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SOME REMARKS ON THE ORIGIN OF THE SUBFAMILY IDOCERATINAE SPATH, 1924 (PERISPHINCTIDAE, AMMONOIDEA)

Abstract: Simoceratids (Idoceratinae) represent a peculiar group of Upper Jurassic ammonites typical of the Tethyan province. The earliest Idoceratinae, the genera *Idoceras* and *Nebrodites*, were thought to appear not before the uppermost Oxfordian. However, in Mid-Oxfordian strata of the Polish Jura Chain there occur some ammonites closer to Kimmeridgian nebroditids than to co-occurring perisphinctids. These forms, separated here as the subgenus *Passendorferia* nov. of the genus *Nebrodites*, most probably evolved from some *Kranaosphinctes* and lead to *Nebrodites* proper. The nominal genus of this subfamily, *Idoceras* Burckhardt, 1906, presumably represents a side-branch of nebroditids.

INTRODUCTION

The present paper deals with the origin of „simoceratids", Upper Jurassic ammonites regarded as typical of the Mediterranean (= Tethyan) province. The origin and taxonomical position of this group is still the subject of controversy, primarily because of scarcity of material. It is generally accepted that the first representatives of this group, ammonites of the genera *Idoceras* Burckhardt, 1906, and *Nebrodites* Burckhardt, 1912, did not appear before the uppermost Oxfordian.

However, during studies on the biostratigraphical subdivision of the Middle Oxfordian in the Polish Jura Chain, chiefly in the area of Częstochowa (see Text-fig. 1), a number of early *Nebrodites* were found. The bulk of the material is derived from Middle Oxfordian platy limestones (Plicatilis-Bifurcatus Zones), the stratigraphy of which was discussed in detail by Różycki (1953), Malinowska (1963, 1972*a*), Brochwicz-Lewiński (1970) and is the subject of further studies on the part of the author. Some of the specimens at the author's disposal were found by Dr. J. Kutek, J. Haase, M. Sc., and G. Kulesza, M. Sc. The specimens are housed in the Geological Institute, Warsaw University, Warsaw, and the numbers

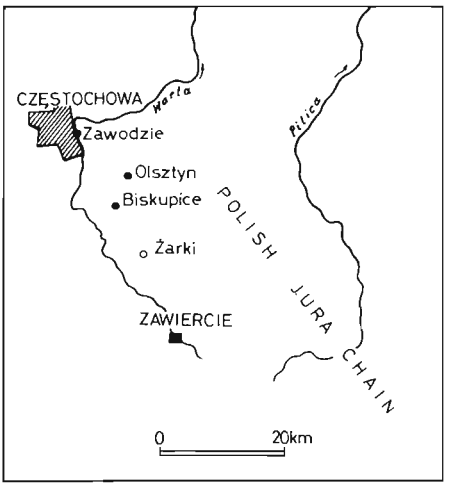

Fig. 1. Location map of the ammonite-bearing exposures (solid circles) in the Polish Jura Chain.

of specimens given throughout the paper refer to the collections of the Institute.

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PREVIOUS STUDIES ON IDOCERATINAE

„Simoceratids" represent a peculiar group of Upper Jurassic ammonites characteristic of the Mediterranean (= Tethyan) province (Neumayr, 1872; Uhlig, 1911; Geyer, 1961; Enay, 1966, 1972). The origin of that group, as well as its systematics are still the subject of controversy, which primarily results from the scarcity of material. A number of ammonites of that group were described in the 19th c. by Neumayr (1871, 1873), Gemmellaro (1872—1882), Favre (1877), Quenstedt (1888), and others, mostly under the generic name of *Simoceras* Zittel, 1870. Subsequently Fisher (1882) selected *Ammonites biruncinatus* Qu. as the genotype of *Simoceras*, thus confining this generic name to ammonites with venter bordered by

characteristic heavy clavi. Thus, on the basis of differences in respect to the *Simoceras* proper, Burckhardt (1906, 1912) introduced two new generic names, *Idoceras* and *Nebrodites*. Later, Spath (1925) proposed a number of other new genera, as *Subnebrodites, Lytogyroceras, Mesosimoceras, Benacoceras,* etc., and separated the whole group in two new families, Idoceratidae Spath 1924 and Simoceratidae Spath, 1924. The former family was to comprise the genera *Idoceras, Subnebrodites,* and *Nebrodites,* and the latter all the remaining ones. Arkell (1957, pp. L323 and L340) placed the genus *Idoceras* in the subfamily Ataxioceratinae (Perisphinctidae) and all the remaining genera in the subfamily Simoceratinae (Aspidoceratidae). In turn, Ziegler (1959) in his revision of this group placed the genera *Mesosimoceras, Simoceras, Lytogyroceras,* and *Simosphinctes* Barthel, 1957, in the subfamily Idoceratinae (Perisphinctidae) and rejected the family Simoceratidae. At present, some authors, as Vigh (1971) a. o., accept the point of view of Arkell (1957), whereas Christ (1960), Geyssant (1966), Bantz (1970) a. o. follow Ziegler (1959).For the present purpose it is more convenient to accept the subfamily Idoceratinae sensu Ziegler (1959, p. 53),as it comprises all the "simoceratid" genera which will be dealt with.

The studies carried out since Neumayr (1872) and Uhlig (1911) confirmed that geographical distribution of this group is essentially confined to the Tethyan areas. However, it appears that the representatives of *Idoceras* and *Nebrodites* also entered the epicontinental seas of the sub-Mediterranean province, reaching as far north as the Polish Jura Chain and the Holy Cross Mts area in Poland, (Wierzbowski, 1965, 1966; Kutek, 1968). These are the northernmost records of these genera, as Japan was at that time situated at 15—20° degree of nothern latitude (see Fujiwara, 1969). The genus *Idoceras* appears for the first time in the Late Oxfordian, the Planula Zone, in Europe (see Ziegler, 1959; Wierzbowski, 1964, 1966; Enay, 1966; Romanov & Danitsh, 1971; Krimholtz *et al.*, 1972) and is also known from roughly contemporaneous strata of Mexico, New Zealand, Sulu Island, Japan and Africa. The earliest representative of *Nebrodites, Simoceras contortum* Neumayr, was recorded by Neumayr 1871, 1873) from remarkably older strata, the Transversarium Zone, of the Carpathians (see also Birkenmajer, 1963, p. 48), but all the recent records of that genus are from the Kimmeridgian (Ziegler, 1959; Geyer, 1961; Bantz, 1970; a. o.) or the uppermost Oxfordian, the Planula Zone (Geister &Geyer, 1968; a. o.). The remaining genera do not appear before the Kimmeridgian (see Ziegler, 1959; Geyer, 1961; a. o.).

The origin of that group is very controversial, primarily due to the scarcity of the material. The first evolutionary series for this group was proposed by Neumayr (1871, p. 370), i.e.: *Simoceras contortum* Neumayr (the Transversarium Zone) — *S. Herbichi* v. Hauer (the Acanthicum

Zone) — *S. colonum* Neumayr — *S. benianum* Catullo — *S. Venetianum* Zittel. Next, Gemmellaro (1877, p. 213) gave more elaborated and complex evolutionary pattern of that group; in that scheme, *Simoceras Fraasi* Oppel (Callovian) was an ancestor of *S. contortum* Neumayr, which, in turn, gave rise to a few series: (a) *S. herbichi* v. Hauer, *S. teres* Neumayr, *S. pulchellum* Gemmellaro, *S. planicyclum* Gemmellaro, *S. zeuxis* Gemmellaro, etc., (b) *S. agrigentinum* Gemmellaro, etc., (c) *S. explanatum* Neumayr, and (d) *S. cavouri* Gemmellaro. Later Mr. Suttner (*fide* Siemiradzki, 1891, p. 54) regarded *Perisphinctes birmensdorfensis* (Moesch) as an ancestral form of the genus *Simoceras* (s. l.). Spath (1925, p. 130) considered *Idoceras* and *Nebrodites* as probable derivatives of the genus *Biplices* Siem. (recte *Orthosphinctes* Schindewolf, 1925), and the family Simoceratidae as „a convenient but polyphyletic group of descendants of Idoceratinae (*Nebrodites*) replenished perhaps by independant off-shoots of other Perisphinctids and Virgatitids and perhaps original Lytoceratids (*Lytogyroceras*?)" (Spath, 1925, p. 132). According to Arkell (1956, p. 599) the genus *Idoceras* originated in Mexico and therefrom it migrated to New Zeland, Asia and Europe. In the case of Simoceratinae, Arkell (1957, p. L340), similarly as Spath (*loc. cit.*), considered that group as polyphyletic, presumably representing largely independant off-shoots of various Perisphinctidae, Aspidoceratidae, or even Oppeliidae. Ziegler (1959, p. 52) regarded *Idoceras* and *Nebrodites* as closely affined genera of obscure origin, and simoceratids proper as representing a higher morphological and phylogenetic stage in the development of nebroditids.

The excellent monograph of Oxfordian perisphinctids by Enay (1966) did not reveal existence of any *Nebrodites* proper in the Oxfordian. However, Enay (1966, p. 590) distinguished a group of Mediterranean (= Tethyan) perisphinctids, comprising *Perisphinctes (Kranaosphinctes) cyrilli* Neumann, *P. (Arisphinctes) tenuis* Enay, *P. (Dichotomosphinctes) trichoplocus* Gemmellaro, and *P. (Otosphinctes) birmensdorfensis* (Moesch) and affined forms. Of these, *P. (O.) birmensdorfensis* deserves a special attention herein, as it was previously regarded as an ancestor of the group in question and its taxonomic position remains questionable (see Enay, 1966, p. 447; and see below). The studies carried out by the present author in the Częstochowa area, Polish Jura Chain, revealed the occurrence of a quite numerous assemblage of perisphinctids much closer to the *Nebrodites herbichi-teres* group from the Kimmeridgian than to the co-occuring Mid-Oxfordian perisphinctid fauna, and which may give a valuable clue to the origin of Idoceratidae. The perisphinctid assemblage in question match the diagnosis of the genus *Nebrodites* Burckhardt, 1912, but cannot be accomodated in any existing subgenera of that genus, so is here separated as *Passendorferia* subgen. nov.

A POSSIBLE ORIGIN OF IDOCERATINAE

The subgenus *Passendorferia* nov., below defined, is undoubtedly closely related to *Nebrodites s.s.*, but is morphologically less advanced and stratigraphically appears earlier. It presumably comprises the earliest representatives of the subfamily Idoceratinae *sensu* Ziegler (1959, p. 53). Looking at *Passendorferia*, and especially at its earlier member, *N. (P.) ziegleri* n.sp., one cannot deny its striking resemblance to certain, somewhat older species of *Kranaosphinctes* Buckman, as *Perisphinctes cyrilli* Neumann (Neumann, 1907, p. 39, Pl. 4, Fig. 12a, Pl. 7, Fig. 12b), and particularly *P. (Kranaosphinctes) cyrilli* Neumann *in* Enay (1966, p. 433, Pl. 18, Fig. 2, text-fig. 124), and to *P. methodii* Neumann (Neumann, 1907, p. 40, Pl. 5, Fig. 15), which, together with *P. navillei* Favre, *P. cf. densicosta* Gemm., and *P. birmensdorfensis* (Moesch) were placed by Neumann (1907, p. 24) in „Simoceroiden-Grouppe". The overall style of ribbing of *Kranaosphinctes* is retained in *Passendorferia* subgen. nov. and differences are primarily limited to the ornamentation of the ventral side, broadly rounded and smooth in *Kranaosphinctes*, and tabulate, ornamented by ribs and with more or less distinct smooth band in these *Nebrodites s.l.* Thus, the derivation of early Idocertaine from the „Simoceroiden-Gruppe" of Neumann (1907) seems quite probable both on morphological and stratigraphical grounds. However, two problems remain unsolved yet, i.e.:

(1) It is not certain whether or not the nebroditids proper occur in the Mid-Oxfordian, the Transversarium Zone *s.l.* They were cited from such early strata twice, by Neumayr (1871, 1873) and by Spath (1913; *Perisphinctes* sp. nov. *aff. trichoplocus* Gemm., p. 575. 575, Pl. 3, Fig. 4). If such early records of *Nebrodites s.s.* are confirmed, it would mean that separation of Idoceratinae from Perisphinctinae took place earlier, before the Plicatilis or even Cordatum Zone and that *N.* (*Passendorferia*) nov. subgen. actually represents less advanced side-branch of Idoceratinae.

(2) Similar ornamentation as that of the outer whorls of the assemblage in question is achieved by contemporaneous representatives of *Arisphinctes* and *Ampthillia*, i.e., by unrelated forms. This raises the problem of reasons of such changes in and reliability of outer whorls sculpture.

If *Passendorferia* nov. subgen. actually represents ancestral group of *Nebrodites s.s.*, than the transition would be related to a decrease in number of biplicate ribs, lowering of the point of furcation, and disappearance of swellings resembling parabolic nodes from the ultimate body chamber of microconchs. In the case of macroconchs, the transition to the *Nebrodites herbichi—teres* group would be connected with changes in ornamentation of their inner whorls corresponding to changes in ornamentation of the microconchs, and with a decrease in overall size of the shell. The diminution

of the shell would primarily result in reduction of shell part occuppied by mature and gerontic ribs.

The origin of the genus *Idoceras* Burckhardt, 1906, is still more obscure. Mexican origin hypothesis advocated by Arkell (1956, p. 599) seems to be supported neither on paleobiogeographic grounds nor on find of ancestral forms in that region. According to the present author, this genus or at least some of its representatives may have evolved from less densicostate forms from the Bimammatum Zone of the Mediterranean region, figured by Oppenheimer (1907) as *Perisphinctes cf. birmensdorfensis* Moesch, *P. abeli* Oppenh., and *P. latumbonatus* Oppenh., and by Christ (1960) as *P. (Alligaticeras)* n. sp. *aff birmensdorfensis* (Moesch).

DESCRIPTIONS

Family **Perisphinctidae** Steinmann 1890
Subfamily **Idoceratinae** Spath 1924

Genus *Nebrodites* Burckhardt 1912

Type species: *Simoceras agrigentinum* Gemmellaro.

Diagnosis: After Ziegler (1959, p. 21).

Subgenus *Passendorferia* nov.

Type species: Passendorferia teresiformis sp.n.

Derivation of the name: Named in honour of Professor Edward Passendorfer, the student of Tethyan ammonite faunas of the Tatra Mts.

Diagnosis. — Dimorphic. Macroconchs: schell markedly evolute, up to 300 mm in diameter or more. Whorls subcircular, slightly overlapping, becoming subquadrate and finally subelliptical. Ribs radial, biplicate and single, finally single, sometimes alternating. Point of furcation close to ventral margin; ribs most prominent at the ventral margin. Early whorls heavily constricted.

Presumable microconchs: shell markedly evolute, up to 70 mm in diameter or more. Whorls subcircular, slightly overlapping. Ribs radial, biplicate and single. Heavy constrictions. Aperture formed by lappet, proceeded by construction. Features resembling parabolic nodes, usually 3, marked on final body chamber.

Species assigned: N. (P.) teresiformis sp. n., *N. (P.) ziegleri* sp. n., *N. (P.) birmensdorfensis* (Moesch), *N. (P.) cf. uptonioides* (Enay). I refer to the proposed new subgenus, besides the above species, *Perisphinctes subrota* Simionescu (non Choffat) figured by Simionescu (1907, p. 51, Pl. 6, Fig. 1,

text-fig. 31) from the Transversarium Zone of Dobrogea, and *Perisphinctes* (?) cf. *melmorei* Enay (non Arkell) figured by Enay (1966, p. 441, Pl. 24, Figs. 2—3, text-fig. 127).

Occurrence. — Oxfordian, the Plicatilis-Bifurcatus-(?) Bimammatum Zones. Northern margins of the Tethys — France, ? SW Germany, Poland, Roumania.

Discussion. — Innermost whorls of the macroconchs and inner whorls of the microconchs are essentially the same, so their dimorphic relationship is inferred. However, number of specimens is too small to permitt establishing actual dimorphic pairs.

The microconchs in question best correspond to the *Perisphinctes birmensdorfensis* group *sensu* Enay (1966, p. 463), characterized by the same degree of shell evolutness, whorls subcircular in outline, style of ribbing and occurrence of parabolic nodes resembling swellings along the ultimate body chamber. It follows from the synonymy given by Enay (*op. cit.*) that representatives of this species were formerly placed in various genera or subgenera, as *Perisphinctes, Simoceras, Nebrodites, Kranaosphinctes*, and *Alligaticeras* „essentielement parce qu'il faut leur trouver une place..." Enay places this species in *Perisphinctes (Otosphinctes) s.l.* because „la costulation fine avec nombreuses côtes simples, l'enroulement lent et les tours à section circulaire or à peine jointifs ne justifient pas une nouvelle unité systématique" (Enay, *op. cit.*). However, at the same time Gygi (1966) placed that species still in other genus, *Properisphinctes* (also with reservation). According to the present author, this species cannot be accomodated in any subgenera of *Perisphinctes s.l.* and it is necessary to follow up the suggestions made by Suttner (*fide* Siemiradzki, *1891*), and to place this troublesome species in the family Idoceratinae Spath 1924.

The microconchs in question markedly differ from the microconchs of the genus *Idoceras* Burckhardt, 1960, in subcircular whorls, wider umbilicus, finer, and more closely spaced primaries, trend and development of secondaries, and in parabolic nodes and heavy constrictions.

They closely resemble microconchs embraced by the genus *Nebrodites* Burckhardt, 1912, differing in more numerous biplicate ribs, higher point of furcation, and in occurrence of parabolic nodes. These differences seems sufficient for separating these microconchs in new subgenus of *Nebrodites*. Such assignment of the microconchs is supported by the position of their presumable sexual counterparts, macroconchs allocated in the subgenus *Nebrodites* (*Passendorferia*) nov.

The macroconchs of the new subgenus form a quite coherent assemblage, primarily varying in density of ribbing and in the ultimate size, and somewhat in the style of ribbing and whorl outline. On the basis of these differences, three groups may be distinguished: (1) extremely densicostate.

highly evolute forms with subrectangular to elliptical whorl sections, embraced by *N. (Passendorferia) ziegleri* n. sp., (2) extremely evolute, small-sized with flat-sided, subquadrate whorls and ribs highly elevated at the ventral margin, embraced by *N. (P.) teresiformis* n. sp., and (3) moderately evolute forms with somewhat compressed, flat-sided whorls, embraced by the species *N. (P.) cf. uptonioides* Enay.

These macroconchs essentially differ from all contemporaneous ammonites of the family Perisphinctidae in peculiar combination of high evolutness and a tendency to single-rib ornamentation. Their outer whorls, ornamented with single ribs, are markedly similar to the corresponding ones of some perisphinctids of the subgenera *Arisphinctes* Buckman, 1924, and *Ampthillia* Arkell, 1947 (see, e.g., *Perisphinctes* (*Arisphinctes*) sp. ex gr. *tenuis* Enay figured herein in Pl. XXII, Figs 1—2), but their inner whorls, *birmensdorfensis*-like, remain essentially different, as the inner whorls of the latter forms are *Dichotomosphinctes*-like in ornamentation, outline, and dimensions. However, when inner whorls are crushed or obscure, even generic identification may be very difficult or impossible. This is the case with some specimens figured by Malinowska under the names of *Perisphinctes* (*Arisphinctes*) *cf. helenae* de Riaz (Malinowska, 1972*a*, p. 181, Pl. 2), *P. (A.) cowleyensis* Buckman (Malinowska, 1972*b*, p. 15, Pl. 2, Fig. 4, text-fig. 2), and *P. (A.) plicatilis* (Sow.) (Malinowska, 1972*b*, p. 18, Pl. 5, Fig. 1, text-fig. 2), where a detailed analysis of inner whorls is required for stating whether they actually belong to *Arisphinctes* or to *Passendorferia* subgen. nov.

For the comparative purpose, the illustration of one of *Arisphinctes* achieving ultimate body chamber sculpture of the same type as the macroconchs of the subgenus *Nebrodites* (*Passendorferia*) nov. is given on Pl. XXII, Figs 1—2.

Inner whorls of the macroconchs closely resemble the corresponding ones of some representatives of the subgenus *Kranaosphinctes* Buckman, 1921, in dimensions, sculpture, and heavy, oblique constrictions. However, the latter forms differ from the population in question in tri- or even quadriplicate ribbing, lower and not so pronounced point of furcation, and in single-rib ornamentation of the ultimate body chamber resulting from obliteration of secondaries and not from gradual reduction in their number. However, secondaries pass across the venter in zig-zag manner in some forms of both these genera (*cf.*, e.g., *Perisphinctes promiscuus* Buk., 1887, Pl. 19, Fig. 2*b*). Thus, at least some *Kranaosphinctes* may be regarded as the closest affinities of the new subgenus among the roughly contemporaneous perisphinctids. The earliest representatives of *Passendorferia* subgen. nov. and the latest *Kranaosphinctes* were recorded from the Plicatilis Zone, Antecedens Subzone, so transition may be inferred.

The macroconchs in question are strikingly similar to somewhat or much younger forms described as *Simoceras herbichi* v. Hauer, *S. expla-*

Table I

Dimensions (in mm.):	D	Ph	H	H/D	T	T/D	U	U/D	T/H	No. of ribs per whorl	
N. (*P.*) *teresiformis*	179	137	40	0.22	—	—	108	0.61	—	180:55	60:56
n. sp., holotype,	147		33	0.23	—	—	85	0.58	—	160:57	40:54
Br 02/040, Zawodzie	33		10	0.30	—	—	16	0.48	—	100:57	30:48
paratype, Ha 20/50	(212)									212:c.44	140:55
Biskupice	200		41	0.205	40	0.20	127	0.63	0.98	180:c.51	120:55
	170		35	0.21	33	0.19	105	0.62	0.94	160:54	60:54
											40:c.52
N. (*P.*) *ziegleri*	270	184	60	0.22	—	—	162	0.60	—	162:c.56	60:71
n. sp., holotype,	230	202	54	0.23	—	—	135	0.59	—	120:c.62	50:68
Br 03/003, Zawodzie	184		47	0.26	—	—	104	0.56	—	80 :c.72	35:62
paratype, Br 02/058	243		55	0.23	—	—	143	0.59	—	242:52	100:c.63
Zawodzie, bed 26	200		46	0.23	—	—	116	0.58	—	200:54	80:c.63
										160:c.54	60:c.68
										140:c.56	40:c.63
Br 01/006, Zawodzie, bed 18	(255)										
	250		50	0.20	48	0.19	158	0.63	0.96	—	
	160		37	0.23	—	—	92	0.57	—		
Br 27/002, Skrajnica	180		45	0.25	36	0.19	100	0.56	0.80	180:53	80:61
	148		38	0.26	35	0.24	81	0.56	0.92	140:55	60:c.64
										120:56	40:c.62
P. (? *Pseudarisph.*)	290	220								290:49	120:46
uptonioides Enay,	285		72	0.25	54	0.18	162	0.56	0.75	250:47	100:51
1966, p.437, holotype, Chamot (Jura)	230		54	0.23	44	0.19	130	0.56	0.81	200:46	80:54
	180		45	0.25	39	0.21	95	0.52	0.86	160:44	
	100		31	0.31	27	0.27	45	0.45	0.86	140:45	
N. (*P.*) cf. *uptonioides* (Enay),	248	231	56	0.23	—	—	142	0.58	—	248:48	100:c.56
	208		55	0.26	41	0.20	109	0.52	0.74	200:46	60:c.56
Br 02/031										140:48	46:55
Zawodzie, bed 26										120:51	33:c.50

Table I cont.

Dimensions (in mm.):	D	Ph	H	H/D	T	T/D	U	U/D	T/H	No. of ribs per whorl	
Br 02/069, Zawodzie, bed 31	(214)									214:50	100:55
	204		49	0.24	—	—	118	0.58	—	180:49	80:56
	178		41	0.24	—	—	100	0.56	—	140:51	60:56
										120:52	40:c.49
Br 05/031, Zawodzie, bed 27	(240)									240:47	100:62
	231		57	0.24	—	—	127	0.55	—	200:48	80:61
	198		53	0.27	—	—	104	0.52	—	160:53	50:56
										140:57	30:c.46
Br 05/032, Zawodzie, bed 26	179	—	43	0.24	—	—	97	0.54	—	179:53	60:56
	152		41	0.27	—	—	77	0.51	—	140:56	50:55
										120:58	40:52
										80:58	30:c.43
Br 02/226, Zawodzie,	215	—	53	0.24	—	—	120	0.56	—	218:45	60:c.56
	180		47	0.26	44	0.24	98	0.54	0.94	140:44	39:52
	32.5		8.4	0.26	—	—	16	0.49	—	120:49	30:44
										100:53	25:c.40
N. (P.) bimensdorfensis (Moesch), Br 05/240, Zawodzie	64	45								62:c.73	30:c.58
	62		15	0.24	—	—	34	0.55	—	50:c.68	20:c.46
	52		14	0.26	—	—	28	0.53	—	40:c.63	
KW/91, Włodowska	64		16	0.25	15	0.23	34	0.53	0.94	—	
	49		15	0.28	11	0.22	25	0.51	—		

natum Neumayr, and *S. teres* Neumayr by Neumayr (1873) from the Upper Jurassic of the Carpathians, *Ammonites planulacinctus* Qu. and other related forms figured by Quenstedt (1888) from Weisser Jura ? β and γ of the SW Germany. The latter forms are recently placed in the subgenus *Mesosimoceras* Spath, 1925, of the genus *Nebrodites* Burckhardt, 1912 (see Ziegler, 1959; a.o.). Actually, there is a remarkable similarity of inner whorls of the author's macroconchs to the corresponding ones of the latter group, except for markedly higher point of furcation. There are also other differences, but they primarily result from difference in ultimate size. The reasons of separations of these two populations are two-fold: (1) the author's assemblage differ from the type species of *Mesosimoceras, Simo-*

ceras cavouri Gemmellaro in coarser ornamentation and lack of constrictions on the ultimate body chamber, ventral smooth band poorly developed and in, the lack of knobby-like terminations of ribs on the body chamber; (2) because of the differences between microconchs of the subgenus *Nebrodites s.s.* and presumable microconchs of the group in question. Moreover, the type of *Mesosimoceras* is incomplete — its inner whorls are lacking. Thus, keeping in mind the (?) homeomorphic similarity of outer whorls of some *Arisphinctes* and of the representatives of the assemblage in question, there may be a circle argument whether it belongs to the genus *Nebrodites* or represents some off-shoot of *Arisphinctes*.

The macroconchs of the new genus also appear similar in overall style of ornamentation and somewhat in shape of outer whorls to *Simoceras heteroplocum* Gemmellaro, the type of *Benacoceras* Spath, 1925 (? synonym of *Mesosimoceras* according to Geyer, 1961, p. 83). However, the inner whorls of that type specimen are obscured; thus, similarly as in the above case, this genus cannot be equivocally interpreted unless its inner whorls are exposed and adequate description given.

Microconchs, which may still belong to this group or represent transition to *Idoceras* were figured from the Bimammatum Zone by Oppenheimer (1907) as *Perisphinctes cf. birmensdorfensis* Moesch, *P. abeli* Oppenheimer, and *P. latumbonatus* Oppenheimer, and by Christ (1960) as *P. (Alligaticeras) aff. birmensdorfensis* (Moesch), and by others. However, establishment of their actual position will be possible when their macroconchs are known.

Nebrodites (Passendorferia) teresiformis n.sp.

(Pl. XIII, Figs 1—2. Pl. XIV, Figs 3a-c, Text-figs 2—3)

?1930. *Perisphinctes orientalis* Siemiradzki; Dorn, Die Ammoniten-fauna... p. 123, Pl. 2, Fig. 5.

?1930. *Perisphinctes orbignyi* de Loriol (= *Perisphinctes plicatilis* d'Orb.); Dorn, *Ibidem*..., p. 125 (*pro parte*), Pl. 1, Figs. 4a-b, (exclusively).

1966. *Perisphinctes* (? *Pseudarisphinctes*) n. sp. *A*; Enay, L'Oxfordien dans la moitié..., p. 439, Pl. 24, Fig. 1. Text-fig. 126.

Holotype: Specimen no. Br 02/040, figured in Pl. XIII; Figs. 1—2.
Paratype: Specimen no. Ha 20/050, figured in Pl. XIV, Figs 3a-c.
Type locality: Zawodzie at Częstochowa, quarry 2.
Type horizon: The Bifurcatus Zone.
Derivation of the name: Resembling Neumayr (1871) species *Simoceras teres.*

Material. — Three specimens, two almost complete.

Diagnosis. — Medium-sized macroconch, extremely evolute, with subquadrate whorls. Early whorls with fine, biplicate and single ribs, outer with single, widely spaced, massive ribs, best pronounced on ventral margin and passing across the venter or not.

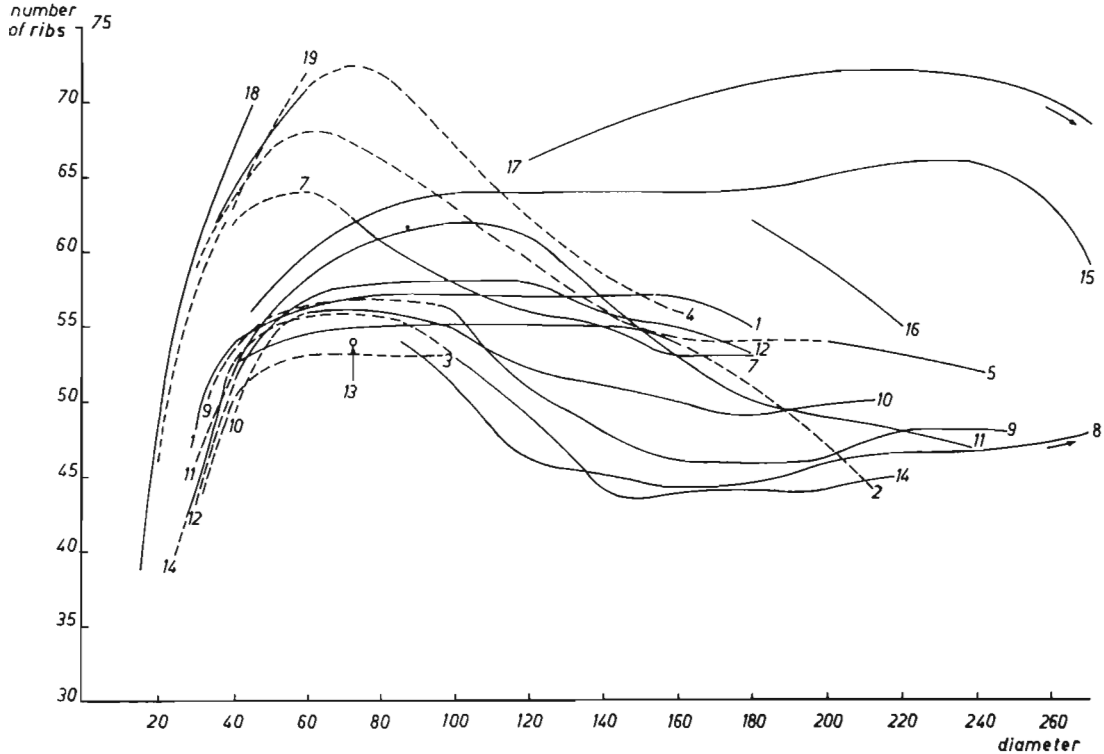

Fig. 2. Comparative rib-curves for ammonites of the subgenus *Passendorferia* nov.and for somme representatives of *Perisphinctes* (*Arisphinctes*), mentioned in the text:*Nebrodites* (*Passendorferia teresiformis* n. sp.: 1 — holotype, Br 02/040, 2 — paratype, Ha 20/50, 3 — *Perisphinctes* (*?Pseudarisphinctes*) sp. A, Enay (1966); *N.* (*Passendorferia*) *ziegleri* n. sp.: 4 — holotype, Br 03/003, 5 — paratype, Br 02/058, 6 — Br 01/009, 7 — Br 27/002; *P.* (*?Pseudarisph.*) *uptonioides* Enay: 8 — holotype; *N.* (*Passendorferia*) cf. *uptonioides* Enay: 9 — Br 02/031, 10 — Br 02/069, 11 — Br 05/031, 12 — Br 05/032, 13 — Br 02/212, 14 — Br 02/226; *Perisphinctes* (*Arisphinctes*) sp. ex gr. *tenuis* Enay 1966: 15 — Ha 20/32; *P.* (*A.*) cf. *helenae* de Riaz in Malinowska (1972a) : 16; *P. (A) plicatilis* (Sowerby) in Malinowska (1972b) : 17; *Nebrodites (Passendorferia) birmensdorfensis* (Moesch): 18 — holotype (after Enay, 1966), 19 — Br 05/240, 20 — KW/91.

Description. — (See Table I) Extremely evolute macroconch, medium-sized, c. 220 mm in diameter or more. Whorl section rounded and depressed up to c. 60 mm diameter, later subquadrate. Umbilical area inclined, smooth. Ribs densely spaced in the umbilicus, bifurcate and single, rectiradiate throughout the development, becoming progressively thicker and more widely spaced on middle and outer whorls; ribs always best pronounced at the ventral margin and passing across the venter. Venter side of the final body chamber initially tabulated, later broadly rounded; sometimes smooth band developed. Early whorls heavily constricted.

Discussion. — Differs from *N. (P.) ziegleri* n. sp. in somewhat smaller size, more flat-sided whorls, and in being less densicostate, as well as in more prominent sculpture.

Differs from *N. (P.) cf. uptonioides* Enay in somewhat wider umbilicus, more depressed, subquadrate whorls, and markedly more prominent sculpture of outer whorls.

Appears to be closely related to *Simoceras teres* Neumayr and *S. herbichi* v. Hauer reported from Lower Kimmeridgian strata of the Carpathians (Neumayr, 1871, 1873; see also Birkenmajer, 1963), differing in larger ultimate size, somewhat less prominent and more closely spaced ribs, and in less depressed outer whorls.

The outer whorls of the author's specimens are strikingly similar in sculpture and whorl outline to fragments of (?) final body chambers figured by Dorn (1930) under the names of *Perisphinctes orientalis* Siem. and *P. orbignyi* de Loriol (= *P. plicatilis* d'Orb.). Moreover, they are similar to the form described as *Perisphinctes* (*? Pseudarisphinctes*) sp. nov. *A* by Enay (1966) in all the features which are preserved in the latter form.

A single, somewhat deformed specimen from Zawodzie (Br 03/016, D_{max} — 63 mm, D — 52 mm, H/D — 0.30, T/D — 0.34, U/D — 0.49, R/D — c. 59/63, c. 55/44, r/R — c. 1.6 — 1.7) may represent incomplete microconch or inner whorls of macroconch of that species.

Occurrence. — Poland, Zawodzie at Częstochowa, quarries 2 and 3, Biskupice near Częstochowa, the Bifurcatus Zone; France, Couches du Geissberg, Champfromier (Montjean) (Ain), the Bifurcatus Zone.

Nebrodites (Passendorferia) ziegleri n. sp.

(Pl. XV—XVIII; Pl. XXII, Fig. 3; Text-figs 2—3)

Holotype: Specimen no. Br 03/003, figured in Pl. XV.

Paratype: Specimen no. Br 02/058, figured in Pl. XVII.

Type locality: Zawodzie at Częstochowa, quarry 3.

Type horizon. The Plicatilis-Parandieri junction beds.

Derivation of the name: Named in honour of Professor Bernard Ziegler, student of simoceratids.

Material. — Four specimens, two with almost complete final body chambers.

Description. — (See Table 1) Large, extremely evolute macroconch with elliptical to subcircular whorls. Ribs biplicate and single, crowded, single on outer whorl, prominent at ventral margin, passing across the ventral side or not, alternating; distinct peak on rib-curve at 60—80 mm diameter. Final body chamber with subelliptical cross-section, and covered by degenerated ribs close to the peristome. Inner whorls heavily constricted.

Discussion. — Differences to *N. (P.) teresiformis* n. sp. as given above.

Occurrence. — Zawodzie at Częstochowa, quarries 1—3, beds 16, 18, and 26, the Plicatilis Zone, Antecedens Subzone — Bifurcatus Zone; Skrajnica near Olsztyn, the Parandieri-Bifurcatus junction beds.

Nebrodites (*Passendorferia*) cf. *uptonioides* (Enay, 1966)

(Pls. XIX — XXII, Text-figs 2—3)

?1930. *Perisphinctes bocconi* Gemmellaro; Dorn, Die Ammonitenfauna des untersten Malm, p. 124, Pl. 2, Fig. 4 (non Pl. 2, Fig. 1).

1966. *Perisphinctes* (? *Pseudarisphinctes*) *uptonioides* Enay, L'Oxfordien dans la moitié..., p. 437, Pl. 22, Figs. 1—4, Pl. 23, Figs. 1—2, text-figs. 125—126.

1970. *Perisphinctes uptonioides* Enay; Brochwicz-Lewiński, Biostratigraphy of Oxfordian Limestones..., Pl. 4.

Material. — Six specimens, one with a part of the final body chamber preserved.

Description. — Shell large, up to 300 mm in diameter or more, evolute. Whorls initially subcircular, depressed up to 60—80 mm diameter, later subrectangular, thickest close to the umbilicus, and with ventral side broadly rounded. Ribs initially fine, biplicate and single, later progressively thicker, finally single, prominent and with very slight forward twist at the ventral margin. Umbilical area gently inclined, smooth. Inner whorls heavily constricted.

Discussion. — Whorl fragment with very similar ornamentation was figured as *Perisphinctes bocconi* Gemmellaro by Dorn (1930). The species differs from the form figured under that name by Gemmellaro (Gemmellaro, 1875, p. 117, Pl. 14 Fig. 2) in more massive ribbing, but remains essentially similar to an incomplete specimen subsequently figured by Gemmellaro (Gemmellaro, 1877, p. 165, Pl. 20, Fig. 15) under that name.

The author's forms are essentially similar both to the holotype and paratype of *Perisphinctes (?Pseudarisphinctes) upotonioides* Enay (Enay, 1966). The reasons of making the reservation are twofold: (1) neither the holotype nor paratype reveal innermost (up to 40—60 mm) whorls, thus

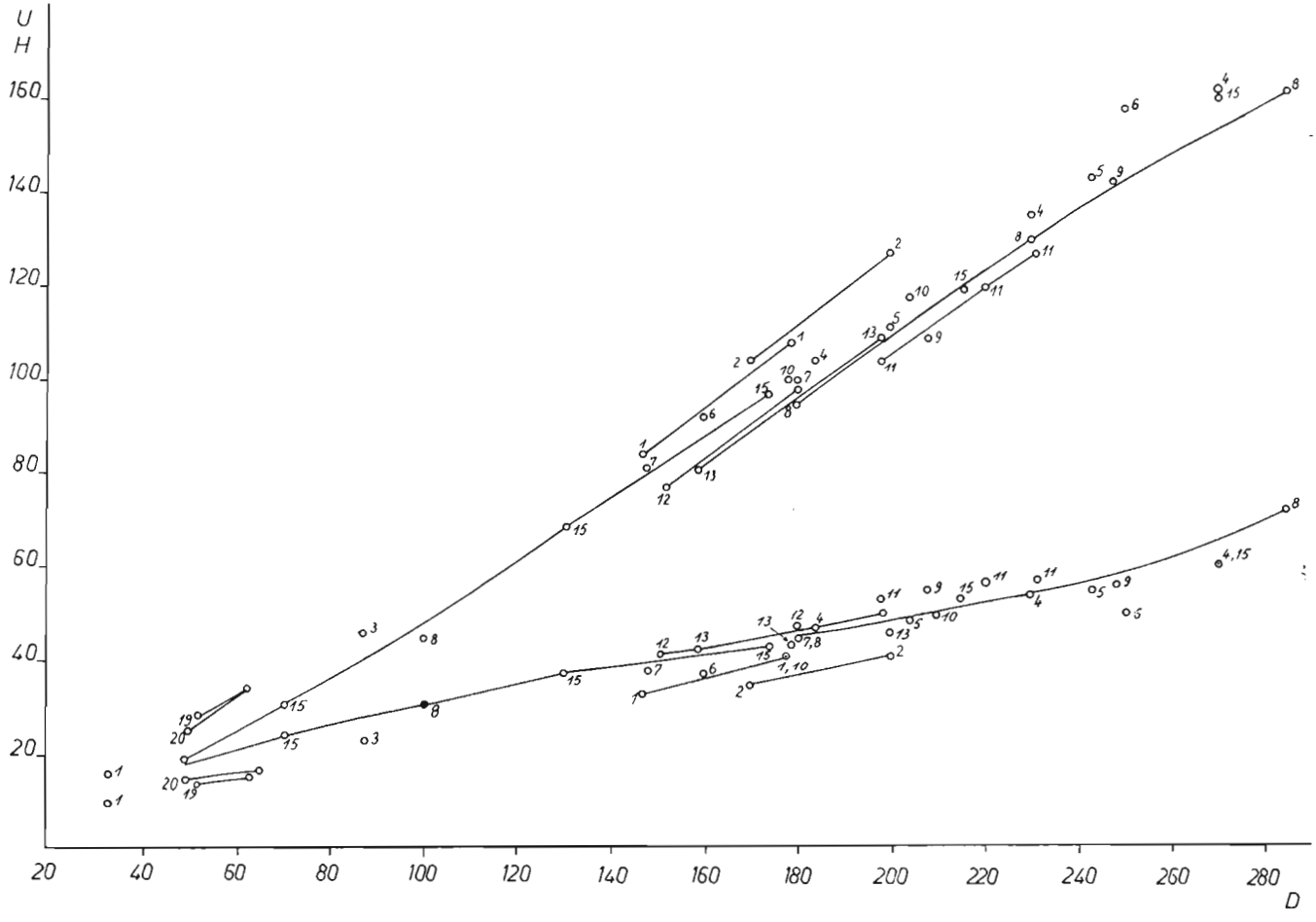

Fig. 3. Changes in umbilical diameter and whorl height along with increase of shell diameter. Explanations as in Fig. 2.

full comparison is precluded, and (2) triplication, mentioned by Enay (1966, p. 437) in the diagnosis was not found in any of the author's specimens. Forms described herein are somewhat smaller than those of Enay (*op. cit.*), but seem to be more similar to them than to the more complete (and identifiable) form of Gemmellaro (1875).

Differs from *N.* (*P.*) *ziegleri* n. sp. in being somewhat more evolute, in more loosely spaced ribs, particularly on inner whorls, and in more compressed whorls with somewhat elevated and broadly rounded ventral side.

Occurrence. — Zawodzie at Częstochowa, quarries 2 and 5, beds 26, 27 and 31, and from fallen block, upper Parandieri-Bifurcatus Zones; Olsztyn near Częstochowa, Parandieri-Bifurcatus junction beds.

Nebrodites (*Passendorferia*) *birmensdorfensis* (Moesch, 1867)

(Pl. XIV, Figs 1—2, Text-figs 2—3)

1966. *Perisphinctes* (*Otosphinctes*) *birmensdorfensis* (Moesch 1867); Enay, L'Oxfordien dans la moitié..., p. 463, Pl. 27, Figs. 1—6, text-figs. 134—136 (*cum synonima*).

1966. *Properisphinctes* (?) *birmensdorfensis* (Moesch, 1867); Gygi, Über das zeitliche Verhältnis..., Pl. 3, Fig. 1.

Material. — Two specimens, one complete with lappets.

Description. — (See Table I) Description as given by Enay (1966, p. 464).

Remarks. — Enay (1966, p. 464) placed this species in the subgenus *Otosphinctes*, embracing presumable sexual counterparts of *Kranaosphinctes*. However, this species also occur outside the range of *Kranaosphinctes* and appears to be a better companion for the most densely ribbed representatives of the subgenus *Nebrodites* (*Passendorferia*) nov. than for *Perisphinctes* (*Kranaosphinctes*) *cyrilli* Neumann.

Occurrence. — Zawodzie at Częstochowa, quarry 5, fallen block, and Włodowska Góra, the Parandieri Zone.

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April, 1973

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WOJCIECH BROCHWICZ-LEWIŃSKI

UWAGI O POCHODZENIU PODRODZINY IDOCERATINAE SPATH

Streszczenie

Niniejsza praca dotyczy pochodzenia „simocerasów", górnojurajskich amonitów uważanych za charakterystyczne dla prowincji medyterańskiej (= tetydzkiej) już od czasów Neumayra (1872) i Uhliga (1911). Pochodzenie tej grupy i jej pozycja taksonomiczna wciąż pozostają niejasne, głównie ze względu na szczupłość materiału. Powszechnie przyjmuje się obecnie, że po raz pierwszy przedstawiciele tej grupy, amonity z rodzaju *Idoceras* Burckhardt, 1906, pojawiają się w najwyższym oksfordzie, a w krótce po nich, w kimerydzie pojawiają się amonity z rodzaju *Nebrodites* Burckhardt, 1912. Jednakże w utworach środkowego oksfordu Jury Polskiej znaleziono kilkanaście form bliższych kimerydzkim nebroditom niż współwystępującym perysfinktom. Dla form tych wyróżniono nowy podrodzaj rodzaju *Nebrodites, Passendorferia* subgen. nov., obejmujący gatunki *N. (P.) teresiformis* sp. n., *N. (P.) ziegleri* sp. n., *N. (P.)* cf. *uptonioides* (Enay, 1966), i *N. (P.) birmensdorfensis (Moesch)*. Amonity z tego podrodzaju najprawdopodobniej wywodzą się od pewnych gatunków rodzaju *Kranaosphinctes* Buckman, 1921, takich jak *Perisphinctes (Kranaosphinctes) cyrilli* Neumann i *P. (K.) methodii* Neumann. Te ostatnie gatunki wraz z *Perisphinctes birmensdorfensis* (Moesch) włączane były uprzednio przez Neumanna (1909, p. 24) do „Simoceroiden-Gruppe". Gatunek *Perisphinctes birmensdorfensis* (Moesch) był ponadto jeszcze przez kilku innych autorów wiązany z simocerasami.

Amonity z podrodzaju *Passendorferia* nov. reprezentują najprawdopodobniej przodków nebroditów właściwych. Wątpliwości wiążą się z faktem, że nebrodity właściwe były uprzednio dwukrotnie cytowane z utworów oksfordzkich poziomu Peltoceras transversarium z Karpat (Neumayr, 1871, 1872; patrz także Birkenmajer, 1963, p. 48) i z Afryki Północnej (Spath, 1913). Gdyby tak wczesne występowanie nebroditów właściwych zostało potwierdzone, oznaczałoby to, że amonity z podrodzaju *Passendorferia* nov. reprezentują starszą, mniej zaawansowaną grupę nebroditów, oraz że wyodrębnienie się podrodziny Idoceratinae nastąpiło już w dolnym oksfordzie, albo nawet już w keloweju. Pochodzenie rodzaju *Idoceras* Burckhardt, 1906, jest mniej jasne. Przypuszczalnie wywodzi się on z górnooksfordzkich rzadkożebrowanych amonitów z grupy *„Perisphinctes" birmensdorfensis* (Moesch).

ВОЙЦЕХ БРОХВИЧ-ЛЕВИНЬСКИ

ПРИМЕЧАНИЯ НА ТЕМУ ПРОИСХОЖДЕНИЯ ПОДСЕМЕЙСТВА IDOCERATINAE

Резюме

В работе рассматривается происхождение „симоцерасов" — верхнеюрских аммонитов, считающихся характерными формами средиземноморской (= тетидской) провинции еще со времени Неймайра (1872) и Улига (1911). Происхождение этой группы и ее таксономическая позиция до сих пор окончательно не выяснены, главным образом из-за скудности материала. В настоящее время общепринят взгляд, что впервые представители этой группы — аммониты рода *Idoceras* Burckhahdt, 1906, появились в верхах оксфорда, а вскоре после них, в кимеридже, появились аммониты рода *Nebrodites* Burckhardt, 1912. Однако в среднеоксфордских отложениях Польской Юры было найдено несколько форм, более сходных с кимериджскими небродитами, чем с сопровождающими их перисфинктами. Эти формы отнесены к новому подроду рода *Nebrodites* — *Passendorferia* subgen. nov., с видами: *N.* (*P.*) *teresiformis* sp. n., *N.* (*P.*) *ziegleri* sp. n., *N.* (*P.*) cf. *uptonioides* (Enay), 1966) и *N.* (*P.*) *birmensdorfensis* (Moesch). Аммониты этого подрода выводятся, по всей вероятности, из некоторых видов рода *Kranaosphinctes* Buckman, 1921, таких как *Perisphinctes* (*Kranaosphinctes*) *cyrilli* Neuman и *P.* (*K.*) *methodii* Neumann. Последние виды, совместно с *Perisphinctes birmensdorfensis* (Moesch), включались ранее Нейманном (1909, с. 24) в „Simoceroiden-Gruppe". Вид *Perisphinctes birmensdorfensis* (Moesch), кроме того, другими исследователями относился к симоцерасам.

Аммониты подрода Passendorferia nov. являются, вероятно, предками настоящих небродитов. Сомнения вызваны тем, что настоящие небродиты до этого дважды упоминались в связи с оксфордскими отложениями зоны Peltoceras transversarium в Карпатах (Неймайр, 1871, 1873; см. также Виркенмайер, 1963, с. 48) и в Северной Африке (Спат, 1913). Подтверждение такого раннего появления настоящих небродитов будет обозначать, что аммониты подрода *Passendorferia* nov. представляют более древнюю, менее развитую группу небродитов и что обособление подсемейства *Idoceratinae* произошло уже в раннем оксфорде или даже в келловее. Происхождение рода *Idoceras* Burckhardt, 1906, менее ясно. По всей вероятности, он происходит от верхнеоксфордских редкоребристых аммонитов группы „*Perisphinctes*" *birmensdorfensis* (Moesch).

EXPLANATIONS OF PLATES

PLATE XIII

Nebrodites (Passendoferia) teresiformis n.sp.

Fig. 1. Holotype (Br 02/040), Oxfordian, the Bifurcatus Zone, Zawodzie at Częstochowa, quarry 2; ×0.78.
Fig. 2. Ventral side of the body chamber of the holotype.

Plate XIV

Nebrodites (Passendorferia) birmensdorfensis (Moesch)

Fig. 1. Complete specimen (Br 05/240) with lappets; Oxfordian, the Parandieri Zone, Zawodzie at Częstochowa, quarry 5, fallen block; ×0.90.
Fig. 2. Specimen KW/91, Oxfordian, the Parandieri Zone, Włodawska Góra; ×0.90.

Nebrodites (Passendorferia) teresiformis n. sp.

Fig. 3*a*. Paratype (Ha 20/50), Oxfordian, the Bifurcatus Zone, Biskupice, ×0.40.
Fig. 3*b*. Paratype; opposite size; ×0.40.
Fig. 3*c*. Paratype; ventral side of the final body chamber; ×0.57.

Plate XV

Nebrodites (Passendorferia) ziegleri n. sp.

Holotype (Br 03/003) with almost complete final body chamber, Oxfordian, the Plicatilis-Parandieri junction beds, Zawodzie at Częstochowa, quarry 3, bed 16; ×0.66.

Plate XVI

Nebrodites (Passendorferia) ziegleri n. sp.

Fig. 1. Specimen no. Br 01/006 with almost complete final body chamber, Oxfordian, the Parandieri Zone, Zawodzie at Częstochowa, quarry 1, bed 18; ×0.69.
Fig. 2. Ventral side of the same specimen; alternation of ribs; ×0.65.

Plate XVII

Nebrodites (Passendorferia) ziegleri n.sp.

Paratype (Br 02/058), Oxfordian, the Bifurcatus Zone, Zawodzie at Częstochowa, quarry 2, bed 26; ×0.62.

Plate XVII

Nebrodites (Passendorferia) ziegleri n. sp.

Specimen no. Br 27/002, Oxfordian, the Parandieri-Bifurcatus junction beds, Skrajnica near Olsztyn by Częstochowa; ×0.83.

Plate XIX

Nebrodites (Passendorferia) cf. *uptonioides* (Enay)

Specimen no. Br 02/069, Oxfordian, the Bifurcatus Zone, Zawodzie at Częstochowa, quarry 2, bed 31; ×0.70.

Plate XX

Nebrodites (Passendorferia) cf. *uptonioides* (Enay)

Specimen no. Br 02/226, Oxfordian, the Parandieri or Bifurcatus Zone, Zawodzie at Częstochowa, quarry 2, fallen block, ×0.70.

Plate XXI

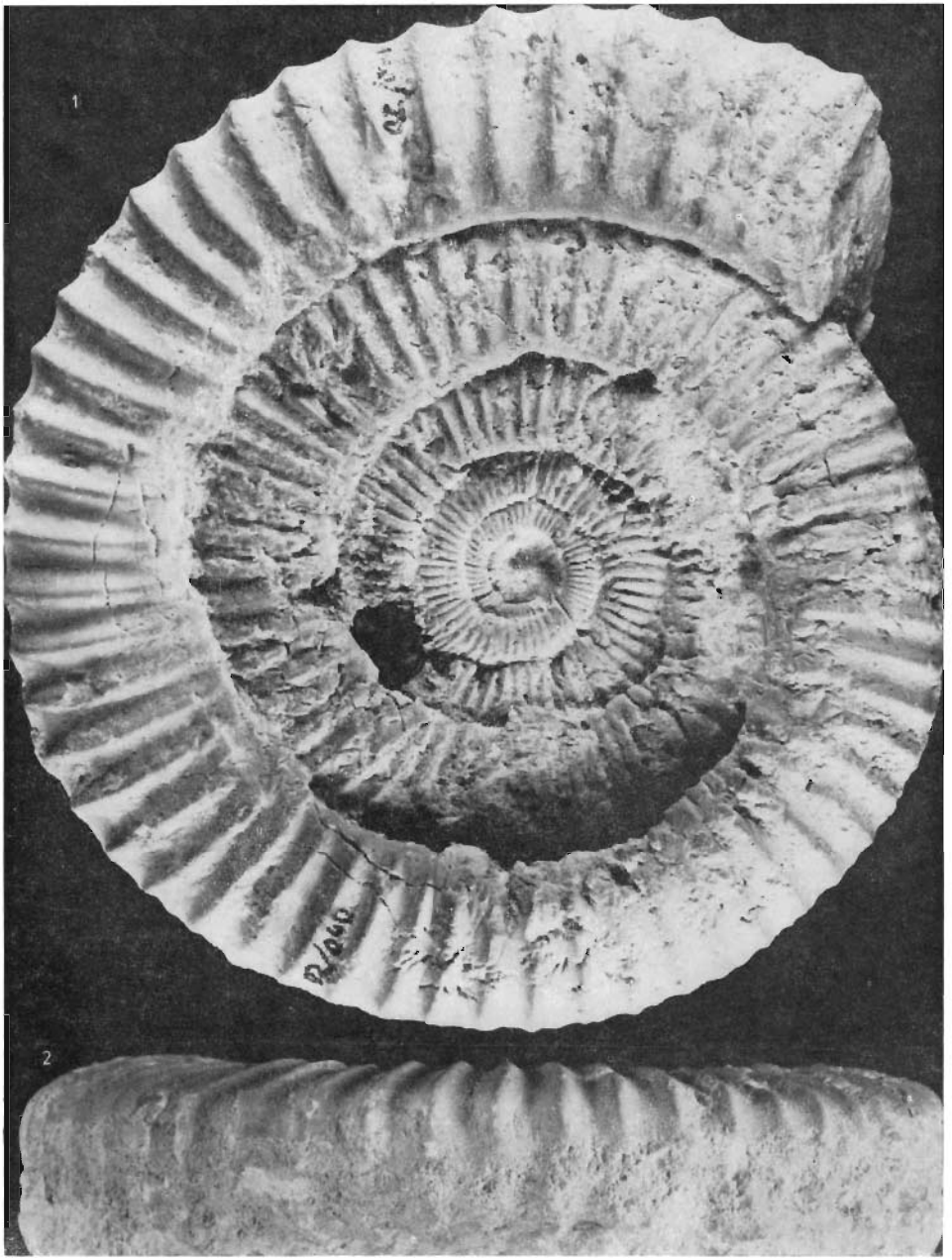
Nebrodites (Passendorferia) cf. *uptonioides* (Enay)

Specimen no. Br 05/031 with (? final) body chamber broken off, Oxfordian, the Bifurcatus Zone, Zawodzie at Częstochowa, quarry 5, bed 27, ×0.63.

Plate XXII

Perisphinctes (Arisphinctes) sp. ex gr. *tenuis* Enay

Fig. 1*a*. Specimen no. Ha 20/32 with a part of the final body chamber preserved; Oxfordian, the Bifurcatus Zone, Biskupice; ×0.71.
Fig. 2. Inner whorls of the same specimen; ×0.8.
Fig. 3. For comparison:inner whorls of the holotype of *Nebrodites (Passendorferia) ziegleri* n. sp.; ×0.86.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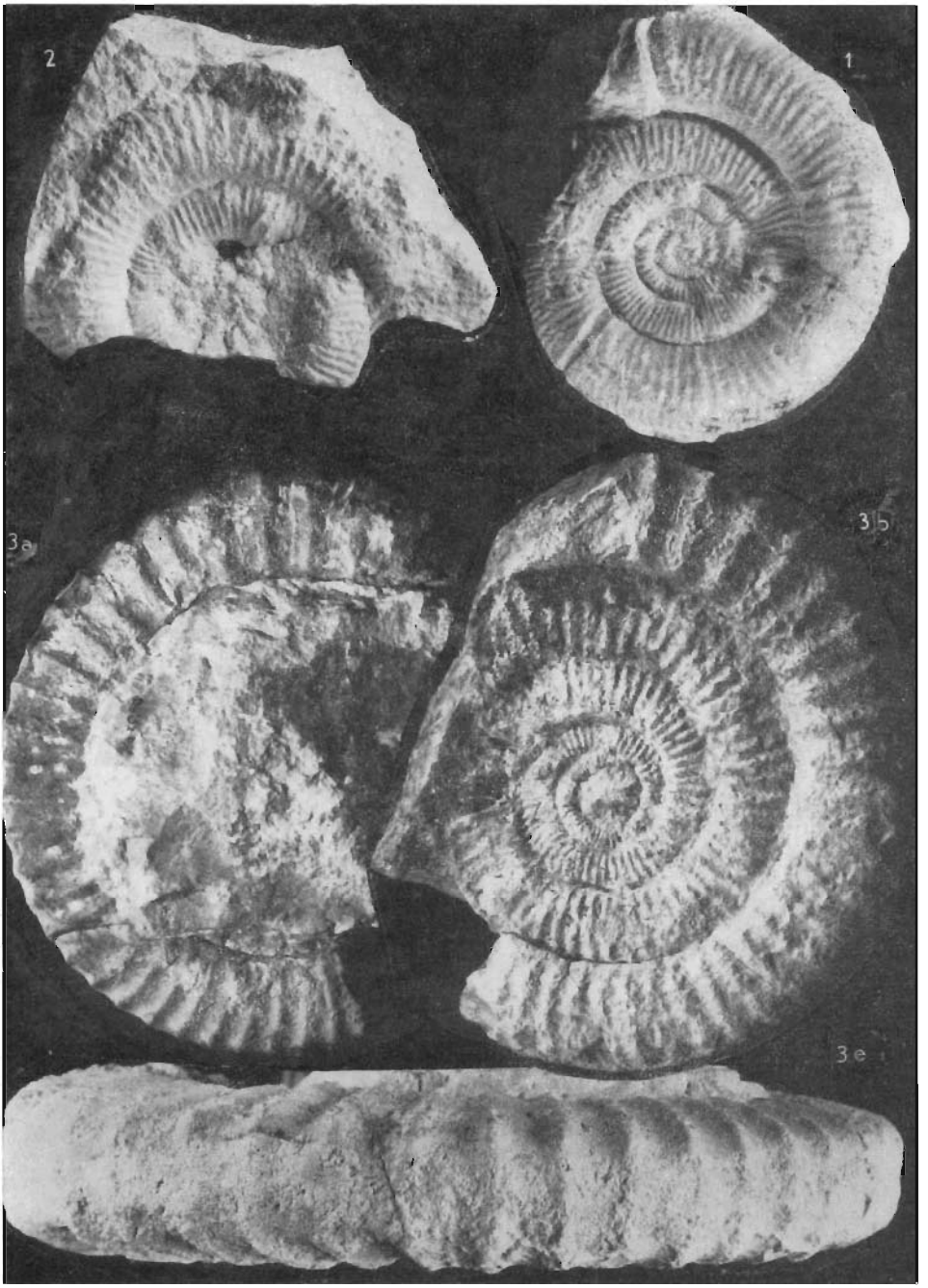
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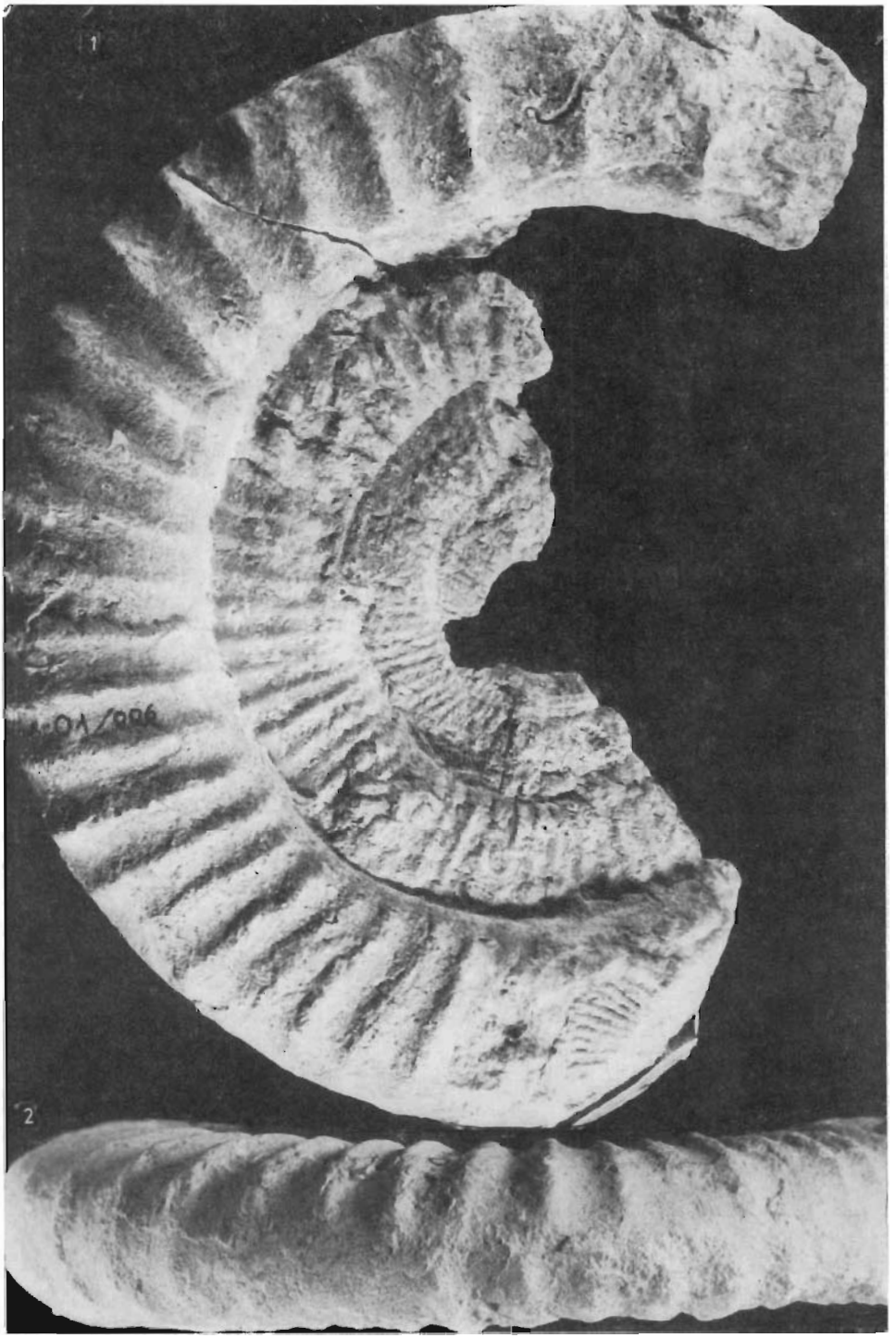
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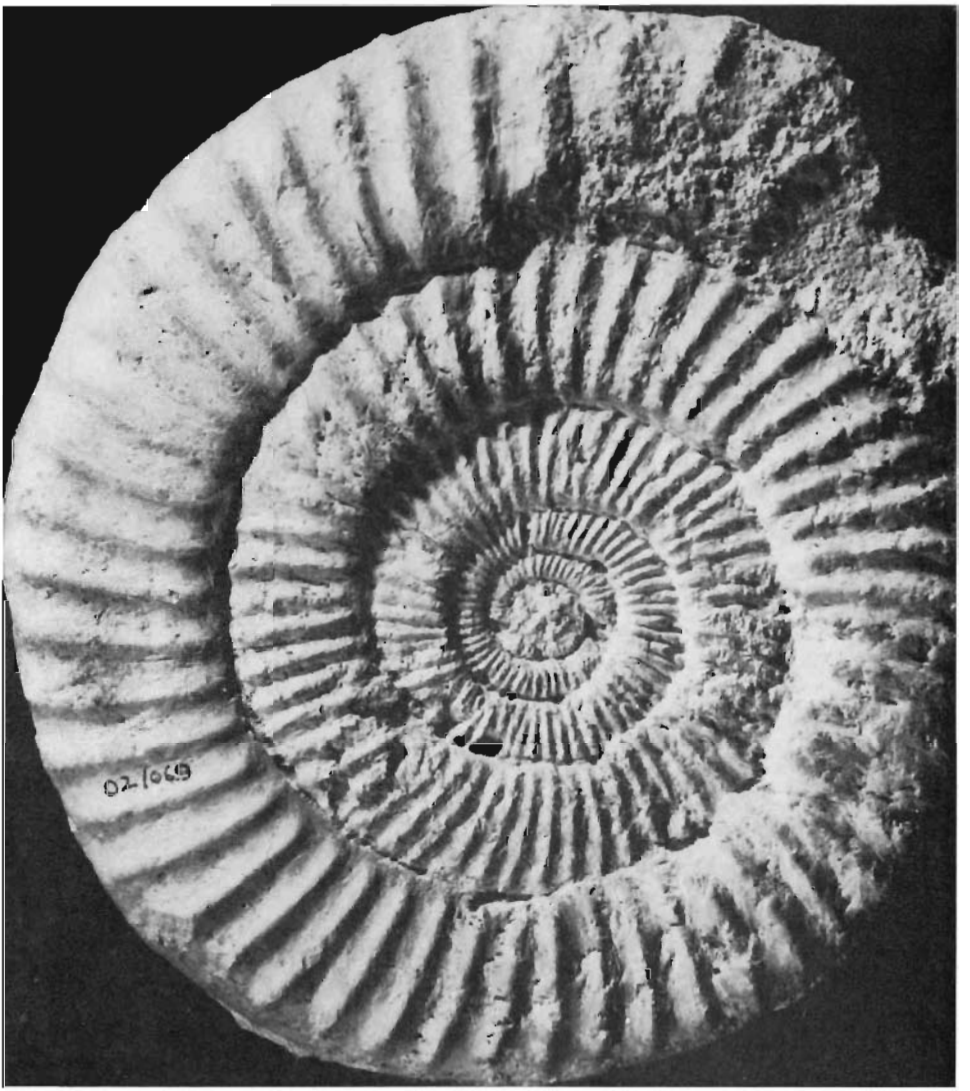
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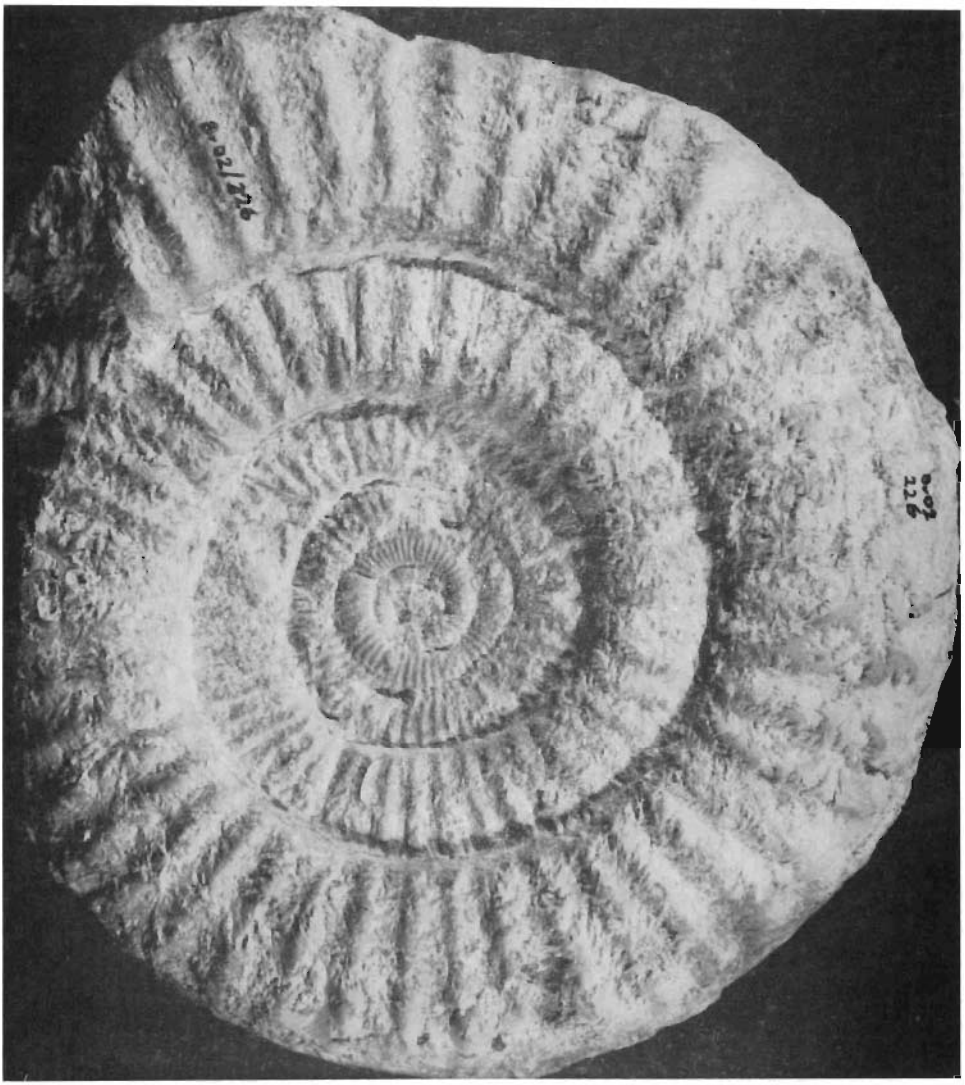


1b
1a