

REPORTS

OF

EXPLORATIONS AND SURVEYS,

TO

ASCERTAIN THE MOST PRACTICABLE AND ECONOMICAL ROUTE FOR A RAILROAD

FROM THE

MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

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are spread from one end of the continent to the other, although many of them are quite limited in their distribution. But one species is mentioned as occurring in South America. Of the second genus, *Lagomys*, there is only one species known in North America, viz: *L. princeps*, or little-chief hare of the Rocky Mountains; none occur in South America.

I have thus sketched out the principal facts in regard to the distribution of the North American *Rodentia*, leaving the details for consideration under more particular heads. It is by no means unlikely that further investigation may require considerable modification in these views, in the addition of many now unknown genera and species, or in the discovery of new localities.

There are a few points in the structure of the *Rodentia* to which brief allusion may be made before proceeding to the consideration of the families composing the group. As already stated, one family, the *Leporidae*, have four incisors in the upper jaw instead of two; a second much smaller pair occurring immediately behind the first, and receiving upon their surface the end of the lower incisors. In the young hares there are six incisors at birth, or a little after, arranged in three pairs, one behind the other. The central pair soon becomes absorbed by pressure from that behind it and disappears.

In *Rodentia*, generally, the incisors of both jaws are usually very long, and describe segments of circles, which in the upper jaw are of smaller radius, but larger arc, than those in the lower. Different groups vary considerably in the point or region attained by the root of the incisors, which thus affords distinctive characters of much importance. The incisors are provided at their roots with a persistent pulp which, constantly forming new tooth substance, keeps them of the same length in supplying the wear of the incisive surfaces. The front of the incisors being composed of enamel, and the main body of it behind the enamel of dentine, the latter wears away more rapidly than the former, and thus is maintained the sharp, chisel-like edge, so necessary to the gnawing function. When one incisor becomes broken off or diseased, the corresponding one continues to grow at quite a rapid rate, and sometimes attains to a considerable length, and may even penetrate the bone or muscle in recurving. I have seen this frequently in the case of the wood-chuck, *Arctomys monax*, L., as well as in other species.

The molar teeth of the *Rodentia* vary in number from $\frac{6-6}{3-3}$ in the hares, to $\frac{2-3}{3-3}$ in the rats; sometimes, indeed, one jaw may exhibit but two teeth. In some forms they are provided, like the incisors, with a persistent pulp which keeps them growing all the time, and supplies the wear and tear of mastication; in others they are rooted, with distinct fangs, and do not continue to grow after these are fully formed. It frequently happens that, in extreme age, the first mentioned kind of molars which, in their normal state, are of uniform size, prismatic, or rounded from top to base, with a diminution in the supply of pulp, throw out short irregular fangs, approximating them in appearance to the rooted molars. The difference in symmetry and regularity, is, however, readily noticeable.

The molars of rodents, in many cases, are very complicated in their structure, and always consist of three portions; the hard enamel which in ridges or layers enfolds or covers the softer and principal component, the dentine; the cement, or *crusta petrosa*, is exterior to the enamel; sometimes forming a thin coat, perhaps only discernible near the base of the crown, (as in many rooted teeth,) and at others filling up all its outer angles and concavities. This is the case generally in the molars without roots, where, occasionally, the cement may completely encircle an island of enamel.

The relative distribution of these constituents of the molars, varying so much in pattern and outline, furnishes excellent subordinate determining characters, being remarkably constant in

the species. It is frequently necessary, however, to take into consideration the age of the animal, as, in consequence of the different elements of the teeth not being parallel to each other, they vary in their respective distances with different degrees of attrition. Again: if the enamel coats the exterior of the crown, and on the grinding surface is studded with tubercles, when these are ground off, we may find an external frame of enamel enclosing a space of dentine, which, if the enamel has dipped down deep into its substance, may still retain islands of the latter component. This condition has given rise to much confusion, and added numerous synonyms to science.

Most Rodents have the tibia and fibula distinct. In the *Muridae* and *Leporidae*, however, they are ankylosed below. All have clavicles, with a few exceptions among the *Hystricinae*, although in the hares they are very small. The normal number of digits is five to each foot; the thumb, however, is generally more or less rudimentary; on the hind foot the whole five are present in most genera, though in some only four are evident; and in others, as *Dipus*, *Cavia*, and *Dasyprocta*, there are but three. All Rodents, but the caviæ and hares, can use the fore feet as instruments of prehension in conveying food to the mouth.

The intestinal canal is generally long, and provided with a distinct cæcum, except in the *Myocina*, which is without it. None of the North American Rodents, as far as known, are without a cæcum.

The systematic arrangement of the *Rodentia*, with its numerous pseudomorphous forms, has been a subject of much discussion among zoologists, whose views have varied materially, according as different characters were selected as the basis of classification. Mr. G. R. Waterhouse,¹ however, has been most successful in furnishing a natural system by which the zoological peculiarities of different groups tally remarkably well with the chief points in their geographical distribution. The structure of the skull, and especially of the lower jaw, furnished him with characters readily appreciable. In Charlesworth's Magazine, he arranged the *Rodentia* in three sections—*Murina*, *Hystricina*, and *Leporina*; in Johnston's Physical Atlas, however, the more natural series is adopted of *Sciuridae*, *Muridae*, *Hystricinae*, and *Leporidae*. *Geomys*, previously placed by him among the Arvicoline section of the *Muridae*, he sets aside with *Perognathus*, *Dipodomys*, *Sacomys*, and *Heteromys*, as forming a natural group of uncertain position, and in the Natural History of Mammalia, gives them the provisional name of *Sacomysina*. In this I agree fully with him, the group having certain characters common to all, and exceptional to nearly all others. I would, however, raise it to the rank of a family, and as such, of equal prominence with the four first mentioned above.

The characters of these groups are to be found in the general form, presence, or absence of cheek pouches; form of the tail; shape of teeth and skull, especially of the lower jaw, &c. They may be given briefly as follows:

I. *LEPORIDÆ*.—Incisors $\frac{4}{2}$, molars $\frac{4-4}{2-2}$ or $\frac{5-5}{2-2}$, rootless. Skull with the two optic foramina united. The lower jaw with very flat rami, which are of great size; *Symphysis menti* nearly horizontal; condyloid process very high and broad; the coronoid represented by a mere ridge

¹ Observations on the *Rodentia*, with a view to an arrangement of the group founded upon the structure of the crania. By G. R. Waterhouse. Charlesworth's Mag. of Nat. Hist. III, 1839, 96, 184, 374, 593. Also, in *Annals and Magazine of Nat. Hist.*

A Natural History of the Mammalia. By G. R. Waterhouse. Vol. II, containing the order *Rodentia*. London, 1848. H. Baillière.

Table of the orders *Rodentia* and *Ruminantia*, Philology and Zoology, No. 5. In Keith Johnston's edition of Bocharov's Physical Atlas. Fells. Edinburgh, 1849.

on its outer side. Descending ramus very large and flat. Tibia and fibula ankylosed below. This family contains but two genera, *Lepus* and *Lagomys*, both found in North America; the former represented by many species, the latter by a single one.

II. HYSTRICIDÆ.—Incisors $\frac{2}{1}$, molars $\frac{4-4}{3-3}$, with or without roots. The snout clothed with short hairs. The skull with a large ante-orbital opening in the zygomatic process of the upper maxillary; the lower jaw with the angular portion joined to the outer, not the under surface of the bony covering of the inferior incisor; tibia and fibula distinct.

Of the six sub-families of this group, *Hystricina*, *Dasyproctina*, *Echymyina*, *Octodontina*, *Chinchillina*, and *Caviina*, North America possesses but a single genus, *Erethizon*, belonging to the *Hystricina* above mentioned. Mexico has, however a second in *Cercolabes*. The entire group belongs to America, except the few species of true *Hystricina*, which are found in Asia and Africa, and some genera of *Echymyina*.

III. MURIDÆ.—Incisors $\frac{2}{1}$; molars, rooted or rootless, $\frac{4-4}{3-3}$ to $\frac{2-2}{3-3}$, usually $\frac{3-3}{3-3}$; they diminish posteriorly. A conspicuous opening on the zygomatic process of the upper jaw, which is a vertical slit, widened above, except in the *Dipodina*, where it is a more expanded aperture. The coronoid and condyloid processes and descending ramus distinct and well developed, situated in nearly the same plane, the latter more or less twisted.

This family abounds in North American representatives, belonging to the sub-families of *Dipodina*, *Murina*, and *Arvicolina*. The genera are, *Jaculus* for the first; *Hesperomys*, *Reithrodon*, *Neotoma*, and *Sigmodon* for the second; and *Arvicola*, *Myodes*, and *Fiber* for the third. The *Dipodina* in some points exhibit considerable differences from the other sub-families, and may prove to be of independent rank.

IV. SACCOMYIDÆ.—Incisors $\frac{2}{1}$, molars $\frac{4-4}{3-3}$, quite simple, and mostly rootless. No perforation or foramen in the zygomatic process of the upper maxillary. The auditory bullae very far back, sometimes forming part of the back of the head. The condyloid process is small; the descending ramus is twisted nearly horizontally at its upper angle, so that when viewed from above a great portion is visible with a tubercle covering the end of the incisor between it and the condyle.

On each side of the head are cheek pouches, opening externally to the mouth. Five toes to each foot; the fore feet usually with broader palms and longer claws than the hinder ones.

This very curious family is eminently characterized by its cheek pouches, which are exterior to the mouth entirely, instead of opening from within it, as in *Tamias*, *Spermophilus*, &c. The peculiarities of these pouches will be discussed more particularly hereafter.

The genera of this family are confined to North and Central America. *Geomys*, *Thomomys*, *Dipodomys*, and *Perognathus* occurring within the United States; *Heteromys* and *Sacomys*, on the other hand, being extra limital. In this country, species of this family are, however, confined mainly to the region west of the Mississippi.

V. SCIURIDÆ.—Incisors $\frac{2}{1}$, molars $\frac{5-5}{3-3}$, in many American forms $\frac{4-4}{3-3}$; nearly equal in size, except the anterior, when five are present. Molars mostly rooted. No foramen in the zygomatic process of the superior maxillary; the ante-orbital foramen very small, and appearing far forward. A distinct post-orbital process in the typical forms. Lower jaw with the descending ramus broad and inflected at its lower angle.

Among the North American species of this type, there are several distinct sub-families, which will be referred to hereafter. The genera are *Sciurus*, *Pteromys*, *Tamias*, *Spermophilus*, *Cynomys*, *Arctomys*, *Aplodontia*, and *Castor*.

FAMILY.

SCIURIDÆ.

Molars $\frac{5-6}{4-4}$ or $\frac{4-5}{4-4}$, rooted or rootless. No ante-orbital foramen in the anterior root of the zygoma, or else small and rounded. Tibia and fibula distinct.

The family of *Sciuridæ* as above constituted, and embracing the sub-families *Sciurinae*, *Myoxinae*, and *Castorinae*, has an extensive range: the first, throughout the world; the second, in Europe, Asia, and Africa; the third, in Europe, Asia, and North America. The most prominent characters by which the sub-families may be distinguished are as follows:

Sciurinae.—A distinct post-orbital process. Molars rooted, $\frac{5-6}{4-4}$.

Myoxinae.—No post-orbital process. Molars rooted, $\frac{4-4}{4-4}$. No coecum.

Castorinae.—No post-orbital process. Molars rootless, $\frac{4-4}{4-4}$, ($\frac{5-5}{4-4}$ *Aplodontia*.)

SUB-FAMILY SCIURINÆ.

Molars, $\frac{5-6}{4-4}$, (the anterior upper sometimes deciduous,) rooted; all nearly equal in size, except the anterior upper when there are five. A distinct post-orbital process of the frontal bone. The infra- or ante-orbital foramen very small, not piercing the broad plate of the zygoma, but anterior to this.

The *Sciurinae* constitute a very natural group as characterized above, although there is a great diversity of appearance between the delicately formed and graceful arboreal true squirrels, at one end of the series, and the clumsy, squat, terrestrial marmots at the other. The component genera, *Sciurus*, *Pteromys*, *Tamias*, *Spermophilus*, and *Arctomys*, are all fully represented in North America by more species than are found in other parts of the world; only one genus, *Pteromys*, having more species elsewhere than here.

The muzzle is generally broad, owing to the development of the frontal and nasal bones. The acute process of the orbital edge of the frontal, which, pointing backwards, forms the hinder upper boundary of the orbit, is a peculiarity only found elsewhere, if I am not mistaken, among the hares. The palatine surface is large and broad, on the same plane from behind the incisors; the incisive foramina far forwards and entirely in the intermaxillaries, seldom if ever passing backwards into the maxillary, which does not send forward a thin plate. The posterior margin of the palate passes considerably behind the last molar. There are two palatine foramina, either in the palato-maxillary suture or behind it.

The zygomatic process of the upper maxillary is a broad thin plate which rises obliquely from the bone, is cylindrically concave in front, and has a broad concave notch at its lower edge, the postero-inferior edge of which is on a level with the bottom of the palate internally, but externally rises somewhat above this level; superiorly, this palate reaches up nearly to the top of the skull, articulating on the edge of the muzzle with the intermaxillary. There is, usually,

no perforation in this plate at all, the infra-orbital foramen for the passage of the nerve opening far forward, except in *Tamias*, some distance beyond the molars, nearly in a line with them or just above and close to the process of the maxillary, near the palate for the attachment of the tendon. The foramen is oval, as in *Tamias*, or triangular, (*Spermophilus*), or vertically compressed, (*Sciurus*), and is situated a short distance anterior to the molars, with a bony margin, generally tubercular, below.

The malar bone is of great extent, as in the family generally. Anteriorly, it extends forward, and is wedged between the lachrymal and the maxillary; posteriorly it reaches behind further than the process of the temporal, and constitutes the outer, and in part the posterior boundary of the glenoid cavity.

The descending ramus of the lower jaw is nearly quadrate, its upper posterior angle acute and directed upwards from the line of the condyle; and the lower posterior angle rounded and directed inwards. The lines formed by the lower margin of the descending ramus on each side are nearly parallel. The horizontal rami meet in front and join by a symphysis of limited extent.

The molars are normally $\frac{5-5}{4-4}$, (sometimes, in the young? $\frac{5-5}{3-3}$). The anterior upper molar is, however, deciduous at an early age in many American squirrels, (especially the fox-colored ones,) reducing the formula to $\frac{4-4}{4-4}$. The anterior upper molar, (where there are five,) is much smaller than the rest, with a simpler crown and a single root. The other molars are simple, with three or four roots. Their crowns are rhomboidal or sub-trigonal; the grinding surface with four transverse ridges going nearly across, one on the anterior and posterior margins, and two intermediate, usually most elevated; these are sub-parallel or sub-convergent.

The body is covered with hair varying from extreme softness to great coarseness. The eyes are well developed. Ears are variable from a mere rudiment to a considerable length. Tail sometimes longer than the body, sometimes only one-tenth the length; always densely coated with hair, usually longest on the sides.

The coccyx is large, the clavicles perfect, the tibia and fibula distinct, and the upper lip cleft.

In an excellent monograph of the *Spermophiles*, Brandt¹ distinguishes the squirrels proper from the marmot squirrels by certain characters which may serve to systematize and simplify the consideration of so large a group as that of the *Sciurinae*, as given above. To the squirrels proper he applies the term *Campsiurina*, which includes *Sciurus*, *Xerus*, *Pteromys*, and *Tamias*, while the *Arctomyina* embrace *Arctomys* and *Spermophilus*, with its sub-genera, *Colobotis* and *Otospermophilus*. The characters of these tribes are as follows:

Tribe I. CAMPSIURINA.—True squirrels. First upper molar much the narrowest, oblong-linear, very simple, shorter than the second, very rarely almost equal in length and about one-eighth the size, conical or sub-conical, very often deciduous. Crowns of the greater molars, except the last, sub-tetragonal or rhomboidal, a little narrowed internally, with two central folds or ridges, nearly parallel, and sometimes with one or more accessory ridges. The anterior dentiform tubercles of the lower molars exceed but slightly, or not at all, in height the height of the crowns. The ridges of the soft palate between the molars are equal in number or nearly so to the molars, quite distinct. The fourth finger often, the third not rarely, longer than the rest. Claws trigonal at the base, strongly compressed and much hooked, generally shorter than the fingers.

¹ Sur les différentes espèces des Sciuriques de Russie, &c., par J. F. Brandt. Bulletin Physico-Mathématique de l'Acad. Imp. des Sciences de St. Petersburg, II, 1844, 358.

Tribe II. ARCTOMYINA.—The first upper molar equal in length to the second, and about one-half or one-third the size; swollen at the base; conico-acuminate at the apex, truncate at the point, compressed and more or less lobed, more rarely simple but always with a slight pit behind. The crowns of the larger molars, except the last, are trigonal, wedge-shaped, with two shorter ridges formed by the anterior and posterior edges of the tooth itself, and two intermediate larger ones, generally quite elevated and acute. The anterior dentiform tubercles of the lower molars exceed almost twice the height of the bases of the crowns. The ridges of the soft palate between the molars almost double the molars in number and considerably approximated. The third finger always longer than the rest. Claws considerably elongated, trigonal, and dilated at the base; moderately curved.

ARCTOMYS, Schreber.¹*Arctomys*, "SCHREBER, Säugetiere, IV, 1792."

ARR. & RACH. N. Am. Quad. I, 1849, 16.

SP. CH.—Size large; body very thick and depressed; thumb very rudimentary, armed with a small flat nail, not a claw; soles entirely naked; cheek pouches very shallow; pupil rounded?

It is in this genus that we find the largest members of the *Sciuridae*, some of them, indeed, taking the second or third rank in size among North American rodents, being exceeded only by *Castor* and *Hystrix*, and one species of hare, the body is thick and massive, the ears distinct and well shown above the fur, though short and rounded. The tail is bushy and full, but nearly cylindrical, the hairs being as long above and below as laterally. The thumb is rudimentary, with a short flat nail, not a claw. The outer finger of the hand extends as far as two-thirds the length of the palm, and in all the feet the claw of the outer toe reaches beyond the base of the one next to it.

The skull is much more flattened than in the *spermophiles*, in fact its upper outline is not only nearly straight, but it is decidedly concave between the orbits. The post-orbital processes are very large, the distance between their apices equal to the greatest width of the back part of the head; their posterior margin is rectilinear and perpendicular to the axial line of the skull, until it passes gently into the temporal ridge of the parietal bone, which is quite prominent and concave externally. There is a distinct semicircular notch behind the subtubercular ante-orbital process of the frontal; the nasal bones extend back nearly as far as this notch. The malar bone is twisted angularly, and shows externally three principal faces; anteriorly, it is wedged between the maxillary and the lachrymal bones. The palate is broad and rather plane, though flattened concave between the molars—the bottom of the palate on a level with the inferior edge of the root of the zygoma. The external outlines of the upper molars are rectilinear and parallel in the adult—curved in the young; the inner outlines are slightly divergent anteriorly in the young. The plane of the grinding surface is nearly horizontal at first, but twisted outwards more and more obliquely behind. There is no very essential difference in the shape of the lower jaw of *Sciurus* and *Arctomys*.

The incisors are much less compressed than in *Sciurus*, considerably rounded anteriorly and laterally; the enamel extends half way round the side. There are faint indications of numerous fine striae on the enamel. The crown of the anterior upper molar is about half the area of the second, and its summit is on the same level with the rest. The other teeth are nearly equal, but increase gradually posteriorly. The first molar has one root, the others three, each; the crown of the first molar, in its most perfect state, exhibits a semicircular marginal ridge on the inner, anterior, and posterior sides, thus encircling nearly three-fourths of the crown; within this curve rises a transversely elongated tubercle.

In the young skull the deciduous first upper molar is much smaller than its successor; the crown however, is not a simple conical tubercle, but shows a distinct longitudinal ridge, with a pit on either side; in this case, however, the direction of the ridge is nearly with the line of

¹ This is the authority given by Agassiz in *Nomenclator Zoologicus*. I find the name used, however, by Gmelin, in 1788. It is probable that Schreber made it in one of the earlier numbers of his volume IV, which was not completed nor furnished with a title until 1792.

the molars. The deciduous second molar is longer than broad, the reverse being the case in its successor; in other respects they are not very dissimilar. The first two upper molars are not replaced until the animal is more than two-thirds grown.

The preceding description of the characters of the skull of *Arctomys* is derived chiefly from undoubted specimens of *A. monax*. An immature skull from Wisconsin, (1879,) at first supposed to be the same, differs in some very essential points, especially, however, in the size of the teeth. Compared with a skull of *A. monax*, from Essex county, New York, of the same age, but a little longer, although the incisors are smaller, the molar teeth are found to be larger in every way. Thus the three posterior teeth measure nearly as much as four in the other skull. The molars thus extend further forward as well as backward in the Wisconsin specimen. The palate between the posterior molars is narrower, but between the anterior ones is of the same width.

It is, perhaps, erroneous to say that *Arctomys* is without cheek pouches. In *A. monax* there is a distinct indentation on the side of the jaw inside, extending to a depth of perhaps half an inch.

ARCTOMYS MONAX.

Woodchuck; Ground Hog.

Mus monax, LAMBEUS, Syst. Nat. (10th ed.) I, 1758, 601.—In. (12th ed.) I, 1766, 81.

BOSSAULT, Elenchus Animalium, I, 1784, 105.

Glis monax, ERZINGER, Syst. 1777, 361.

Arctomys monax, GMELIN, Syst. Nat. I, 1768, 142.

SHAW, Gen. Zool. II, 1801, 117, (from Pennant.)

DESMARSET, Mamm. II, 1822, 328.

SARIN, Linn. Trans. XIII, 1822, 582.

HALLAN, F. Amer. 1825, 158.

GRIFFITH'S, Cuvier, III, 170; plate (from Lawson).—In. V, 1827, 244.

RICHARDSON, F. B. Am. I, 1829, 153; (from Godman.)

GODMAN, Am. N. H. II, 100.

DE KAY, N. Y. Zool. I, 1842, 68; pl. xxi, f. 4.

AUD. & BACH. N. Am. Quad. I, 1849, 17; pl. H.

KENNICOTT, Rep. U. S. Pat. Office, Agricultural for 1856, (1857,) 82; pl. x.

Glis canadensis, ERZINGER, Syst. An. 1777, 363. (Quebec Marmot, of Pennant.)

Mus europæus, PALLAS, Nov. Spec. Ghr. 1778, 74.

BOSSAULT, Elenchus Anim. I, 1784, 105.

Arctomys europæus, SCHREBER, Säugetiere, IV, 1792, 743; pl. cxx.

SHAW, Gen. Zool. II, 1801, 119.

GMELIN, Syst. Nat. I, 1768, 142.

DESMARSET, Mamm. I, 1822, 329.

SARIN, Linn. Trans. XIII, 1822, 584.

HALLAN, F. Amer. 1825, 159.

GRIFFITH'S Cuvier, V, 1827, 245.

RICHARDSON, F. B. Amer. I, 1829, 147; pl. ix.

FISCHER, Synops. 1829, 343.

GRAY, Knowsley Menagerie, 1846; pl. vii.

"*Marmota quadratus*, PENNANT, Syn. 270," (as quoted by Pallas.)

Arctomys melanopus, Kuhl, Beiträge, 1820, 64. (Canada.)

FISCHER, Synops. 1829, 343.

Arctomys parvulus canadensis, Kuhl, Beiträge, 1820, 64.

FISCHER, Synops. 1829, 344.

Maryland skunk, PENNANT, Synopsis Quad. 1771, 270.—In. Hist. Quad. 1781, No. 260.—In. Arctic Zoology, I, 1784, 111.

Quebec skunk, PENNANT, Synopsis, 1771, 270.—In. Hist. Quad. 1781, No. 259.—In. Arctic Zool. I, 1784, 111.

Moscow grise, ST. HILAIRE & CUVIER, Hist. des Mammif. III, 1819; plate and text.

SE. CR.—Tail, with the hairs, about half as long as the body and head, or a little less. Color varying from nearly pure black all over to grizzled above, and bright chestnut red beneath. Feet always black, or dark brown. Tail usually black, sometimes annulated grayish. Length, 15 to 18 inches. Hind foot over 3 inches.

Description of specimens before skinning (847, 854).

Form very thick and clumsy. No constriction at the neck, which is short, the head set apparently directly on the shoulders. Head broad, flattened above. Legs short and thick. Tail short, full, and bushy, somewhat flattened; the tips of the hairs reaching a little beyond the ends of the claws of the outstretched feet. Fur of two kinds—the basal soft and moderately close, the longer projecting beyond the basal fur half the length of the latter, composed of stiff lustrous hairs; the tail entirely of the latter kind, without any soft fur. Annulations are distinctly visible on the skin of the tail on separating the hairs.

Head broad and full. Centre of the eye midway between the tip of the nose and the posterior margin of the ear. Nose broad, the muffle covered with hair to the edge of the nostrils; the broad septum between them, with the inside of the nostrils themselves, naked and black. The upper lip is divided vertically by a broad shallow furrow, running up and bisecting the septum. This is naked throughout. The lower end of this furrow is occupied by an angular cartilaginous pad, which lies over the base of the incisors. The lips are very full and fleshy; the upper ones inflected into the cavity of the mouth, with its coating of hairs, the boundary of which is marked by a fringe of short bristles. The lower lip is not attached to the end of the jaw, but may be slipped down for a distance equal to the length of the incisors.

There is a short shallow cavity between the muscles of the jaw and the cheek, attaining a depth perhaps of half an inch or less, and occupying the place of the internal pouch of *Tamias* and *Spermophilus*. The inner edge of this is covered by a cartilaginous roughened pad, which extends backwards so as when the molars are in apposition, to lie against their line of junction.

The cheek whiskers are in five horizontal series on each side, nearly parallel, the upper somewhat divergent. There are about five large hairs in each series, though sometimes two spring from the same root, and there are in the lower rows some feebler ones anterior to the larger ones. All, however, are short, and do not extend back to the ear. Another set of whiskers (four hairs in the set) is seen above the anterior canthus of each eye, extending obliquely upwards and backwards. On each cheek, again, and about as distant from the eye and ear as these are from each other, is a clump of long hairs, about five or six in number. The tips of these reach some distance behind the ear. There is also a tuft of bristles under the chin, as well as some scattered shorter ones in advance of these and near the edge of the lip.

The eyes are rather small, the pupil nearly or quite circular, the iris liver brown. In the anterior canthus is a small thin cartilaginous and triangular flap, which is directed backwards over the base of the eyeball. It is firmer and black at tip.

The ears are short, broader than their projection above the skull. The upper edge is subtruncate, the corners rounded or rather it forms the arc of a rather large circle. It has no appreciable antitragus, and is coated with short hairs on both sides. It scarcely projects above the hairs of the nape, though very distinctly visible from the sides.

The feet are rather large, the palms and soles entirely naked; the latter from the heel and well wrinkled. There are five callosities on the palm—three anterior, and two posterior much larger. Of the former, the outer ones are situated at the base of the outer (longer) fingers; the central one between the bases of the two central long toes, (third and fourth.) This is largest and as if formed by the confluence of two situated like the others. On the soles there are six callosities or tubercles—four anterior over the bases of the toes, except the third, which is larger, and between the bases of the third and fourth. The two posterior are very low and scarcely appreciable.

The thumb of the hand or fore foot is excessively rudimentary, like a mere wart, and would be scarcely appreciable but for the broad, short nail, with its subjacent pad. The fore claws are considerably longer than the hinder ones. In the hand, the claw of the third finger projects furthest; the fourth comes next, reaching nearly as far as the third; the second is a little shorter. The claw of the fifth extends as far as the end of the fourth finger.

The second and third toes of the hind foot, with their claws, are about equal and longest; the fourth is a little shorter. The claws of the first and fifth do not quite reach the last articulation of their adjacent toes. The tip of the claw of the first toe extends about as far as the middle of the fifth claw. There is a slight web at the base of the fingers and toes.

On slightly everting the anus (of the male) there are visible, just within its inner edge, three glandular papillæ—one anterior, and two lateral—themselves capable of considerable protrusion (one-fourth of an inch) by eversion, when they are conical, and white and like the teats of a cow. During life these may frequently be seen in a state of constant protrusion and retraction, at first sight giving the impression of large ascarides. These appear to secrete a thickened matter, white, and of a slightly offensive smell.

The stomach is simple, shaped much like that of man; the cecum is very large and full, in shape and size not dissimilar to the stomach; no partitions distinguishable. The gall bladder is distinct.

The predominant color of the outer surface of the hair of the specimen is a lustrous deep black, especially on the hinder part of the back and belly, the tail, legs, the nape, and top of the head. On the shoulders, sides of the body and neck, cheeks below the eyes, whole under parts, except posteriorly, there is a strongly distinct hoariness, caused by a subterminal space of silver grayish white, which, on the under parts of the body and legs, passes gradually into a brownish chestnut, (the mesial line of the belly lighter.) There is also a distinct ring of whitish round the muzzle, the posterior edge of which is about half way between the eye and nostril, or perhaps the muzzle may be described as grayish white, excepting the extreme end, which is black.

The above remarks respecting color apply, however, exclusively to the long coarse hairs. The intermediate soft hairs are generally of a dark plumbeous black at the base, and of a tinge of whitish at the tip, varying with the region from light brownish to dull gray, through chestnut, darkest towards the ends of the hairs. The chestnut tinge predominates on the posterior half of the body. On the sides of the body, anteriorly, these hairs are more annulated, there being a second dark bar separated from the basal one by a somewhat lighter one, making four rings, the terminal one again almost divided into one grayish and one reddish white. The basal fur on the belly is, however, very scant and mostly black. The hairs on the tail are entirely black. The incisors are white.

Another specimen, from the same litter in all probability, differs in having all the long hairs

on the upper parts and sides of a pale yellowish hoary, instead of being black. The top of the head is dark brown, except on the muzzle, which is black; there is, however, a subterminal band of grayish white, as described. The feet and tail are entirely black. The bases of all the hairs in this specimen are almost black. In this, though a male, the teats are distinctly discernible to the number of four on each side—two on the groin, one inside of the shoulder, and one behind the axilla. There are none visible on the belly.

We thus see that this species varies very considerably in the color of the lower parts, and to a less extent in the upper; nor is the color a question of age, as very large specimens are as different as half grown and young ones. The principal variations before me are as follows:

1. Almost entirely glossy jet black all over. On the back, however, the long hairs have dull yellowish rusty tips. The under fur on the back sooty brown at the base, becoming faintly yellowish brown towards the end. Nose and chin whitish. (No. 1572.)

2. General color dusky. The grizzling of the dorsal surface confined mainly to the sides of the shoulders. Under fur with light brownish yellow tips. A dark rusty or chestnut suffusion round the fore legs. Nose and chin whitish. (No. 847.)

3. Similar to the last in all respects, but with the black hairs of the belly tipped mostly with dark chestnut. (No. 1571.)

4. Under parts still more chestnut, though also showing much black; above, more generally yellowish hoary. A still deeper chestnut tinge round the fore legs. (Nos. 854, 1575, 1574.)

5. Under parts pretty uniform chestnut, the bases of the hairs still dusky. The hairs around and between the bases of the fore legs brighter and deeper chestnut. (Nos. 1631, 1573.)

6. Similar to preceding, but the tail is grizzled like the back, the hairs above and below being all finely annulated with brownish yellow, white and dark brown. (Nos. 1392, 1150.)

As a generalization from these variations, it may be stated that the legs and tail are almost always black, (in 1392 the tail is grizzled like the back.) Where the belly is rusty, the region round the base of the fore legs is of a deeper chestnut. The upper parts are not pure black in any of the specimens before me; where the dorsal surface is hoary, this is most distinct, and lightest on the sides of the shoulders, as in *Spermophilus douglassii* and *beecheyi*. In all the specimens the soles are naked.

It is worthy of remark that the only specimens enumerated in which the tail is grizzled like the back, with the hairs annulated, are those from Wisconsin and Missouri.

This species, so familiarly known throughout the United States as the woodchuck, or ground hog, has been described under several names. There is now no reasonable doubt that the *Arctomys campestris*, so long kept separate from the *A. monax*, is really identical with it, as insisted on by Audubon and Bachman. According to these authors, the species ranges from Hudson's Bay to South Carolina, and westward to the Rocky Mountains. It is probable, however, that at some distance west of the Upper Missouri it is replaced by the species I have called *A. flaviventris*.

List of specimens.

Catalogue number.	Corresponding no. of skull.	Sex and age.	Locality.	When collected.	Whence obtained.	Nature of preparation.	Measurements.											
							Nose to eye.	Nose to ear.	Nose to neck pit.	Nose to tail.	Tail to end of verteb.	Tail to end of hairs.	Fore ft. length.	Hind ft. length.	Skull, length of.	Skull, width of.	Width of ear, etc.	Height of ear.
1671	9401	♂	Middleboro', Mass.	.....	J. W. P. Jenks	Skin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1671	9401	♂	Roseton, N. Y.	.....	Dr. S. E. Hale	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1670	9400	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1670	9400	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1674	9404	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1676	9406	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2664	.....	♂	do	.....	do	Skull	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3995	.....	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
847	1905	♂	do	Aug. 25, 1855	S. F. Baird	Skin	1.67	3.00	2.80	14.59	4.73	6.33	3.20	3.64	3.19	2.13	.....	.....
854	1907	♂	do	Sept. 7, 1855	do	do	1.50	2.10	2.50	14.00	5.05	7.05	2.42	3.14	3.22	2.60	.....	.....
994	.....	♂	Carlisle, Pa.	.....	do	Skull	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1150	2035	♂	Barre, Wis.	1855	A. C. Barry	In alcohol	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1692	.....	♂	West Northfield, Ill.	June	B. Kennist	Skull	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
347	1951	♂	Western Missouri.	June, 1854.	Dr. P. E. Roy	Mammal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
798	.....	♂	Carlisle, Pa.	.....	S. F. Baird	Skull	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
807	.....	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1679	.....	♂	Racine, Wis.	.....	P. E. Roy	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2038	.....	♂	do	.....	do	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* To end of outstretched hind legs, 19 inches.

* To end of outstretched hind legs, 19 inches; longest fore claw, .69; hind claw, .22.

ARCTOMYS FLAVIVENTER, Bachman.

Yellow-Footed Marmot.

Arctomys flaviventer, Ann. & Bachm. Pr. A. N. Sc. Phila. I, 1841.—In. J. A. N. Sc. Phila. VIII, n, 1843, 309.—In.

N. Am. Quad. III, 1853, 160; pl. cxxxiv.

WAGSEN, in Wiegmann's Archiv, 1843, II, 45.

Sp. Ch.—Size of common woodchuck. Above, yellowish brown, somewhat grizzled with gray. Under parts of body and tail, and the legs all round, inside and out, reddish chestnut.

A skin from the Black Hills, obtained by Dr. Hayden, is of very large size. The under parts, with the legs all round, are uniform chestnut brown, or dark chestnut, to the roots of the hairs. The upper parts are rusty yellowish, except in the middle portion of the lumbar region, where they are paler, and grizzled somewhat with dark brown, owing to a subterminal annulation of this color near the tips of the long hairs. The top of the head is uniform dark brown, nearly black; the top and sides of the muzzle are reddish; the under part of the chin whitish. The tail is colored much like the belly; the hairs becoming dark brownish towards the roots. Length of skin, stretched, 22 inches; tail vertebrae, 8; with the hairs, 10.

The feet are wanting in part, or else so much mutilated as not to admit of a satisfactory description. The skull of this animal has fortunately been preserved in good condition, and presents some very characteristic features, as compared with that of *A. monax*. The muzzle is remarkably short and broad, owing to the extent to which the intermaxillaries enter into its upper surface. This is connected with a much greater proportional size of the upper incisors, which require more space for their accommodation. There is a more than usual depression or concavity on the frontal bone between the orbits. The upper molars again are rather smaller

than in *A. monax*. The body of the lower jaw is lower, the descending ramus projecting further backward than in *A. monax*.

This animal agrees very well with the *A. flaviventer* of Bachman, except in being chestnut colored beneath instead of yellow. This is, however, a difference of no consequence.

A very imperfect skin, collected at Fort Dalles by Dr. Suckley, is in very imperfect fur, and does not furnish the materials for a satisfactory description. It is about the size of the northern hare, (*Lepus americanus*), and is just changing its fur, the new hairs being very short. The prevailing color above of the short hairs is a very pale grizzled brownish white and black, imparting a hoary appearance. The old soft under fur, however, is dusky at the base, then light brownish yellow, then brownish chestnut. The under parts are yellowish chestnut, the base of the fur darker; the sides of the neck and shoulders, and the area round the fore legs, with the legs themselves, are similar, but more yellowish. The tail is yellowish rusty, becoming brownish towards the roots of the hairs. The end of the muzzle all round is whitish, margined all round by a broad band of rather dark brownish chestnut, interrupted under the throat. The soles of the feet are naked.

This specimen bears a close resemblance to the *Arctomys monax*, but differs in the yellowish tail and legs.

Although there are some differences in these two specimens, yet they are hardly of specific value; at any rate, for the present I shall combine them and refer both to *Arctomys flaviventer*, a species the essential character of which appears to be in having all the legs and feet reddish inside and out, in distinction to the universally black feet of *A. monax*.

No locality is given by Bachman to his animal, having found it among some skins in the rooms of the Zoological Society of London. Supposed to have come from Western Texas or California.

List of specimens.

Catalogue number.	Corresponding no. of skull.	Age and sex.	Locality.	When collected.	Whence obtained.	Original number.	Nature of specimen.	Measurements.					
								From tail.	To end of tail.	To end of hairs.	Length.	Width.	Width of maxilla.
297*	.....	♀	Fort Dalles, C. T.	May 20, 1855	Dr. Geo. Suckley.....	69	Skin	14.35	4.20	6.50	2.50	.....	.....
1585†	1372	.....	Black Hills, Neb.	1855	Dr. F. V. Hayden.....	.....	do	26.00	8.60	18.00	3.60	2.45	.34

* Measured before skinning.

† Much stretched.

The following species of *Arctomys* I have not had an opportunity of examining:

ARCTOMYS PRUINOSUS, Gmelin.

Hoary Marmot, Whistler.

- Arctomys pruinus*, Gmelin, Syst. Nat. I, 1788, 144.
 SHAW, Gen. Zool. II, 1801, 121.
 SAUND, Trans. Linn. Soc. XIII, 1822, 586.
 HARLAN, Fauna Americana, 1825, 169.
 RICHARDSON, Zool. Jour. III, 1828, 518.—In. F. Bor. Amer. I, 1829, 159.
 FISCHER, Synopsis, 1829, 343.
 AUD. & BACH. N. Am. Quad. III, 1853, 17; pl. ciii.
 ? *Arctomys caligatus*, EICHENHOLTZ, Zoolog. Atlas, II, 1829, 1; pl. vi.
 RICH. Zool. Blossom, 1839, 7.
 WAGNER, Suppl. Schreber, III, 1843, 260.
 ? *Arctomys okanagenus*, KING, Narrative Beck's Jour. II, 1836, 257; plate ii, vol. f.
Arctomys alba, WOLF, Linné's Natursystem, II, 1808, 481. (Made to embrace both *A. caprea* and *pruinosa*, supposed to be the same.)
Hoary Marmot, PENNANT, Hist. Quad. II, 1781, 130.—In. Arctic Zoology, I, 1784, 112.
 ? *Arctomys mosae*, MIDDENDORFF, Sibiriache Reise, II, u, 1853, 85.

The whistler appears to be about the size of the common woodchuck, which it resembles in a great many respects; nor, indeed, have the precise differences been fully pointed out. The animal was first described by Pennant, as the hoary marmot, in the following terms:

"Tip of the nose black; ears short and oval; cheeks whitish; crown dusky and tawny; hair on all parts rude and long; on the back, sides, and belly, cinereous at the bottom, black in the middle, and tipped with white, so as to spread a hoariness over the whole; legs black; claws dusky; tail full of hair and ferruginous. Size of the Maryland marmot." (From F. B. A.)

To this Richardson adds the testimony of some gentlemen of the fur countries, who state that it is the size of the badger, or smaller, with much the same appearance; covered with beautiful long silver gray hair, and having a long bushy tail. Another account says that the breast and shoulders to the middle of the body are of a silver gray color; the rest of the body and the brush (or tail) of a dirty yellowish or brown.

The first satisfactory account of the supposed whistler is by Dr. King, in his "Narrative of a Journey to the Shores of the Arctic Ocean, in 1833-'35, under command of Captain Back," 2 vols. 12mo. Bentley, London, 1836. He describes a living specimen brought from Fort Okanagan, and, as furnishing a better means of comparison with the woodchuck, I here introduce it entire.

"*Arctomys okanagenus*, KING. Okanagan marmot, with the head somewhat oval and flattened; nose short, obtuse, and covered with very minute hairs; incisor teeth slightly curved, upper ones anteriorly of a pale yellow, lower ones whitish; whiskers few, black, and of various lengths, but none exceeding two inches; ears semi-oval, shorter than the fur on the neck, but, from the arrangement of the hair covering the cheeks, perfectly distinct, and thickly covered on both sides with short appressed hairs; extremities short and strong; fore feet shaped for grasping, having four toes well divided, and armed with strong claws, which are compressed, curved, and rather sharp-pointed, well adapted for digging; third toe is the longest, then the second, next the inner one, and lastly the outer one; in place of a thumb there appears a rounded projection of the palm, having a small but well defined claw; palm black and bare; five hind toes, of which the middle is the longest, the one on the right next, and afterwards that on the left, then the outer one, and lastly the inner one; claws resembling those of the fore feet; sole bare and black.

"Fur around the nose and margins of the mouth gray; crown inclined to black, with a few long and irregularly scattered gray hairs; tip of the nose brown; from either side of the dorsal aspect of the head a blackish band extends in an arched form down to the fore shoulders, somewhat resembling a ram with his horns laid back; and a slight bar of the same color is spread

for about an inch along the hind part of the neck; cheeks reddish brown, of rather a darker hue just beneath the eye; shoulders and fore part of the back covered with long coarse hair, gray at the surface and bluish gray at the roots; fur of the hind parts shorter by at least one half; bluish gray at the roots, light gray in the middle, tipped with pale rusty brown, and frequently pointed with glossy black; fore legs and feet well covered with short but dense hair, black, excepting just beyond the insertion of each claw, where a very conspicuous irregular spot of gray is seen; hind legs and feet perfectly black; claws rather lighter; neck, chest, and whole ventral aspect of the body sparingly covered with a short fur of a buff color, rather lighter towards the sides; tail depressed, slightly convex on the upper surface, but quite flat beneath; narrowest at the root, gradually but slightly widening towards the end, where it appears rounded; color above the same as the hind parts of the back, except at the tip, where it is dull black; beneath entirely dull black. Total length from the nose to the tip of the tail twenty-six inches, of which the head is three inches and three-quarters, and the tail eight inches; palm, including middle fore toe and claw, two inches and a half, while the sole, similarly measured, is three inches and a quarter; height of ears posteriorly three-quarters of an inch, and breadth between the eyes two inches.

"The Okanagan marmot therefore is separated from Pennant's hoary marmot in not having a black nose, in the fur not being universally rude and long, and in not having on the back, sides and belly any such arrangement of colors as cinereous at the root, black in the middle, and whitish at the tip. Richardson's description in the Zoological Journal, which savors of both Pennant's and McPherson's remarks, is too slight to afford anything like satisfactory comparison; but there are sufficient discrepancies—such as the long coarse fur on the chest—twenty-seven and a half inches being given as the length of the head and body, and two and a half for that of the head,—to show that it is not synonymous with the Okanagan. Were it not for the difference in the size of the head, which is very great, the dimensions of McPherson's animal would correspond pretty accurately with those of the Okanagan marmot, for the slight variation of an inch from the tip of the nose to the end of the tail might be reconciled by supposing that the arched form of the back had been flattened by pressure. It is very far, however, from resembling the beaver in the shape of its body, as in McPherson's specimen, being, if anything, rather broader across the shoulders than about the hind parts.

"The length of the head, the grey spot on the upper part of each of the fore toes, which strongly contrast with the black fur of the rest of the foot—the singularly arched hand extending from the back of the head to either shoulder, and the peculiarly short and scanty fur covering the neck and whole ventral aspect of the body—likewise the dull black of the under part of the tail distinguish the Okanagan marmot as a new species."

"Found on a small tract of country on the borders of the Rocky Mountains, between the Columbia and Fraser's rivers, supplying with food and clothing the Okanagan Indians, included between Seechewap lake to north and Spokane river to south."

From this account it will be seen that King contests stoutly the identity of his animal with the *A. pruinosus*. It is, however, without much question, the same animal as described by Eschscholtz under the name of *A. caligata*, which has priority over *A. okanaganus*.

The specimen described and figured by King remained several years alive in the menagerie of the Zoological Society of London, and after its death was carefully preserved, and served as the basis of the figure and description of Audubon and Bachman. This fact must be borne in mind in the event of there being two northern marmots. To complete Dr. King's account, I subjoin the measurements of Audubon and Bachman.

	Inches.	Lines.
Length from nose to root of tail	19	-----
Length of tail, (vertebre)	8.	6.
Length of tail, with hairs	7.	9.
From nose to occiput	3.	4.
Ear	-----	5½.
Palm and nail	2.	9.
Tarsus	3.	8.
Nail on hind foot	-----	8.

Middendorff, in his *Sibirische Reise*, refers to a large marmot from Kamtschatka under the

name of *Arctomys monax*, and says that they agree exactly with the figure by Audubon and Bachman of *A. pruinosus*, (the same one just described.) The paws of the Asiatic specimens he states, however, to be yellowish brown, instead of black, although the intermixture of single blackish brown hairs suggests the possibility of their varying to this extent. From the analogy of *Spermophilus parryi*, it would seem highly probable that the same species might inhabit the adjacent shores of the North Pacific.

Middendorff is inclined to think that *Arctomys caligata* of Eschscholtz may be distinct from the *A. pruinosus*, as its color is much lighter, and the tail measures ten inches in length, or about half the length of the body, both according to Eschscholtz' description and a skin brought subsequently from California by Vosnes'ens'kij, a taxidermist in the employ of the Academy of Sciences of St. Petersburg, who spent several years in the Russian possessions on the Pacific.

ARCTOMYS LEWISII, Aud. & Bach.

Lewis' Marmot.

Arctomys lewisii, Aud. & Bach. N. Am. Quad. III, 1853, 39; pl. cvii.

"**Sk. Cu.**—Size of the gray rabbit; shape of head and body similar to that of *Arctomys monax*. Tail, with the hairs, about one-fifth the head and body. Nose and nails black. Upper surface and ears reddish brown, the softer dense under fur being light yellowish brown, the longer interspersed hairs blackish brown at the tips. On the haunches the hairs are interspersed with black and yellowish brown; feet and belly light salmon red. Tail from the root, for half its length, reddish brown; the other half to the tip, soiled white. Above the nose, edges of ears, and along the cheeks, pale reddish buff. There is a white band across the toes, and another irregular one behind them; there is an irregularly defined dark brown line round the back of head and lower part of the chin, marking the separation of the head from the throat and neck."

	Inches.
Length from nose to root of tail	16
Tail, (vertebrae)	2
Tail, with hairs	3
Nose to ear	3
Nose to eye	1
Heel to middle claw	2½

The specimen described as above was found by the authors in the museum of the Zoological Society, where it is labelled "*Arctomys brachyura?* No. 461." It was received from some of western British fur posts, and supposed to have been collected somewhere in the vicinity of the Columbia river.

From the description, as well as the figure, I should be inclined to consider this animal rather as a prairie dog (*Cynomys*) than as a true marmot (*Arctomys*). The tail and feet are much shorter in their proportions than in our other *Arctomys*, but agree very closely with the other genus. Thus, in a fresh specimen of the Missouri prairie dog, (No. 1803,) the head and body measure 13 inches; the head alone, 3½; nose to ear, 2½; the hind foot, 2.38. The tail is nearly twice as long as in *A. lewisii*. A very little stretching of the skin, which it could scarcely fail to receive after stuffing, and especially if prepared as hunters' skins usually are, would bring these measurements to 16 inches for the length to root of tail, and one-eighth of an inch added to the hind feet would make up three inches. Now, in a fresh specimen of *A.*

monax, No. 854,) the head and body measure 14 inches, and the hind foot 3.14. The tail, with the hairs, measures 7 inches.

The most important point, however, is in the character of the thumb. *Cynomys*, as already explained, differs from *Arctomys* in having the thumb moderately developed, and armed with a distinct *claw*, nearly as long as the fifth, the soles hairy; while in *Arctomys*, the thumb is more rudimentary and armed only with a broad flat *nail*, very different in character from the prominent claw of the other. The soles also are perfectly smooth. Now, Audubon & Bachman expressly mention that the "thumbs, instead of being remarkably short and equipped with blunt nails, have long nails nearly the length of those on the other toes." Nothing is said of the character of the soles.

The next question that remains to be discussed is the relationship of the species to the *burrowing squirrel of the Columbia*, of Lewis and Clark.—See article under *Cynomys gunnisonii*, page 336.

It is quite possible, judging from the descriptions, that the *Arctomys lewisii* may be the same animal as Lewis and Clark described from a fresh specimen 12½ inches long, which might easily be stretched to 16. The dimensions of the tail are almost precisely the same. The flat distichous tail of a living animal might easily become rounded in a skin, especially if the caudal vertebrae were removed. The discrepancies in the descriptions of the feet are more apparent than real, especially if, in speaking of the "two inner thumbs of the fore feet," they meant only one thumb to each foot, as is most probable. Nor do our authors make any special reference to the claws; they merely say that the *thumbs* are remarkably short, and equipped with blunt nails, the remaining toes being long. Now, in *Arctomys*, the thumbs and their nails or claws would probably not be mentioned at all by unscientific authors, as they are so minute and inconspicuous as scarcely to attract attention. In color of body and tail the descriptions agree almost precisely.

The fact that Lewis and Clark refer to their animal as a squirrel does not militate against it being a *Cynomys*, as they call the common prairie dog, the barking squirrel of the Missouri.

For the above reasons I am inclined to consider the *Arctomys lewisii* rather as a *Cynomys*, and quite possibly the same with the burrowing squirrel of Lewis and Clark, called *Arctomys columbianus*, by Ord, and *Anisonyx brachyura*, by Rafinesque.

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