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AND KAMCHATKA

WITH THREE PLATES

BY

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(WITH THREE PLATES)

A study of the larger mammals collected by the Smithsonian party on the Alpine Club of Canada expedition to Jasper Park and the Mount Robson region, during the summer of 1911, has resulted in the discovery of several unrecognized forms. The hoary marmot and the caribou from the vicinity of Moose Pass prove to be new; and a thorough study of the caribou in the National Museum collections shows the necessity of recognizing three additional forms. For the subspecies of the eastern woodland caribou found in Keewatin and Manitoba, Richardson's name *sylvestris* is revived; and new species from the Arctic coast of Alaska and from Kamchatka are named.

MARMOTA SIBILA, sp. nov.

Type from head of Moose Pass branch of the Smoky River, Alberta; 7,200 feet. Cat. no. 174503, U. S. National Museum. Adult female, skin and skull. Collected August 3, 1911, by N. Hollister and C. D. Walcott, Jr. Original no. 3871.

Characters.—A large member of the *caligata* group; much larger (as known only by the female) than *M. caligata*; coloration dark; cheeks ochraceous. Skulls of females equal in size to largest male skulls of *caligata*.

Color of type (new coat replacing the worn pelage).—Hair around nose and lips white; top of nose and malar stripe black; a whitish strip across forehead between eyes; top of head and nape mixed brown and black; sides of neck and lower throat ochraceous. Shoulders and forward part of body, above, grizzled, the hairs dull blackish underneath, white above, with brownish-black tips. Posterior part of back (still largely in the old coat) mixed brown, black, and buff. Feet black, the hands with scattering white hairs. Underparts brownish-gray, bright hazel at base of tail. Tail above with black center; bordered and tipped with dull mummy brown; beneath Vandyke brown. Immature specimens differ from young of *M. caligata*,

from western Alaska, in the great amount of black in the coat. Two young males have the whole crown, nape, lower back, and feet, black; and the tail black above and below, narrowly edged with ochraceous.

Skull and teeth.—The skulls of females are slightly larger than male skulls of *M. caligata*, and are about the size of male skulls of *M. olympus*. Compared with skulls of adult females of *caligata*, the female skulls of *M. sibilata* are very much larger, relatively narrower, and with elongated rostra. The orbital ring is relatively much smaller; the tip of postorbital process, as viewed from above, almost in center between maxillary and squamosal arms of zygomatic arch [in *caligata* much further back, or forward only about one-third the distance from squamosal arm]; coronoid process of mandible reduced, the superior notch one and one-half times as long as high at point of coronoid process [in *caligata* same length as height to point of coronoid]; teeth slightly smaller.

Measurements of type (adult female).—Head and body, 510 millimeters; tail vertebrae, 210; hind foot, 95. Skull of type and female topotype, the latter in parentheses: Condylbasal length, 101.5 (104.2); palatal length, 56.5 (62.1); postpalatal length, 40.9 (38.5); zygomatic breadth, 67 (66.3); length of nasals, 44 (40.5); alveolar length of upper tooth row, 22.5 (23.5); alveolar length of mandibular tooth row, 21 (22.3).

Remarks.—A large series of hoary marmot skulls from the Alaska Peninsula around the coast to Mount Rainier, Washington, including topotypes of *M. vigilis*, shows remarkably little variation in size; and the relative size of male and female skulls is constant. The males are considerably larger. As the female skulls of *M. sibilata* about equal the male skulls of *M. olympus*, the new species must be the largest American marmot. Specimens of the hoary marmot from Stuart Lake, Barkerville, Glacier, and other points in British Columbia, west of the main Rockies, and from northern Idaho, are much like true *caligata* from western Alaska, and show no approach toward *M. sibilata* in cranial characters. The name *Arctomys okanaganus*, proposed by King in 1836¹ for a hoary marmot from the southern interior of British Columbia thus remains in synonymy, unless the *caligata*-like marmots of these interior ranges prove subspecifically separable from true *caligata* from Bristol Bay. A female specimen

¹ Narrative of a Journey to the Arctic Ocean, Vol. 2, p. 236, 1836.

from St. Mary's Lake, Montana, is clearly referable to *M. sibirica*, which thus ranges along the eastern Rockies to the United States boundary.

RANGIFER FORTIDENS, sp. nov.

Type from head of Moose Pass branch of the Smoky River, Alberta (north-east of Mount Robson). Cat. no. 174505, U. S. National Museum. Adult male, skin and skull. Collected July 29, 1911, by N. Hollister and C. D. Walcott, Jr. Original no. 3826.

Characters.—Largest of the caribou, exceeding in measurements the largest specimens of *Rangifer osborni* and *R. montanus*. Coloration very dark, no whitish on underparts of body. Teeth conspicuously larger than in other species. Antlers stout and heavily palmed; not so long and slender as in *osborni*; main beam nearly straight. Females normally without antlers.

Color of type.—Head blackish-brown; neck grayish-brown, with a small white throat-mane. Shoulders and body deep brownish-black; a stripe of the old pelage on belly shows the long faded brown hair of the winter coat; the new coat coming in here is almost as dark as the back. Legs blackish-brown; feet broadly white around hoofs. Rump patch small, white; tail like back above, bordered with white, a continuation of the rump patch. Five topotypes, four younger bulls and one cow, show the new coat, which is replacing the faded winter pelage, to vary from clove brown to clear black.

Skull and teeth.—Skull largest in size, general proportions much as in *osborni*, but larger, more massive, and with rostrum and palate actually and relatively much broader, and nasals proportionally longer. Exceeds the largest skulls of *montanus* from the Selkirk and Gold Ranges in every measurement. Teeth conspicuously larger than in any other species; each tooth longer and much heavier. Upper premolars and the mandibular teeth especially large. Posterior external cusp of pm_3 and pm_4 separated from remainder of crown-pattern of respective teeth by a deep and broad valley, widening at the exterior edge; the cusp ridge standing almost at right angles with longitudinal axis of tooth, the crown-pattern connecting with tooth immediately behind rather than pattern of crown of tooth of which it is a part. Compared with corresponding teeth of other caribou this character is very conspicuous. In the last premolars of other species, the posterior external cusp lies close to and parallel with the diagonal ridge connecting the posterior internal cusp with the main outer cusp, from which it is separated by a narrow and shallow sulcus. Incisors of the "woodland" type

(more uniformly grading in size from middle to outer pair than in the "barren-ground" type, which decrease by conspicuous steps, with the outer pairs very small).

Antlers large and stout; main ascending beam rather straight, without the low, sweeping, backward curve of *osborni*; less slender and more palmated.

Measurements of type.—Head and body, 2,220 millimeters; tail vertebrae, 150; hind foot, 690. Skull: Condylbasal length, 427; palatal length, 268; postpalatal length, 136.5; greatest orbital breadth, 182; greatest length of nasals, 151; maxillary tooth row, crowns, 112; mandibular tooth row, crowns, 120; length of upper molars, 62.1; upper premolars, 52; greatest breadth of m^2 , 18; lower molars, length, crowns, 70.5; lower premolar row, 50.

Remarks.—From its large size and dark coloration, this species scarcely needs comparison with *Rangifer caribou sylvestris* Richardson, represented in the National Museum collection by specimens from Nelson River, Keewatin, and east of Lake Winnipeg, Manitoba. Six specimens of *Rangifer fortidens*, all from the type locality, have been examined. Apparently the females of this species are normally without antlers. A number seen and one killed lacked them, and the resident hunters all told me this was the usual condition. The cow collected, a sub-adult specimen, has small knobs on the skull, which did not pierce the skin. The type specimen, a magnificent bull, was shot by Chas. D. Walcott, Jr., in the snow fields above timberline.

RANGIFER CARIBOU SYLVESTRIS (Richardson)

1829. *Cervus tarandus*, var. β *sylvestris* RICHARDSON, Fauna Boreali-Americana, Vol. 1, p. 250.

Type locality.—Southwestern shores of Hudson Bay.

Characters.—Like *Rangifer caribou caribou* of eastern Canada, but skull longer and more slender; rostrum narrower; teeth larger, the tooth rows, especially mandibular row, longer; nasal bones longer. Neck and head darker in color; ears, back and sides of neck, much darker, the hairs brown to roots.

Measurements of skulls.—Adult male (east of Lake Winnipeg, Manitoba): Total length 417 millimeters; condylbasal length, 398; greatest orbital breadth, 163; breadth of rostrum in front of first premolars, 73; upper tooth row, 107; lower tooth row, 112.5. Adult female (Nelson River, Keewatin): Total length, 396; condylbasal length, 377; greatest orbital breadth, 165.5; breadth of rostrum in front of first premolars, 68; upper tooth row, 102.5; lower tooth row, 113.5.

Remarks.—A careful comparison of four skulls of adult caribou from Manitoba and Keewatin with ten skulls from eastern Canada and Maine, has convinced me that Richardson's *sykcestris* is a good subspecies of the eastern *Rangifer caribou*. I am indebted to Dr. Glover M. Allen, of the Museum of Comparative Zoölogy, Cambridge, Massachusetts, for the loan of several skulls of eastern caribou, to supplement the National Museum series for this study.

RANGIFER EXCELSIFRONS, sp. nov.

Type from Meade River, near Point Barrow, Alaska. Cat. no. 16755, U. S. National Museum. Adult male, skull only. Collected March, 1883, by Lieutenant P. H. Ray. Original no. 1496.

Characters.—Skull short and broad. Compared with a large series of skulls of *Rangifer arcticus* from Fort Anderson and Fort Rae, Mackenzie, it is about the same average breadth across orbits, but with rostrum considerably shorter. Braincase very high; the frontal bone abruptly rising, back of frontal depression, to a height of 35 millimeters above general plane of rostrum; angle of profile of forehead from line of nasal bones and anterior portion of frontals is about 45 degrees. The two branches of the parieto-frontal suture meet to form the median frontal suture at the apex of this high crown. Hollow between orbits deep and rounded. Teeth much as in *arcticus*. Compared with all American mainland caribou the character of this high braincase is very distinctive. The skull of *Rangifer grælandicus*, however, exhibits much the same forehead inflation, but the braincase in this species is very narrow, as opposed to the broad braincase of *R. excelsifrons*. The general shape of the skull of *excelsifrons* is much like that of the Kamchatkan reindeer but the size is very much less.

Measurements of type skull.—Condylbasal length, 366 millimeters; basal length, 344; palatal length, 230; postpalatal length, 114; greatest breadth, 175; greatest length of nasals, 119; maxillary tooth row, crowns, 92.5; mandibular tooth row, 96; upper molars, 52; upper premolars, 43; lower molars, 57.1; lower premolars, 42.

Remarks.—With a series of over eighty skulls of American mainland caribou before me, I find no specimens of other forms approaching *R. excelsifrons* in the peculiar shape of the braincase. Compared with a good series of skulls of *R. stonei*, the skull of *R. excelsifrons* is very short and relatively broad. Skulls of old male *stonei* frequently develop a longitudinal ridge on the forehead, which is very different from the general broad elevation of the crown of *excelsi-*

frons. The two skulls of *R. granti* available for comparison are peculiar in the hypsodont character of the molariform teeth. Two skulls, collected by Lieutenant Ray on the Meade River, are referred to this new species. Unfortunately no skins of caribou from the Arctic coast of Alaska are available, and the external characters of this form can not now be described.

RANGIFER PHYLARCHUS, sp. nov.

Type from southeastern Kamchatka. Cat. no. 21343, U. S. National Museum. Adult male, skull. Collected in 1883, by Dr. Leonhard Stejneger. Orig. no. 2709.

Characters.—Largest of the Palearctic reindeer; exceeds *Rangifer tarandus fennicus* of Finland in every important cranial measurement. Skull very much larger than that of *R. t. sibiricus*, with higher braincase and smaller teeth.

Skull and teeth.—Skull large, massive, and elongated. Compared with measurements of skull of *R. t. sibiricus*, as published by Doctor Lönnberg,² it is very much larger than that form, with a relatively narrower rostrum. Braincase high and rounded; frontal bones concave in center and rising abruptly, back of frontal depression, to a height of about 35 millimeters above plane of rostrum. Lachrymal vacuities large. Mandible relatively slender. Tooth rows measuring less than in *sibiricus*, but probably averaging about same actual size, and thus relatively much smaller. The incisor teeth are, unfortunately, missing.

Measurements.—For measurements of the type skull see table below.

Remarks.—As known from the skull alone, the Kamchatkan reindeer is a very different animal from the species of northeastern Siberia, referred by Doctor Lönnberg to *R. t. sibiricus* Murray. The name *sibiricus* dates, however, from Schreber, "Die Saugthiere," plate 248c, 1784, instead of from Murray's "Geographical Distribution of Mammals," as stated by Doctor Lönnberg. This fact puts the question of the name of the reindeer from the Chukchi country, as represented by the Nordqvist specimen described by Doctor Lönnberg, in a different light. A careful review of the text for the reindeer plates of Schreber's work, published in 1804, gives little help in determining a type locality for *sibiricus*. It is evident that the plate is chiefly based upon a description of the color of the 'Siberian' reindeer, furnished Schreber in a letter from Pallas—"Die sibiris-

² Arkiv för Zool., Vol. 6, hft. 1, No. 4, pp. 17-18, 1909.

chen sind nach Pallas im Sommer dunkel mausefarbig, im Winter weisslichgrau," (Schreber, l. c., p. 1034). On page 1039, Schreber says that Pallas found wild reindeer on the Kama and Ufa; and on the Obi, in the neighborhood of the Berezov Mountains. The last place, as a Pallas Siberian locality known at the time to Schreber, might be regarded as the type locality.

From our present imperfect knowledge of the Asiatic wild reindeer, it has been necessary for me to compare the Kamchatkan animal with Doctor Lönnberg's '*sibiricus*' of the Chukchi country, though it is scarcely to be doubted that there is more than the one form of this animal between the extremes of northeastern and northwestern Asia. The size and relative proportions of the Kamchatkan species are best expressed in a table of comparative measurements. In the following I have copied Doctor Lönnberg's measurements of adult male skulls of *R. t. fennicus* and of *R. t. 'sibiricus'*, and added the measurements of the type skull of the new species from Kamchatka.

	<i>R. t. fennicus</i>	<i>R. t. 'sibiricus'</i>	<i>R. phylitarchus</i>
<i>Measurements of Skulls of Adult Male Reindeer.</i>			
Basal length	357	329	387
Distance from <i>crista occipitalis</i> to tip of premaxillaries...	397	362	430
Distance from <i>crista occipitalis</i> to tip of nasals.....	302	276	325
Length of nasals	125	129	135
Width of single nasal at <i>os supramaxillare accessorium</i> ..	21	16	23.4
Width of single nasal at middle	23.5	18	25
Width of single nasal just in front of lachrymal vacuity..	36	37	43.6
Combined width of both nasals at <i>os supramaxillare accessorium</i>	36	32	40.2
Combined width of both nasals at narrowest place.....	33	29	39.5
Combined width of both nasals just in front of lachrymal vacuities	54	62	68
Distance from <i>crista occipitalis</i> to posterior end of nasals	176	147	195
Distance between tip of nasals and tips of premaxillaries..	104	92	119.5
Distance in line from <i>m</i> ² to nasal suture.....	115	103	120
Vertical height of skull on level with anterior end of nasals	69	57	74
Width of skull just behind the canines.....	69	72	75
Width of skull on a line with anterior end of nasals....	72	69	72
Interorbital width at the middle of the orbits.....	149	126	148
Width of skull on a level with <i>meatus auditorius</i>	142.5	117	153.2
Zygomatic width just behind the orbits.....	149	139	152
Length of upper molar series	85	93	91.5
Length of lower molar series	90	102	98.5
Distance from orbit to tip of premaxillary.....	243	223	268

EXPLANATION OF PLATES.

PLATE I

Molar-premolar Rows of *Rangifer* (Natural Size)

- FIG. 1 *R. fortidens*, upper left tooth row. Type. ♂ ad. Smoky River, Alberta. (Cat. No. 174505 U. S. N. M.)
- FIG. 1a. *R. fortidens*, lower left tooth row. Type. ♂ ad. Smoky River, Alberta. (Cat. No. 174505 U. S. N. M.)
- FIG. 2. *R. osborni*, upper left tooth row. ♂ ad. Klappan River, British Columbia. (Cat. No. 171093 U. S. N. M., Biological Survey Collection.)
- FIG. 2a. *R. osborni*, lower left tooth row. ♂ ad. Iskut River, British Columbia. (Cat. No. 171092 U. S. N. M., Biological Survey Collection.)
- FIG. 3. *R. montanus*, upper left tooth row. ♂ ad. Okanagan County, Washington. (Cat. No. 105947 U. S. N. M.)

PLATE 2

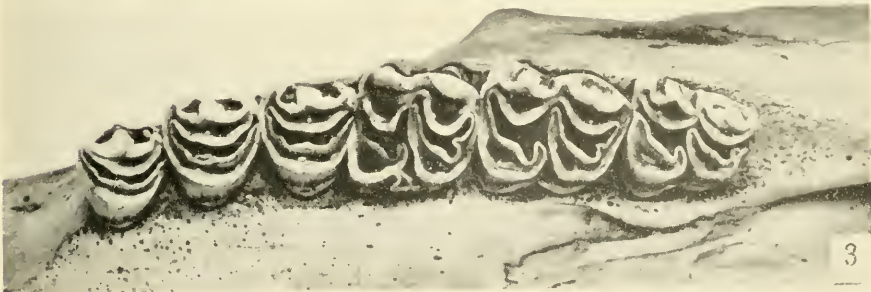
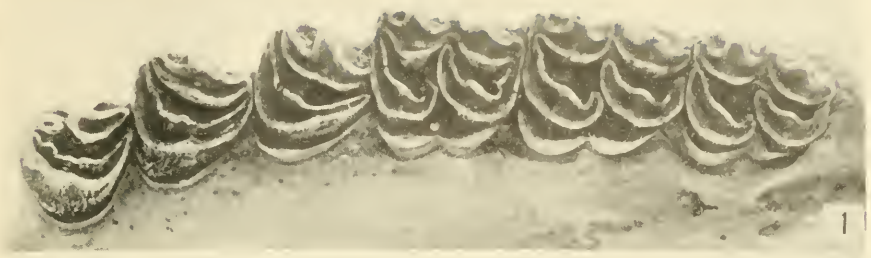
Skulls of *Rangifer* (ventral views, reduced)

- FIG. 1. *R. caribou caribou*. ♀ ad. Houlton, Maine. (Cat. No. 57823, U. S. N. M.)
- FIG. 2. *R. caribou sylvestris*. ♀ ad. Nelson River, Keewatin. (Cat. No. 3289, U. S. N. M.)
- FIG. 3. *R. phylarchus*. ♂ ad. Type. Eastern Kamchatka. (Cat. No. 21343, U. S. N. M.)

PLATE 3

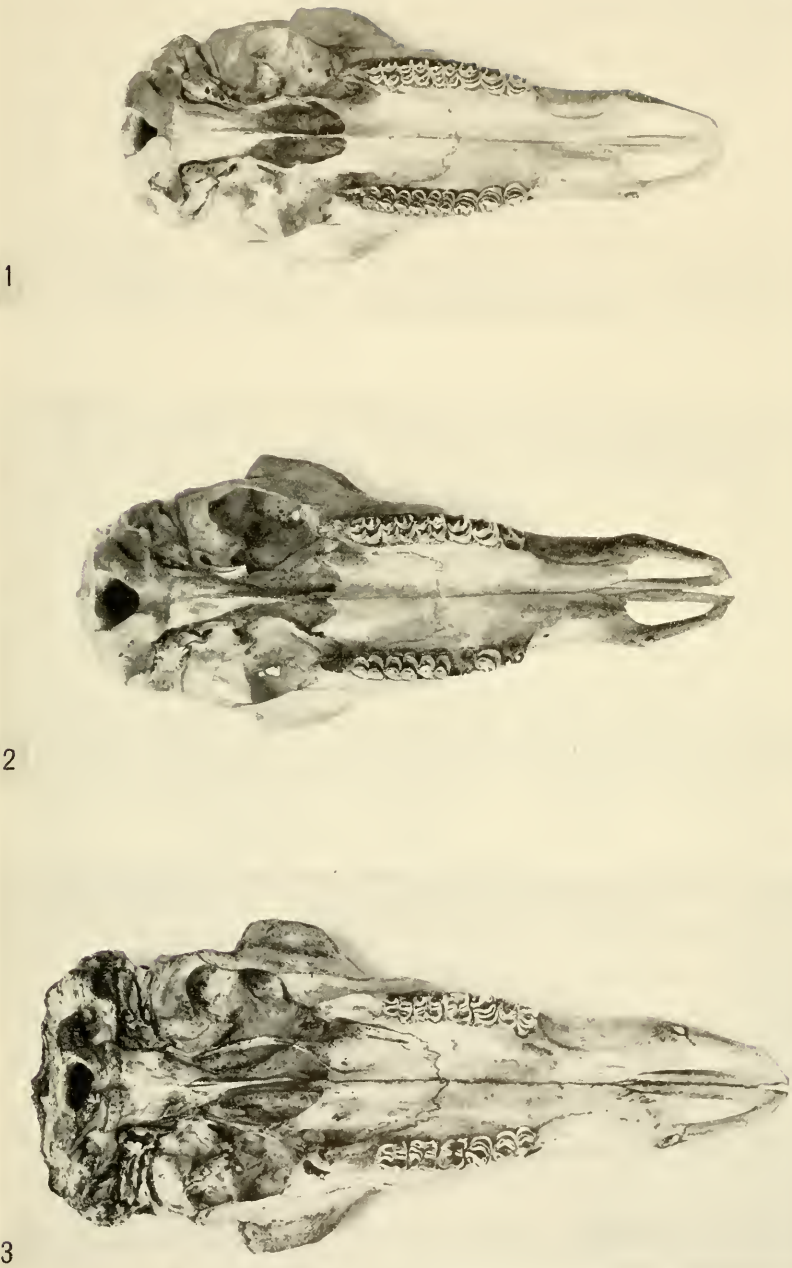
Skulls of *Rangifer* (lateral views, reduced)

- FIG. 1. *R. excelsifrons*. ♂ ad. Type. Meade River, Alaska. (Cat. No. 16755, U. S. N. M.)
- FIG. 2. *R. arcticus*. ♂ ad. Fort Rae, Mackenzie. (Cat. No. 6277, U. S. N. M.)
- FIG. 3. *R. phylarchus*. ♂ ad. Type. Eastern Kamchatka. (Cat. No. 21343, U. S. N. M.)



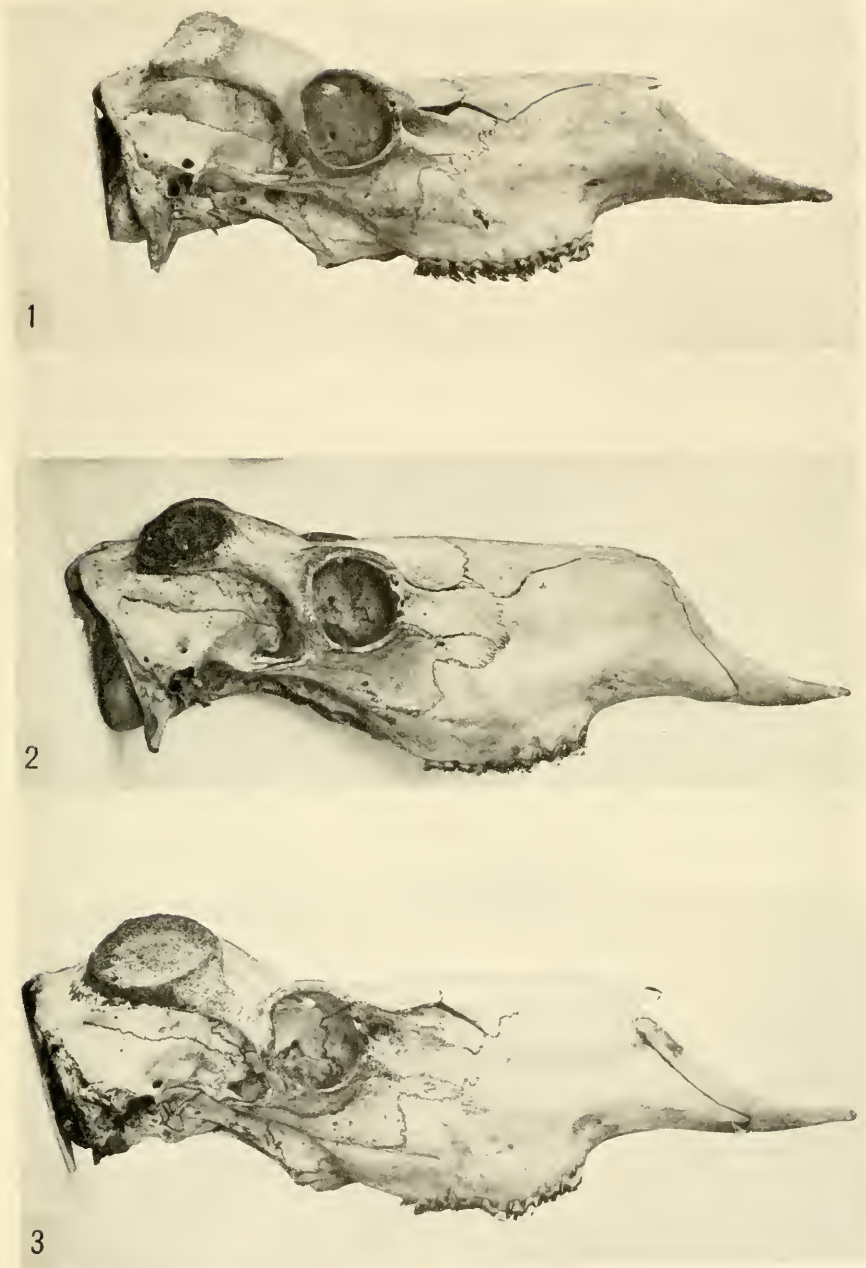
TOOTH ROWS OF RANGIFER (Natural Size).

FIGS. 1 AND 1A, R. FORTIDENS; 2 AND 2A, R. OSBORNI; 3, R. MONTANUS.



SKULLS OF RANGIFER (Reduced)

FIG. 1, *R. CARIBOU CARIBOU*; 2, *R. CARIBOU SYLVESTRIS*; 3, *R. PHYLARCHUS*.



SKULLS OF RANGIFER (Reduced)

FIG. 1, R. EXCELSIFRONS; 2 R. ARCTICUS; 3, R. PHYLARCHUS.