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PRIMATE *PARADOLICHOPITHECUS SUSHKINI SP. NOV.* FROM UPPER PLIOCENE OF THE PAMIRS PIEDMONT

(Preliminary communication)

B. A. TROFIMOV

PALEONTOLOGICAL INSTITUTE, USSR
ACADEMY OF SCIENCES, USSR, MOSCOW.

ABSTRACT

A new primate species of the Cercopithecidae family-*Paradolichopithecus* Sushkini-from the Kuruksai location of Late Pliocene age, situated in the Pamirs piedmont (South Tajikistan), is described. The new species shows the greatest affinity with the European *P. arvernensis* (Deperét) from France and *P. geticus* from Romania. It has also some features common with *Procynocephalus wimani* Schlosser (Upper Pliocene, China), and *Papio falconeri* (Lydekker) and *P. subhymalayanus* (Meyer)/Siwalik Hills, Punjor, India/. The author discusses the need for revision of the Euroasian fossil *Cercopithecidae* and the likely reasons for the scarcity of records in comparison with those of anthropoid apes.

During the last few years several mammalian localities from Pliocene and Pleistocene have been found and excavated in the piedmonts of the Pamirs and Darvaz (South Tajikistan). The richest fauna was collected from the Kuruksai formation of Villafranchian age, generally consisting of tightly cemented siltstones. Four members (from top to bottom): conglomerate, siltstons, conglomerates with siltstones, stony loess, totally of near 400m thick, were distinguished in the Kuruksai type section located in upper reaches of the Kyzylsu river. A greater part of the section most probably dates from the Paleomagnetic Matuyama Epoch (1,5-2,5 mln years). A mass burial of fauna remains was found in siltstones which are represented by: *Villanya, Hystrix, Canis,* Ursidae, *Hyaena perrieri* Croiz. et Job., *Megantherion megantherion* Croiz. et Job., *Homotheriun sainzelli* Aymard, *Machairodontinae, Felis /Lynx/ issidorensis, Archidiscodon gromovi* Garutt et Alexeeva, *Protelephas planifrons* Falc. et Caut., *Equus* of. *stenonis* Cochi, *Dicerorhinus, Paracamelus gigas* Schlosser, *Suidae, Euctenocerus, Axis, Cervus, Sogdianotherium kuruksaense* Sharapov, *Sivatherium, Gazellospira gromovi* Dmitrieva, *Demalops palaeoindicus*/Falconer/; *Protoryx paralaticeps* Dmitrieva, tortoise Geochelonia and Aves remains/Nikonov *et al.*, 1971; Dodonov, 1973; Sotnikova, 1974; Sharapov, 1974/. Primates, represented by a well-preserved cranium, mandibula and other remains are of a particular interest. Records of fossil primates from the Southern USSR are very scanty, they are known from Moldavia and Ukraine (*Mesopithecus pentelici* Wagner, *M. ucrainicus* Gremiatskij, *Dolichopithecus* cf. *rusclensis, Adelopithecus hipsilophus* Gremiatskij), the North Caucasus (*Macaca* sp.) and Transcaucasian, Georgia (*Udabnopithecus garadziensis* Burchak-Abramovich et Gabaschvili/Gremyatsky 1957, 1961, 1962; Alexeeva, 1964; Burchak-Abramovich, Gabashvili, 1945/.

Despite few finds of fossil primates in the Southern USSR, a search for them may be promising, particularly in the Caucasus and Soviet Asia (Pamirs Piedmont and other areas). This area was primates habitat and, perhaps a part of, as it was indicated by the prominent Russian zoologist and paleontologist P. P. Sushkin/1928/ and anthropologist, G. G. Debets /1952/.

SYSTEMATIC DESCRIPTION

Order	Primates Linné, 1758
Suborder	Anthropoidea Mivart, 1864
Suborder	Cercopithecoidea Simspon, 1931
Family	Cercopithecidae, Gray 1821
Genus	*Paradolichopithecus* Necrasov, Samson, Rădulesco, 1960

Paradolichopithecus Necrasov, Samson, Rădulesco, 1960, p. 415, Pl. I—V.

Type species: *P. arvernensis*/Deperét, 1926/; Upper Pliocene/Villafranchian age/; France.

Diagnosis: Large in size/the cranium length up to 200 mm/. The facial part of the cranium is long like that of a baboon. There is a double suborbital fossa. The

dental arch is elongated, V-type. The male's canine teeth are strongly developed. Hypoconulid of M^1-M^2 is developed, small; M^3 is large. Molar teeth, especially lower ones, are considerably lophodont. On the posterior end of M^3 there is an additional tubercle.

Species: Three species: *P. arvernensis*/Deperét, 1926/, France, *P. geticus* Necrasov, Samson, Radulesco/1960/, Romania; *P. sushkini* sp. nov., Soviet Middle Asia, Tajikistan. Late Pliocene.

Comparison: *Paradolichopithecus* is very close to *Dolichopithecus* /Deperét, 1889/ from French Middle Pliocene/ Astian/ locality, differing from the latter by larger sizes, a longer dental arch, presence of a double suborbital fossa, more developed molar lophs, and the presence of additional fifthtion posterior tubercle on M^3. All this testifies to more advanced specialization *Paradolichopithecus*. Nevertheless, on the whole, both genera are similar, particularly in the cranium structure /see Battetta, 1969/. Their difference appears to be not greater then that of a subgenus, despite younger geological age and later stage of *Paradolichopithecus* evolution.

The following fossil Cercopithecidae similar to the genus *Paradolichopithecus* were described by remains (fragments of upper and lower jaws, several teeth): *Procynocephalus wimani* Schlosser, 1924, Late Pliocene/Villafranchian?/ from North China, which in spite of the similar sizes, differs from *Paradolichopithecus* by a somewhat less developed molar crests and the absence of fifth tubercle on M^3. Similarity and affinity of these genera were noted by Jolly/1967/ who tentatively placed them in the same genus. Indian Cercopithecidae : *Papio subhymalayanus* /Meyer, 1848/ and *Papio falconeri* /Lydekker, 1886/ from Late Pliocene locality of the Siwalik Hills /Punjor zone/ are also very similar to *Paradolichopithecus*.

P. subhymalayanus described by Meyer as *Semnopithecus* is similar to now living babons but differs from them in larger sizes. *P. falconeri* has elongated, flat symphysis, wide molar teeth and poorly developed thalonid in M_3 /Colbert, 1935/*

The comparison may be extended to Early Pleistocene forms from Africa (*Dinopithecus*, *Gorgopithecus*, *Papio*) and to similar genera (e.g. *Parapapio et al.*) described by Broom, 1940 (Freedman, 1956, 1960, 1970; Jones, 1937; Maier, 1970, 1971). *Paradolichopithecus* differs from all fossil and recent forms in larger sizes, features connected with a specialization of the dental system and also, in some peculiarities of the cranium structure.

The structure of the large bones in the limbs of *Dolichopithecus*, as Gabis showed (1961), and, probably, of *Paradolichopithecus* is similar to that of *Papio*.

Conclusion: It should be emphasized that the cranium and dental system especially lophodontness considerably vary in different Cercopithecidae what was mentioned by many researchers (Feidler, 1956; Freedman, 1963; Lampel, 1962; Oliver, *et al.*, 1955; Remane, 1951; Vorus, 1970; Welsh, 1967).

Considering all this, the author thinks that it is to revise the fossil Cercopithecidae, particularly those from Europa.

Paradolichopithecus sushkini Trofimov, sp. nov.

Fig. 1-5. Plates 1-11.

The species is named in the honour of P. P. Sushkin, Soviet Zoologist and Paleontologist

Holotype: Cranium N 3120-523, (♀) left zygomatic arch and J^2 are broken, Peleontological Institute, USSR Academy of Sciences; Pamirs Piedmont, South Tajikistan, Dangarinsky district, right bank of the Kuruksai river, sai Navruho; Kuruksai locality. The Kuruksai formation of Upper Pliocene age /Villafranchian/.

Material: Besides the holotype, there is a fragment of the lower part of the skull with a jung from C-M^3 /M^3 in the stage of eruption), N 3125-524; Lower jaw, N 3120-525; lower jaw of an old specimen with very worn teeth, N 3120-526; M^3 dext., N 3120-527; M^2 sin., N 3120-528.

Description: The cranium (Figs. 1-3; Plate 1 A, B, C; Plate 11 D; Plate 1) is large; facial part is rather narrow and long in comparison with the cerebral one. The cerebral portion is on the same level with the facial but the front muzzle part is slightly raised upwards. The braincase is rounded, wide and convex, without traces of crista sagittalis. Its highest part is in the bregma region. The frontal and parietal bones are well-developed, with pronounced metopic suturae separating them. The occipital facies is wide and flat, testifying to the presence of well-developed cervical muscules. The occipital region is elongated backwards. The squama occipitalis holds a low position and as a consequence large

* It is quite possible that certain fossil rests (P_4—M_3) from Pliocene deposits in Bonica /Gava/, Barcelona province, Spain/Delson, 1971/ belong to *Paradolichopithecus*.

Fig. I. *Paradolichopithecus sushkini* sp. nov.

Holotype—N. 3120-523; The cranium. Paleontological Institute, the USSR Academy of Sciences: Kuruksai river, South Tajikistan; Upper Pliocene/Villafranchian age/.

A—lateral view.
B—top view.
C—view from below.

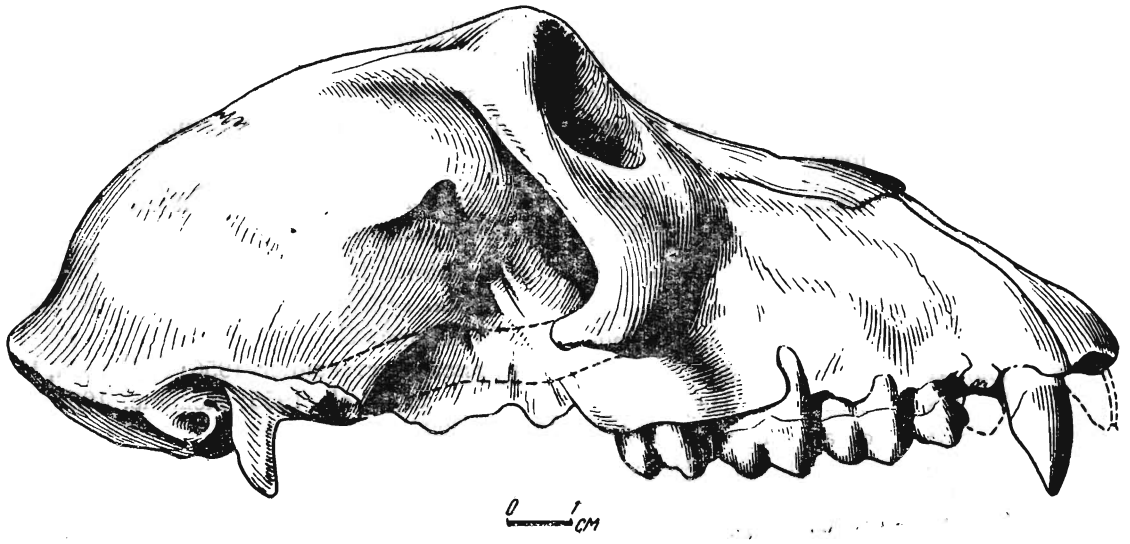

Fig. 1 A

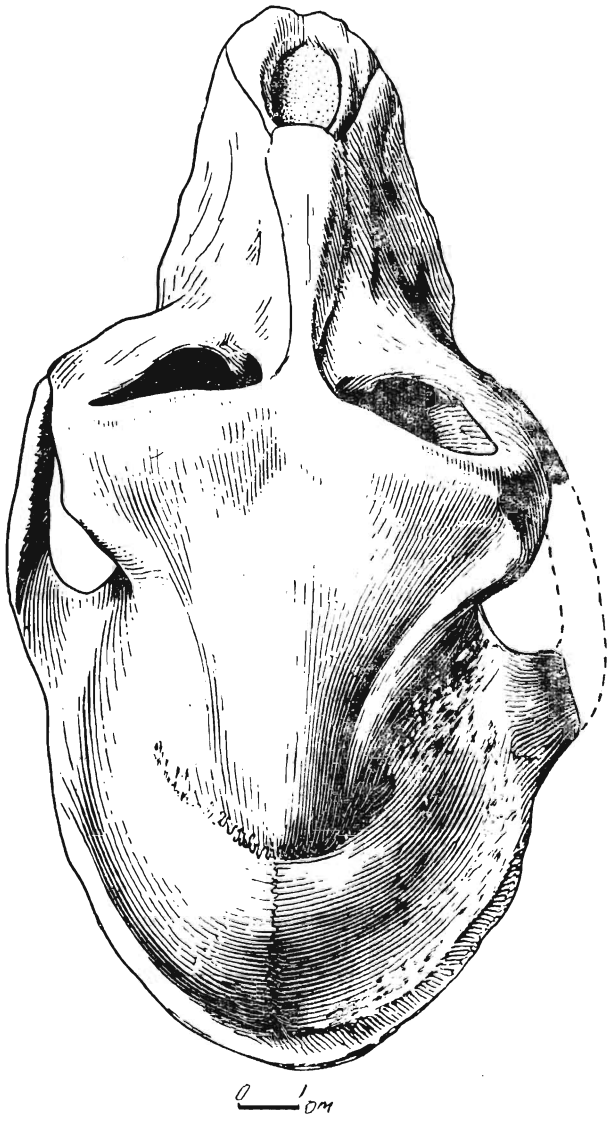

Fig. 1 B

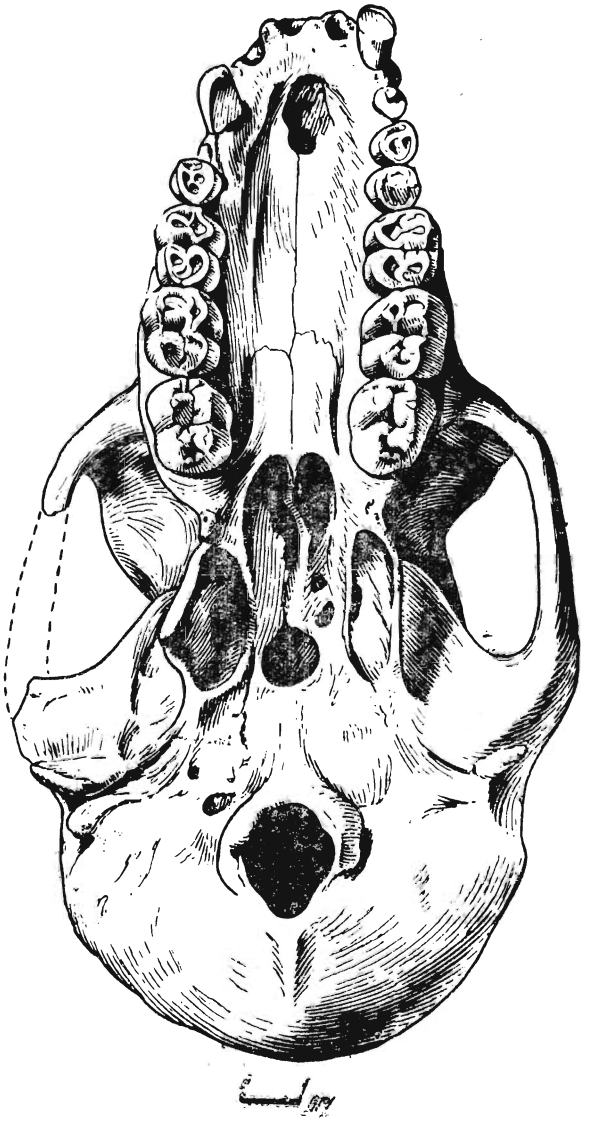

Fig. 1 C

occipital foramen is shifted to the base of the skull. The foramen magnum is situated on the same level with dental series and removed for about 30 mm from crista occipitalis. The crista occipitalis is well developed and situated somewhat higher of the foramen magnum, at the level of meatus acusticus externus and alveolar margin. This well developed character of the crista is particularly distinct due to the absence of sagittal crista. The condylis occipitalis are small and oriented towards the foramen magnum almost transversely with a slight frontward inclination. Due to the form and considerable volume of the brain the great lateral convex of parietalia is particularly noticeable. The parietal bones are bent backwards while squamous are situated more vertically. The absence of the crista temporalis shows that m. temporalis is poorly developed. The processus mastoideus is small and short. The articular cavities for the mandibula trochlea are wide, not convex and situated almost transversely to the long cranium axes. The processus postglenoidalis is high and the processus preglenoidalis are poorly developed. The zygomatic arch, except its front part, is relatively weak. It is situated low, only slightly above the alveolar margin. The processus zygomaticus is at the level of the anterior edge of M^3. On the large forehead there is a small depression. The processus postorbitalis of the frontal bones are rather strong and the toruli supraorbitalis are relatively weak. They are about 7 mm thick. The interorbital zone is thin and narrow (about 12 mm). The orbits are big, slightly oval, more high than wide (Plate 1). The suture between os lacrimale and os maxillare is situated as in all Cercopithecidae along fossa lacrimalis. Nasal bones are narrow, steeply contracted backwards. Bones maxillary are widened in the region abuting to the orbit and have rather big and deep cavity testifying to a large area of fixation of m. levator labii superioris and, hence, to the high mobility of both the labium and the tip of the nose. The praemaxillaria are wide and massive in the anterior part and sharply, narrowing backwards they end at the level of P^4. The palatal bones have almost the same width throughout their length and end at the level of the posterior margin of M^3. The palatum when viewed from the base of the cranium dorms a sloping, tub-like fornix, particularly deep in its middle part.

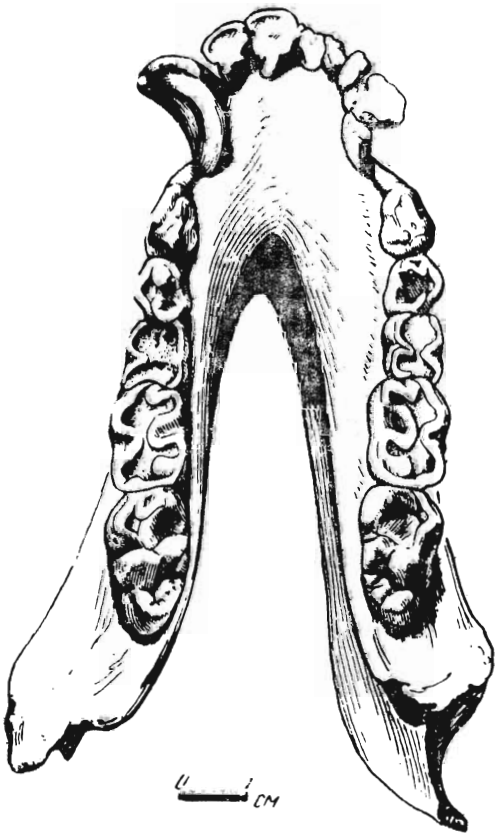

Fig. 2 A

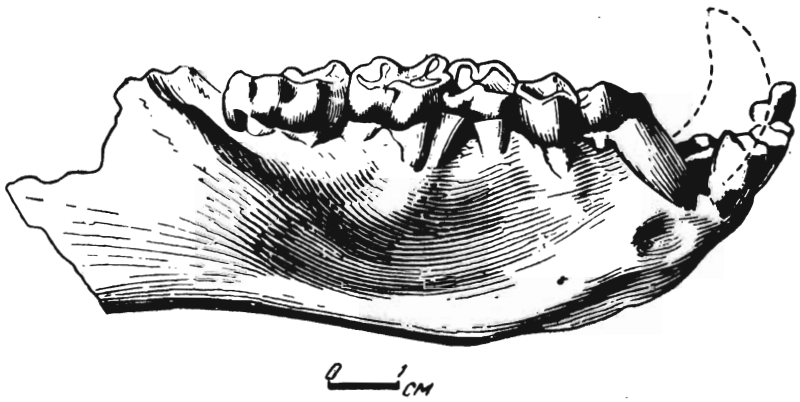

Fig. 2 B

Fig. 2. *Paradolichopithecus sushkini* sp. nov.

N. 3120-525; Mandibula; Paleontological Institute, the USSR Academy of Sciences; Kuruksai river: South Tajikistan; Upper Pliocene/Villafranchian age/.

A—top view.

B—lateral view.

Mandibula (Figs. 4-5; Plate 11 E, F)/*. In habitus it is typical of *Cercopithecus;* low and long with more narrow anterior part; the incisor part is short and slightly sloping backwards; symphysis is long reaching the anterior edge of P_2. Mandibula height between M_1—M_2 is 28 mm; and at the posterior margin of P_4 it is 33 mm. The distance between alveolars before P_4 is 27 mm; and behind M_3 it is 36 mm. The length of the inferior margin of the symphysis is 44 mm.

Table 1

Cranium Measures of *Paradolichopithecus sushkini* sp. nov. *

[in mm]

Measurements	Cranium N 3120—523
Maximum length	175
Basic length	135
Length from anterior edge of nasal bone to middle of occipital bone	137
From I_1 to anterior edge of orbit ..	74
From anterior edge of orbit to posterior edge of occipital bone	105
From anterior edge of orbit to posterio edge of condulis occipitalis	82
Cranium width at the level of zygomatic dentitions/ maximum/	96
Cranium width at the level of orbits	75
Cranium height over P^3	30
Cranium height over M^3	42
Palate length before P^3	24
Palate width before M^3 .., ..	22
Orbits length	21
Orbits width	25
Foramen magnum length	19
Foramen magnum width	16

* Sizes are slightly distorted due to deformation.

Upper teeth (Figs. 1-3; Plate 2). The incisors are large, directed slightly forward, considerably more wide then long. I^2 is significantly larger than I^1. A fovea appears at the masticatory incisor surface as a result of abrasion. The canine teeth, especially in males, are large. They have similarly developed crests at the anterior and posterior sides. P^3 and P^4 are similar in structure, but P^4 is bigger. There is a recess at the posterior part of the tooth. The molar teeth (M^1-M^3) have poorly expressed bilophonty. The cingalum of the internal part of the teeth is hardly noticeable. The lingual tubercles in the unworn teeth (protocon and hypocon) are considerably higher than buccal ones (paracon and metacon). M^3 has a posterior poorly developed fifth tubercle.

Lower teeth: (Tab. 2, Figs. 4-5). It is significant that P^3 and P^4 sharply differ in structure, the former being more "primitive". It consists of a high tubercle with sharp anterior and posterior crests. Therefore it partly resembles the canine tooth. Bilophodontness the lower molar teeth is more prominent then that of the upper ones. M_3 has a well developed complex talonid.

Comparison: The *Paradolichopithecus sushkini* Trofimov, sp. nov. is very close to *P. geticus* Necrasov, Samson, Radulesco, 1960 from Upper Pliocene deposits, Romania (Graunceanueui locality) but differs from it in smaller size less developed bilophodontness of molar teeth especially of lower ones and smaller fifth tubercle on M^3. *P. sushkini* differs from the type species *P. arvernensis* (Deperet, 1929), described from the Upper Pliocene locality, Senese, France in more developed bilophodontness of molar teeth, the presence of the fifth tubercle on M^3, and larger sizes. The difference found in these three species appears to be within the limits of the interspecific variation. The question will be answered in the course of further investigation of new, more complete fossil remains of these primates.

Remarks: The anthropoid apes were most prevailing among Pliocene and Miocene primates in the Eastern Hemisphere. Cercopithecidae were not numerous and presented by about 10 genera. The finds of fossil anthropoid apes always prevailed in Miocene and Early Pleistocene of Northern parts of India and Africa, the only exception being probably the South of the continent. This ratio differs greatly from that of the recent fauna of primates, presented by 30 genera of *Cercopithecus* and only by 6-7 genera of gibbons, pongos and hominids (Feidler, 1956; Sanderson, Steinbacher, 1957). *Cercopithecus* are numerous and adapted to different ecological conditions. All this suggests that *Cercopithecus*, probably, represent a side branch of specialized Tertiary primates, which only later found themselves in favourable conditions, or that we do not know well enough their paleontological history. It is worth noting that from the taphonic point of view the fossil *Cecrcopithecus* have more favourable chances to be discovered in the future. To answer these questions further study of already known

* Mandibula N 3120-525 is greatly deformed, ascending rami were lost.

Table 2

Dentition Measures of *Paradolichopithecus sushkini* and *P. geticus* /in mm/ *

Denomination of measurement		Upper dentition		Lower dentition	
		P. sushkini N. 3120-523	*P. geticus*	*P. sushkini* N. 3125-525	*P. geticus*
Length P^2—M^3	..	55,2	56,0	62,0	63,1
Length P^2—P^3	..	15,0	17,0	20,0	19,6
Length M^1—M^2	..	40,2	39,0	44,0	43,4
Length	..	..	9,3	7,0	..
J1 Width	..	..	9,3	6,5	..
Height	..	..	11,6	7,0	..
Length	..	7,4	8,3	6,0	..
J2 Width	..	7,5	8,3	5,0	..
Height	..	7,2	8,0	9,6	..
Length	..	9,5	10,0	7,5	5,5
C Width	..	7,3	8,0	8,0	10,3
Height	..	12,0	12,0	9,5	10,0
Length	..	7,3	7,5	11,0	11,5
P3 Width	..	7,5	8,0	7,0	7,0
Height	..	7,5	7,6	8,0	7,0
Length	..	8,0	9,0	9,0	10,4
P4 Width	..	8,5	9,0	7,5	8,0
Height	..	9,0	8,3	8,0	8,0
Length	..	12,2	12,0	9,3	12,5
M1 Width	..	10,0	10,0	7,5	10,0
Height	..	6,0	4,9	4,8	4,4
Length	..	13,2	13,4	13,5	14,5
M2 Width	..	12,5	12,0	11,5	11,2
Height	..	7,0	6,5	5,0	4,0
Length	..	14,5	15,4	17,2	18,5
M3 Width	..	12,5	12,6	12,5	12,0
Height	..	7,0	5,4	7,0	5,0

* Teeth measurements of *P. sushkini* are made on well preserved specimens, data for *P. geticus* are taken from Necrasov *et al.*

species of Euroasian primates (*Dolichopithecus*, *Paradolichopithecus*, *Procynocephalus* and *Papio*) is required. New fossil primate records in Asia, the Himalayas and the Pamirs piedmonts will be of specific interest in this case.

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EXPLANATION OF PLATES

PLATE I.

Paradolichopithecus sushkini sp. nov.

Holotype—N. 3120-523; Paleontological Institute, the USSR Academy of Science. Cranium. 2/3 of nat.-size; Kuruksai river, South Tajikistan; Upper Pliocene/Villafranchian age/.

A—lateral view.

B—top view.

C—anterior view.

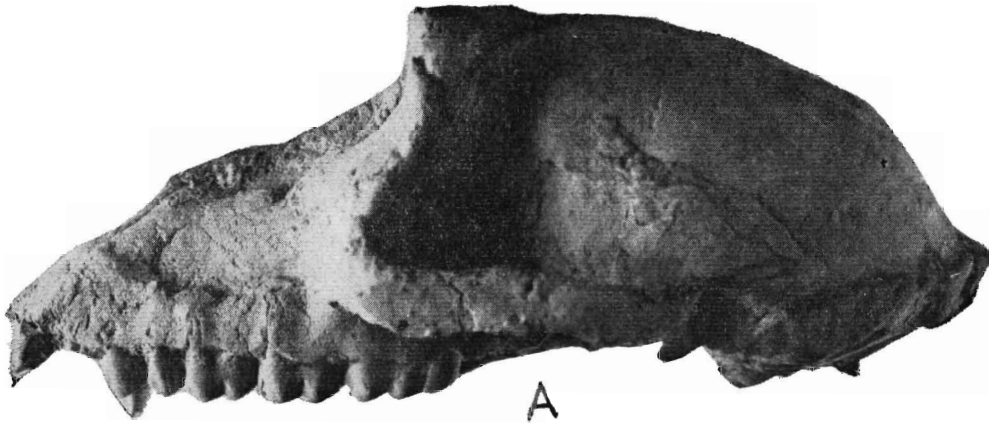
PLATE II.

Paradolichopithicus sushkini sp. nov.

D—the cranium from below. 2/3. Mandibula N. 3120-525 of nat. size.

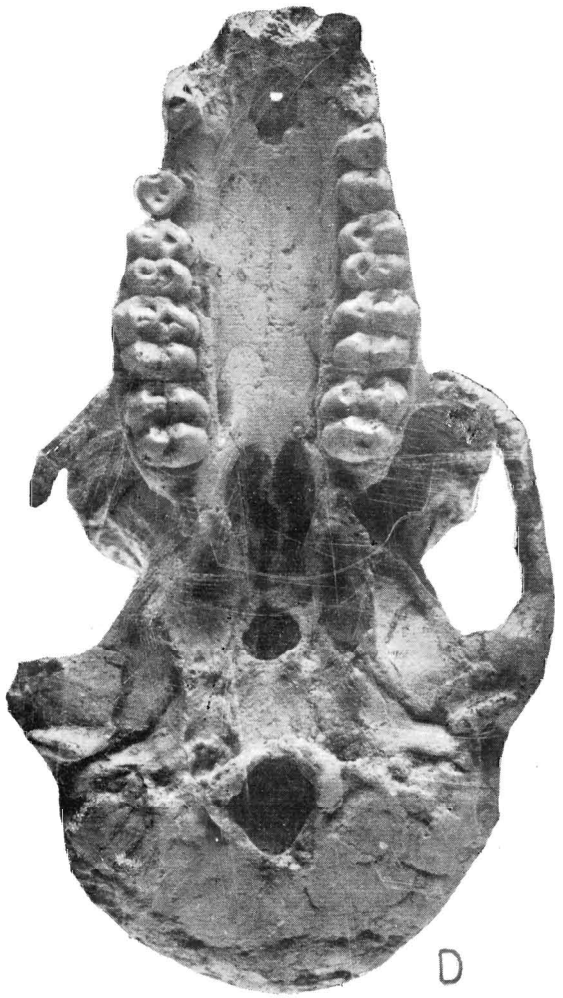
E—top view.

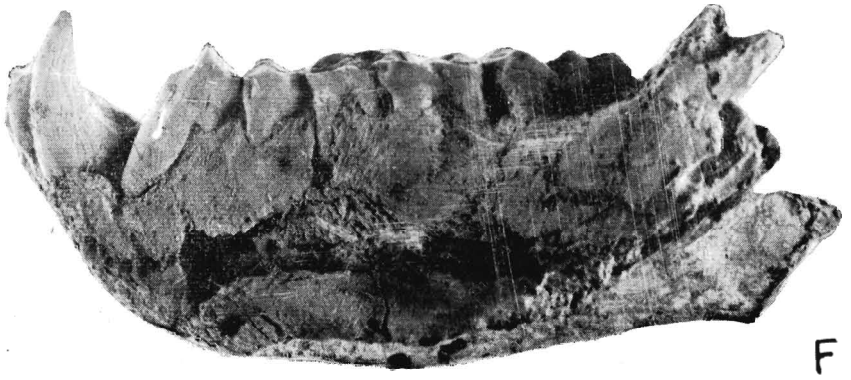
F—lateral view.


A


B


C





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