



Family TAPIRIDÆ.

Genus **TAPIRUS**, Brisson (1766).

The last and least specialized family of surviving Perissodactyle Ungulates again consists of a single genus, having four toes on each fore, and three on each hind foot. The general form is heavy, the limbs short and stout, the tail short, the ears oval, the eyes small, and the nose and upper lip produced into a snout or short proboscis.

The skull is compressed laterally and is rather high. There are no true postorbital processes. The anterior opening of the nares is very large; the nasals are short, triangular, pointed in front, and widely separated from the premaxillaries.

Dentition: i. $\frac{6}{6}$, c. $\frac{1-1}{1-1}$, pm. $\frac{4-4}{3-3}$, m. $\frac{3-3}{3-3}$. The outer upper incisors are large and conical, larger than the canines. Molars and premolars bilophodont, having the crowns mainly composed of two transverse ridges.

Vertebrae: C. 7, D. 18, L. 5, S. 6, C. about 12. The ulna and fibula distinct and complete.

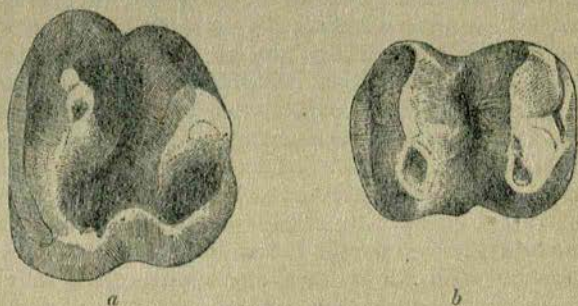


Fig. 156.—Crowns of (a) upper and (b) lower second right true molars of *Tapirus indicus*, the inner side uppermost.

One species, the largest of the genus, is Malayan and occurs in Tenasserim. All other living forms are Central- or South-American. Remains of several extinct species have been discovered in Europe, of one in China, and of one rather doubtful form in Burma.

337. *Tapirus indicus*. *The Malay Tapir*.

Tapirus indicus, Cuv., Desmarest, *Nouv. Dict. d'Hist. Nat.* xxxii, p. 458 (1819); W. Selater, *Cat.* p. 198.

Tapirus malayanus, Raffles, *Tr. L. S.* xiii, p. 270 (1822); Cantor, *J. A. S. B.* xv, p. 263; Blyth, *Cat.* p. 135; *id.* *Mam. Birds Burma*, p. 49.

Tapirus bicolor, Wagner, Schreb. *Säugeth.* vi, p. 400 (1835).

Tara-shu, Burmese; *Kuda Ayer*, Tenu, Malay.



Colour. The body behind the shoulders, including the rump and upper part of the thighs, white or greyish white, tips of the ears the same; head, limbs, and fore part of body black or dark brown.

The young at first are velvety black or brownish black, with spots and longitudinal streaks of brownish yellow on the sides and of white below. This coloration changes into that of the adult between 4 and 6 months after birth.

Dimensions. Height at shoulder 3 ft. to 3 ft. 6 in., at rump 4 inches higher; length from nose to tail, over curves, 8 feet. A skull measures 15.75 inches in basal length by 8 in zygomatic breadth.

Distribution. The Malay Peninsula, extending north in Tenasserim as far as about N. lat. 15°; also Sumatra.

Habits. The Malay tapir is a shy, mild, and gentle creature, inhabiting the wilder forests, and, it is said, avoiding inhabited tracts. It is nevertheless, when captured, easily tamed. It is fond of water, and is said to plunge in and walk along the bottom, instead of swimming.

Suborder *ARTIODACTYLA*.

By far the majority of living Ungulates belong to this suborder, which comprises all the Ruminants together with the hippopotami and pigs.

The digits are even in number, either 2 or 4 on all feet, and the 3rd and 4th digits are subequal. No third trochanter on the femur. Dorsal and lumbar vertebrae together always 19. No alisphenoid canal. Nasal bones not expanded behind. Premolar and molar teeth usually dissimilar, the former with a single lobe, the latter bilobed or trilobed. Last lower molar, with very few exceptions, trilobed. Stomach almost always more or less complex. Cæcum small. Placenta diffused or cotyledonary. Mammae inguinal or abdominal.

A. No upper incisors. Ruminant.

a. Horns generally present in males, sometimes in females; second and fifth digits incomplete, the metapodials rudimentary or absent.

a'. Horns permanent, a corneous sheath on a bony core

b'. Horns permanent, covered with hairy skin; lateral digits wanting

c'. Horns branched, deciduous, but on unbranched bony cores

d'. Horns solid, deciduous, generally branched, no cores

b. No horns; second and fifth digits complete..

PECORA.

Bovidae.

Giraffidae (Africa).

Antilocapridæ (America).

Cervidae.

TRAGULINA. Tragulidæ.

Upper incisors present.

- a. Selenodont. Ruminant.....
 Lateral digits wanting
 b. Bunodont. Non-ruminant
 a'. Snout elongate, with a terminal flat disk
 containing nostrils; feet narrow, outer
 digits not reaching ground.
 a''. Toes 4—3
 b''. Toes 4—4
 b'. Snout broad, hairy, no terminal disk; feet
 short, broad, outer digits reaching ground

TYLOPODA.

Camelidæ.

SUINA.

Dicotylidæ

(America).

Suidæ.

Hippopotamidæ

(Africa).

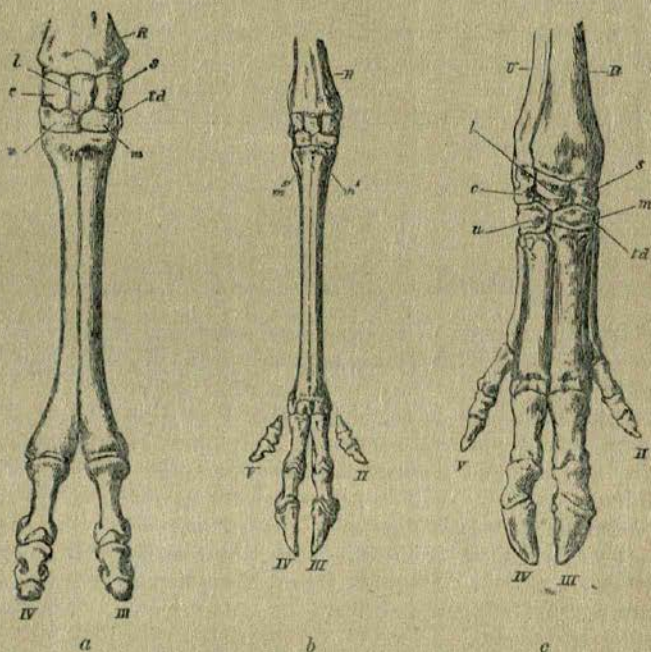


Fig. 157.—Bones of the right fore foot in:—a. Camel (*Camelus bactrianus*), b. Red Deer (*Cervus elaphus*), c. Pig (*Sus scrofa*).—U, ulna; R, radius; II, III, IV, V, second, third, fourth, and fifth digits; c, euneiform; L, lunar; s, scaphoid; u, unciform; m, magnum; td, trapezoid; m², m⁵, rudimentary second and fifth metacarpals. (Flower's 'Osteology of the Mammalia'.)

There are a few terms used in describing the genera and species of Artiodactyle Ungulates that require explanation.

The *muffle* or *rhinarium* is the naked moist area between and around the nostrils.

The *suborbital glands* are situated in front of the eye, and each has a circular or longitudinal orifice termed by some "eye-pit." Generally, when the gland is present, there is a corresponding



hollow, sometimes of large size, in the surface of the skull, on the inner anterior side of the orbit. This depression is the *lachrymal fossa*.

The *inguinal glands* are in the hollow of the groin.

The *interdigital glands* are between the large third and fourth digits, the orifice, or "foot-pit," of each being in front between the free portions of the digits.

The *lachrymal fissure* is a vacuity in the bones of the face forming the outer wall of the skull between the lachrymal and nasal.

The maximum lengths of horns in *Bovidae* and *Cervidae* are chiefly from some MS. notes kindly lent to me by Mr. A. O. Hume; from the same notes I have taken details as to localities, native names, &c. I have also made use of a list of maximum measurements of horns published by Mr. W. L. Sclater in the 'Asian' of 1891, pp. 197, 217, and 232, and republished in pamphlet form; and of some notes for which I am indebted to Colonel J. Biddulph and Mr. R. A. Sterndale.

PECORA.

The typical Ruminants are distinguished by several well-marked characters, of which the following are the most important. There are no premaxillary teeth. The dental formula is almost invariably i. $\frac{0}{0}$, c. $\frac{0}{1-1}$ or $\frac{1-1}{1-1}$, pm. $\frac{3-3}{3-3}$, m. $\frac{3-3}{3-3}$; the lower canines precisely resembling the incisors and in contact with them. The molars are selenodont, that is they have crescent-shaped tubercles on the unworn crown and show crescentic patterns after wear. Third and fourth metapodials (metatarsals and metacarpals) confluent, forming "cannon-bones." Outer or lateral toes small or sometimes wanting; their metapodial bones never complete. Navicular and cuboid bones of tarsus united. Horns or antlers generally present, at least in the male sex. Stomach with four complete cavities. Placenta cotyledonous.

The stomach of the Pecora is more complicated than that of the other Ruminants, the camels and chevrotains, and comprises four well-defined cavities, whereas in the Tylopoda and Tragulina there are only three. The four cavities are known as:—(1) The rumen or paunch, much the largest, which has its mucous lining membrane closely covered with villi, resembling the pile on velvet; (2) the reticulum or honeycomb-bag, with the lining membrane arranged in shallow hexagonal cells; (3) the psalterium or manyplies, the inner surface of which is composed of numerous longitudinal folds; and (4) the abomasum or reed, which is the digestive stomach proper. The food when swallowed is received in the paunch, and after being retained there for a time, and undergoing a softening process, it is regurgitated into the mouth, where it undergoes the process known as "chewing the cud" and consisting of trituration by the molar teeth.

Family BOVIDÆ.

Horns permanent (non-deciduous), in the majority of the genera present in both sexes, and each composed of a bony core, containing numerous air-cells, encased in a horny sheath. No upper canines. Molars frequently hypsodont. The lateral digits always imperfect, sometimes entirely absent, but generally they are either represented by the hoofs alone, or by the hoofs with a very rudimentary skeleton, the phalanges replaced by irregular nodules

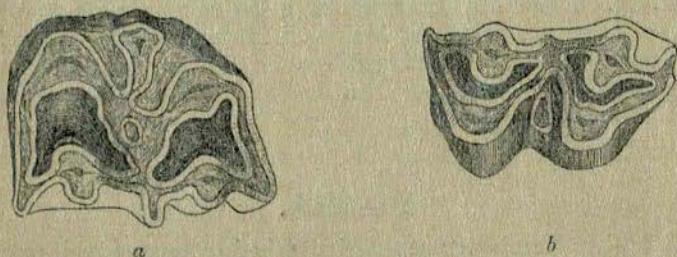


Fig. 158.—Crowns of (a) upper and (b) lower second right molars of *Bos gaurus*, the inner side uppermost.

of bone. The distal ends of the lateral metapodials wanting. A gall-bladder almost always present. Placenta with numerous cotyledons.

The *Bovidæ*, or hollow-horned Ruminants (*Cavicornia*), are a very extensive family, containing all cattle, goats, sheep, and true antelopes, and they are distributed throughout Europe, Asia, Africa, and North America. The following genera occur within Indian limits :—

- A. Horns smooth, or closely, irregularly, and transversely wrinkled.
 - a. Horns in both sexes, not differing much in size; inserted far apart, at extremities of vertex. Size of animal large Bos.
 - b. Horns in both sexes, inserted near together.
 - a'. Horns large in males, small in females.
 - a''. Males inodorous: horns curved at sides of head Ovis.
 - b''. Males odorous: horns ascending, spiral or scimitar-shaped CAPRA.
 - b'. Horns small (not longer than head) in both sexes and not differing much in size.
 - a''. Males odorous: horns angulate in front .. Hemitragus.
 - b''. Males inodorous: horns not angulate.
 - a³. Suborbital glands present Nemorhædus.
 - b³. No suborbital glands Cemas.
 - c. Horns in males only, not so long as head.
 - a'. Size large: male with 2 horns; a long tail .. Boselaphus.



- b'*. Size small; generally 4 horns in male; tail short TETRACERUS.
B. Horns with prominent rings at subequal intervals.
a'. Horns much longer than head; females hornless.
a''. Horns spiral; muzzle fine ANTILOPE.
b''. Horns nearly straight; muzzle swollen.... PANTHOLOPS.
b'. Horns scarcely longer than the head; females sometimes with horns..... GAZELLA.

Genus BOS, Linn. (1766).

Syn. *Bubalus* and *Bison*, H. Smith (1827); *Bibos*, Hodgs. (1837); *Poëphagus*, Gray (1843); *Gavceus* and *Syncerus*, Hodgson (1847).

Size large. Body massive and limbs stout. Tail long, usually tufted at the end. Muffle naked, large and broad. No suborbital, inguinal, or interdigital glands. Mammæ 4.

Horns in both sexes, not differing greatly in size, smooth or nearly so; inserted, far apart, on each extremity of the vertex of the skull, spreading more or less outwards at first, then curving upwards. The surface of the skull behind the horns makes an angle rather less than a right angle with the face. Molars very hypsodont. Vertebrae: C. 7, D. 13-14, L. 6-5, S. 5, C. 15-18.

By many modern writers the animals here referred to the genus *Bos* have been distributed amongst several genera. The distinctions between the latter, however, are scarcely of generic rank. The principal subdivisions are the typical or taurine, comprising *Bos gaurus* and *B. sondaicus*, the bisonine, including *B. grunniens*, and the bubaline, to which *B. bubalus* belongs.

Indian fossil oxen are numerous, at least 3 Pleistocene and 10 Pliocene forms having been described. The most important are the Pleistocene *B. namadicus*, somewhat allied to *Bos gaurus*, but with much larger horns, ancestral forms of the gaur and buffalo, and a Pliocene bison, *B. sivalensis*.

Synopsis of Indian, Ceylonese, and Burmese Species.

- A.* Horns round or oval in section.
a. No fringe of long hair on sides; a raised dorsal ridge.
a'. No white on back of thighs.
a''. Horns turned inwards near the tips ... *B. gaurus*, p. 484.
b''. Horns spreading, not turning inwards ... *B. frontalis*, p. 487.
b'. A large white disk on back of thighs.... *B. sondaicus*, p. 489.
b. A fringe of long hair on sides; no dorsal ridge *B. grunniens*, p. 490.
B. Horns trigonal or subtrigonal *B. bubalus*, p. 491.

The common domestic humped cattle of India, *Bos indicus*, belong to a species differing in structure, general coloration, voice, and habits from the tame animal of Europe and Northern Asia, *B. taurus*. The origin of *B. indicus* (sometimes called Zebu by European naturalists) is unknown, but was in all probability



tropical or subtropical, and was regarded by Blyth as probably African. No ancestral form has been discovered amongst Indian fossil bovines, which, as already mentioned, comprise species allied to the gaur and buffalo. Humped cattle have run wild at times in many parts of India (Oudh, Rohilcund, Surat, Mysore, Nellore, Char Sidhi, at the mouth of the Megna, &c.: see Blyth, *J. A. S. B.* xxix, p. 288, and Jerdon, *Mam.* p. 301).

338. *Bos gaurus*. *The Gaur*.

Gour, *Trail, Edinb. Phil. Jour.* xi, p. 334 (1824).

Bos gaurus, *Ham. Smith, Griffith's Cuv. An. Kingd.* iv, p. 399 (1827); *Evans, J. A. S. B.* vi, p. 223, pl. xvi; *Elliot, J. A. S. B.* x, p. 579; *Blyth, J. A. S. B.* xi, p. 444, xxi, p. 483, xxxi, p. 336; *id. Mam. Birds Burma*, p. 47; *W. Blanf. P. Z. S.* 1890, p. 592, pl. xlix; *W. Selater, Cat.* p. 124.

Bos gour and *B. gayæus*, *Hardwicke, Zool. Jour.* iii, p. 233 (1828).

Bibos subhemachalus, *Hodgson, J. A. S. B.* vi, p. 499 (1837).

Bibos cavifrons, *Hodgson, J. A. S. B.* vi, p. 747 (1837), x, p. 449, pl. xvi, p. 706; *Blyth, J. A. S. B.* xi, p. 588; *Elliot, Mad. Jour. L. S.* x, p. 227; *Horsfield, Cat.* p. 181.

Bos gour, *Cantor, J. A. S. B.* xv, p. 272.

Bibos asseel, *Horsfield, Cat.* p. 181 (1851).

Gavæus gaurus, *Blyth, J. A. S. B.* xxix, p. 282; *id. Cat.* p. 161; *Jerdon, Mam.* p. 301.

Gaur, *Gauri-gai*, H.; *Gâyâl*, in Orissa, &c.; *Gaor* ♂, *Gaib* ♀, in Chutia Nâgpur (commonly *Ban-boda*, *Ban-parra*, *Ran-hîla*, *Ran-pado*, *Jangli-khulga*, and even *Ban-bhainsa* and *Arna*, all signifying wild buffalo, in various parts of the Peninsula); *Sainal*, Hokol; *Gariya*, Mahr.; *Pera-Mao*, Gond. in the South; *Katu-erimai*, Tam.; *Karkona*, *Karti*, *Kard-yemné*, *Kard-korna*, *Doddu*, Can.; *Karthu*, *Paothu*, Mal.; *Mithan*, Assam; *Seloi*, Chittagong; *Pyoung*, Burmese; *Saladang*, Malay. The *Bison* or *Indian Bison* of European sportsmen.

General form massive; body deep, limbs and hoofs small. Ears large. A high ridge along the anterior half of the back terminating abruptly about halfway between the shoulder and the tail, and caused by the spinous processes of the dorsal vertebræ being long and those of the lumbar vertebræ short, the change in length taking place suddenly. Skull bearing a high ridge, convex on the vertex between the horn-cores; in front of this ridge the forehead is deeply concave. Horns considerably flattened towards the base, curved throughout; the tips turned inwards and slightly backwards. Thirteen pairs of ribs. Tail just reaching the hocks. No distinct dewlap. Hair short, very thin on the back in old bulls.

Skulls from the Duars of Bhutan, the Mishmi hills, and the Malay Peninsula are much broader in proportion across the forehead than those from the Indian Peninsula; but I cannot say whether the broad-headed type is alone found east of the Bay of Bengal. I think not. There is in the fine collection presented by Mr. Hume to the British Museum a very broad skull from Salem,



South India. The only Mishmi skull I have seen, one in Mr. Hume's collection, has the vertex arched and the forehead broad, but wants the frontal concavity, and thus shows a tendency towards *B. frontalis*. The horns in all these heads have the normal curve of the gaur (see fig. 159, p. 488).

Colour. Brown, almost black in old males, less dark and sometimes more rufous in females and young males, especially during the cold season, and in those inhabiting drier parts of the country, where there is less shade. Lower parts rather paler, hair about axil and groin golden brown. Legs from above the knees and hocks to the hoofs white. Head from above the eyes to the nape ashy grey, becoming in some animals whity-brown or dirty white. Muzzle pale-coloured. In calves, according to Blyth, there is a dark stripe down the back. Horns pale greenish or yellowish, with black tips.

Dimensions. This appears to be the largest of existing bovines. Large bulls are said to exceed 6 feet in height at the shoulder, but this is rare and exceptional, 5 ft. 8 in. to 5 ft. 10 in. being the usual height. Cows are much smaller, about 5 ft. high. A huge bull measured by Elliot was 6 ft. 1½ in. high, 9 ft. 6 in. from nose to root of tail, tail 2 ft. 10 in. long, girth behind shoulders 8 ft. A cow 4 ft. 10½ in. high measured 7 feet from nose to rump over curves, and 6 ft. 9 in. in girth. A large male skull from the Western Ghats measures 18 inches in basal length and 9·9 in. in zygomatic breadth. Average male horns measure 20 to 24 inches round the outside curve. Horns from Travancore have been recorded 39 inches in length and 19 inches in girth at the base; whilst other Travancore horns measure 20·75 in girth, and a pair from the Malay Peninsula 22, though only 32 long. Large cows' horns measure 23 and 24 round the outside curve, with a girth of 13·25. The girth of each horn in freshly killed specimens is about an inch more than in dried skulls.

Distribution. All the great hilly forest-tracts of the Indian Peninsula, Assam, Burma, and the Malay Peninsula. The eastern range of this species is not clearly known except that it is said to extend to Siam and, I believe, to Cochin China. *B. gaurus* does not exist in Ceylon nor in any of the Malay Islands; it is said, however, to have inhabited Ceylon up to the commencement of the present century*. In India at present its extreme north-western habitat is probably the Rajpipla hills, near Broach; and west of long. 80° East the river Nerbudda forms approximately, though

* Knox, writing in 1681, mentioned under the name of *Guavera* an animal kept tame at Kandy. The description of this animal corresponds with *B. gaurus*. Kelaart (Prod. p. 87), Forbes ('Journal of Eleven Years' Residence in Ceylon,' ii, p. 159), and Griffiths (Ouv. An. King. v, p. 410) also mention the *Guavera* or *Goura* as formerly inhabiting Ceylon. On the other hand, Sanderson has pointed out the improbability of the gaur having disappeared from an area where wild elephants still exist in large numbers. Nevill ('Taprobanian,' iii, p. 5) regards it as probable that the gaur formerly existed wild in Ceylon, but had been introduced by man.



not absolutely, the northern boundary of its range. It does not inhabit the grass-jungles of the Gangetic plain, except close to the Himalayas; but it is found in the forests at the foot of those mountains as far west as Nepal. South of the Ganges it exists in suitable tracts in Chutia Nágpur, Orissa, and the northern Circars, the Central Provinces, Hyderabad territories, Mysore, and throughout the Western Gháts, wherever it has not been exterminated or driven away.

Habits. Excellent accounts are given by Elliot (*l. c.*), Forsyth ('Highlands of Central India'), Sterndale (*Nat. Hist. Indian Mam.* and 'Seonee'), Hornaday ('Two Years in the Jungle'), J. D. Inverarity (*Jour. Bombay N. H. Soc.* iv, p. 294), and above all by Sanderson ('Thirteen Years &c.'). Hodgson's description is evidently from native reports and is untrustworthy; whilst Col. Campbell's delightful stories in 'The Old Forest Ranger,' though quoted with approval by many writers, must, I fear, be regarded as works of imagination.

The gaur keeps to forest or high grass, generally but not always near hills, and is found in herds of from five or six to about 20, or occasionally more. Bulls often wander by themselves, and the finest and oldest bulls are said always to occur solitary; still very large bulls are found with herds, and young bulls are frequently seen alone, or two or three together. All are shy and avoid cultivated tracts as a rule, though instances occur in wild parts of the country of gaur feeding on growing crops. Their food consists chiefly of grasses; they do not commonly browse, though they occasionally eat the leaves and even the bark of particular trees, and they are fond of the shoots of bamboos. They feed generally in the early morning and evening, and lie down to rest from about 9 A.M. to about 4 P.M., and at night. They drink as a rule in the afternoon.

These bovines inhabit the hills of the Indian Peninsula to an elevation of 5000 or 6000 feet, or occasionally even higher; but they do not ascend the Himalayas to nearly the same extent. They are admirable climbers, and ascend or descend steep hills with wonderful facility. They are timid animals, but in wild places, where they are rarely subject to attack and disturbance, they are by no means remarkably wary. Wounded animals occasionally charge, and solitary bulls have been known to attack without provocation; but the tales of the gaur's ferocity recorded by some sportsmen are not confirmed by any of the later writers who have had good opportunities of studying the animals. A bull gaur is one of the noblest animals in the world, a model of strength and symmetry, and his formidable appearance has led to his being unjustly credited with a savage disposition.

The period of gestation is not known with any certainty. Breeding is said to take place in the cold season. The calves are mostly born (in the Peninsula of India) in August or September, a few early in April, May, or June. Gaur suffer from the same diseases as domestic cattle.



In India all attempts at domestication of this bovine have been failures. The calves appear always to die in captivity, none it is said having been known to attain their third year. But there can be little doubt that the gaur has been tamed and kept tame in some of the hill-tracts between Assam and Burma (see also under *B. frontalis* on the next page); and quite recently a young male animal, now nearly four years old, has been brought to England from Pahang, in the Malay Peninsula, and is still (1891) living in the Zoological Gardens, Regent's Park.

According to Sanderson, three distinct sounds are uttered by this species. The first is a sonorous bellow, used as a call, and unlike any of the usual bovine sounds. The second is a low "moo," indicative of apprehension or curiosity. The third is the well-known whistling snort of alarm with which the animal dashes off when frightened. I have heard the tame animal in the Regent's Park utter a prolonged call, not very unlike the lowing of *Bos taurus*, but utterly unlike that of *B. indicus*.

339. *Bos frontalis*. *The Gyal or Mithan*.

Bos frontalis, Lambert, *Tr. L. S.* vii, pp. 57, 302, pl. iv (1804); Griffith, *J. A. S. B.* viii, pp. 211, 281; Blyth, *J. A. S. B.* xxxi, p. 338; *id.* *Mam. Birds Burma*, p. 48; Selater, *P. Z. S.* 1866, p. 1, pl. i; J. Sarbo, *P. Z. S.* 1883, p. 142; W. Blanf. *P. Z. S.* 1890, p. 593, fig. 2; W. Selater, *Cat.* p. 126.

Bos gavaeus, Colebrooke, *As. Res.* viii, p. 488, pl. (1805); Hodgson, *J. A. S. B.* x, pp. 453, 470, pl.

Bos sylhetanus, F. Cuvier, *Hist. Nat. Mam.* pls. 418, 419 (1824).

Gavaeus frontalis, Hodgson, *J. A. S. B.* xvi, p. 705; Horsfield, *Cat.* p. 179; Blyth, *J. A. S. B.* xxix, p. 291; *id.* *Cat.* p. 162.

Gyal, H.; *Mithan*, *Bunerea-goru*, *Gavi* or *Gabi*, Assam and Chittagong; *Sandung*, Manipuri; *Shel*, *Shio*, Kuki; *Jhongnua*, Mugh; *Bui-sang*, Hui, Naga; *Phu*, Aka; *Siba*, Daphla; *Nuni*, *Tsaing*, Burmese.

Very similar to *B. gaurus* but smaller, with proportionally shorter limbs, somewhat less developed dorsal ridge, a well-marked dewlap, and very different skull and horns, as shown in the accompanying figures (p. 438). The head is shorter, with shorter nasals, the forehead quite flat, and the transverse outline of the vertex between the horn-cores straight, not arched. The horns are much less curved, in fact nearly straight, spreading outwards and directed more or less upwards at the tips, but not inwards.

Colour very similar to that of *B. gaurus*. Head and body dark brown in both sexes, legs from above the knees and hocks white or yellowish. Many tame individuals are mottled and some are white throughout. Horns blackish throughout.

Dimensions. Considerably less than in *B. gaurus*, especially in height. The skull of an old bull known to be that of a wild animal measures 16.2 inches in basal length, 8.5 in breadth across the orbits, length of nasals 6.5, length of horn 14, girth at base the same. I have seen much longer horns on a tame animal.

Distribution, &c. The history and range of this animal are

singularly obscure. *Bos frontalis* was described by Lambert and Colebrooke as occurring both in the tame and wild state in the hills of Tipperah amongst the Kukis; and Lambert gave a detailed account, furnished by Mr. McRae, of the capture of wild animals and their domestication by these tribes. It has since been ascertained that tame "mithans" or "gayals" are found in possession



Fig. 159.—Skull and horns of *Bos gaurus*.



Fig. 160.—Skull and horns of *Bos frontalis*.

of particular tribes both north and south of the Assam valley, around Manipur and Cachar, and in the Tipperah, Chittagong, and Lushai hills as far south as the neighbourhood of Chittagong. But the wild bovine of the area in general was ascertained by Blyth, Sarbo, Anderson, and others to be *Bos gaurus*. The later evidence is confusing. Peal ('Nature,' Nov. 5th, 1885, p. 7) states that both wild and tame animals are called *Mithan* in Upper Assam, that they are perfectly distinct, and no intermediate forms ever occur; whilst Sanderson ('Thirteen Years &c.,' p. 250) declares that in Chittagong the two forms, wild and tame, are similar. Lastly, Mr. E. C. Steuart Baker ('Asian,' March 6th, 1891, p. 358), in the North Cachar hills confirms the old story of the wild mithans being reclaimed and domesticated by the Kukis.

Much confusion has doubtless arisen from the terms *Mithan* and *Gayal* being used for both *B. frontalis* and *B. gaurus* (*Gayal* is a word of Sanscrit derivation applied to *B. gaurus* in parts of India, and not used by the Indo-Chinese tribes who alone own *B. frontalis*). But it is very probable that some of the domesticated "mithans" are *B. gaurus*, the domestication of which by the Kukis was described by Blyth on information from a missionary, M. Barbe (J. A. S. B. xxix, p. 294). This would explain the old accounts of Mr. McRae and the recent one by Mr. Baker, both of which have every appearance of authenticity.



Until quite recently there were grounds for supposing that the wild "mithan" of the mishmi hills, Upper Assam, might be *Bos frontalis*, but, as already mentioned under *Bos gaurus*, this appears not to be the case. A few days before these pages were sent to press, I saw, in Mr. Hume's private collection, a typical skull of *B. frontalis*, obtained by Mr. W. Davison in Tenasserim, and distinctly identified by him as that of a wild animal killed in Tenasserim, between Lemyne, 66 miles south by east of Moulmein, and Tenasserim town. This is, I believe, the first distinct record of the occurrence of *B. frontalis* in the wild state. The range of the species is still a question to be solved.

The tame herds of *B. frontalis* are kept for food, and according to some authorities for their milk, though this is doubtful, as most of the Indo-Chinese tribes who keep mithans never drink milk. The animals appear never to be employed in agricultural labour, nor as beasts of burden. They roam and feed unattended through the forest during the day, and return to their owner's village at night. They breed at times freely with the common humped cattle, and the progeny has been crossed with other bovines (Bartlett, P. Z. S. 1884, p. 399). The period of gestation is said by one writer to be ten months, by another eleven, but further information on this point is desirable.

340. *Bos sondaicus*. *The Banting*.

Bos sondaicus, Müller & Schleg. *Verhandl.* p. 197, pls. xxxv-xxxix (1839); Blyth, J. A. S. B. xi, p. 445, xxxi, p. 336; *id.* *Mam. Birds Burma*, p. 48; W. Blanford, P. Z. S. 1890, p. 593; W. Sclater, *Cat.* p. 127.

Bibos banting, Gray, *Knowsley Menagerie*, p. 48 (1850); Horsfield, *Cat.* p. 183.

Bos banteng, Wagner, Schreb. *Säugeth. Suppl.* v, p. 473.

Gavæus sondaicus, Blyth, J. A. S. B. xxix, p. 293; *id.* *Cat.* p. 160.

Tsaing, Burmese; *Sapi-utan*, Malay.

This animal appears to be slighter than the gaur, with the legs longer in proportion and the dorsal ridge less developed. The tail descends below the hocks. The dewlap is of moderate size. The head is much more elongate, the forehead not concave, the horns smaller, cylindrical in the young, flattened towards the base in adults, and curving outwards and upwards at first, and towards the tips somewhat backwards and inwards.

Colour. Cows and young bulls have the head, body, and upper portions of the limbs bright reddish brown, approaching chestnut, old bulls are black; in both sexes the legs from above the knees and hocks, a large oval area on the buttocks, extending to the base of the tail but not including it, a stripe on the inside of each limb, the lips, and the inside of the ears are white. Calves have the outside of the limbs chestnut throughout and a dark line down the back.

Dimensions. According to S. Müller, a full-grown Javan bull measured 5 ft. 9½ in. high at the shoulder, the length of the head



and body was 8 ft. 6 in., and of the tail 3 ft. The largest Burmese specimen recorded was 16 hands high (5 ft. 4 in.). A skull from Java in the Indian Museum, Calcutta, has horns measuring 30 inches long by 17 inches in circumference at the base. This is unusually large. A male skull from Borneo in the British Museum measures 17·75 inches in basal length by 8·75 in zygomatic breadth.

Distribution. Throughout Burma and the Malay Peninsula, also in the islands of Borneo, Java, and Bali. This species is probably found also in Sumatra and Siam. It extends north to Northern Pegu and Arrakan, and probably to the hill-ranges east of Chittagong.

Habits. So far as is known, similar to those of *Bos gaurus*, except that *B. sondaicus*, from the greater proportional length of the legs, is probably less of a climber and more restricted to the plains of high grass.

The banting is domesticated in Java, and perhaps in other parts of its range.

341. *Bos grunniens.* *The Yak.*

Bos grunniens, *L. Syst. Nat.* i, p. 99 (1766); *W. Selater, Cat.* p. 128.

Bos poëphagus, *H. Smith, Griffith's An. King.* iv, p. 404 (1827).

Bison poëphagus, *Hodgson, J. A. S. B.* x, pp. 449, 912, xi, p. 282, xvi, p. 708.

Poëphagus grunniens, *Gray, List Mam. B. M.* p. 153 (1843); *Horsfield, Cat.* p. 184; *Adams, P. Z. S.* 1858, p. 529; *Blyth, Cat.* p. 158.

Dong, Brong-dong (wild), *Pegu* (tame), Tibetan; *Yak*, Tibetan of Ladak and N. Kumaun; *Bun-chowr*, H.; *Kuch-gau*, P.; *Boku* (old ♂), *Kotass*, Kirghiz.

The form is massive, high at the shoulder, back nearly level, not falling away above the hips. Legs short and thick; hoofs large, rounded. Muzzle small. Ears small. No dewlap. Hair nearly smooth on upper parts and sides, very long on lower part of each side, forming a deep fringe extending across the shoulder and thigh. A tuft of long hair also on the breast. Terminal half of tail thickly covered with long hair, forming an enormous tuft, not descending in general below the hocks. Ribs 14 pairs. Head elongate. Forehead nearly flat. Horns smooth, round, slightly oval at the base in very old animals, curving outward and upward at first, then forward, then inward and upward, and slightly backward in some at the end.

Colour dark brown, almost black, throughout, with the exception of a little white about the muzzle, and a sprinkling of grey on the head and neck in old animals. Old bulls are reddish on the back.

Dimensions. According to Captain E. Smyth (*J. A. S. B.* xxx, p. 393) some bulls are nearly 18 hands (6 feet) high; the same is stated by Prejvalski and others. A bull 16½ hands (5 ft. 6 in.) high measured from horns to root of tail 7 ft. 3 in.; length of tail (with hair) 3 ft. 4 in., girth round chest 7½ feet. A bull weighs,



according to Prejvalski and Dalglish, about 1200 lbs. Basal length of a large skull 20 inches; orbital breadth 11. Good horns measure 25 to 30 inches in length round the curve; the largest recorded is 40 long, and nearly 19 in girth at the base. Cows are considerably smaller than bulls and have smaller horns.

Distribution. The plateau of Tibet at considerable elevations, from about 14,000 or 15,000 to 20,000 feet in summer; and part of the Kansu province of China. The wild yak is only found within Indian limits in Northern Ladak, especially about Chang Chenmo.

Habits. The wild yak, according to Kinloch ('Large Game Shooting,' ed. 2, p. 82) and Prejvalski ('Mongolia,' &c., D. Morgan's translation, ii, p. 187), inhabits the coldest, wildest, and most desolate mountains, and is found at a greater elevation than any other mammal. In summer the cows and young collect in herds of from ten to upwards of a hundred in number. Bulls are generally solitary or in small parties of 3 or 4, except in the rutting-season, when each bull separates 4 or 5 cows from the main herd and remains with them. They feed morning and evening, mainly on a rough wiry grass that grows in the high Tibetan valleys, and usually betake themselves to a steep barren hill-side, often at a great elevation, to rest during the day. They require plenty of water, and in winter eat snow. Their powers of sight and hearing are far less acute than their sense of smell. They are timid animals, but wounded yak sometimes charge, as do most bovines.

Domesticated yaks are largely kept by Tibetans and by various tribes inhabiting the higher Himalayas, for their milk, as beasts of burthen, and for food. They are smaller than wild yaks and vary in colour, many being white or piebald; the white tails are the *chowris* of India, used as fly-flaps. They rut in winter, and bear young in autumn after a period of gestation of 10 lunar months according to Hodgson. They breed freely with domestic cattle.

342. *Bos bubalus.* *The Buffalo.*

Bos bubalis, *L. Syst. Nat.* i, p. 99 (1766); *W. Selater, Cat.* p. 129.

Bos arnee, *Kerr, An. King.* p. 336 (1792); *Gray, A. M. N. H.* (2) xvi, p. 230 (1855); *id. P. Z. S.* 1855, p. 17, pl. xl.

Bos buffelus, *Blumenbach, Handb. Naturgesch.* p. 121 (1821); *W. Blanf. J. A. S. B.* xxxvi, pt. 2, p. 195.

Bubalus arna, *Hodgson, J. A. S. B.* x, pp. 469, 912 (1841), xvi, p. 709; *Horsfield, Cat.* p. 179.

Bubalus buffelus, *Kelaart, Prod.* p. 87; *Blyth, Cat.* p. 163.

Bubalus arni, *Jerdon, Mam.* p. 307; *Blyth, Mam. Birds Burma*, p. 49.

Arna ♂, *Arni* ♀, *H.*; commonly *Arna bhainsa*, *Jangli bhains* (*bhains*, tame buffalo); *Mang*, Bhagalpur; *Mains*, Bengali; *Bir Biar*, Ho-Kol; *Gera erumi*, Gond; *Mi Harak*, Cingalese; *Moh*, Assamese; *Siloi*, Kuki; *Gubui*, Rili, Ziz, Le, Naga; *Misip*, Cachari; *Iroi*, Manipuri; *Kywa*, Burmese; *Pana*, Karen; *Karbo*, Malay.



General form heavy, body massive, legs thick and short, hoofs large. Tail reaching the hocks (but, I think, variable in length). Ribs 13 pairs. Hair on the body very thin, especially in old animals. Muzzle large and square. Head carried very low.

Skull elongate, nasals long, forehead nearly flat. Horns very large, flattened, transversely rugose, trigonal in section, tapering slowly and gradually from the base, curving at first upward, outward, and slightly backward from the plane of the face, the curve increasing towards the ends, where the horns curve inwards and a little forwards. The horns depart but little from one plane throughout. In some (*macrocerus* of Hodgson) the horns are almost straight till near the end, where they turn more rapidly upward.

Colour throughout dark ashy, almost black. The legs are sometimes whitish; in some tame forms the legs are white to the same height as in the Gaur. Horns black.

Dimensions. According to Jerdon (who probably took the figures from Hodgson) and others, the wild buffalo measures in height up to 6½ feet, and in length from snout to root of tail 10½. Kinloch, however ('Large Game Shooting,' ed. 2, pp. 88, 91), doubts if any exceed 5 ft. 4 in. in height (16 hands), and gives the following measurements of a good-sized bull: height 5 ft., length from nose to root of tail 9 ft. 7 in.; tail 3 ft. 11 in.; girth 8 ft. 3 in.; length of horns from tip to tip round curve 8 ft. 3 in. This is a common way of measuring buffalo horns. The longest recorded single horn known, one in the British Museum, measures 78½ inches, which would give an outside sweep of about 14 feet. Cows' horns are longer than bulls', but of less girth. Basal length of a large bull's skull 22·8 inches, orbital breadth 10·25.

Distribution. Plains of the Brahmaputra and Ganges from the eastern end of Assam to Tirhoot, and the Terai as far west as Rohilcund, the plains near the coast in Midnapore and Orissa, and also plains in the Eastern Central Provinces (Mandla, Raipur, Sambalpur, Bastar, and other districts) as far south as the Godávari and Pranhita rivers, and perhaps a little beyond. Wild buffaloes are wanting in Southern and Western India, but abundant in Northern Ceylon. Some buffaloes are also found in the wild state in Burma and the Malay Peninsula, but it is uncertain whether they are not descended from herds escaped from captivity.

Varieties. Besides the two forms, one with horns approaching a circle (*spirocerus* of Hodgson) and the other with horns nearly straight at first and turned up at the end (*macrocerus* of Hodgson), there is a very distinct race of a dun colour that inhabits Upper Assam. I have seen two heads of bulls, one in Mr. Hume's collection now in the British Museum, the other in the Indian Museum, Calcutta. These differ in the much more convex forehead, and the skull is remarkably short in front of the orbits, the nasals being shorter than the distance from their posterior end to the vertex, whilst in ordinary buffaloes they are longer. This difference is so great that the form requires a distinctive name, and may be called *Bos bubalus*, var. *fulvus*, or the dun buffalo.



Habits. The wild buffalo keeps chiefly to level ground and is generally found about swamps. It haunts the densest and highest grass-jungle or reeds, but is also found at times in open plains of short grass, or amongst low bushes, but very rarely in tree-forest. Buffaloes associate in herds, often of large size. I have seen 50 together, and have heard of much larger assemblages. They feed chiefly on grass, in the evening, at night, and in the morning (probably morning and evening as a rule), and lie down, generally in high grass, not unfrequently in a marsh, during the day; they are by no means shy, nor do they appear to shun the neighbourhood of man, and they commit great havoc amongst growing crops. Sometimes a herd or a solitary bull will take possession of a field and keep off the men who own it. In fact buffaloes are by far the boldest and most savage of the Indian *Bovidae*, and a bull not unfrequently attacks without provocation, though, probably on the principle that a council of war never fights, a herd, although all will gallop to within a short distance of an intruder and make most formidable demonstrations, never, I believe, attacks anyone who does not run away from them. A wounded animal of either sex often charges, and has occasionally been known to knock an elephant down. Buffaloes retain their courage in captivity, and, as mentioned already (*ante*, pp. 63, 67), a herd will attack a tiger or other dangerous animal without hesitation, and, although gentle with those they know and greatly attached to them, they are inclined to be hostile to strange men and strange animals. Whether wild or tame they delight in water, and often during the heat of the day lie down in shallow places with only parts of their heads above the surface.

Few, if any, tame animals have changed less in captivity than buffaloes. Unlike the yak and gayal, they never breed with tame cattle (*B. indicus*), although the cows often pair with wild bulls of their own species. Tame buffaloes are chiefly kept for milk and for draught. They have been introduced throughout many of the warmer parts of the Old World, and even in Italy, whither they were brought in the sixth century (Griffith's Cuvier, iv, p. 381). Both wild and tame rut in autumn; the females gestate for 10 months (10 months and 10 days according to some), and bear one or two young in summer.

Genus **OVIS**, Linn. (1766).

Syn. *Ammotragus*, Blyth (1840); *Pseudois*, Hodgson (1846); *Caprovius*, Hodgson (1847).

Tail short in all wild Asiatic forms. Suborbital gland and lachrymal fossa usually present (wanting in *O. nahura*). Interdigital glands present on all feet. Inguinal glands present. No muffle. No beard on chin, but frequently long hair on neck. Mammæ two. Males non-odorous.

Skull broadest at the orbits, which are prominent, and narrowing suddenly in front of them; the frontal and occipital planes, the

latter including the parietal region, meeting at about a right angle. Occipital plane very flat. Horns in both sexes, very large in males, much smaller in females; in the former thick, sometimes very thick at the base, tapering regularly, and forming a circular or spiral curve at the side of the head (*O. nahura* is an exception). Vertebrae: C. 7, D. 13, L. 6, S. 4, C. 10-14.

Wild sheep are found in the Palæarctic and Nearctic regions, one species ranging into Sind and the Punjab. The structural differences from the genus *Capra*, comprising the true goats, are very small, and one species, *O. nahura*, is absolutely intermediate. Both inhabit mountains and high plateaus, but the sheep keep more to open undulating ground, the goat to crags and precipices. The flesh of all wild sheep is excellent, the males never having the rank odour that is characteristic of goats.

The period of gestation in different breeds of European tame sheep varies from 144 to 150 days, but, according to Hodgson, in several Himalayan and Tibetan breeds the period is 160 (J. A. S. B. xvi, pp. 1010 &c.). The origin of tame sheep is quite unknown.

Synopsis of Indian Species.

- A. Normal; suborbital glands present, horns with a circular or spiral curve.
 - a. Very large; adults exceeding 42 inches in height at shoulder.
 - a'. Horns in male never exceed one circle . . . *O. hodgsoni*, p. 494.
 - b. Horns in male considerably exceed a circle. *O. poli*, p. 496.
 - b. Size moderate; adults not exceeding 36 inches in height *O. vignei*, p. 497.
- B. Abnormal; no suborbital glands, curve of horns S-shaped *O. nahura*, p. 499.

343. *Ovis hodgsoni*. *The great Tibetan Sheep.*

Ovis nayaur, Hodgson, *As. Res.* xviii, pt. 2, p. 135 (1833), *partim*.
Ovis hodgsoni, Blyth, *P. Z. S.* 1840, p. 65; *id.* *A. M. N. H.* vii, p. 199 (1841); Selater, *P. Z. S.* 1860, p. 129; V. & B. Brooke, *P. Z. S.* 1875, p. 520; W. Selater, *Cat.* p. 136.
Ovis ammonoides, Hodgson, *J. A. S. B.* x, p. 230, pl. i, fig. 1 (1841); xv, p. 338, with 3 plates; Hutton, *J. A. S. B.* xvi, p. 568.
Ovis ammon, Horsfield, *Cat.* p. 176; Blyth, *Cat.* p. 177; Blanford, *J. A. S. B.* xli, p. 40, *nec* *Capra ammon*, L.
Caprovis argali, Adams, *P. Z. S.* 1858, p. 527, *nec* *Ovis argali*, Pallas.
Nyan ♂, *Nyanmo* ♀, Ladak; *Nyang*, *Nyand*, *Hyan*, Tibetan.

Hair short, coarse, and very close. Ears short. Tail very short. In adult males the hair on the sides and lower surface of the neck is lengthened into a white ruff, and there is a dark crest of hair, not so long as the ruff, along the back of the neck to the withers.

Horns in male very massive, coarsely wrinkled transversely, subtriangular in section, but with the edges, especially the fronto-orbital, much rounded, the orbital and nuchal surfaces very much broader than the frontal. The curve is a spiral, the two horns



diverging very slowly, tips turned very little outwards, and the whole curve of each horn not equal to a complete circle. In females the horns are short, erect, curved backwards and outwards, thin and strap-like towards the ends.

Colour greyish brown above, paler and whitish below. In males the caudal disk surrounding the tail, the rump, throat, chest, belly, and insides of the legs are white, crest and a stripe down the front of each leg dark. Old males are grizzled on the back, white hairs being mixed with the brown of the upper parts. A dark mark above the tail. Females have little or no mane, the white is less pure, and the caudal disk is indistinct. The colour in winter is probably paler than in summer.

Dimensions. Height of old rams at shoulder $3\frac{1}{2}$ to 4 feet, females not much less. Length from nose to rump (skins), males 6 to $6\frac{1}{2}$ feet, females $5\frac{1}{2}$; tail without hair 1 inch, with hair 3; ear 6; basal length of male skull 13, breadth at orbits 7.5. Horns of adult males are 36 to 40 inches long round the curve, and the girth at the base is 16 to 17. The greatest recorded measurements are said to be, length 53, basal girth 24 or perhaps 25, but there appears a little doubt about these. 48 inches in length and 20 in girth have certainly been measured. Female horns are said to attain 24 inches in length, but rarely exceed 18.

Distribution. The plateau of Tibet from Northern Ladak to the country north of Sikkim and probably farther east. This sheep does not range south of the main Himalayan axis; it is not found in summer below about 15,000 feet elevation; in winter it may descend to about 12,000 in places.

Habits. This magnificent sheep, probably the largest of the genus, inhabits the bare undulating Tibetan plateau in herds, keeping to open valleys and low stony slopes. In summer the rams are found in small parties of from 3 or 4 to about 15, apart from the ewes. The rutting-season is in winter; at this time the great sheep inhabit the lower and more sheltered Tibetan valleys. The young are born about May or June.

No animal is more wary. Owing to its watchfulness, its keen sight and acute sense of smell, its speed when on foot, and the open character of the ground it haunts, the great Tibetan sheep is one of the most difficult of all animals to stalk or shoot.

Ovis brookei (P. Z. S. 1874, p. 143; 1875, p. 521) has now been ascertained to be a wild hybrid between a male *O. hodgsoni* and female *O. vignei* (Sterndale, Jour. Bombay N. H. Soc. i, p. 35, and P. Z. S. 1886, p. 205)—a male of the great sheep in Zaskar having taken possession of a small flock of *O. vignei* ewes, and bred with them. The converse, a hybrid between the male *O. vignei* and female *O. hodgsoni* has also been shot by Major C. S. Cumberland (P. Z. S. 1885, p. 851). The hybrid in the latter case was found with a flock of *O. hodgsoni*.

Ovis ammon, L. sp. (*O. argali*, Pall.), inhabits plateaus in Northern Mongolia, and perhaps in Southern Siberia. It is nearly allied to *O. hodgsoni*, but appears to have no ruff.

344. *Ovis poli*. *The great Pamir Sheep.*

Ovis poli, *Blyth*, *P. Z. S.* 1840, p. 62; *id.* *A. M. N. H.* vii, p. 195, pl. v, figs. 1, 2, 3, 4; *Stoliczka*, *P. Z. S.* 1874, p. 425, pl. liii; *Biddulph*, *P. Z. S.* 1875, p. 157; *id.* *P. A. S. B.* 1879, p. 280; *Scully*, *P. Z. S.* 1881, p. 209; *Blanford*, *P. Z. S.* 1884, p. 326; *W. Selater*, *Cat.* p. 133.

Ovis poli and karelini, *Severtzoff*, *Turk. Jev.* pp. 84-102, 149, pls. i-vi (1873); *id.* *A. M. N. H.* (4) xviii, pp. 171, 210, 217, 220 (1876); *V. & B. Brooke*, *P. Z. S.* 1875, pp. 512, 514; *Blanford*, *Yark. Miss.*, *Mam.* pp. 80, 83.

Kuchkâr ♂, *Mesh* ♀, Wakhan; *Kulja* or *Gulja* ♂, *Arkar* ♀, Turki (E. Turkestan).

Closely allied to *O. hodgsoni*, from which this great sheep is distinguished chiefly by the form of the horns, partly by colour. It has a white ruff on the throat and dark crest on the nape. The horns in adult males are enormous, less in girth than in *O. hodgsoni*, but much longer, each forming a spiral of considerably more than a circle. Horns in the female compressed, very similar to those of *O. hodgsoni*.



Fig. 161.—Skull and horns of *Ovis poli*. (Guide to the Galleries of Mammalia, British Museum.)

Colour. Upper parts rather light brown or hoary brown, more or less tinged with rufescent, especially towards the border of the dark area, a darkish line of slightly lengthened hair from the nape to the withers. Lower parts, with the fore part of the neck, muzzle, chest, legs, and rump, including the tail, white; a dark mark sometimes on the tail. In summer the colour is probably darker and browner. In females the neck is brown in front.

Dimensions of an adult male with 48-inch horns:—height at shoulder 44 inches; length of head 13·25; from horns to tip of tail 62; tail with hair 5·5, without 4; length of ear in front 4·75; girth round chest 51·5 (*Stoliczka*). Basal length of a good skull 12·7, breadth across orbits 7·5. Females are not much smaller than males. Good horns of rams measure 50 to 60 inches round the curve and about 15 in girth at the base, the extreme recorded measurements being 75 and 16·75. *Severtzoff* estimates the



weight of an old male at about 600 lbs., but he did not weigh one.

Distribution. The high Pamir and the plateaus west and north of Eastern Turkestan, extending to the Alai. This sheep only comes within Indian limits in Hunza, north of Gilgit.

Habits. Precisely similar to those of *O. hodgsoni*. The rutting-season is in December and January. Some herds at this time are large.

345. *Ovis vignei*. *The Urial or Shé.*

Ovis vignei, *Blyth*, *P. Z. S.* 1840, p. 70; *id.* *A. M. N. H.* vii, p. 251, pl. v, fig. 9 (1841); *Hutton*, *J. A. S. B.* xv, p. 152; *Horsfield*, *Cat.* p. 175; *Sclater*, *P. Z. S.* 1860, p. 127, pl. lxxix; *Scully*, *P. Z. S.* 1881, p. 209; *W. Sclater*, *Cat.* p. 139.

Ovis cycloceros, *Hutton*, *Calc. Jour. N. H.* ii, p. 514, pl. xix (1842); *Sclater*, *P. Z. S.* 1860, p. 128, pl. lxxx; *Blyth*, *Cat.* p. 177; *Jerdon*, *Mam.* p. 294; *Blanford*, *Eastern Persia*, ii, p. 87; *Thomas*, *Tr. L. S.* (2) *Zool.* v, p. 63; *W. Sclater*, *Cat.* p. 138.

Ovis montana, *Cunningham*, *Ladak*, p. 199, pl. vii (1854), *nec* G. Cuvier.

Caprovís vignei, *Adams*, *P. Z. S.* 1858, p. 526.

Ovis blanfordi, *Hume*, *J. A. S. B.* xlvi, pt. 2, p. 327, pl. iv. (1877).

Guch ♂, *Mish* ♀, *P.*; *Shá* (*Shápo* ♂, *Shámo* ♀), *Ladak*; *Urin*, *Astor*; *Koh-i-dumbá*, *Afghanistan*; *Koch*, *Gad* ♂, *Garand* ♀, *Baluch and Sindhi*; *Kar* ♂, *Gad* ♀, *Brahui*; *Uriál*, *Punjab*.

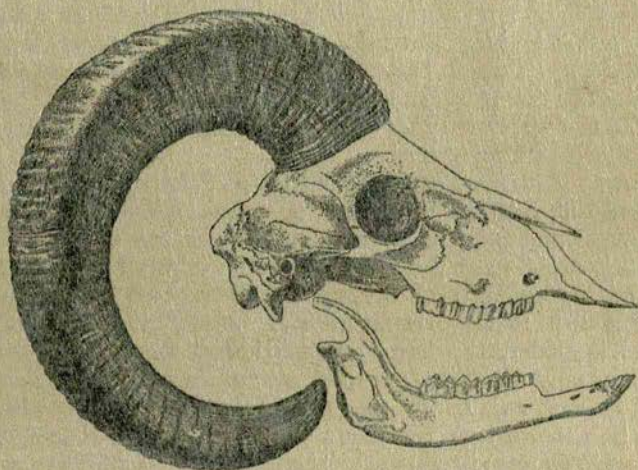


Fig. 162.—Skull and horns of *Ovis vignei* (Salt Range variety).

Fur coarse, close and short. Tail short. Adult rams have a gular ruff of long hair commencing behind the chin in two lobes, which immediately unite and extend down the middle of the throat to the chest.

Horns in male coarsely wrinkled transversely, triangular in section; orbital and nuchal surfaces not very much broader than



frontal; fronto-orbital edge sometimes much rounded, the others, as a rule, less so. The two horns arise close together, diverge considerably, and are curved round nearly in a circle, sometimes keeping almost, or even absolutely, in one plane, sometimes wound spirally. The curve very rarely exceeds a circle. Horns of females are short and nearly straight.

Colour above in summer rufous grey or fawn, in winter light greyish brown; lower parts, limbs, buttock, and tail whitish or white; ruff sometimes black throughout, but generally with some white hairs and in old rams white in front, gradually passing into black behind. Muzzle in old animals whitish or white. A patch behind the shoulder black or blackish, sometimes a blackish lateral line and markings outside the limbs. Females and young males are almost uniform greyish brown, paler beneath.

Dimensions. Height of a male 32 inches, length 48, tail 4. Some Ladak specimens are larger and are said to be 3 feet or more in height. A male Ladak skull measures 9·25 in basal length, and 5·5 in breadth across the orbits. A Punjab skull is about half an inch less in length. Horns measure 24 to 30 inches round the curve, and about 10 in girth at the base, the maximum recorded length and girth being 37·75 and 11·5.

Distribution very wide. The shá is found in Ladak and Zaskar, and, according to information obtained by Mr. Hume from Mr. Dalgleish, considerably farther east in Northern Tibet, at elevations of 12,000 to 14,000 feet, and it ranges through Astor and Gilgit, where it is known as úrin, to Afghanistan. The Astor animal is the typical *O. vignei*. The uríál, which I now regard as identical, is found in the Punjab Salt Range and in places throughout the ranges west of the Indus in the Punjab and Sind down to the sea-level. To the westward this animal is found throughout Afghanistan, Baluchistan, and Southern Persia.

Varieties. Until recently I believed, as Sclater, Blyth, Jerdon, and others did, that the Ladak shá, *O. vignei*, was distinct from the Punjab, Sind, and Baluchistan uríál, usually known as *O. cycloceros*. But an examination of the series of skulls collected by Mr. Hume shows the impossibility of distinguishing the two by the horns. The shá is undoubtedly, on an average, larger, the circle made by the horns is wider, the horns are thicker at the base, and their edges, especially the fronto-orbital, are more rounded as a rule; the ruff, too, is said to be much less developed. According to some MS. notes for which I am indebted to Mr. Hume, horns of uríál scarcely ever exceed 10 inches in girth at the base, whilst shá horns are sometimes between 11 and 12 in circumference. Judged by this test, as Mr. Hume has pointed out to me, the typical *O. cycloceros* of Hutton is identical with *O. vignei*, and the smaller uríál, if kept distinct, must bear a different name. But I cannot find any definite distinctive characters; those of colour noted by Sclater I believe to be merely individual, and some skulls and horns from Ladak appear indistinguishable from Salt Range specimens.



O. blanfordi is a variety of the urial from Kelât, Baluchistan, with horns diverging throughout so as to form an open spiral, instead of each lying in one plane or nearly so. Thus the tips of the horns are very much farther apart than in typical *O. vignei*. This character, I am now convinced, is not of specific importance, and in this view Mr. Hume agrees.

Habits. In Ladak this sheep inhabits open valleys; in Astor and Gilgit it keeps to grassy ground at moderate elevations below the forest; in the Salt Range of the Punjab, and in Sind, Baluchistan, and Persia, it is found on undulating or hilly ground cut up by ravines, and is more often seen on stony and rocky hill-sides than amongst bushes and scrub. The herds vary usually from 3 or 4 to 20 or 30 in number; the sexes are generally together, but the males often keep apart in summer. These sheep are wary and active; although not such masters of the art of climbing amongst precipices as the goats, tahr, or bharal, they get over steep places with wonderful ease. Their alarm cry is a shrill whistle, their usual call a kind of bleat.

The rutting-season in the Punjab is September. According to Adams the period of gestation is 7 months, but according to Selater (P. Z. S. 1863, p. 230), from observations in the Zoological Gardens in London, only 4. It is not improbable that the true period is between the two. The young in Astor are produced about the beginning of June, as observed by Mr. H. Littledale, and the rutting-season there must be considerably later than September. One or two young are born. This species has bred freely with tame sheep. The occurrence of wild hybrids with *O. hodgsoni* has been noted in the account of the latter. The flesh of *O. vignei* is excellent.

346. *Ovis nahura.* *The Bharal or blue Wild Sheep.*

Ovis nayaur, *Hodgson, As. Res.* xviii, pt. 2, p. 135 (1833).

Ovis nahoor, *Hodgson, P. Z. S.* 1834, p. 107; *id. J. A. S. B.* x, p. 231, pls. i, ii, p. 913, xi, p. 233; *Selater, P. Z. S.* 1860, p. 129; *M. Edw. Rech. Mam.* p. 357, pls. lxxviii, lxxix; *W. Selater, Cat.* p. 140.

Ovis burrhel, *Blyth, P. Z. S.* 1840, p. 67; *id. A. M. N. H.* vii, p. 248; *id. J. A. S. B.* x, p. 863.

Ovis nahura, *Gray, List Mam. B. M.* p. 170 (1843); *Blyth, Cat.* p. 178; *Jerdon, Mam.* p. 296; *Blanford, J. A. S. B.* xli, pt. 2, p. 40; *id. Yark. Miss., Mam.* p. 85, pl. xiv.

Pseudois nahoor, *Hodgson, J. A. S. B.* xv, p. 343, xvi, p. 702; *Horsfield, Cat.* p. 176; *Adams, P. Z. S.* 1858, p. 527; *Lydekker, J. A. S. B.* xlix, pt. 2, p. 131.

Bharal, *Bharar*, *Bharut* (males often *Menda*, a ram), H.; *Na*, *Sna*, Ladak; *Wa*, *War*, Sutlej Valley; *Nervati*, Nepal; *Nao*, *Gnao*, Bhotia.

Hair of uniform length throughout, no trace of mane or ruff. No suborbital glands nor lachrymal fossæ, but interdigital and inguinal glands present. Ears short. Tail longer than in *O. vignei* and *O. hodgsoni*.

Horns in males rounded at the base or subquadrangular, nearly



smooth, with transverse striae, arising close together, curving outwards, first upwards, then downwards, and lastly backwards. In females the horns are short, slightly curved upwards and outwards, suboval in section, the longer diameter across the head.

Colour brownish grey above, much browner in summer, slaty grey with a brownish wash in winter. Lower parts, inside and back of limbs, and buttocks as far as base of tail white. In adult males the face, chest, a stripe down the front of all limbs, but broken by white at the knees in the fore limbs, a band down the lower part of the side bordering the white of the belly, and the terminal two-thirds of the tail black. The black markings on the face, chest, and sides are wanting in females.

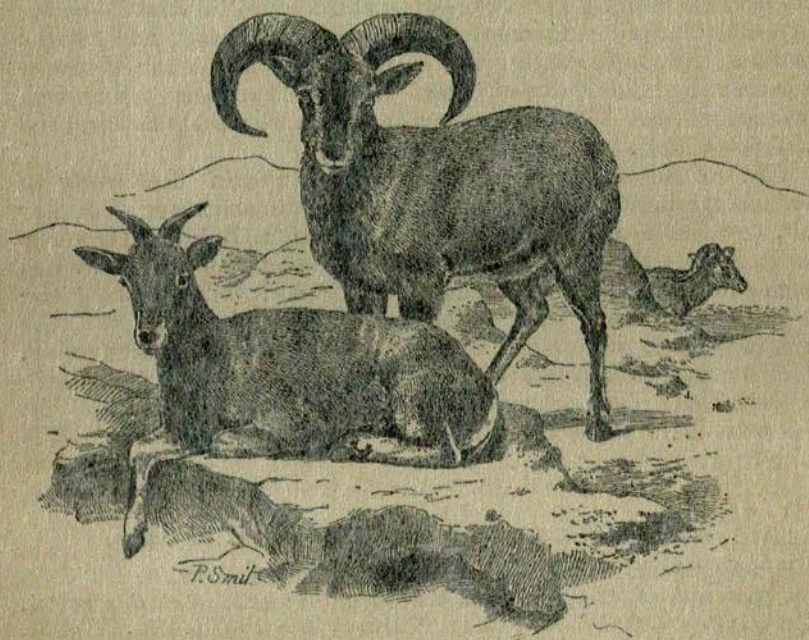


Fig. 163.—*Ovis montanus*.

Dimensions. Height at shoulder in males about 3 feet, length to root of tail 5, tail 7 inches; horns about 24 round curve, girth at base about 11; the greatest recorded dimensions being length 32.1 and 30.5, girth 13; basal length of skull 9.5, breadth across orbits 5.6. Females considerably smaller in all dimensions.

Distribution. Tibet from near Shigar in Baltistan, and near Sanju S.E. of Yarkand, to Moupin, and from the main Himalayan axis, or in places the high ground south of it, to the Kuenlun and Altyn Tagh. Never found below about 10,000 feet. In summer usually seen about 14,000 to 16,000.

This animal in structure is quite as much allied to *Capra* as to *Ovis*, and is referred to the latter genus mainly because it resembles sheep rather than goats in external appearance, and hence has been gene-



ally classed with the former. Hodgson distinguished it as *Pseudois*, and there is much to be said in favour of the distinction, but the sheep and goats are so nearly allied that an intermediate generic form can scarcely be admitted.

Habits. In habits as in structure the bharal is intermediate between the sheep and the goats. Like the former it is found on undulating ground, and frequently lies down during the day on its feeding-ground, though generally amongst stones; but, like the latter, it is a splendid climber, perfectly at home on precipitous cliffs, and wont, when alarmed, to take refuge in ground inaccessible to man. It is found in herds of from 8 or 10 to 50 or even 100; the males and females being generally found apart in the summer, but frequently associating together at all seasons. The herds keep to high open ground above forest and never enter bush even. They feed and rest alternately during the day; owing to their colour it is peculiarly difficult to make them out when they are lying down amongst stones. Their flesh is excellent, especially about September, when they are in good condition.

The bharal is easily tamed if taken young, and has bred freely in the Zoological Gardens, Regent's Park. The period of gestation has not, however, been accurately determined; it is 160 days according to Hodgson. This animal has never been known to breed with tame sheep.

Genus **CAPRA**, Linn. (1766).

Syn. *Hircus*, Bodd. (1785); *Iber*, Hodgson (1847).

Size moderate. Tail short. No suborbital nor inguinal glands. Interdigital glands wanting or confined to fore feet. No distinct muffle. A beard present in all Indian species. Mammaræ two. Callosities on the knees and sometimes on the chest. Males with a peculiar strong odour.

Skull broad at the orbits and narrowing rather suddenly in front, the occipital and frontal planes meeting at an obtuse angle, occipital and parietal area much rounded, outline of face concave. Horns in both sexes, very (30 to 54 inches) long and arising close together in adult males, much smaller and farther apart in females, commencing from the vertex and rising above the continuation of the frontal plane, scimitar-shaped or spiral, more or less compressed and angulate. Vertebrae: C. 7, D. 13, L. 6, S. 3-4, C. 9-13.

The true goats are almost confined to the Palearctic region. All live in herds, the males sometimes keeping apart from the females and occasionally being found solitary. All haunt steep cliffs and are splendid climbers, and all browse largely. They are very wary and active. The period of gestation in tame goats is about 160 days (Hodgson, J. A. S. B. xvi, pls. 1020, 1021, &c.), and is probably similar in their wild allies.

*Synopsis of Indian Species.*

A. Horns scimitar-shaped.

a. Horns compressed in front. *C. ægagrus*, p. 502.b. Horns of males flattened in front, with knobs at intervals. *C. sibirica*, p. 503.B. Horns spirally twisted *C. falconeri*, p. 505.

Remains of a goat, closely allied to *C. falconeri*, are found in the Pliocene Siwaliks, and traces of another species in the beds of Hundes in Tibet.

347. *Capra ægagrus*. *The Persian wild Goat.*

Capra ægagrus, *Gmelin, Syst. Nat.* i, p. 193 (1788); *Hutton, Calc. Jour. N. H.* ii, p. 521, pl. xix; *id. J. A. S. B.* xv, p. 161; *Blyth, Cat.* p. 176; *Blanford, J. A. S. B.* xlv, pt. 2, p. 15; *id. Eastern Persia*, ii, p. 89; *Danford, P. Z. S.* 1875, p. 458; *Sclater, P. Z. S.* 1886, p. 315, pl. xxxi; *W. Sclater, Cat.* p. 142.

Ægoceros ægagrus, *Kotschy, Verh. zool.-bot. Ver. Wien*, iv (1854), p. 201.

Capra caucasica, *Gray, List Mann. B. M.* p. 167 (1843); *Adams, P. Z. S.* 1858, p. 525, *nec* *Güldenstädt*.

Capra blythi, *Hume, P. A. S. B.* 1874, p. 240.

Pásang ♂, *Boz* ♀ (generally *Boz-pásang*), *P.*; *Borz*, *Afghan*; *Sair*, *Sarah*, *Phashin*, *Pachin*, ♂ *Borz-Kuhi*, *Baluch*; *Chank* ♂, *Hil*, *Haraf* ♀, *Brahui*; *Ter*, *Sarah*, *Sindhi*; *Sind ibex* of European sportsmen.

Male with a beard on the chin only, and with the hair on the back of the neck and on the shoulders rather longer in winter. At this season a soft underfur is developed in all individuals inhabiting cold climates.

Horns of male scimitar-shaped, curved backwards, greatly compressed, the anterior edge forming a prominent keel, irregularly notched and jagged, posterior edge rounded, the outer surface of each horn more convex than the inner; the tips generally converging more or less, sometimes diverging. Horns of female much smaller, erect, curved slightly backwards, farther apart at the base than in the male, slightly compressed, oval in section and ribbed.

Colour brownish grey in winter, yellowish or rufous-brown in summer, lower parts and inner portion of buttocks whitish or white. Older males are paler and have the face, back of the neck, shoulders, a stripe along the back, the tail, chin, and throat, with the beard, the front of all legs, except at the knees, and a stripe along the lower part of each side joining the band of the hind leg dark brown. The carpus and tarsus are all white except the dark band in front. These markings vary much in distinctness.

Dimensions. A full-grown male was 37 inches high at the shoulder, muzzle to end of tail 61·5, tail with hair 5 (*Hutton*). Females are less, and both sexes in Lower Sind are usually small. Basal length of a male skull 9·2, orbital breadth 4·8. Good horns measure 40 inches round the curve, the extreme length known being 52·5, with a basal girth of 7, in a specimen killed by General Marston in the Karáchi hill-tracts.



Distribution. The hills and mountains of South-western Asia, from the Caucasus to Sind. Formerly common in the Grecian Archipelago. Within Indian limits, this wild goat is found on the barren hills of Baluchistan and Western Sind, but not east or north-east of the Bolan Pass and Quetta, as it is replaced by *C. falconeri*. Specimens of a wild hybrid between the two were obtained by the late Sir O. B. St. John on Takatu near Quetta. This goat, which does not occur east of the Indus, is found near the sea-level in Sind and Baluchistan, but ascends to 12,000 or 13,000 feet in Persia.

Habits. The wild goat of Sind and Baluchistan inhabits barren rocky hills in herds of varying numbers, keeping much to cliffs and crags. It is very active, and leaps with wonderful precision from one ledge to another on the face of a precipice, having like other goats, as Hutton has pointed out, a peculiar power of stopping short and balancing itself on a very small foothold after a leap up or down. Hutton also states that he has seen a male of this goat, kept tame, save itself when it has made a false step by falling on its horns.

One or two kids, sometimes, it is said, three, are produced at a time, about May in the Caucasus, but I believe earlier in Sind, for I saw a very young animal captured in the Khirthar range on March 11th.

The true bezoar, formerly famous in Europe and still regarded in Persia as an antidote to poison, and as a remedy in many diseases, is a concretion found in the stomach of this goat, which was known to the older European writers as Pazen or Pasen, evidently a corruption of the Persian name. The *Capra bezoartica* of Linnæus was doubtless intended for this species, although the description cannot be recognized. The subject is fully discussed by Danford.

There can be no doubt that *O. agagrus* is one of the species, and probably the principal, from which tame goats are derived.

348. *Capra sibirica.* *The Himalayan Ibex.*

Capra sibirica, Meyer, *Zool. Annal.* i, p. 397 (1794); Blyth, *Cat.* p. 176; Jerdon, *Mam.* p. 292; Blanford, *Yark. Miss., Mam.* p. 86; Scully, *P. Z. S.* 1881, p. 203; Aitchison, *Tr. L. S.* (2), *Zool.* v, p. 64; W. Selater, *Cat.* p. 143.

Himalayan ibex, Blyth, *P. Z. S.* 1840, p. 80.

Capra ibex, Hodgson, *J. A. S. B.* x, p. 913, xi, p. 283, *nec* Linn.

Capra sakeen, Blyth, *J. A. S. B.* xi, p. 283 (1842).

Ægoceros skyn, Wagner, *Schreb. Säugeth. Supp.* iv, p. 491 (1844).

Capra himalayana, Schinz, *Syn. Mam.* ii, p. 463 (1845); Adams, *P. Z. S.* 1858, p. 523.

Ibex sakin and sibirica, Hodgson, *J. A. S. B.* xvi, p. 700.

Skin or *Sakin* ♂, *Dabmo* or *Danmo* ♀, Ladak; *Kail*, Kashmir; *Tangrol*, Kulu; *Buz*, Kunawar; *Skiu*, Balti.

Build rather heavy, legs short. Male with a profuse beard confined to the chin, and with a ridge of coarse dark hair along the back. Hair coarse and brittle, with, in winter, dense soft woolly underfur (pashm or tús).



Horns scimitar-shaped, curved backwards, diverging, the points sometimes converging slightly; nearly triangular in section, the anterior surface flat, with large knobs at tolerably regular intervals, hinder edge compressed. In the female the horns are much smaller, set wider apart, rugose, almost ringed, oval in section at the base, compressed above, curving slightly backwards.

Colour in summer brown, scarcely paler beneath, old males being chocolate, with patches of dirty white on the back. In winter the general colour is yellowish white, tinged with brown or greyish. There is generally a dark band on the back. Legs dark. Beard and tail dark brown.

Dimensions. Height of males at shoulder about 40 inches; females one-third smaller (*Kinloch*). Basal length of a male skull 10·8; orbital breadth 6. Good horns of males measure 40 to 45 inches round the curve; the greatest recorded length is 54 with a girth of 11·5 inches above the lowest knob. Female horns measure about a foot in length.

Varieties. A very dark-coloured ibex is said to occur in Baltistan, but is, according to Scully, merely the old male in winter vesture. Ibex from Siberia and from the Thian Shan Mountains north of Káshgarh have the abdomen and the back of the carpus and tarsus white, contrasting strongly with the front of the legs, which is very dark brown. Colonel Biddulph, to whom I am indebted for calling my attention to this character, is of opinion that the Thian Shan animal is true *C. sibirica* and the Himalayan one distinct, in which case the latter would take the name of *C. sakin*. I have only been able to examine one undoubted Himalayan skin, and cannot say if the difference is constant.

Mr. R. A. Sterndale has described and figured (*Jour. Bombay N. H. Soc.* i, p. 24) the head of an ibex purchased in Kashmir. The horns are 52 inches long, dark coloured, and remarkably curved round, much more than in ordinary *C. sibirica*; there are no knobs except near the tips. In section the horns resemble those of *C. sibirica*. Three specimens are recorded, and it is suggested they may come from the country west of Kashmir. Mr. Sterndale proposed to call this wild goat *C. dauvergnei* if new.

Distribution. The mountain ranges of Central Asia from the Altai to the Himalayas, and from the neighbourhood of Herat to Kumaun. The ibex occurs in most of the high ranges north of Kashmir, but not in the Pir Panjál, and it also inhabits the higher Himalayas as far east at all events as the source of the Ganges. It is not known to occur farther east in the Himalayas nor in Eastern Tibet, and although it is included in Hodgson's lists of Nepal mammals, there are no specimens in his collection; but when in Northern Sikkim, I heard from Tibetans of an animal, probably this species, inhabiting the mountains north of Shigatze, and Hodgson obtained similar information as to its occurrence north of Lhasa and Digarchi.

Habits. The ibex of the Himalayas is found on and about precipitous cliffs at high elevations close to the snow at all seasons.



Its habits have been well described by Adams, Kinloch, and others. Owing to the protection afforded by its thick underfur, it is but little affected by cold, and "even during the winter ibex do not as a rule descend very low, but resort to places where, from the steepness of the hill-side, snow does not lie in any quantity. At this season males and females herd together, but as the snow melts and the time (May and June) for the birth of the young approaches, the old males forsake the females altogether, and, as the summer advances, retire to the most inaccessible mountains, frequently sleeping during the day above the limits of vegetation, and descending great distances to feed in the morning and evenings." (*Kinloch*). The males descend about October and mix with the herds, the rutting-season being in winter.

Kinloch also says :—"Although an excessively wary animal, the ibex is usually found on such broken ground that it is not very difficult to obtain a shot. The grand rule, as in all other hill-stalking, is to keep well above the herd, whose vigilance is chiefly directed beneath them. In places where they have been much disturbed, one or two of the herd usually keep a sharp look out while the others are feeding, and on the slightest suspicion of danger the sentries utter a loud whistle, which is a signal for a general rush to the nearest rocks."

The female has one or two young. Many of these animals are killed for the sake of obtaining the soft woolly underfur, which is woven into cloth, and used for lining articles of dress.

349. *Capra falconeri*. *The Markhor*.

Egoceros (Capra) falconeri, *Hügel, Wagner, Münch. gel. Anz.* ix, p. 430 (1839).

Capra megaceros, *Hutton, Calc. Jour. N. H.* ii, p. 535, pl. xx (1842); *id. J. A. S. B.* xv, p. 161; *Blyth, Cat.* p. 176; *Jerdon, Mam.* p. 291.

Capra falconeri, *Hügel, Kaschmir*, iv, p. 579, pl.; *Blanford, J. A. S. B.* xlv, pt. 2, p. 17; *Scully, P. Z. S.* 1881, p. 209; *Sclater, P. Z. S.* 1886, p. 317; *W. Sclater, Cat.* p. 145.

Hircus megaceros, *Adams, P. Z. S.* 1858, p. 525.

Capra jerdoni, *Hume, P. A. S. B.* 1874, p. 240.

Markhor (snake-eater), Afghanistan, Punjab, and S. Kashmir; *Râche* (*Râpho-che* ♂, *Râwa-che* ♀), Ladak; *Rezkuh*, *Mutt*, ♂, *Hil*, *Haraf* ♀, Brahui; *Pachin*, *Sarâ*, ♂, *Buzkuhi* ♀, Baluch.

Beard in old males long and copious, extending from the chin down to the breast; in females and young males short, confined to the chin. Little or no underfur. Horns of males compressed, close together at the base, spirally wound, sharply angulate in young animals both in front and behind, more rounded in front at the base in old animals; the anterior keel turns outwards at first in each horn. In some the horns form an open spiral like that of a corkscrew, in others each horn is straight and conical, with the two keels winding round it, like the worm of a screw. Horns of females short, compressed, spiral.

Colour in summer rich reddish brown, in winter grey; hair of the body long, white at the base with brown tips, lower parts paler, sometimes whitish; carpus and tarsus with a dark stripe in front, tail dark brown. The young are greyish brown throughout, with a darker stripe down the back. Beard black in front, light grey behind, said in the young to be black throughout. Old males in summer look whitish throughout.

Dimensions. An old Gilgit male measured by Colonel Biddulph was 38·5 inches high, and 55 from between the horns to the root of the tail. Much longer dimensions are given by other writers. A skull measures 10 inches in basal length, 11·25 in extreme length, and 7·5 in orbital breadth. The length of the horns varies in different varieties.



Fig. 164.—Head of *C. falconeri*, Astor var. (Copied from the figure of the type in Hügel's 'Kaschmir'.)



Fig. 165.—Head of *C. falconeri*, Pir Panjál var. (Copied from Kinloch's 'Large Game Shooting'.)

Distribution. The Pir Panjál ranges south of Kashmir (not east of the Chenab) and the ranges of Baltistan, Astor, and Gilgit to the north. Hazára, and many of the hill ranges of Afghanistan, amongst others the Sulemán range as far south as Gendári Hill near Mithankot, also Takatu and Chehiltan near Quetta.

Varieties. Throughout the *Bovideæ* no species varies to so great an extent in the form of the horns as the markhor, and those who have seen but two or three varieties naturally regard them as belonging to distinct species. Four varieties are worthy of notice:—

1. The true *Capra falconeri* of Astor and Baltistan. (Fig. 164.)



This has massive horns forming a very open spiral, never exceeding $1\frac{1}{2}$ turns.

2. The Pir Panjal markhor. (Fig. 165.) The spiral is less open. The horns have from 1 to 2 turns of the spiral in fine heads. This race extends, I believe, to Hazara and Gilgit, but it passes into the last and the next by every possible gradation. A horn of this or the first variety is said to have measured 63 inches round the curve (starting at back of horn) and 14.75 in girth at the base. Good horns measure 36 inches straight from base to tip, and 45 to 50 round the curve.

3. True *C. megaceros* of Hutton, from near Cabul. (Fig. 166.) Horns almost straight, but still having a slight spiral. Hutton had a horn of this that measured 42 inches straight from base to tip and 44 round the (? front) curve; horns of 60 inches are said to occur.

4. The Sulemán race, for which the name of *C. jerdoni* was proposed by Mr. Hume. (Fig. 167.) Many, perhaps most horns of this

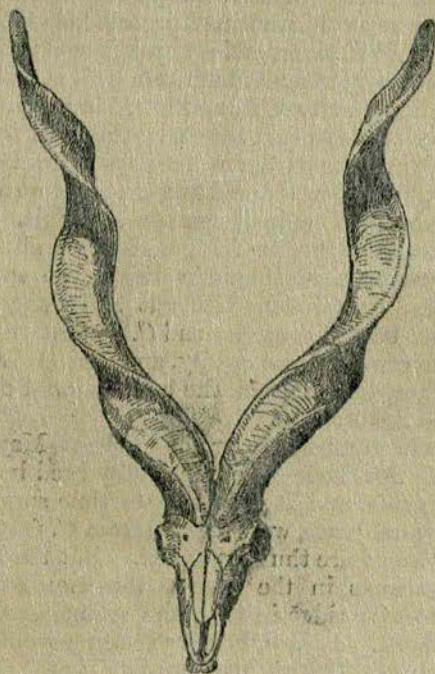


Fig. 166.—Head of *Capra falconeri*, Cabul var. (Copied from Hutton's figure of *C. megaceros*.)



Fig. 167.—Head of *Capra falconeri*, Sulemán var. (*C. jerdoni*, Hume). (Copied from Kinloch's 'Large Game Shooting'.)

race are absolutely straight and conical, with the two keels, anterior and posterior, wound spirally round, the curve of the spiral much sharper than in other varieties, so that in good horns there are two or three complete turns. Other heads, however, show a complete passage into the Cabul form. The longest recorded horns of the



Sulmān markhor were 36 inches in length straight and 49 round the curve (beginning behind), girth at base 10·5; the main ridge made $3\frac{1}{2}$ turns. This race is said to be considerably smaller than that of the Pir Panjāl and to have a less developed beard. In the extreme south, however, near Quetta, the horns again assume an open spiral.

The accompanying figures (pp. 506, 507) show the variation in the horns, but it must not be forgotten that intermediate varieties occur. It is true that heads from one locality are, as a rule, similar to each other, but when a series from various places is examined it appears to me impossible to draw a line between the different types.

Habits. These vary with the character of the ground. Kinloch says:—"Unlike ibex, which keeps to the rugged crags and steep ravines above the limit of the forest, the markhor delights in rocky forests, and although it occasionally comes out into the open glades, it seeks concealment as much as possible." Like other goats it generally occurs in herds, and keeps much to steep rocky cliffs. In Afghanistan, where forest is, as a rule, wanting, the markhor is found in stony ravines and on steep hill-sides, and is found in some places at a low elevation. Wherever it inhabits high ranges it is usually driven to the valleys when heavy snow falls, and Col. Biddulph, who has noticed that the sensitiveness to cold shown by this goat is due to its wanting the woolly underfur or pashm, so greatly developed in *Capra sibirica*, tells me that he once found and captured an adult male markhor, driven down by snow, in his garden at Gilgit.

The markhor is in appearance by far the grandest of all wild goats, and although it attains a considerable weight, no species excels it in agility and skill in climbing difficult and dangerous ground. Hutton, who had both this species and *C. agagrus* in captivity, gave the palm to the markhor for agility, and Mr. H. Little-dale, after hunting markhor, remarked on the heavier build of the ibex which he met with in Astor.

The young, one or two in number, are produced about May and June in Astor and Gilgit. Markhor have repeatedly bred in confinement with domestic goats, and it was at one time supposed that the tame races with spiral horns were derived from *C. falconeri*. It is not improbable that some are thus descended. But the spiral in tame goats is almost always in the reverse direction to that found in markhor, the anterior ridge in the tame animals turning inwards at first in each horn. I have, however, seen exceptions; there is one from Nepal in the British Museum.

Genus **HEMITRAGUS**, Hodgson (1841).

A small muffle. Mammæ 4 or 2. No suborbital, inguinal, nor interdigital glands. No beard. Males odorous.

Skull long and narrow, orbits scarcely projecting. Occipital plane flat, meeting the frontal at a right angle or rather less. Horns close together at the base, small (rarely exceeding 15 or 16 inches), not very much larger in males than in females, commencing



in the same plane as the forehead and curving backward, compressed, angulate in front. Otherwise as in *Capra*.

This genus is by many naturalists united to *Capra*, but appears fairly separable, the skull and horns differing greatly. The only two known species are Indian. Their habits are precisely those of goats.

Synopsis of Indian Species.

Horns flattened externally. Mammæ 4..... *H. jemlaicus*, p. 509.
Horns convex externally. Mammæ 2..... *H. hylocrius*, p. 511.

A fossil species, *H. sivalensis*, has been found in the Pliocene of the Siwaliks.



Fig. 168.—*Hemitragus jemlaicus*.

350. *Hemitragus jemlaicus*. *The Tehr or Tahr*.

Capra jemlahica, *Ham. Smith, Griffith's An. King.* iv, p. 308, pl. (1827); *Selater, P. Z. S.* 1886, p. 317; *W. Selater, Cat.* p. 146.

Capra jharal, *Hodgson, As. Res.* xviii, pt. 2, p. 129, pl. (1833); *id. P. Z. S.* 1834, p. 106; *id. J. A. S. B.* iv, p. 491.

Capra quadrinammis, *Hodgson, J. A. S. B.* iv, p. 710; v, p. 254.

Hemitragus quadrinammis vel jharal, *Hodgson, J. A. S. B.* x, p. 913.

Hemitragus jemlaicus, *Adams, P. Z. S.* 1858, p. 523; *Boyle, Cat.* p. 175; *Jerdon, Man.* p. 286; *Blanford, J. A. S. B.* xli, pt. 2, p. 40; *Lydekker, J. A. S. B.* xlvi, p. 286.

Tehr, Jehr, Western Himalayas; *Krás, Jagla*, Kashmiri; *Jhula* ♂, *Tahrni* ♀, Kunáwar; *Esbu*, Sutlej above Chini; *Kart*, Kulu, Chamba, &c.; *Jharal*, Nepal.

Hair on head short, on body longer, and on the neck, shoulders,



and breast so long in old males as to form a shaggy mane reaching to below the knees. Tail short, depressed, nude below; knees and breast callous. Four mammae.

Head long, face narrow and straight; nasals narrow. Horns almost touching or touching at the base, slightly wrinkled transversely, greatly compressed, flattened on each side, more rounded but still slightly flattened towards the base behind, strongly compressed and furnished with a distinct nodose keel in front, diverging from the base, curved sharply backwards, converging again a little at the tips.

Colour rich dark brown or reddish brown, old males much darker; the fur pale at the base, dark brown towards the ends. There is considerable variation in colour, some individuals of both sexes being very pale. The face and the front of all the limbs very dark, almost black in some; a dark band, indistinct in old males, down the back. The backs of the limbs pale or rusty red in males. Young animals are greyish brown; kids are said to be very pale.

Dimensions. Height of a male at shoulder 36 to 40 inches, nose to root of tail 4 ft. 8 in., tail without hair 3.25, with hair 7. Extreme length of skull 10.75, orbital breadth 5.4. Horns 12 to 15 inches long outside the curve; extreme measurement recorded 16.5, with a basal girth of 11.5. Females are much smaller, and the horns seldom exceed 10 inches in length.

Distribution. Throughout the Himalayas from the Pir Panjal to Sikkim (I have skins from the latter, obtained by Mr. Mandelli), in the higher forests.

Habits. Col. Kinloch's account is excellent. He says:—"The tahr is, like the markhor, a forest-loving animal, and although it sometimes resorts to the rocky summits of the hills, it generally prefers the steep slopes which are more or less clothed with trees. Female tahr may be frequently found on open ground; but old males hide a great deal in the thickest jungle. Nearly perpendicular hills with dangerous precipices, where the forest consists of oak and ringal cane, are the favourite haunts of the old tahr, who climb with ease over ground where one would hardly imagine that any animal would find a footing." He adds that tahr and markhor are found together on the Pir Panjal.

Like the true goats, tahr associate in herds, the males and females at times keeping apart. They rut in winter, and the females produce one kid as a rule in June or July, the period of gestation, according to Hodgson, being six months. But it is necessary to point out that Hodgson's information about this animal's habits was chiefly derived from his collectors and was not always correct. He, however, kept some individuals tame with a flock of tame goats, but, although they had free intercourse, no offspring was produced. He also states that in Nepal a hybrid was born between a male tahr and a female spotted deer, but the story must, I think, be erroneous.

The flesh of the female tahr is excellent, but that of old males is too rank for European tastes, though much relished by particular classes of natives.

351. *Hemitragus hylocrius*. *The Nilgiri wild Goat*.

Kemas hylocrius, *Ogilby*, *P. Z. S.* 1837, p. 81.

Capra (Ibex) warryato, *Gray*, *A. M. N. H.* x, p. 267 (1842).

Hemitragus hylocrius, *Blyth*, *J. A. S. B.* xxviii, p. 291; *id.* *Cat.* p. 175; *Jerdon*, *Mam.* p. 288.

Capra hylocrius, *Sclater*, *P. Z. S.* 1886, p. 318; *W. Sclater*, *Cat.* p. 146.

Warri-ádú, *Warri-átú*, Tam.; *Kard-ardu*, Can.; *Mulla-átú*, Mal.; *Ibex* of European sportsmen.

Hair short, thick, and coarse. A short stiff mane in males on the ridge of the neck and withers. Knees callous. The face slightly concave at the end of the frontals, nasals a little convex in front. Horns almost touching at the base and subparallel for some distance, then curved back and diverging slowly; they are transversely wrinkled, flat inside, convex outside, rounded behind, with a low compressed keel inside at the front. Mammæ two.

Colour dark yellowish brown, with a greyish tinge in females and young; a dark band down the back; lower parts paler. Old males are dark sepia-brown, almost black on the face and limbs; a broad band on each side of the face, and an area behind the eye grizzled and paler, fawn-coloured around the eye; a large area in the lumbar region and the legs grizzled white, the latter dark



Fig. 169.—Head of *H. hylocrius**.

brown in front, paler behind. The lumbar tract is almost white in very old animals, and from its being conspicuous at a distance adult males are known as "saddlebacks."

Dimensions. According to Col. Douglas Hamilton old males measure from 39 to 42 inches at the shoulder, nose to tail (straight) 50½, tail 3. Females measure up to 35 inches at the shoulder.

* I am indebted to Mr. R. A. Sterndale for making and sending to me the drawing from which this cut is taken.



Horns of males are 12 to 16 inches long round the curve; the largest recorded was 17 long and $9\frac{3}{4}$ in girth. Female horns are found 11 inches long and perhaps longer. Basal length of a male skull 9·7, extreme length 10·9, orbital breadth 4·9.

Distribution. Nilgiri and Anaimalai hills, in Southern India, and the Western Ghats from the Anaimalais to the neighbourhood of Cape Comorin, chiefly at elevations of 4000–6000 feet, but occasionally in suitable places at lower levels.

Habits. The haunts of the present species are similar to those of the tahr and of the true goats, but much more tropical. With the exception of an ibex on the higher mountains of Abyssinia, this is the only goat living south of the north temperate zone. The Nilgiri goat is found usually in herds of from 5 or 6 to 50 or 60 amongst the crags and rocky precipices that border the Nilgiris and other high ranges in the extreme south of India. It keeps above the forest and but rarely enters woods. I have more than once seen these animals feeding on the grassy hills at the top of the Kundahs west of the Nilgiris, but their usual haunts are the grassy slopes and precipitous crags on the edges of the plateau; they feed on the former in the mornings and evenings, and rest on ledges amongst the cliffs during the day. They are quite as wary and sharp-sighted as tahr or markhor, and just as nimble and alert on precipitous ground. An old doe, as with other goats, usually acts as sentinel to the herd, and they always appear to suspect danger from below and not from above. Many are killed by leopards, a few by tigers, and probably some by wild dogs.

The old male has the usual strong odour of goats, and his flesh is rank and unpalatable; that of does and young males is excellent. The breeding-season appears to extend throughout a great part of the year, kids being found with the herds, according to Col. Douglas Hamilton, in most months. The female is said to produce two young at a birth.

Genus **NEMORHÆDUS**, Ham. Smith (1827).

Syn. *Capricornis*, Ogilby (1836).

Tail short, hairy. Suborbital glands present, and opening by a small circular orifice; a large but shallow lachrymal fossa. Interdigital glands on all feet. No inguinal glands. A naked muffle. Mammaræ 4.

Facial and parietal regions of skull not separated by an angle, but slightly rounded; occipital plane forming an obtuse angle with the parietal region. Orbits not projecting, the zygomatic arches wider than the orbits. Nasals more or less truncated behind, articulating with the maxillaries for a long distance. Horns in both sexes scarcely differing in size, short, conical, closely ringed, the rings small, rather irregular, and broken by longitudinal striae. The direction of the horns is at first nearly continuous with the facial plane, then slightly curved backwards.



This genus is peculiar to South-eastern and Eastern Asia. Two species occur within Indian limits. The others are *N. swinhoei* from Formosa, and *N. crispus* from Japan, both small, about the size of the goral.

Synopsis of Indian and Burmese Species.

Legs white or grey near the feet	<i>N. bubalinus</i> , p. 513.
Legs rufous	<i>N. sumatrensis</i> , p. 514.

**352. *Nemorhædus bubalinus*. *The Himalayan Goat-antelope*
*or Serow.***

Antilope bubalina, Hodgson, *P. Z. S.* 1832, p. 12; *id. Gleanings Sc.* iii, p. 122.

Antilope thar, Hodgson, *Gleanings Sc.* iii, p. 324 (1832); *id. P. Z. S.* 1833, p. 105, 1834, p. 86; *id. J. A. S. B.* iv, p. 489.

Capricornis thar, Ogilby, *P. Z. S.* 1836, p. 139.

Nemorhædus proclivus vel thar, Hodgson, *J. A. S. B.* x, p. 913 (1841).

Capricornis bubalina, Adams, *P. Z. S.* 1858, p. 522; Blyth, *Cat.* p. 174.

Nemorhædus bubalina, Jerdon, *Mam.* p. 283; Blanford, *J. A. S. B.* xli, pt. 2, p. 40; Anderson, *An. Zool. Res.* p. 335.

Nemorhædus bubalinus, W. Sclater, *Cat.* p. 149.

Sardo, N.W. Himalayas; *Rāmu*, Halj, *Sālābhir*, Kashmir; *Goa*, *Chamba*; *Aimu*, Kunāwar; *Yamu*, Kulu; *Thar*, Nepal; *Gya*, Bhotia of Sikkim; *Sichi*, Lepcha.

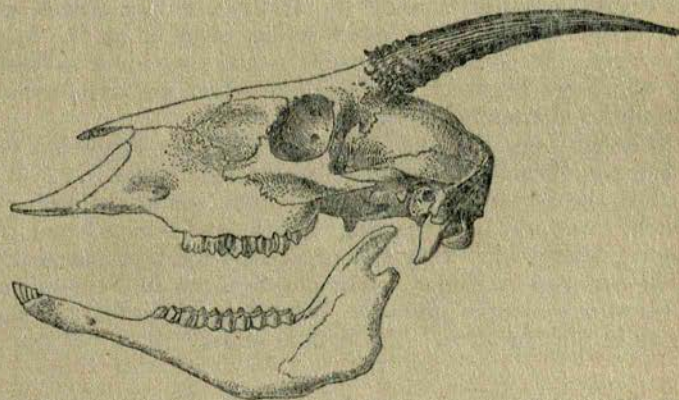


Fig. 170.—Skull and horns of *Nemorhædus bubalinus*.

Form heavy, head large. Ears large. Hair coarse, rather thin, of moderate length; a crest of rather longer hair from the nape to the withers; no underfur.

Colour black or dark grey above, somewhat grizzled owing to the hair being whitish at the base; head and neck black. The black passes into rusty red on the sides, buttocks, thighs, forearms, chest, and throat; abdomen, inside of thighs, and lower part of all



legs dirty white; inside of ears, chin in front and at the sides, also white. A black line down the back cannot always be distinguished. Horns black.

Dimensions. An adult male measured: height at shoulder 37 inches, length of head $11\frac{1}{2}$, horns to root of tail 49, tail with hair $6\frac{1}{2}$, without $3\frac{1}{4}$, total length 67, ear $7\frac{3}{4}$, girth of body 38 (*Hodgson*). Basal length of skull 10.5, zygomatic breadth 4.9; horns in male 9 to 10 long, 5 to 6 in girth, maximum recorded 13.5 and 6.5 in males, 8.75 and 4.75 in females. Weight over 200 lb.

Distribution. Throughout the Himalayas from Kashmir to the Mishmi hills at elevations between 6000 and 12,000 feet. Also obtained by Anderson in Yunnan.

Strictly, the specific name *thar* has priority over *bubalinus*, having been published earlier in 1832 (in the first notice of the "bubaline antelope" published in the 'Gleanings in Science' no Latin name was given), but as the term *thar* or *tahr* is commonly applied to *Hemitragus jemlaicus* its employment for the serow would lead to confusion. The use of native names for animals is generally to be avoided; thus the term Saráo or Sará, used in parts of the Himalayas for the present species, is applied in the Suliman range to *Capra falconeri* and in Sind to *C. aegagrus*, whilst in the Sutlej valley it is used for the goral.

Habits. Kinloch says:—"The serow has an awkward gait, but in spite of this it can go over the worst ground, and it has, probably, no superior in going down steep hills. It is a solitary animal, and is nowhere numerous." It is generally found in thick forest, but often on rocky hill-sides, and "its favourite resting places are in caves, under the shelter of overhanging rocks or at the foot of shady trees. It constantly repairs to the same spot, as testified to by the large heaps of its droppings which are to be found in the localities above alluded to."

"Although very shy and difficult to find, the serow is a fierce and dangerous brute when wounded and brought to bay"... "When disturbed the serow utters a most singular sound, something between a snort and a screaming whistle, and I have heard them screaming loudly when they had apparently not been alarmed."

Hodgson says a single young one is born in September or October after 8 months' gestation, but Adams states that the young are born in May or June. The flesh is coarse.

353. *Nemorhædus sumatrensis.* The Burmese Goat-antelope.

Antelope *sumatrensis*, Shaw, Gen. Zool. ii, pt. 2, p. 354 (1801); Raffles, Tr. L. S. xiii, p. 266.

Antelope (*Nemorhædus*) *sumatrensis*, Ham. Smith, Griffith's An. King. iv, p. 277 (1827).

Nemorhædus sumatrensis, Cantor, J. A. S. B. xv, p. 272; Beavan, P. Z. S. 1866, p. 4; W. Selater, Cat. p. 150.

Capricornis sumatrensis, Gray, P. Z. S. 1850, p. 135; Blyth, Cat. p. 174; id. Mam. Birds Burma, p. 46; Bock, P. Z. S. 1879, p. 308.

Capricornis rubida, Blyth, Cat. p. 174.



Capricornis milne-edwardsii, David, *Nouv. Arch. Mus.* v, p. 10 (1869).
Antelope (Nemorhædus) edwardsii, M.-Edw. *Rech. Mam.* p. 364,
pls. lxxii, lxxiii.

Nemorhædus edwardsii, Anderson, *An. Zool. Res.* p. 335.

Tau-tshick, Burmese (*Tau-myin* in Pegu); *Kambing-ûtan*, Malay.

This appears only to differ from *N. bubalinus* in being more rufous. The present species is said to be smaller, but there is very little, if any, difference in size.

Colour varying from rufous-brown to black, the black sometimes with a white nape. A black dorsal stripe in brown examples. Legs always rufous from the thigh and forearm downwards.

Dimensions. An adult female from near Moulmein measured in height at the shoulder $34\frac{1}{2}$ inches, from nose to root of tail 49, tail without hairs 5, with hair 7, girth of body 34, ear $8\frac{3}{4}$ (Beavan). Basal length of a large female skull 10.5, extreme length 11.25, zygomatic breadth 4.9. Horns 8 to 9.5 long.

Distribution. From the Eastern Himalayas, Moupin, and Yunnan to Sumatra, throughout the Assam Hills, Burma, Siam, and the Malay Peninsula, on hills. An animal intermediate in colour between *N. sumatrensis* and *N. bubalinus* was killed by Col. Kinloch near Darjiling, whilst *N. bubalinus* inhabits the interior of Sikhim.

I am far from satisfied that this goat-antelope and *N. bubalinus* are really distinct, or, if they are, whether the Arakan *N. rubidus* belongs to the present form. I follow Blyth in uniting *N. rubidus* and *N. sumatrensis*, but *N. swinhoei* from Formosa, also united by Blyth, is a perfectly distinct species. The habits of *N. sumatrensis* resemble those of *N. bubalinus*, but the former inhabits less elevated ground.

A very remarkable animal, *Budorcas taxicolor*, the *Takin* of the Mishmis, is found on ranges within sight of Upper Assam, but not within our limits. It has been well described by Hodgson (*J. A. S. B.* xix, p. 65, pls. i-iii; see also M.-Edw. *Rech. Mam.* p. 367, pls. lxxiv-lxxix, and Hume, *P. Z. S.* 1887, p. 483). It is a heavily-made animal, much larger than a Serow, with stout limbs, large hoofs to the lateral digits, a short tail like a goat's, a large head, convex profile, and thick horns in both sexes, arising close together in males and curving outwards at first, then making a sharp turn and pointing backwards; whilst in females, according to Hume, the horns arise further apart and curve outwards and then backwards without any sharp twist. According to other writers, female horns resemble those of males in shape, but are smaller. Colour of the body varying from yellow dun to deep reddish brown mixed with black; head always black. Length from snout to vent $6\frac{1}{2}$ feet, height at shoulder $3\frac{1}{2}$, tail 3 inches long; skull 18 long and $7\frac{3}{4}$ wide, horns 20 to 24 long in males, 12 in females, girth of each 9 to 10. *Budorcas* is found in herds or singly at high elevations in the Mishmi hills and Eastern Tibet, and is probably one of the peculiar Tibetan types like *Pantholops*; it is evidently, like *Nemorhædus*, allied to both goats and antelopes; I can not see the bovine affinities attributed to it.

Genus **CEMAS**, Ogilby (1836).

Syn. *Kemas*, Ogilby; *Nemorhædus*, auct., nec H. Smith; *Urotragus*, Gray.

No suborbital glands nor lachrymal fossæ. Interdigital glands present. No inguinal glands. A naked muffle. Mammæ 4.

The parietal and facial regions of the skull meet at an obtuse angle. Orbits somewhat more prominent than in *Nemorhædus*. Nasals very short, pointed or convex behind, separated by a fissure from the maxillaries. Horns short, of nearly equal size in the two sexes, conical, curved backwards, ringed closely except at the tip, the rings rather irregular and wavy, slightly broken up by longitudinal striæ.

This genus has generally been united to *Nemorhædus*, but I think Ogilby, Hodgson, and Gray were right in separating it, the shape of the skull being very different. The species are Palearctic, and range from the Himalayas to North China. Only one is found within Indian limits; the others are *C. cinerea* and *C. grisea* from E. Tibet, and *C. caudata* from Northern China.

354. **Cemas goral.** *The Goral.*

Antelope goral, *Hardwicke, Tr. L. S.* xiv, p. 518, pl. xiv (1825).

Antelope (*Nemorhædus*) goral, *Hodgson, P. Z. S.* 1834, p. 85; *id. J. A. S. B.* iv, p. 488.

Kemas goral, *Ogilby, P. Z. S.* 1836, p. 138; *Hodgson, J. A. S. B.* xvi, p. 697.

Nemorhædus goral, *Horsfield, Cat.* p. 168; *Adams, P. Z. S.* 1858, p. 523; *Blyth, Cat.* p. 175; *Jerdon, Mam.* p. 285; *Blanford, J. A. S. B.* xli, pt. 2, p. 40; *Butler, J. A. S. B.* xlv, pt. 1, p. 332; *Lydekker, J. A. S. B.* xlvi, pt. 2, p. 286; *W. Selater, Cat.* p. 148.

Goral, N.W. Himalaya; *Pij, Pijur, Rai, Rom*, Kashmir; *Sák, Sár*, Sutlej Valley; *Suh-ging*, Lepcha; *Ra-giyu*, Sikkim Bhotia; *Deo Chágal*, Assam.

Form goat-like. Limbs stout. Horns subparallel, scarcely diverging. Hair rather coarse, with a little woolly underfur; a very small crest of longer hair on the back of the neck and around the horns.

Colour brown, more or less rufous or greyish, but little paler below. Face paler and rufescent, darker near the horns. A black line down the back from the nape to the tail, which is also black, a dark line down the front of each leg, remainder of carpus and tarsus rufous brown. Throat white. Horns black.

Dimensions. Height at shoulder 27 inches, length exclusive of tail 50 (*Hodgson*); tail 4 according to *Jerdon*. Extreme length of skull 8.25, breadth across orbits 3.85. Horns of males 6 to 8 inches long, of females less; maximum length and girth recorded in males 9.75 and 4, in females 7.75 and 2.5.



Distribution. Himalayas, at moderate elevations between 3000 and 8000 feet, from Kashmir to Bhutan. Not common in the Siwalik hills according to Kinloch. According to Captain Butler this species is found in the Naga hills, south of Upper Assam.

Habits. It is difficult to improve upon Jerdon's account. He says the goral "usually associates in small parties of from four to eight or so, and frequents rugged grassy hills or rocky ground in the midst of forest. If one goral is seen, you may be pretty certain that others are not far off, and they rarely or never forsake their own grounds. If cloudy they feed at all hours, otherwise only morning and evening. When one is alarmed it gives a hissing snort, which is answered by all within hearing." The few I have seen were in pairs, but this may have been due to the time of year—September. Old males, according to Kinloch, are generally solitary.

According to Hodgson the period of gestation is six months, and the young, usually single, is born in May or June. The goral is one of the best known Himalayan animals; it cares but little for the neighbourhood of man, and is frequently found near hill-stations.

Genus **BOSELAPHUS**, Blainville (1816).

Syn. *Portax*, H. Smith (1827).

Tail long and tufted. Hind limbs shorter than fore, withers very high. Suborbital gland small; no lachrymal fossa. Interdigital glands present. No inguinal glands. Muffle large, bovine. A mane on the back of the neck in both sexes, and a tuft of hair on the throat of the male.

Frontals and parietals almost in one plane, forming a right angle with the occipital. Molars very hypsodont, a large accessory column in those of the upper jaw. Females hornless; horns in males arising a little distance apart, just behind the orbit; they are short, smooth, pointed, directed upwards and backwards, nearly straight, subconical above, triangular at the base, with the posterior side flat, and a ridge in front, which in old animals runs forwards and inwards at the base till the horns almost touch.

This is the only surviving genus in Asia of the Tragelaphine antelopes, comprising eland, kudu, &c. There is but a single living species, peculiar to India. A closely allied fossil form, *B. namadicus*, occurs in Indian Pleistocene and Pliocene beds.

355. *Boselaphus tragocamelus*. *The Nilgai or blue bull.*

Antilope tragocamelus, Pallas, *Spic. Zool.* i, p. 9 (1767), xii, p. 13.

Antilope picta, Pallas, *Spic. Zool.* xii, p. 14 (1777); Sykes, *P. Z. S.* 1831, p. 105.

Damalis risia, H. Smith, *Griffith's An. King.* iv, p. 363 (1827); Elliot, *Mad. Jour. L. S.* x, p. 226.



- Portax tragocamelus*, *Adams, P. Z. S.* 1858, p. 523; *Blyth, Cat.* p. 165.
Portax picta, *Horsfield, Cat.* p. 170; *Jerdon, Mam.* p. 272.
Boselaphus tragocamelus, *W. Sclater, Cat.* p. 154.

Nil, Nilgao ♂, Nilgai ♀, *Rojh, Roz, Rojra*, H.; *Rū-i*, Dakhani, Mahr., Guj., &c.; *Gūraya*, Gond; *Murim* ♂, *Susam* ♀, Ho Kol; *Māmī-potū*, Tam.; *Mairu*, *Maruvi*, *Kard-kadrai*, Can.

General form somewhat equine; neck deep and compressed. Tail reaching hocks.

Colour of adult male dark grey, varying from bluish to brownish grey throughout, except the mane, throat tuft, terminal half of the ear outside and two spots inside, and the tip of the tail, which are black, and a patch on the throat, two spots on each cheek, the lips, chin, inside of the ears, except the two black spots, the lower surface of the tail, the abdomen, and a ring above and another below each fetlock, which are white. Females and young males brown. Horns black.

Dimensions. Male usually 52 to 56 inches (13 to 14 hands) high at the shoulder, but 58 inches is said by McMaster to have been measured; length from nose to rump $6\frac{1}{2}$ to 7 feet, tail 18 to 21 inches, ear 7. Basal length of a male skull 15·3; orbital breadth 5·85. Females considerably smaller. Horns are usually 8 to 9 inches long and 8 in girth at the base, maximum recorded measurements 11·75 and 9·5.

Distribution. The Peninsula of India from the base of the Himalayas to the south of Mysore; not in Ceylon, nor, I believe, near the Malabar coast in the Madras Presidency, although the nilgai inhabits the Konkan near Bombay. It is common in parts of the Eastern Punjab, the North-west Provinces, Guzerat and the Central Provinces, rarer to the southward. It is not found in Eastern Bengal, Assam, nor anywhere east of the Bay of Bengal, nor does it range to the Indus on the west.

Habits. Thin bush with scattered low trees or alternations of scrub and open grassy plains are the usual haunts of this animal; it is found either on level or undulating ground or on hills. It is rarely met with in thick forest, though it may often be found on cultivated plains, where it does much damage to crops.

Males are often solitary, but they occasionally associate in herds, and I have seen as many as a dozen old blue bulls together. Females and young, sometimes accompanied by one or more old males, are found usually in small parties of from four to ten, though sometimes in herds of 15 to 20 or more. Nilgai feed a good deal throughout the day, and care but little for sun, though they lie down at times in shade. They both graze and browse, feeding on the leaves of ber (*Zizyphus*) and other trees, and, according to Sterndale, they devour quantities of the acrid fruits of aonla (*Phyllanthus*). He also says that they drink daily, but this does not correspond with my observations. So far as I could ascertain, in the cold season they only drink at intervals of two or three days. They keep much to the same ground, and their haunts may



be recognized by their droppings, which they are in the habit of repeatedly depositing in the same spot, until considerable accumulations are formed.

The pace of the nilgai when alarmed is a heavy gallop. It requires a good horse to catch the bull, which has, however, been not unfrequently run down and speared, but he must be pressed at first. The cow, Kinloch says, cannot be run down by a single rider, and I never heard of one being speared. Few sportsmen care about shooting nilgai, and in some places they become very tame, as they are generally protected by Hindus, who regard them as a kind of cow.

Nilgai are easily tamed, but the males are sometimes savage in confinement. Tame individuals have been taught to draw light carriages, and Sterndale relates that he trained one to carry a load and to be ridden. They have bred in confinement in Europe, and the period of gestation was found in the Regent's Park Zoological Gardens to be between 8 and 9 months (P. Z. S. 1863, p. 230). One or very often two young are produced. The flesh of the nilgai is fairly good, though inferior to that of most Indian wild *Bovidae*.

Genus **TETRACERUS**, Leach (1825).

Size small. A muffle present. An elongate suborbital gland; interdigital glands confined to the hind feet. No inguinal glands. Hoofs small, rounded in front. Tail short. Mammaræ 4.

Frontal and parietal profile of skull slightly and gently rounded, the occipital meeting the parietal at a right angle. Lachrymal fossa large. Horns in the male only, usually 4 in number in adults; all the horns short, conical, smooth, the posterior pair much longer than the anterior, which are situated between the orbits, are often mere knobs and are not unfrequently wanting. Jerdon's statement that there are canines in the males is a mistake.

There is a single species peculiar to India. This is the only Indian representative of the Cephalophine antelopes of Africa or Duikerboks. Remains of *T. quadricornis* are found fossil in the Pleistocene cave-deposits of Kurnool, and a small Siwalik ruminant is referred to this genus.

356. *Tetracerus quadricornis*. *The four-horned Antelope*.

Antelope (Cervicapra) quadricornis, Blainville, *Bull. Soc. Philom.* 1816, p. 78.

Antilope chickara, Hardwicke, *Tr. L. S.* xiv, p. 530, pls. xv, xvi (1825); Hodgson, *J. A. S. B.* i, p. 346.

Antilope sub-4-cornutus, Elliot, *Mad. Jour. L. S.* x, p. 225, pl. iv, fig. 2 (1839).

Tetracerus chickara, Blyth, *J. A. S. B.* xi, p. 451.

Tetracerus quadricornis, Gray, *List Mam. B. M.* p. 159; Blyth, *J. A. S. B.* xvi, p. 879, xvii, p. 561; *id.* *Cat.* p. 165; Horsfield, *Cat.* p. 167; Adams, *P. Z. S.* 1858, p. 522; Jerdon, *Mam.* p. 274; Blanford, *J. A. S. B.* xxxvi, p. 196; W. Selater, *Cat.* p. 168.



Tetracerus chickara, quadricornis, subquadricornutus, iodes, *and* paccerois, *Hodgson, Calc. Jour. N. H.* viii, pp. 89, 90 (1847); *id. J. A. S. B.* xvi, p. 695.

Tetracerus subquadricornutus, *Gray, P. Z. S.* 1850, p. 117; *Sclater, P. Z. S.* 1875, p. 527.

Chousingha, *Chouka*, *Doda*, H.; *Benkra*, Mahr.; *Bhokra*, *Phokra*, Gujr.; *Bhirki*, at Saugor; *Bhir*, Gond; *Bhirul*, Bheel: *Kotari*, Chutia Nagpur; *Kurus*, Gonds of Bastar; *Konda-gori*, Tel.; *Kondguri*, *Kaulla-kuri*, Can.; commonly in the Deccan *Jangli bakri*.

Fur thin, harsh, and short. Tail above with longer hair than on the body.

Colour dull pale brown, with a more or less rufous tinge above, passing gradually on the sides and limbs into the white of the lower parts. A dark stripe down the front of each leg, broadest on the fore limbs; muzzle and ears outside also dark. A dark stripe down the back in some specimens, probably young.

Dimensions. Height of a male at shoulder $25\frac{1}{2}$ inches, at croup 27; length from muzzle to rump 42, tail (? without hair) 5, ear $4\frac{1}{4}$. Weight 43 lb. Females are rather smaller. Basal length of a large male skull 6.5, orbital breadth 3.2. The posterior horns are usually 3 to 4 inches long, the anterior 1 to $1\frac{1}{2}$; maximum recorded lengths 4.5 and 2.5.

Distribution. Along the base of the Himalayas from the Punjab to Nepal, and probably in most parts of the Peninsula where the country is wooded and hilly, but not in dense jungle. The four-horned antelope is not found in the Gangetic plain nor on the Malabar coast in the Madras Presidency. It is said by Mr. Murray to be found in Sind; it is common in the wooded parts of Rajputana, throughout the Bombay Presidency, the Central Provinces, and the northern parts of Madras, less abundant to the eastward in Chhattisgarh, Chutia Nagpur, Bengal, and Orissa, and to the southward in Mysore, but it occurs in the latter State occasionally, and has been observed on the Nilgiri and Palni hills. It is unknown in Ceylon and east of the Bay of Bengal. In jungle this species and hog-deer (*Cervus porcinus*) may easily be mistaken the one for the other, and some recorded localities of the latter may be due to this circumstance.

Varieties. In the Madras Presidency the anterior horns are said to be but rarely developed, and certainly fully adult animals occur without any, and with only small projections on the skull. But I can see no other difference; the skulls, whether the anterior horns are developed or not, are precisely similar in form and scarcely differ in size. In the case of a male that I obtained young in Nimar and that was kept alive by a friend in Bombay, the anterior horns did not appear till the third year, although the posterior horns were well developed early in the second. Doubtless many of the two-horned individuals seen are young. Blyth (*J. A. S. B.* xvii, p. 560) came to the conclusion that the two-horned form is merely a variety; and after reading all that has been written by McMaster and Sterndale on the subject, I agree with him.



Habits. This species differs from all other Indian antelopes in habits as much as in structure. It is not gregarious, very rarely are more than two seen together; it haunts thin forest and bush, and keeps chiefly to undulating or hilly ground. It drinks daily, and is never seen far from water. It is a shy animal, and moves with a peculiar jerky action, whether walking or running. The rutting-season is in the rains, and the young, one or two in number, are born about January or February, the period of gestation being, according to Hodgson, six months. The placentation has been described by Mr. Weldon (P. Z. S. 1884, p. 2). The present species, according to Elliot, has the habit of depositing its dung repeatedly in one spot. This does not agree with my experience.

The name *Chinkara* has been applied to this animal in error. The flesh is said to be dry, but I have often eaten it and found it better than that of most Indian deer, though not equal to antelope or gazelle. When taken young this antelope is easily tamed.

Genus ANTILOPE, Pallas (1767).

Size moderate. Tail short, compressed. Large suborbital glands with a linear opening. Interdigital glands large in all feet. Inguinal glands large. No muffle, Mammæ 2. Hoofs pointed. A tuft of long hair on each knee (carpus).

Skull with prominent orbits; the frontal profile rounded off into the parietal, which meets the occipital at an obtuse angle. Supra-orbital foramina of frontals large, a small lachrymal fissure and large lachrymal fossa. Horns in the male only, arising near together, cylindrical, spiral, diverging, ringed throughout, the rings subdistant, closer together near the skull, blunt, extending all round the horns.

A single species peculiar to India. The horn-cores are found fossil in the Pleistocene Jumna beds.

357. *Antelope cervicapra.* *The Indian Antelope or black Buck.*

Capra cervicapra, L. *Syst. Nat.* i, p. 96 (1766).

Antelope cervicapra, Pallas, *Spic. Zool.* i, p. 19, pls. i, ii (1767); Gray & Hardw. *Ill. Ind. Zool.* i, pls. xii, xiii; Bennett, P. Z. S. 1836, p. 34; Elliot, *Mad. Jour. L. S.* x, p. 222; Hutton, J. A. S. B. xv, p. 150; Blanford, J. A. S. B. xlv, pt. 2, p. 18; Ball, P. A. S. B. 1877, p. 171; W. Sclater, *Cat.* p. 162.

Antelope bezoartica, Gray, P. Z. S. 1850, p. 117; Blyth, *Cat.* p. 171; Jerdon, *Mam.* p. 275; Blanford, J. A. S. B. xxxvi, pt. 2, p. 196; Stoliczka, J. A. S. B. xli, pt. 2, p. 229.

Ena ♂, *Harina*, Mirga, Sanser; *Haran*, *Harna* ♂, *Harni* ♀, *Kalwit* ♀, *Mrig*, H.; *Kala* ♂, *Goria* ♀, Tirhoot; *Kalsar* ♂, *Baoti* ♀, Behar; *Bureta*, Bhagalpur; *Báránt*, *Sásin*, Nepal; *Alali* ♂, *Gandoli* ♀, Baori; *Bádú*, Ho Kol; *Bámáni-haran*, Uria and Mahr.; *Phandayat*, Mahr.; *Kutsar*, Korku; *Veli-man*, Tam.; *Irri* ♂, *Ledi*, *Jinka*, Tel.; *Chigri*, *Hulé-kara*, Can.

The horns vary in divergence and in closeness of spiral; in some



the points are not more than 7 inches apart, in others as much as 20, irrespective of length; the turns of the spiral in adults vary from less than 3 to 5. Horned females are occasionally, but very rarely, met with; I once saw one, near Nágpur. In these the horns curve back, more or less, from the head.

Colour of does and young bucks yellowish-fawn above and on the outside of the limbs, lower parts white, the two colours sharply divided; a distinct pale lateral band a little above the line of division. Old bucks are blackish brown above, becoming almost black in very old animals, except on the nape, which remains brownish rufous, whilst the sides and front of the neck, and also the face except a white area round each eye, are blackish brown. The pale lateral band disappears in old males.

Dimensions. Height at shoulder about 32 inches; length of head and body 4 feet, tail 7 inches, weight about 90 lb. Basal length of a male skull 8·6; breadth across orbits 4·1. Horns of adults are usually 16 to 20 inches long, measured in front straight from base to tip; in the Peninsula they rarely exceed 22 inches. The longest horns are met with in Rajputana and Hurriana, where 28·75 inches has been recorded. Largest observed girth at base 6·25.

Distribution. India from the base of the Himalayas to the neighbourhood of Cape Comorin (the southernmost locality known to me is Point Calimere), and from the Punjab to Lower Assam, in open plains, not in Ceylon nor east of the Bay of Bengal. Not found on hills nor in thickly wooded tracts, and wanting throughout the Malabar coast south of the neighbourhood of Surat. The statement that this antelope is not found in Lower Bengal is not quite correct; none are found in the swampy Gangetic delta, but many exist on the plains near the coast in Midnapore (I have shot them near Contai), as they also do in Orissa. Antelopes are most abundant in the North-west Provinces, Rajputana, and parts of the Deccan, but are locally distributed and keep to particular tracts.

Habits. Open plains of short grass, level or undulating, and cultivated land are the usual haunts of the Indian antelope, which is generally found in herds; these are sometimes extremely numerous, and comprise occasionally several thousand animals of both sexes and all ages; but more often small herds of does, generally 10 to 30 in number, but sometimes as many as 50, are met with, attended by a single black buck, which does not always accompany the females. Very often two or three younger bucks coloured like the does remain with the latter; but these young males are sometimes driven away by older bucks, and form separate herds. This antelope never enters forest nor high grass, and is but rarely seen amongst bushes. Where not much pursued or fired at, it will often allow men to come in the open within about 150 yards, sometimes nearer. Of country-carts, bullocks, or coolies carrying loads, it often takes but little notice at half that distance.



Like most animals of open plains, the Indian antelope appears to have no particular hours for feeding, though it generally rests in the middle of the day. I cannot say it never drinks, for I have been assured by several people that it does, but I cannot help suspecting that its visits to the neighbourhood of water are for the purpose of feeding on the fresh grass to be found there. That it can exist without ever drinking is proved by its abundance between the salt Chilka Lake in Orissa and the sea, on a spit of sand 30 miles long, where the only drinking-water is from a well.

The speed and endurance of the antelope are well known. Col. W. Campbell, in 'My Indian Journal,' relates how his brother, on a fast Arab horse, once ran down and speared a buck near Dharwar, but the feat has not often been repeated. Wounded antelope are often ridden down, but sometimes require a good horse to catch them. I was once completely beaten on fair ground by a buck with a broken fore-leg, but I was on a horse that, although speedy, had but little endurance. Jerdon says: "Very rarely good greyhounds have pulled down this antelope unwounded on ordinary ground; but there are at least three localities where this coursing used to be practised successfully." The localities were on heavy sand at Pooree in Orissa and at Sirsa in the Punjab, and on fine pasture land at Point Calimere, south of Trichinopoly. Jerdon adds that on soft ground, during the rains, antelope are easily caught by good dogs. He also says: "Greyhounds are very keen after a wounded antelope, and occasionally get savage and fight over it when pulled down." This is confirmed by McMaster.

The Indian antelope, like the South-African springbok (*Gazella eunchores*), has the habit of occasionally springing into the air, all the members of a herd generally bounding, one after the other. This is done, as Sir W. Elliot has shown, before they are much frightened, and when the herd is first moving off. When at speed the gallop is like that of any other animal.

Occasionally these antelopes conceal themselves in grass or cultivation, and wounded animals not unfrequently hide. Young fawns, too, are generally concealed by the mothers. The only sound I have ever heard the buck utter is a peculiar grunt that he makes when excited; the females have a hissing alarm note, according to Forsyth. Like most other Indian antelopes, they deposit their dung repeatedly on the same spot.

Like most antelopes, and indeed ruminants in general, this species is easily tamed, if captured young. Many used to be taken in nets or in snares, and one native method of capturing the bucks was to send a tame black buck with nooses attached to his horns into the herd, and to seize the wild one when entangled in the fight which inevitably ensued. The bucks are greatly given to fighting. "The rutting-season," says Mr. Elliot, "commences about February or March, but fawns are seen of all ages at every season. During the spring months the buck often separates a particular doe from the herd, and will not suffer her to join it again, cutting her off and intercepting every attempt to mingle with the rest. The two are often



found alone also, but on being followed always rejoin the herd." A buck may frequently be seen chasing one particular doe. I cannot find the period of gestation recorded.

The flesh of the Indian antelope is excellent.

Genus **PANTHOLOPS**, Hodgson (1834).

Tail short. No suborbital glands. Large interdigital glands in all feet. Inguinal glands very large. No muffle. The muzzle peculiarly swollen in the male; nostrils large and furnished inside with extensive sacs. Mammæ 2.

Skull with very prominent orbits directed forwards; premaxillæ long, narial opening large; the frontal region gently rounded off into the parietal; occiput nearly at right angles to parietal region. No horns in females. Horns of male long, erect, arising near together, very slightly curved, sublyrate, greatly compressed laterally, ringed subdistantly in front but not behind.

Only one species exists, and this is peculiar to the Tibetan plateau, where remains of an allied form have been found fossil.

358. *Pantholops hodgsoni*. *The Tibetan Antelope*.

Antelope hodgsonii, *Abel, Phil. Mag.* lxxviii, p. 234 (1826); *id. Edinb. Jour. Sci.* vii, 1827, p. 164; *Hodgson, Gleanings Sc.* ii, p. 348, pls. iii, iv; *id. P. Z. S.* 1831, p. 52; *id. J. A. S. B.* i, p. 59, pl. iv; iii, p. 134.

Antelope (Oryx) kemas, *H. Smith, Griffith's An. King.* v, p. 196 (1827).

Antelope chiru, *Lesson, Man. Mam.* p. 371 (1827).

Pantholops hodgsonii, *Hodgson, P. Z. S.* 1834, p. 80; *Adams, P. Z. S.* 1858, p. 521; *Blanford, Yark. Miss., Mam.* p. 89, pl. xvi; *W. Slater, Cat.* p. 163.

Kemas hodgsonii, *Gray, List Mam. B. M.* 1843, p. 157; *Horsfield, Cat.* p. 166; *Blyth, Cat.* p. 173; *Blanford, J. A. S. B.* xli, pt. 2 p. 39.

Tsüs ♂, *Chus* ♀, *Chiru*, *Chuhai*, Tibetan.

Fur very thick and close, erect, very woolly near the skin. Hoofs pointed.

Colour very pale fawn (light rufous brown) above, the hair pinkish (or, according to Hodgson, slaty grey) towards the base, white below. The whole face and a band down the front of each leg dark brown or black in males; females have no black marks.

Dimensions. A male was 32 inches high at the shoulder, 50 in length from nose to rump, tail with hair 9, ear $5\frac{1}{2}$, girth of body 39 (*Hodgson*). The corresponding dimensions in a female were 27.5, 50 (over curves), 7, 5.8, and 35 (*Stoliczka*). A male skull is 9.8 in basal length, and 4.6 in orbital breadth. Horns are 24 to 26 inches long, exhibiting very little variation, and 5.5 to 6 in girth at the base, maximum recorded dimensions being 27.5 and 6.5.



Distribution. Probably throughout the Tibetan plateau, from 12,000 to 18,000 feet elevation. Found in Northern Ladak, north of Kumaun, north of Sikkim, and also in Northern Tibet.

Habits. The Tibetan antelope is shy and wary. It is sometimes seen solitary or in small parties of three or four, sometimes in large herds, which are said at times to consist of hundreds. The sexes live apart in summer, and Kinloch, who has given a good account of this animal's habits, says he never saw a doe in Changchenmo, where bucks are not rare. This antelope keeps to the plains and open valleys, feeding morning and evening on the patches of grass, especially those on the banks of streams, and lying down during the day on the flats, in which, Kinloch says, it excavates hollows deep enough to conceal its body.

According to Hodgson, the Tibetan antelopes rut in winter; the females gestate for 6 months and produce a single young in summer.

Genus **GAZELLA**, Blainville (1816).

Syn. *Procapra*, Hodgs. (1846); *Tragops*, Hodgs. (1847); *Tragomma*, Hodgs. (1848).

Size small or moderate. Frame slender. Eyes large. Tail short. Suborbital glands small, sometimes wanting. Interdigital glands in all feet. Inguinal glands generally present. No muffle.

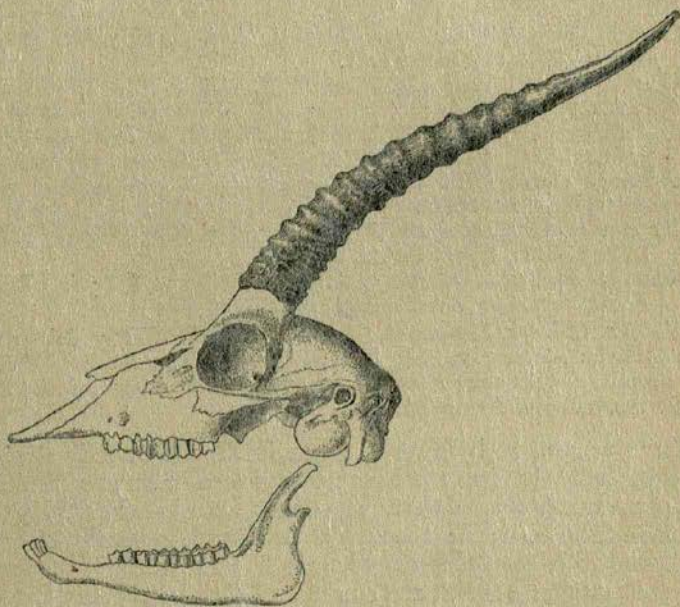


Fig. 171.—Skull and horns of *Gazella bennetti*.

Mammæ 2. Hoofs pointed. Generally a tuft of longer hair on each knee.



Skull resembling that of *Antelope*, but shorter in proportion. Nasals short. Lachrymal fossa variable; a distinct lachrymal fissure. Auditory bullæ large. Horns sometimes in both sexes, those of the male compressed, oval in section, erect, with a more or less marked sigmoid curve, sublyrate or lyrate, surrounded by subdistant prominent rings almost throughout.

This genus contains more than 20 species, distributed throughout Africa, Western and Central Asia (Brooke, P. Z. S. 1873, p. 535). Remains belonging to it are found in Indian Pleistocene and Pliocene deposits, those in the former agreeing with *G. bennetti*.

Synopsis of Indian Species.

- A. Females horned. Horns not turning inwards at points; no caudal disk *G. bennetti*, p. 526.
B. Females hornless.
a. No caudal disk. Horns lyrate; the tips turned inwards *G. subquitturosa*, p. 528.
b. A white disk surrounding the tail. Horns much curved *G. peticaudata*, p. 529.

359. *Gazella bennetti*. *The Indian Gazelle*.

Antelope bennettii, *Sykes*, P. Z. S. 1831, p. 104; *Blanford*, J. A. S. B. xxxvi, pt. 2, p. 196.

Antelope arabica, *Elliot*, *Mad. Jour. L. S.* x, p. 223 (1839), *nee Licht*.

Gazella christii, *Gray*, *apud Blyth* J. A. S. B. xi, p. 452 (1842); *Hutton*, J. A. S. B. xv, p. 151.

Gazella bennetti, *Gray*, *List Mam. B. M.* 1843, p. 161; *Hutton*, J. A. S. B. xv, p. 150; *Jerdon*, *Mam.* p. 280; *Stoliczka*, J. A. S. B. xli, p. 229; *Blanford*, P. Z. S. 1873, p. 315; *Brooke*, P. Z. S. 1873, p. 544; *Ball*, P. A. S. B. 1877, p. 172; *W. Selater*, *Cat.* p. 159.

Antelope hazenna, *Is. Geoffr. Jacquemont*, *Voyage*, iv, *Zool.* p. 74, *Atlas*, ii, pl. vi (1844).

Tragops bennetti, *Hodgson*, J. A. S. B. xvi, p. 695; *Adams*, P. Z. S. 1858, p. 522; *Blyth*, *Cat.* p. 173.

Gazella fuscifrons, *Blanford*, P. Z. S. 1873, p. 317; *id.* *Eastern Persia*, ii, p. 92; *Brooke*, P. Z. S. 1873, p. 545.

Chinkāra, *Chikāra*, *Kal-munch*, H.; *Phaskela*, N.W. P.; *Ask* or *Ast*, *Ahu*, *Baluch*; *Khazm*, *Brahui*; *Kalsipi*, *Mahr.*; *Tiska*, *Buddri*, *Mudari*, *Can.*; *Sank-hulé*, *Mysore*; *Porsya* ♂, *Chari* ♀, *Baori*; *Burudu-jinka*, *Tel.*; *Ravine deer* of some Anglo-Indians.

Horns present in both sexes, those in the male nearly straight, diverging slightly from the base when viewed from the front, but having a slight S-shaped curve when seen from the side, the points curving a little forward; the number of rings is generally 15 or 16, but is said to be sometimes as many as 25; the horns in the female are much smaller, smooth and conical. Infraorbital gland distinct, having a small opening.

Colour above light chestnut, a little darker where it joins the white on the sides and buttocks; no pale lateral bands; chin, breast, lower parts, and back of thighs white, the white colour not



ascending to the root of the tail; tail nearly black, knee-brushes varying, often dark brown; a whitish streak down each side of the face; middle of face from base of horns to nostrils darker rufous, sometimes with a dusky patch above the nose; a rufous stripe outside each pale facial band.

Dimensions. An adult male measured 26 inches high at the shoulder, 28.5 at the croup, nose to rump 41.5, tail 8.5, ear 6, horns 11 (*Elliot*). Weight of bucks about 50 lb., of does 35 to 40. Basal length of a male skull 6.75, orbital breadth 3.6. Horns measured in front along the curve are usually 10 to 12 inches long, with a girth of 4 at the base; the largest recorded dimensions in males are 14 and 5, the longest known female horns measure 8 inches.

Distribution. Throughout the plains and low hills of North-western and Central India, extending throughout Baluchistan to the eastern shore of the Persian Gulf. This gazelle is found in a considerable part of the Peninsula, ranging in suitable localities throughout the Punjab, Sind, Rajputana, the N.W. Provinces, and the whole Bombay Presidency with the exception of the Western Ghats and Konkan; also Central India as far east as Palamow and Western Sarguja, and the Central Provinces as far east as Seoni and Chánda, together with the Hyderabad territories, and the Madras Presidency to a little south of the Kistna, gazelles being found at Anantapur, south of Kurnool, and in Northern Mysore.

Varieties. *G. fuscifrons* was described from a doe with distinctly, though not prominently ringed horns, 7.25 inches long, and with the dark portions of the face dark brown, obtained at Jálk in Northern Baluchistan. Sir O. B. St. John, after long search, obtained what he justly concluded must be the male, and this proved to be *G. bennetti*. The rather pale form of this gazelle from the Indian desert and Sind has been distinguished as *Gazella christii*, but is perfectly identical with the Central Indian type.

Habits. The Indian gazelle is far less gregarious than the Indian antelope, and is most commonly seen in small parties of from two to six, though I have found from ten to twenty associating in a herd. It keeps much to waste ground, especially where that is broken up by ravines, but it is seldom seen on alluvial plains, and it haunts cultivation less than the antelope. It is frequently found amongst scattered bushes or thin tree-jungle, and may be met with on undulating ground even on the top of hills; it is commonly found amongst sand-hills, and is nowhere so abundant as in parts of the Indian desert. It lives on grass and the leaves of bushes, and I believe never drinks, for it is common in tracts where there is no water except from deep wells; and although I was on the look out for some years, and saw the tracks of almost every common wild animal at the pools in stream-beds, the only water remaining in many places in the hot season, I never saw the easily recognized prints of the gazelle's hoofs. It is, however, fond of the green grass near water.

Gazelles are very swift and can but rarely be caught by dogs. The present species does not bound like the Indian antelope when disturbed. It has a peculiar habit of uttering a sharp hiss when alarmed and of stamping with its fore-foot. The doe is often seen followed by two fawns. I cannot find that the rutting-season or the period of gestation has been observed. The flesh is excellent. This species has the habit of dropping its dung repeatedly in the same spot to a greater extent than the Indian antelope, but it not infrequently resorts to heaps of nilgai dung for the sake of depositing its own.

Gazella dorcas and several allied forms found in Northern and Eastern Africa, *G. arabica* and *G. muscatensis* from South Arabia, are nearly allied to *G. bennetti*.

360. *Gazella subgutturosa*. *The Persian Gazelle*.

Antelope subgutturosa, *Güldenstädt, Act. Acad. Petrop.* i, p. 251, pls. ix-xii (1778).

Gazella subgutturosa, *Blainv. Bull. Soc. Philom.* 1816, p. 75; *Hutton, J. A. S. B.* xv, p. 151; *Blyth, Cat.* p. 172; *Blanford, P. Z. S.* 1873, p. 313; *id. Eastern Persia*, ii, p. 91; *id. Yark. Miss., Mam.* p. 88, pl. xv; *Brooke, P. Z. S.* 1873, p. 545; *Scully, J. A. S. B.* lvi, pt. 2, p. 76; *Thomas, Tr. L. S.* (2) v, p. 64; *W. Sclater, Cat.* p. 160.

Ahu, Persian.

Females hornless. Horns in males lyrate, diverging near the base and with the tips turned inwards and converging; viewed from the side the curve is S-shaped, but slight. Rings strongly marked, 16 to 25 in number. A distinct infraorbital gland and well-marked lachrymal fossa.

Colour. Upper parts rufescent sandy, lower parts and buttocks up to the base of the tail, but not including it, white; colours sharply divided on the side. A distinct dark pygal band on the edge of the white buttocks. Facial markings not very distinct, but the usual pale lateral bands down each side of the face are present, and also the median and lateral dark facial bands. Tail blackish brown.

Dimensions. Nearly identical with those of *G. bennetti*. Eastern Turkestan individuals may be rather larger. Basal length of a Persian male skull 6·75 inches, orbital breadth 3·4; of a Yarkand skull 7·5 and 3·7. The longest horns I have heard of were from Herat, and measured 14·7 inches with a basal girth of 4·5 (*Scully, l. c.*).

Distribution. Throughout the highlands of Persia, and an enormous area in Central Asia extending through Eastern Turkestan to the Gobi desert. This is the gazelle of Afghanistan and Candahar, but only occurs in British territory in Pishin, north of Quetta, as I was informed by the late Sir O. B. St. John.

Habits. Very similar to those of *G. bennetti*, except that the present species is even more of a desert animal and that it has a less tropical habitat.

A considerably larger species, *G. gutturosa*, with shorter, very pale-coloured horns, inhabits parts of Mongolia.

361. *Gazella picticaudata*. *The Tibetan Gazelle*.

Procopra picticaudata, Hodgson, *J. A. S. B.* xv, p. 334, pl. (1846), xvi, p. 696; *Blyth*, *J. A. S. B.* xvi, p. 725; *id.* *Cat.* p. 173; *Adams*, *P. Z. S.* 1858, p. 523; *Blanford*, *J. A. S. B.* xli, pt. 2, p. 39.
Gazella picticaudata, Brooke, *P. Z. S.* 1873, p. 547; *W. Selater*, *Cat.* p. 161.

Goa, Rágao, Tibetan.

Females hornless. Horns in males slender, diverging, very much curved back, the tips curving forwards, but not or very little inwards; from the point the horns look nearly straight. Annulation less strongly marked but closer together than in the other Asiatic species; 25 to 30 rings in adults. No infraorbital orifice, a naked space on the face corresponding to the position of the gland; lachrymal fossa very shallow. No knee-brushes. Hair in winter long and soft, particularly long about the corners of the mouth. Tail and ears very short.

Colour above in winter light sandy fawn, grizzled by the pale tips of the hairs, greyer in summer. Lower parts white, not very sharply divided from the colour of the back; the white of the buttocks extends all round the base of the tail, forming a distinct caudal disk; tip of the tail dark rufous brown or black; no lateral or facial markings; the fawn colour of the back becomes more rufous on the border of the caudal disk.

Dimensions. Height of a fine male at shoulder 24 inches, snout to rump 43, tail 0·75, ear 5, horns along curve 13 (*Hodgson*); longest recorded horns 15·75 measured along the curve in front; greatest basal girth 4. Basal length of a male skull 6·8, orbital breadth 3·7.

Distribution. The Tibetan plateau from about 13,000 to about 18,000 feet. Found commonly in Ladak and north of Nepal and Sikhim.

Habits. Very similar to those of other gazelles. This species inhabits the bleak plains of the Tibetan plateau in small parties varying from two or three to about a dozen. They are not generally very shy, and according to Kinloch are but little frightened by noise; they are even said to pay but little attention to men passing to windward.

In the Pliocene period antelopes were represented in India by many forms now restricted to Africa. Amongst these ancient Indian antelopes were species of *Alcelaphus* (hartebeest, &c.), *Hippotragus* (sable antelope, &c.), and probably of *Cobus* (water-buck, &c.), *Cephalophus* (duikerbok), *Oreas* (eland), and *Strepsicerus* (kudu).

Although the *Giraffidæ* no longer exist in India, several extinct genera belonging to the family and one species of true giraffe have been discovered in the Indian Pliocene beds. Amongst the extinct forms *Sivatherium* is the best known; it was a large animal with two pairs of horns.



Family CERVIDÆ.

Horns, when present, taking the form of solid antlers, without core or horny sheath, and shed periodically. With but few exceptions (and those not Indian) the horns are confined to the male sex. A large lachrymal fissure in the skull. Upper canines generally present in both sexes. Molars more or less brachydont, the first molar in both jaws especially so. The lateral digits almost always present on all feet, and frequently the distal ends of the metapodials. No gall-bladder except in *Moschus*. A small muffle almost always developed. Infraorbital glands always present, and interdigital generally. Mammæ always four, inguinal. Placenta with few cotyledons.

The horns are composed of true bone, and during their growth are enclosed in a hairy integument supplied with blood-vessels, and known as the "velvet." When the growth is complete the integument dries and peels off. The horns are shed, as a rule, annually, and are replaced by others in the course of from three to six months. The horns increase in size year by year up to maturity, but aged stags bear small and inferior horns.

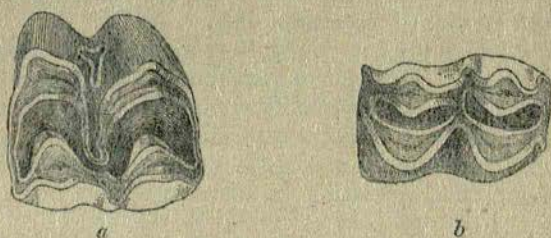


Fig. 172.—Crowns of (a) upper and (b) lower second true molars of *Cervus unicolor*, inner side uppermost.

Two subfamilies are recognized; both are Indian, and they are thus distinguished:—

Horns generally present in males. No gall-bladder . . . *Cervinæ*.
No horns. A gall-bladder *Moschinæ*.

The true deer are widely distributed, being found throughout the Palæarctic and Oriental regions of the Old World, and in both North and South America, but they are wanting in Africa south of the Sahara, and, of course, in Australia.

The following terms are applied to the horns of deer:—Each entire horn is composed of a "beam" or main stem, and minor branches known as "tines," "antlers," or "snags." Sometimes the beam and branches are flattened or "palmated," as in the elk and fallow-deer, but generally they are rounded. The whole horn rests on a bony support or "pedicel," which is never shed, and



there is a swelling, the "burr," at the base of the deciduous portion. The tine immediately above the burr is the "brow tine" or "brow antler;" and in most Indian deer this is the only tine developed, except near the end of the horn. But in the Elaphine group of deer, to which *Cervus cashmirianus* belongs, there are two more tines springing from the beam above the brow tine, the second being known as the "bez" and the third as the "tres" (pronounced bey and trey); by many writers the tres is called the "royal." The terminal tines are known collectively as the "crown," and if they are three in number on each horn the stag is termed "royal." The inner angle between the brow tine and the beam is sometimes called the "axil."

Subfamily CERVINÆ.

No gall-bladder. Two orifices to the lachrymal canal, both on the margin of the orbit. Hemispheres of brain considerably convoluted. Cotyledons of placenta distributed over the surface.

The arrangement of Sir V. Brooke (P. Z. S. 1878, p. 889), here followed, divided the deer into *Plesiometacarpæ*, with the proximal ends of the lateral metacarpals remaining, and *Telemetacarpæ*, with the distal ends only. The two Indian genera belong to the first-named, and may readily be discriminated thus:—

Short horns, pedicels as long as antlers or longer. No phalanges to lateral digits	CERVULUS.
Long horns on short pedicels. Bony phalanges of lateral digits present	CERVUS.

Genus CERVULUS, Blainville (1816).

Syn. *Styllocerus*, H. Smith (1827); *Prox*, Ogilby (1836); *Muntjacus*, Gray (1843).

Antlers not exceeding half the length of the head, on pedicels as long as themselves or longer. A very short brow antler, the beam above undivided, but curved downward and inward at the extremity. In females there is a bristly tuft of hair and a small projection in place of each horn. A bony ridge extends from the base of the pedicel or tuft above the orbit, and down each side of the face, the two ridges converging anteriorly; there is a frontal cutaneous gland inside each ridge. Lachrymal fossa in skull very deep, and including the facial portion of the jugal; lachrymal fissure moderate. Upper canines of males very large, those of females small. Muffle large. Interdigital glands large, but confined to the hind feet. No tuft of long hair on the metatarsus. No traces of the phalanges of the lateral digits. Vertebrae: C. 7, D. 13, L. 7, S. 5, C. 13-14 (*Hodgson*).

The anatomy of *C. muntjac* has been described by Hodgson (J. A. S. B. xvii, pt. 2, p. 483).

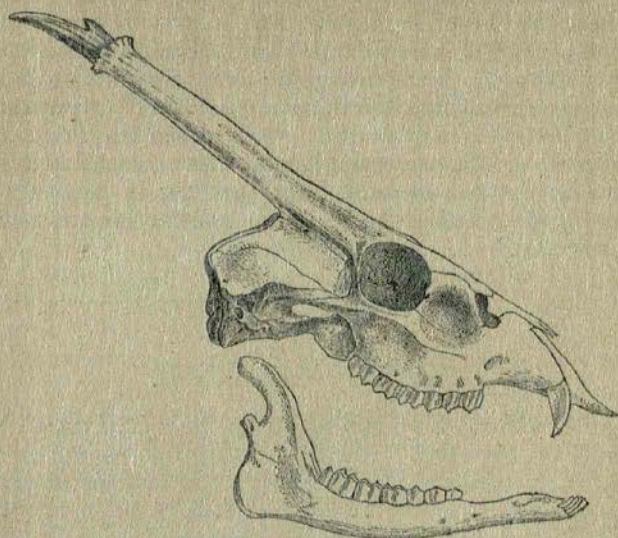


Fig. 173.—Skull and horns of *Cervulus muntjac*.

The genus *Cervulus* is found throughout the Oriental region, and is restricted to it.

Synopsis of Indian and Burmese Species.

Colour chestnut-red *C. muntjac*, p. 532.
 Colour sepia-brown *C. fce*, p. 534.

362. *Cervulus muntjac*. The rib-faced Deer or barking Deer.

- Cervus muntjak*, Zimm. *Geog. Gesch.* ii, p. 131 (1780); Sykes, *P. Z. S.* 1831, p. 104; Elliot, *Mad. Jour. L. S.* x, p. 221.
Cervus muntjak and vaginalis, Boddaert, *Elench. Anim.* i, p. 136 (1785).
Cervulus moschatus, Blainville, *Bull. Soc. Phil.* 1816, pp. 74, 77; Horsfield, *Cat.* p. 190.
Cervus aureus, Ham. Smith, *Griffith's Cuv. An. King.* iv, p. 148 (1827).
Cervus ratwa, Hodgson, *As. Res.* xviii, pt. 2, p. 139, pl. (1833).
Cervus melas, Ogilby, *Royle's Bot. Himal.* p. lxxiii (1839).
Styloceros muntjak, Cantor, *J. A. S. B.* xv, p. 269.
Stylocerus muntjacus, Kelaart, *Prod.* p. 85 (1852).
Cervulus vaginalis, Adams, *P. Z. S.* 1858, p. 530; Blyth, *Cat.* p. 154.
Cervulus aureus, Jerdon, *Mam.* p. 264; Blyth, *Mam. Birds Burma*, p. 46.
Cervulus moschatus, curvostylis, and tamulicus, Gray, *Hand-list Edentate &c. Mam. B. M.* pp. 163, 165 (1873).
Cervulus muntjac, Brooke, *P. Z. S.* 1874, p. 38, 1878, p. 899; Anderson, *An. Zool. Res.* p. 337; W. Selater, *Cat.* p. 173.



SL

Kakar, H.; *Ratwa*, Nepal; *Karsiar*, Bhot; *Sikka*, Lepcha; *Maya*, Beng. Rungpore; *Gutra* ♂, *Gutri* ♀, *Bherka*, Gond; *Bekra*, *Bekar*, *Mahr.*; *Kānkari*, *Kārd-kari*, *Kond-kari*, *Chāli*, Can.; *Kūka-gori*, Tel.; *Kalai*, *Katu-ardu*, Tam.; *Weli*, *Hula-muha*, Cing.; *Huger*, Assam; *Gyi*, Burm.; *Kidang*, Malay; *Jungli-bakri* and *Jungle-sheep*, vulgarly, in Southern India.

Colour deep chestnut, becoming darker on the back and paler and duller below. Face and limbs brownish, a black line along the inside of each horn-pedicle and for some distance inside the facial rib; this line in the female ends above in a slight tuft. Chin and upper throat, lower abdomen, lower surface of tail and inside of thighs white; a whitish mark in front of the digits on each foot. Axils whitish. A dark brown variety has been found near Darjiling by Kinloch, and a still darker form is figured in Hodgson's MS. drawings. Young spotted.

Dimensions. Height at shoulder 20 to 22 inches; length of head and body about 35; tail, with hair, 7. A male skull measures 7 inches in basal length and 2·7 in breadth across the orbits. The horns from the burr (pedicle not included) rarely exceed 5 inches in length, and are generally 2 or 3 inches, on pedicles 3 to 4 long, but horns of 11 inches are said to have been measured. Weight of a male 38 lb.

Distribution. Throughout India, Ceylon, and Burma on all thickly-wooded hills, never in the plains, nor, so far as I am aware, away from tree-forest. This deer ascends the Himalayas to about 5000 or 6000 feet, and sometimes even higher. It is rare in the Central Provinces and farther to the north-west, but I have known it killed near Baroda, and it probably occurs on the Aravalli range. Outside of India it is found throughout the Malay Peninsula, Sumatra, Java, Borneo, and eastward to Hainan, though replaced by *C. Reevesi* in parts of Southern China.

Habits. The rib-faced deer is a solitary animal, usually found singly or in pairs. It keeps in thick jungle, only leaving the forest to graze on the skirts of the woods or in abandoned clearings. It has a wonderful way of getting through the thickest underwood, and it runs in a peculiar manner with its head low and its hind quarters high; when not alarmed, as Colonel Hamilton observes, it steps "daintily and warily, lifting each leg well above the grass or leaves."

The call of this species, from which the common name of "barking deer" is derived, is at a little distance very like a single bark from a dog, and is very loud for the size of the animal. It is often repeated at intervals, usually in the morning and evening, sometimes after dark, and I have heard it in Burma very late in the morning and again in the afternoon, in the cold weather, which is the rutting-season. It is uttered by the animal when alarmed, as well as when calling its mate.

Elliot and Jerdon state that the tongue is very long and extensile, and this deer often licks the whole face with it. McMaster and Sterndale confirm this. The latter has found that in confinement



This deer is a coarse feeder and fond of cooked meat. When the buck is attacked by dogs it uses its canine teeth in defence and inflicts severe wounds with them. Colonel Hamilton has pointed out that these teeth are not fixed firmly in the jaw, but that the animal has some power of moving them. Several observers have noticed a peculiar rattling noise, like that produced by a pair of castanets, made by this deer when running, but the cause is not known. Adams suggests that the sound is produced by the feet, Hamilton and McMaster think it may be made by the long canine teeth, but Kinloch says he has heard it made by a female, though he also thinks it is produced by the mouth.

The rutting-season in Northern India is chiefly in January and February, the period of gestation is six months, and the young are born, as a rule, in June and July, but some young are said to be produced throughout the year; the female has one or two young at a birth. The horns of the male fall in May and the new horns are perfect in August. These details are from Hodgson. The flesh is very good, superior to that of other Indian deer in general.

363. *Cervulus feæ*. *Fea's rib-faced Deer*.

Cervulus feæ, Thomas & Doria, *Ann. Mus. Civ. Gen.* 2, 2 a, vii, p. 92 (1889).

A short tuft of hair between the horns.

Colour above sepia-brown, speckled with golden brown, the hairs of the back having golden-yellow tips. Legs darker. Lower parts light brown. Forehead, horn-pedicels, and occiput brownish yellow, with a blackish line down the inside of each pedicel to the brown of the face. The hair around the hoofs, an indistinct line up the front of each carpus and tarsus, and a distinct band, growing broader above, up the front of each thigh, white. Tail with a narrow black band above, the rest white.

Dimensions of the type, a male :—Total length 34·6 inches; tail without hair 4, with hair 5·7; hind foot and tarsus 11·3; horn 2.

Distribution. The only specimen known was obtained on Muleyit mountain, west of Moulmein, by Mr. L. Fea.

Genus *CERVUS*, Linn. (1766).

Syn. Rusa, *Axis*, H. Smith (1827); *Rucervus*, Hodgson (1838); *Pseudocervus*, Hodgson (1841); *Procervus*, Hodgson (1847); *Panolia*, Gray (1843); *Hyelaphus*, Sundevall (1846).

Antlers large, two or three times the length of the head, on short pedicels. Upper canines never large and sometimes wanting. No bony ridge on the face. The parietal region of the skull forms an obtuse angle with the frontal plane, and a right angle with the occipital. There is a large and deep lachrymal fossa, and an extensive fissure or vacuity between the frontal, nasal, maxillary,



and lachrymal bones. The suborbital glands are large; interdigital variable. A moderate-sized muffle. A tuft of hair generally on the outer surface of the metatarsus above the middle. Phalanges of the lateral digits present.

Vertebrae: C. 7, D. 13, L. 6, S. 4, C. 11-14.

Synopsis of Indian, Ceylonese, and Burmese Species.

- A. Each horn in adults normally with more than three tines.
a. Brow and bez tines present; usually a pale caudal disk. *C. cashmirianus*, p. 535.
b. Brow tine, no bez; no caudal disk.
a'. Brow tine and beam meet at a right angle. *C. duvauceli*, p. 538.
b'. Brow tine forming a continuous curve with beam *C. eldi*, p. 541.
B. Each horn in adults normally with three tines.
a. Never spotted; large, height 48 to 56 inches. *C. unicolor*, p. 543.
b. Always spotted; height 30 to 38 inches .. *C. axis*, p. 543.
c. Spotted in summer only; height less than 30 inches. *C. porcinus*, p. 549.

The members of this genus, like those of *Bos*, have been divided amongst several genera by many naturalists, but the differences are scarcely of generic importance, and the number of intermediate forms between the best-marked types, such as Red Deer and Sambar, renders it difficult to separate them. Of the Indian species, *C. cashmirianus* alone belongs to the Elaphine group, or true *Cervus*, which comprises the European Red Deer (*C. elaphus*) and the American Wapiti (*C. canadensis*). The other Indian species belong to the Rusine group, with a large muffle and no bez tine, and have been distributed amongst several small genera, *C. unicolor* being the type of *Rusa*, *C. duvauceli* of *Rucervus*, *C. eldi* of *Panolia*, *C. axis* of *Axis*, and *C. porcinus* of *Hyelaphus*, the last species having also been referred alternately to *Rusa* and *Axis*.

Indian fossil forms are not numerous. *C. unicolor*, *C. axis*, *C. porcinus*, and perhaps *C. duvauceli*, are represented in the Pleistocene beds of the Peninsula, and three extinct forms, one allied to *C. duvauceli*, in the Pliocene Siwaliks.

364. *Cervus cashmirianus*. *The Kashmir Stag*.

"Kashmir Stag," *Blyth*, *P. Z. S.* 1840, p. 79; *id.* *J. A. S. B.* x, p. 750, plate, figs. 8, 9; xxiii, p. 734.

Cervus cashmerensis, *Falconer*, *apud Gray*, *List Ost. Spec. B. M.* p. 65 (1847) (no description); *Adams*, *P. Z. S.* 1858, p. 529; *Iydekker*, *J. A. S. B.* xlv, pt. 2, p. 286.

Cervus wallichii, *Wagner*, *Hugel's Kaschmir*, iv, p. 576; *Blyth*, *J. A. S. B.* xxx, p. 188; *id.* *Cat.* p. 146; *Jerdon*, *Mam.* p. 250; *nec Cuv. Hist. Nat. Mam.* pl. 356 (1823).

Cervus cashmeerianus, *Falconer*, *Pal. Mem.* i, p. 576 (1868); *Slater*, *Tr. Z. S.* vii, p. 339, pl. xxx; *Brooke*, *P. Z. S.* 1878, p. 912; *Scully*, *J. A. S. B.* lvi, p. 76; *W. Slater*, *Cat.* p. 184.

Hangal, *Honglu*, ♂, *Minyamar* ♀, Kashmir; *Bārasingha*, H.

Size large. In males the hair on the ridge of the neck is long, thick, and bushy, and the hair of the lower neck long and shaggy. Muzzle small. Horns with brow, bez, and tres or royal tines, and usually in adults each horn with five points, sometimes with more. The tines, with rare exceptions, are undivided. The bez or second tine, as a rule, considerably exceeds the brow or first tine in length.

Colour brown or brownish ash, or dark liver-colour; a whitish caudal disk surrounding the tail, contrasting strongly with the dark border that merges into the body-colour; sides and limbs

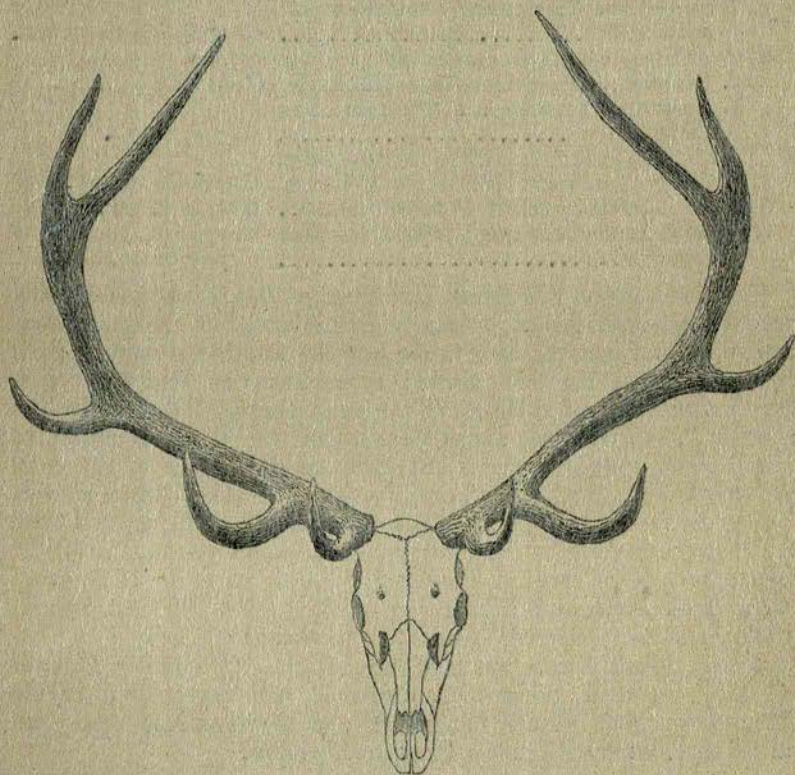


Fig. 174.—Skull and horns of *Cervus cashmirianus*.

paler; lips and chin white, ears whitish. In summer the fur is brighter and more rufous, the lower parts albescent, the belly in the male dark brown. Young fawns are spotted, the markings being retained, according to Adams, till the third or fourth year.

In Selater's figure, from an animal in the Zoological Gardens, there is no caudal disk; the tail is dark brown above, pale below, and only the buttocks pale rufous. Whether this is due to variation in colouring or to age it is impossible to say, but a skin from the Zoological Gardens, now in the British Museum, agrees with the figure.



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Dimensions. Height at shoulder 48 to 52 inches, length 7 to 7½ feet, tail 5 inches. Extreme length of a male skull 15.1 inches, breadth 7.5. Horns in adults average about 40 inches in length, and 5½ to 6 in girth at mid-beam; the longest known measure 52, 53.5, and 55 along the inside from the burr to the tip; basal girth 2.5, clear of the burr; girth at mid-beam 7.

Distribution. The Kashmir valley, throughout the pine-forests between about 9000 and 12,000 feet in summer, lower in winter. Not found east or north of Kashmir; a few occur in Wardwan, Kishtwár, Badrawár, &c.; none in Ladak. The range westward is not known; a horn referred to this species was obtained from the banks of the Oxus near Balkh by Captain Yate, but the identification is open to doubt, as there are several Asiatic stags allied to the Kashmir animal.

Habits. The Kashmir deer are found singly or in small parties in summer, the males generally alone. In the winter they collect into larger herds. The males generally shed their horns in March, and the new horns are not perfect till October, when, as Adams states, "the rutting-season commences and the loud bellowings of the stags are heard all over the mountains." The voice of the Kashmir stag, according to Sir V. Brooke, resembles that of the wapiti, and differs from that of the European red deer. "In the former it is a loud squeal ending in a more guttural tone; in the latter it is a distinct roar, resembling that of a panther."

According to Adams, these deer "are seldom confined to one locality, but roam from forest to forest, preferring grassy glades alternating with dense forest, where there is a copious supply of water." The young are born in April, so the period of gestation must be about six months.

A much larger species than *C. cashmirianus* inhabits one or more wooded upland tracts north of Bhutan, but belonging to Tibet. This stag, *C. affinis* (Hodgson, J. A. S. B. x, p. 721, pl. xix, pp. 466, 518, pl.; xx, p. 388, pl. vii), called, but erroneously, the Sikhim Stag by Jerdon, must be excluded from the fauna of British India. It is not found in Sikhim nor in the Chúmbi valley, immediately east of Sikhim, but apparently in the next valley to the eastward. Mr. Hume was assured, he tells me, that the area inhabited by *C. affinis* is drained by streams running northward to the Sangpo. The coloration of *C. affinis* resembles that of *C. cashmirianus*. The caudal disk is well marked. The horns are large, 54 inches having been measured, and bear almost always five points each, but the principal distinction from *C. cashmirianus* is in the beam being much bent forward just above the origin of the tree line. The bez is sometimes larger than the brow antler, but less constantly than in *C. cashmirianus*. A skull measures 18.25 inches in extreme length, another 17.5. The basal length of the latter is 16.25, breadth at orbits 7.35. All the skulls I have seen are conspicuously larger than those of *C. cashmirianus*.



The animal to the figure of which, by Duvaucel, Cuvier gave the name of *C. wallichii*, lived in the Barrackpore menagerie, and was said to have been brought from Muktinath near Mount Dwālagiri in Nepal (Hardwicke, Tr. L. S. xiv, p. 581). This place is as nearly as possible halfway between the localities inhabited by *C. cashmirianus* and *C. affinis* respectively. It is difficult to believe that any large deer living in Northern Nepal could have escaped the knowledge of Hodgson's collectors. The shed horns of the type of *C. wallichii* are preserved in Calcutta, and have been figured (J. A. S. B. x, p. 750, pl., fig. 7); they are probably, according to W. Sclater, of the third year, but whether they agree better with those of *C. cashmirianus*, or *C. affinis*, of the stag of Eastern Turkestan, or of any other species, is undecided. The assigned locality must be regarded as very doubtful, and the name must remain in abeyance for the present. *C. narayanus* of Hodgson (J. A. S. B. xx, p. 392, pl. viii), founded on a single horn said to have been brought from Ladak, was probably a young *C. affinis*. No importance need be attached to the supposed locality; no stag is found in Ladak.

Recently (J. A. S. B. lviii, pt. 2, p. 186, pl. xi) W. L. Sclater has described a deer's dried head (with the skin) and horns purchased in the Darjiling bazaar, and has shown that they agree best with a stag called *Cervus dybowskii* by Taczanowski (P. Z. S. 1876, p. 123), and found in the Ussuri country, N.E. Manchuria, not far from Vladivostok. Additional evidence may be awaited before supposing that *C. dybowskii* extends to Tibet. It belongs to the Pseudaxine group, without a bez tine and usually with four points on each horn.

A fine elaphine stag inhabits the forests near the rivers east of Yárkaud and Káshgarh, and appears to be nearly allied to the Western Asiatic deer known as *C. maral*, or perhaps identical with it. The great stag of the Thian Shan, for which (P. Z. S. 1875, p. 638, woodcut) I proposed the name of *C. eustephanus*, is a race of the American wapiti, *C. canadensis*, or a closely allied form. The other Asiatic elaphine deer are *C. xanthopygus*, widely distributed, and *C. luehdorfi* from Amoorland, the distinctness of which is doubtful. Besides *C. dybowskii*, *C. sika* from Japan, *C. manchuricus* from Northern China, *C. caspius* from Northern Persia, and some less known species belong to the Pseudaxine group.

365. *Cervus duvauceli*. The Bárasingha.

Cervus duvaucelii, Cuv. Oss. Foss. ed. 3, p. 505, pl. xxxix, figs. 6-8 (1825); Anon. J. A. S. B. v, p. 240; Sclater, Tr. Z. S. vii, p. 346, pl. xxxvi; Brooke, P. Z. S. 1878, p. 905; W. Sclater, Cat. p. 179.

Cervus bahrainja, Hodgson, P. Z. S. 1834, p. 99 (no description).

Cervus elaphoides, Hodgson, J. A. S. B. iv, p. 648, pl. liii, fig. 4 (1835).

Cervus (*Rucervus*) *elaphoides*, Hodgson, A. M. N. H. i, p. 154 (1838).

Cervus dimorphe, Hodgson, J. A. S. B. xii, p. 897, pl. (1843).



Rucervus duvaucelii, *Hodgson, J. A. S. B.* xvi, p. 689; *Blyth, Cat.* p. 150; *id. P. Z. S.* 1867, p. 835, figs. 1-5; *Blanford, J. A. S. B.* xxxvi, pt. 2, pp. 197, 199; *Jerdon, Mam.* p. 254; *Anderson, J. A. S. B.* xxxvi, pt. 2, p. 185, note; *Ball, Stray Feathers*, ii. p. 371.

Bārasingha, Mahā, H.; *Baraya, Gorr, Ghos, Nepal Terai*; *Jhinkar, Kyarda Dūn*; *Goin, Sind &c.*; *Goinjak ♂, Gaoni ♀, Central India*; *Bāra-Nerwari, Sāl-Sāmar, Mundla*; *Bhelingi pohu, Assam. Swamp deer of Jerdon.*

Size large. Hair moderately fine, rather woolly. Neck maned, tail moderate. Muzzle elongate. No interdigital glands (*Hodgson*). Skull narrow and long; premaxillaries produced considerably beyond the nasals. Horns smooth, with a brow-tine nearly at right angles to the beam, frequently bearing smaller points on its upper surface; sports in the axils are rare. Above the brow-tine the beam is unbranched for more than half its length; it then divides into two, each branch dividing again. In the normal adult horn figured in the accompanying cut the inner branch bears two tines,

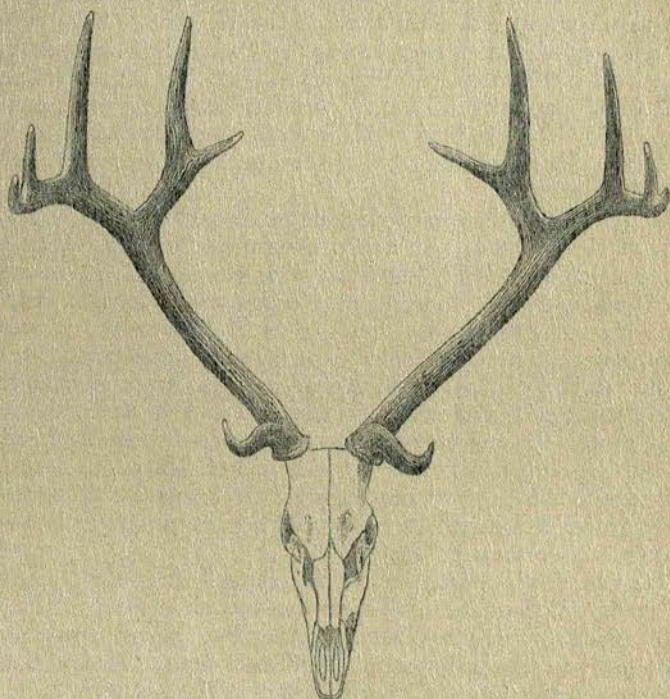


Fig. 175.—Skull and horns of *Cervus duvaucelii*. (From a figure by Forsyth.)

the outer three, but this number is often exceeded. Some remarkable horns are figured by *Blyth l.c.*, one pair of them having more than twenty points.

Colour in winter yellowish brown above, paler below, in summer bright rufous-brown usually more or less spotted with white,



especially along the spine, whitish or white on the throat and belly and inside the thighs, and always white beneath the tail. Females paler than males. Young spotted.

Dimensions. Height at shoulder 44 to 46 inches; length nearly 6 feet; tail 8 to 9 inches, without hair 5; ear 7. Extreme length of a skull 15·3, breadth across orbits 6. Large stags in Cooch Behar are said to have weighed from 32 stone 12 lbs. to 40 stone 10 lbs., or 460 to 570 lbs. ('Asian,' April 3rd, 1891). Average horns measure 30 inches round the curve, with a girth of 5 at mid-beam; extreme measurements 38 and 5·25.

Distribution. Along the base of the Himalayas from Upper Assam to the Kyarda Dún west of the Junna, throughout Assam, in a few places in the Indo-Gangetic plain from the Eastern Sundarbans to Baháwalpur and to Rohri in Upper Sind, and locally throughout the area between the Ganges and Godávari as far east as Mandla, this deer being common in parts of the Upper Nerbudda valley and to the south in Bastar and the neighbourhood. Forsyth has shown that the range of *C. duvauceli* in the Central Provinces corresponds with that of the sál tree (*Shorea robusta*) and red jungle-fowl (*Gallus bankiva*). In the Denwa valley, 150 miles west of the main sál region, and not far from Pachmarhi, an isolated patch of sál forest contains both this deer and the jungle-fowl. I have seen heads of this stag shot in Upper Sind by General Marston, and there are two on the mosque at Ghotki in the Rohri district.

Habits. The twelve-tined deer is not found in thick forest, but keeps on the skirts of the woods and on flat or undulating grass plains more or less interspersed with trees. It is known as the "Swamp-deer" in parts of North-eastern Bengal, but the term, though used as its English name by Jerdon, is scarcely appropriate. The bárasingha is sometimes met with in open forest. In the winter it is highly gregarious, herds of from thirty to fifty being met with, whilst in Mandla, and probably elsewhere, about September and October, several hundreds sometimes collect. The rutting-season follows. At the end of March in Assam the bucks are found in grass singly, with the horns for the most part partly grown and in velvet, so the old horns must there be shed as a rule not later than February.

This deer feeds chiefly on grass. Forsyth says that it is much less nocturnal than the sámbar, and although it rests in the shade about midday, it may be found grazing late in the forenoon and again early in the afternoon. Anderson found that a male in confinement was fond of lying in water in the hot season.

I have examined the type of *C. dimorphe*, and ascertained that it belongs to this species and not, as Blyth supposed, to *C. eldi*. Mr. Thomas, I find, had made the same identification.

An allied species, *C. schomburgki* (Blyth, P. Z. S. 1863, p. 155, 1867, p. 835, figs. 6-12), chiefly distinguished by the undivided portion of the beam in each horn being shorter than the branches, is found in Siam and may be met with in the Shan States east of Upper Burma.

366. *Cervus eldi*. The brow-antlered Deer or Thameng.

- "Nondescript species of Deer," McClelland, *Calc. Jour. N. H.* i, p. 501, pl. xii, figs. 1 a, 1 b.
Cervus eldii, Guthrie (teste Blyth, *P. Z. S.* 1867, p. 837), *Calc. Jour. N. H.* ii, p. 417, pl. xii (1842); Beavan, *P. Z. S.* 1867, p. 759; Swinhoe, *P. Z. S.* 1869, p. 653, figs. 1-3; Selater, *Tr. Z. S.* vii, p. 348, pls. xxxvii, xxxviii; Brooke, *P. Z. S.* 1878, p. 906; W. Selater, *Cat.* p. 180.
Cervus (Rusa) frontalis, McClelland, *Calc. Jour. N. H.* iii, p. 401, pls. xiii, xiv (1843); Blyth, *J. A. S. B.* xxviii, p. 296.
Panolia acuticornis, Gray, *List Mam. B. M.* 1843, p. 180 (no description); Cantor, *J. A. S. B.* xv, p. 272.
Panolia platyceros, Gray, *ibid.* p. 181 (no description); Blyth, *P. Z. S.* 1867, p. 842, figs. 20-23.
Panolia eldii, Gray, *Cat. Mam. &c. Nepal & Thibet B. M.* 1846, p. 34; Blyth, *J. A. S. B.* xxx, p. 193, xxxi, p. 334; *id.* *Cat.* p. 149; *id.* *P. Z. S.* 1867, p. 835, figs. 13-19; *id.* *Mam. Birds Burma*, p. 45; Beavan, *J. A. S. B.* xxxvi, pt. 2, p. 175.

Sangnai, Sangrai, Manipur; Thameng, Burmese.

Size moderate. Hair very coarse, shaggy in winter, thick and long about the neck in stags. Tail short. Skull elongate, frontal

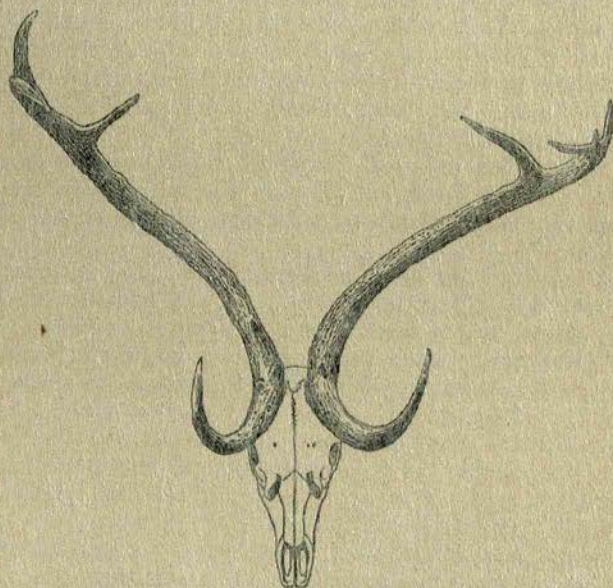


Fig. 176.—Skull and horns of *Cervus eldi*.

area very narrow; premaxillaries much shorter than in *C. duvauceli*. Horns with an extremely long curved brow-antler joining the beam in such a manner that the two form one continuous curve at right angles to the pedicel. There are frequently small



points on the upper surface of the brow-antler; and generally a prominent snag in the axil. The beam is unbranched for a considerable distance, generally more than half the length, and curved backwards, then outwards, and lastly forwards; towards the end it bears a number of small points from two or three to eight or ten or possibly more, as figured by Blyth (P. Z. S. 1867, l. c.). Curve of the two horns seldom exactly corresponding; those figured on the preceding page are typical, but perhaps with fewer branches than usual. Blyth shows that horns of this deer from Mergui and the Malay Peninsula are shorter and have commonly two or three vertical snags on the brow-antler. In the Siam form (*Panolia platyceros*) the upper part of the beam is flattened and bears several small points on its posterior edge.

Colour. Males in winter are said to be dark brown, almost black, in summer fawn-coloured; does are paler rufous fawn. The lower parts are white in summer, pale brown in winter. No caudal disk. A white mark above the eye is shown in Selater's figure of the summer garb. The very young are spotted.

Dimensions. Stags about 45 inches, does 42, in height at the shoulders. I can find no other measurements. The basal length of a male skull is 11.75, extreme length 13.4, orbital breadth 5.4. Average horns measure about 40 inches from the tip of the brow-antler to the end of the horn; one of a pair in the British Museum is 54 long, or 35.5 from the burr to the tip; but 38.25 without the brow-antler is said to have been measured. Beavan says that males weigh 210 to 245 lbs., females about 140 lbs.; this is perhaps the weight of cleaned carcasses.

Distribution. The valley of Manipur, and thence southwards in suitable localities throughout Burma and the Malay Peninsula (*Cantor*), also in Cambodia and Hainan, always in flat alluvial ground.

Habits. These have been described by Lieut. Eld (the discoverer of the species) and Captain Beavan. *O. eldi* inhabits grassy and swampy plains, and is usually seen in herds of from 10 to 50 or more; occasionally much larger numbers are found associating. They may enter the fringe of the forest in places for shade during the day, but they generally keep in the open plain. In some places in the Irrawaddy delta, and in Martaban, they are found in plains where, during the dry season, no fresh water is procurable. They are frequently seen in swamps, and feed on wild rice and other plants growing in such places.

The stags commence to shed their horns in June in Manipur; in Lower Burma the horns are lost about September. The rutting-season in Burma lasts from March till May; the young, usually one at a birth, are born in October and November. Males begin to acquire horns in the second year, and are in their prime when about seven years old. The sexes begin to breed at the age of eighteen months.

The call of the female is a short barking grunt, that of the male is lower and more prolonged, and is most frequently heard in the rutting-season.

367. *Cervus unicolor*. *The Sambar or Rusa Deer*.

Middle-sized and Great Axis, *Pennant, Hist. Quad.* p. 106 (1781).
Cervus unicolor and *C. albicornis*, *Bechstein, Allgem. Uebers. d. vierfüß. Thiere*, i, p. 112 (1799).

Cervus niger, *Blainv. Bull. Soc. Phil.* 1816, p. 76, *teste Blyth, J. A. S. B.* xi, p. 449.

Cervus hippelaphus, *Cuv. Oss. Foss.* ed. 2, iv, p. 40, pl. v, figs. 31-35, 42 (1823); *Duvaucel, As. Res.* xv, p. 157, pl. i (1825); *Elliot, Madr. Jour. L. S.* x, p. 220; *Blyth, J. A. S. B.* xi, p. 449, xx, p. 174; ? *Brooke, P. Z. S.* 1878, p. 903; *W. Sclater, Cat.* p. 179.

Cervus equinus, *Cuv. ibid.* p. 45, pl. v, figs. 37, 38, 46 (1823); *Sykes, P. Z. S.* 1831, p. 104; *Brooke, P. Z. S.* 1878, p. 901.

Cervus aristotelis, *Cuv. Oss. Foss.* ed. 3, iv, p. 503, pl. xxxix, fig. 10 (1825); *Blyth, J. A. S. B.* xi, p. 449; *Brooke, P. Z. S.* 1878, p. 901; *W. Sclater, Cat.* p. 176.

Cervus leschenaultii, *Cuv. ib.* p. 506, pl. xxxix, fig. 9 (1825).

Cervus (Rusa) *hippelaphus*, *unicolor*, *aristotelis*, and *equinus*, *Ham. Smith, Griffith's An. Kingd.* iv, pp. 105-112 (1827).

Cervus jarai, *Hodgson, Gleanings in Sc.* iii, p. 321, pl. xxi (1831); *id. J. A. S. B.* i, pp. 66, 115, pl. v.

Rusa jaraya, *nepalensis*, and *heterocervus*, *Hodgson, J. A. S. B.* x, p. 914 (1841) (no descriptions).

Axis pennantii, *Gray, List Mam. B. M.* p. 180 (1843).

Rusa aristotelis, *Gray, List Mam. B. M.* p. 179; *Blyth, Cat.* p. 150; *id. Mam. Birds Burma*, p. 45; *Jerdon, Mam.* p. 256; *Gilbert, Jour. Bomb. N. H. Soc.* iii, p. 224.

Rusa hippelaphus, *Kelaart, Prod.* p. 83.

Rusa equina, *Cantor, J. A. S. B.* xv, p. 271.

Sambar, *Samar*, H.; *Jarao* ♂, *Jarai* ♀, Nepal; *Mahá*, Terai; *Merá*, Mahr. of Ghats; *Ma-ao*, *Mauk*, Gond; *Sáram*, Ho-Kol; *Kadavé*, *Kadaba*, Can.; *Kennadi*, Tel.; *Kadumai*, Tam.; *Gora Rusa*, Cing.; *Gous*, *Gaoj*, *Bhalongi* ♀, E. Bengal; *Khát-khoua-poku*, Assam; *Sacha*, Daphla; *Tshat*, Burmese; *Takhau*, *Hseukhau*, *Kheu*, Karen; *Rusa*, *Rusa-etam*, Malay.

The largest Indian deer. Ears large. Hair coarse. Neck and throat of the adult male covered with long hair forming an erectile mane. Muzzle large. Orifices of infraorbital glands very large and capable of eversion. Tail moderate. Interdigital glands wanting, according to Hodgson. Molars markedly hypsodont, with small accessory columns. A deep lachrymal fossa; auditory bulla slightly inflated and rugose. Horns each normally with but three times and very rarely bearing more, irregular points or sports being less common than in most deer; the brow-antler meets the beam at an acute angle; the two upper tines generally subequal in Indian heads, but very variable in form and proportion.

Colour almost uniform dark brown throughout, sometimes greyer, sometimes with a slight yellowish tinge, scarcely paler below. Females and young paler and more rufous than males. Chin, inside of the limbs near the body, lower surface of the tail, and inner part of the buttocks yellower, sometimes dull yellowish white. Young not spotted at any stage. Some old males are very dark-coloured, almost black or dark slaty grey.

Dimensions. Height at shoulder of males 48 to 56 inches, and it is said even more; length 6 to 7 feet, tail 12 to 13 inches, ears 7 to 8. Females are smaller. A male skull measures in basal length 14·2 inches, extreme length 15·7, orbital breadth 6·7. A very large stag killed in Cooch Behar is said to have weighed 700 lbs. (51 stone), smaller but still fine male animals about 560 ('Asian,' April 3rd, 1891, p. 3). Horns vary enormously; any over 35 inches in length are of good size, and such are seldom, if

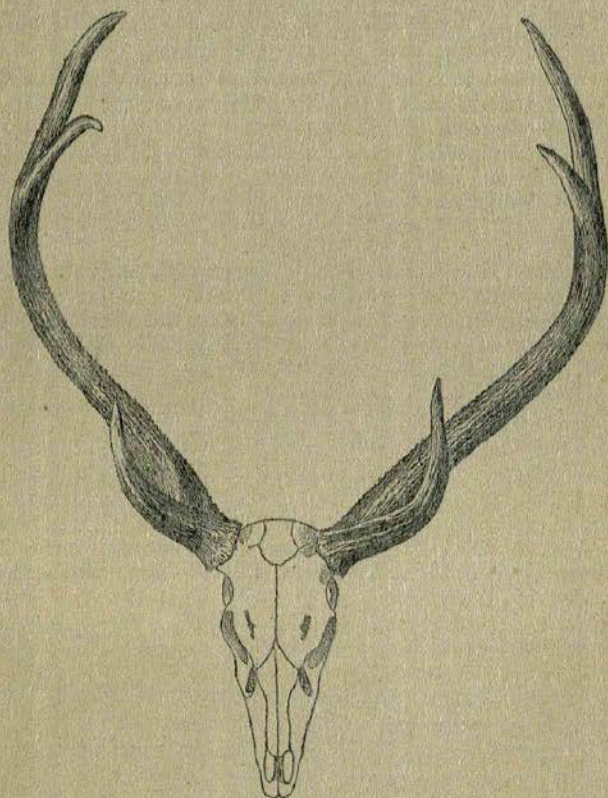


Fig. 177.—Skull and horns of *Cervus unicolor*. (From Forsyth.)

ever, seen out of India. The largest recorded measured 48 inches, but the girth at mid-beam was only 6; horns 35·5 and 38 inches in length have been found to have a girth of 8·25 inches halfway up the beam, and 8·5 has been measured in horns 41 inches long.

Distribution. Almost throughout the Oriental region wherever there is undulating ground or hilly country with forest, but the forms in some of the Malay Islands appear to be specifically distinct. The sambar ascends the Himalayas in places to 9000



or 10,000 feet, and is common on the summits of the ranges in Southern India and Ceylon. It is not common on alluvial flats, though it is occasionally found on them, at considerable distances from any hills. It is, of course, wanting in the treeless plains of the Punjab, Sind, and Western Rajputana.

Varieties and Nomenclature. This fine deer appears to have been first mentioned by Pennant, who described it as the middle-sized and greater Axis (*Cervus axis unicolor* and *C. axis major* of Kerr). To these forms the names of *Cervus unicolor* and *C. albicornis* were applied by Bechstein. Cuvier, in the second edition of his 'Ossements Fossiles,' named different varieties *C. hippelaphus* and *C. equinus*, and two years afterwards added the names of *C. aristotelis* and *C. leschenaultii*, given to horns only. Why the name *C. aristotelis*, given to an abnormal horn, has been preferred for the Indian Sambar it is difficult to say. The name *C. unicolor*, employed by Hamilton Smith, is preferable on account of both priority and suitability, being an appropriate term for the only Indian deer with unspotted young.

Continental forms of sambar do not greatly vary in size, though some Malay Island varieties are very much smaller. Horns from the Himalayas, Assam, and Burma are inferior in size to those from Central India and Bengal. Moreover, whilst in Indian heads the two upper tines generally are nearly equal in length, in Burmese heads the inner tine is considerably shorter than the outer, and the brow-antler is much longer in proportion to the others, as in the Malay form usually called *C. equinus*. The name *C. hippelaphus* is by Brooke and others applied to a Malay variety in which the inner tine is the longer. But all the three names were by Horsfield and others used for varieties found in the Peninsula of India. Elliot showed that these passed into each other, and Blyth, correctly as I believe, united the Himalayan, Burmese, and Malay races with the Indian.

Habits. This is the woodland deer of South-eastern Asia generally, and is more widely and generally distributed than any other species. Although it does not shun the neighbourhood of man to the same degree as *Bos gaurus* does, it is only common in wild tracts of country. It comes out on the grass slopes where such exist, as in the Nilgiris and other hill-ranges, to graze, but always takes refuge in the woods. It is but rarely found associating in any numbers; both stags and hinds are often found singly, but small herds from four or five to a dozen in number are commonly met with. Its habits are nocturnal; it may be seen feeding in the morning and evening, but it grazes chiefly at night, and at that time often visits small patches of cultivation in the half-cleared tracts, returning for the day to wilder parts, and often ascending hills to make a lair in grass amongst trees, where it generally selects a spot well shaded from the sun's rays. It feeds on grass, especially the green grass near water, and various wild fruits, of which it is very fond, but it also browses greatly on shoots and leaves of trees. It drinks, I believe, daily, though



Sterndale doubts this; it certainly travels long distances to its drinking-places at times.

The rutting-season is about October and November in the Peninsula of India, but, according to Hodgson, in spring in the Himalayas. At that time sámbar collect in larger numbers, and the loud roaring call of the stags is often heard in the morning and evening and sometimes late at night. The period of gestation is eight months, and a single young one is generally born at a time. The horns are usually dropped in March in the Peninsula, and about April in the Himalayas, but all stags do not lose their horns at this time. I have shot them myself in the Central Provinces in April and May with fully developed horns; and Forsyth, who paid particular attention to this characteristic of the sámbar, not only insists upon the fact that stags with perfect horns may be found at all seasons, but declares that individual stags to his knowledge retained their horns for successive years.

The stag's call, already mentioned, is termed by McMaster a "loud and somewhat metallic-sounding bellow," whilst the hind's call, a sharper but fainter note, is described as a "faint grunting low" by the same authority, who has given an excellent account of this animal's habits in his 'Notes on Jerdon.' There is also a sharp snort or cry of alarm caused by the presence of a tiger or panther, or by the sight of man.

The speed of a sámbar is very moderate, and if found on ground where riding is possible, a rare event, any fairly good horse with a rider of moderate weight can catch either stag or hind. All species of *Cervus*, I believe, can be ridden down without much difficulty. I have heard of both spotted and hog deer being speared in favourable localities. Sámbar are usually driven by beaters, or stalked, but in Ceylon it was at one time the practice to hunt them with deer-hounds and kill them with a knife, as described in Sir S. Baker's 'Rifle and Hound in Ceylon.' They are very tenacious of life, and often take several bullets before they fall. Many are killed by tigers and wild dogs. The stags fight much amongst themselves, the brow-antler, as in all deer, being the principal weapon of offence, and the wound it inflicts has the reputation of being very deadly. The flesh of the sámbar is coarse, but well-flavoured, the marrow-bones and tongue being usually retained by sportsmen for themselves; but as most Hindoos will eat deer with antlers, the meat is seldom wasted in India, as that of wild cattle and pigs often is.

368. *Cervus axis*. The spotted Deer.

Cervus axis, *Ersl. Syst. Reg. An.* p. 312 (1777); *Elliot, Mad. Jour.* L. S. x, p. 221; *Blyth, J. A. S. B.* xi, p. 1202, xxii, p. 415; *Brooke, P. Z. S.* 1878, p. 907; *Ravenscroft, P. Z. S.* 1883, p. 465; *W. Sclater, Cat.* p. 181.
Cervus nudipalpebra, *Ogilby, P. Z. S.* 1831, p. 136.



Axis major and minor, Hodgson, *J. A. S. B.* x, p. 914 (1841), no descriptions; xvi, pp. 691, 711; xvii, pt. 2, p. 486.

Axis maculata, Gray, *List Mam. B. M.* p. 178 (1843); *Kelaart, Prod.* p. 82; *Adams, P. Z. S.* 1858, p. 530; *Blyth, Cat.* p. 152; *Jerdon, Mam.* p. 260.

Chital, *Chitra*, *Jhánk*, H.; *Chatidah*, Bhagalpur; *Boro khotiya*, Beng., Rungpore; *Buriya*, Gorakhpur; *Lupi*, Kars, Gond; *Dárkár*, Korku; *Pásta*, Ho-Kol; *Sáring*, *Sáraga*, *Jati*, *Mikka*, Can.; *Dupi*, Tel.; *Pali-man*, Tam. Mal.; *Tic Muha*, Cing.

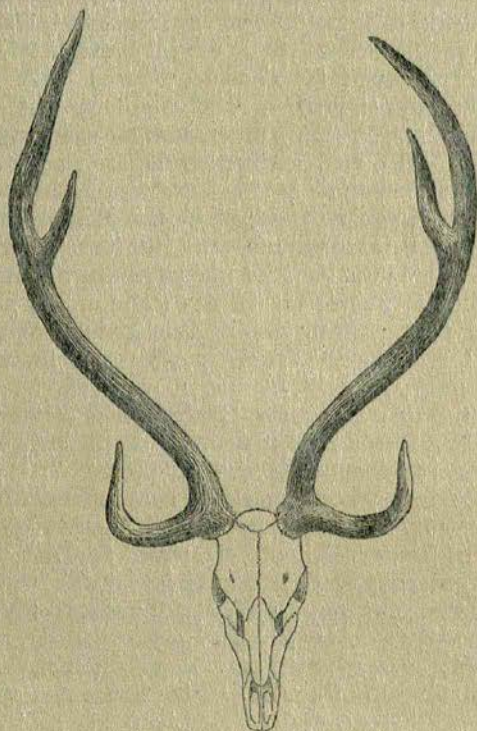


Fig. 178.—Skull and horns of *Cervus axis* (horns after Forsyth).

Size moderate. No mane. Molars very hypsodont. Muffle as in *C. unicolor*. Tail long, pointed. Interdigital glands in hind feet only (Hodgson). Upper canines generally wanting (Hodgson states that he has found them in both sexes). Horns normally with three tines, a brow-antler which joins the beam at rather less than a right angle, and two upper tines of which the outer is always much the longer. Sports or irregular points in the axil of the brow-tine very common; few fine horns are without them, but other additional points are rare.

Colour rufous fawn, spotted throughout the body with white at all seasons and all ages. A dark dorsal stripe from nape to end of tail, bordered by a single or double row of white spots on the back. Low down on the sides the white spots sometimes blend into a