *Salaziceras salazacense* is well dated in western Europe as coming from the upper (but not uppermost) Upper Albian *Mortonicerases fallax* Zone (Latil 1995). We propose that the present species, named *Salaziceras lemoinei* sp. nov. below, arose from a diminutive species such as *S. salazacense* through the mechanism of hypermorphosis, a heterochronous process (Gould 1977; McNamara 1986), whereby onset of sexual maturity is delayed, and the adult of the descendant species is larger than that of the ancestral species.



**Fig. 1.** A–F, *Salaziceras salazacense* (Hébert & Munier-Chalmas, 1875). A–F, C. W. and E.V. Wright Collection, F.218–9, now housed in the Natural History Museum, London. G–K, *Salaziceras lemoinei* sp. nov. G, H, paratype; I–K, the holotype. Both specimens are from the upper Upper Albian of Mont Raynaud, Madagascar, and are in the Sorbonne Collections, now housed in the Muséum National d’Histoire Naturelle, Paris. Figures A–F are  $\times 2$ ; G–K are  $\times 1$ .

#### SYSTEMATIC PALAEOLOGY

Superfamily **ACANTHOCERATOIDEA** de Grossouvre, 1894

Family **FLICKIIDAE** Adkins, 1928

Subfamily **SALAZICERATINAE** Wright & Kennedy, 1984

Genus ***Salaziceras*** Breistroffer, 1936

Type species

*Ammonites salazacensis* Hébert & Munier-Chalmas, 1875, p. 114, pl. 5, fig. 6, by original designation of Breistroffer 1936, p. 64.

Discussion

See Wright & Kennedy 1979, p. 686.

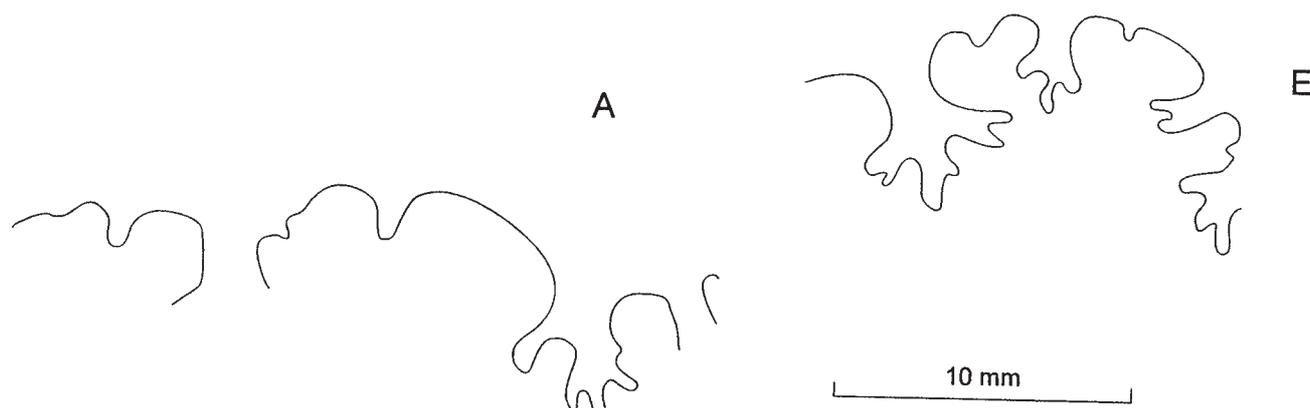


Fig. 2. *Salaziceras lemoinei* sp. nov. Partial external suture of the paratype. E = external lobe; A = adventive lobe.

#### Occurrence

Upper Upper Albian, southern England, southeast France, Hungary, Morocco, Nigeria, KwaZulu, South Africa, and Madagascar.

#### *Salaziceras lemoinei* sp. nov.

Figs 1G-K, 2

1907 *Acanthoceras naviculare* Mantell; Boule, Lemoine & Thévenin, p. 10(30), pl. 1(8), fig. 1 only.

#### Derivation of name

For Paul Lemoine, who collected the type material.

#### Types

The holotype (Fig. 1I-K) is the original of Boule *et al.* 1907, pl. 1 (8), fig. 1; the paratype is the original of Fig. 1G, H. Both specimens are from the upper Upper Albian of Mont Raynaud, Madagascar. Both specimens are unregistered, and in the Sorbonne Collections, currently in the course of transfer to the collections of the Muséum National d'Histoire Naturelle, Paris.

#### Dimensions

	D	Wb	Wh	Wb:Wh	U
Holotype	53.4 (100)	—(—)	26.9 (50.4)	—	4.8 (9.0)

#### Diagnosis

A large species of *Salaziceras*. Coiling very involute with tiny conical umbilicus, very depressed whorl section and a total of twelve regularly alternating straight prorsiradiate primary and secondary ribs that are straight and transverse across the venter.

#### Description

The holotype (Fig. 1I-K) is a partially abraded composite mould with a maximum preserved diameter of 53.4 mm, and is almost wholly septate, with traces of a further 120° sector of body chamber. Coiling is very involute, the tiny, deep umbilicus comprising 9% of the diameter. The whorl section is depressed, with a whorl breadth to height ratio of 1.31, the greatest breadth around mid-flank. There are 12 primary ribs on the outer whorl. They arise at the umbilical seam, and are feebly prorsiradiate on the umbilical wall, across

which they strengthen progressively. The ribs are distant, coarse and prorsiradiate on the flanks, across which they also strengthen progressively, and pass straight across the venter. Single intercalated ribs separate the primaries, arising on the outer flank, and strengthening to match the primaries on ventrolateral shoulders and venter, where they are very widely separated.

The paratype (Fig. 1G, H) is in an identical preservation to the holotype, with one flank partially abraded. The maximum preserved diameter is 65 mm, with indications of the former presence of a further 90° sector of body chamber. It is septate to at least a whorl height of 32 mm. The umbilicus is plugged by sediment. The whorl section is as in the holotype, with an approximate whorl breadth to height ratio of 1.43. There are six to seven primaries, and a total of 12 primary plus secondary ribs at the ventrolateral shoulder of the apertural half whorl.

The moderately incised suture is partially decipherable on the paratype (Fig. 2). E/A is broad and bifid, A/U<sub>2</sub> broad with a minor median incision.

#### Discussion

*Salaziceras lemoinei* sp. nov. most closely resembles *S. salazacense* (Fig. 1A-D), from which it is readily separated by its much greater size, very broad, flattened venter, very small umbilicus, and distant, straight primary ribs that pass straight across the venter.

#### Occurrence

Upper Upper Albian, Mont Raynaud, Madagascar.

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