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THE PIG *PROPOTAMOCHOERUS PALAEOCHOERUS* FROM THE UPPER MIOCENE OF GRYTSIV, UKRAINE

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ABSTRACT

The suid from Grytsiv (= Gritsev) in Ukraine belongs to the genus *Propotamochoerus*. This genus was not yet known from the Miocene of eastern Europe. The Grytsiv suid is described and its significance is discussed within the palaeobiogeographical and stratigraphical framework of the genus *Propotamochoerus*. Grytsiv is geographically situated between three areas with different species of the genus: W Europe (*P. palaeochoerus*), China (*P. hyotherioides*) and the Indian Subcontinent (*P. hysudricus*). In Europe, *P. palaeochoerus* is replaced at the MN 9-10 boundary or early in MN 10 by a different species of *Propotamochoerus* with affinities with *P. hyotherioides* or *P. hysudricus*. The fossils from Grytsiv extend the known range of *P. palaeochoerus* eastward into Ukraine.

Key words: *Propotamochoerus, Suidae, Mammalia, Vallesian, Miocene, Ukraine.*

RESUMEN

El suido de Grytsiv (= Gritsev) en Ucrania pertenece al género *Propotamochoerus*. Este género todavía no se conocía en el Mioceno de Europa oriental. Se describe el suido de Grytsiv y se discute su significado dentro del marco paleobiogeográfico y estratigráfico del género *Propotamochoerus*. Grytsiv está situado entre tres áreas con diferentes especies del género: Europa occidental (*P. palaeochoerus*), China (*P. hyotherioides*), y el Subcontinente Indio (*P. hysudricus*). En Europa, *P. palaeochoerus* fue substituido en la transición MN9-10 o a MN10 por una especie distinta de *Propotamochoerus* con afinidades con *P. hyotherioides* o *P. hysudricus*. Los fósiles de Grytsiv extienden su distribución geográfica conocida de *P. palaeochoerus* por el este hasta Ucrania.

Palabras clave: *Propotamochoerus, Suidae, Mammalia, Vallesian, Miocene, Ukraine.*

Introduction

Though the locality became first known in the English literature as Gritsev (transcription from the russian), the name Grytsiv (from the ukrainian) will be used here. It is situated in the Shepetovsky district of the Khmelnitsky Region in Ukraine. The fossils were discovered in the eastern wall of an abandoned quarry, near the village of Grytsiv in fissure fillings in an 8 to 12 metres thick limestone formed by a Middle Sarmatian reef. The fillings constist of clays and contain mollusc shells and vertebrate bones. These vertebrates include small and large mammals, abundant amphibians and reptiles, as well as scarce fishes and birds. The following mammals have been identified: Chiroptera indet., *Schizogalerix* sp., *Lanthanotherium* sp., *Amphechinus* sp., *Domninoides* sp., *Proscapanus* sp., *Urotrichini* spp. 1 & 2, *Plesiodymilus* sp., *Dinosorex grycivensis, Anourosoricodon* sp., *?Asoriculus* sp., *Amphilagus sarmaticus, Miopetaurista* sp., *Blackia* sp., *Forsythia* sp., *Sciurotamias* sp., *Monosaulax* sp., *Palaeomys* sp., *Steneofiber* (?) sp., *Leptodontomys* sp., *Keramidomys* sp., *Glis vallesiensis,*

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Muscardinus topachevskii, Myoglis ucranicus, Paraglirulus cf. *werenfelsi, Miodyromys gryciven-sis, Anomalomys* sp., *Lophocricetus* sp., *Cricetulo-don complicidens, Sarmatomys podolicus, Allohye-na sarmatica, Eomellivora wimani piveteaui, Ictit-herium spelaeum,* Mustelidae indet., *Gomphothe-rium* sp., Rhinocerotidae indet., *Chalicotherium* sp., *Hipparion primigenium, Hipparion* sp., *Dorcathe-rium* sp., Lagomericinae sp., *Dystychoceras* sp., *Euprox* sp., *Procervulus* sp., Cervulinae sp. (Korot-kevich, 1998; Korotkevich et al., 1985; Nesin & Kowalski, 1997; Rzebic-Kowalska & Topachevsky, 1997; Semenov, 1989, 1994; Wolsan & Semenov, 1996). The presence of *Hipparion* and the absence of murids, suggests an MN9 age.

Apart from some short descriptions of the *Hippa-rion* (Krakhmalnaya, 1994, 1996a, 1996b), none of the large mammals from Grytsiv have been descri-bed. Korotkevich (1988) identified some suid remains from Grytsiv as ?*Hyotherium* sp. Besides, *Microstonyx* has been described from the Miocene and *Propotamochoerus* from the Pliocene of Ukrai-ne (Korotkevich, 1967, 1970, 1976, 1988; Krakh-malnaya, 1989). The suid material from Grytsiv has increased and it is the aim of this paper to describe it, assign it to a taxon and discuss its palaeogeo-graphical significance.

Measurements and terminology

All measurements in mm and taken as indicated by Van der Made (1996).

Nomenclature of the tooth morphology from Van der Made (1996).

DAP	Anteroposterior diametre of a tooth or bone.
DAPd	DAP at the distal end of a bone.
DAPp	DAP of the proximal end of a bone.
DLL	Labio-lingual diametre of an incisor.
DMD	Mesio-distal diametre of an incisor.
DT	Transverse diametre.
DTa	DT of the anterior lobe of a tooth.
DTp	DT of the posterior lobe of a tooth or proximal end of a bone.
DTpp	DT of the third lobe of a M3.
DTd	DT of the distal end of a bone.
DTdf	DT of the articular facet at the distal end of a bone.
L	Length of a bone.

Collections and their abbreviations

The fossils are housed in the Department of Vertebrate Pala-eozoology and Paleontological Museum of the National Museum of Natural History, Kiev (NMNHK) and were compa-red with fossils that are kept in the following institutions.

BSPHGM	Bayerische Staatssammlung für Paläontologie und historische Geologie, München.
GSP	Geological Survey of Pakistan, Islamabad.
HLD	Hessisches Landesmuseum, Darmstadt.
IM	Indian Museum, Calcutta.
IPS	Instituto de Paleontología, Sabadell.

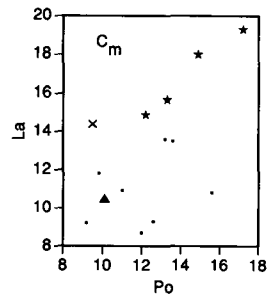

Fig. 1.—Bivariate plot of the male lower canine. Legend and provenance of data as in Figure 2.

IPUW	Institut für Paläontologie der Universität, Wien.
IVAU	Instituut voor Aardwetenschappen, Utrecht.
IVPP	Institute for Vertebrate Paleontology and Paleo-anthopology, Academia Sinica, Beijing.
MAMA	Museu Arqueològic Municipal «Camil Visedo Moltó», Alcoy.
MGL	Museum Guimet, Lyon.
MNCN	Museo Nacional de Ciencias Naturales, Madrid.
MNHNP	Muséum National d'Histoire Naturelle, Paris.
NMB	Naturhistorisches Museum, Basel.
NMM	Naturhistorisches Museum, Mainz.
NMW	Naturhistorisches Museum, Wien.
MPV	Museo Paleontológico de Valencia.
PIMUZ	Paläontologisches Institut und Museum der Uni-versität, Zürich.
SLJG	Steiermärkisches Landesmuseum Joanneum, Graz.

Systematics

Order	Artiodactyla Owen, 1841
Superfamily	Suoidea Gray, 1821
Family	Suidae Gray, 1821
Subfamily	Suinae Gray, 1821
Genus	*Propotamochoerus* Pilgrim, 1925
Species	*Propotamochoerus palaeochoerus* (Kaup, 1833)

Selected synonymy

1833 *Sus palaeochoerus* Kaup - Kaup: 11-13, pl. 1, figs. 1-3.

1926 *Sus (Hyotherium) palaeochoerus* - Pilgrim: 11, pl. 1.

1971 *Korynochoerus palaeochoerus* (Kaup) 1833 - Schmidt-Kittler: 129-168.

1992 *P.* [*ropotamochoerus*] *palaeochoerus* - Van der Made, Montoya & Alcalá: 402, 406, 411.

Type locality: Eppelsheim.

Age of type locality: Early Late Miocene, Valle-sian, MN9.

Material: All material is indicated in tables 1-3.

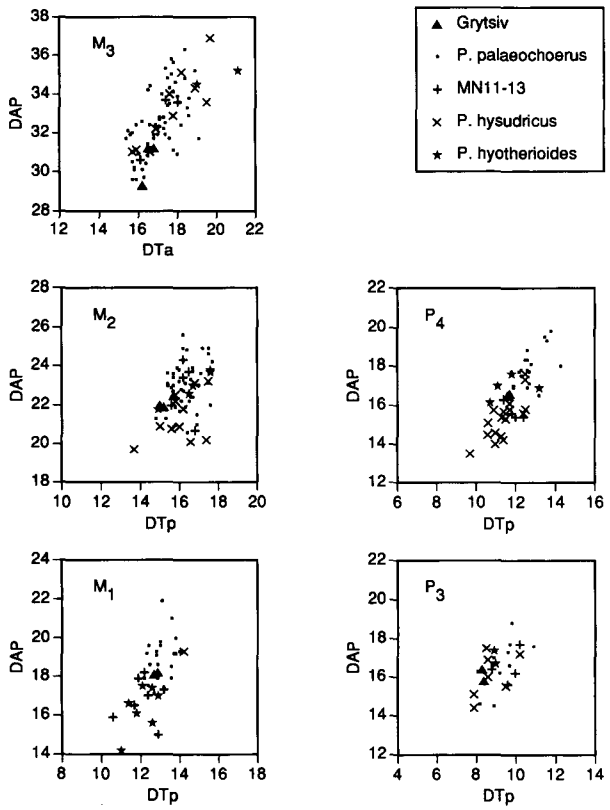

Fig. 2.—Bivariate plots of the lower cheek teeth. *Propotamochoerus palaeochoerus* from Grytsiv (NMNHK), *P. palaeochoerus* from various localities in Europe (BSPHGM, HLD, IPS, IPUW, MGL, MNHNP, NMM, NMW, SLJG), *Propotamochoerus* sp. of MN 11-13 from Europe (MNCN, MPV, NMB, NMW), *P. hysudricus* from various localities in Pakistan (GSP, IM, IVAU), *P. hyotherioides* from Lufeng (IVPP; Van der Made & Han, 1994).

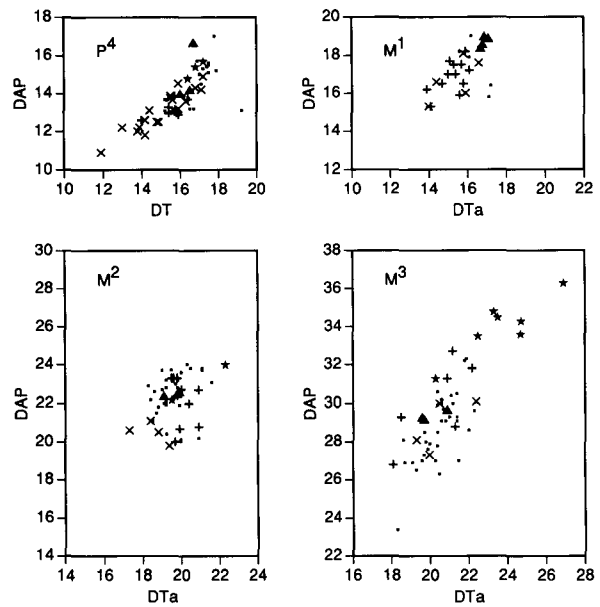

Fig. 3.—Bivariate plots of the upper cheek teeth. Legend and provenance of data as in Figure 2.

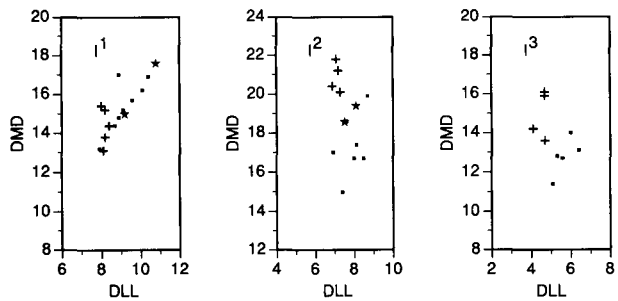

Fig. 4.—Bivariate plots of the upper incisors. Legend and provenance of data as in Figure 2.

Description and comparison

The $\mathbf{I_1}$ (Pl. 1, fig. 7) and $\mathbf{I_2}$ (Pl. 1, fig. 8) have crowns of an intermediate height. In Hyotheriinae and Cainochoerinae, the crowns are lower, in many Tetraconodontinae and Suinae, the crowns are of similar height, but in part of the Suinae, including *Sus* the crowns are higher. In the incisors with higher crowns the lower limits of the crown are not so clear; the enamel becomes thinner gradually, whereas in the Grytsiv incisors, the crowns have well marked limits. The labio-lingual diametre is long. It tends to be relatively less in the higher incisors. It is in the Dicoryphochoerini, as a stem group of the Suinae, that these changes start to take place. Within this group the type of incisor from Grytsiv is primitive.

The $\mathbf{I_3}$ (Pl. 1, fig. 6) reflects the changes described above. However, the situation is even more complex. In some lineages, that increase 1-2 crown height (eg. *Hippopotamodon*), this incisor also becomes higher, whereas in others (eg. *Sus*), the tooth is reduced in size, the crown is low and the morphology not well defined. In *P. hyotherioides*, the I_3 has a much lower crown (Van der Made & Han, 1994, Pl. 13, fig. 5).

The $\mathbf{C_m}$ (Pl. 1, fig. 5) has a section that resembles a isoscele triangle. In many suids, either the labial side («scrofic canines») or the posterior side («verrucosic canines») tends to be narrow. *P. palaeochoerus* (dots in fig. 1) and the MN 11-13 *Propotamochoerus* (square) tend to have both sides equally wide or even the posterior side wider, whereas *P. hysudricus* (triangle) and *P. hyotheriodes* (stars) tend to have wider labial sides («scrofic canines»). All three sides of the section of the canine are convex. This is a very typical morphology that occurs in *P. palaeochoerus*, while other suids tend to have the labial surface flat or with ridges. *P. palaeochoerus* and the suid from Grytsiv have relatively small canines.

The isolated $\mathbf{P_1}$ (Pl. 2, fig. 3) and P_2 (Pl. 2, fig. 5) are assigned with some reservations to this species, since there is no independent indication of the presence of a second species. They are small teeth, with, in particular in the P_1, the protoconid placed much foreward, and with an inflated talonid shelf with only a faint indication of the protopostcristid. This morphology tends to be common in Tetraconodontinae. The small tetraconodontines *Parachleuastochoerus crusafonti* and *Parachleuastochoerus huenermanni* are often found in the same localities as *P. palaeochoerus*. The problem in recognition is that P1 and P2 tend to be more or less rare teeth, and those that are known are often isolated. Therefore variation in morphology and size is not well

Table 1.—**Measurements (in mm) of the associated cheek teeth of *Propotamochoerus palaeochoerus* from Grytsiv**

			P_2	P_3	P_4	M_1	M_2	M_3
22-1067	R	DAP	14.4	15.8	16.5	18.2	21.9	31.2
		DTa	5.3	7.1	9.8	12.4	14.9	16.8
		DTp	6.2	8.4	11.6	12.9	15.2	14.7
		DTpp						11.6
22-1068	L	DAP	14.0	16.4	16.6	18.1	22.0	31.2
		DTa	5.2	7.1	9.8	12.3	14.8	16.5
		DTp	6.0	8.3	11.7	12.7	15.0	14.8
		DTpp						11.6
22-1071 (M_3)	R	DAP					22.5	29.3
22-1072		DTa					15.7	16.2
		DTp					15.7	14.4
		DTpp						11.7
			P^2	P^3	P^4	M^1	M^2	M^3
22-1064	R	DAP			14.2	18.6	22.4	29.3
		DTa			16.5	16.8	19.1	19.6
		DTp				15.8	18.1	17.5
		DTpp						10.2
22-1063	L	DAP			14.9	18.4	22.6	29.2
22-1063a (M^3)		DTa			16.7	16.7	19.9	19.7
		DTp				15.7	18.2	16.9
		DTpp						11.1

known in these teeth. The two islolated teeth are tentatively assigned to *P. palaeochoerus*, but the possibility that they belong to one of the small *Parachleuastochoerus* species cannot be excluded.

The **P_2** and **P_3** (Pl. 2, figs. 1 & 4) have a flattened protoconid with anterior and posterior crests. In the P_2 in the mandibles, the protopostcristid is a better developed than in the isolated premolars. The **P_4** (Pl. 2, figs. 1 & 4) has a metaconid that is placed close to and slightly behind the protoconid. Though the differences are small, the cusp is better developed than in the majority of the species of this genus and is similar in size and position to the metaconid of the *P. palaeochoerus* P_4. The protoprecristid becomes rapidly lower away from the protoconid. The talonid has a well developed hypoconid, more or less in the middle. The tooth is of the Dicoryphochoerine type (sensu Schmidt-Kittler, 1971 and Van der Made & Moyà-Solà, 1989).

The **M_1** and **M_2** (Pl. 2, figs. 1 & 4) have the common suine morphology. The **M_3** (Pl. 1, fig. 9; Pl. 2, figs. 1 & 4) has a third lobe consisting of a pentaconid in the middle, preceeded by a pentapreconulid and several small cusplets and wrinkles of the enamel to the sides (formed by the pentaendocristid and pentaectocristid). A specimen from Ravin des Zouaves has a pentaconid and hexaconid (De Bonis & Bouvrain, 1996, fig. 9), wheras other MN 11-13 *Propotamochoerus* do not have a hexaconid. Hexaconids are known in the M_3 of *P. hyotherioides*, but not in those of *P. palaeochoerus* and *P. hysudricus*.

The **C^f** (Pl. 1, fig. 4) has a low crown and a rapidly narrowing root.

The **P^4** (Pl. 1, fig.1; Pl. 2, fig. 2) has the paracone and metacone well separated. The paraendoconulid and metaendoconulid are clearly present, though not big.

The **M^1** and **M^2** (Pl. 1, fig. 1) have the typical suine morphology, though the crests or lobes are not as well visible as in several of the younger genera of the Suinae. The **M^3** (Pl. 1, fig. 2) has a simple third lobe consisting of a pentacone that is placed lingually of the axis of the tooth. In addition to this cusp, there is also a pentapreconule and some lateral wrinkles (formed by the pentaectocrista and pentaendocrista).

Some **deciduous teeth** and **bones** have the common suid morphology.

In figures 2 & 3 the DAP and DT of the teeth of the different species of *Propotamochoerus*. *P. palaeochoerus* (dots) and the Grytsiv (triangles) suid tend to have large first molars and P4, while the second molars are not so big, and the third molars are even small compared to the other species. The relative size of the third (and to some extend the second) molar reflects diet; larger or longer M3 suggest a more herbivorous diet. *P. hyotherioides* (stars), *P. hysudricus* (oblique crosses) and the European *Propotamochoerus* of MN 11-13 (crosses) seem to have relatively large M_3 and small P_4 compared to *P. palaeochoerus* (dots).

Discussion

The Vallesian suids include very small Cainochoerinae, lophodont Listriodontinae, Tetraconodontinae with an enlarged P_4 with only one main cusp, Chinese Hyotheriinae with no paraendoconulid in the P^4 and Suinae of the tribe Dicoryphochoerini. The morphology of the premolars suggests that the Grytsiv suid belongs to the Dicoryphochoerini, a tribe of the Suinae (Schmidt-Kittler, 1971; Van der Made & Moyà-Solà, 1989). In a recent classification, this tribe includes: *Propotamochoerus* (=*Korynochoerus*), *Hippopotamodon* (=*Microstonyx*), *Eumaiochoerus*, *Kolpochoerus* and *Hylochoerus*

Table 2.—**Measurements of the isolated teeth of *Propotamochoerus palaeochoerus* from Grytsiv**

			DMD	DLL		
22-1079	I_1	L	6.6	9.9		
22-1077	I_1	R	6.7	10.0		
22-1078	I_1	R	6.6	10.7		
22-1080	I_2	R	8.5	11.5		
22-167	I_2	R	8.4	12.5		
22-1081	I_3	L	6.5	10.2		
22-1053	I_3	R	6.5	9.6		
22-1082	I_3	R	6.5	9.4		
22-379	I_3	R	6.3	10.5		
22-2914	DI_2	L	4.9	8.3		
			DAP	DTa	DTp	DTpp
22-951	C^f	L	12.4	7.4		
22-2917	D^3	R	14.9	7.0	11.4	
22-2918	D^4	L	—	—	> 12.7	
22-1025	P^4	R	14.0	16.0		
22-1073	M^1	L	18.9	17.1	15.7	
22-1074	M^1	R	19.0	16.9	15.6	
22-1070	M^2	R	22.5	19.8	18.7	
22-158	M^3	L	29.7	20.9	19.0	12.0
22-2916	P_1	R	9.6	4.0	4.2	
22-10.5	P_2	R	12.8	4.7	5.4	
22-1076	P_4	R	—	10.9	—	
22-1058	M_2	R	—	—	—	
			Li	La	Po	
22-2915	C_m	L	11.0	10.5	10.1	

(Van der Made, 1997). All species of *Hippopotamodon* are much larger than the Grytsiv suid. *Eumaiochoerus* is an endemic of a Miocene island that included Toscane and Sardinia and has a number of peculiar features. *Kolpochoerus* and *Hylochoerus* are known only from Africa and are suids with a highly specialized dentition, with incisors with increased DMD relative to DLL, with very elongated M3 and with some tendency to increase hypsodonty. The suid from Grytsiv belongs to *Propotamochoerus*.

Most of the species of *Propotamochoerus* were originally assigned to the genus *Sus*. This is for instance the case with *P. palaeochoerus*, which has intially been assigned to *Sus* and later to *Hyotherium* and *Korynochoerus*. Pickford (1988) stated that the species was very similar to *Propotamochoerus hysudricus* and Van der Made et al. (1992) were possibly the first to place the species formally in *Propotamochoerus*, though the justification for that remained a long time in press (Fortelius et. al., 1996). The genus *Propotamochoerus* includes the following species: *P. palaeochoerus, P. hysudricus, P. hyotherioides, P. wui, P. provincialis* and a form that entered Europe either in MN 10 or MN 11 and that lived on till at least MN 13 (Pickford, 1988; Van der Made & Moyà-Solà, 1989; Van der Made & Han, 1994; Fortelius et al., 1996). The limits of the geographical distribution of these species is not known. Pliocene *P. provincialis* has been described from Kuchurgan (Korotkevich, 1967, 1988) and Kvabevi (Vekua, 1972). Miocene *Propotamochoerus* have not been cited from the area and the collection from Grytsiv is the first one in being described from the area that extends from the north of the Black Sea to the north of China. Grytsiv is thus in a position between the three areas from where the genus is well known.

P. wui is a very small species from the Late Miocene of China (Van der Made & Han, 1994) and is much smaller than the Grytsiv suid.

P. hysudricus. Pickford (1988) revised the Miocene Suids of the Indian Subcontinent and recognized only *P. hysudricus*. Skulls assigned to this species have either the parietal ridges wide apart and a straight dorsal profile or have these crests close together and a concave profile with the occipitals appearing as being elevated. It is the question, whether all this material represents one species, or whether there is a rupture like in Europe. Until this problem is resolved, we follow Pickford (1988) and treat the material as representing one species.

The material assigned here to *P. hysudricus* includes tooth rows with premolars, some isolated premolars, but no isolated molars. The material is predominantly from Dhok Pathan equivalent strata, or of unknown exact provenance. M_3 tend to have a

Table 3.—**Measurements of the bones of *Propotamochoerus palaeochoerus* from Grytsiv**

Humerus		>DAPd	DTd	DTdf	R1	R2	R3	R4	R5
22-1069	R	> 48.9	54.4	39.5	33.6	24.9	26.3	24.4	25.2
MP II/MP V		DAPd	DTd						
22-119	L	14.8	9.3						
22-1087	L	16.4	11.9						
Lateral phalanx 3		DAPp	DAPpo	DTp	L				
22-395	R	9.7	8.7	7.9	> 17.9				

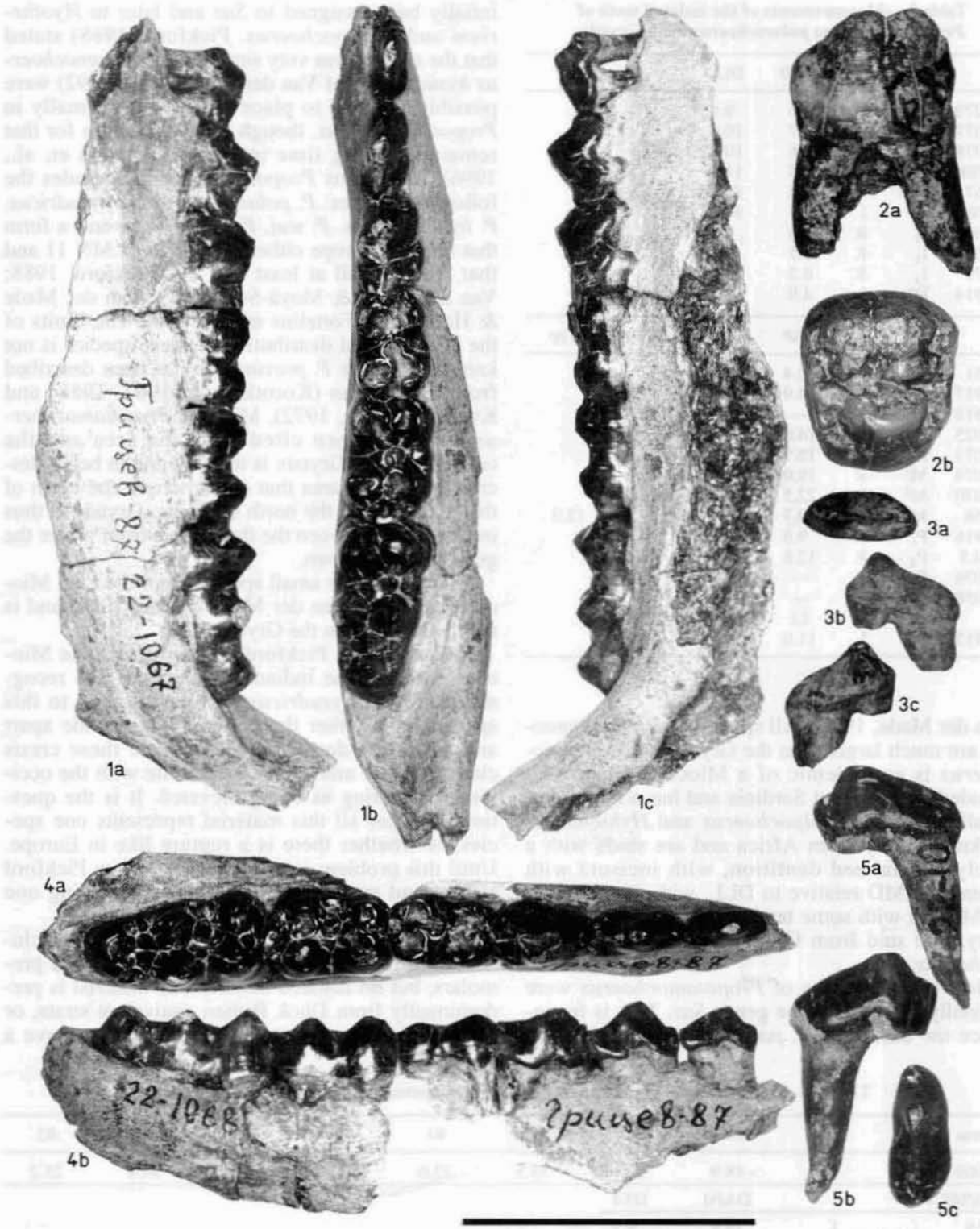

Plate 1.—*Propotamochoerus palaeochoerus* from Grytsiv. Fig. 1.—22-1067 - right mandible with P_2-M_3, a) lingual view, b) occlusal view, c) buccal view. Fig. 2.—22-1025 - right P^4; a) buccal and b) occlusal views. Fig. 3.—22-2916 - right P_1; a) occlusal, b) lingual, and c) buccal views. Fig. 4.—22-1068 - left mandible with P_2-M_3, a) occlusal and b) lingual views. Fig. 5.—22-1085 - right P_2; a) lingual, b) buccal, and c) occlusal views. The bar represents 2.5 cm for figs. 2, 3 & 5 and 5 cm for figs. 1 & 4.

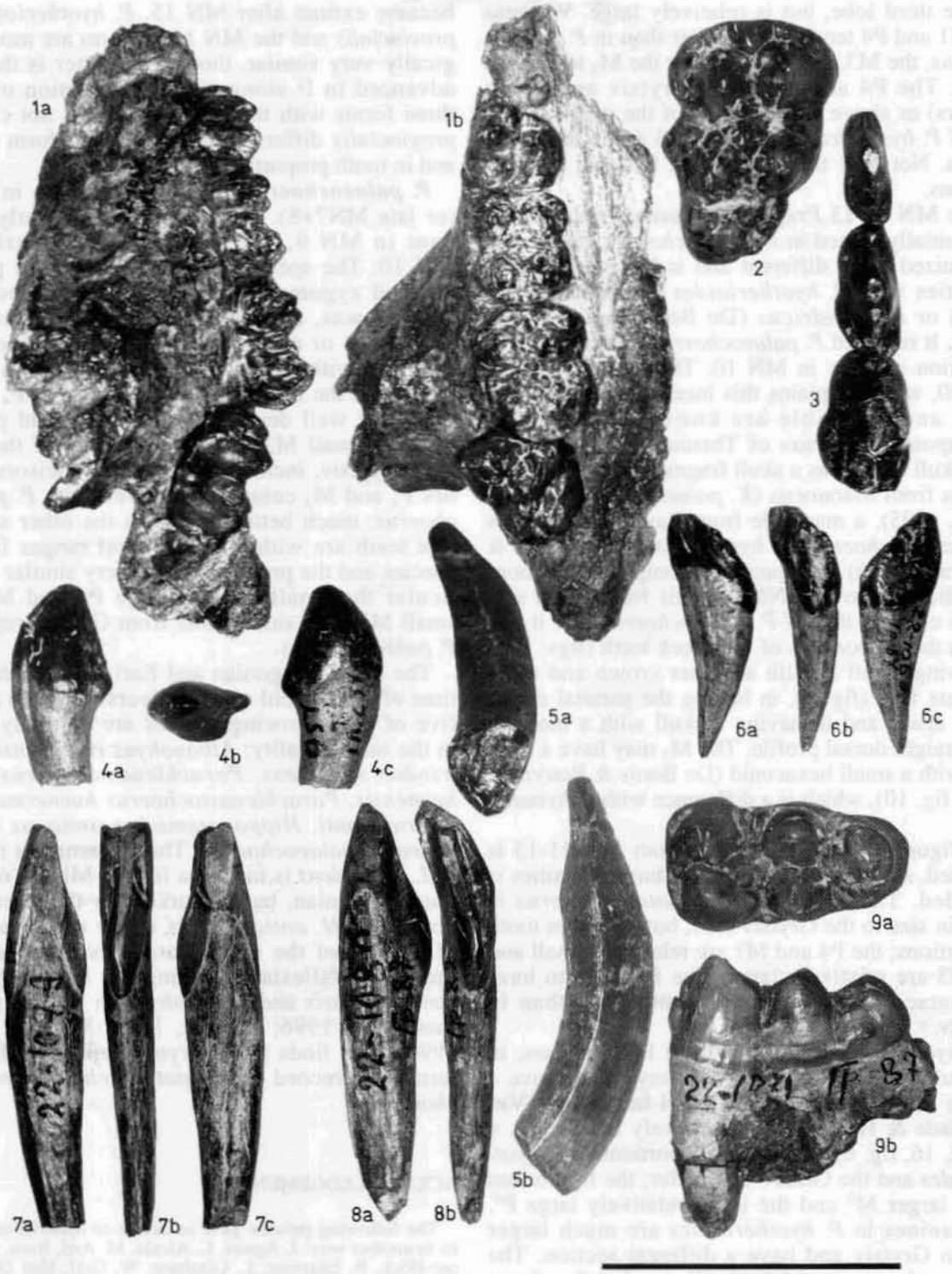

Plate 2.—*Propotamochoerus palaeochoerus* from Grytsiv. Fig. 1.—22-1064 - right maxilla with P^4-M^2 fully erupted and with M^3 in alveolus; a) buccal and b) occlusal views. Fig. 2.—22-158 - left M^3; occlusal view. Fig. 3.—22-1068 (detail) - left P_2-M_3; occlusal view. Fig. 4.—22-951 - left C^1; a) lingual, b) buccal, and c) occlusal views. Fig. 5.—22-2915 - left C_{inf}; a) postero-inferior, and b) buccal views. Fig. 6.—22-1053 - right I_3; a) mesio-lingual, b) labial, and c) distal views. Fig. 7.—22-1079 - left I_1; a) distal, b) lingual, and c) mesial views. Fig. 8.—22-1080 - right I_2; a) mesial, and b) lingual views. Fig. 9.—22-1071 - right M_3; a) occlusal and b) lingual views. The bar represents approximately 3.6 cm for figs. 2-9 and 5 cm for fig. 1.

simple third lobe, but is relatively large. Whereas the M1 and P4 tend to be smaller than in *P. palaeochoerus,* the M3, and in particular the M_3 tend to be large. The P4 and M1 from Grytsiv are within (lowers) or above (upper teeth) of the metrical ranges of *P. hysudricus,* while the M3 are in the lower ranges. Not only the size differs, but also the proportions.

The **MN 11-13** ***Propotamochoerus*** from Europe was initially placed in *P. palaeochoerus,* but is now recognized to be different and is believed to have affinities with *P. hyotherioides* (Fortelius et al., 1996) or *P. hysudricus* (De Bonis & Bouvrain, 1996). It replaced *P. palaeochoerus* at the MN 9-10 transition or early in MN 10. The genus is rare in MN 10, which explains this incertainty. A juvenile skull and mandible are known from Samos («*Postpotamochoerus*» of Thenius, 1950), a deformed skull as well as a skull fragment and other specimens from Maramena (*K. palaeochoerus* of Hellmund, 1995), a mandible from Ravin des Zouaves (*Propotamochoerus* cf. *hysudricus* of De Bonis & Bouvrain, 1996) and many less complete specimens from Baccinello V3 (NMB). This form has a size that is close to that of *P. palaeochoerus,* but it differs in the proportions of the cheek teeth (figs. 1-2), in having small I^1 with a higher crown and more elongate I2-3 (fig. 4), in having the parietal ridges wider apart, and in having a skull with a more or less straight dorsal profile. The M_3 may have a third lobe with a small hexaconid (De Bonis & Bouvrain, 1996; fig. 10), which is a difference with *P. hysudricus.*

In figures 1-4 only material from MN 11-13 is included, so that no material of dubious affinities is included. The MN 11-13 *Propotamochoerus* is close in size to the Grytsiv suid, but differs in tooth proportions; the P4 and M1 are relatively small and the M3 are relatively large. The P_4 tends to have the metaconid closer to the protoconid than in Grytsiv.

P. hyotherioides tends to have large molars, in particular the M3, and the M_3 may either have a simple third lobe or have a small hexaconid (Van der Made & Han, 1994, respectively Pl. 15, fig. 4 and Pl. 16, fig. 6). The tooth proportions in *P. hyotherioides* and the Gritsiv suid differ; the former has much larger M^3 and the latter relatively large P^4. The canines in *P. hyotherioides* are much larger than in Grytsiv and have a different section. The meta- and protoconid in the P_4 tend to be closer together than in Grytsiv.

P. provincialis is the largest species of the genus. It has large third molars, and the M_3 may have a hexaconid, the canines are large and the skull profile is straight. It entered in MN 13 in Europe and became extinct after MN 15. *P. hyotherioides, P. provincialis* and the MN 11-13 form are morphologically very similar, though the latter is the most advanced in I^2 elongation. The relation of these three forms with the Indian one(s) is not clear. *P. provincialis* differs from the Grytsiv form in size and in tooth proportions.

P. palaeochoerus apeared in Europe in MN 8 (or late MN7+8). The genus is particularly abundant in MN 9, but became rare or extinct in MN 10. The species has a concave skull profile, inflated zygomatic arcs, incisors with not very high crowns, an I^1 with a large distal cusp, not very large or elongate I^{2-3}, small and short C^m, small C_m with a particular section, M_3 with a pentaconid in the middle and no hexaconid, P_4 with a relatively well developed metaconid and proportionally small M3. The morphology of the teeth from Grytsiv, including that of the incisors, canines P_4 and M_3 coincide very well with *P. palaeochoerus,* much better than with the other species. The teeth are within the metrical ranges for that species and the proportions are very similar in particular the small canine, large P4 and M1 and small M3. The suid fossils from Grytsiv represent *P. palaeochoerus.*

The latest Aragonian and Early Vallesian was a time of great suoid species diversity. Up to four or five of the following species are comonly found in the same locality: *Albanohyus castellensis, Listriodon splendens, Parachleuastochoerus steinheimensis, Parachleuastochoerus huenermanni* or *P. crusafonti, Hippopotamodon antiquus* and of course *P. palaeochoerus.* The easternmost records of *L. splendens* is in China for the Middle or early Late Aragonian, but in Turkey for the latest Aragonian, of *H. antiquus* it is in the early Vallesian of Turkey, of the small *Parachleuastochoerus* in the early Vallesian of Hungary, and of both *P. steinheimensis* and *Albanohyus* in Poland (Fortelius *et al.,* 1996; Kubiak, 1981; Van der Made, 1996). The finds from Grytsiv represent the eastern most record of *Propotamochoerus palaeochoerus.*

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