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Samotragus occidentalis n. sp., a new bovid from the late Messinian of Italy

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ABSTRACT — The recently discovered infilled karst fissures in the Monticino quarry (Brisighella, Faenza, Italy) have yielded a fairly rich mammal fauna from the MN13 zone. The bulk of the bovid remains can be referred to a new species of caprine antelope: *Samotragus occidentalis*. Prior to this discovery, the genus *Samotragus* was thought to be restricted to the late Vallesian and middle Turolian of Greece, with the species *S. praecursor* and *S. crassicornis*. *Samotragus* has never been reported from the numerous late Miocene localities of Spain or from France. The finds from Brisighella demonstrate that the genus *Samotragus* was present further west than the Balkan regions along the northern border of the Mediterranean, where it survived until the latest Miocene. These new finds also increase the systematic importance of this group, which is rare in the fossil record.

RIASSUNTO — [*Samotragus occidentalis* n. sp.: un nuovo bovide del tardo Messiniano italiano] — Le fessure carsiche scoperte recentemente nella cava Monticino (Brisighella, Faenza) hanno restituito un'associazione a mammiferi abbastanza ricca della zona MN13. La maggior parte del materiale di bovidi appartiene alla nuova specie *Samotragus occidentalis*. Precedentemente al rinvenimento di questi resti il genere *Samotragus* era documentato solamente nel Vallesiano superiore (*Samotragus praecursor*, Ravin de la Pluie) e dal Turoliano medio (*S. crassicornis*, Samos) della Grecia. I resti di Brisighella dimostrano che *Samotragus* era presente anche più a Ovest della Penisola Balcanica lungo il margine nord del Mediterraneo, dove è sopravvissuto almeno fino al Miocene terminale. Questi nuovi ritrovamenti aumentano anche l'importanza tassonomica del genere che è piuttosto raro nella documentazione fossile.

FOREWORD

Recently discovered infilled karst fissures in the Monticino quarry (Brisighella, Faenza, Italy) have yielded a fairly rich mammal fauna (Tab. 1). The fossiliferous fissures are part of a karst system developed in Messinian gypsum layers (Gessoso-solfifera Fm.). The sediments infilling the cavities are silty marls of the brackish-continental Colombacci Formation, which unconformably overlies the evaporites. Pliocene marine clays are superimposed on the Colombacci sediments. The occurrence of a rich rodent fauna indicates that the fossil assemblage belongs to MN13 zone (latest Turolian) (Costa *et al.*, 1986; De Giuli *et al.*, 1988).

In this paper we describe a new species of bovid, *Samotragus occidentalis*, and discuss its position in the tribe Oiocerini.

The bulk of the bovid remains recovered at the Monticino quarry can be referred to the new species *Samotragus occidentalis*. The specimens were collected mainly from site BRS5, where the remains of at least 5 individuals, some of them represented by partially articulated skeletons, occur. Other remains from the same species have also been recovered from sites

BRS1, BRS2, BRS3, BRS8, BRS10, BRS15, BRS16, BRS19.

Scant material from bovids other than *Samotragus* in the Monticino quarry has been collected. The occurrence of a large antelope is documented by the following specimens: an unworn lower left M2, a second phalanx, an incomplete and deformed metapodial, all from site BRS1 and a fragmented first phalanx from site BRS16. The stoutness and size of the phalange, and the features of the lower molar (crown fairly hypsodont, inner ribs tending to outbow, compressed labial lobes, fairly distinct mesostylid, rugose enamel, presence of goat fold) may suggest a large boselaphini, possibly a *Parabos*. This genus is known from some late Turolian localities of Spain such as Venta del Moro (Moyà-Solà, 1983).

Because they are larger sized than the material referred to *Samotragus*, a few other remains may belong to a different bovid species: right M³ BRS4-3; left distal tibia BRS3-2.

The genus *Samotragus* was created by Sickenberg (1936) on some skull remains of a mid-sized caprinae-like antelope from Samos (Greece, Middle Turolian). Solounias (1981) revised the Samos material and merged *Samotragus* with *Sinotragus*, a genus from the

BRS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20
<i>Galerix</i> sp.		?	+	+	+						+	+							+
<i>Postpalaerinaeus</i> sp.					+				+										
<i>Episoriculus</i> aff. <i>gibberodon</i>		+	+	+	+	+		+	+		+	+							+
Soricidae indet. (small size)																			+
<i>Megaderma</i> gr. <i>vireti-mediterraneum</i>			+		+														
Rhinolophidae indet.		+			+	+													+
Vespertilionidae indet.			+		+														
Chiroptera indet.								+											
Colobinae cf. <i>Mesopithecus</i>	+																		
cf. Gomphotheriidae																			+
<i>Plioviverrops faventinus</i> n. sp.		+	+	+	+					+						+		+	
Hyaenidae indet.			+		?														?
Canidae indet.					+														
<i>Orycteropus</i> sp.				?	+														?
<i>Dicerorhinus</i> cf. <i>megarhinus</i>	+																		
<i>Hipparion</i> sp.	+		+		+					+					+				
<i>Samotragus occidentalis</i> n. sp.	+	+		?	+	?		+	+	+					+	+	+	+	?
Bovinae cf. <i>Parabos</i>	+				+											+		+	
Bovidae indet.			+	+															
Cervidae indet. (small size)					+														
Suidae indet.	+																		
<i>Hystrix</i> sp.					+	?						+							
<i>Stephanomys debruijini</i> n. sp.	+	+	+	+	+	+	+	+	+		+	+		+	+	+	+	+	+
<i>Paraethomys anomalus</i>	+	+	+		+	+			+		+	+				+	+	+	+
<i>Castillomys benericettii</i> n. sp.	+	+		+	+	+		+	+		+	+					+	+	+
<i>Occitanomys</i> sp.									+									+	
<i>Apodemus</i> cf. <i>gudrunae</i>			+	+	+	+	+	?										+	+
<i>Cricetus</i> cf. <i>barrierei</i>			+		+														
<i>Ruscinomys</i> cf. <i>lasallei</i>				+	+	+			+									+	
<i>Myomimus</i> sp.								?											
<i>Atlantoxerus</i> cf. <i>rhodius</i>			+		+														
<i>Hylopetes</i> sp.					+														
<i>Trischizolagus</i> cf. <i>maritsae</i>		+		+	+	+		+	+						+		+	+	+
<i>Prolagus</i> cf. <i>sorbinii</i>	+		+	+	+	+		+	+					+			+	+	+

Tab. 1 - Distribution of taxa in the sites of the Monticino quarry.

Turolian of China. The latter name had priority. Solounias also referred other fossils from Beglia (Tunisia, Turolian) and Maragheh (Iran, Turolian) to *Sinotragus*, but did not describe them.

Bouvrain & De Bonis (1985) described *Samotragus praecursor*, a new species from Ravin de la Pluie (late Vallesian, MN10, Macedonia), and made a revision of the genus. According to these authors, there is no reason to merge the Greek species with *Sinotragus*, since they do not share significant apomorphies except the homonymous torsion of their horn cores and the

squarish enlarged basioccipital, two features that are, however, common to a number of other closely related bovid species and evidently subject to parallel evolution. Therefore, the genus *Samotragus* appears to be restricted only to the late Vallesian and middle Turolian of Greece, with the species *S. praecursor* and *S. crassicornis*. *Samotragus* has never been reported from the numerous late Miocene localities of Spain or from France. However, it is impossible at present to assess the range of this genus, since we do not know whether the underscribed "*Sinotragus*" sp. 1 (medium size) from

Maragheh and "*Sinotragus*" sp. 2 (small size) from Beglia quoted by Solounias (1981) actually belong to *Samotragus* or to *Sinotragus* s. s.. However, Robinson (1986) described recently two species of very hypsodont bovids from the Beglia Formation, which he left unassigned but presumed as *Rupicaprina*.

The finds from Brisighella demonstrate that the genus *Samotragus* was present further west than the Balkanic regions along the northern border of the Mediterranean, where it survived up until the latest Miocene. These new finds also increase the systematic importance of this group of forms, which is fairly rare in the fossil record.

SYSTEMATICS

Family BOVIDAE

Subfamily CAPRINAE (?)

Tribe OIOCERINI

Genus SAMOTRAGUS Sickenberg, 1936

SAMOTRAGUS OCCIDENTALIS n. sp.

Pl. 1, figs. 1-7

Derivatio nominis — It is the western-most representative of the genus *Samotragus* identified so far in Europe.

Holotype — Fragment of frontal with horn cores BRS5-29 (Pl. 1, figs. 1a-1b).

Hypodigm — Right and left mandibles BRS5-31 and 32 (Text-fig. 3); fragment of maxilla of an old individual BRS5-298 (Pl. 1, fig. 3); fragmentary juvenile skull with mandibles BRS5-37 (Pl. 1, fig. 2).

Other material — Mandibles: frag. left with P₄ and M₃ BRS8-3; frag. right BRS5-38; frag. right BRS5-305; frag. left with M₃-M₂ BRS5-273. Isolated teeth: r. M₃ BRS5-28; l. M₃ BRS8-3; l. M₃ BRS1-13; r. M₂ BRS16-5; r. P₂ BRS9-2; l. M² BRS18-2; l. P³ BRS5-291; I₂ BRS16-2; r. DP₃ BRS9-3; l. DP₃ BRS5-316; r. DP³ BRS5-299; l. DP¹ BRS5-315; r. D² BRS2-12; r. DI1 BRS5-317. Postcranial bones: frag. r. humerus BRS10-2; frag. r. tibia BRS5-176; frag. r. MC BRS19-2; frag. l. MC BRS5-48; l. MT BRS10-1; frag. r. MT BRS1-18; frag. MT BRS5-78; l. calcaneus juv. BRS5-74; l. astragalus BRS1-17; r. astragalus BRS1-3; l. astragalus BRS19-13; frag. l. astragalus BRS3-16; 1st phalanges BRS5-72,73,304.; 2nd phalanx BRS15-304; 3rd phalanges BRS5-130; BRS5-173.

Repository — The material is preserved in the collections of the Museo Civico di Scienze Naturali of Faenza.

Type locality — Monticino quarry (Brisighella, Faenza, Italy), site BRS5.

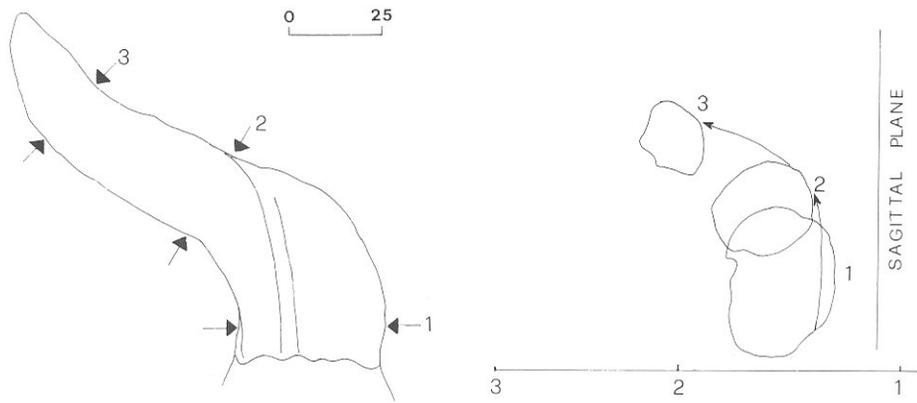
Horizon — Late Messinian, MN 13 zone.

Diagnosis — A *Samotragus* about the size of a modern *Rupicapra*, with slender limb bones, hypsodont dentition, fairly reduced premolars and a distinct postcornual groove. Horn cores similar to those of *Samotragus praecursor*, slightly inflated at the base, slightly protruding laterally at their top, very close to each other in their proximal third, and much smaller than *Samotragus crassicornis* from Samos. It differs from *Samotragus praecursor* in its distinctly larger body size and more hypsodont dentition.

species	site	inv.	apd	td	l	ed	id	md
<i>S. occidentalis</i> n. sp.	BRS5	BRS5/29	33.0	25.0	104.6	69.0	12.4	10.00
<i>S. praecursor</i>	Rav. Pluie	RPL3	31.0	32.5	~100.0	85.0	16.8	-
		NN	40.0	33.0	~130.0	92.1	~20.0	19.00
		RPL394	35.5	34.5	~110.0	80.5	~20.0	23.00
		RPL349	35.0	31.7	~120.0	80.0	~18.5	-
		RPL481	33.2	30.5	-	80.0	18.6	28.00
		RPL37	36.2	30.3	137.0	-	-	-
		RPL480	30.3	25.4	~80.0	77.7	~29.5	38.30
<i>S. crassicornis</i>	Rav. Zoares	RZ77	26.5	26.1	116.5	66.8	15.6	18.50
	Samos	VVNUM	68.1*	58.4*	-	93.0*	-	-

Tab. 2 - Measurement of horn cores of *Samotragus* spp..

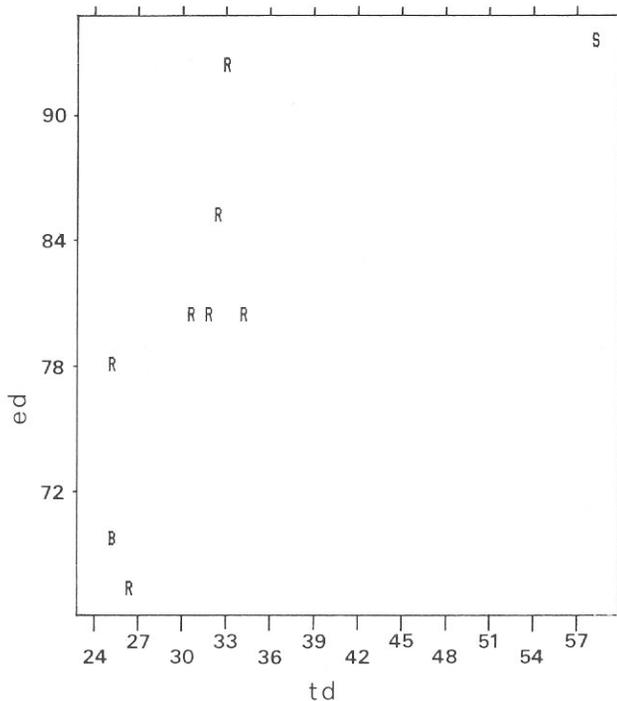
~ = inferred value; * = mean values (from Solounias, 1981); apd = antero-posterior diameter at base of horn-core; td = transverse diameter at base of horn-core; l = length, measured anteriorly; id = distance between internal sides of horn pedicels; ed = distance between external sides of horn pedicels; md = minimum distance between horn cores



Text-fig. 1 - *Samotragus occidentalis*, n. sp. Section of right horn core BRS5-29. Scale in mm.

Description — Horn cores (Tab. 2; Text-figs. 1-2, 7). The holotype is a fragmented frontal with part of the left orbital roof, the right horn core and the proximal half of the left horn core. The specimen is broken caudally at the fronto-parietal suture. Its anterior part

lacks the very base of the right horn core, while part of the base of the horn core is preserved on the left side. The features and the size of the horn cores are very similar to those of *Samotragus praecursor* (Bouvrain & De Bonis, 1985: text-fig. 3; pl. 1, fig. 1).



Text-fig. 2 - Diagram of transverse diameter of horn cores versus distance between external sides of horn pedicels in *Samotragus praecursor* (R), *S. crassicornis* (S) and *S. occidentalis* n. sp. (B).

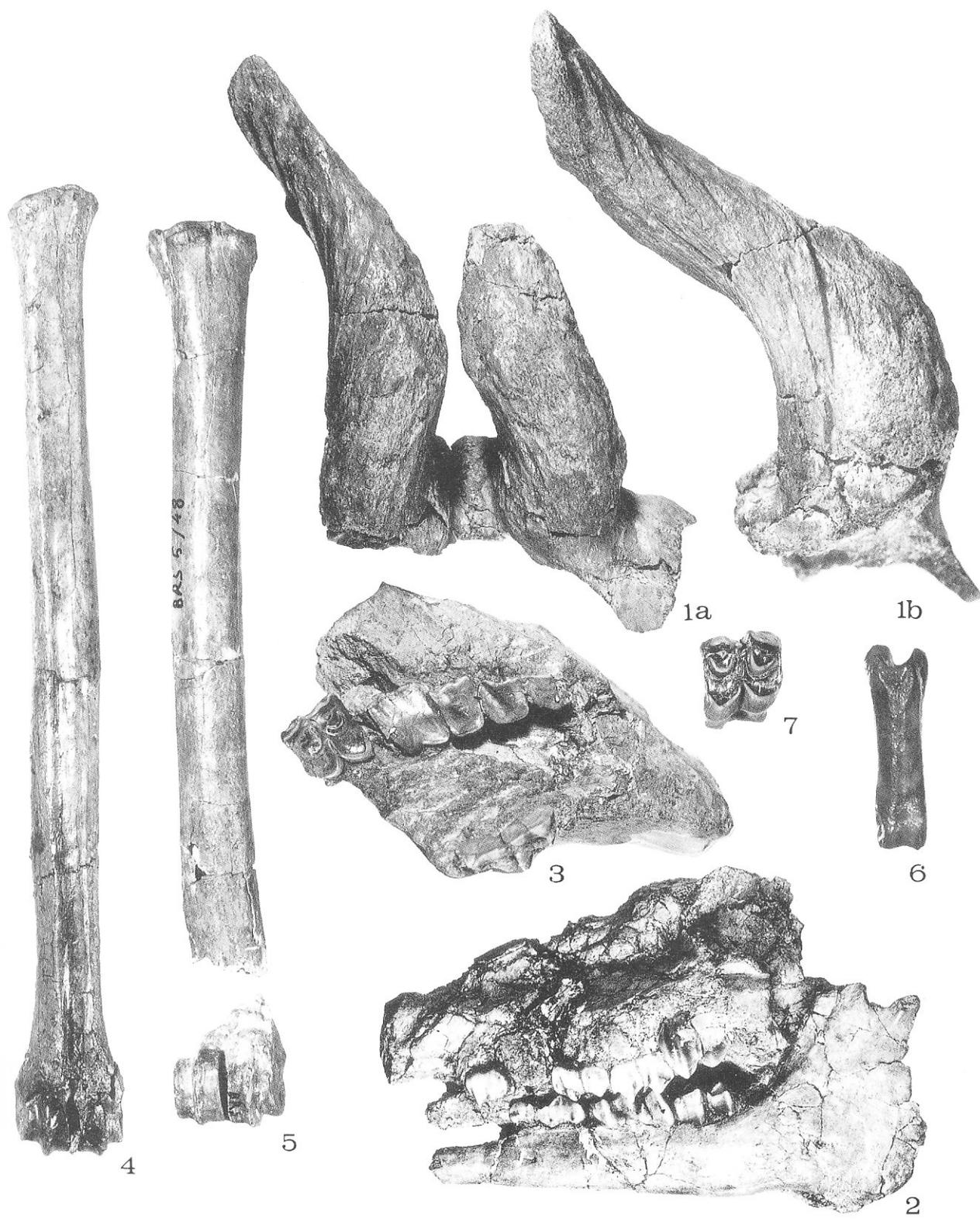
The right horn core is twisted counter-clockwise from the proximal to the distal end when observed from the posterior and dorsally. It shows a fairly large helicoidal spiralization of a complete gyre. The horn cores are inserted close together on the frontal bone and have short pedicels. Their proximal halves are rather massive, and look inflated, diverge slightly laterally, and then tend to reapproach each other distally. The horn cores become abruptly thinner at about 1/2 of their length, where they turn outwards and posteriorly. Their surfaces are grooved. A major groove starts postero-laterally, related with the postcornual groove, and extends almost straight along the lateral side of the horn-core, disappearing in the distal part. Distinct keels and internal sinuses are absent. The section is elliptical at the base, with a distinct lateral groove and then becomes more rounded at about 1/2 length. The distal end is medio-laterally compressed.

The frontal bones are thickened in sagittal section, without sinuses and with very complicated and surelevated interfrontal and fronto-parietal sutures. The orbit roof is broad and protrudes laterally. The postcornual groove is distinct.

Dentition and mandibles (Tabs. 3-4; Text-figs. 3-5). The lower premolars are reduced. The molars are hypodont, with very reduced or absent basal pillars. The internal wall is fairly flat with distinct para- and entosty-

EXPLANATION OF PLATE 1

Figs. 1-7 - *Samotragus occidentalis* n. sp. from Brisighella. 1a-b) horn cores, BRS5-29; 2) facial part of the skull and mandibles of a young individual, BRS5-37; 3) fragmented palate with left upper tooth row, BRS5-298; 4) left metatarsal, BRS10-1; 5) fragmented left metacarpal, BRS5-48; 6) 1st phalanx, BRS5-304; 7) left upper M2, BRS18-2.



species	site	inv.	tl	pl	ml	pmrat
<i>S. occidentalis</i> n. sp.	BRS5	BRS5/32	62.5	23.8	38.4	62.0
		BRS5/31	~65.0	~23.5	42.0	~55.9
<i>S. praecursor</i>	Rav. Pluie	RPL558	~56.0	20.7	35.4	58.5
		RPL9	53.8	21.8	32.7	66.7
		RPL526	55.2	21.0	34.6	60.8
		RPL129	49.4	18.3	32.0	57.2
		RPL3	53.9	20.7	32.3	64.1
		RPL47	~57.0	21.0	36.0	58.3
		RPL31	54.6	22.2	33.2	66.9

Tab. 3. - Measurement of lower tooth rows of *Samotragus* spp..

~ = inferred value; tl = length of the tooth-row; pl = length of premolar row; ml = length of molar row; pmrat = premolar/molar ratio

lids in M_1 - M_2 . A mesostylid is present in the high part of the crown. The central cavities are narrow, not complicated, surrounded by very thin enamel, and do not extend very far basally. A feeble, smooth goat fold occurs at the mesio labial corner of the crown. P_3 and P_4 , even if they are relatively small with respect to the molars, have a primitively complex pattern with distinct parastylid. The lingual wall tend to be closed distally. The labial wall is flat in P_3 while a feeble vertical groove marks the posterior lobe in P_4 . A first milk incisor is enlarged, a feature already pointed out by Bouvrain & De Bonis in *S. praecursor*. The upper dentition is known only from an isolated premolar, an M^2 and two very worn and incomplete series.

Postcranial bones (Pl. 1, figs. 4-6; Tab. 5; Text-fig. 6). The limb bone material is scant and not well preserved. The morphology agrees with *Samotragus praecursor*; but the Monticino specimens are distinctly larger. The dimensional variability is apparently not greater than could be expected in a sample from a natural population.

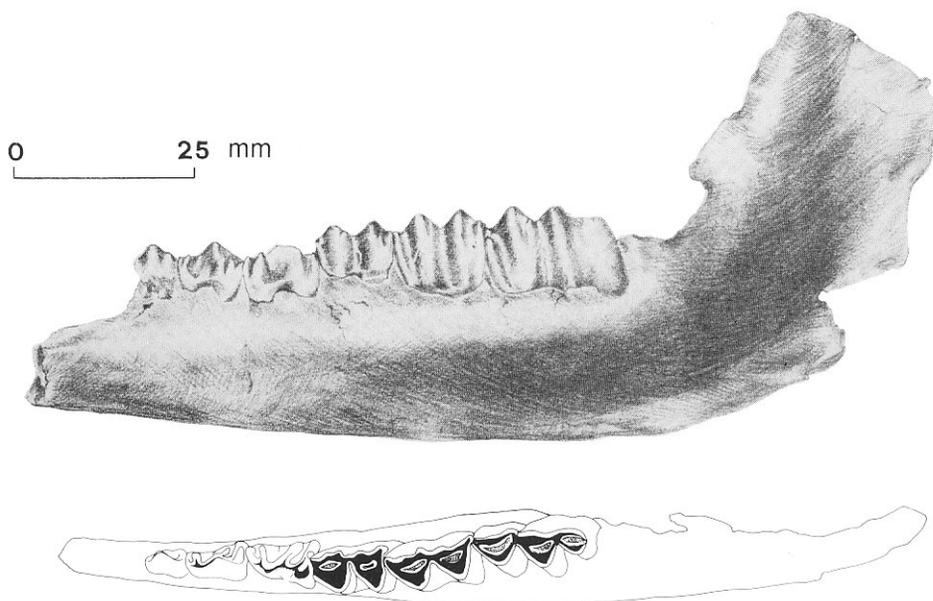
Comparisons and discussion — The form from Brisighella very clearly belongs to the *Oioceros* group or *Oiocerini* tribe, which includes, according to Bouvrain & De Bonis (1985), the genera *Samotragus*, known from the deposits of Samos and Ravin de la Pluie, *Samodorcas*, a new genus founded by the authors on the basis of the type skull of the species "*Ovis*" *kullmanni* from Samos, as well as the late Miocene *Oioceros* from the Greece-Iranian region. These authors therefore propose to exclude the middle Miocene Tung Gur, Jiulonghou, and Fort Ternan "*Oioceros*" from the genus. These forms do, in fact, lack the strong inverse torsion of the horn cores and the grooves or distinct keels, characteristics considered here to be synapomorphies defining the *Oioceros* group. Recently, Kohler (1987) grouped these forms in the new genus *Turcocerus* in which she included also the new species *T. gracilis* from Candir (middle Miocene, Turkey).

Though the genus *Samodorcas* can be readily distinguished from the genera *Oioceros* and *Samotragus*

specimen	inv.	element	le	br	specimen	inv.	element	le	br		
mandible	BRS5/31	l.	M_3	17.1	7.2	mandible	BRS5/32	l.	M_3	17.2	~7.5
			M_2	13.4	7.8				M_2	12.6	7.3
			M_1	11.3	7.0				M_1	10.6	6.8
			P_4	9.1	5.2				P_4	10.2	6.6
			P_3	-	6.0				P_3	8.4	5.1
			P_2	5.7	4.0				P_2	5.5	3.4
			P_1	-	-				P_1	-	-
	BRS5/273	l.	M_3	17.0	6.9		BRS8/1	l.	M_3	17.6	6.6
			M_2	13.0	7.0				P_4	9.1	6.0
lower teeth	BRS5/28	r.	M_3	18.6	7.3	upper teeth	BRS18/2	l.	M^2	13.5	14.4
	BRS8/3	l.	— ₃	17.8	7.6		BRS5/291	l.	P^3	9.3	7.9
	BRS5/38	r.	M_3	~18.4	7.6		BRS16/5	r.	M^2	12.8	6.9
	BRS9/2	r.	P_2	5.0	3.3						

Tab. 4. - Measurements of teeth for *Samotragus occidentalis*. n. sp.

~ = inferred value; le = length; br = breadth.



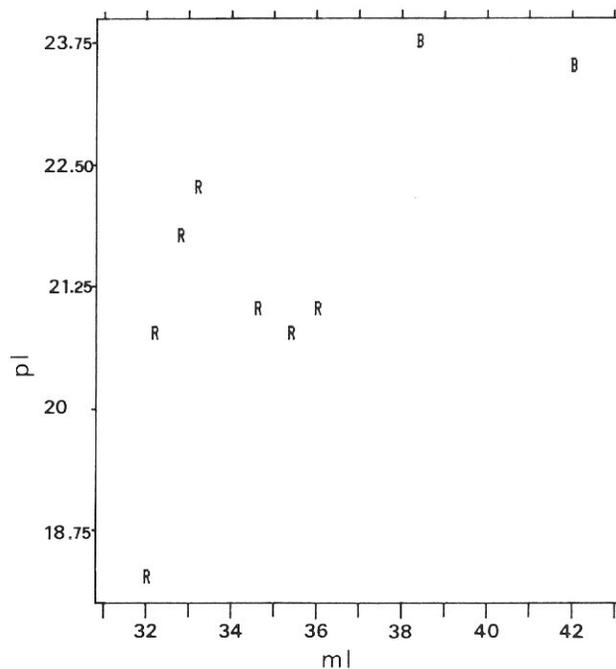
Text-fig. 3 - *Samotragus occidentalis* n. sp., mandible BRS5-31.

because of its long ribbed horn cores with sharp keels, their implantation behind the orbits, their considerable backwards inclination, as well as the strong antero-posterior compression at their base, it appears to be more difficult to distinguish between the genera *Oioceros* and *Samotragus*. Bouvrain & De Bonis (ibid.) do not propose a diagnosis that differentiates between the genera *Oioceros* and *Samotragus*. If one restrains oneself to the morphologies of the horn cores and the frontal region, which are the only parts of the skull preserved in the form from Brisighella, the separation between *Samotragus* and *Oioceros* can be justified by a very small number of characteristics:

<i>Samotragus</i>	<i>Oioceros</i>
postcornual groove absent	postcornual groove present
abrupt narrowing of the APD in the upper part of the horn cores	no abrupt narrowing of the APD in the upper part of the cores
inverse torsion of the horn cores along an open (large radius) helix whose axis curves backwards	inverse torsion of the horn cores, often along a small radius helix whose axis is straight

These characteristics, which can be considered distinctive, deserve a few remarks. With regards to the postcornual groove, it is absent in *Samotragus crassicornis* from Samos. In this case the disappearance may

be tied to the extreme thickening at the base of the horns cores, which may have somehow obliterated the postcornual groove. An analogous observation can be made on an as of yet unpublished skull from a late Miocene deposit of Mugla in western Anatolia (Turkey)



Text-fig. 4 - Diagram of premolar length versus molar length for *Samotragus praecursor* (R) and *S. occidentalis* n. sp. (B).

element	species	site	inv.	l	papd	ptd	mdd	mbd	dapd	dtd	
Humerus	<i>S. occidentalis</i>	BRS10	BRS10/2	-	-	-	-	-	~28.0	28.0	
	<i>S. praecursor</i>	Rav. Pluie	RPL211a	105.5	-	-	-	-	-	-	
			RPL211b	105.7	-	-	-	-	-	20.0	
Metacarpal	<i>S. occidentalis</i>	BRS5	BRS5/48	~155.0	16.5	19.7	12.0	12.9	14.3	18.5	
		BRS19	BRS19/2	-	14.0	18.3	~11.7	~12.5	-	-	
	<i>S. praecursor</i>	Rav. Pluie	RPL273		128.7	10.4	15.5	-	-	11.7	16.8
			RPL623		135.4	-	16.9	-	-	11.7	16.8
			RPL217		135.7	12.3	16.5	-	-	-	-
			RPL177		135.0	-	-	-	-	-	-
			RPL274		120.5	-	-	-	-	11.4	17.2
			RPL276		136.8	17.2	-	-	-	-	-
Metatarsal	<i>S. occidentalis</i>	BRS13	BRS13/01	170.0	~17.0	-	15.5	12.6	15.2	20.4	
		BRS1	BRS1/18	-	-	-	-	-	23.0	16.9	
		BRS6	BRS5/178	-	23.7	22.0	14.0	-	-	-	
	<i>S. praecursor</i>	Rav. Pluie	RPL487		134.2	-	15.1	-	-	12.0	17.9
			RPL668		136.7	17.2	-	-	-	-	-
			RPL276		136.8	16.9	15.2	-	-	13.0	18.0
			RPL547		126.8	17.4	15.3	-	-	11.8	18.6
			RPL257		129.2	-	15.2	-	-	12.9	18.6
			RPL172		123.0	15.9	14.3	-	-	11.0	17.2
			RPL215		132.8	-	15.5	-	-	12.6	17.5
			RPL500		125.5	-	-	-	-	-	-
1st phalanx	<i>S. occidentalis</i>	BRS5	BRS5/72	40.0	~10.8	14.5	7.4	7.9	9.4	8.6	
			BRS5/304		36.1	10.8	14.1	8.2	7.8	8.9	8.6
			BRS5/73		36.2	10.8	14.1	7.7	8.7	9.6	8.9

Tab. 5. - Comparative measurement of postcranial skeleton in *S. occidentalis* n. sp. and *S. praecursor* (data from Bouvrain & De Bonis, 1985).

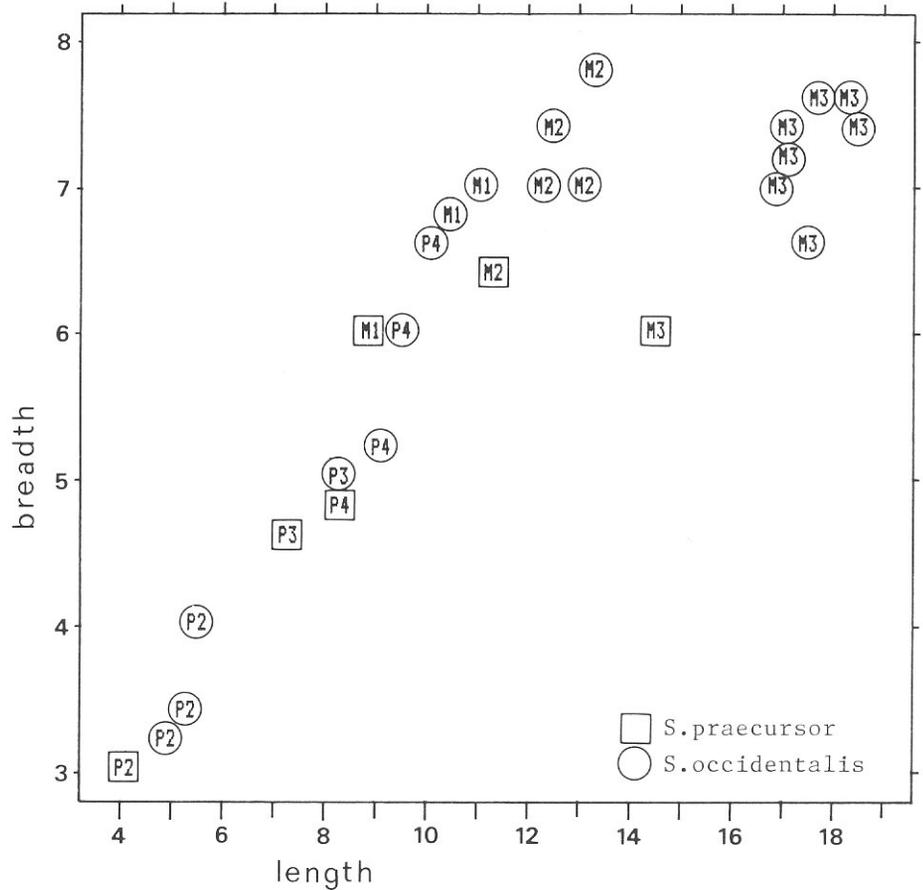
~ = inferred value; l = total length; papd = anteroposterior diameter of proximal end; ptd = transverse diameter of proximal end; mdd = minimum depth of diaphysis; mbd = minimum breadth of diaphysis; dapd = anteroposterior diameter of distal end; dtd = transverse diameter of distal end

reported by Ozansoy (1957) as "Antilope gen. et sp. indet.". This skull, which can be assigned to the *Oioceros* group on the basis of the inverse torsion of its horn cores, whose bases are very close to each other and are extremely thick, does not have postcornual grooves. With regards to *Samotragus praecursor* from Ravin de la Pluie, one can note that the absence of a postcornual groove is not a general characteristic, since it was observed in at least one of the horn cores assigned to this species. Although the form from Brisighella must be assigned to the genus *Samotragus* on the basis of the two other characteristics mentioned above, it has a deep, well defined postcornual groove which is connected to the main helicoidal groove running up the horn core. Therefore, because of the degree of variability in the presence or absence of the postcornual groove, this characteristic can no longer be considered a distinguishing characteristic at the generic level separating the genera *Samotragus* and *Oioceros*. In conclusion, only two characteristics (helicoidal spiraling of the horn cores and abrupt decrease of the antero-posterior diameter, which could be linked) seem to be significant enough to justify the separation of the two genera and

result in the attribution of the form from Brisighella to *Samotragus*.

As far as comparisons with the two described species of this genus are possible, owing to the fragmentary state of our material, *S. occidentalis* n. sp. differs from *S. praecursor* in its larger size, as is suggested by tooth rows and limb bones and in its more hypsodont dentition. Differences in horn core morphology are slight, but *S. occidentalis* n. sp. appears to be distinguishable by the tendency of the proximal halves of the horn cores to approach each other distally, while they are sub-parallel in *S. praecursor* (Text-fig. 7). A further distinctive feature of *S. occidentalis* is the already mentioned presence of a distinct postcornual groove.

Comparisons with *S. crassicornis* are limited to frontal bone and horn cores (Text-fig. 7). The form from Brisighella differs from *S. crassicornis* (Sickenberg, 1936, pl. 1, fig. 1; description and figures in Solounias, 1981, pp. 164-165) in its much smaller size, in the occurrence of a postcornual groove and in that its horn cores are much less closely spaced and inflated at the base, tend not to merge at the sagittal suture, are

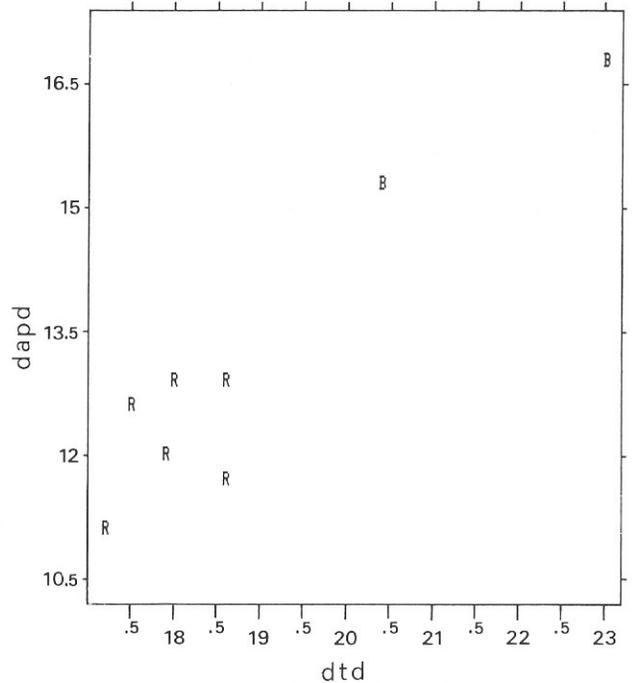


Text-fig. 5 - Diagram of breadth versus length for lower teeth of *Samotragus occidentalis* n. sp. and *S. praecursor*.

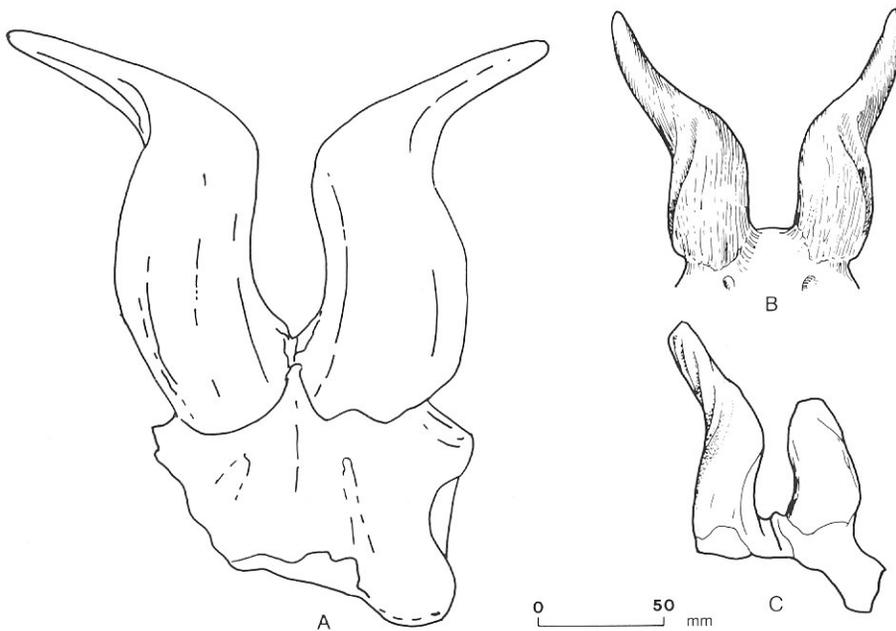
much less outbowed laterally in their proximal half and protrude less laterally in their distal half.

We feel that the larger body size with respect to the size of the horn cores, coupled with the derived features of the dentition, clearly separate the Brisighella finds from the older and smaller *S. praecursor*. The specimen from Brisighella is also distinguished from *S. crassicornis* by its much smaller size, by the morphology of the horn cores and the presence of a post-cornual groove. Even if the form from Brisighella is represented by not very abundant material, and therefore its morphological variability can not be satisfactory evaluated, we believe that its characteristics are distinctive enough to warrant recognition of its separate specific systematic status.

The available data are too poor to assess the phylogenetic relationships of this new Messinian species. It must be pointed out, however, that *Samotragus occidentalis* n. sp. appears to be more plesiomorphic with respect to the Turolian species from Samos in its smaller size and likely also in the features of the horn cores, which are, in fact, more similar to the older species from Macedonia. A direct derivation from *S. crassicornis* seems therefore unlikely. *Samotragus occidentalis* is at present the westernmost find of a genus of



Text-fig. 6 - Diagram of distal diameters of metatarsal for *Samotragus occidentalis* n. sp. (B) and *S. praecursor* (R).



Text-fig. 7 - Horn cores from: A) *Samotragus crassicornis* (after Solounias, 1981); B) *S. praecursor* (from Bouvrain & De Bonis, 1985); C) *S. occidentalis* n. sp..

the tribe Oiocerini, a diverse group that was widespread in the late Miocene of the Balkan-Iranian regions.

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