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THE GEOLOGY OF THE UPPER DJADJERUD AND LAR VALLEYS (NORTH IRAN)
II. PALAEOLOGY

LOWER OXFORDIAN AMMONITES
FROM THE DALICHAH FORMATION

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Riassunto. Nel presente lavoro che fa parte degli studi sul Mesozoico dell'Elburz Centrale (Iran) in corso presso gli Istituti di Paleontologia e Geologia dell'Università di Milano viene illustrata una piccola fauna ad Ammoniti raccolta al tetto della Formazione di Dalichai.

Sono state identificate complessivamente 8 specie appartenenti ai generi *Sowerbyceras*, *Taramelliceras*, *Creniceras* e *Perisphinctes* con i due sottogeneri *Alligaticeras* e *Properisphinctes*.

Le specie riconosciute sembrano indicare con sufficiente sicurezza la presenza dell'Oxfordiano basale (zona a *Quenstedtoceras mariae*).

Si tratta della prima segnalazione dell'Oxfordiano inferiore in tutta la Catena dell'Elburz.

Introduction.

This study, which forms part of the programme of research on the Mesozoic of Central Elburz being carried out at the Institutes of Geology and Palaeontology at Milan University, deals with a small Ammonite fauna collected in 1963 by R. Assereto on the southern slope of Tiz Kuh. It represents the first record of the presence of the Lower Oxfordian in the region.

Preliminary determinations on the material were described by the writer at the Congress on the Jurassic which was held in Luxembourg in July 1967, in a paper presented in collaboration with R. Assereto and P. D. W. Barnard and published on v. 74, n. 1 of this periodical, to which the

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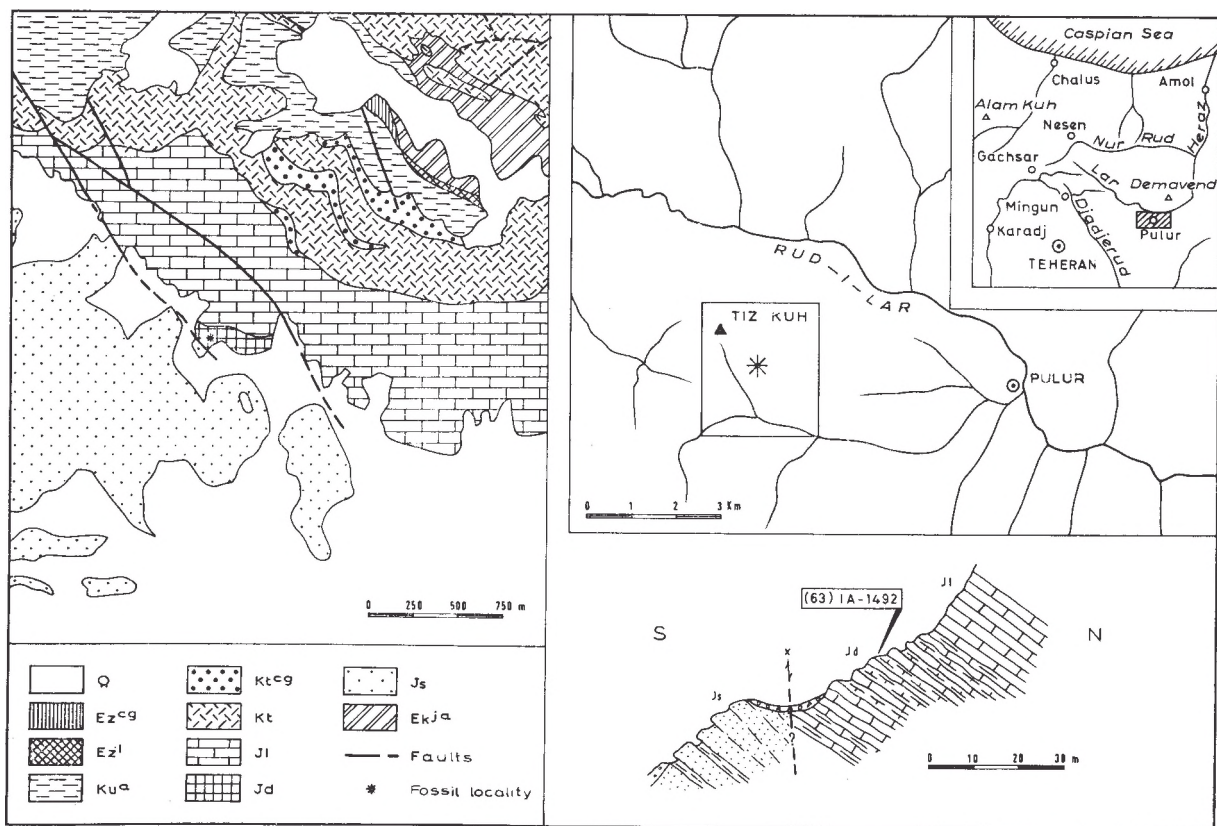


Fig. 1 - Map and section showing the location of the fossil locality. Q : scree slope, scree cone, detritus of large blocks; $Ez^{c,l}$: Ziarat Formation (Lower-Middle Eocene); Ku^a : Upper Cretaceous (Cenomanian); $Kt^{c,l}$ and Kt : Tiz Kuh Formation (Aptian-Albian?); Jl : Lar Limestone (Malm); Jd : Dalichai Formation (Upper Dogger-Lowest Malm); Js : Shemshak Formation (Lias - Lower Dogger); Ek^j : Karaj Formation (Middle-Upper Eocene).

reader is referred for a complete account of the state of knowledge of the Jurassic of Elburz.

It can be said of the Lower Oxfordian that faunas of this age have so far not been identified with certainty in the Tiz Kuh region or, indeed, in any part of the Elburz range. The only Lower Oxfordian reference made is that of Furon (1941) who recorded in the Abiek region, to the east of Kasvin, the presence of *Hibolites hastatus* (de Blainville) in shaly marls which according to Arkell (1956) may be referable to the Upper Callovian.

Composition of the fauna.

The fauna examined comprises 19 specimens of small and medium dimensions, not well preserved, in a marly limestone, and occurring as external moulds. Eight species have been identified, all belonging to the Ammonoidea, and in particular to the suborders *Phylloceratina* and *Ammonitina*. This latter is the best represented, comprising seven of the eight species, mostly belonging to the family *Perisphinctidae*. The complete list of species is presented below, arranged according to the general classification proposed by Arkell et al. (1957). *Alligaticeras* and *Properisphinctes* are however still considered to be subgenera of *Perisphinctes*, in accordance with the greater number of authors (Haas, Christ, Malinowska). Their systematic position definitely warrants an exhaustive reconsideration.

Sowerbyceras helios (Noetling)
Taramelliceras (Proscaphites) globosum (de Loriol)
Creniceras renggeri (Oppel)
Perisphinctes (Alligaticeras) cf. pseudograciosus Arkell
Perisphinctes (Properisphinctes) bernensis de Loriol
Perisphinctes (Properisphinctes) filocostatus Haas
Perisphinctes (Properisphinctes) trapezoidalis Haas
Perisphinctes (Properisphinctes) vicinus Haas

Considerations of the abundance of the individual species have in the present case only an empirical value, on account of the small number of specimens examined. In fact, of the many samples collected in the region, only one has yielded Ammonites assignable to the Lower Oxfordian. In this sample *Sowerbyceras helios* is the best represented, with six specimens; *Perisphinctes (Properisphinctes) bernensis* has four, and the other species have one or two specimens each.

Discussion on age.

The fossils examined in this work were collected on the southern slope of Tiz Kuh at 2970 m, towards the top of the Dalichai Formation. This last consists of alternations of limestones and greenish marls in thin beds. It is conformably overlain by the Lar Formation, referable to the Upper Oxfordian and perhaps to the Lower Kimmeridgian. The Dalichai Formation rests upon alternations of sandstones, siltstones and shales belonging to the Shemshak Formation, the age of which lies between Lower Lias and Lower-Middle Dogger (Barnard, 1965; Fantini Sestini, 1966; Barnard, 1967).

The thickness of the Dalichai Formation is reduced in the section including the fossiliferous locality compared with that in surrounding zones; in particular, the Callovian faunas so prominent elsewhere have not been found. It is thus probable that the lower part of the formation is faulted out. Unfortunately the Dalichai/Shemshak junction is covered by a thin layer of detritus and consequently the precise course of the fault is indeterminable. A large fault is however visible just to the north-west of the fossiliferous Tiz Kuh I locality, and has a trend N. 25° O.; its probable extrapolation would pass slightly to the south of the locality indicated.

The species identified are of limited stratigraphical range. The species *Sowerbyceras helios*, *Perisphinctes* (*Properisphinctes*) *filocostatus*, *P.* (*Properisphinctes*) *trapezoidalis*, *P.* (*Properisphinctes*) *vicinus* have been so far found only in the *Quenstedtoceras mariae* zone of Mount Hermon in Syria. The remaining species, *Taramelliceras* (*Proscaphites*) *globosum*, *Creniceras renggeri* and *Perisphinctes* (*Alligaticeras*) *pseudograciosus* are already present at the top of the Callovian (*Quenstedtoceras lamberti* zone or *Peltoceras athleta* zone) and persist as far as the *Quenstedtoceras mariae* zone or the *Cardioceras cordatum* zone, often exhibiting maximum frequency in the *mariae* zone (*Creniceras renggeri*). On the basis of these features the fauna under examination would seem assignable to the base of the Oxfordian (*Quenstedtoceras mariae* zone) (1).

Loc. Tiz Kuh I: (63) IA-1492.

LOCATION: descending towards Pular from the pass of the Lar and

(1) The Oxfordian-Callovian boundary is placed between the zone of *Quenstedtoceras lamberti* and that of *Quenstedtoceras mariae*, in accordance with the Recommendations of the Stratigraphical Committee as defined at the International Geological Congress on the Jurassic, held in Luxembourg in 1962.

Pulur valleys, taking the third stream on the left and climbing to 2970 m.
Geographical co-ordinates: Long. E. 51°59'42", Lat. N. 35°51'36".

Palaeontological descriptions (1)

Order AMMONOIDEA

Suborder PHYLLOCERATINA

Superfamily *Phyllocerataceae*

Family *Phylloceratidae*

Subfamily *Calliphylloceratinae*

Genus *Sowerbyceras* Parona & Bonarelli, 1895

Sowerbyceras helios (Noetling, 1887)

Pl. 31, fig. 1; text-fig. 2

1887 *Phylloceras helios* Noetling, p. 14, pl. 2, figs. 3, 4.

1893 *Phylloceras helios* - Pompeckj, pp. 190, 192, 202.

1928 *Phylloceras helios* - Frebold, p. 192.

1955 *Sowerbyceras helios* - Haas, p. 23, pl. 3, figs. 7-34; pl. 4, figs. 1-5.

HOLOTYPE. Not designated. Lectotype designated by Haas (1955): specimen figured by Noetling (1887) in pl. 2, fig. 4.

LOCUS TYPICUS. Majdal Shams, Mount Hermon, Syria.

STRATUM TYPICUM. *Quenstedtoceras mariae* zone, Lower Oxfordian.

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 a (6 specimens).

Small shell, moderately involute; latero-ventral shoulders rounded; flanks flattened, slightly convergent towards the umbilical seam; venter broad and very weakly convex; umbilicus rather broad.

Constrictions, limited to four per whorl, commencing on the umbilical wall strongly prorsiradiate, straight or slightly concave adorally and then, at about 2/3 of the height of the whorl, abruptly rursiradiate, at an obtuse angle to the first part, and finally joining the ventro-lateral shoulder in a tight adorally concave curve and crossing the venter almost straight or slightly convexed adorally. The depth and breadth of the

(1) Explanation of the symbols used. D: greatest diameter; H: height of the last whorl from the umbilical seam to the venter; H': height from the dorsum to the venter; W: width of the whorl section; U: width of the umbilicus.

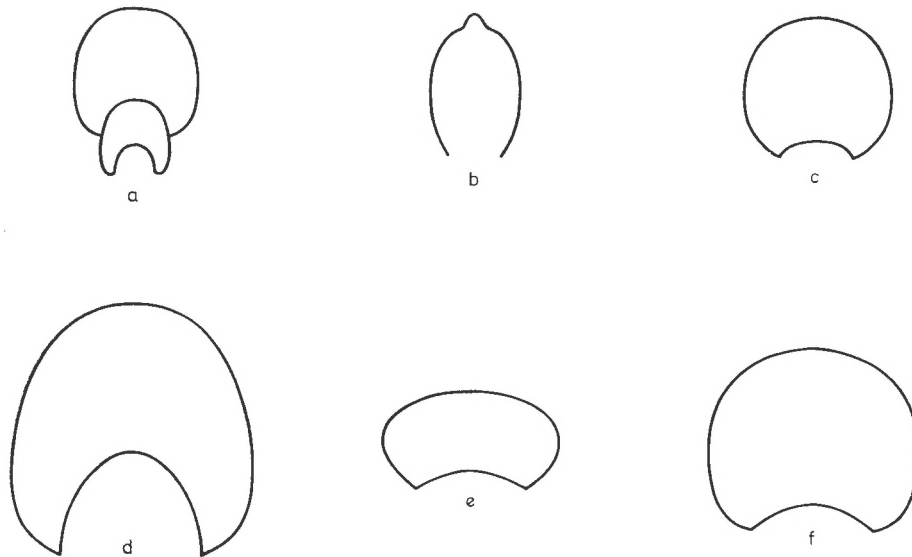


Fig. 2 - Whorl sections, a: *Sowerbyceras helios* (Noetling), specimen (63) IA-1492 ae; b: *Creniceras renggeri* (Oppel), specimen (63) IA-1492ba; c: *Perisphinctes* (*Properisphinctes*) *vicinus* Haas, specimen (63) IA-1492e; d: *Taramelliceras* (*Proscaphites*) *globosum* (de Loriol), specimen (63) IA-1492d; e: *Perisphinctes* (*Properisphinctes*) *trapezoidalis* Haas, specimen (63) IA-1492n; f: *Perisphinctes* (*Alligaticeras*) cf. *pseudograciosus* Arkell, specimen (63) IA-1492g.

constrictions very pronounced on the internal part of the flanks and weak on the venter.

DIMENSIONS (in mm):

	aa	ac	ae	ad
D	17.7	16.4	14.4	14.2
H	—	—	6.2 (43%)	—
W	7.4 (42%)	7.2 (44%)	6.2 (43%)	6.4 (45%)
U	5 (?) (28%)	—	—	—

REMARKS. The whorl section, which can be termed subquadrate, is slightly rounded ventrally; this, and the course of the constrictions, distinguish this species very well from related species. In *S. tortisulcatum* (d'Orbigny) of the Upper Oxfordian (Arkell, 1957, p. 189, fig. 220/1) the constrictions are not so strongly prorsiradiate in the first part of the course and lack the characteristic angulosity at 2/3 of the height of the

whorl; the section is higher also. *S. kobyi* (de Loriol) of the Jura Lédonien (1900, p. 21, pl. 2, figs. 12, 12 a) appears however to correspond well with the species of Noetling in general shape and in the constrictions; the section is however slightly higher and broader ventrally. The ratios obtained from the dimensions measured on the specimen illustrated on plate 2, figs. 12, 12 a (de Loriol, 1900) were: $H = 51\%$, $H' = 35\%$ and $W = 42\%$. Comparisons with those derived from the rich material of Haas (1955) confirm that the value of H is too high, while the other values fit well into the field of variability of *S. helios*.

OCCURRENCE. *S. helios* (Noetling) has been found in the Lower Oxfordian (*mariae* zone) of the Mount Hermon, Syria.

Suborder AMMONITINA

Superfamily *Haplocerataceae*

Family *Oppeliidae*

Subfamily *Taramelliceratinae*

Genus *Taramelliceras* del Campana, 1904

Subgenus *Proscaphites* Rollier, 1909

Taramelliceras* (*Proscaphites*) *globosum (de Loriol, 1900)

Pl. 31, fig. 2; text-fig. 2

1900 *Oppelia episcopalis* var. *globosa* de Loriol, p. 41, pl. 3, figs. 19, 20, 24.

1900 *Oppelia episcopalis* - de Loriol, p. 41, pl. 3, figs. 18, ? 21, 22, 23 (not fig. 17).

1928 ? *Oppelia* sp. (*globula* Qu. ?) - Frebold, p. 185.

1939 *Taramelliceras* (*Proscaphites*) *episcopale* var. *globosa* - Arkell, p. 149, pl. 8, fig. 6.

1955 *Taramelliceras* (*Proscaphites*) *globosum* - Haas, p. 102, pl. 16, figs. 6-27.

HOLOTYPE. Not designated. Lectotype designated by Haas (1955): specimen figured by de Loriol (1900) in pl. 3, figs. 19, 19 a.

LOCUS TYPICUS. Arinthod, Jura Lédonien.

STRATUM TYPICUM. *renggeri* Beds (Lower Oxfordian).

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 d (1 specimen).

Shell globose, with rapid growth, strongly involute. Section of whorls suboval, slightly broader dorsally, with venter and flanks rounded and with high umbilical wall.

Ornament of circumumbilical folds, poorly preserved, splitting into

two or three slender adorally concave riblets, separated by broad flat intervals, terminating at about 1 mm from the low keel, which is formed from a single spiral series of long slender beads separated from one another by narrow spaces.

DIMENSIONS (in mm):

D	23.8	
H	13 (?)	(55%)
W	12.9	(54%)
U	—	—

REMARKS. The specimen under examination is poorly preserved, but nevertheless the general shape and the ornament visible in restricted zones permit its attribution with assurance to the present species.

OCCURRENCE. *T. (Proscaphites) globosum* (de Loriol) has been found in the *renggeri* Beds of the Jura Lédonien and in the *mariae* zone of the Mount Hermon, Syria.

Genus *Creniceras* Munier-Chalmas, 1892

Creniceras renggeri (Oppel, 1863)

Pl. 31, fig. 3; text-fig. 2

- 1825 *Ammonites cristatus* - Sowerby, p. 24, pl. 421, fig. 3.
 1863 *Ammonites renggeri* Oppel, p. 203, (*cum syn.*).
 1887 *Oppelia (Oecotraustes) renggeri* - Noetling, p. 26, pl. 4, fig. 3 (*cum syn.*).
 1898 *Creniceras renggeri* - de Loriol, p. 65, pl. 5, figs. 3-9, text-fig. 24 (*cum syn.*).
 1900 *Creniceras renggeri* - de Loriol, p. 53, pl. 4, figs. 10, 11 (*cum syn.*).
 1914 *Creniceras renggeri* - Douvillé, p. 20, pl. 1, figs. 17-21 (*cum syn.*).
 1914 *Creniceras crenatum* - Douvillé, p. 21, pl. 1, fig. 16.
 1938 *Creniceras renggeri* - Roman, p. 169, pl. 15, fig. 161.
 1939 *Creniceras renggeri* - Arkell, p. 150, pl. 9, figs. 15-27 (*cum syn.*).
 1951 ? *Creniceras renggeri* (?) - Jeannet, p. 101, pl. 31, fig. 16.
 1955 *Creniceras renggeri* - Haas, p. 111, pl. 17, figs. 18-37 (*cum syn.*).
 1956 *Creniceras renggeri* - Ziegler, p. 567, figs. 13 c-f.
 1963 *Creniceras renggeri* - Malinowska, p. 30, pl. 4, figs. 29, 30.
 1966 *Creniceras renggeri* - Palframan, p. 301, pl. 50, figs. 2-4; pl. 51, figs. 1-12; pl. 52, figs. 1-9.

HOLOTYPE. Specimen figured by Sowerby (1825) in pl. 421, fig. 3.

LOCUS TYPICUS. Weymouth, England.

STRATUM TYPICUM. Oxford Clay.

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 b (2 specimens).

Shell of very small dimensions, flattened, with irregular winding.

Whorl section subelliptical with weakly convex flanks; umbilical angle rounded; venter convex and tending to fastigate; umbilicus broadening appreciably in the last half whorl, corresponding to the body chamber.

Ornament apparently absent in the inner whorls; body chamber with weak and indistinct folds. Strong and high ventral serrations, of elliptical section at the base and very flattened at the distal extremity, absent in the inner whorls.

DIMENSIONS (in mm):

	ba	bb
D	17.7	17.5
H	7 (40%)	—
H'	6	6.9 (?) (39%)
W	4.8 (27%)	4.2 (29%)

OCCURRENCE. *C. renggeri* (Oppel) has been found in the Lower Oxfordian of England, France, Poland, Russia and Syria. This species seems to be present from *lamberti* zone to *cordatum* zone with acme in *mariae* zone (Arkell, 1939).

Superfamily *Perisphinctaceae*

Family *Perisphinctidae*

Subfamily *Perisphinctinae*

Genus *Perisphinctes* Waagen, 1869

Subgenus *Alligaticeras* Buckman, 1923

***Perisphinctes* (*Alligaticeras*) cf. *pseudograciosus* Arkell, 1939**

Pl. 31, fig. 8; text-fig. 2

cf. 1932 *Perisphinctes* cf. *gracilis* - Maire, p. 36, pl. 4, fig. 9.

cf. 1939 *Perisphinctes* (*Alligaticeras*) *pseudograciosus* Arkell, p. 161, pl. 9, fig. 12.

HOLOTYPE. Specimen figured by Arkell (1939) in pl. 4, fig. 12.

LOCUS TYPICUS. Woodham Pit, Akeman Street Station, Buckinghamshire.

STRATUM TYPICUM. Bed B, *mariae* zone.

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 g (1 specimen).

Shell small, evolute. Whorl section tending to subrectangularity, more broad than high; venter broad, weakly convex; flanks almost flat; umbilical angle rounded; umbilicus broad and probably shallow.

Ornament consisting of ribs, about 35 in the outer whorl, slender and separated by rather broad intervals, prorsiradiate, weakly concave adorally and bifurcating on the external quarter of the whorl height. On the outer whorl are two constrictions, at about 225° to one another, very deep and broad, strongly convex adorally on the venter. Inner whorls not visible.

DIMENSIONS (in mm):

D	22.9	
H	8.4	(36%)
W	10.2	(44%)
U	9	(39%)

REMARKS. The umbilicus of the present specimen appears to be smaller than that of the specimen illustrated by Arkell. The difference is however not encountered in the specimen reproduced by Maire; the latter is however more slender, probably as a result of its greater dimensions (D = 57 mm). The ornament however corresponds well.

OCCURRENCE. *P. (Alligaticeras) pseudograciosus* Arkell has been found in the *lamberti* zone of the Franche-Comté and in the *mariae* zone of Woodham Pit of Buckinghamshire and in St. Ives of Huntingdonshire.

Subgenus *Properisphinctes* Spath, 1931

Perisphinctes (Properisphinctes) bernensis de Loriol, 1898

Pl. 31, fig. 5

1887 *Perisphinctes latilinguatus* Noetling, p. 28 (not pl. 4, figs. 7, 8).

1898 *Perisphinctes bernensis* de Loriol, p. 76, pl. 5, figs. 18-24.

1900 *Perisphinctes bernensis* - de Loriol, p. 62, pl. 4, figs. 27-32 (not figs. 23-26).

1931 *Properisphinctes bernensis* - Spath, p. 404, pl. 54, figs. 3, 9; pl. 58, fig. 8; pl. 59, fig. 7.

1936 *Perisphinctes bernensis* - Arkell, p. 41, pl. 100, figs. 2, 3.

1939 *Perisphinctes (Properisphinctes) bernensis* - Arkell, p. 159, pl. 9, figs. 10, 11.

1955 *Perisphinctes (Properisphinctes) bernensis* - Haas, p. 131, pl. 20, figs. 37-58; pl. 21, figs. 1-31.

HOLOTYPE. Not designated. Lectotype designated by Arkell (1936): specimen figured by de Loriol (1898) in pl. 5, figs. 18, 18 a.

LOCUS TYPICUS. Jura bernois.

STRATUM TYPICUM. Lower Oxfordian (probably *cordatum* zone).

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 f (4 specimens).

Shell of medium size, evolute, discoidal in the adult state and globose

in the juvenile forms. Whorl section wider than higher to slightly higher than wider; whorl shape elliptical to subquadrate transversally, with venter initially very broad and almost flat, then narrower and moderately convex; flanks slightly convex but not inclined towards the umbilical seam; umbilical angle rounded. Umbilicus broad and not very deep.

Ornament of ribs, denser in the inner whorls, very rare at the end of the outer whorl, slender, separated by broader intervals, prorsiradiate, bifurcating on the ventro-lateral shoulder in slender small riblets. These are convex adorally and almost absent in correspondence to the spiral median sulcus, which is visible on the outer whorl of the largest specimen.

Constrictions more or less deep, about three per whorl, slightly sinuous.

DIMENSIONS (in mm):

	fa		fe	
D	11.1		18.9	34.8
H	4.2 (?)	(38%)	6.7 (35%)	9 (26%)
H'	3.3	(29%)	4.6 (24%)	8.4 (24%)
W	6.2	(56%)	8.5 (45%)	10 (29%)
U	—		9.3 (49%)	—

OCCURRENCE. *P. (Properisphinctes) bernensis* de Loriol has been found in the *mariae* and *cordatum* zones of England, in the *mariae* zone of France, in the *renggeri* Beds of the Jura bernois and Jura Lédonien, from *athleta* zone to *cordatum* zone of Franche-Comté, in the *crenatum* and *christoli* zones of La Voulte, in the *mariae* zone of the Mount Hermon and in the Cutch (Upper « *athleta* beds »).

***Perisphinctes (Properisphinctes) filocostatus* Haas, 1955**

Pl. 31, fig. 7

1955 *Perisphinctes (Properisphinctes) filocostatus* Haas, p. 130, pl. 20, figs 19-36.

HOLOTYPE. Figured by Haas (1955) in pl. 20, figs. 32-34.

LOCUS TYPICUS. Majdal Shams, Mount Hermon, Syria.

STRATUM TYPICUM. *Quenstedtoceras mariae* zone (Lower Oxfordian).

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 c (1 specimen).

Shell small, about 24 mm in diameter, slightly involute. Section of whorls subcircular, more high than broad, slightly depressed ventrally.

Ornament very characteristic, formed of costae of variable thickness strong initially and then very slender, irregularly distributed, rectiradiate or slightly rursiradiate near the umbilical seam, then prorsiradiate, bifurcating at the inner third of the flank or, more rarely, at the outer third, with rare small costae intercalated on the ventral region. 12 inner ribs and 23 outer ribs were counted on the ventro-lateral shoulder in a quarter of a whorl.

Three constrictions are visible on the outer half whorl.

OCCURRENCE. *P. (Properisphinctes) filocostatus* Haas has been found in the *mariae* zone of the Mount Hermon, Syria.

Perisphinctes (Properisphinctes) trapezoidalis Haas, 1955

Pl. 31, fig. 6; text-fig. 2

1955 *Perisphinctes (Properisphinctes) trapezoidalis* Haas, p. 139, pl. 22, figs. 1-20.

SYNTYPES. A and B designated by Haas (1955) in p. 139, pl. 22, figs. 2-4 and 18-20.

LOCUS TYPICUS. Majdal Shams, Mount Hermon, Syria.

STRATUM TYPICUM. *Quenstedtoceras mariae* zone (Lower Oxfordian).

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 n (1 specimen).

Shell small, evolute, globose. Whorl section much more wide than high; venter very wide, weakly convex; ventro-lateral shoulder prominent; flanks short, strongly inclined towards the umbilical seam. Umbilicus broad and deep.

Ornament of robust ribs, slightly prorsiradiate, always more prominent up to the point at which they divide into two slender riblets convex adorally.

Constrictions, two very deep and two superficial on the outer whorl, slightly prorsiradiate, sinuous with weak concavity initially adoral and then, on the venter, aboral.

DIMENSIONS (in mm):

D	14.8	
H	4.3	(29%)
H'	3.9(?)	(26%)
W	8.8	(59%)
U	6.8	(46%)

OCCURRENCE. *P. (Properisphinctes) trapezoidalis* Haas has been found in the *mariae* zone of the Mount Hermon, Syria.

Perisphinctes (Properisphinctes) vicinus Haas, 1955

Pl. 31, fig. 4; text-fig. 2

1955 *Perisphinctes (Properisphinctes) vicinus* Haas, p. 127, pl. 19, figs. 22-33; pl. 20, figs. 1-18.

SYNTYPES. A and B designated by Haas (1955) and figured in pl. 20, figs. 7-12.

LOCUS TYPICUS. Majdal Shams, Mount Hermon, Syria.

STRATUM TYPICUM. *Quenstedtoceras mariae* zone (Lower Oxfordian).

LOCALITY. Tiz Kuh I.

MATERIAL. (63) IA-1492 e (2 specimens).

Shell of small dimensions, evolute. Whorl section transversally elliptical, slightly more wide than high; venter broad; flanks weakly convex; umbilical angle rounded and umbilical wall low; umbilicus large and shallow.

Ornament of outer whorl consisting of ribs, 40 per whorl, slightly prorsiradiate, rather robust, bifurcating at the outer third, very rarely at the inner third also. Constrictions shallow, rare, perhaps two per whorl. Inner whorls smooth, then with markedly prorsiradiate costae and with broad and deep constrictions, more prorsiradiate than the costae.

DIMENSIONS (in mm):

D	23.3	
H	7.2	(31%)
H'	5.4	(23%)
W	7.7	(33%)
U	11.2	(48%)

OCCURRENCE. *P. (Properisphinctes) vicinus* Haas has been found in the *mariae* zone of the Mount Hermon, Syria.

REFERENCES

- ARKELL W. J. (1935-48) - A monograph on the Ammonites of the English Corallian beds. *Palaeont. Soc.*, v. 88-102, 504 pp., 84 pls., 138 text-figs., London.
- ARKELL W. J. (1939) - The Ammonites succession at the Woodham Brick Company's Pit, Akeman Street Station, Buckinghamshire, and its bearing on the classification of the Oxford Clay. *Quart. Journ. Geol. Soc.*, v. 95, pp. 135-222, 4 pls., London.
- ARKELL W. J. (1956) - The Jurassic of the world. V. of 757 pp., 46 pls., Ed. Olyver & Boyd, London.
- ARKELL W. J., FURNISH W. M. & OTHERS (1957) - In MOORE R. C.: Treatise on Invertebrate Paleontology, Part I, Mollusca 4. Cephalopoda, Ammonoidea. *Geol. Soc. Amer., Univ. Kansas Press*, 490 pp., 558 text-figs., Lawrence, Kansas.
- ASSERETO R. (1966) - Geological Map of Upper Djadgerud and Lar Valleys (Central Elburz Iran). With Explanatory Notes. *Pubbl. Ist. Geol. Univ. Milano*, s.G, n. 232, 96 pp., 2 geol. maps, Milano.
- ASSERETO R., BARNARD P. D. W. & FANTINI SESTINI N. (1968) - Jurassic stratigraphy of the Central Elburz (Iran). *Riv. Ital. Paleont. Strat.*, v. 74, n. 1, pp. 3-21, 3 text-figs., 11 tab., Milano.

- BARNARD P. D. W. (1965) - The geology of the Upper Djadjerud and Lar Valleys (North Iran). II. Palaeontology. Flora of the Shemshak Formation. Part 1. Liassic plants from Dorud. *Riv. Ital. Paleont. Strat.*, v. 71, n. 4, pp. 1123-1168, 5 pls., 8 text-figs., Milano.
- BARNARD P. D. W. (1967) - The geology of the Upper Djadjerud and Lar Valleys (North Iran). II. Palaeontology. Flora of the Shemshak Formation. Part 2. Liassic plants from Shemshak and Ashtar. *Riv. Ital. Paleont. Strat.*, v. 73, n. 2, pp. 539-590, 4 pls., 6 text-figs., Milano.
- CHRIST H. A. (1960) - Beiträge zur Stratigraphie und Paläontologie des Malm von Westsizilien. *Mém. Soc. Paléont. Suisse*, v. 77, 141 pp., 9 pls., 14 text-figs., Bâle.
- DOUVILLÉ R. (1914) - Etudes sur les Oppedidés de Dives et Villers-sur-Mer. *Mém. Soc. Géol. France*, n. 48, 26 pp., 2 pls., 32 text-figs., Paris.
- FANTINI SESTINI N. (1966) - The geology of the Upper Djadjerud and Lar Valleys (North Iran). II. Palaeontology. Upper Liassic Molluscs from Shemshak Formation. *Riv. Ital. Paleont. Strat.*, v. 72, n. 3, pp. 795-852, 5 pls., 2 text-figs., Milano.
- FREBOLD H. (1928) - Die stratigraphische Stellung der Grenzschichten des syrischen Calloviens und Oxford. *Centralbl. Min. Geol. Pal.*, s.B, pp. 183-201, 1 pl., 1 text-fig., Stuttgart.
- FURON R. (1941) - Géologie du Plateau Iranien (Perse-Afghanistan-Belouchistan). *Mém. Mus. Hist. Nat.*, n.s., v. 7, n. 2, pp. 177-414, 8 pls., 58 text-figs., Paris.
- HAAS O. (1955) - Revision of the Jurassic Ammonite fauna of Mount Hermon, Syria. *Bull. Amer. Mus. Nat. Hist.*, v. 108, 210 pp., 30 pls., New York.
- JEANNET A. (1951) - Stratigraphie und Palaeontologie des oolithischen Eisenerzlagers von Herznach und seiner Umgebung. 1. Teil. *Beitr. Geol. Schweiz, Geotechn. Ser.*, v. 5, n. 13, 240 pp., 107 pls., 544 text-figs., Bern.
- LORIOU P. DE (1898-99) - Etude sur les Mollusques et Brachiopodes de l'Oxfordien inférieur ou zone à *Ammonites renggeri* du Jura bernois, accompagnée d'une notice stratigraphique par M. le Professeur E. Koby. *Mém. Soc. Paléont. Suisse*, v. 25-26, 220 pp., 12 pls., 29 text-figs., Genève.
- LORIOU P. DE (1900) - Etude sur les Mollusques et Brachiopodes de l'Oxfordien inférieur ou zone à *Ammonites renggeri* du Jura Lédonien, accompagnée d'une notice stratigraphique par M. Abel Girardot. *Mém. Soc. Paléont. Suisse*, v. 27, 196 pp., 6 pls., 19 text-figs., Genève.
- MAIRE V. (1932) - Etude sur les espèces d'Ammonites de l'Oxfordien inférieur de France-Comté appartenant aux genres *Perisphinctes*, *Aspidoceras*, *Peltoceras*. *Bull. Soc. Géol. France*, v. 2, pp. 21-51, 2 pls., Paris.
- MALINOWSKA L. (1963) - Stratigrafia Oksfordu Jury Czeszochowskiej na podstawie Ammonitów. *Inst. Geol. Prace*, v. 36, 165 pp., 41 pls., 26 text-figs., Warszawa.
- NOETLING F. (1887) - Der Jura am Hermon. Eine geognostische Monographie. V. of 52 pp., 7 pls., Ed. Schweizerbart'sche Verlagsbuchhandlung (E. Koch), Stuttgart.
- PALFRAMAN D. F. B. (1966) - Variation and ontogeny of some Oxfordian Ammonites: *Taramelliceras richei* (de Loriol) and *Creniceras renggeri* (Oppel), from Woodham, Buckinghamshire. *Palaeontology*, v. 9, n. 2, pp. 290-311, 5 pls., 15 text-figs., London.
- OPPEL A. (1863) - Ueber jurassische Cephalopoden. *Palaeont. Mitt. Mus. K. Bayer. Staat.*, v. 2, n. 3, pp. 163-266, 24 pls., Stuttgart.
- POMPECKJ J. F. (1893) - Beiträge zu einer Revision der Ammoniten des schwäbischen Jura. *Jahresh. Ver. Vaterl. Naturk. Württemberg*, Jg. 49, pp. 151-248, 7 pls., 23 text-figs., Stuttgart.
- ROMAN F. (1938) - Les Ammonites Jurassiques et Crétacées. Essai de genera. V. of 551 pp., 53 pls., Ed. Masson, Paris.
- SOWERBY J. (1825) - The mineral conchology of Great Britain. V. 5 (1825), 186 pp., 96 pls., London.
- SPATH L. F. (1927-33) - Revision of the Jurassic Cephalopod fauna of Kachh (Cutch). *Palaeont. Indica*, n.s., v. 9, Mem. 2, 952 pp., 130 pls., Calcutta.
- ZIEGLER B. (1956) - *Creniceras dentatum* (Ammonitacea) in Mittel-Malm Südwestdeutschlands. *N. Jb. Geol. Paläont., Mh.*, v. 12, pp. 553-575, 13 text-figs., 2 tab., Stuttgart.

PLATE 31

- Fig. 1 - *Sowerbyceras helios* (Noetling). Tiz Kuh I, (63) IA-1492 a a; $\times 2$.
- Fig. 2 - *Taramelliceras (Proscaphites) globosum* (de Loriol). Tiz Kuh I, (63) IA-1492d;
 $\times 2$.
- Fig. 3 - *Creniceras renggeri* (Oppel). Tiz Kuh I, (63) IA-1492bb; $\times 2$.
- Fig. 4 - *Perisphinctes (Properisphinctes) vicinus* Haas. Tiz Kuh I, (63) IA-1492e; $\times 2$.
- Fig. 5 - *Perisphinctes (Properisphinctes) bernensis* de Loriol. Tiz Kuh I, (63) IA-1492fe;
 $\times 2$.
- Fig. 6 - *Perisphinctes (Properisphinctes) trapezoidalis* Haas. Tiz Kuh I, (63) IA-1492n;
 $\times 2$.
- Fig. 7 - *Perisphinctes (Properisphinctes) filocostatus* Haas. Tiz Kuh I, (63) IA-1492c;
 $\times 2$.
- Fig. 8 - *Perisphinctes (Alligaticeras) cf. pseudograciosus* Arkell. Tiz Kuh I, (63) IA-1492g; $\times 2$.



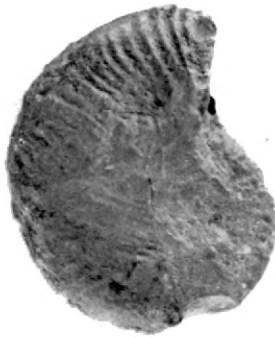
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