

GIGANTIC BISONS OF ASIA

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In Russian time vast open spaces, slightly hilly and here and there broken by the mountain and river valleys, overgrown with mixed and coniferous forests were stretching from the Volga River across the southern Siberia, Kazakhstan, Mongolia, Transbaikalia area to Manchuria and the Far East.

In North America similar landscapes also occupied vast areas from the Rocky Mountains to the Mississippi River and from southern Canada to Mexico. Vast open spaces created favourable conditions for the origin of the gigantic bisons with horns-spread reaching 210 cm and more between their tips. *Bison latifrons* inhabited North America, and *Bison priscus gigas* lived in Asia.

Until recently Asian gigantic bisons were known only by the cerebral parts of the skull with horn cores and by separate bones of postcranial skeleton. Nothing was known of the facial part of the skull and only tentative suggestions could be made regarding the morphology and ecology of these splendid animals. Therefore, complete skulls and considerable parts of the postcranial skeleton found recently in Bashkiria and Kazakhstan call a special interest.

SYSTEMATIC DESCRIPTION

Bison priscus gigas Flerow

Bison priscus gigas Flerow, 1969, Paläontol. Abhandl., Abt. A. Paläozoologie, B. III Heft B/4, S. 514.

Holotype: Male subad. Cranium with the horn cores, N 2654, Palaeontological Institute, USSR Academy

of Sciences, collector Rukis, Khogot, the Buryat Mongolian Autonomous Republic.

Description: The largest of all European and Asiatic bisons. The distance between the tips of horns ranges from 1,400 to 2,100 mm; the length of the horn cores along the outer curvature equals to 750—850 mm, the width of the forehead, being minimal between the orbits and horn cores, is 310—360 mm. The horn cores are very long, project sharply outwards, almost straight angularly to the longitudinal axis of the skull. At their base horn cores are bent downwards below the frontal surface, so that the distance between their lower edges and the upper edge of the processus zygomaticus ossis temporalis is very small (some 10 mm), and in some cases they practically touch each other. The horn cores are feebly curved in one plane arching outwards and slightly upwards and forwards. The horns ends are roughly on a par with the forehead, a little below or above it. By the structure of some of its parts the skull is similar to that of *Bison priscus priscus*. The facial part is narrow and elongated. The nasal cavity is not very large, what is due to habitation in a zone with relatively warm climate. The width of the cerebral portion is relatively and absolutely greater than it is the case in other *Bison priscus*. All attachments of ligaments and muscles supporting the head are more solid due to the greater weight of the head and its constant bowing down by picking up food items from the ground. The orbits are relatively less tubular (as in *Bison priscus latifrons*), and less tubular than in *Bison priscus priscus*. *Bison priscus crassi-*

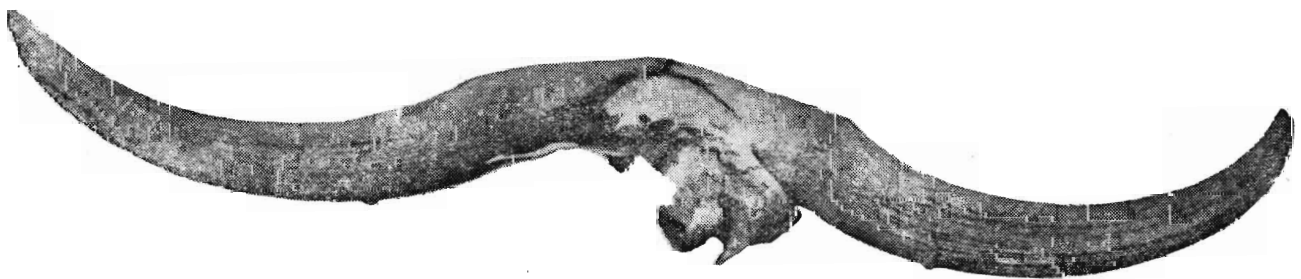


Fig. 1. *Bison priscus gigas* Flerow, Holotype.



2—*Bison priscus gigas* Flerow, Irtysh River, near town Pavlodar. Front view.

cornis and *Bison bison*. Therefore, it can be suggested that the wooly coat on the head of *Bison priscus gigas* was not so thick as in the above mentioned races.

Ossa intermaxillaria are constructed like in true herbivores, on the outer anterior edge they have lateral lobe-like extensions; the anterior intermaxillary region form a more broad system of incisor teeth, suitable for catting great quantities of grass in contrast to the chisel-like incisors of the forest bisons.

The mandible is similar to that of *Bison bison bison* and is adopted for grinding of hard steppe grass.

All morphological features of the *Bison priscus gigas* characterize him as the denizen of open steppe regions and as a typical herbivorous animal, whose ration mainly included grassy vegetation.

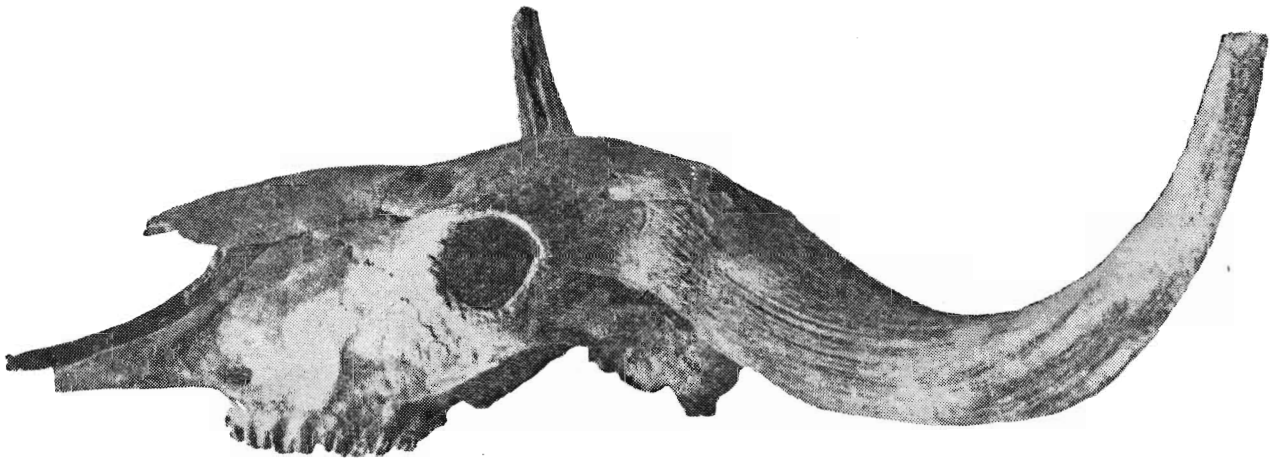
Geographical distribution : Southern part of the Eastern Europe (westwards up to the Volga), Kazakhstan,

Southern Siberia, North Mongolia. In the East—up to Buryat-Mongolia and Transbaikal area. The race is analogous to the American *Bison latifrons* (Harlan); it is close to it in size and lived, apparently, under similar landscapes and climatic conditions and in the same latitudes. It was undoubtedly the denizen of open spaces.

Geological age : End of the Mindel-Riss and beginning Riss. This form is probably somewhat older than the *Bison priscus priscus* and *Bison priscus crassicornis*, which in Rissian time apparently succeeded it in the eastern part of the area where *Bison priscus* was very common.

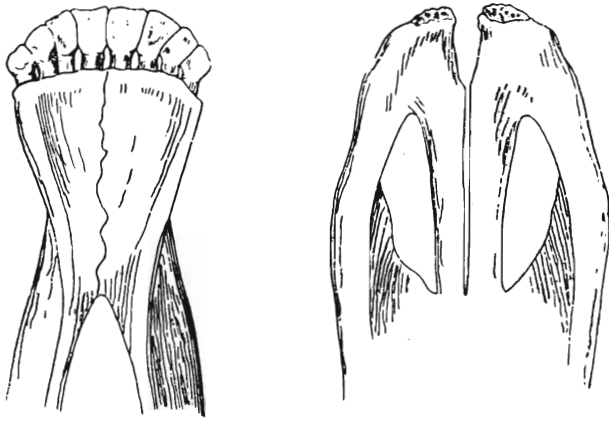
Now I pass to the description of the known complete skulls.

Old male animal. Right bank of the Ika river, west of the Suyundukovo Village, the Bakshin region of the Bashkirian Autonomous Republic, Periglacial



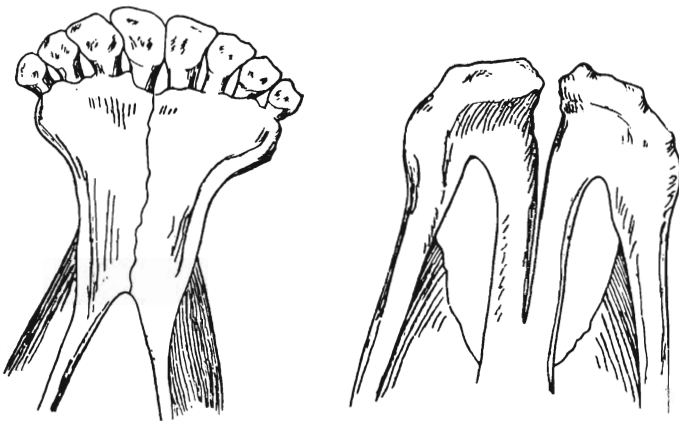
3—*Bison priscus gigas* Flerow, side view (the same specimen).

deposits. Collection of the Palaeobiological Laboratory, Zoological Institute, Kazakh Academy of Sciences in Alma-Ata. Very large, almost complete skull. It lacks the right intermaxillare, the upper P^2 and M^1 and the lower part of the left orbit. The horn cores are broken at near 10 cm from the base; the whole middle part is missing; distal terminal parts preserved.



4—*Bison priscus athabascae* Rhoads, wood, soft food.

The skull is very massive, all joints of the cranium except for the anterior half of the middle-frontal joint, are closed. The horn cores descend from the base in such a way that the upper part of the crown lies lower than the frontal surface. Because of this, the distance between the lower edge of the horn base and the upper edge of processus zygomaticus ossis temporalis is very small (some 10 mm). Distal part of the horn cores is slightly curved upwards in one plane, not spiral. The forehead is protuberant, even, without concavities or prominences.



5—*Bison priscus gigas* Flerow, plain, hard food.

Intermaxillare bear on its outer anterior edge the lobe-like lateral extension. So, muzzle is generally widened just as in *Bison bison*.

In general structure the skull is highly typical for

the *Bison priscus gigas*. It is the largest one of all known skulls of this race.

The mandible is completely preserved. Only the anterior part of the symphyseal region is broken. The incisors and fangs are missing. All teeth are strongly worn out; PM_4 —almost to the root, M_1 —right to the root, M_2 —almost to the root, M_3 —worn out very strongly, the crown is only 10 mm above the root.

The incisor region is rather extended.

	Size in mm			
Greatest length of the skull	707
Greatest orbital width	363
Postorbital width	324
Width between the bases of the horn cores (by the burr)	347
Antero-posterior diameter of orbits	85
Greatest occipital width	305
Height of occiput from the lower edge under foramen magnum to the upper edge of crista occipitalis	197
Horizontal diameter of the horn core	130
Vertical diameter of the horn core	120
Height of the mandible at the level of the posterior edge of PM_3	66
Height of the mandible behind M_3	81
Width of the branch at the level of the middle of M_2	43

The skull was found together with many bones of the postcranial skeleton (Metacarpus, Metatarsus, Humerus, Femur, etc.) All bones are very huge and heavy, surpassing in size similar bones of other *Bison priscus* races.

In 1968 the complete skull of *Bison priscus gigas* was found in the Irtysh River near the village Peschanoe (not far from Pavlodar). M. K. Gapon, Director of the Pavlodar Regional Museum of Nature and History, courteously handed over this find to the Palaeontological Institute of the USSR Academy of Sciences. The skull is characterized by features definitely typical of the *Bison priscus gigas*. It belongs to the grown-up but not very old male animal.

Besides the holotype and the complete skulls described here, the Pavlodar Regional Museum of Nature and History has among its exhibits the cranium with both horn cores broken at the ends (the preserved part of the right horn equals to 540 mm, and the left one, to 520 mm). The distance between the ends of preserved broken ends is 1450 mm. From the structure of the preserved parts of horn cores it can be suggested that the overall spread between the horn's ends exceeds 2,000 mm. The skull did not belong to the very aged male, for the frontal and occipital joints are not coalescent as it is also the case in the typical specimen.

Basic features of the skull structure of *Bison priscus gigas* fully confirm the earlier expressed point of view that this race was the denizen of open spaces (Flerow

1969. Paläont. Abhandl., Ab., A B, III. Heft. 3/4). The immense widely spread horns rule out the assumption that they could live in forests. The structure of rostral part of the skull lobe-like lateral extensions on the anterior -outer edges of Ossa intermaxillaria, just like those in *Bison bison*, as well as that of the incisor region and the branches of the mandible mentioned above by describing the skull, all point to a typical grass-feeding animal. Both, morphologically and ecologically the *Bison priscus gigas* was to a large extent similar to the steppe *Bison bison bison*.

In contrast to these denizens of the steppe all forest bisons, *Bison schoetesacki*, *Bison bonasus*, *Bison priscus athabasca*, whose ration comprised forest feeds—foliage, branches, bark of trees and bushes and soft forest grasses—are sharply distinguished from them both by the general exterior appearance and the structure of the skull and maxillary apparatus.

Their intermaxillaria do not bear additional lobes, the incisors and fangs are not widened, they are straight and chisel-like and are capable of withstanding the pressures involved in cutting and stripping the bark. Even all other races of the *Bison priscus* (*B. priscus priscus*, *B. pris-*

cus crassicornis) who inhabited not only the forests but also the forest-steppe and the forest-tundra regions and fed on mixed feeds and not on the coarse steppe grasses, have their jaw apparatus and the entire anterior region of the skull and mandible structured similarly to those of the true forest bisons.

It should be noted that, with the exception of *Bison latifrons* and *Bison priscus gigas*, the horns of all the long-horned bisons curve absolutely differently than those in the steppe bisons. The gigantic steppe bisons bear huge horns widely spreaded outwards while the other *Bison* species have the horns steeply curved and twisted with their ends directed partly upwards and inwards. Although their horns are of considerable absolute length they never spread so wide as in gigantic steppe species.

As the gigantic bisons lived under temperate climatic conditions, much less rigorous than in regions inhabited by the *Bison priscus crassicornis*, *B. priscus occidentalis* and *B. priscus athabasca* the facial region of the skull of these bisons was narrower and the nasal cavity of a smaller volume. They did not need, while breathing, to warm the cold air, the process was indispensable for the denizens of the arctic and subarctic countries.