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ERRATA.

Page 235, line 13, for **akleyorum** read **akeleyorum**.

“ “ “ 19, “ **akleyorum** “ **akeleyorum**.

“ 359, “ 29, “ **Stenolæmus** read **Stenotæmus**.

“ 375, “ 13, “ **Chilorsiac hrysochlamys** read **Chilorsia chrysochlamys**.

Plates XXIII and XIV, for **AKLEYORUM** read **AKELEYORUM**.

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Article I.—HISTORICAL AND NOMENCLATORIAL NOTES ON NORTH AMERICAN SHEEP.

BY J. A. ALLEN.

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INTRODUCTION.

The present paper originated in an attempt to settle the question of priority between the names *Ovis cervina* Desmarest and *Ovis canadensis* Shaw, both of which prove to have been published early in the year 1804. This investigation led to the finding of many interesting facts connected with the original discovery of the Rocky Mountain Bighorn and the origin of its early technical names, and also other information relating to the discovery of other forms of North American sheep. While little of the early information here cited is new, much of it has been lost sight of in recent years; nor has it ever been presented fully or connectedly. For this reason the McGillivray account is here treated with a fullness of detail that may seem unnecessary, notwithstanding its historic interest, and the fact that it is the sole basis of the three technical names most frequently employed for the designation of the Rocky Mountain Bighorn. Attention is called, also, to various misstatements that have crept into the literature of the general subject, and to the diverse figures based on the original drawing of the type specimen. These show how untrustworthy zoölogical illustrations may be, and how easy it is to place too much reliance on pictorial representations of animals in even standard works.

Finally it has seemed desirable to conclude this paper with a list of the numerous forms of American sheep at present currently recognized, with their synonymy, type localities, geographical distribution, and principal references.

DISCOVERY OF WILD SHEEP IN CANADA IN THE YEAR 1800
BY DUNCAN MCGILLIVRAY.

The accounts of the discovery and the early descriptions of the Rocky Mountain Sheep are of such interest as to be worthy of consideration in some detail, especially since a question of nomenclature rests on the correct determination of the dates of publication of different accounts based on the original McGillivray specimen.

The first specimen of this sheep known to science was killed and preserved by Duncan McGillivray, an agent of the North West Fur Company,¹

¹ "Duncan McGillivray was a clerk of the North West Co., in 1797 or earlier," says Dr. Coues, and "accompanied David Thompson on his Bow River tour, Nov. 17th-Dec. 3d, 1800. He left the N. W. country in 1802, became a partner of McTavish, Frobisher & Co., and was one of the signers of the Montreal agreement of Nov. 5th, 1804."—*New Light on the Early History of the Greater Northwest: The Manuscript Journals of Alexander Henry and of David Thompson*, I, 1897, p. 439, footnote.

who accompanied the well known explorer and surveyor, David Thompson, while making his survey of the upper Bow River country of Canada in the autumn of 1800. McGillivray has left on record definite information as to the time and place of its capture, and a first hand account¹ of the habits, haunts, and external characters of this now well known species. It appears from his narrative that these two explorers first met with these animals on November 30, 1800, near what is now Calgary in southern Alberta, where the Bow River emerges from the first range of the Rocky Mountains, in, as McGillivray states, longitude 115° 30' west, and latitude 50° north.² They found here a small band and killed a number of them, including a fine old ram. He recognized the animal as a nondescript, and preserved the skin of the ram to send to the Royal Society of London.

His account³ begins as follows: "In the fall of 1800, I was on an excursion on horseback, through the plains that are situated between the Saskatchewan and Missouri rivers, along the rocky mountains, accompanied by Mr. Thompson, a Gentleman of the N. W. Company's employ, five Canadians, and an Indian guide. Returning back to the north, we followed the course of the Bow-River, into the heart of the mountains, with a view of examining them — and on the 30th November, at noon, we halted at the foot of the first ridge to graze our horses, and ascertain our latitude. At a little distance ahead, appeared a herd of small animals, which we took to be a species of the Deer, in that country very numerous. While Mr. Thompson was taking his meridian altitude, I went forward with the Indian to have a shot, and on a nearer approach, was very much surprised to find (instead of Deer) a herd of about twenty animals, that were utterly unknown to me." He describes how he and the Indian killed five, and adds: "I had the satisfaction to shoot a large male, whose motions appeared to guide the flight of the rest — his superior size, and enormous horns, made him the particular object of my pursuit, and I have preserved his skin, with a view of presenting it to the Royal Society of London. During the Winter, I had frequent opportunities of hunting this tribe, which has enabled me to make a few observations on it, that may be of advantage to Naturalists, in ascertaining the genus, or species of this animal. The dimensions of the above male, taken on the spot, where he was killed, namely, longitude 115. 30, West, and latitude 50. North, are as follows:...." He describes the hair and horns, and says: "....in short, this animal

¹ New York Daily Advertiser, Vol. XVIII, No. 5561, December 4, 1802; New York Medical Repository, Vol. VI, 1803, pp. 238-240.

² Latitude 50° N., is evidently wrong, as David Thompson's map of the Bow River country (see maps accompanying Coues's 'New Light on the early History of the Greater Northwest') shows the Bow River emerging from the first range of the mountains at about latitude 51° 20', as on modern maps, and hence near Calgary.

³ In the New York Daily Advertiser, *l. c.*

appears to be a compound of the deer and the sheep, having the body and hair of the former, with the head and horns of the latter." Later, after speaking of its habits and its range, he describes the female, and says "they are all [both males and females] distinguished by the white rump and black tail," but he nowhere makes any reference to the general coloration.

"The Crees, or Knistianeaux," he continues, "distinguish this animal by the name MY-ATTIC, or the *Ugly Rein Deer*. The Slave Nations, comprehending *Blood Indians*, *Picicans*, and *Black Feet Indians*, call it EMA-KI-CA-NOW, which also means a species of the Deer — but the Canadians who accompanied me, at first sight, named it *le belier des montagnes* (the mountain Ram). It is only to be met with in the rocky mountains, and it generally frequents the highest regions, which produce any vegetation, though sometimes it descends to feed to the bottom of the valleys. . . . The Mountain-Ram, or Sheep, though not numerous, are to be met with in considerable numbers in some parts of the mountains, from latitude 54 southward. I have, on several occasions, seen herds of 20 or 30, but generally not more than 2 or 3 of them together."

MCGILLIVRAY'S ACCOUNT, AND SAVAGE'S DRAWING OF THE ORIGINAL SPECIMEN.

Mr. McGillivray was in New York late in the year 1802, with his non-descript mountain ram, which was for a short time in a private museum and art gallery in that city, owned by an artist named E. Savage, before it was sent to London. To Mr. Savage great credit is due, as will be soon shown, for his part in making known to the world McGillivray's discovery, as he not only made a careful drawing of the specimen, but induced McGillivray to prepare an account of his discovery of this new species, with his observations on its habits and external appearance, and also secured the prompt publication of both his own drawing and Mr. McGillivray's narration. Thus, the 'Daily Advertiser' article is introduced by a letter to the editor from Mr. Savage, which reads as follows:

"Having been informed that Mr. D. McGillevray, a Gentleman from Canada, had in his possession, the Skin of a non-descript animal, I made application to him for leave to make a drawing of it, to enrich the Columbian Gallery. He very politely indulged my request and at my solicitation has favored me with the following account, which elucidates the drawing, and which may gratify the public curiosity. E. SAVAGE."¹

¹ The Daily Advertiser, New York, Vol. XVIII, No. 5561, Saturday, December 4, 1802.

The article is entitled 'Description of the My-Attic, or Mountain-Ram,' and makes a full column, and a few lines on the next, of the large folio page, and is printed as a single paragraph. The sentences are frequently separated only by a dash, and the sentence following the dash sometimes begins with a capital letter and sometimes with a lower case initial. There is a profuse use of commas, but in other respects the article is intelligently written and has the appearance of having been printed as the author wrote it.

Before Mr. McGillivray's article was sent to the 'Daily Advertiser,' a manuscript copy of it had been communicated to Dr. Samuel Latham Mitchill, one of the editors of the New York 'Medical Repository,'¹ by this same Mr. Savage, in a letter dated Nov. 24, 1802. It was published in the 'Repository,' probably in the following January,² in an article entitled 'Account of the Wild North American Sheep.' This article consists of an editorial introduction to a communication bearing the following explanatory caption: "Memorandum respecting the Mountain Ram of North America. By Duncan McGillivray. Communicated to Dr. Mitchill, by Mr. Savage, in a Letter, dated New York, November 24, 1802."

Dr. Mitchill states in his editorial introduction (*l. c.*, p. 237): "It is not universally known that there are species of sheep running wild in the woods of North America. This, however, is the fact; and a dried specimen of one of them was lately brought to New-York by Mr. M^cGillivray. It was made known to Dr. Mitchill by Mr. Savage, and is now in his Museum. That enterprising artist has made two good paintings from it. . . ." The uncolored plate in the 'Medical Repository' (facing p. 237) is of course from one of them. As will be shown later, the other soon found its way to Paris, and "the dried specimen" was, apparently, soon after received at the British Museum.

Mr. McGillivray's account of the animal in the 'Daily Advertiser' was republished in London in the 'European Magazine and London Review' for 1803, under the title 'Description of the My-Attic, or Mountain Ram,' and credited to the 'New York Daily Advertiser.' From this source it was again republished, one hundred and seven years later, in New York,

¹ The Medical Repository, and Review of American Publications on Medicine, Surgery, and the Auxiliary Branches of Science. Conducted by Samuel Latham Mitchill, M. D., and Edward Miller, M. D. Vol. VI, No. III, (Jan.?) 1803, pp. 237-240, with a plate.

The manuscript sent to the editors of the 'Medical Repository' was probably a duplicate copy of that published in the 'Daily Advertiser,' but subjected before printing to considerable editorial revision. The paragraphing and the construction of the sentences vary much from the London magazine version, and in the use of capitals and punctuation it further widely differs from the 'Advertiser' article. There are also a few verbal changes, and the omission here and there of words or phrases essential to the integrity of the original text. In substance, however, the 'Medical Repository' version is the same as the article in the 'Advertiser.' This is fortunate, since the 'Medical Repository' is the source from which, with perhaps a single exception (Geoffroy), the McGillivray account has been uniformly cited or made use of by all later writers prior to 1910.

² As bound up the separate numbers carry no date, nor is a date indicated for them in the table of contents, but there is evidence in the dates carried by some of the communications to show that the four quarterly numbers composing the volume were issued for July, October, January, and April, 1802-1803, as was the case in the later volumes, in which the numbers are dated.

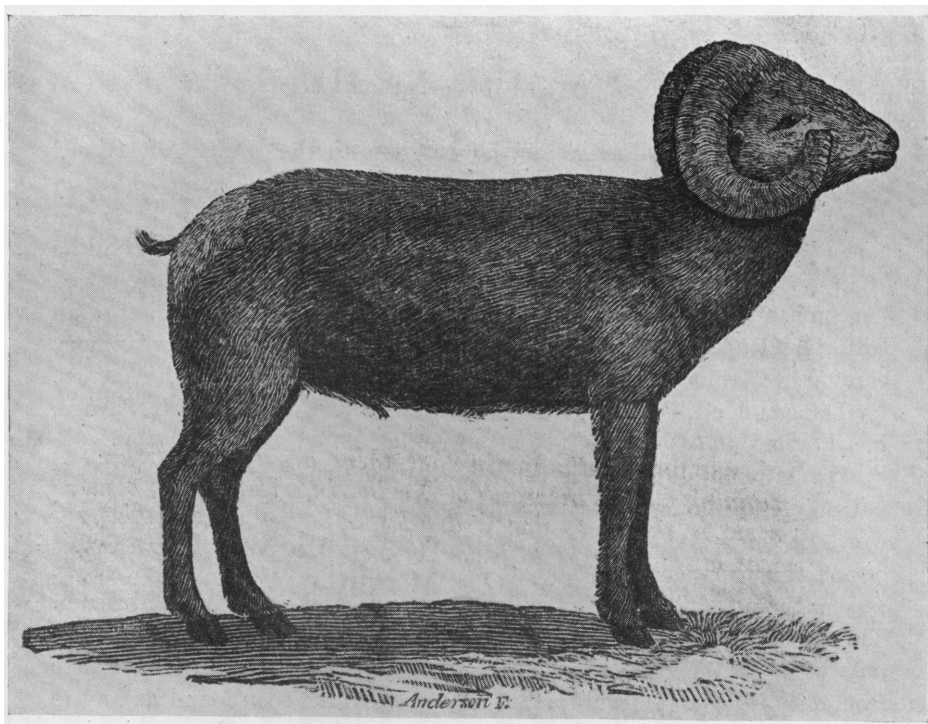


Fig. 1. From drawing by E. Savage. New York Med. Reposit., Vol. VI, 1802-03, pl. facing p. 237.

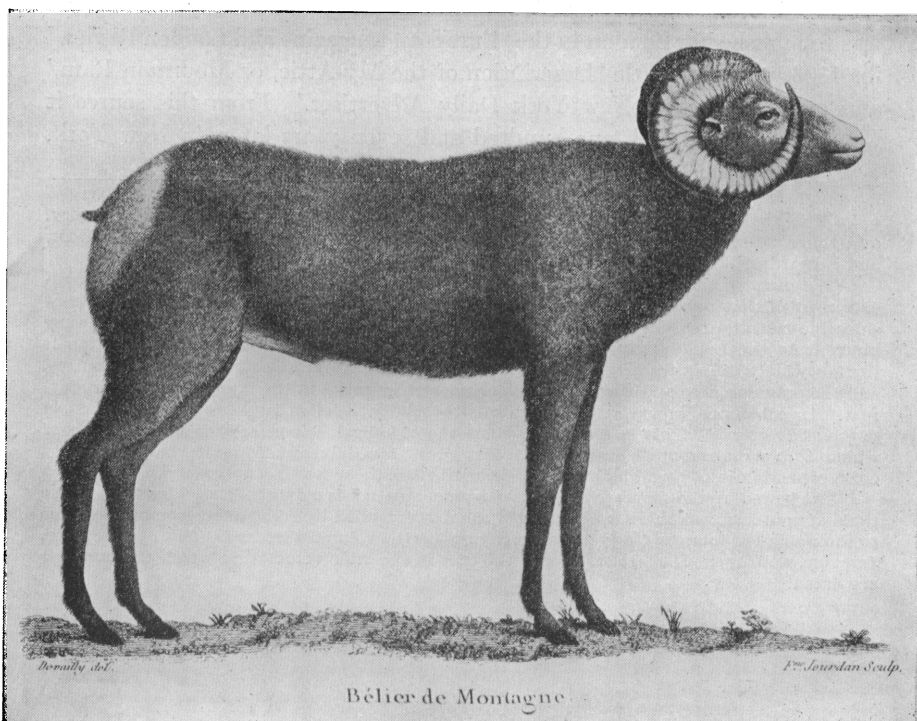


Fig. 2. From drawing by E. Savage. From Ann. du Mus. d'Hist. Nat., Vol. II, 1803, pl. lx.

in the issue of 'Forest and Stream' for October 29, 1910.¹ It was this republication that gave me a clue to the source whence the Rocky Mountain Sheep was originally introduced into technical zoölogical literature, for immediately I recalled the fact that Mr. Savage's drawing and Mr. McGill-

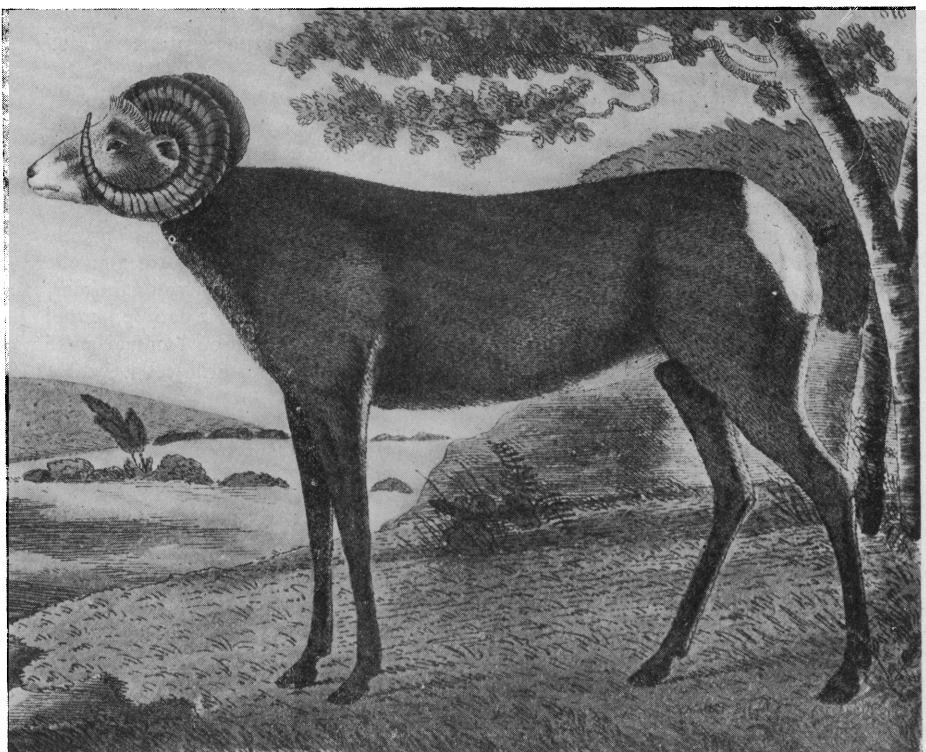


Fig. 3. Reversed and modified copy of plate in Ann. du Mus. Nat. Hist., Vol. II, plate lx. See Fig. 2. Based originally on same drawing as Fig. 1.

vray's account as published in a New York newspaper formed the basis of Geoffroy's original description and figure of his 'Belier de Montagne,' in 1803, which became the basis of Desmarest's name *Ovis cervina* early in 1804.

¹ The First Story of a Sheep Hunt. Forest and Stream, Vol. LXXV, No. 18, pp. 692, 693. See also a further account, with references to Geoffroy, Shaw, and Desmarest, in the number of this journal for Nov. 19, 1910, pp. 811, 812.

As republished in the 'European Magazine and London Review' (judging by the literal reprint of it in 'Forest and Stream' in 1910), the article is divided into seven paragraphs, the sentences begin uniformly with a capital letter, and many superfluous commas are omitted. In other respects it is almost an exact reproduction of the original 'Advertiser' text.

Through the courtesy of Dr. George Bird Grinnell, editor of 'Forest and Stream,' I have been able to examine the original article in a file of the 'Advertiser' discovered by him in the New York Society Library.

GEOFFROY'S BELIER DE MONTAGNE.

The first French account of the Rocky Mountain Sheep, by the eminent naturalist Etienne Geoffroy St. Hilaire, appeared in the 'Annals' of the Paris Museum of Natural History for 1803, under the title 'Description d'une nouvelle espèce de belier sauvage de l'Amérique septentrionale.'¹ Geoffroy says:

"Le directeur du Muséum de New-York, M. Savage, a bien voulu, à la sollicitation de M. Lormerie, agriculteur français, nous envoyer la figure d'un belier de l'intérieur des terres, qui est à peine connu des Anglo-Américains eux-mêmes. Il nous prévient qu'il n'a pu faire cette figure que sur la peau bourrée qui est dans son Muséum, mais qu'au surplus il s'est attaché à copier avec la plus grande exactitude les couleurs et les traits qui peuvent le mieux servir à caractériser cette nouvelle espèce.² Dans l'intention de suppléer à ce que son dessin ne pouvoit exprimer, il a eu la complaisance de nous adresser une notice qu'on a imprimée dans le journal américain l'*Avertisseur*, et qui a été rédigée sur les lieux même où l'animal a été découvert. Cette notice nous apprend qu'on doit la découverte de cet animal à un Anglais nommé M. Gillevray...."³

From these sources of information Geoffroy characterized the species as "un animal à corps de cerf et à tête de belier," and further observes: "Il est assez singulier qu'un animal que la forme de sa tête et de ses cornes place dans le genre des beliers ait la taille svelte et élégante de nos cerfs; . . . En effet, le *belier de montagne*. . . a le poil court, roide, grossier et comme desséché. Ses couleurs rentrent dans celles des cerfs, des chevreuils, et son pelage est brun-marron; . . ." He quotes McGillivray's measurements, and summarizes his account of its habits and haunts. He was evidently strongly impressed with its cervine features of form and pelage, and derived from the drawing an erroneous conception of its coloration.⁴ His artist, in reproducing Savage's drawing, idealized it on these lines. Savage's drawing, as published in the 'Medical Repository' (here reproduced in Fig. 1), is of normal proportions for an old ram of this species as to both the body and the limbs, and the horn is truncated at the tip, through the natural

¹ Ann. du Mus. d'Hist. nat., Tome II, An. XI (1803), pp. 360-363, pl. ix.

² In this connection attention may be called to the accompanying Figures 1 and 2, showing Savage's drawing as reproduced in the 'Medical Repository' and Geoffroy's modified reproduction of the same drawing.

³ Notwithstanding Geoffroy's explicit statement as to the basis of his information, Richardson says (Faun. Bor.-Amer., I, 1829, p. 272): "This specimen [McGillivray's] being afterwards sent to M. Geoffroy, he published a description of it with a figure in the *Annales du Muséum*!" This error was repeated by Audubon and Bachman, and by other later authors.

⁴ Possibly during the two years of exposure in camp life and travel the original color may have become changed by staining to such a degree as to mislead the artist as to its proper color. It is otherwise difficult to explain the erroneous coloring of Mr. Savage's drawing.

abrasion usually seen in very old rams, and the tip rises only to the level of the eye. The depth of the body behind the shoulders is only about one-third the total length, and just equals the length of the fore limb.¹ In Geoffroy's plate the body is much slenderer and the legs much longer, the fore limbs being considerably longer than the depth of the body at the shoulders. The horn (only one can be seen) terminates in a point, which is not on a level with the eye but considerably above the dorsal outline of the forehead. (See Fig. 2.) These facts are noted in detail on account of their bearing on the source of the plate accompanying Shaw's description, soon to be considered. (See Fig. 3.) Geoffroy's plate was uncolored; Shaw's was colored to agree with Geoffroy's description.

OVIS CERVINA DESMAREST.

Geoffroy while giving all the information at his command, and idealizing in the plate his impressions of how the species should look, failed to give it a technical name, merely designating it, in his text and on the plate, as the Belier de Montagne. One year later, however, in 1804, this was supplied by another French naturalist, A. G. Desmarest, who formally introduced the species into technical nomenclature as *Ovis cervina*.² Desmarest's description is avowedly based on Geoffroy's, all but eight lines of which are given in quotation marks from Geoffroy.

OVIS CANADENSIS SHAW.

Almost simultaneously with the publication of Desmarest's account, as far as it is possible to determine, the Rocky Mountain Sheep was briefly described and figured in Shaw and Nodder's 'Naturalist's Miscellany,'³ under the name *Ovis canadensis*, the text being in Latin and English, and the plate colored. Shaw cites Geoffroy only, on whose account both the description and plate are obviously based, although he adds at the end of his description: "A very fine specimen of this rare quadruped may be seen in the British Museum." This can have been no other than the specimen sent by McGillivray to London in 1803, as already detailed. Shaw's plate

¹ Savage's figure in the 'Medical Repository' is noteworthy for its accuracy, though less artistic than that of Geoffroy's artist and Nodder's plate; yet we find it thus criticised by an American author in 1825: "In the New York Medical Repository, (vol. vi., p. 238, 1803), is a description, accompanied with an indifferent figure, of the *Argali* of North America, under the name of Mountain Ram."—HARLAN, Fauna Americana, 1825, p. 262.

² Nouv. Dict. d'Hist. nat., Tome XXIV, An. XII (1804) pp. 5, 6.

³ Nat. Miscel., Vol. XV, pl. 610, and accompanying text (4 pp.), unpaginated and without date.

(drawn by Nodder) is evidently a reversed copy of Geoffroy's, with the cervine form of body and limbs still further emphasized, the horn-tip just as perfectly restored, and a background added (Fig. 3). It is not likely that this close agreement would have happened had Nodder made his drawing from an actual specimen, say the original McGillivray specimen then in London. The coloring, ferruginous brown, of both Shaw's diagnosis and the plate, is evidently the "brun-marron" of Geoffroy.

It is hence perfectly evident that McGillivray's description of his Mountain Ram and Savage's drawing of the same specimen served jointly as not only the basis of Geoffroy's description and figure, and hence of Desmarest's name *Ovis cervina*, but also of Shaw's *Ovis canadensis*, while Geoffroy's account gave rise, much later, to Cuvier's name *Ovis montana*.

OVIS MONTANA CUVIER, AND REVIVAL OF THE NAMES OVIS CERVINA AND OVIS CANADENSIS.

Cuvier's name *Ovis montana* is merely a Latin translation of Geoffroy's French vernacular name, "belier de montagne."¹ Blainville in 1818, and most later authors for the next fifty years, erred in ascribing the name *Ovis montana* to Geoffroy.²

If Geoffroy had really used this name instead of the French equivalent it would have saved disagreement among modern nomenclators over the question of priority between *O. cervina* and *O. canadensis*, as when *O. montana* was used by Cuvier it was preoccupied by an *Ovis montana* given by Ord in 1815 to the Rocky Mountain Goat. Yet this name was used almost exclusively for the sheep until 1880, when Alston³ adopted *Ovis cervina* Desmarest, on the ground that *Ovis montana* was preoccupied; but he wrongly took Desmarest's name from 1818 instead of from the original date, 1804.

Merriam, in 1890 and 1891,⁴ employed *Ovis canadensis* Shaw as the earliest available name, and later⁵ gave his reason for this selection, claiming 1803 as the date of publication of this name.

Rhoads, in 1894,⁶ rejected *Ovis canadensis* Shaw as "unavailable," for

¹ "Le Moufflon d'Amérique. (*Ov. montana*.) Geoff. Ann. du Mus. II, pl. ix."—CUVIER, Règne Anim., I, Dec. 7, 1816, p. 267.

² Desmarest used *Ovis cervina* for the species as late as 1818, but abandoned it in 1822 for *Ovis montana*, without giving any reason for making the change. Later *Ovis montana* was wrongly credited by many authors to Desmarest.

³ Biologia Centrali-Americana, Mamm., p. 111, June, 1880.

⁴ North Amer. Fauna, No. 3, p. 78, Sept. 11, 1890; *ibid.*, No. 5, p. 81, July, 1891.

⁵ Proc. Biol. Soc. Washington, XIV, p. 29 (footnote), April 5, 1901. He here says that he "adopted the name *canadensis* as of unquestionable priority."

⁶ Reprint of Ord's North American Zoology, 1894, Appendix, p. 25; Amer. Nat., XXVIII, June, 1894, p. 526.

the reason that Shaw's work is "without any date whatever, . . . though it [the name *Ovis canadensis*] has priority over any other." (*Ovis cervina* is here wrongly cited as dating from 1818.)

In the following year the present writer¹ also employed the name *Ovis cervina* Desmarest (here cited correctly, almost for the first time, as dating from 1804) as preferable, on the ground that "there can be a difference at most of but a few months in the publication of the two names. Obviously the name having a positive date should have preference." Elliot, in 1901,² adopted *Ovis cervina*, and this name and *O. canadensis* both have at present about equal currency.

While the name *Ovis cervina* Desmarest is known to have been published early in 1804, the date of *Ovis canadensis* Shaw has been assumed, on hypothetical grounds, as December, 1803.³ The careful collation of Shaw and Nodder's work given below shows that the actual date of publication of this name was almost unquestionably February, 1804, and could not have been in 1803.

COLLATION OF SHAW AND NODDER'S 'NATURALIST'S MISCELLANY.'

This work, of twenty-four volumes, was published in monthly parts, beginning August 1, 1789. The first volume has an engraved title-page⁴ bearing date 1790, and also two dedicatory title-pages, facing each other, one in Latin, the other in English, but carrying no date. Each following volume has also two similar printed dedicatory undated title-pages, each volume being inscribed to a different person or to some learned Society.⁵ The only dates of publication for any part of the work (in the copy examined), except the first volume, are those engraved on the plates. Thus all the plates in Volume I are dated.⁶ The plates are all, with rare exceptions (in

¹ Bull. Amer. Mus. Nat. Hist., VII, p. 258, June 29, 1895.

² Synopsis of the Mammals of North America, 1901, p. 46.

³ Cf. Sherborne, Ann. and Mag. Nat. Hist. (6), April, 1895, pp. 376.

⁴ Vivarium Naturæ or the Naturalist's Miscellany. Vol. I. Dedicated by permission to Her Majesty. By G. Shaw M. D., F. R. S. the Figures by E. P. Nodder, Botanic Painter to Her Majesty. London. Printed for Nodder & Co., 15 Brewer Str. Golden Sq. 1790. [24 vols., Royal 8vo, 1790-1813.]

⁵ The English version of the dedication in volume I is as follows: To the | Most Illustrious Princess, | Charlotte, | Queen of Great Britain, | not less distinguished by | Her Virtues | than Her Station, | this First Volume | of the | Naturalist's Miscellany | is | with profound humility inscribed | by | Her Majesty's most devoted | and | most obedient subjects and servants, | George Shaw, | Frederick P. Nodder.

⁶ Plate 1 is inscribed across the bottom: "Published Aug^t. 1, 1789, by F. P. Nodder and C^o., N^o. 13 Panton Street." The inscription at the bottom of Plate 16 is: "Published Jan^y. 1st 1790, by F. P. Nodder & C^o. N^o. 13 Panton Street." The plate inscriptions are similar throughout the next five or six volumes.

which the plates are not even numbered), dated in a similar manner to the end of Volume V; in Volume VI only one plate is dated in each of six parts, two are dated in five parts, and three in the last or August part. In Volume VII usually only one plate is dated in each part, and the same is true of Volume VIII as far as plate 265, the first plate in the December part; the plates in the rest of the volume are all without dates. The first plate of Volume IX is dated (Sept. 1, 1797), and the next 29 plates have no date; for the rest of the volume one or more plates are dated in each part, and all are dated in the final part (August, 1798). In Volumes X, XI, XII, and the first three parts of Volume XIII, nearly all the plates are dated. From this point on to the end of the work very few plates are dated, in most of the volumes none, and when dated only the year is given.

Each volume is furnished with an index consisting of a single leaf. In 1813, a general index was issued, probably with the concluding part, with references for both the Latin and English names, to both the volumes and the plates.

In the course of the work seven plates have no numbers, and ten are wrongly numbered, through errors in engraving; but their serial relation is evident from their position in the volumes and by the subject references in the indexes. In the October part of Volume XIII the dates and numbers are not serially conformable, plates 497 and 498 being dated October 1, 1801, while plates 499 and 500 are dated Sept. 1, 1801. In Volumes IX and X plates 339 and 349 are dated 1789 instead of 1798, and plate 360 is dated 1770 instead of 1789.

The copy of the work examined has been collated with the volume indexes in order to determine whether the plates included together as volumes have been properly made up for binding, and no error in this respect has been found. The plates themselves have been listed serially, by volumes, throughout the work and the date, or the absence of a date, noted for each plate. The results of the collation, as given below, are thus based on thorough study, with a view to their possible usefulness to others.

Mr. Sherborne¹ refers to the prospectus of this work as announcing its publication to be in monthly parts, beginning August 1, 1789, each part to consist of "three, and sometime more" plates. My collation shows that the first two volumes contained 37 plates each, an extra plate having been issued with the part for April, 1790, and with the part for February, 1791. The next succeeding five volumes (III-VII) contain only 36 plates each, issued regularly at the rate of three plates per month. Volume VIII contains 46 plates, the first two parts consisting each of three plates, and the remaining ten parts having four plates each. This number was maintained

¹ *Ann. and Mag. Nat. Hist.* (6), XV, 1895, p. 376.

for each subsequent part, and the following volumes contain 48 plates each except the last which has only 44,¹ lacking the August issue, owing to the illness and death of Dr. Shaw, who died July 22, 1813.²

Volumes I-V began with August and ended with the part for the following July. No part was issued in March, 1795, and the volume (Volume VI) ended with August instead of July, as previously. So far as the dates on the plates and the number of plates in each volume give evidence, all the remaining volumes, beginning with Volume VII, began with August and ended uniformly with the July part.

The above data may be presented in tabular form, as follows:

Tabular Statement.

N. B.—Hypothetical dates are enclosed in brackets [-].

Volumes.	Number of Plates per Volume.	Plates and Dates.		Plates and Dates.	
I.	37	1- 15, Aug. 1, 1789-	Dec. 1, 1789	16- 37, Jan. 1-July 1, 1790	
II.	37	38- 52, " 1790-	" 1790	53- 74, " " 1791	
III.	36	75- 87, " 1791-	" 1791	88-110, " " 1792	
IV.	36	111-125, " 1792-	" 1792	126-146, " " 1793	
V.	36	147-161, " 1793-	" 1793	162-182, " " 1794	
VI. ³	36	183-197, " 1794-	" 1794	198-218, " Aug. 1, 1795	
VII.	36	219-230, Sept. 1, 1795-	" 1795	231-254, " " 1796	
VIII.	46	255-268, " 1796-	" 1796	269-300, [" " 1797]	
IX.	48	301-316, " 1797-[" 1797]		317-348, [Jan. 1-Aug. 1, 1798	
X.	48	349-365, " 1798-	" 1798	366-396, Jan. 1- " 1799	
XI.	48	397-412, " 1799-	" 1799	413-444, " " 1800	
XII.	48	445-460, " 1800-	" 1800	461-492, " " 1801	
XIII.	48	493-508, " 1801-[Dec. 1801]		509-540, [Jan. 1-Aug. 1, 1802]	
XIV.	48	541-556, [Sept. 1802- Dec. 1802]		557-588, [" " 1803]	
XV.	48	589-604, [Sept.] 1803-[Dec. 1803]		605-636, [" " 1804]	
XVI.	48	637-652, [Sept. 1804- Dec. 1804]		653-684, [" " 1805]	
XVII.	48	685-700, [Sept. 1805- "] 1805		701-732, [" " 1806]	
XVIII. ⁴	49	733-748, [" 1806 " 1806]		749-780, [" " 1807]	
XIX.	48	781-790, [" 1807- " 1807]		797-728, [" " 1808]	
XX.	48	729-844, [" 1808- " 1808]		845-876, [" " 1809]	
XXI.	48	877-892, [" 1809 " 1809]		893-924, [" " 1810]	
XXII.	48	925-940, [" 1810- " 1810]		941-972, [" " 1811]	
XXIII.	48	973-988, [" 1811- " 1811]		989-1020 [" " 1812]	
XXIV.	44	1021-1036 [" 1812- " 1812]		1037-1064 ["]-Aug. 1813	

¹ There is, however, one other exception: In volume XVIII, the part for July (1806), had apparently five plates, and the volume 49 plates, there being two, with different subjects numbered 774.

² Volume XXIV contains an engraved memorial (bound at the end of the last volume in the present copy) to Dr. Shaw, on which is inscribed the date of his death, at the age of 60 years.

³ No part was issued in March, 1795, and the volume ended in August instead of July.

⁴ The July part contained 5 plates, No. 774 having been given to two different plates, making 49 plates for the volume.

Explanatory Notes.

The following data are supplementary to the above Table. Many of them have been given in the text preceding the Table, but are here presented with many others in more convenient form for reference, in the order of the volumes.

- Vol. I. All the plates are dated. This is the only volume in which all the plates have dates.
- Vol. II. All but 4 of the plates are dated; these, with the obvious date of issue, are: no. 44, Oct. 1, 1790; no. 62, March 1, 1791; no. 69, June 1, 1791; no. 72, July 1, 1791.
- Vol. III. All but two of the plates are dated: these are no. 78, Aug. 1, 1791; no. 103, May 1, 1792.
- Vol. IV. All plates are dated except no. 112, Aug. 1, 1792; no. 124, Dec. 1, 1792; no. 146, July 1, 1793.
- Vol. V. Four plates are without dates: no. 151, Sept. 1, 1793; no. 169, March 1, 1794; no. 172, April 1, 1794; no. 182, July 1, 1794.
- Vols. VI and VII. One or more plates are dated in each monthly part, except in the issue for March, 1795; the dated plates render practically certain, as in the previous volumes, the month of issue of the undated plates.
- Vol. VIII. The first two monthly parts contained each 3 plates, and the remaining ten parts each 4 plates. Only the first plate in each of the first four parts is dated, the last dated plate being no. 265, dated Dec. 1, 1796.
- Vol. IX. The first plate of the volume (no. 301) is dated Sept. 1, 1797; the next plate bearing a date is no. 331, dated April, 1798; 1 plate of the May, 3 plates of the June, 3 of the July, and all of the plates of the August issue are dated.
- Vol. X. Most of the plates in each monthly part are dated.
- Vol. XI. In this volume all the plates are dated except one in the September issue, which has neither date nor number.
- Vol. XII. Each monthly part has two, three, or all four of the plates dated.
- Vol. XIII. All the plates in the September, October, and November parts are dated, except two in the September issue. No plates in this volume after the November issue (ppl. 505-540) are dated.
- Vol. XIV. Only one plate is dated; this is plate 553 of the December issue, which bears simply the date of the year (1802).
- Vol. XV. Only 7 plates are dated, and these bear only the year, namely, no. 589, the first plate in the volume, which is dated 1803. All the four plates of the April issue are dated 1904, and there is one plate thus dated in the May issue. The *Ovis canadensis* plate, no. 610, belongs to the February part, on the basis of four plates in each monthly issue, there being 48 plates in the volume. This plate has previously been assigned to December, 1903.¹
- Vol. XVI. No plates are dated.
- Vol. XVII. Only one plate is dated, no. 699, in the issue for December, which is dated 1805.
- Vol. XVIII. No plates are dated.
- Vol. XIX. The single dated plate is no. 804, dated 1807.
- Vol. XX. No plates are dated.
- Vol. XXI. Only five of the 48 plates are dated; three of them are dated 1809, and two, 1910.
- Vol. XXII, XXIII, XXIV. In these volumes no plates are dated.

¹ Cf. Sherborne, l. c., p. 376.

DATE OF *OVIS CANADENSIS* SHAW.

From the foregoing it is evident that the date of publication of the name *Ovis canadensis* Shaw cannot be positively determined, but in all probability was early in February, 1804. There is little room for doubt that *Ovis cervina* Desmarest was published also early in 1804. The 'Nouveau Dictionnaire d'Histoire Naturelle' appeared in 1803 and 1804, in twenty-four volumes, the first twenty-one of which, according to the title-page dates, were published in 1803, and the last three in 1804. The volumes were thus published at the rate of about two a month, and doubtless Volumes XXII and XXIII, and possibly also Volume XXIV, appeared in January, 1804. On the other hand, it must be assumed that from November, 1801, on to the end of Shaw and Nodder's work in 1813, the plates were issued regularly, four in a part for each month, in order to fix even a hypothetical date for any of them. There is, however, evidence that this regularity of issue was not always maintained. The last 560 plates, comprising all the plates in the last 12 volumes except the first 12 of Volume XIII, are wholly without dates except for 15, scattered at wide intervals, which give the year. No plates are definitely dated after November 1, 1801. It seems therefore that where a question of priority between two names is at stake, the only proper course is to accept the name which was published in a work of known date rather than the alternative undated name, the probable or approximate date of which depends upon an assumption and mathematical computation.

OTHER EARLY REFERENCES TO THE MOUNTAIN SHEEP OF NORTH AMERICA.

It is of interest to note in this connection that the next references to the Rocky Mountain Sheep, following McGillivray's discovery of the species, based on personal observation of the animal in life, occur in Paul Allen's narrative of the Lewis and Clark Expedition.¹ These explorers first became acquainted with the species in 1805, in the badlands of the Upper Missouri (first met with a little below the mouth of the Yellowstone), and the next specimens after McGillivray's to reach civilization were the pair (male and female) brought by them to Philadelphia on their return in 1806. Very good figures of them were published by Godman in 1826 in his 'American Natural History.'² He identified them with the Argali of Siberia, and says

¹ History of the Expedition under the command of Lewis and Clark to the Sources of the Missouri, thence across the Rocky Mountains and down the River Columbia to the Pacific Ocean. Performed during the Years 1804-5-6, etc. 2 Vols., 8vo, 1814.

² Vol. II, 1826, p. 329, with an original plate.

of them: "Two specimens of the Argali, a male and female, were brought in by Lewis and Clarke, and may be seen in the Philadelphia Museum, where they are preserved." The plate of an old ram in Griffith's 'Animal Kingdom' (Vol. IV, 1827, facing p. 318) was also drawn from the Lewis and Clark specimens.¹

Barton had, however, in 1804,² published the story of a Mohawk Indian who had apparently reached the sheep country of the Upper Missouri on a journey northwest from Detroit, to the effect that he had met with "a kind of Sheep with a hairy back, much like a deer, but having long wool over its belly, and large horns (one of which he saw weighed seven pounds)." Barton further says, in the same article: "The existence of a large species of sheep, in the same tract of country ["adjacent to the sources of the Missouri"] is no longer doubtful. This is probably the Argali of Asia. It is unquestionably the *Taye*³ of the Monqui-Indians, who reside in California. A figure of this animal was published by Venegas as early as the year 1757, in the first volume of the *Noticias de la California*, printed at Madrid."

In the following year Barton again referred to the sheep of the Missouri badlands in a further account of the *Taye*,⁴ stating: "I have myself received some additional information concerning the existence of a large horned animal, in all probability the *Taye*, in the country adjacent to the river Missouri. . . . This animal is a native of the Stony-mountains [Rocky Mountains of to-day] about the headwaters of the Missouri." He refers to the use of its horns by the Indians, etc., and considers "the existence of a native sheep in North-America, is thus sufficiently established," but that it "remains to be ascertained whether it is a species *peculiar* to this continent or one *common* to it and the old world." Barton was obviously ignorant, of McGillivray's account, published in 1803, and his comment on the subject of sheep in North America is mainly of interest as being apparently

¹ In an effort to trace the history of these specimens further, I wrote to Mr. Witmer Stone, Curator of Mammalogy and Ornithology, Academy of Natural Sciences of Philadelphia, in the hope of obtaining further information. His reply (*in litt.*, Jan. 6, 1912), though negative in character, is of interest, as follows: "The Lewis and Clarke material all went to Peale's Museum so far as I know. Lewis's Woodpecker and Clarke's Crow are explicitly based upon Peale's Museum specimens by Alexander Wilson. Furthermore I do not think the Academy was ever referred to as the 'Philadelphia Museum.' That term was the regular title of Peale's Museum in 1826 and later. It is hard to say where the specimens may be by this time. The birds that turned up in the Boston Society some years ago and three birds purchased by our Academy are the only Peale's Museum specimens that I know of."

² Medical and Physical Journal, I, 1804, pp. 75, 77, in an article entitled 'Notice of the Travels of a Mohawk-Indian.'

³ The "*Taye*" and its interesting history will be considered later.

⁴ Med. and Phys. Journ., II, 1805, pp. 106-113, in an article entitled: "Some Account of the *Tayë*, a species of Sheep.'

the first reference in any scientific journal to the wild sheep of the Missouri River country, the existence of which there was soon after established by Lewis and Clark's specimens and the narrative of their explorations.

It is rather surprising that Sir Alexander Mackenzie did not acquire some definite information of wild sheep in 1793, on his wonderful voyage from Fort Chipewyan over the Rocky Mountains to the mouth of the Frazer River, but he evidently did not meet with them, although the mountains flanking the Peace River-Frazer River divide, in about latitude 55° north, is 'sheep country.' While in camp at the head of Peace River, on June 10, the natives, he says, gave him among other things, "the skin of a moose-deer, dressed, and a white horn, in the shape of a spoon, which resembles the horn of the buffalo of the Copper-Mine River; but their description of the animal to which it belongs does not answer to that."¹ Yet Richardson surmised, and no doubt, correctly, that this spoon was made from the horn of a mountain sheep.²

Mackenzie also learned from the natives of the occurrence of "small white buffaloes" in the mountains west of the lower Mackenzie River,³ which have been identified by various later writers with the White Sheep (*Ovis dalli dalli*) described by Nelson in 1884.

THE TAYE OF "CALIFORNIA."

As is well known, the sheep discovered by McGillivray in the year 1800 in southern Alberta, was not the first form of American sheep known to explorers and historians. Pennant in his 'Arctic Zoology,' published in 1784 (Vol. I, p. 12), refers to "certain quadrupeds of this genus [sheep]" as having been observed by missionaries in California in 1697, and quotes their account as found in Jones's 'Abridged Philosophical Transactions' (Vol. V, part 2, p. 195). Richardson quotes from the same account as originally published in the unabridged 'Philosophical Transactions' of much earlier date.

A similar account of the sheep is given by Venegas in his 'History of California,' published in Madrid in 1758, and republished in English in two

¹ Voyages from Montreal through the Continent of North America, English ed., 1802, Vol. II, p. 95; Amer. ed., 1802, p. 150.

² Faun. Bor.-Amer., I, 1829, p. 272.

³ Voyages from Montreal, etc., English ed., Vol. I, 1802, pp. 202, 239; Amer. ed., pp. 29, 56.

volumes in 1759.¹ The most interesting feature of Venega's account is the figure of the "Taye or Californian Deer," here reproduced in Fig. 4.

The Venegas account has been referred to or more or less fully quoted by many subsequent authors, but his description of the Taye is merely a paraphrase of Father Piccolo's statement, published originally in Paris some fifty years earlier, and republished in English in the 'Philosophical Transactions' for 1708.² The explanatory title of Piccolo's article is:

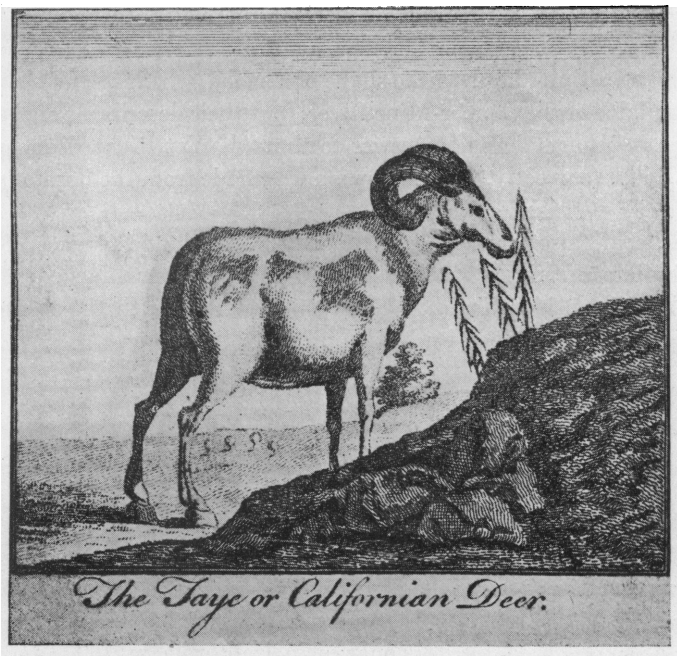


Fig. 4. From Venegas's Nat. and Civ. Hist. of California, Vol. I, 1759, lower figure of plate facing p. 36.

¹ A Natural and Civil History of California: containing an accurate Description of that Country, its Soil, Mountains, Harbours, Lakes, Rivers, and Seas; its Animals, Vegetables, Minerals, and famous Fishery for Pearls. The Customs of the Inhabitants, Their Religion, Government, and Manner of Living, before their Conversion to the Christian Religion by the missionary Jesuits. Together with Accounts of the several Voyages and Attempts made for settling California, and taking actual Surveys of that Country, its Gulf, and Coast of the South-Sea. Illustrated with Copper Plates, and an accurate map of the Country and the adjacent Seas. Translated from the original Spanish of Miguel Venegas, a Mexican Jesuit, published at Madrid 1758. In two Volumes. — Vol. I. London: Printed for James Rivington and James Fletcher, at the Oxford Theatre, in Pater Noster-Row. 1759.

The original Spanish edition is said to be titled 'Noticias de la California'.

The sheep matter in Venegas occurs in Vol. I, pp. 36, 37, with a figure of the Taye on the plate facing p. 36.

² Phil. Trans., Vol. XXVI, No. 318, for the months of November and December, 1708, pp. 232-240, with Kino's map. The Taye matter is at p. 336.

"An Extract of a Memoir, concerning the Discovery of a passage by Land to California; with a Map and Description of that Country. Presented to the Royal Council of Guadalaxara in Mexico, by Francis Maria Piccolo.¹ Taken from the Letters of the Missionary Jesuits, printed at Paris." The memoir is dated "Guadalaxara, Mexico, February, 10, 1702." The accompanying map is entitled 'A Passage by Land to California Discovered by the Rev. Father Eusebius Francis Kino jesuite between y^e years 1698 and 1701.' Piccolo's reference to the Taye is here quoted in full, it being the source of all subsequent accounts of sheep in California based on the records of the early Jesuit missionaries.²

"Besides several sorts of Animals that we knew; which are here in plenty, and are good to eat, as Stags, Hares, Coneys, and the like; we found two sorts of Deer, that we knew nothing of: We call them Sheep, because they somewhat resemble ours in make. The first sort is as large as a Calf of one or two Years old: Its Head is much like that of a Stag; and its Horns, which are very large, like those of a Ram: Its Tail and Hair are speckled, and shorter than a Stags: But its Hoof is large, round, and cleft as an Oxes. I have eaten of these Beasts; their Flesh is very tender and delicious. The other sort of Sheep, some of which are White, and others Black, differ less from ours; They are larger, and have a great deal more Wool, which is very good, and easy to be Spun and Wrought."

Father Juan Maria de Salvatierra crossed the Gulf of California from the mouth of the Yaqui River, Sonora, to California and took formal possession of the country in the name of the King of Spain October 25, 1697, and was soon joined by Father Francis Maria Piccolo. They established missions during the following five years of their sojourn here, at various points from about latitude 26° southward to La Paz. It was in this region that they became acquainted with the Taye, as recorded by Piccolo, the historian of these first attempts to establish missions in what is now Lower California. Hence the 'California' where the Taye was found in 1697 was the peninsula of Lower California south of north latitude 26°, and not the present State of California, which at that time had not become a field of missionary enterprise, nor had the country then received a distinctive name.

It is of interest to note that sheep still exist where the first Spanish missionaries found them in 1697. Dr. Charles H. Townsend on his recent 'Albatross' expedition to Lower California in the interest of this Museum, obtained some imperfect skulls of mountain sheep from the natives at Conception Bay, and saw a living specimen in the low mountains at the head of the bay. He also informs me that mountain sheep are said still to inhabit the low mountains near the Gulf coast as far south as Saltillo del Rey, or to

¹ The correct spelling of the name is Piccolo.

² Clavigero (*Stor. ant. del Messico*, IV, 1781, p. 158), often cited in this connection, gives four lines to the Tajé, identifying it with the ibex of Pliny and the quentin of Buffon.

within about one hundred miles of La Paz, and that they range thence northward in all the high hills and mountains, especially on the Gulf side, nearly to the United States boundary.

The Lower California mountain sheep received its first technical name in 1903, when it was described by Dr. D. G. Elliot as *Ovis cervina cremnobates*,¹ the description being based on specimens from the San Pedro Martir Mountains, in the northern part of the Peninsula. It is closely related to the previously described *Ovis nelsoni* Merriam, from the Grapevine Mountains, on the boundary between California and Nevada, and also to *Ovis canadensis gaillardi* Mearns (1907), from the Gila Mountains, near the boundary of southwestern Arizona and Sonora.

Many authors have made the mistake of supposing that the "California" mountain sheep of the seventeenth century Spanish missionaries was the sheep of the modern State of California. Sir John Richardson, in 1829, stated that "Mr. David Douglas described Piccolo's sheep under the name *Ovis californica*."²

OVIS CALIFORNIANUS DOUGLAS.

In 1829, David Douglas described a North American sheep under the name *Ovis californianus*.³ No type locality is stated, but he says that the only specimen he had been able to examine was taken near Mount Adams ("Lat. 46. 14. 55., Long. 121. 17. 0"), in what is now Yakima County, Washington. This should evidently be taken as the type locality, notwithstanding the name *californianus* is applied to the species, and his statement that it "is more numerous in the mountainous districts of California," than in "the subalpine regions of Mounts Wood [Hood], St. Helens, and Vancouver." In this account of *Ovis californianus* he makes no reference to the Taya of Lower California.

NORTHERN MOUNTAIN SHEEP.

The sheep of the far north are, so far as known at present, specifically distinct from the sheep of the Rocky Mountains of southern Canada and the United States, the mountainous districts of northern Mexico and Lower

¹ Field Columbian Museum, Zool. Ser., III, No. 14, p. 239, Dec., 1903.

² Fauna. Bor.-Amer., I., p. 272. As no page is cited in the reference he gives to the 'Zoological Journal,' where the species was described, it is probable the description had not been published at the time he wrote this statement, and hence the error in the specific name, given as *californica* instead of *californianus*.

³ Zoological Journal, IV, p. 332, Jan., 1829.

California, and (formerly) the Cascade Mountains and the Sierra Nevada of California. The numerous 'subspecies' of this group are all closely related to the sheep of the central Rocky Mountains, they differing only slightly in coloration, in size, or in any other characters, although the southern forms have long been restricted to isolated areas. It is to this fact as much as to any marked evidences of differentiation that appears to have led to their recent recognition as nameable forms.

The sheep of northern Canada and Alaska differ strongly from the southern group in coloration, in size, and in the conformation of the horns. The three or four forms of the northern group commonly recognized present a wide range of color variation, the most northern phase being practically pure white, while the most southern form is so dark as to be commonly known as the *black* sheep. Notwithstanding this striking difference in color, they are otherwise but slightly and rather inconstantly differentiated, while, as recently shown by Sheldon,¹ they completely intergrade over a large intermediate district. The southern form of this group does not, so far as known, intergrade with the adjoining form of the southern group, nor is it known whether their respective ranges actually meet.

The white sheep of Alaska² was described and named in 1884, from specimens taken near Fort Reliance on the Upper Yukon, Alaska.

The black sheep of northern British Columbia was described and named in 1897,³ from specimens taken in the Cheonnee Mountains in northwestern British Columbia, and an intermediate type in 1901,⁴ from specimens taken near Dawson City, Yukon Territory.

Richardson's "*Ovis montana* Desmarest," as shown by both the description and plate,⁵ is doubtless a composite of *O. dalli* and *O. stonei*, the white male being apparently referable to *dalli* and the dark female to *stonei*. The locality, "the mountains which skirt the south branch of the Mackenzie [Liard River]," whence these specimens are said to have come is vague, and evidently Richardson's first-hand knowledge of the sheep of the Northern Rockies was extremely limited. His description of the coloration of the two specimens figured indicates that he believed the difference in color to be seasonal.

"The head, buttocks, and posterior part of the belly, are white; the rest of the body and the neck are of a pale umber or dusky wood-brown colour. A deeper and

¹ The Wilderness of the Upper Yukon: A Hunter's Exploration for Wild Sheep in Sub-Arctic Mountains. By Charles Sheldon. New York, 1911.

² *Ovis montana dalli* Nelson, Proc. U. S. Nat. Mus., VII, 1884, p. 12.

³ *Ovis stonei* Allen, Bull. Amer. Mus. Nat. Hist., IX, 1897, pp. 111-114, pl. ii, iii. Re-described by Lydekker in 1898 (Wild Oxen, Sheep, and Goats, 1898, p. 215) as *Ovis canadensis liardensis*.

⁴ *Ovis fannini* Hornaday, Fifth Ann. Rep. New York Zool. Soc., 1901, App. I, pp. 1-4.

⁵ Fauna Bor.-Amer., I, 1829, p. 271, pl. xxiii.

more shining brown prevails on the anterior aspect of the legs. The tail is dark brown, and a narrow brown line, extending from its base, runs up betwixt the white buttocks, to unite with the brown colour of the back. The colours reside in the ends of the hair, and as these are rubbed off during the progress of the winter, the tints become paler. The old rams are almost totally white in the spring. This is the case with the male specimen of our plate. The female in the back ground, presents the colours mentioned above."

According to Biddulph,¹ the male of Richardson's plate was still extant in 1885, as he says: "There is stowed away in one of the basement rooms [of the British Museum] a stuffed specimen in bad preservation, labelled *canadensis*. This is the specimen described and figured by Richardson in the 'Fauna Boreali-Americana.'" He also refers to a specimen from Liard River, "labelled *nivicola* or the Alaskan Wild Sheep," a dark colored specimen which thirteen years later became the type of Lydekker's *Ovis canadensis liardensis*.

According to a letter from Mr. Lydekker to Mr. Sheldon (kindly shown me by Mr. Sheldon), dated November 28, 1905, Richardson's ram was still in the British Museum ("although in very bad condition"), and is regarded by Lydekker as "undoubtedly a *dalli*." Mr. Sheldon (*in litt.*, February 10, 1912) calls my attention to the fact that the "tail of the ram in Richardson's figure is *white*," and it must therefore have been "killed in the Nahanni Mountains (most probably) or farther to the north on the Mackenzie watershed, area 'A'" (on Mr. Sheldon's map of the distribution of sheep in his 'The Wilderness of the Upper Yukon').

SYNONYMIC LIST OF NORTH AMERICAN SHEEP, WITH THEIR TYPE LOCALITIES AND RANGES.

The listing of a form in the following enumeration does not necessarily imply its acceptance by the present writer. The form here entered as *Ovis cervina californiana* has not usually been recognized as tenable; as it is now probably extinct at the type locality and is unrepresented by typical specimens in museums, its real status in relation to other forms can probably never be satisfactorily determined. On geographical grounds it seems as well entitled to enumeration as several of the more southern races now commonly recognized. *Ovis cervina auduboni* is a nearly parallel case with *Ovis californiana* Douglas. Both are admitted as a matter of con-

¹ On the Geographical Races of the Rocky Mountain Bighorn. By Lieut. Col. John Biddulph. Proc. Zool. Society London, 1885; pp. 678-684. See p. 679 for the reference to Richardson's type.

venience in compiling the records. This is true also of *Ovis cervina gaillardi*, *O. c. cremnobates*, and *O. dalli fannini*, although the latter seems to be merely an unstable intermediate between *O. d. dalli* and *O. dalli stonei*.

A. *The Ovis cervina Group.*

1. *Ovis cervina cervina* Desmarest.

The My-Attic, or Mountain Ram DUNCAN MCGILLIVRAY, New York Daily Advertiser, Dec. 4, 1802; with letter of introduction by E. Savage. Republished in the 'European Magazine and London Review,' 1803 (not seen), and thence republished in 'Forest and Stream,' New York, for Oct. 29, 1910.

Mountain Ram of North America MCGILLIVRAY, New York Medical Repository, VI, No. III, 1803, pp. 237-240, with pl. (Probably published Jan., 1803.) Same as the above, with slight editorial changes and the addition of a figure of the animal drawn by E. Savage, and an introduction by Dr. Samuel Latham Mitchell. McGillivray is usually cited from this source by subsequent authors.

Belier de Montagne GEOFFROY, Ann. du Mus. d'Hist. Nat., II, 1803, pp. 360-363, pl. lx. Based on McGillivray in the 'New York Daily Advertiser' (as cited above) and on a copy of Savage's drawing. The figure, however, is much modified.

Ovis cervina DESMAREST, Nouv. Dict. d'Hist. Nat., XXIV, 1804, pp. 5, 6; Nouv. Dict. d'Hist. Nat., nouv. éd., XXI, 1818, 553. Both based wholly on Geoffroy, as cited above.—ALSTON, Biol. Cent.-Amer., Mamm., p. 111, June, 1880. From Desmarest at 1818.—RHOADS, Reprint of Ord's N. Amer. Zool., 1894, App. p. 25. From Desmarest at 1818.—ALLEN, Bull. Amer. Mus. Nat. Hist., VII, p. 258 (footnote) June 29, 1895. Desmarest is cited at 1804, with discussion of the availability of the name.—ELLIOT, Synop. Mamm. N. Amer., 1901, p. 46; Check List of Mamm. N. Amer., West Indies, etc., 1905, p. 53.

Ovis canadensis SHAW, Nat. Miscel., XV, pl. 610 and text (unpaged and without date). Based wholly on Geoffroy, as cited above.—BIDDULPH, Proc. Zool. Soc. London, 1885, pp. 681, 683 (claims priority for the name, citing *cervina* Desmarest as from 1818.—MERRIAM, N. Amer. Fauna, No. 3, p. 78, Sept. 11, 1890 (San Francisco Mountain and Grand Cañon, Arizona; name *canadensis* employed without comment); Proc. Biol. Soc. Washington, XIV, p. 29 (footnote), April 5, 1901 (priority claimed for the name *canadensis*).—MEARNS, Mamm. U. S. and Mex. Bound. Surv., I, 1907, pp. 235, 236, footnote (synonymy).—PREBLE, N. Amer. Fauna, No. 27, p. 155, Oct. 26, 1908 (range in Alberta).—WARREN, Mamm. of Colorado, 1910, pp. 9-12 (nearly extinct in Colorado; those still remaining are increasing in numbers).

Ovis canadensis typica LYDEKKER, Wild Oxen, Sheep, and Goats, 1898, pp. 209-215, pl. xvii (general account, part); Great and Small Game of Europe, Asia and America, 1901, p. 10 (part).

Ovis montana CUVIER, Règne Anim., I, 1817 (= "Dec 7, 1816") p. 267. Based on Geoffroy's 'Belier de Montagne,' 1803, as cited above.—BLAINVILLE, Journ. de Physique, LXXXVII, 1818, p. 151 (footnote). Name attributed to Geoffroy.—Desmarest, Mamm., Pt. II, 1822, p. 487. Desmarest here abandons his own earlier name *cervina* for *montana*, without comment.—*Ovis montana* was used by most

authors from this date till 1880, and by some for twenty years later, the authority for the name being usually given as Geoffroy, frequently as Desmarest, rarely correctly as Cuvier. The more important recent references are:

Ovis montana BAIRD, P. R. R. Expl. and Surv., VIII, 1857, pp. 673-679, figs. 24-32, part (systematic and general).—ALLEN, Bull. Essex Inst., VI, 1874, 55 (Mt. Lincoln, Colorado).—COUES, Proc. Acad. Nat. Sci. Philadelphia, 1867, p. 136 (horns "often met with about bases of cliffs and precipices").—COUES and YARROW, Rep. Wheeler Surv., V, Zool., 1875, p. 68 (Santa Fé, N. Mex.).—HORNADAY, Fifth Ann. Rep. N. Y. Zool. Soc. (1900), June 1, 1901, pp. 101-116, 4 half-tone cuts (description and distribution).

Ovis ammon ? MITCHILL, New York Med. Repos., X, p. 35 (footnote), July, 1806. Stony Mountains, on authority of a manuscript journal of James M'Kay. Origin of the myth: "The animal does not live more than ten or twelve years, because the horns make so great a sweep, and grow so far forward as to make it difficult or impossible for the mouth to reach the ground, and graze the herbage for nourishment."

Ovis ammon HARLAN, Faun. Amer., 1825, p. 262. Regarded as merely a variety of the Argali of Asia.—GODMAN, Amer. Nat. Hist., II, 1826, p. 329, with an original plate drawn from the Lewis and Clark specimens.

Ovis pygargus GRIFFITH, Anim. Kingd., IV, 1827, p. 318, V, p. 359, with an original plate by Hamilton Smith drawn from the Lewis and Clark specimens.

Type Locality, near Calgary, Alberta.

Range, Rocky Mountain region, from Alberta and southern British Columbia to New Mexico and central Arizona; in the State of Washington west to the mountains in Ferry, Okanagan and Chelan Counties (W. F. Sheard); also the Blue Mountains of northeastern Oregon (H. E. Anthony).

I am indebted to Dr. D. G. Elliot for the following notes on the former abundance of sheep in the southern part of Yale County, British Columbia.

"In 1886 I made a hunting trip in British Columbia after mountain sheep. Starting from Hope on the Fraser River, I crossed a portion of the Coast Range into Ashnola, and under Indian guidance proceeded to a mountain called by the natives "Ka-Asch-Ho," where our camp was pitched. At that time there had been but little or no hunting in that part of the country as it was not easy of access, and great numbers of sheep and mule deer frequented the district. The mountain, on which our hunting was done, had many more or less flat stretches on it, some of considerable extent, so that it was possible to ride a horse over most of it. The sheep, not having been much disturbed, were not particularly shy and it was possible to approach quite close to bands of considerable size without alarming them or causing them to move away to any distance. The old rams had not yet joined the ewes, but kept by themselves in companies of five to eight, while the large bands were composed of ewes, young rams and lambs.

"To illustrate how plentiful the sheep were at this period in that locality, the following incident will show. I had been hunting one morning without meeting any rams carrying horns sufficiently large to be considered a worthy trophy, when about eleven o'clock I reached a hog-back having quite a sharp ridge and which dropped down in a graded descent to the plain or wide valleys on either side. I sat down on the edge and was surveying the country and other ridges below me, when I heard sounds as if some metal had struck a stone sharply on the side of the hog-back away from me. I kept perfectly still and soon was able to distinguish the unmistakable

sound of small hoofs striking against small stones. In a few moments, not more than seventy-five feet from where I sat, the horns and then the head and body of an old ewe appeared and crossed the top of the hog-back and began to descend the side on which I sat. This leader was closely followed by a crowding company of ewes, lambs and young lambs. If they saw me, they paid no attention to my presence, as I kept perfectly still in hope that a head would appear with sufficiently large horns to be worth obtaining. The procession of animals continued to pass over the ridge until I estimated that at least one hundred and fifty had crossed, but without any head appearing worth securing, so I sat and watched them descend slowly the steep side to the valley below. On other days however I obtained specimens, and the head of a ram and ewe are still in my possession.

"These sheep on Mt. Ka-Asch-Ho seemed to be rather local in their habitat, for so far as I could learn at the time from the Indians, they were not to be found farther north in the Range, and of course if they did go as far as the Fraser, that river would be an insuperable bar to their farther progress unless far up towards its head waters. After we had left the Ashnola Country, the news of our successful hunt became bruited about and many hunters went to the sheep mountains and in a few seasons the animals were compelled to seek a safer retreat and all or nearly all left the locality."

2. *Ovis cervina californiana* Douglas.

Ovis californianus DOUGLAS, Zool. Journ., IV, p. 332, Jan. 1829. Specimen described (type) from near Mount Adams; said to occur in the Cascades and "in the mountainous districts of California."

Ovis californica RICHARDSON, Faun. Bor.-Amer., I, 1829, p. 272 (a passing reference in the text, identifying it with "Piccolo's sheep").

Ovis californiana BLYTH, Proc. Zool. Soc. London, 1840, pp. 65, 67; Ann. and Mag. Nat. Hist., VII, 1841, pp. 199, 260, pl. v, fig. 5, horns. Recognized as a good species.—BIDDULPH, Proc. Zool. Soc. London, 1885, p. 683. Name, *O. californianus* Douglas rejected, owing to an error in the length of the tail as given by Douglas.

Ovis montana KENNERLY, P. R. R. Expl. and Surv., X, pt. 6, 1859, p. 72. Abundant on Mount Shasta, and evidence of its habitual presence in the vicinity of Rhett and Wright Lakes, northern California.—SUCKLEY and GIBBES, P. R. R. Expl. and Surv., XII, 1860, p. 137. Mt. Hood, Oregon; Mt. Shasta and eastward in California.

Ovis canadensis MERRIAM, N. Amer. Fauna, No. 16, p. 103, Oct. 28, 1899. Evidence of its recent occurrence at Mt. Shasta.—STEPHENS, California Mamm., 1906, pp. 57, 58. "Formerly found in parts of the Sierra Nevada and on Mt. Shasta, but they are apparently now exterminated in those mountains."

Ovis cervina, ELLIOT, Synop. N. Amer. Mamm., 1901, p. 46, part.

Type locality, near Mount Adams, Yakima County, Washington.

Range. Formerly the Cascade Mountains of southern Washington and Oregon, and Mount Shasta and the mountainous country to the eastward in northern California; now probably extinct.

3. *Ovis cervina auduboni* Merriam.

Native Species of Sheep BARTON, Med. and Phys. Journ., I, 1804, pp. 75-77, II, 1805, pp. 106-113. Contains probably the earliest references to the sheep of the

Upper Missouri country. Supposed to be the Argali of Asia, and also identified with the Taye of Piccolo and Venegas.

Ovis montana BAIRD, P. R. R. Expl. and Surv., VIII, 1857, pp. 673-679, figs. 24-32, part.—ALLEN, Proc. Boston Soc. Nat. Hist., XVII, Oct. 1874, p. 48 (badlands of the Yellowstone River). GRINNELL, Ludlow's Recon. Black Hills of Dakota, 1875, p. 84 (Little Missouri River).

Ovis cervina ALLEN, Bull. Amer. Mus. Nat. Hist., VII, p. 263, Aug. 21, 1895, (Black Hills region, South Dakota).

Ovis canadensis auduboni MERRIAM, Proc. Biol. Soc. Washington, XIV, p. 31, April 5, 1901. Based on skulls from the badlands of South Dakota.

Type locality, badlands between the White and Cheyenne Rivers, South Dakota.

Range. Badlands of the Yellowstone and Missouri Rivers in eastern Montana, eastern Wyoming, North and South Dakota, and western Nebraska. Probably now extinct over most of this area.

4. *Ovis cervina mexicana* Merriam.

Ovis mexicanus MERRIAM, Proc. Biol. Soc. Washington, XIV, p. 30, April 5, 1901.—BAILEY, N. Amer. Fauna, No. 25, pp. 70-75, Oct. 25, 1905 (western Texas).—HORNADAY, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 120-122 (description, from Merriam).

Ovis cervina mexicanus ELLIOT, Mamm. Middle Amer., 1904, p. 86; Check List Mamm. N. Amer., 1905, p. 54.

Ovis canadensis mexicanus LYDEKKER, Great and Small Game of Europe, Asia and America, 1901, p. 11 (from Merriam).—MEARNS, Mamm. U. S. and Mex. Bound. Surv., I, 1907, pp. 232-239 (range and relationships).

Type locality, Lake Santa Maria, Chihuahua, Mexico.

Range. Mountains of northern Chihuahua, extreme western Texas, southern New Mexico, and southern Arizona.

5. *Ovis cervina nelsoni* Merriam.

Ovis nelsoni MERRIAM, Proc. Biol. Soc. Washington, XI, pp. 217-218, July 15, 1897 (original description; Grapevine Mountains, boundary between California and Nevada).—HORNADAY, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 117-119 (description and distribution).

Ovis cervina nelsoni ELLIOT, Synop. Mamm. N. Amer., 1901, p. 46; Check List Mamm. N. Amer., 1905, p. 54.

Ovis canadensis nelsoni LYDEKKER, Wild Oxen, Sheep, and Goats, 1898, p. 208 (from Merriam); Great and Small Game of Europe, Asia and America, 1901, p. 10 (from Merriam).—STEPHENS, California Mamm., 1906, pp. 58, 59 (general account and range).—MEARNS, Mamm. U. S. and Mex. Bound. Surv., I, 1907, pp. 245-247 (detailed account and range).

Type locality, Grapevine Mountains, on the boundary of southern Nevada and California.

Range. Mountains of southern Nevada, southern California, and northern border of Lower California.

6. *Ovis cervina gaillardii* Mearns.

Ovis montana BAIRD and SCHOTT, Mex. Bound. Surv., pt. 2, Zool., 1859, p. 52. "Rocky waterless sierras of northwestern Sonora and New Mexico" (= southwestern Arizona).

Ovis canadensis gaillardii MEARNs, Mamm. U. S. and Mex. Bound Surv., I, 1907, pp. 240-244, figs. 35-39 (original description).

Type locality, Gila Mountains, between Tinajas Altas and the Mexican boundary line in Yuma County, Arizona.

Range. Mountains of northwestern Sonora and southwestern Arizona.

7. *Ovis cervina cremnobates* Elliot.

Taye of the Monqui Indians PICCOLO, Phil. Trans., XXVI, No. 318, 1708, p. 336 (English transl., original not seen); Jones's Abridged Phil. Trans., V, 1731, pt. 2, p. 194 (same as the above); Baddam's Abridged Phil. Trans., V, 1740, p. 156 (same as the two above cited). These English translations have been repeatedly cited.

The Taye, or California Deer VENEGAS, "Noticias de la California, 1758" (not seen; usually cited from the English ed.: Nat. and Civ. Hist. California, I, 1759, pp. 36, 37, pl. facing p. 36, lower fig. Based on Piccolo's account, of which it is a paraphrase, but is the source usually cited for Taye. Its noteworthy feature is the plate, well reproduced in 'Forest and Stream,' Oct. 29, 1910, p. 593. Also here shown in Fig. 4.

Ovis cervina cremnobates ELLIOT, Field Columbian Mus., Zool. Ser., III, No. 14, pp. 239-241, 2 figs., Dec., 1903; Mamm. Middle Amer., 1904, p. 84, figs. xxvi, xxvii; Check List Mamm. N. Amer., 1905, p. 54.

Type locality, Mattomi, San Pedro Martir Mountains, Lower California.

Range. Mountainous parts of Lower California, from Satillo del Rey northward, especially on the Gulf side, nearly to the United States boundary.

B. *Ovis dalli* Group.¹

8. *Ovis dalli dalli* Nelson.

Small White Buffaloes MACKENZIE, Voyages from Montreal through the Continent of North America, English ed., I, 1802, pp. 202, 239; Amer. ed., 1802, pp. 29, 36.

Ovis montana RICHARDSON, Faun. Bor.-Amer., I, 1829, p. 271, pl. xxiii (part, the male only).

Ovis montana dalli NELSON, Proc. U. S. Nat. Mus., VII, 1884, p. 12 (original description).

Ovis dalli ALLEN, Bull. Amer. Mus. Nat. Hist., XII, p. 3, March 4, 1899 (Nahanna Mts.; measurements).—STONE, Bull. Amer. Mus. Nat. Hist., XIII, pp. 43-47, April 6, 1900 (distribution and habits).—PREBLE, N. Amer. Fauna, No. 27, p. 157,

¹ On the *Ovis dalli* group see Hornaday, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 77-100, with illustrations; Sheldon's 'The Wilderness of the Upper Yukon: A Hunter's Explorations for Wild Sheep,' New York, 1911. Sheep *passim*, and especially Chapter XX, with colored map of distribution and illustrations of color phases.

Oct. 26, 1898 (range; male of *O. montana* Richardson referred to *O. dalli*).—HORNADAY, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 80–96, 8 half-tone figs. (description, distribution, habits, color of type specimens, etc.).

Ovis canadensis dalli NELSON and TRUE, Nat. Hist. Collections from Alaska, 1887, pp. 282–284 (measurements, distribution, habits).—McCONNELL, Ottawa Nat., VI, No. 8, Dec., 1892, pp. 131, 132 (distribution and color variation).—LYDEKKER, Wild Oxen, Sheep, and Goats, 1898, pp. 219–221 (general account); Great and Small Game of Europe, Asia and America, 1901, p. 15, pl. i, fig. 3.

Ovis cervina dalli ELLIOTT, Synop. Mamm. N. Amer., 1901, p. 47; Check List Mamm. N. Amer., 1905, p. 55.

Type locality, near Fort Reliance, Yukon.

Range. Greater part of Alaska and Yukon, and southeastward in the Mackenzie Mountains.

9. *Ovis dalli kenaiensis* Allen.

Ovis dalli OSGOOD, N. Amer. Fauna, No. 21, p. 62, Sept. 26, 1901 (Cook Inlet region, Alaska).

Ovis dalli kenaiensis ALLEN, Bull. Amer. Mus. Nat. Hist., XVI, pp. 145–148, figs. 1, 2, Apr. 23, 1902 (Kenai Peninsula, Alaska; original description); *ibid.*, XX, p. 227, Nov. 4, 1904 (Kenai Peninsula).—ELLIOT, Check List Mamm. N. Amer., 1905, p. 55.

Type locality, Sheep Creek, Kenai Peninsula, Alaska.

Range. Kenai Peninsula, Alaska.

10. *Ovis dalli stonei* Allen.

Ovis montana RICHARDSON, Faun. Bor.-Amer., I, 1829, p. 271, pl. xxiii, (part, the female only).

Ovis stonei ALLEN, Bull. Amer. Mus. Nat. Hist., IX, pp. 111–114, pll. i, ii, Apr. 8, 1897 (original description); *ibid.*, XII, p. 2, March 1, 1899 (Nahanna Mts.).—STONE, *ibid.*, XIII, p. 42, April 6, 1900 (range and habits).—PREBLE, N. Amer. Fauna, No. 27, p. 156, Oct. 26, 1908 (*O. liardensis* considered a synonym of *O. stonei*; female of *O. montana* Richardson referred to *O. stonei*).—HORNADAY, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 97–100, 3 half-tone cuts (detailed description and figures).

Ovis canadensis stonei LYDEKKER, Wild Oxen, Sheep, and Goats, 1898, p. 217–219 (general account); Great and Small Game of Europe, Asia and America, 1901, pp. 12–15, text figs. 2, 3, pl. i, fig. 1 (additional matter).

Ovis liardensis LYDEKKER, Wild Oxen, Sheep, and Goats, 1898, p. 215, fig. 41. Type from "Liard River." Later (Great and Small Game of Europe, Asia and America, 1901, p. 12) referred by him to *Ovis stonei*.

Type locality, Cheeoonnee Mountains, northern British Columbia.

Range. Northern British Columbia, east of longitude 130° W.; further north merges into the *fannini* type.

11. *Ovis dalli fannini* Hornaday.

Saddle-backed Sheep McCONNELL, Ottawa Nat., VI, No. 8, Dec., 1892, p. 131, in text (Upper Yukon River, N. W. Terr.).

Ovis fannini HORNADAY, Fifth Ann. Rep. New York Zool. Soc. (1900), June 1, 1901, pp. 78-81, 5 half-tone pll., 1 map (original description).

Ovis canadensis fannini LYDEKKER, Great and Small Game of Europe, Asia and America, 1901, pp. 19-21 (suggests it may be a hybrid between *dalli* and *stonei*).

Type locality, near Dawson City, Yukon.

Range. Mainly between latitude 58°-64° north, and between longitude 129°-135° west, in British Columbia and Yukon, gradually merging in the south with *O. dalli stonei*, and west and north with *O. dalli dalli*. (See Sheldon, *op. cit.*)

