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III.—ON A NEW SUBSPECIES OF PORCUPINE
FROM NEBRASKA¹

BY MYRON HARMON SWENK

Nebraska porcupines all belong to the yellow-haired species (*Erethizon epixanthum*), and these animals have never been abundant in the state. Formerly, however, they were much more numerous than today, and enjoyed a more extended range in the state than they do at the present time. Up to about 1885 these animals occurred across the northern portion of Nebraska east at least to Pierce and Madison counties, there being records of four specimens secured along the small streams tributary to the Elkhorn river in these two counties between 1870 and 1885. Also, in March, 1900, a specimen was killed along the Republican river at Orleans, Harlan county, Nebraska, by Eskey Cobb and is now in the A. M. Brooking collection. As early as 1880 Aughey referred to these animals as being present in the state in small numbers only.

All of the more recent records of the occurrence of porcupines in Nebraska have come from the counties west of the 100th meridian, and mostly from the Pine Ridge of Sioux and Dawes counties and the North Platte valley in Scottsbluff and Banner counties. However, in this study I have carefully examined four mounted porcupines which are in the Rees Heaton collection and which were taken at intervals up to 1903 in Frontier and other western counties. Also, a subadult female porcupine was captured alive with a lasso near the Roseberry ranch in the Cherry county sandhills north of Mullen, Hooker county, September 12, 1914, by Carl Kiehl, quite away from any timber. This specimen was taken to Omaha and sold there, whence it came into my possession by purchase, and is now in the University collection. In August of that same year (1914), a porcupine was killed in a

¹ Publication No. 2 of the Nebraska State Biological Survey.

cottonwood grove west of the city of North Platte, Lincoln county, about three miles from the river, according to Mr. Wilson Tout. Mr. Tout saw the specimen, which, unfortunately, was not preserved.

In the winter of 1900-1901 a porcupine was reported as killed by a ranchman in the Pine Ridge near Harrison, Sioux county, but was not preserved, and a Plateau Lynx killed in southern Sioux county on February 9, 1916, had numerous porcupine quills in its head. Mr. L. M. Gates writes me that two porcupines were caught in the Ridge near Chadron, Dawes county, during the fall of 1915. But the center of abundance of this animal in Nebraska during recent years seems to be in the North Platte valley. On January 8, 1896, a specimen was received at the University from Scottsbluff county and was mounted for the Museum. During the summer of 1913 Dr. R. H. Wolcott saw a porcupine lying by the roadside in Banner county. On July 28, 1914, Mr. P. P. Wilcox, of Minatare, Scottsbluff county, caught a porcupine in an oats field seven miles north of the town of Scottsbluff, and he kept the animal in captivity in the town of Minatare for a time, but it finally chewed its way out of its cage and escaped. At about the same time Mr. J. N. Wood, of Scottsbluff, captured another specimen in about the same manner. On September 26, 1915, Mr. J. E. Dorothy found a fine old male porcupine in the trees on his farm three miles east of Mitchell, Scottsbluff county, and captured it alive. It was sent to me on September 30 and kept alive in captivity until October 19, when it was killed and added to the author's collection at the University. Later in the fall Mr. F. C. White, a neighbor of Mr. Dorothy, found another porcupine on his farm in a beet field and sent it alive to Hastings College, from whence it was sent to an eastern museum. These, with other records that I have been unable to fully verify, indicate that porcupines are yet surviving in fair numbers in extreme western Nebraska.

In 1877 J. A. Allen pointed out the large size of the porcupines from Wyoming and Montana² as contrasted with Alaska specimens. This same characteristic apparently holds true when

² *Monog. N. A. Rodentia*, p. 392.

British Columbia and California specimens are contrasted. A careful comparison of the available Nebraska specimens with the published measurements and descriptions of the various described subspecies of yellow-haired porcupines, and with specimens of the typical subspecies, convinces me that the Nebraska animal may well be separated under the name

Erethizon epixanthum bruneri subsp. nov.

NEBRASKA YELLOW-HAIRED PORCUPINE

Type.—Three miles east of Mitchell, Scottsbluff county, Nebraska, September 26, 1915. ♂ adult (No. 305, Collection of State Entomologist, University of Nebraska). J. E. Dorothy, collector.

Subspecific Characters.—Similar to *E. epixanthum epixanthum* Brandt,³ of California, but slightly larger, with the hind feet comparatively shorter, the general coloration paler and duller, the under side of the tail largely or wholly brownish yellow, the nasals broader in front and much more narrowed posteriad, the audital bullae larger, and the sagittal, supraorbital and occipital crests less developed, especially in the male; similar also to *E. epixanthum nigrescens* Allen,⁴ of northern British Columbia, but slightly larger, general coloration much paler and less blackish, and osseous crests of skull much less developed; larger, with the coloration paler and less yellowish than *E. epixanthum myops* Merriam,⁵ of Alaska, and differing further in the larger skull with the brain case broader posteriorly, and other cranial characters; very similar in its pale, dull coloration to *E. epixanthum couesi* Mearns,⁶ of Arizona, but with the skull much larger throughout than in the type of that subspecies, and probably the whole animal larger.

Color.—Adult in winter pelage: Upper parts copiously clothed with a fine, soft, woolly, black or blackish underfur which mostly conceals the white, dark brown to blackish tipped quills, which

³ *Mem. Acad. St. Petersburg*, IX, pl. i (1835).

⁴ *Bull. Amer. Mus. Nat. Hist.*, XIX, pp. 521-567 (1903).

⁵ *Proc. Wash. Acad. Sci.*, II, pp. 27-28 (1900).

⁶ *Proc. U. S. Nat. Mus.*, XIX, pp. 719-724 (1897).

are abundant everywhere and densely crowded on the neck, shoulders and hips, and become more or less tinged with yellow basally on the sides of the lower back and rump; all of this more or less overtopped with long, straight, coarse, bristle-like hairs which are concolorous with the underfur all or most of their length (pure white at extreme base), the wholly black ones being most numerous dorsally, the others having the apical exposed one-fourth or one-fifth very pale yellowish gray to greenish yellow, these partly yellowish hairs few and scattered dorsally but numerous and with a more pronounced yellow cast on the lower shoulders, sides and especially the flanks, the rump and median area of the upper side of the tail without long hairs; under parts along the midventral line with soft, fine, sooty brownish hairs, these becoming stiffer and white at their bases toward the sides and rather heavily overlaid with the long bristle-like hairs of the overfur, like those above but usually with more extensively white bases; the long, yellowish-tipped hairs of the overfur become stiffer and yellower over the flanks and extend down the sides of the tail as long, very heavy, pale yellow, spinous bristles concealing numerous yellowish white to white quills, the under side of the tail with rather short, exceedingly dense and hispid or spinous bristles which toward the base of the tail are mostly brownish yellow but become increasingly intermixed with black, so that the terminal one-half of the tail is blackish; nose, forehead to interorbital line, a ring around eyes, anterior cheeks, chin and throat covered with short, wholly blackish or brownish hairs, these abruptly intermixed on the forehead and cheeks posteriorly with stiff, appressed, whitish hairs that cover small, white quills and these developing on the occiput and nape to the normal, long overfur hairs and quills; whiskers jet black; legs with the underfur brownish sooty more or less overlaid with greenish yellow to pure gray-tipped hairs. (Description of type ♂; September.)

Adult in summer pelage: Like the winter adult but general color much darker owing to the reduction of the long, greenish-yellow tipped hairs of the overfur which more largely exposes the black underfur. (Description of a living specimen captured at Scottsbluff, July.)

Immature animal: Like the adult but general color much paler and duller, owing to the very much heavier overfur; with the greenish-yellow apical portion of the long hairs much more extended, involving the exposed one-half to two-thirds of the hairs, so that the general color of the sides, shoulders and neck is almost all greenish-yellow; whitish hairs of forehead and posterior cheeks much more numerous; underfur brownish sooty to brownish black; quills of lower back and rump more yellowish, a clear pale yellow; spinous bristles on sides of tail more strongly yellow, the ventral spinous bristles wholly brownish yellow; legs so heavily overlaid with gray-tipped hairs that the prevailing color of the limbs is gray. (Description of paratype ♀; September.)

Measurements of Type ♂.—Length to end of vertebrae, 797; length to end of tail hairs, 878; tail vertebrae, 202; tail to end of hairs, 283; hind foot, 117. Weight $22\frac{1}{2}$ pounds.

Measurements of Paratype ♀.—Length to end of tail hairs 865; tail vertebrae, 199; hind foot, 98. Near Roseberry Ranch in Cherry county, north of Mullen, Nebraska, September 12, 1914. ♀ subadult (No. 285, Collection of State Entomologist, University of Nebraska). Carl Kiehl, collector.

Erethizon epixanthum was described by Brandt in 1835 from specimens collected in California and Unalaska. Mearns in 1897 selected California specimens as typical of *E. e. epixanthum* in his cranial comparisons with *E. e. couesi*, and Merriam in 1900 described *E. e. myops* from the Alaska Peninsula, thus restricting *E. e. epixanthum* to the California form which he designated as "typical." Evidently, the assumption has been adopted by these two mammalogists that California is the type locality of *E. e. epixanthum*.

Compared, then, with an adult ♀ specimen of typical *E. e. epixanthum* from California (Independence Lake, Nevada county, July 22, 1910, L. Kellogg; Mus. Vert. Zool., 12642) the Nebraska animal is slightly larger (the California specimen is 745 mm. long; tail vertebrae, 200; hind foot, 120), except that the hind foot is comparatively shorter, and the general coloration is paler because the long, bristle-like hairs are mostly pale yellowish gray or greenish-yellow-tipped, with but few wholly black ones

even dorsally (in *E. e. epixanthum* the wholly black hairs are much more numerous dorsally and the under parts have very few pale-tipped hairs except on extreme sides), while the dense, spinous bristles on the under side of the tail are largely or wholly brownish yellow (wholly jet black in *E. e. epixanthum*).

Compared, also, with the description of *E. e. nigrescens*, which is evidently a form very close to typical *epixanthum*, but blacker, the Nebraska animal is again slightly larger (the adult ♂ type of *E. e. nigrescens* is 740 mm. long; tail vertebrae, 210; hind foot, 90) and differs in coloration much as from typical *epixanthum*, only in even greater degree, since in *E. e. nigrescens* the long dorsal hairs are almost wholly black, with pale-tipped hairs only on the nape, sides of lower back and thighs, while the under parts are wholly sooty black and the long, spinous bristles on the sides of the tail are black, broadly tipped with yellowish white.

From *E. e. myops* the Nebraska form differs, as does typical *epixanthum*, in the paler, less yellow coloration of the pale-tipped hairs of the sides, flanks and sides of the tail, and by the sides of the face and interorbital region being less grayish-haired in the mature animal. It also appears to be a larger animal than *E. e. myops*. *E. e. couesi* is smaller than *E. e. bruneri*, but the two are apparently very similar in coloration.

Compared with an adult ♀ specimen of the Canada porcupine, *E. dorsatum dorsatum* (Linnaeus)⁷ from Wisconsin (Sayer, November 11, 1907, E. Heller; Field Mus. Nat. Hist., 16284), the Nebraska porcupine differs in the more abundant long, pale-tipped hairs, which are yellowish gray or greenish yellow in color (comparatively few and white or yellowish white for the terminal one-fourth or one-fifth of their length in *E. dorsatum*), in the long, yellowish bristles on the sides of the tail (much shorter and white or whitish in *E. dorsatum*), in the more grayish legs (mostly black in *E. dorsatum*), in the largely brownish yellow color of the under side of the tail (wholly jet black in *E. dorsatum*), and in the white or yellowish, dusky tipped quills of the lower back, rump and flanks (quills of the lower back and flanks clear white with the extreme tips black, of the rump wholly black,

⁷ *Syst. Nat.*, ed. 10, I, p. 57 (1758).

in *E. dorsatum*). The Nebraska animal is larger than this Wisconsin specimen (which is 790 mm. long; tail 190; hind foot 93) but does not reach the maximum measurements given for *E. dorsatum* by Allen (875–1,000 mm.) and Elliott (900–1,200 mm.). *E. dorsatum picinus* Bangs,⁸ from Labrador, with a shorter tail (166 mm.) and longer hind foot (124 mm.) than typical *E. dorsatum*, probably differs in much the same color characters.

Skull.—Measurements of the type in millimeters: Total length, 115.5; basal length, 99; basilar length of Hensel, 95; occipito-nasal length, 111; zygomatic width, 73; interorbital width, 30; length of nasals, 40; width of nasals in front, 21; width of nasals behind, 15.5; length of upper molariform teeth, 27.5; audital bullae, 21×16.5 ; length of mandible, 83; height of mandible, 36.5.

Inasmuch as the skulls of *Erethizon* exhibit considerable sexual variation, for a proper analysis of the characters the skulls of the sexes are better compared separately. The adult ♂ type skull of *E. e. bruneri* compared with the skull of an adult ♂ specimen of *E. e. epixanthum* from California (Whitney Creek, Sierra Nevada mountains, August 26, 1911, Storer and Taylor; Coll. Mus. Vert. Zool., 16216) differs distinctly in its greater length, comparatively shorter and broader rostrum, the much more posteriorly narrowed nasals which are more convex when viewed in profile, larger audital bullae, less developed depression on the top of the skull in the fronto-parietal region, lower lateral borders of interorbital region without any knob-like processes posteriorly, and much less developed sagittal and occipital crests. The ♀ skull exhibits much the same differences, only they are less pronounced. The ♀ paratype skull of *E. e. bruneri* compared with the skull of a ♀ specimen of *E. e. epixanthum* from California (Coll. Mus. Vert. Zool., 12642) though of the same length is distinctly more slender, the nasals are broader and narrow distinctly between the anterior and posterior margins (*E. e. epixanthum* ♀ has the nasals narrower in front than behind and their sides subparallel), and the audital bullae are distinctly larger. The differences in the development of the borders of the interorbital region and the sagittal and

⁸ *Proc. New England Zool. Club*, II, p. 37 (1900).

occipital crests are not very great, though slightly stronger in *E. e. epixanthum*.

Compared with the description of the skulls of ♂ and ♀ *E. e. nigrescens*, *bruneri* apparently differs, as from *E. e. epixanthum*, in the poorly developed fronto-parietal depression and lateral border of the interorbital region. In these respects the skull of *E. e. bruneri* agrees with that of *E. e. myops*, as well as in the poorly developed sagittal and occipital crests; but the skull is longer and the nasals are more narrowed posteriorly than in *myops*, while the brain case does not narrow posteriorly but rather broadens, and the form of the zygoma and the outer wall of the antorbital vacuity are not as described for *myops* but as these occur in *epixanthum*. The skull of *E. e. bruneri* is much larger than that of the subadult type of *E. e. couesi*, and the audital bullae are as large or even larger than in that form, but the form of the nasals is apparently much the same. In the figures given by Baird⁹ of a paratype of *E. e. couesi* (Bill Williams Fork, Arizona, 1854, C. B. R. Kennerly; U. S. N. M., 1262) the nasals resemble those of typical *epixanthum* ♂ and the audital bullae are no more inflated than in *epixanthum*; possibly this specimen really represents *epixanthum* and not *couesi*.

The skull of *E. e. bruneri* ♀ compared with an adult ♀ skull of *E. dorsatum dorsatum* from Wisconsin (Field Mus. Nat. Hist., 16284) reveals considerable similarity, the nasals in both forms narrowing posteriad from the anterior extremity, but these bones are throughout broader and proportionately longer in *bruneri*, more than one-third of the total length of the skull, while in *E. dorsatum* they are less than one-third of the total length of the skull. These differences are even more accentuated between typical *epixanthum* and *dorsatum*, but less so between *myops* and *dorsatum*. The form of the outer wall of the antorbital vacuity in *dorsatum* also resembles that described for *myops* rather than that of *epixanthum*, *couesi* or *bruneri*.

These cranial differences may be expressed concretely by the following table of typical measurements:

⁹ *Mammals of North America*, plate LV, fig. 1, a, b, c, d and e.

	Total Length ¹⁰	Greatest Zygomatic Width	Least Interorbital Width	Greatest Length of Nasals	Width of Nasals in Front	Width of Nasals Behind ¹¹	Length of Upper Molariform Teeth	Audital Bulge ¹²	Length of Mandible ¹³	Height of Mandible
<i>F. e. epixanthum</i> . Ad. ♂ (M.V.Z., 16216).....	107	72	29	37	19	18	26	19x15	84	32
<i>E. e. nigrescens</i> . Ad. ♂ (Type, A. M.N.H., 20772).....	105	67	..	..	..	..	26	.....	..	..
<i>E. e. bruneri</i> . Ad. ♂ (Type, U.N., State Ent. 305).....	115.5	73	30	40	21	15.5	27.5	21x16.5	83	36.5
<i>F. e. epixanthum</i> . Ad. ♀ (M.V.Z., 12642).....	98	71	34.25	38	19.5	21.5	24	20.5x16.5	78.5	35
<i>E. e. nigrescens</i> . Ad. ♀ (A.M.N.H.)	104	71	29	..	..	..	28	.....	..	..
<i>E. e. bruneri</i> . Subad. ♀ (U.N., State Ent., 285)	97.5	67	30.5	34	22.5	20.5	26	22.75x17.5	77	37.5
<i>E. e. couesi</i> . Subad. (♀?) (U.S.N.M., 6501) ¹⁴	86	64.25	25	30	18.25	15.75	23.75	21x16.7	62.5	29.25
<i>E. d. dorsatum</i> . Ad. ♀ (F. M.N.H., 16284).....	96	64	25	29.5	17	15	24	21x17	76.25	33

¹⁰ Distance from front edge of premaxilla to posterior edge of occipital condyles.

¹¹ Distance across nasals between postero-superior angles of premaxillæ.

¹² The width is taken across the widest point between basioccipital suture and inferior edge of auditory tube.

¹³ Chord of the distance from front edge of the mandibular symphysis to the end of the angular process.

¹⁴ Measurements translated into millimeters from Allen, *Monog. N. A. Rodentia*, p. 395, and from the original description of Mearns.

As to the geographical range of *E. e. bruneri*, I do not have the material or data to indicate except in a very general way. The specimens recorded by Baird from Kansas (Republican

	Total Length	Greatest Zygomatic Width	Least Interorbital Width	Greatest Length of Nasals	Width of Nasals in Front	Width of Nasals Behind	Length of Upper Molariform Teeth	Length of Mandible	Height of Mandible
<i>E. e. bruneri</i> :									
Republican Fork, Kansas. Ad. ♂ (U.S.N.M., 2595).....	106	71	31	45	24	18	28	79	38
Republican Fork, Kansas. Ad. (sex?) (U.S.N.M., 2594).....	104	71	33	41	..	17.5	27	74	39
Fort Bridger, Wyoming. Ad. (sex?) (U.S.N.M., 3657).....	112	78	34	44.5	26	22	30.5	..	..
Wyoming. Ad. (sex?) (U.S.N.M., 11564).....	104	72.5	31	38	24	20	28	76	38
Wyoming. Imm. (sex?) (U.S.N.M., 6863).....	..	..	26.5	32	20	16	24	72	..
Three Buttes, Montana. Ad. ♀ (U.S.N.M., 13977).....	107	71	27	42	22	18.5	26.5	78	36
Three Buttes, Montana. Ad. ♀ (U.S.N.M., 13978).....	99	..	31	41	24	19.5	26	73	39
<i>E. e. epixanthum</i> ?									
Idaho. Imm. (sex?) (U.S.N.M., 12405).....	95	70	33	37	24	23	27.5	71.5	37
Utah. Ad. (sex?) (U.S.N.M., 3680).....	102	77	30	40	21.5	19.5	28	80	38
<i>E. e. myops</i> : ¹⁶									
Fort Yukon, Alaska. Ad. (sex?) (U.S.N.M., 6528).....	97	72	33	35	23.5	20	26	79	38
Yukon River, Alaska. Ad. (sex?) (U.S.N.M., 6105).....	103	73	31	..	..	..	24	80	38
Yukon River, Alaska. Ad. (sex?) (U.S.N.M., 6104).....	104	72	34.5	40	21.5	19	26	80	36.5
Yukon River, Alaska. Imm. (sex?) (U.S.N.M., 6108).....	100	70.5	30	..	..	..	26	79.5	35.5
Yukon River, Alaska. Imm. (sex?) (U.S.N.M., 6106).....	94	..	33	..	..	..	26	72	33
Peel River, Alaska. Imm. ♂ (U.S.N.M., 6237).....	94	73	32	37	21.5	19.5	25	74	34
Peel River, Alaska. Imm. ♀ (U.S.N.M., 6238).....	91.5	..	27	32.5	19.5	17	24	71	35
Alaska. Imm. (sex?) (U.S.N.M., 8948).....	83	63	32	..	..	..	22	64	30.5

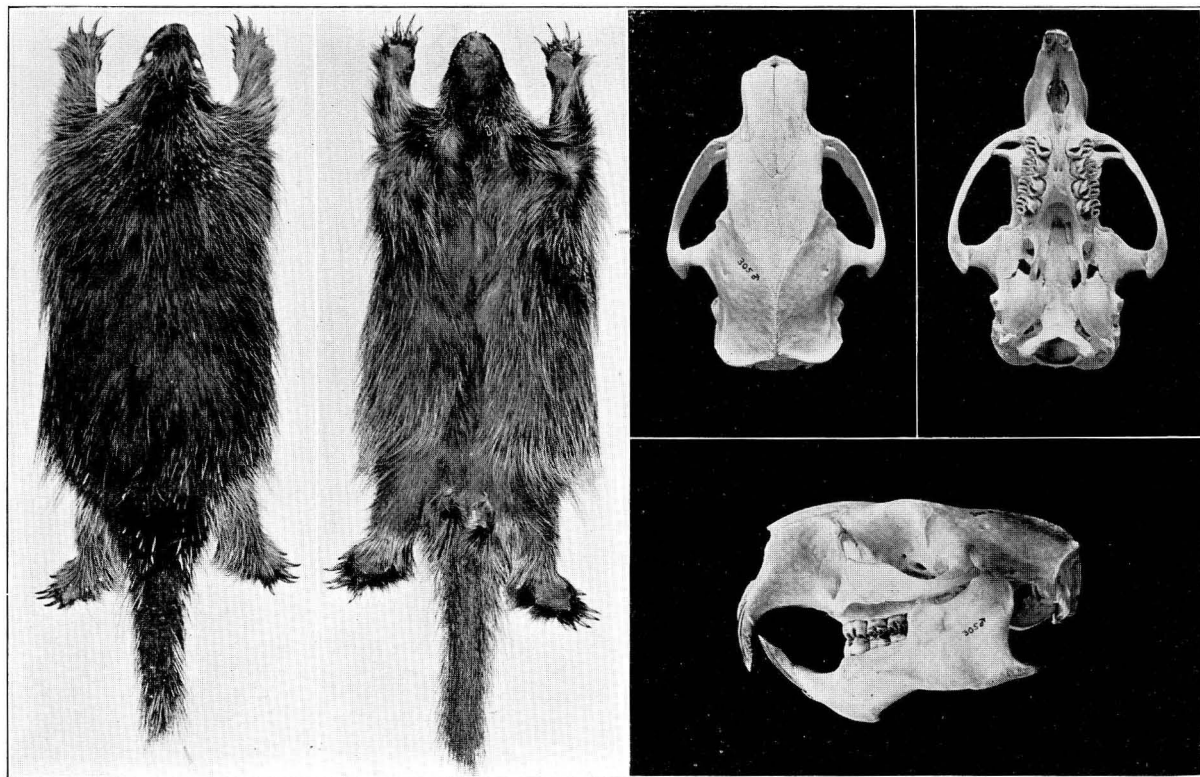
¹⁶ According to Osgood (*N. A. Fauna*, 30, pp. 26, 56 and 80), the porcupines of this region are referable to *E. e. myops*.

Fork, October 6 and 7, 1856, W. S. Wood, U. S. N. M., 1896-2594 and 1897-2595) from their large size (1896, length 812, tail 162; 1897, length 819, tail 212) and the posteriorly much narrowed nasal bones undoubtedly belong to *bruneri*.¹⁵ The three skulls from Wyoming measured by Allen (F. V. Hayden; U. S. N. M., 3657, 6863 and 11564) are large, and this, with the dimensions of the nasals, indicates that these are also *bruneri*. The two adult ♀ skulls from Three Buttes, Montana, measured by Allen (August 1 and 31, 1873, E. Coues; U. S. N. M., 13977 and 13978) are proportioned essentially like the Wyoming specimens; however, the Montana specimen figured by Baird as representative of *epixanthum* (Fort Union, U. S. N. M., 822; *Mamm. N. A.*, p. 571 and pl. LV) is not only small, being probably immature, but has the nasals nearly as wide posteriorly as anteriorly and is possibly an intergrading specimen with *E. e. epixanthum*. The Idaho and Utah skulls (U. S. N. M., 12405 and 3680, respectively) are apparently also intergrades with *E. e. epixanthum*. The skulls of *E. e. myops* are smaller and have the nasals formed as in *E. e. epixanthum*. The following table has been compiled in millimeters from Allen's measurements, and is appended for comparison.

The writer takes pleasure in naming this new subspecies for Professor Lawrence Bruner, of the University of Nebraska, in recognition of his pioneer work upon the fauna of Nebraska and his continued enthusiasm toward the furthering of our knowledge concerning it. The writer also wishes at this time to acknowledge his obligation to Dr. Joseph Grinnell, of the Museum of Vertebrate Zoology, University of California, for the loan of California specimens of *E. e. epixanthum* for comparison, and for permission to publish photographs of these specimens along with the Nebraska form, and to the authorities of the Field Museum of Natural History for the loan of material representative of *E. d. dorsatum*.

¹⁵ Measurements taken from those given by Baird, *Mammals of N. A.*, p. 571, and Allen, *Monog. N. A. Rodentia*, p. 395.

PLATE I.



Erethizon epixanthum bruneri ♂

Type.—Skin one-tenth natural size; skull two-fifths natural size.

PLATE II.



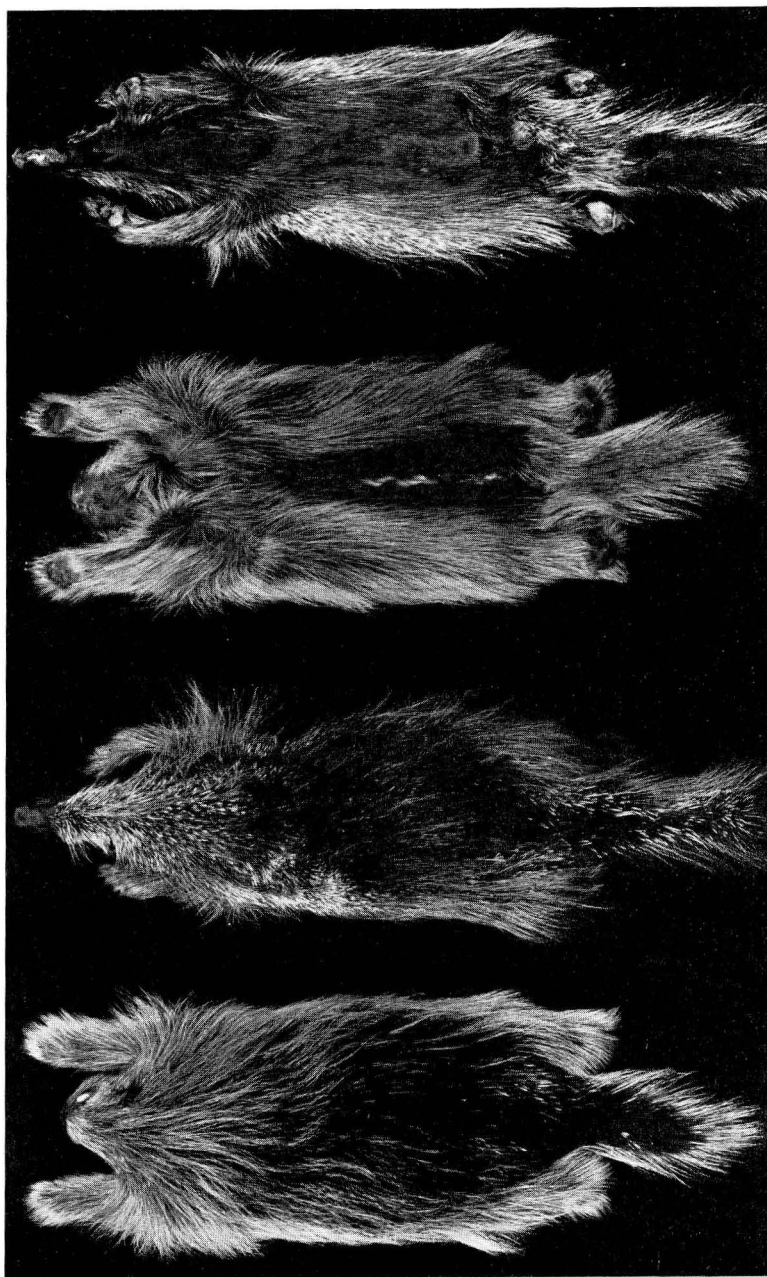
E. e. epixanthum ♂

E. e. epixanthum ♀

E. e. bruneri ♀

Skulls two-fifths natural size.

PLATE III.



E. e. epixanthum ♀

E. e. bruneri ♀

E. e. epixanthum ♀

E. e. bruneri ♀