

ON *LUNULOCERAS* BONARELLI (JURASSIC AMMONOIDEA) FROM KUTCH, W. INDIA

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ABSTRACT

Lunuloceras Bonarelli, a subgenus of *Hecticoceras* Bonarelli, was supposedly represented in Kutch (Gujarat State in W. India) by a few forms coming from 'Callovian' and 'Divesian' horizons. Except for a few questionably immature specimens, forms previously assigned to *Lunuloceras* from Kutch are reassigned to *Sublunuloceras* Spath, another subgenus of *Hecticoceras*. The description of a new species, *H. (Lunuloceras) rajnathi*, from Middle Callovian strata of Kutch extends the stratigraphic range of the subgenus upwards from the Lower Callovian.

INTRODUCTION

Lunuloceras Bonarelli (type species — *Nautilus hecticus* Reinecke, 1818, from Lower Callovian of Germany) is characterized by rather evolute shells with smooth inner whorls and falcoid, non-tuberculate ribs confined to the outer part of the whorls. Spath's revision of the Kutch cephalopods (1927-33) enabled him to identify three species of *Lunuloceras*, namely, *L. orientale* (d'Orbigny) (Spath, 1928, p. 118, pl. 13, fig. 9). *L. nisoides* Spath (1928, p. 120, pl. 13, fig. 8b [sic]; pl. 14, fig. 11; pl. 15, fig. 5), and *L. spp. juv.* (Spath, 1928, p. 121, pl. 13, fig. 8, 12; pl. 18, fig. 9) from 'Rehmanni zone' and 'Anceps beds', 'Lower Athleta beds', and 'Upper Anceps beds' and 'Athleta beds', respectively (Spath, 1933, pp. 712-713) of 'Callovian' and 'Divesian' ages (Spath, 1933, pp. 872-873). However, after a reexamination of the Kutch forms in the light of the definition of *Lunuloceras* outlined above, it is deemed necessary to transfer *orientale* and *nisoides*, and most of the examples of the third form (i.e. *L. spp. juv.*) to *Sublunuloceras* Spath (typified by *Harpoceras lairensis* Waagen, 1875; Upper

Callovian of Kutch) which is characterized by falcoid ribs showing a lesser degree of sinuosity. Spath (1933, p. 670) himself doubted the generic assignment of the last two forms (viz. *L. nisoides* and *L. spp. juv.*), while Haas (1955, p. 41; also Vautrin, 1934 (in Haas, 1955), p. 1439) considered *nisoides* to actually belong to *Sublunuloceras*. Even the two juvenile examples figured by Spath (1928, pl. 13, figs. 8a,b), provisionally retained here under *Lunuloceras*, with almost smooth lateral sides, may represent young stages of any hecticeratid. The other figured specimens of the juvenile form (Spath, 1928, pl. 13, fig. 12 and pl. 18, fig. 9) are definitely not *Lunuloceras*. Persistence of *Lunuloceras* to such late times, as believed by Spath (1928, 1933), has yet to be corroborated. Undoubted *Lunuloceras*, thus, remained unrepresented in Kutch until the finding of the present new species, *L. rajnathi*, from the Jhikadi Member of the Habo Formation (Kanjilal, 1978), described below.

Both *Lunuloceras* and *Sublunuloceras* have been subsequently regarded as sub-genera of *Hecticoceras* Bonarelli (cf. Treatise on Invertebrate Paleontology, Pt. L, 1957, pp. L276-L277).

The abbreviations used herein are: Sp. No. — Specimen Number; D — Diameter of the shell; H — Height of the whorl along the measured diameter; T — Maximum width (thickness) of the same whorl; and U — Maximum umbilical diameter of the whorl. All measurements are in millimetres. Figures in parentheses are the percentage of the particular measurement with respect to the diameter of the shell. The specimens are retained in the Department of Geology, Banaras Hindu University, Varanasi 221 005.

SYSTEMATIC DESCRIPTION

- Class — CEPHALOPODA Cuvier, 1797
 Subclass — AMMONOIDEA Zittel, 1884
 Order — AMMONITIDA Hyatt, 1889
 Superfamily — HAPLOCERATACEAE Zittel, 1884
 Family — OPPELIIDAE Bonarelli, 1894
 Subfamily — HECTICOCERATINAE Spath, 1925
 Genus — *Hecticoceras* Bonarelli, 1893

Type Species: Nautilus hecticus Reinecke, 1818.
 Lower Callovian; Germany.

Subgenus — *Lunuloceras* Bonarelli, 1893

Type Species: Nautilus lunula Reinecke, 1818.
 Lower Callovian; Germany.

Hecticoceras (Lunuloceras) rajnathi n. sp.

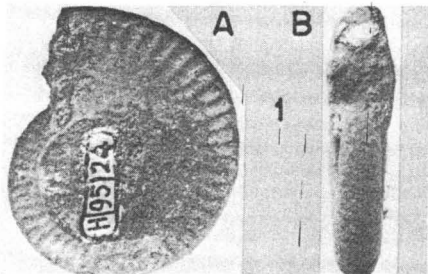


Fig. 1. *Hecticoceras (Lunuloceras) rajnathi* n.sp., holotype (Sp. No. H/95/24; X 1. Bed No. 5 (Middle Callovian), NE of Rudra Mata (Habo Hill, Kutch). A, Lateral view; B, Peripheral view.

Remarks: *Lunuloceras* has been regarded as restricted to Lower Callovian (Arkell, in Moore 1957, pp. L276-L277). However, *L. rajnathi* n.sp., with typical *Lunuloceras* sculpture, has been collected in association with several species of *Reineckeia* Bayle — a Middle Callovian ammonoid. As mentioned earlier, the few juvenile specimens doubtfully retained here under *Lunuloceras*, may in fact be the young of any member of the subfamily Hecticoceratinae. Therefore, their age (Divesian? ('athleta beds') — Spath, 1928, explanation of fig. 8, pl. 13) cannot necessarily be taken as that of *Lunuloceras*. Transfer of Spath's other 'higher' forms (1928, p. 102) to *Sublunuloceras* is also compatible with the latter's stratigraphic range of Middle Callovian to Middle Kimmeridgian (Kanjilal, 1980). Consequently, the age of *Lunuloceras* is considered to range from Lower to (at least) Middle Callovian.

Material: One specimen.

Horizon and locality: Bed No. 5 (Middle Callovian) — NE of Rudra Mata (for location and stratigraphy of the rocks of the Habo Hill, see Kanjilal, 1978).

Derivation of name: The species has been named in memory of late Professor Rajnath, pioneer among Indian workers studying the fauna and stratigraphy of the Mesozoic rocks of Kutch.

Dimensions:

	Sp. No.	D	H	T	U
Holotype	H/95/24	36.4	15.1 (41.5)	9.0 (24.7)	11.0 (30.2)

Diagnosis: Compressed, unicarinate shell with rursiradial ribs on the outer part.

Description: Shell small, much compressed and rather evolute. Lateral flanks flat with moderately thick, backwardly projected ribs in the outer half, the inner half remaining smooth; venter narrowly rounded and unicarinate. Umbilical edge sharp; umbilical wall vertical and short.

Remarks: The present form, by virtue of its smooth inner side, undoubtedly belongs to *Lunuloceras*. *Hecticoceras (Lunuloceras) kersteni* (Noetling) from Syria (Haas, 1955, p. 31, pl. 4, figs. 20-37; pl. 5, figs. 1-5) differs mainly in its sharper venter bearing a strong keel. Besides, the dimensions of the holotype (Haas, 1955, p. 31) show that *kersteni* is relatively more compressed and involute. The immature examples of *Lunuloceras*? (Spath, 1928, p. 121; pl. 13, figs. 8a,b) are too small and featureless for meaningful comparison. *L. cf. lunuloides* (Killian) from the Callovian of Madagascar (Spath, 1925, p. 149) probably differs by its fine and closely spaced ribs.

Another crushed specimen (No. H/123/73) from Bed No. 13 (Lower Callovian: in association with macrocephalid ammonoids of S of Lodai in Habo Hill has similar ornamentation, but is probably less compressed. This has been tentatively referred to the present new species.

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