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# Article XVIII.— NOTES ON AMERICAN DEER OF THE GENUS *MAZAMA*.

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During recent years the collection of South American deer of the genus *Mazama* in the American Museum of Natural History has been increased by important accessions from many and widely separated localities, the number of specimens referable to this genus now numbering about 65. They represent localities in Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Trinidad, Guiana, Ecuador, Matto Grosso, and Paraguay. In identifying this material it was necessary to make a careful study of the group as a whole, the results of which investigation are recorded in the present paper, which incidentally includes descriptions of a number of new forms. This material is of course wholly inadequate for a satisfactory revision of the group, but is sufficient to indicate the existence of a much larger number of forms than has hitherto been recognized.

I am indebted to Mr. E. W. Nelson, of the Biological Survey, for the loan of skulls of the Mexican species, and to Mr. W. H. Osgood, of the Field Museum of Natural History for a skull of his Venezuelan species, for examination in the present connection.

## Distribution.

The distribution of the genus *Mazama* includes, as is well known, nearly all of tropical and subtropical America, from the State of Vera Cruz in Mexico to Paraguay, the altitudinal range extending from sea-level to 16,000

feet. The species differ greatly in size, the largest being nearly twice the weight and bulk of the smallest, the extremes being the large red brockets of the Guianas and the small red brockets of Venezuela and Ecuador. On the basis of coloration the brockets form two groups, known respectively as red brockets and brown brockets. The forms of the red group vary in color from dark chestnut red to yellowish red, with the mid-dorsal region, head, and neck ranging from black or blackish to dark brown. The members of the brown brocket group vary from drab brown in Paraguay and southern Brazil to yellowish gray brown in Guiana, Venezuela, and northern Colombia. The little *Mazama pandora* of Yucatan is the only member of the brown group known from north of the Isthmus of Panama, and none appear to have been recorded from the Andean region north of Peru. On the other hand, the red brockets appear to be quite generally distributed from tropical Mexico south to Paraguay and Bolivia.

## Nomenclature.

During the early part of the nineteenth century all the brockets then known to systematists were referred to two species, a red one and a brown one, the former known as *Cervus rufus,* the latter as either *Cervus simplicicornis* or *Cervus nemorivagus,* each being assigned a very wide range. These names, as later applied, became 'blanket' names for, respectively, the red and the brown brocket groups.

The existence in Mexico, Brazil, and the Guianas of small deer with antlers reduced to simple, short spikes, became known in a general way in the eighteenth century, through the writings of travellers and sojourners in these countries, and from occasional specimens that had reached Europe, but the information given by these early authors was too vague and too incomplete to afford a proper basis for nomenclature, and most of the systematic names based on these early accounts by compilers prove to be indeterminable. Azara, in his 'Quadrupeds du Paraguay,' published in 1801, was the first author to whom we can turn for any intelligent descriptions of these small deer; he having described in great detail and with accuracy the two species which inhabit Paraguay, under the names, respectively, *Gouazoupita* and *Gouazoubira.* His attempt to identify with his species the corresponding animals of Mexico, Guiana, and Brazil mentioned by previous authors does not in the least detract from the value and usefulness of his excellent descriptions of the Paraguay animals from actual specimens. These names fortunately became the *sole basis* of systematic names

proposed by Illiger, in a paper [1] read before the Berlin Academy of Sciences early in the year 1811, but which was not published till 1815. In this paper Azara's "Gouazoupita" was named *Cervus rufus* and his "Gouazoubira," *Cervus simplicicornis*, the first being the red and the other the brown brocket of Paraguay, which country is of course the type locality of both species. Thus Illiger's names, dating from 1815 and based on Azara's descriptions, form the point of departure in the consideration of the systematic names of the species of the modern genus *Mazama*.

In 1817, Frederic Cuvier (Dict. des Sci. Nat., VII, 1817, p. 485) gave names also to two species of *Mazama*, a red one and a brown one. The red one was described under the name *Cervus rufus* and was based primarily on specimens in the Paris Natural History Museum, from Cayenne [2] with which he identified the Gouazoupita of Azara. Although the Cayenne red brocket proves to be specifically different from the red brocket of Paraguay, the name *Cervus rufus* F. Cuvier is preoccupied by *Cervus rufus* Illiger and cannot be used for the Cayenne form. Cuvier's brown brocket, also from Cayenne, he named *Cervus nemorivagus*,[3] and he identified with it Azara's Gouazoubira. As the names *Cervus simplicicornis* Illiger and *Cervus nemorivagus* F. Cuvier were given to quite different species both names are available. Illiger's names appear to have been overlooked by most writers during the nineteenth century, who used F. Cuvier's names in place of them, or when both were known, *Cervus nemorivagus* was treated as a synonym of *Cervus simplicicornis*.

The earliest name requiring consideration is *Moschus americanus* Erxleben (Syst. Reg. Anim., 1777, p. 324), which until recently has been regarded as unidentifiable, but of late attempts have been made to revive it for one of the brockets of the Guianas.[4] Its status is discussed at length later in this paper (see below, pp. 533–536).

The next names in order of date to be considered are those of Kerr, published in 1792 in his 'Animal Kingdom' (Nos. 662–671), who gave provisional names to 10 "uncertain species" of Mexican and South American deer. These names were based on Hernandes, Marcgrave, Barrere, De la Borde, and Buffon. The original accounts on which they rest prove to be for the most part brief references to deer, some of which it is evident relate to

[1] Ueberblick der Säugethiere nach iherer Vertheilung über die Welttheile. Abhandl. d. Berlin Akad., 1804–11 (1815), pp. 39–160. *Cervus rufus* and *C. simplicicornis*, pp. 108 and 117. Read before the Academy February 28, 1811, but not published till 1815.

[2] According to Sir Victor Brooke (Proc. Zool. Soc. London, 1878, p. 925) the types are Nos. 535 (female) and 532 (young), from "Surinam."

[3] According to Brooke (*l. c.*) the types are, "stuffed head of ♂ and skull of same (Cat. 2223), Paris, in Mus. d'Hist. Nat. and Mus. d'Anat. Comp."

[4] *Cf.* Osgood, Field Mus. Nat. Hist., Zoöl., X, No. 5, p. 43, footnote, Jan. 10, 1912; Thomas, Ann. and Mag. Nat. Hist. (8), XI, p. 581, footnote, June, 1913.

brockets, but without recognizable characterization of the species. His *Cervus temama,* however, has the same basis as Rafinesque's *Mazama tema* (1817), which is antedated twenty-five years by *Mazama temama* (Kerr.)[1] Some of the other citations obviously relate to red brockets and other deer of Guiana and Brazil. Thus his *Cervus cuguapara* has the same basis as *Cervus bezoartica* Linné, namely, the *Cuguacu-apara* of Marcgrave. His *Cervus caguete* was based on the *Cuguacu-ete* of Marcgrave, a red brocket from the Pernambuco district of Brazil.

Another name, dating from 1792, is *Cervus delicatulus* Shaw (Museum Leverianum, p. 149, pl. 36), based on a small spotted fawn, source of origin not stated. The specimen figured came later into the possession of G. Cuvier (*cf.* Rech. Ossem. foss., 2d ed., IV, 1823, p. 55). From the association of Cuvier's comment thereon in the text, it was evidently a young red brocket in spotted coat, presumably from Surinam.

*Cervus mangivorus* Schrank (Ann. Wetteraus. Gessells. gesam. Naturk., IV, 1819 (= Neue Ann. etc., I, 1819), p. 327), based on a specimen obtained in Brazil by the Spix Expedition, is unidentifiable. It was referred by Gray (Cat. Ungul. Furcip. Brit. Mus., 1852, p. 237) to *Cervus nemorivagus,* but it seems more likely referable to *Odocoileus gymnotis* Wiegmann.

*Cervus humboldtii* Wiegmann (Isis, 1833, p. 954, footnote 2); Abbild. u. Beschreib. merkw. Säugeth., Lief. 2, pp. 69 and 80, footnotes), was based on a deer casually mentioned by Humboldt in the narrative of his explorations in Venezuela as *Matakana.* Although obviously unidentifiable, it has been given the rank of a "selbständige Art," under the name *Subulo humboldtii,* by Fitzinger.[2]

*Cervus nanus* Lund (Blik paa Brasiliens Dyreverden för sidste Jordomvæltning, 1837–1845, *passim*) is included in several of his comparative lists of species (living and fossil) as "*Cervus nanus* m.," but I have been unable to find that he has given a description of it, nor can I find any description by him cited by later authors, although the name has repeatedly received mention.[3]

*Cervus spinosus* Gay and Gervais (Ann. des Sci. Nat. (3), 1846, p. 84, in text) is based on a pair of antlers from Cayenne, which have been considered as those of a brocket, but the name is of course not identifiable.

*Coassus auritus* Gray (Proc. Zool. Soc. London, 1850, p. 242, pl. xxvi, animal, pl. xxvii, fig. 6, front view of head) was based on a red brocket in the Gardens of the Zoological Society of London, from an unknown locality.

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[1] *Cf.* Allen, Bull. Amer. Mus. Nat. Hist., VII, p. 191, June 20, 1895.

[2] Sitz. d. k. Akad. d. Wissens. Wien, math.-naturw. Cl., LXXIX, 1879, p. 20.

[3] *Cf., e. g.,* Burmeister, Thiere Brasiliens, I, 1854, p. 318; also Lesson, Wagner, Lydekker, etc.

Gray states later (Cat. Rumin. Mamm. Brit. Mus., 1872, p. 92, under *Coassus superciliaris*) that the type seems not to have been preserved. Brooke says (Proc. Zool. Soc. London, 1878, p. 926): "The type of *Coassus auritus* Gray, not having been preserved, I have omitted the name from my list, as without the type it will be impossible to decide with certainty upon what species Dr. Gray's name was conferred." Yet Fitzinger in 1897 (*l. c.*, p. 20) not only included the species but referred to it as "Nicht nur im zoologischen Garten zu London, sondern auch in Lord Derby's Menagerie zu Knowsley befand sich ein lebendes Weibchen dieser Art."

*Coassus whitelyi* Gray (Ann. and Mag. Nat. Hist. (4), XII, 1873, p. 163; Hand-list Edentate, Thick-skinned and Ruminant Mamm. Brit. Mus., 1873, p. 162, pl. xxxii, fig. 2) was based on a young skull from Conipata, Peru. Referred by Lydekker (Deer of All Lands, 1898, p. 305) to *Cervus* (*Subulo*) *tschudii* Wagner (probably on geographical grounds).

*Nanelaphus namby* Fitzinger (Sitz. d. k. Akad. Wissens. Wien, math.-naturw. Cl., LXXIX, 1879, p. 32), was based on two specimens collected by Natterer in Matto Grosso, Brazil, one at the Fazenda Caiçara, near Jaurú, and the other at Villa Maria, both young animals, the Caiçara specimen retaining the milk dentition.[1] Doubtless referable to *Mazama simplicicornis*. Available for the Matto Grosso form, should it prove separable from the (typical) Paraguay form.

## General Considerations.

*Coloration.* As already noted (*antea*, p. 522), the species of *Mazama* may be separated, in a general way, into two groups on the basis of coloration, although the forms referable to each group vary much *inter se*. In the red group the general color varies from yellowish rufous to dark chestnut rufous, and in one form to dark blackish brown with only a slight rufous suffusion. The dark color along the midline of the shoulders and on the back of the neck and head varies from dull brownish to strong black, in correlation with the intensity of the general coloration. The legs vary in color from pale or dull rufous to quite intense black. The dull band of brownish (usually broken in the middle) behind the white chin varies from obsolescence to strong rufous brown. The underparts (except for certain sharply defined white areas, as on the buttocks, inside of the thighs, and inguinal region) may be uniform in tone with the flanks, or much lighter. There is considerable seasonal variation, due to wear and fading, usually easily recognizable

[1] *Cf.*, Pelzeln, Sitz. d. k. Akad. Wissens. Wien, math.-naturw. Cl., XXXIII, 1883, Beiheft, p. 85).

as such. The ears, in fresh coat, are thickly covered with very short hairs; later they are usually partly or wholly naked, as is the case with most other Central and South American deer. Individual differentiation, as such, is not usually strongly shown, most of the color variation being traceable to wear and exposure, although a tendency to melanism seems apparent in some of the normally dark forms.

In the brown group the coloration varies in different species from yellowish gray brown to drab brown, the southern forms being darker and less fulvous than the northern ones. In addition to the general more or less fulvous brown of the upperparts in the brown brockets they are further distinguishable by the ventral area being white instead of like the flanks as in the red brockets.

*Pelage.* The pelage of the red brockets is short, thin, and rather stiff in the forms of the tropical lowlands, but longer and thicker and less rigid in the mountain forms. In the brown brockets it is longer and softer than in the red species, the hair being distinguished by the early authors as, respectively "hard" in the red and "soft" in the brown species. Both seasonal and individual color variation seem more marked in the brown species than in the red, as in the amount of fulvous suffusion, and especially in the varying distinctness of the white spot over the front of the eye, which is in some species conspicuous, in others wholly absent. In the Santa Marta form the light eye spot is subject to wide individual variation, being sometimes a well-defined white mark, often indistinct but traceable, and sometimes wholly absent. In some of the other forms it appears to be always absent, in others always present.

A conspicuous feature in some of the red brockets is the reversed direction of the hair on the back of the neck, common to many of the forms of this group but absent in others, and apparently always absent in the brown group. It consists of an elongated hairwhorl in front of the withers, often extending thence forward for from several inches nearly to the whole length of the neck, in which the hair on the midline of the neck is directed outward and forward (mainly forward, or 'reversed'). This reversed condition may be present or absent in different individuals of the same species from the same locality, and therefore is not of great value as a morphological character. In a series of eight specimens of *Mazama tema cerasina* from Nicaragua the nape hairs are reversed in six of them, and a similar proportion prevails in a like series of *M. tema reperticia* from Panama. Those with the hair reversed in these series include both males and females, and also fawns in spotted coat, showing that the condition of reversed or non-reversed hair on the nape is not a feature of sex or age. On the other hand, in the *M. rufina* or subparamo group, in which the hair on the neck is much

thicker and much longer, this reversal of the nape hairs is apparently always absent. Nor has it been noted in several other species of the red group. In a large series of the brown brocket of Santa Marta none have the nape hairs reversed, nor are they reversed in any other species of the brown group, so far as my limited material (about 20 specimens) gives evidence.

*Antlers.* The antlers, normally a single tapering spike, vary greatly in development even in adult males of the same species, and are so nearly alike in size and general character in both the red and brown species that they are not diagnostic. They vary in length (measured from the burr) in fully adult males from the same locality (*e. g.*, Santa Marta) from two to nearly five inches (55 to 115 mm.). The longest pair of antlers belongs to the single specimen from Paraguay (135 mm.); both species are members of the brown group. In both groups there is a marked tendency to malformations, through the broadening of the burr and basal portion of the antler, the shortening of the shaft, and the development of large accessory tubercles at the base. The exterior of the shaft is subject to great variation, being in some cases smooth and polished and nearly circular in crosssection, in others roughened with sharp ridges and more or less triangular in cross-section.

*Teeth.* G. Cuvier,[1] in discussing the characters of supposed species, laid great stress on the presence or absence of canines in the upper jaw, and in this he was followed by various subsequent authors. Later Pucheran[2] reached the conclusion that they were evanescent, being usually present in young animals and absent in adults. Brooke,[3] in his diagnosis of the subgenus *Coassus* (= *Mazama*) stated: "Canines of uncertain occurrence." My material (more than 60 skulls) confirms Pucheran's opinion that they are essentially a feature of the milk dentition, they being rarely present in skulls of mature animals. I have found only three instances of their presence in some 50 adult skulls, in two of which only one canine was present in each, in the other both. In young skulls with milk dentition in tact, both canines are usually present in both sexes; they usually disappear during the development of the molars, but the alveoli remain more or less distinct till the permanent dentition is fully developed, and sometimes they can be plainly seen in adult skulls.

The molars usually show no trace of a supplementary column (on the inside of the upper and on the outside of the lower); there is frequently a vestige on one or more of the teeth, and very rarely a strong column on each molar, which forms part of the enamel pattern as the teeth become worn.

[1] Ossem. foss., 2d ed., IV, 1823, p. 53–55.
[2] Arch. du Mus. d'Hist. nat. Paris, VI, 1852, p. 480.
[3] Proc. Zool. Soc. London, 1878, p. 924.

But this feature evidently has no diagnostic significance, being merely individual.

*Skull.* Among the brockets there are long-nosed and short-nosed forms both among the red and the brown species, and while this difference is not a group feature, it is characteristic to a certain extent of species and subspecies. The amount of variation in this respect can be easily expressed by ratios. In the short-nosed species the ratio of the preorbital length (tip of premaxillaries to front edge of orbit) to the condylobasal length of the skull is about 50%, in both red brockets and brown brockets. In other species the ratio is sometimes as high as 56%, and such species are also represented in both groups. About 53% is the average ratio. (See the Table of comparative measurements of skulls at the end of this paper.)

The brockets, like other deer,[1] present a wide range of individual variation in certain cranial characters, especially in those of the preorbital portion of the skull. The range of individual variation in the size of the skull is usually small, as is also the amount of sexual variation in size. In the fine series of the brown brocket of the Santa Marta district of northern Colombia, the males average slightly larger than the females, but the largest skull of the series is that of a female. Five adult male skulls range in total length from 180 to 186 mm., five adult female skulls from 175 to 187; condylobasal length, males 167 to 181, females 167 to 180; occipitonasal length, males 155–165, females 155 to 165 mm. The zygomatic breadth in the same skulls varies in the males from 77 to 82, in the females from 75 to 79 mm. The orbital breadth varies in the same series from 3 mm. less to 4 mm. more than the zygomatic breadth, and the occipital breadth is from 1 to 4 mm. less than the width of the braincase.

The nasals, in respect both to relative size and to form, are an exceedingly variable element, varying in length from 50 to 58 mm., and in breadth from 23 to 28 mm., but the long nasals are sometimes narrower than some of the short ones. They vary in outline on the posterior border from slightly to deeply emarginate; on the front or apical border from obtusely rounded (about 40% of the series) to doubly emarginate (about 40%), in which the central (inner) points extend much beyond the outer, or all four points may be of nearly equal length, giving a symmetrically double-emarginate front border; in others (about 20%) the anterior border is variously intermediate in form between these two strongly contrasting outlines.

The varying subbasal width of the nasals greatly modifies the size and form of the antorbital vacuity, which is twice larger in some specimens than

[1] See exposition of the case of *Odocoileus sinaloæ*, described and illustrated in this Bulletin, Vol. XXII, pp. 203–208, pll. xxiii–xxiv, July 25, 1906.

in others comparable with them in age and sex. It is evident, however, that age influences to some extent the size and shape of the vacuity through the gradual extension of the margins of the bones that form its boundaries, as the lacrymals, the nasals especially, and to a less extent the frontals and maxillaries, the size of the fossa thus tending to decrease with progress toward senescence. Thus in specimens of the same species the size of the lacrymal vacuity may be two or three times larger in some than in others.

The premaxillaries, in specimens of the same species, may present a broad junction with the nasals (in one case for a space of 10 mm.) or merely meet them (as in about 50% of the Santa Marta series), or terminate 2 or 3 to 10 mm. below them. In some species (of each color group), in which the number of specimens available for examination is small, the normal condition seems to be complete junction of the premaxillaries with the nasals.

The lacrymal pit also proves to be a highly variable character, being sometimes deep and well-defined and sometimes indistinct or nearly obsolete in specimens of the same subspecies.

It is therefore evident that the relative size and form of the nasals, the size and contour of the antorbital vacuity, the junction or otherwise of the premaxillaries and nasals, and the depth of the lacrymal pit are extremely untrustworthy as diagnostic characters, although they often enter into the diagnoses of species and subspecies.

*Species and Subspecies.* With the present lack of material available in even the largest museums, the discrimination of species and subspecies of the *Mazama* group must depend largely upon the experience and point of view of the describer with respect not only to the importance and probable constancy of the differences noted but also the geographical conditions involved. For example, *Mazama rufina* of Mount Pichincha in Ecuador and *M. bricenii* of the paramo of the Sierra de Merida in Venezuela so closely resemble each other in size, in coloration, and in the peculiar character of the pelage, that if their known ranges were contiguous they would naturally be regarded as local forms of a single species, but their wide separation by regions of much lower elevation and very different climatic conditions renders improbable any continuous distribution and consequent geographical intergradation. On the other hand four forms of red brocket are recognized in the present paper from Ecuador alone, one of which is from the paramo of Mount Pichincha and one from the tropical coast district. One of the others is from the eastern slope of the Andes, the other from the western. Three of them are large forms, some of which, or perhaps all, may be found to intergrade when material in proper amount becomes available from intermediate points. In this case, as with most of the other forms here recognized, it seems best to treat them nomenclatorially as full

species. As these deer are difficult for even the professional collector to capture they must remain for a long time imperfectly known. Both brown and red brockets have been known for three fourths of a century to occur throughout the greater part of Peru but the number, character, and relationships of the forms inhabiting this diversified area are at present quite unknown. The same is also true of other vast areas of South America.

Prior to 1850 all the brockets known were currently referred to two species. In 1878 Sir Victor Brooke, in his review of the Cervidæ,[1] recognized six, but only four of them as well established. He says of them (*l. c.*, p. 926): "It is now many years since I commenced the study of this difficult group of Cervidæ; but although I have examined the specimens contained in nearly all the continental museums, and made a private collection of some importance, I must confess that I am still far from a satisfactory understanding of the subject. The complete absence of cornual and cranial characters renders it exceedingly difficult to grasp the characteristic peculiarities of the different modifications of the form, six or seven of which are, I think, probably persistent, and worthy of specific recognition by naturalists." Lydekker, in 1898,[2] recognized seven species, but only six of them are well founded.

In the present paper 24 forms are recognized as probably valid, of which 7 are here first described, while 6 of the others have been described within the last three years. Following is a list of them with their type localities.

*Species and Subspecies of Mazama with their type localities.*

RED BROCKETS.

*Mazama trinitatis* sp. nov. Caparo, Trinidad (p. 532).

*Mazama americana americana* (Erxleben). Cayenne (p. 533).

*Mazama americana tumatumari* subsp. nov. Tumatumari, British Guiana (p. 536).

*Mazama americana juruana* subsp. nov. Rio Juruana, Venezuela, near border of British Guiana (p. 537).

*Mazama rufa rufa* (Illiger). Paraguay (p. 538).

*Mazama rufa jucunda* Thomas. Sierra do Mar, Paranà, Brazil (p. 539).

*Mazama sheila* Thomas. Lowlands near Merida, Venezuela (p. 539).

*Mazama rufina* (Pucheran). Val de Lloa, western slope of Mount Pichincha, Ecuador (p. 540).

*Mazama bricenii* Thomas. Paramo de la Culata, Merida, Venezuela (p. 540).

*Mazama sartorii sartorii* (Saussure). Mirador, State of Vera Cruz, Mexico (p. 541).

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[1] On the Classification of the Cervidæ, with a Synopsis of the existing Species. Proc. Zool. Soc. London, 1878, pp. 883–928, pl. lv, text fig. 1–19.

[2] Deer of All Lands, pp. 298–306.

*Mazama sartorii cerasina* Hollister. Talamanca, Costa Rica (p. 542).

*Mazama sartorii reperticia* Goldman. Gatun, Canal Zone, Panama (p. 542).

*Mazama zetta* Thomas. Medellin, Antioquia, Colombia (p. 544).

*Mazama gualea* sp. nov. Gualea, Ecuador; altitude 6000 feet (p. 545).

*Mazama fuscata* sp. nov. Rio de Oro, Manavi, Ecuador; altitude near sea-level (p. 545).

*Mazama zamora* sp. nov. Zamora, southeastern Ecuador; altitude 2000 feet (p. 546).

BROWN BROCKETS.

*Mazama simplicicornis* (Illiger). Paraguay (p. 547).

*Mazama murelia* subsp. nov. Murelia, Caquetà district, southeastern Colombia; altitude 600 feet (p. 547).

*Mazama tschudii* (Wagner). Peru (p. 548).

*Mazama nemorivagus* (F. Cuvier). Cayenne (p. 548).

*Mazama superciliaris* (Gray). Para, Brazil (p. 549).

*Mazama cita cita* Osgood. El Panorama, eastern side of Lake Maracaibo, Venezuela (p. 550).

*Mazama cita sanctæ-martæ* subsp. nov. Bonda, Santa Marta district, northern Colombia (p. 550).

*Mazama pandora* Merriam. Tunkas, Yucatan (p. 551).

## **Mazama** *Rafinesque.*

*Mazama* RAFINESQUE, Amer. Monthly Mag., I, p. 263, Sept. 1817. Type *Mazama pita* Rafinesque (1817) = *Cervus rufus* Illiger (1815) = *Gouazou-pita* Azara.

Synonyms: *Subulo* Ham. Smith (1827); *Coassus* Gray (1850); *Doryceros* Fitzinger (1879); *Nanelaphus* Fitzinger (1879) = *Mazama* part + *Pudu* part. Type, *Nanelaphus namby* Fitzinger = *Mazama simplicicornis* (Illiger), by designation of Lydekker (1898).

The short, simple, spike-like antlers of the males, the small, slightly expanded bullæ in comparison with those of *Odocoileus* and *Blastocerus*, the flat and usually nearly straight (not arched and expanded) upper border of the orbits, the slight over-hang of the frontals over the postorbital fossa, together with small size and the red coloration of most of the species, large rhinarium, and absence of the metatarsal tuft, are the principal characters that distinguish the species of *Mazama*, the form of the antlers, when present being the obvious distinctive feature of the group. Skulls of large females of the brown group might easily be mistaken for female skulls of the smaller forms of *Blastocerus* and *Odocoileus*, but the form of the superior border of the orbits and the small uninflated audital bullæ serve readily for their separation. The coloration and texture of the pelage in the brown group adds further resemblance, on casual inspection, of females to the females of the South American species of *Odocoileus*. The enamel pattern of the last

molars will readily separate skulls of *Mazama* from those of *Blastocerus*, but not from those of *Odocoileus*. The members of the red group are not readily separable from the members of the brown group by the skulls; in some cases it would be impossible to identify skulls without the skins belonging to them as being either red or brown brockets. Coloration, and usually the character of the pelage, are the only distinctions that will serve to separate them.

## Red Brockets.

### **Mazama trinitatis** sp. nov.

*?Cariacus*, sp. Thomas, Journ. Trinidad Field Nat. Club, I, No. 7, p. 7 of separate, April, 1893.

*Cariacus* (*Coassus*) *nemorivagus* Allen and Chapman, Bull. Amer. Mus. Nat. Hist., V, p. 228, Sept. 21, 1893. Skull only.

*Mazama rufa* (F. Cuvier) Allen and Chapman, ibid., IX, p. 22, Feb. 26, 1897. Skin and skull.

Type, No. $\frac{7\,5\,4\,5}{5\,9\,3\,9}$, ♀ ad., Caparo, Trinidad, March 13, 1894; Frank M. Chapman.

Size large. Pelage thin, hairs of the nape reversed. Premaxillaries broadly in contact with the nasals.

General color of upperparts of body cinnamon rufous, paler on the sides and much paler on the belly; throat and inguinal region white; tail above like the back, white below; legs dull cinnamon brown, somewhat lighter posteriorly; ears dull brown, externally the hairs very short; crown dark brown, the hairs tipped with rufous; no white eyespot; white on lips greatly restricted.

Collector's measurements: Total length, 1118 mm.; tail vertebræ, 127; height at shoulder, 645; girth, 711; fore leg, 396; ear, 89; tip of nose to base of ear, 205.5. Weight, $80\frac{1}{2}$ pounds, including a fœtus which weighed 6 pounds.

Two skulls, adult female (type) and adult male: Total length, ♂ 220 ♀ 210; condylobasal length, ♂ 210, ♀ 203; occipitonasal length, ♂ 188, ♀ 178; preorbital length, ♂ 115, ♀ 104; zygomatic breadth, ♂ 99, ♀ —; orbital breadth, ♂ 100, ♀ 92; interorbital breadth, ♂ 48, ♀ 42; occipital breadth, ♂ 65.5, ♀ 61.5; breadth of braincase, ♂ 62.5, ♀ 60.7; nasals, ♂ 63 × 29, ♀ 63 × 25; maxillary toothrow, ♂ 68, ♀ 62.5; $m^{1-3}$, ♂ 30, ♀ 28; right antler from burr, 118; diameter of burr, 21.6; pedicel (inside), 12. In the female skull (type) the teeth are much worn, but in the male skull they are only slightly worn.

Represented by the skin and skull of an old female (the type) and the skull of an adult male.

In size *M. trinitatis* closely approaches *M. americana tumatumari* of Guiana, the largest of the red brockets, but while the latter is dark chestnut red in general coloration, with the top of the neck, head, and ears nearly black, in strong contrast with the body, the color of *M. trinitatis* is light cinnamon rufous, with the top of the neck as light colored as the body, and the head and ears only a little darker, and hence not in strong contrast with the general coloration.

## Mazama americana americana (*Erxleben*).

*Moschus americanus* ERXLEBEN, Syst. Reg. Anim., 1777, p. 324. Primarily, *Cervula surinamensis* Seba.

*Mazama americana* THOMAS, Ann. and Mag. Nat. Hist. (8), XI, p. 586, footnote, June, 1913 = *Cervus rufus* auct. (ex F. Cuvier). Not *Mazama americana* Osgood, Field Mus. Nat. Hist., Zool., X, No. 5, p. 43, footnote, Jan. 10, 1912 = *Cervus nemorivagus* F. Cuvier.

*Cervus rufus* F. CUVIER, Dict. Sci. Nat., VII, 1817, p. 485, part (the Cayenne specimens, not *Gouazoupita* Azara). Not *Cervus rufus* Illiger = *Gouazoupita* Azara.

*Cervus rufus* PUCHERAN, Arch. du Mus. d'Hist. nat. Paris, VI, 1852, pp. 471–478, part.

*Cervus (Subulo) dolichurus* WAGNER, Suppl. Schreber's Säug., IV, 1844, p. 389, footnote = large form of red brocket recognized by G. Cuvier from Cayenne (Ossem. foss., ed. 2, IV, 1823, pp. 45 et seq.).

Type locality, Cayenne.

The best descriptions available of the red brocket of Cayenne are G. Cuvier's (*l. c.*, pp. 53, 54) and Pucheran's (*l. c.*), from which it is evident that the red brocket of Cayenne differs essentially in coloration, and probably in other features, from the red brocket of the northern coast region of British Guiana. In the absence of Cayenne specimens I transcribe Pucheran's diagnosis and description, as follows:

"Pelage roux vif en dessus, brun rougeâtre dans la région thoraco-abdominale. Queue de longueur moyenne, présentant supérieurement la même coloration que le dessus du corps, blanche en dessous...

"Le poil dans ce type est dur et de couleur roux vif en dessus, à teinte moins foncée sur les parties latérales. Le pelage est plus flexible en dessous, et de couleur brun rougeâtre. Il est blanc sur la région ano-génitale, à l'intérieur des fesses et des cuisses; dans cette dernière région, le blanc est très-lavé de fauve. Du brun fauve existe également à l'intérieur de la moitié supérieure du membre autérieur, sur le dessous du cou et de la machoire inférieure, où le blanchâtre reparaît d'une manière saillante. Le dessus du cou est brun foncé. Il existe une petite tache blanche à l'extrémité de la levre inférieure; en arrière d'elle, se trouve une bande transversale d'une brun roux un peu foncé. L'orbite est entourée d'une peau très-dénudée. Du brun fauve existe sur les côtés de la tête, du brun obscur tirant au roux sur le dessus, ainsi que sur la face externe des jarrets et des oreilles. La queue est, en dessus, couverte de poils d'un brun rougeâtre et très-flexibles, blanche en dessous."— Pucheran, *l. c.*, pp. 471, 472.

Pucheran gives a detailed table of the external measurements of a specimen from Cayenne, in which the total length is recorded as 1340 mm.; tail vertebræ, 120; length of ears in front, 62, at back, 65. He gives no measurements of the skull, which, however, are given by Sir Victor Brooke (Proc. Zool. Soc. London, 1878, p. 925) for his *Cariacus (Coassus) rufus*, as: Total length, 235 mm.; preorbital length, 124; length of maxillary toothrow, 68; orbital breadth, 80. Based on an adult female skull, presumably from "Surinam."

The red brocket of Guiana (*i. e.*, French Guiana, or Cayenne) is the

*Cervus rufus* of F. Cuvier [1] (1817), but this name is preoccupied, as already shown (*supra*, p. 523) by *Cervus rufus* Illiger (1815), based exclusively on the red brocket of Paraguay, the *Gouazoupita* of Azara. The only other name that has been applied to it is *Cervus* (*Subulo*) *dolichurus* Wagner, based on the larger of the two brockets distinguished by G. Cuvier.[2] Hitherto it has almost universally been known as *Cervus* (or *Subulo*, or *Coassus*, or *Mazama*) *rufus* of F. Cuvier, but recently attempts have been made (as indicated in the citations given above) to substitute therefor Erxleben's *Moschus americanus* (1777). In order to ascertain the real basis of this name I have looked up and collated all of Erxleben's citations under this species, and am convinced that *Moschus americanus* should be accepted as a valid name, on the basis of Seba. In order, however, to show its exact basis, and also to illustrate the nature of the descriptions and records left by the eighteenth century authors cited by Erxleben in this connection,[3] I give below literal transcripts of all the passages bearing on the question, as follows:

1731. **Des Marchais.**

Biche de Guiane *Des March.* voy. III p. 281.

Des Marchais's account[4] of his "Biche Guiane" occupies about two pages, the substance of which is that this animal is a small deer, without antlers in either sex. There is not a word that has any value in a distinctive sense. About one third of the account is given to a statement of why the French inhabitants of Guiane (*i. e.*, Cayenne), call the animal *biche*. Another third relates to its size and conformation, and the other third to how it is hunted and the value of the flesh and skin to its captors. The essential part, from a taxonomic point of view, is the following (from p. 282):

"Ils sont très vif, très legers à la course, timide à l'exces. Ils sont couverts d'un poil fauve rougeâtre, asse court & épais. Ils ont le tete petite, décharnée, les oreilles minces, le col long & arqué, les pied fourchu, le queue court, la vuë perçante...."

This is not definitive, vaguely indicating a small reddish deer as occurring in Guiana.

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[1] F. Cuvier (*l. c.*) says "Les têtes de ces deux espèces [his Cervus *rufus* and *Cervus nemorivagus*], envoyées par M. Martin au Muséum d'Histoire naturelle, en ont bien fait connoitre les caractères." G. Cuvier (*l. c.*, p. 53) further says: "MM. Martin et Poiteau nous ont envoyé en abundance, des grandes forêt de Cayenne, sous le nom de *biche de bois*," etc. These included both large and small specimens, small ones having also been sent from Brasil by Laland and Auguste de St. Hilaire, but no large ones. Pucheran (*l. c.*, p. 474) makes the same statement.

[2] Ossements fossiles, 2d ed., IV, 1823, p. 53. For extended comment on the large and small brockets distinguished by G. Cuvier, and the later complications connected therewith, see Pucheran, *l. c.*, pp. 474–477.

[3] Eight in number, ranging in date from 1731 to 1771, the authors being: 1 Marchais, 1731; 2, Seba, 1734; 3, Klein, 1751; 4, Brisson, 1756; 5, Hallen, 1757; 6, Diction. Anim., 1759; 7, Bancroft, 1769; 8, Pennant, 1771.

[4] Voyage du Chevalier Des Marchais en Guinée, Isles voicines, et à Cayenne, fait en 1725, 1726, 1727.... Par C. R. Père Labat. Vol. III, 1731, pp. 281–283.

1734. **Seba.**

Cervula surinamensis, albis macula notata *Seb. thes. I, p.* 71 *tab* 44 *fig.* 2.

"Num. 2, Cervula, Surinamensis, subruba, albis maculis notata.

"Caput, pectus, abdomen, & pedes exceperis, quæ unicoloria sunt; reliquum, ex ruffo luteum, maculis albis undique, Tygridis in modum, variegatur. Auriculæ grandes, longæ: cauda brevis, obtusa. Cursûs rapiditate incredibili vel magnum Cervum superat. Memorabile est, Cervos Americanos adeò pusillos esse: quum, dentur, leporem qui magnitudine haud excedunt; & omnium maxima species altero tanto circiter major sit, quàm quæ hâc Tabulâ repræsentatur. Cornua verò nunquam gerunt, & pro sapidissimâ ferinâ habentur."

This clearly indicates a small reddish deer, spotted with white, of Surinam; in all probability a faun of the red (not the brown) brocket of Surinam.

1751. **Klein.**

Tragulus surinamensis *Klein. quadrup. p.* 22. Based exclusively on Seba.

1756. **Brisson.**

Le Chevrotain de Surinam: Tragulus (surinamensis) ex rufo luteus, macula albis variegatis *Briss. regn. an. p.* 96, *n.* 3.

Based exclusively on Seba and Klein, therefore primarily on Seba.

1757. **Hallen.**

Das Surinamische rothliche Hirschen mit weissen Flekken und langen Ohren *Hall vierf. p.* 321.

Not seen, but obviously from Seba.

1759. **Dictionn. etc.**

Chevrotain de Surinam *Dictionn. anim.* I, *p.* 602.

This edition not seen, but in a later edition (1776) this reference is based exclusively on Klein, therefore originally on Seba.

1769. **Bancroft.**

The Wirrebocerra *Bancr. Guian. p.* 123.

"Of deer, in *Guiana*, there are two kinds, one large, and the other small. The former is both by the Natives and *Europeans* termed *Baieu*, and the latter Wirrebocerra. The Baieu is a stag, about the size of the *European* Buck,..." (p. 122). "The Wirrebocerra is at least one third less than the Baieu, and entirely destitute of horns. These seem to be of the same species which Father *Labat* describes at Cayenne.[1] Their whole structure is extremely slender and delicate. Their heads are small, ears narrow and short, necks long and arched, eyes lively and piercing, tails small and short, feet cloven, and their legs slender and nervous, and peculiarly adapted to that velocity of motion, by which alone they are able to preserve themselves from the attacks of the Tiger and other voracious animals, whom the great delicacy of their flesh has rendered their enemies. They are covered with a short soft hair, of a reddish fallow colour...." (pp. 123, 124).

The above is Bancroft's entire description in so far as it relates to the physical characters of the Wirrebocerra, which may be only a female or a young male of his Baiew. The evidence is not conclusive that it is a brocket, and less so that it is a red brocket. The only tangible character given is that the "short soft hair" is of "a reddish fallow colour." The few words of description are obviously from Des Marchais (*l. c., supra*).

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"[1] Voyage du Chev. de Marchais en Guinée & à Cayenne, &c." [See above, the first citation.]

1771. **Pennant.**

The Brasilian Musk *Penn. syn. quadr. p.* 58 *n.* 47.

A compilation, based on the following seven authors: Margrave, Piso, Marchais, Bancroft, Seba, Klein, Brisson. The gist of his description is: "About the size of a roebuck; both sexes without horns; hair short and smooth; head and neck brown; throat and *lower part of neck* white; body and legs tawny. Inhabits Guiana and Brazil." This agrees, so far as it goes, better with the brown brocket than with the red brocket, especially in "the lower part of the neck" being white.

Pennant evidently derived some of his account from Marcgrave's description of the Cuguacu-ete (Brazil, etc., p. 235). Erxleben cites Marcgrave's Cuguacu-ete only among the references given by him under *Cervus capreolus* as "Hunc pertinere videntur."

Erxleben's own diagnosis is as follows: "M. rufo-fuscus, ore nigro, gula alba." His description, so far as it has significance, is: "Pili breves mollesque, capitis collique supra fusci, colli subtus albi, corporis crurumque rufo-fusci. . . . *Habitat* in Guiania et Brasilia."

To summarize the foregoing: Erxleben's *Moschus americanus* was obviously based primarily on Seba, his second citation; four of his other citations rest exclusively on Seba; two of the others are worthless; the reference to Pennant brings in a new element, Marcgrave,[1] not cited by Erxleben under *Moschus*, but doubtfully under *Cervus capreolus*. Otherwise Pennant adds nothing to the case.

## **Mazama americana tumatumari** subsp. nov.

*Cervus rufus* auct., part.

Type, No. 36350, ♀ ad., Tumatumari, British Guiana, Aug. 8, 1913; Leo E. Miller.

Upperparts of body dark chestnut rufous; ventral surface much duller and paler; a broad black dorsal line begins behind the shoulders and runs forward on the upper side of the neck to the head; sides of the neck dull rufous; front of neck and throat buff; upper surface of head and ears nearly black; inner surface of thighs white; front of limbs blackish brown, nearly black on the hind limbs; tail like rump above, white below.

No external measurements appear to have been taken by the collector.

Measurements of the skull of the type (adult female): Total length, 234 mm.; condylobasal length, 222; occipitonasal length, 190; preorbital length (anterior border of orbit to tip of premaxillaries), 124; zygomatic breadth, 92; orbital breadth,

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[1] Aside from the references to size and form, which are not diagnostic, the essential part of Marcgrave's description of his "Cuguacu-ete Brasiliensibus" is: "Pilis vestiter glabris, qui in toto corpore, cruribus & pedibus rufescunt, in collo & capite fusci, sub guttere & inferiori collo albo." G. Cuvier (*l. c.*, p. 56) summarizes Marcgraves description and adds: "Voilà sans contredit, la femelle de notre petite espèce rouge-bai."

Kerr's *Cervus caguete* is based on Marcgrave's Cuguacu-ete, and this name may be considered available (as *Mazama caguete*) for the red brocket of the Pernambuco district of eastern Brazil, should it prove distinguishable from the red brockets of Surinam and southern Brazil

91; interorbital breadth, 51; occipital breadth, 72.5; breadth of braincase, 67; maxillary toothrow, 73.5; $m^{1-3}$, 42.

This is much the largest and one of the darkest forms of the red brocket known to me, *M. d. juruana* (described below) being the next in size, while *M. fuscata* of the coast region of Ecuador is still darker. It evidently differs much in coloration from the red brocket of Cayenne, described in great detail by G. Cuvier (*l. c.*) and again by Pucheran (*l. c.*), both of whom give the color of the body above as bright rufous, and make no mention of the dark or blackish color of the legs, which is a conspicuous feature in the form here described, the legs being blackish instead of merely "brun foncé." Season, or rather the condition of the pelage, may make some difference with the coloration, the freshly acquired coat being doubtless more deeply toned than the same coat would be at the end of several months, or just before the moult, but in series of specimens of other species of brockets taken at different seasons of the year there is no very marked difference. On the other hand, individuals taken in the same month of the year may present quite a strong difference in coloration, but not so great as between the type specimen of *tumatumari* and Cayenne specimens, as described by the Cuviers and by Pucheran.

### **Mazama americana juruana** subsp. nov.

*Mazama rufa* ALLEN, Bull. Amer. Mus. Nat. Hist., XXX, p. 247, Dec. 2, 1911.

Type, No. 30624, ♀ ad., Rio Juruan, Venezuela (near Guiana boundary), March 21, 1910; M. A. Carriker, Jr.

Size large; hair on nape reversed. Upperparts intense bright rufous, slightly darker on back, a little paler on sides; back of neck and top of head dull brownish, the long hairs on the crown tipped with rufous; the usual patch of white on the upper lip bordering the rhinarium; sides of head and neck dull pale buffy brown; chin, throat, and fore neck whitish with a buffy tinge; interramial space with a pale rusty patch opposite the angles of the mouth; breast and belly rufous like the flanks; inguinal region and lower abdomen white, the white extending down the inside of the hind legs in narrowing band nearly to the hocks; outside of limbs dull brown, nearly like back of neck, fading to pale yellowish rufous on the metatarsus and digits; tail above bright rufous, white below; ears dark brown externally, white laterally at the base with a slight fringe of white.

Collector's measurements: "Length, 4 ft. 7 in. [1140 mm.]; tail, 6 in. [154]; circumference of chest, 2 ft. 5 in. [785]; height at shoulders, 2 ft. 8 in. [812]."

In general size the skull agrees well with a female skull of *M. americana tumatumari* from British Guiana, but the maxillary toothrow is much shorter and some of the transverse measurements are much greater, others less, as follows: Total length (Juruan skull), 228; (Guiana skull), 234; condylobasal length, 214, 222; occipitonasal length, 194, 190; preorbital length, 116, 124; zygomatic breadth, 100, 92; orbital breadth, 100, 91; interorbital breadth, 45, 51; occipital breadth, 65, 72.5;

breadth of braincase, 65, 67; length of nasals, 67.5, 69; breadth of nasals, 23, 24; maxillary toothrow, 61.5, 73.5; $m^{1-3}$, 27, 42. While the condylobasal length is 8 mm. less than in the Guiana skull, the zygomatic breadth is 8 mm. more, and the length of the maxillary toothrow 12 mm. less. On the other hand the braincase and occiput are narrower.

The short toothrows and the short preorbital length, combined with the great zygomatic and orbital breadth are features that may require confirmation by additional material, but the two skulls from Tumatumari both differ similarly from the Rio Juruan one, and the difference is unusual, both in kind and degree, from ordinary individual differentiation. There is also much difference in the coloration from that of either *tumatumari* or *americana*.

### Mazama rufa rufa (*Illiger*).

*Cervus rufus* ILLIGER, Abhandl. k. d. Akad. Wissen. zu Berlin, III, 1811 (1815), p. 108 (nom. nud.), p. 117 = *Gouazoupita* Azara.

*Mazama pita* REFINESQUE, Amer. Monthly Mag. I, p. 363, Sept. 1817 = *Gouazoupita* Azara.

The seven specimens of red brockets obtained on the Roosevelt Expedition to South America in southwestern Matto Grosso are doubtless referable to typical *Mazama rufa* (type locality, Paraguay). Unfortunately the field numbers on the skulls were lost before the specimens reached the Museum, and hence the skins and skulls cannot be correlated with certainty. The specimens are as follows: Three females (2 adult, 1 young), Urucum, near Corumbá, Dec. 6–13 (Miller and Cherrie); 4 males, 3 adult, 1 young (the latter skull only), Porto Campo, Rio Sipotuba, Jan. 7 (T. and K. Roosevelt).

The field measurements of 2 males and 2 females (all adult) give the total length as follows: ♀ 1100, ♀ 1420, ♂ 1050, ♂ 1350.

Two adult female skulls from Urucum: Total length, 207, 217; condylobasal length, 198, 208; occipitonasal length, 175.3, 184; preorbital length, 107, 113; zygomatic breadth, 90, 93; orbital breadth, 86.5, 92.7; interorbital breadth, 44, 45; occipital breadth, 58, 59; breadth of braincase, 60.5, 59; nasals, 62.5 × 28.5, 66 × 20; maxillary toothrow, 62.5, 61.5; $m^{1-3}$, 29, 27.5. Ratio of preorbital to condylobasal length, 54, 56.3.

Three adult male skulls (the two larger with the teeth much worn) from Porto Campo: Total length, 213, 206, 209; condylobasal length, 203, 193, 196; occipitonasal length, 184, 172, 178; preorbital length, 111, 102, 106; zygomatic breadth, 90, 91, 93; orbital breadth, 92.5, 91.5, 94; interorbital breadth, 45.3, 45, 49; occipital breadth, 59, 57, 62; breadth of braincase, 61.5, 62, 62.7; nasals, 78.5 × 28, 58.5 × 21, 65 × 26; maxillary toothrow, 60, 60.5, 59. The length of the antlers (from burr to tip) in two specimens is 94 and 78; in the other male the antlers had recently been shed when the animal was killed. Ratio of the preorbital to the condylobasal length, 55.4, 53.6, 55.6.

Three adult male skulls from Chapada, Matto Grosso, are similar in size and in other features, and are doubtless referable to this form.

The general coloration of the upperparts is pale rufous, deepest on the back and paler on the sides and belly; the head and back of the neck are dusky brown. The skulls average about 25 mm. shorter than an adult female skull from Tumatumari, British Guiana, described above (*M. americana tumatumari*), and the coloration is everywhere much lighter; the limbs are colored like the body instead of being blackish as in the Guiana form.

### Mazama rufa jucunda *Thomas.*

*Mazama americana jucunda* THOMAS, Ann. and Mag. Nat. Hist. (8), XI, p. 587, June, 1913. Roça Nova, Serra do Mar, Parana, Brazil (alt. 1000 m.).

"Similar in general characters to the ordinary *M. americana* of eastern South America (*M. rufa auctorum*), but the skull conspicuously shorter. Fur of medium length; nape hairs reversed (one skin only). Colour above of head and neck brown, of body bright rufous fawn, not very unlike that of *M. zetta*. Under surface, as usual in this group, whitish on chin and throat, rufous, like back, on belly. Limbs brown proximally, rufous on the digits. Tail dark rufous above, white below."

The type is an immature female, but measurements of an adult male skull are given, as follows: "Condylo-basal length 178 mm.; zygomatic breadth 88; length of nasals 45 [in the immature female 57]; interorbital breadth 46; gnathion to front of anterior premolar 55; palatal length 109; breadth between sides of $m^2$ 65; upper toothrow 61." — Thomas, *l. c.*

Closely related to typical *rufa*, but apparently rather smaller and somewhat paler than specimens from Matto Grosso.

### Mazama sheila *Thomas.*

*Mazama sheila* THOMAS, Ann. and Mag. Nat. Hist. (8), XI, p. 587, June, 1913.

Type locality, Montaña de Limones (altitude 50 m.), lowlands, near Merida, Venezuela.

"A small pale rufous ally of *M. americana*.

"Size conspicuously smaller than in *M. zetta*. Form about as in that species. Fur close and short. Nape-hairs not reversed (in the single specimen). General colour bright rufous (between orange-rufous and tawny of Ridgway). Muzzle, centre of crown, and neck brown, supraorbital lines rufous, not sharply defined. Ears pale brown, with distinct patches of white at the base of their inner edges. Chin and interramia, a patch on chest, and anal region whitish; rest of under surface rufous, like back. Fore limbs rufous throughout. Hind limbs rufous, but the metatarsals brown, darker posteriorly. Tail rufous above, white below.

"Skull of the same somewhat broad squat shape as in *M. zetta*, but far smaller. Premaxillæ not quite reaching to the nasals.

"Dimensions of the typical skull (adult, but not old):— Condylo-basal length 177 mm.; zygomatic breadth 85; length of nasals 48; interorbital breadth 39; gnathion to front of anterior premolar 58; palatal length 111; breadth between outer sides of $m^2$ 63; upper toothrow 55.

"*Hab.* Lowlands near Merida, Venezuela. Type from the Montaña de Limones. Alt. 50 m.

"*Type.* Adult male. B. M. no. 13.24.4. Collected 17th October, 1910, by S. Briceno and Sons.

"This Brocket is readily distinguishable by its bright rufous colour, unreversed nape-hairs, and small size, as compared with its only near allies, *M. americana* and *zetta.*"— Thomas, *l. c.*

A young fawn from La Palma, Colombia, eastern slope of the southern end of the Eastern Andes, may be referable to this species. (See below, p. 545.)

### Mazama rufina (*Pucheran*).

*Cervus rufinus* PUCHERAN, Rev. et. Mag. Zool. (2), III, p. 561, Nov. 1851; *ibid.*, Arch. du Mus. Paris, VI, 1852, p. 491, pl. xxx. "Vallée de Lloa, sur le versant occidental de la Cordillière du Pichincha."

One specimen, an old female with teeth much worn, a topotype of the species, Mt. Pichincha, May 15, 1913 (Richardson). Reliable external measurements are not available. Skull, total length, 161.5; condylobasal length, 151; occipitonasal length, 142.5; zygomatic breadth, 72; interorbital breadth, 36; mastoid breadth, 55.5; breadth of braincase, 51; maxillary toothrow, 48; $m^{1-3}$, 29.

This specimen is practically a topotype, as Richardson collected it in "Vallée de Lloa." It agrees with Pucheran's description and plate, except that Pucheran says the front of the legs is blackish, while in the present specimen there is a mixture of white on the lower tarsus and digits, probably an individual variation.

The hairs of the nape are not reversed, nor are they in a topotype of *M. bricenii.*

### Mazama bricenii *Thomas.*

*Mazama bricenii* THOMAS, Ann. and Mag. Nat. Hist. (8), I, p. 349, June, 1908. Paramo de la Culata, Merida, Venezuela; altitude 3000 m.

Represented in the present collection by a topotype (skin without skull).

This species and *Mazama rufina* (Pucheran) of the high Andes of Ecuador resemble each other greatly and differ from all the other known red brockets in their small size and very dark coloration and in the long coarse

thick pelage. From their wide geographical separation and the similarity of their environment it would seem probable that their close resemblance is a case of parallelism in development.

Thomas's measurements of a skull (adult female): "Greatest length 159 mm.; basal length 143; greatest breadth 70; nasals 43.5 × 22.5; height of orbit 25; muzzle to front of $p^2$ 45; combined length of three upper premolars 23.5, of whole toothrow 51."

### Mazama sartorii sartorii *Saussure.*

*?? Cervus temama* KERR, Anim. Kingdom, 1792, No. 662 = *Tema-maçame* Hernandes.

*?? Mazama temama* ALLEN, Bull. Amer. Mus. Nat. Hist., VII, p. 191, June 20, 1895 = *Cervus tamama* Kerr.

*?? Mazama tema* RAFINESQUE, Amer. Monthly Mag., II, p. 44, November, 1817 = *Temamazame* Hernandez.— THOMAS, Ann. and Mag. Nat. Hist. (8), I, p. 349, footnote, April, 1898.

*Cervus sartorii* SAUSSURE, Rev. et Mag. de Zool. (2), XII, p. 252, June, 1860. Based on a skull from Mirador, Vera Cruz, Mexico.

Type locality, Mirador, State of Vera Cruz, Mexico.

An adult female skull from Palenque, Chiapas, Mexico (U. S. Nat. Mus. No. 100418) gives the following measurements: Total length, 174 mm.; condylobasal length, 160; occipitonasal length, 150; preorbital length, 83.5; zygomatic breadth, 80; orbital breadth, 77; interorbital breadth, 47.5; occipital breadth, 53.7; breadth of braincase, 56; nasals, 48 × 19; maxillary toothrow, 51.5; $m^{1-3}$, 29.5. Ratio of preorbital length to condylobasal length, 52.2.

This skull, the only material available of this species, indicates that the size of the Mexican red brocket is below the medium size for the genus, and somewhat less than in the Central American forms of the *sartorii* group.

There is no reason to question the applicability of the name *Cervus sartorii* Saussure to the red brocket of Mexico. On the other hand the applicability of Rafinesque's name *Mazama tema,* and of Kerr's earlier *Cervus temama,* to this species is not at all evident. Hernandez's description and figure scarcely indicate a red brocket, being much more likely to have been based on a young *Odocoileus* with spike horns, as long ago stated by Lichtenstein. Hernandez's entire description, aside from generalities, is as follows: "Deinde in quondam Damarum genere quas Macatlchichiltic, aut Temamaçame, appellant, brevissimis cornibus, acutissimisq; coloris fulvi, fusci, & inferne albi, quarum quoque præstita est imago."[1]

[1] Hernandez, F. Nova Plantarum, Animalium et Mineralium Mexicanorum, 1651, p. 325, with figure in text.

Hernandez's description and figure calls for an animal entirely white below, including the lower half of the sides of the head, and the light and shade of his figure agree with his description. Lichtenstein long since [1] claimed that Hernandez's account of his Maçama was not entitled to serious consideration, and expressed the opinion that it was a "Spiesser" of *Cervus mexicanus*, an opinion I feel forced to accept.

### Mazama sartorii cerasina (*Hollister*).

*Mazama tema* ALLEN, Bull. Amer. Mus. Nat. Hist., XXIV, p. 649, Oct. 13, 1908; *ibid.*, XXVIII, p. 95, April 30, 1910.

*Mazama tema cerasina* HOLLISTER, Proc. Biol. Soc. Washington, XXVII, p. 209, Oct. 30, 1914. Talamanca, Costa Rica.

A series of 6 specimens from Tuma and Savala, Nicaragua (eastern slope, 800 to 1000 feet altitude), and 1 from San Juan Telpaneca, Nicaragua (north of Matagalpa, altitude 3500 feet), are referred to Mr. Hollister's recently described subspecies *cerasina* (type locality Talamanca, Costa Rica, but to which specimens from "Guatemala" are also referred). Also 1 specimen from Pozo Azul, Costa Rica.

Two of these specimens, the one from San Juan Telpaneca, taken in January, the other from Pozo Azul, taken in July, are very much darker than any of the others of the series, but, considering the wide separation of the two localities and the dates of collecting (January and July), they are doubtless only to be regarded as exceptionally highly colored examples. The "brown" (rufous brown) band on the chin, mentioned in the description of this form, is rarely noticeably present in my series, while the hairs on the back of the neck are strongly reversed in six of the eight specimens.

Five adult skulls from Nicaragua average, total length, 185 (180–190); condylobasal length, 174 (170–180); occipitonasal length, 161 (158–165); preorbital length, 88.5 (85–89.5); zygomatic breadth, 80.6 (77–86); orbital breadth, 79.1 (77–82); interorbital breadth, 39.2 (37–43.2); occipital breadth, 51.2 (48.5–54); breadth of braincase, 57.1 (56.3–58); length of nasals, 51.2 (47–55); breadth of nasals, 22 (19–22); maxillary toothrow, 56.2 (54–58); $m^{1-3}$, 26.9 (25–28).

The ratio of preorbital to condylobasal length is 48 (47.2–48.3).

### Mazama sartorii reperticia *Goldman.*

*Mazama tema reperticia* GOLDMAN, Smithsonian Misc. Coll., LX, No. 21, p. 2, Feb. 26, 1913.

Type locality, Gatun, Canal Zone, Panama.

[1] Abhandl. Akad. Wissens. Berlin, (1827) 1830, p. 111.

Ten specimens, as follows: Chepigana, adult male, Dec. 3, 1914; El Real, young male, adult male, adult female, Jan. 6–28, 1915; Tapalisa, 3 adult females, Feb. 12–27; Boca de Cupe, adult female, April 30; Cituro, adult female, May 12; these localities are all in eastern Panama, at or near sea level (the highest, Tapalista, has an altitude of 400 feet), on the Rio Tuyra and its tributaries, Rio Cupe, and Rio Pucro. All were collected by W. B. Richardson.

There is also a young specimen, in spotted coat, from Curchirbo, Canal Zone, collected by H. E. Anthony, Feb. 12, 1914.

These specimens are all doubtless referable to *M. t. reperticia* Goldman, from the Canal Zone, a much lighter colored form than *M. t. cerasina* Hollister, from Talamanca, Costa Rica.

Unfortunately the skins are all without field measurements.

Two young adult males (teeth fully matured but not worn), total length, 182, 195 mm.; condylobasal length, 177, 178; occipitonasal length, 160, 170; preorbital length, 89, 91; zygomatic breadth, 83, 82; orbital breadth, 81.5, 82; interorbital breadth, 42.5; 40.5; occipital breadth, 53, —; breadth of braincase, 56, 59; length of nasals, 51, 58; breadth of nasals, 22.5, 22.5; maxillary toothrow, 59, 59; $m^{1-3}$, 28, 27.5; length of longest antler from burr, 39.

Three adult female skulls (teeth only slightly worn), total length, —, 190, 200.3; condylobasal length, —, 178, 183; occipitonasal length, —, 165, 178; preorbital length, 95.5, 92.5, 105; zygomatic breadth, 82.5, 83.6, 81; orbital breadth, 81.5, 83, 80.7; interorbital breadth, 40, 41, 43; occipital breadth, ——, 58, 59.3; breadth of braincase, 58, 60, 59; length of nasals, 65, 58, 63.5; breadth of nasals, 23.5, 29, 22.5; maxillary toothrow, 60, 58.3, 57.2; $m^{1-3}$, 28, 27, 25.2. The ratio of preorbital to condylobasal length in the two males is 50 and 52.2; in three females, 50.2, 52, 52.3, as compared with 48 in 1 adult male and 3 adult females in *M. s. cerasina.*

In 8 of the 10 skulls the posterior border of the nasals is broadly rounded, in the other 2 it is acutely pointed. The front border of the nasals is double emarginate in 9 of the 10 skulls and in the other tapers to a single median point. The premaxillaries reach the nasals, with a more or less broad junction, in 9 of the skulls; in the other they are wholly separated by a space of 5 or 6 mm. In the two younger of 3 skulls still retaining the milk dentition the canines are present, in the other (the oldest of the 3) the canine alveoli are widely open but the teeth have been shed. In none of the adult skulls are canines present, and in most of them the alveoli have wholly disappeared.

### Mazama zetta *Thomas.*

*Mazama tschudii* ALLEN, Bull. Amer. Mus. Nat. Hist., XXXI, p. 74, April 19, 1912. Provisional reference.

*Mazama zetta* THOMAS, Ann. and Mag. Nat. Hist. (8), XI, p. 586, June, 1913. Type locality, Medellin, Antioquia, Colombia.

Two specimens, adult female and young in spotted coat, from Gallera, Colombia (altitude 5700 feet), "referred provisionally" by me in 1912 to *Mazama tschudii*, appear to agree quite satisfactorily with Thomas's description of *Mazama zetta* from Medellin. The female is fully adult, with much worn teeth. The fawn in spotted coat is very much darker than the adult.

Field measurements of the adult female: total length, 1180 mm.; tail vertebræ, 180. The skull measures, total length, 200; condylobasal length, 188; occipitonasal length, 173; preorbital length, 101; zygomatic breadth, 87.5; orbital breadth, 86; interorbital breadth, 40; occipital breadth, 60; breadth of braincase, 60; length of nasals, 64; breadth of nasals, 29; maxillary toothrow, 60; $m^{1-3}$, 27.3. Preorbital length 50% of the condylobasal.

Thomas's measurements "of fully adult male and female skulls," as far as they are comparable with the above, are: Condylobasal length, 187, 190; interorbital breadth, 42, 46; maxillary toothrow, 60, 61.

Two other specimens require mention in the present connection, both from the eastern slope of the southern end of the Eastern Andes of Colombia. Both are fawns in spotted coat, skins without skulls; one is much younger and smaller than the other, and it lacks head, neck, and feet. The younger one, apparently not more than a few days old when killed, is from La Candela (altitude 6500 feet), and has the ground color very dark and the white spots very sharply defined. The older one, still in spotted coat, from La Palma (altitude 5300 feet, a few miles east of La Candela), has the ground color very much lighter, the white spots less sharply defined, the pelage much coarser and longer, and the hairs of the nape not reversed. Compared with a fawn from Gallera, southern part of the Colombian Western Andes, (referred above provisionally to *M. zetta*), the coloration is strikingly different, the La Palma specimen being light yellowish rufous on the flanks and ventral surface, but the middle of the dorsal area and the top of the head are much darker. In the Gallera specimen the top of the head, top of the nape, and the dorsal area are dark brown with a faint dark rufous suffusion; the flanks are rufous; the fore neck, chest, and belly are much lighter, mostly dingy gray suffused with very pale rufous, the tips of the hairs lighter.

The two fawns, respectively from Gallers and La Palma, unquestionably represent different species, but the material is too unsatisfactory for positive identification. It is possible that the La Palma specimen may be referable to *M. sheila*, from the lowlands near Merida, as the coloration and unreversed nape hairs suggest that type.

### **Mazama gualea** sp. nov.

Type No. 36473, ♀ adult, Gualea (altitude 6000 feet), Ecuador, June 2, 1913; W. B. Richardson.

Size large; coloration dark; hair of back of neck reversed. Upperparts near liver brown of Ridgway, darker over the middle region of the back, lighter and more tinged with rufous on the sides and underparts; back of neck and head (including ears) not darker than the middle of the back; a lighter band, tinged with rufous, over the eyes; the usual white patch on the lip bordering the rhinarium; chin whitish, bordered posteriorly with a broad band of dark brown, broken by whitish on the median line; throat dingy grayish white; foreneck drab gray; inguinal region and inside of thighs clear white, from which a white band descends on the inside of the hind limb nearly to the hock; limbs otherwise dark brown, like the upperparts; tail above like the back, white below; ears dark brown externally, whitish near inner base, and fringed with white internally.

Represented by the type from Gualea and another female from Mount Pichincha. In coloration the two specimens are essentially alike.

Collector's measurements: Total length (female, type), 1050 mm.; tail vertebræ, 50; hind foot, 290. Female, Mount Pichincha, total length, 1250; tail vertebræ, 60; hind foot, 290.

Skull (female, type, Gualea; young female, nearly adult, Mount Pichincha); total length, 195, 193; condylobasal length, 185, 179; occipitonasal length, 165, 163; preorbital length, 96.5, 96.5; zygomatic breadth, 86.5, 88; orbital breadth, 88, 84; interorbital breadth, 45, 45; occipital breadth, 65, 59; breadth of braincase, 60, 57.5; length of nasals, 56, 55; breadth of nasals, 27, 26.5; maxillary toothrow, 58, 63; $m^{1-3}$, 27, 29. The ratio of preorbital length to the condylobasal is, respectively, 52.3%, and 53.3%.

This form seems nearest related to *M. zetta* of Antioqua, but greatly exceeds the type in size, and is very much darker and much less rufous.

### **Mazama fuscata** sp. nov.

Type, No. 34267, ♂ ad., Rio de Oro, Manavi, Ecuador; altitude, near sea-level.

Size large; coloration blackish brown; hair on back of neck reversed. Similar to *M. gualea* but coloration much darker and size larger. Upperparts blackish brown darker, almost black, over the whole dorsal area, browner on the sides where the hairs are finely vermiculated with rufous near the tips; belly nearly drab brown, but little lighter than the flanks, with a faint rufous suffusion; inguinal region clear white,

the white extending as a broad band down the leg two thirds of the distance to the hock; interramial space and throat whitish, with a brownish band across the former; upper lip faintly edged with whitish; sides of neck cinnamon drab; legs in front like the body, posteriorly pale cinnamon rufous; ears dark brown, like the top of the head; tail very short, dark brown above, white below.

In the adult male type the pelage is thin and short; in the young female topotype it is much longer and thicker, and the rufous vermiculation on the tips of the hairs much stronger.

Represented by the type, an old male, and a young female topotype.

Skull, male type, total length, 210; condylobasal length, 200; occipitonasal length,— (nasals imperfect); preorbital length, 105; zygomatic breadth, 96; orbital breadth, 94; interorbital breadth, 56; occipital breadth, 64; breadth of braincase, 61.5; maxillary toothrow, 65; $m^{1-3}$, 29. Ratio of preorbital length to condylobasal length, 52.2%. Length of antlers from burr, 66; breadth of burr, 19; length of pedicel (inside), 11.

*M. fuscata* differs from *M. gualea* in much darker coloration and much larger size. *M. fuscata* is from the tropical coast-belt, *M. gualea* from the interior at altitudes of 6000 to 12,000 feet. They are probably representative forms of the same species. Neither of these forms is very closely related to *M. zetta*, judging by present material. In size *M. fuscata* approaches typical *M. americana* of the Guianas.

### **Mazama zamora** sp. nov.

Type (and only specimen), No. 36581, ♀ ad., Zamora (altitude 2000 feet), southeastern Ecuador, Oct. 22, 1913; W. B. Richardson.

Hairs of back of neck not reversed. Bright yellowish red, redder over the middle region of the back, paler on the sides and on the ventral surface; nape and top of the head dusky; the tuft of long hairs on the front of the head mixed blackish and red; sides of interorbital region rufous; facial region blackish brown; a small white spot on each side of the rhinarium; ears blackish brown; chin and a median stripe on the lower throat white; upper throat buffy white, with a dusky brown spot on each side opposite the angle of the mouth, nearly meeting in the midline; color of the legs nearly uniform with the ventral surface; inguinal region and inside of thighs white; tail above like the back, white below.

Collector's measurements, total length, 1370 mm.; tail vertebræ, 80. Skull (teeth much worn), total length, 204; condylobasal length, 193; occipitonasal length, 174; preorbital length, 104; zygomatic breadth, 87; orbital breadth, 87; interorbital breadth, 40.6; occipital breadth, 61.5; breadth of braincase, 61; nasals, 64 × 22; maxillary toothrow, 65; $m^{1-3}$, 30.

In bulk *M. zamora* is about twice the size of *M. rufina*, as shown by perfectly comparable skulls (old females), and the two forms also differ greatly in color, *zamora* being light red and *rufina* dark red, and much blacker on the head, nape, ears, throat and limbs. The condylobasal length

of the skull in *rufina* is 148 mm., in *zamora* 193; zygomatic breadth, respectively, 71 and 87; length of the maxillary toothrow, 49 and 65.

The red brockets of Peru, referred by Tschudi to *Cervus rufus*, doubtless include forms subspecifically separable from any of those recognized in the present paper, but there is at this writing no material available for their elucidation.

### Brown Brockets.

### **Mazama simplicicornis** (*Illiger*).

*Cervus simplicicornis* Illiger, Abhandl, d. k. Akad. Wissen. zu Berlin, III, 1811 (1815), p. 108 (nom. nud.), p. 117 = *Gouazoubira* Azara, ex Paraguay.

*Mazama bira* Rafinesque, Amer. Monthly Mag., I, p. 363, Sept., 1817 = *Gouazoubira* Azara.

Represented by an adult male (teeth much worn) from Rio Negro (near Asuncion), Paraguay, collected on the Roosevelt Expedition to South America, November 14, 1913, by Leo E. Miller. This specimen can be taken, geographically at least, as typically representing the species.

General color of the upperparts dull gray brown; no white facial markings; upper surface of tail and adjoining parts of back and buttocks yellowish rufous; digits and posterior face of limbs pale yellowish rufous; front of limbs dark brown, darker than upperparts of body; chin, throat, breast and most of the ventral surface washed with buff.

Collector's measurements, total length, 1200 mm.; tail vertebræ, 100; hind foot, 60; ear, 140. Skull, total length, 195; occipitonasal length, 163; condylobasal length, 183; zygomatic breadth, 86; interorbital breadth, 46.5; occipital breadth, 61; breadth of braincase, 58; maxillary toothrow, 54; $m^{1-3}$, 32. The premaxillaries do not reach the nasals, the space between them being 6 mm. The antler forms a cylindrical tapering spike, 133 mm. long from burr; diameter at base, 12; diameter of burr, 23.3; length of pedicel (inside), 12.

### **Mazama murelia** sp. nov.

Type, No. 33906, ♀ juv., La Murelia (Rio Bodoquera), Caquetá, Colombia, altitude 600 feet, July 13, 1912; Leo E. Miller.

Upperparts drab gray, darker along middle of back, finely vermiculated with light buff and dusky; whole top of head blackish brown; broad dark eyering; a faint band of dingy grayish buff, both above and below the eye; no white eyespot; a small whitish spot on upper lip bordering the rhinarium; ears externally dark brown like top of head, edged basally with whitish; tail above dark brown like the midline of the back, the edges slightly mixed with fulvous, underside white; underparts dull

white with a wash of pale drab, darker laterally and on the middle of the breast; limbs drab gray in front and on the sides, buffy white posteriorly.

Field measurements, total length, 980 mm.; tail vertebræ, 100.

Represented by a young female, in which the molars are fully developed but not worn, and the anterior milk premolars and canines still in place. Skull, total length, 174; condylobasal length, 163; occipitonasal length, 150; preorbital length, 88; zygomatic breadth, 74; orbital breadth, 74; interorbital breadth, 37.5; occipital breadth, 48; breadth of braincase, 63; nasals, 46 × 19; maxillary toothrow, 54; $m^{1-3}$, 24.

This specimen in coloration resembles, in a general way, a specimen of *M. simplicicornis* from Paraguay, but the upperparts are darker and lack wholly the broad band of cinnamon brown on the buttocks and sides of the tail, and the strong fulvous wash of the lower parts, while the dark drab color occupies three fourths of the circumference of the limbs instead of being restricted to a narrow band down the front. While the available material of the two forms is too limited for a satisfactory comparison, it is evident that the Murelia specimen represents a form strongly differentiated from typical *simplicicornis*.

### Mazama tschudii (*Wagner*).

*Cervus nemorivagus* TSCHUDI, Fauna Peruana, I, 1844, p. 240.

*Cervus tschudii* WAGNER, Schreber's Säug., Suppl., V, 1855, p. 386 (name in the text of p. 387). Based on the above.

This is doubtless a member of the *M. simplicicornis* group, of which I have as yet seen no Peruvian specimens. Judging by Tschudi's description it differs very appreciably in color from typical *simplicicornis*, and is also larger. It is quite probable that several forms of this type occur in Peru, in which case it will fall to their describer to fix the type locality for *tschudii*. According to Tschudi, deer of this general type range in Peru from sea-level to 16,000 feet.

### Mazama nemorivagus (*F. Cuvier*).

*Cervus nemorivagus* F. CUVIER, Diction. Sci. Nat., VII, 1817, p. 485 (part, the Cayenne specimens only).

*Mazama americana* OSGOOD, Field Mus. Nat. Hist., Zoöl., X, p. 43, footnote, 1912 = *Cervus nemorivagus* F. Cuvier.

Type locality, Cayenne.

The name *Cervus nemorivagus* has been usually employed as a blanket name for all the brown brockets of South America. It is evident, from the author's own statement, that his *Cervus rufus* and *Cervus nemorivagus* were

both based primarily on specimens in the Paris Museum from Cayenne, collected by M. Piteau.[1] It is therefore quite unimportant that he believed the Gouzoubira of Azara to be the same species and compiled his account in part from Azara.

I refer to this small species three specimens collected at Tumatumari, northern British Guiana, by Leo E. Miller in August, 1913. They are an adult female, a young female (just breaking through the alveolus), and a semi-adult male. The female (with the teeth considerably worn) may be described as follows:

Pelage long, coarse and soft; hairs of the nape not reversed. Upperparts grizzled pale fulvous gray, fading toward the ventral area, darkening to a broad median dorsal band of yellowish brown; hairs of the back ochraceous apically, narrowly banded near the tip with blackish; midventral area white, tinged with yellowish laterally, from chin to base of tail; limbs dusky externally, ochraceous buff internally; whole top of head dark brown, the long hairs of the crown more or less tipped with pale rufous; a supraorbital band of pale ochraceous from front of orbital region to side of crown; no white eyespot, but a small whitish area on either side of the rhinarium, and a whitish median spot above it; tail above like the back, white below; ears externally dark brown, scantily haired externally, nearly naked internally.

Field measurements: Total length, ♂ juv. 1020 mm., ♀ ad. 1160 (? = 1060); tail vertebræ, ♂ 150, ♀ 120.

The skulls measure: Total length, ♂ 150, ♀ 189; condylobasal length, ♂ 159, ♀ 176.5; occipitonasal length, 150, ♀ 162.5; preorbital length, ♂ 83, ♀ 95.6; zygomatic breadth, ♂ 75, ♀ 76; orbital breadth, ♂ 75, ♀ 76; interorbital breadth, ♂ 39, ♀ 35; occipital breadth, ♂ 53.2, ♀ 54; breadth of braincase, ♂ 55, ♀ 56.4; nasals, ♂ 51 × 16, ♀ 51 × 15.4; maxillary toothrow, ♂ 50.5, ♀ 50.5; $m^{1-3}$, ♂ 23, ♀ 23. The antlers of the male are smooth, slender spikes, 55 mm. long from burr.

Preorbital portion of skull short, as in the *M. cita* group; about 50% of the condylobasal length.

## Mazama superciliaris (*Gray*).

*Coassus superciliaris* Gray, Knowsley's Menagerie, pl. xlviii, 1850 (Jan. 24, 1852); name on the plate but not given in the text.—Gray, Proc. Zool. Soc. London, 1850, p. 242, pl. xxv (animal), pl. xxvii, fig. 4 (front view of head). Para, Brazil. External characters only; Gray, Cat. Mamm. Brit. Mus., 1852, p. 239; Cat. Ruminant Mamm. Brit. Mus., 1872, p. 92, part; Hand-List Edentate, Thick-skinned and Ruminant Mamm. Brit. Mus., 1873, p. 161. "S. America."

The type locality, as given by Gray, is Para, Brazil, from which locality I have seen no specimens, nor from elsewhere in east-central Brazil. According to Gray's plates and description, this should be a well marked form, particularly characterized by the white band over the eyes.

[1] *Cf.* G. Cuvier, Ossem, foss., ed. 2, IV, p. 55; Pucheran, Arch. du Mus., VI, 1852, p. 474; Brooke, Proc. Zool Soc. London, 1878, 925.

It has been recognized as a "good species" by most subsequent compilers and revisers, including Sir Victor Brooke, by whom it is listed, however, without comment.

### **Mazama cita cita** *Osgood.*

*Mazama americana citus*[1] OSGOOD, Field Mus. Nat. Hist., Zoöl., X, p. 43, Jan. 10, 1912.

Type locality, El Panorama, Rio Aurare, eastern shore of Lake Maracaibo, Venezuela.

This species, as noted by the author, differs very considerably in coloration from *M. nemorivaga* of the Guianas, and also in the heavier dentition, although the measurements given do not indicate larger general size. The color differences are much more significant than the difference in size.

Osgood (*l. c.*) gives the external measurements of the type (male) and of a female paratype as follows: "Total length 1,090, 1,060 mm.; tail vertebræ 105, 115; hind foot 278, 280; circumference of chest 600, 560; neck, 240, 218; shoulder to hip 550, 570; height at shoulder 545, 587." Skulls of the same specimens: "Greatest length, 189, 185; zygomatic breadth 80.6, 81.8;....breadth of braincase 57.4, 55; maxillary toothrow 61.5, 58.8...."

My own measurements of the female paratype skull (Field Mus. No. 18778, Empalado Savanna, Venezuela) are as follows: Total length, 184.5; condylobasal length, 177, occipitonasal length, 160; preorbital length, 92; zygomatic breadth, 81; orbital breadth, 76; interorbital breadth, 40.6; occipital breadth, 55; breadth of braincase, 54.5; nasals, 58.5 × 29.5; maxillary toothrow, 58; $m^{1-3}$, 33.5. The specimen is a young female with the teeth fully developed but unworn.

### **Mazama cita sanctæmartæ** subsp. nov.

*Mazama nemorivaga* ALLEN, Bull. Amer. Mus. Nat. Hist., XX, p. 429, Nov. 28, 1904.

Type, No. 14640, ♂ ad., near Bonda, Santa Marta, Colombia, Dec. 20, 1898, H. H. Smith. Coll.

Size medium. Pelage short and fine. Hairs on nape not reversed. Upper parts pale ochraceous buff, deeper and more ochraceous on the median line, paler and lighter on the flanks, grizzled faintly with blackish (most strongly medially), the hairs being barred near the tip with dusky; underparts white from chin to base of tail, faintly washed on the breast and laterally with a tinge of buff; fore limbs externally like the flanks but with a faint grayish drab tone, internally like the belly; hind

[1] As *Mazama* is usually treated as feminine, it seems preferable to write *cita* instead of *citus*.

limbs like the flanks with a tone of grayish drab, the white of the underparts continued as a narrowing white band as far as the hock; tail above like the back, beneath white; top of head wood brown, sides of head pale drab gray, passing gradually into the white of the throat; usually a small white or whitish spot over the anterior corner of the eye, often absent (or only a trace, as in the type); rest of the space between the orbital region and the long hair of the crown reddish ochraceous; a conspicuous white lip spot on each side of the nose; ears clothed externally with very short wood brown hair, bordered with white, especially basally.

Collector's measurements: "Length 3 feet 8 inches [1117 mm.]; girth, 2 feet $1\frac{3}{4}$ inches [654 mm.]" Skull (type), total length, 183 mm.; condylobasal length, 181; occipitonasal length, 165; preorbital length, 93.5; zygomatic breadth, 79; interorbital breadth, 45; orbital breadth, 81; breadth of braincase, 54; occipital breadth, 79; nasals, 52 × 27.5; maxillary toothrow, 59 (maximum in a series of 12 skulls); antlers, length from burr 104, diameter at burr 15, length of pedicel, 8. (See next page for table of measurements.)

The variation in color is not very great and appears to be correlated largely with season; March and April specimens are more ochraceous than November and December examples, and the pelage is fuller and longer, and the hairs of the crown more strongly tipped with rufous. The white eyespot is present in most of the specimens, in some large and conspicuous, in others reduced to a mere trace or wholly wanting. The young in spotted coat are yellowish ochraceous above with the white spots rather dull and not sharply defined.

*Mazama cita sanctæmartæ* belongs to the *M. nemorivaga* group, but differs from typical *nemorivaga* in larger size and more fulvous coloration. It is evidently closely related to *Mazama cita* Osgood, from which it seems to be only subspecifically separable, differing from *cita* in smaller size and somewhat in coloration.

### **Mazama pandora** *Merriam.*

*Mazama pandora* MERRIAM, Proc. Biol. Soc. Washington, XIV, p. 105, July 19, 1901.

This is one of the palest and smallest species of the brown brocket group, it being paler and somewhat smaller than even *M. nemorivaga.* The external measurements given by Dr. Merriam for the male type are, total length, 1125 mm.; tail vertebræ, 140; hind foot, 273; height at shoulders, 572. The principal measurements of the skull of the male type, as given by Dr. Merriam, are as follows: Basal length, 163; occipitonasal length, 157; zygomatic breadth, 82; orbital breadth, 73.5; interorbital breadth, 44; maxillary toothrow, 50; antler, length from burr, 113. My own measurements of the adult female skull (paratype) from Apazote, Campeche, Mexico (U. S. Nat. Mus. No. 108287) are: Total length, 181; condylobasal length,

*Measurements of 12 Adult Skulls of Mazama cita sanctæmartæ.*

| Cat. No. | Locality | Sex | Total length | Condylobasal length | Occipitonasal length | Preorbital length | Zygomatic breadth | Orbital breadth | Interorbital breadth | Occipital breadth | Breadth of braincase | Length of nasals | Breadth of nasals | Maxillary toothrow | Length of $M^{1-3}$ | Ratio of condylobasal to preorbital length |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14865 | Bonda, Santa Marta, Colombia | ♂ | 183 | 173 | 163 | 90 | 82 | 83 | 44 | 55 | 56 | 58 | 23 | 57 | 26 | 52 |
| 14640 | " " " " | ♂ | 185 | 181 | 156 | 93.5 | 79 | 81 | 45 | 53 | 54 | 52 | 27.5 | 58 | 26 | 51.7 |
| 14645 | " " " " | ♂ | 182 | 173 | 159 | 89 | 77 | 81 | 44 | 54 | 57 | 57 | 24 | 55 | 25 | 51.4 |
| 14643 | " " " " | ♂ | 186 | 175 | 165 | 91 | 79 | 81.5 | 44 | 55 | 60 | 59 | 28.3 | 56 | 25 | 52 |
| 23478 | " " " " | ♂ | 180 | 167 | 166 | 83 | 80 | 85 | 45 | 54 | 57 | 53.5 | 26 | 55 | 25 | 50.4 |
| 14642 | " " " " | ♀ | 187 | 180 | 165 | 94 | 79 | 81 | 42 | 54.5 | 55 | 61 | 23 | 54.5 | 23.6 | 52.2 |
| 14646 | " " " " | ♀ | 178 | 165 | 157 | 86 | 76 | 75 | 40.5 | 50 | 51.4 | 58 | 24 | 53 | 24 | 52.1 |
| 14638 | " " " " | ♀ | 175 | 166 | 153 | 83 | 79 | 78.5 | 38.5 | 51.6 | 54 | 52 | 23.5 | 56 | 26.3 | 50 |
| 14864 | " " " " | ♀ | 176 | 172 | 151 | 90 | 78 | 78 | 43 | 54 | 55 | 50 | 23.5 | 54.5 | 24 | 52.3 |
| 23476 | " " " " | ♀ | 180 | 170 | 160 | 89.5 | 75 | 72 | 39 | 55 | 56 | 58 | 24.3 | 57 | 25.5 | 52.4 |
| 23479 | " " " " | ♀ | 180 | 172 | 155 | 90.5 | 77.5 | 80 | 40 | 54 | 56.5 | 55 | 21.3 | 55 | 25.5 | 52.6 |
| 23481 | " " " " | ♀ | 180 | 167 | 153 | 88 | 76.3 | 75 | 38 | 52 | 56 | 49 | 19 | 53 | 23 | 52.7 |
| | Average | | 181 | 171.8 | 158.3 | 89 | 78.2 | 79.4 | 42.8 | 51.8 | 55.7 | 56 | 24 | 55.3 | 24.9 | 51 |
| | Minimum | | 175 | 165 | 151 | 83 | 75 | 72 | 38 | 50 | 51.4 | 49 | 19 | 53 | 23 | 50 |
| | Maximum | | 187 | 181 | 166 | 93.5 | 82 | 85 | 45 | 55 | 60 | 61 | 28.3 | 58 | 26.3 | 52.7 |

171; occipitonasal length, 160; preorbital length, 86; zygomatic breadth, 79; orbital breadth, 78; interorbital breadth, 38; occipital breadth, 60; breadth of braincase, 55.5; nasals, 56 × 15; maxillary toothrow, 53; $m^{1-3}$, 29.5. Ratio of preorbital to condylobasal length, 53.7.

Known at present only from original specimens, respectively from the two Tunkas, Yucatan, and Apazote, Campeche.

This is the only species of the brown group known from north of Venezuela, as the specimen recorded by me from Nicaragua (this Bulletin, XXVIII, p. 95, April 30, 1910) proves on reëxamination to belong to a small species of *Odocoileus*, probably *O. truei*.

*Comparative Measurements of Skulls of Species and Subspecies of Mazama.*

| | Number of specimens | Total length | Condylobasal length | Preorbital length | Zygomatic breadth | Occipital breadth | Breadth of braincase | Maxillary toothrow | Ratio of preorbital to condylobasal length |
|---|---|---|---|---|---|---|---|---|---|
| M. trinitatis | 1 ♂, 1 ♀ | 215 | 206.5 | 109.5 | 96 | 63.5 | 61.6 | 65.3 | 53% |
| M. americana americana | 1 ♀ | 235 | — | 124 | — | — | — | 68 | 52.6 |
| M. americana tumatumari | 1 ♀ | 234 | 222 | 124 | 92 | 72.5 | 67 | 73.5 | 55.9 |
| M. americana juruana | 1 ♀ | 228 | 214 | 116 | 100 | 65 | 65 | 61.5 | 54.2 |
| M. rufa rufa | 3 ♂, 2 ♀ | 211 | 202 | 108 | 91.2 | 59 | 61 | 60.7 | 54.8 |
| | Min. | 206 | 193 | 102 | 90 | 57 | 59 | 59 | 52.6 |
| | Max. | 217 | 209 | 114 | 93 | 62 | 62.5 | 62.5 | 55.6 |
| M. rufa jucunda | 1 ♂ | — | 178 | — | 88 | — | — | 61 | — |
| M. brincenii | 1 ♀ | 159 | — | — | 70 | — | — | 51 | — |
| M. rufina | 1 ♀ | 162 | 151 | 77 | 72 | 55.5 | 51 | 48 | 53 |
| M. zamora | 1 ♀ | 204 | 193 | 104 | 87 | 61.5 | 61 | 65 | 51 |
| M. sartorii sartorii | 1 ♀ | 174 | 160 | 83.5 | 80 | 53.7 | 56 | 51.5 | 52.2 |
| M. sartorii cerasina | 1 ♂, 4 ♀ | 185 | 174 | 88.6 | 80.7 | 51 | 57.1 | 55.2 | 50.7 |
| | Min. | 180 | 170 | 85 | 77 | 48.5 | 56 | 54 | 50 |
| | Max. | 189 | 180 | 91 | 86 | 54 | 58 | 58 | 52 |
| M. sartorii reparticia | 1 ♂, 3 ♀ | 193 | 186 | 94 | 82.4 | 55.6 | 58 | 58.6 | 51.1 |
| | Min. | 188 | 176 | 89 | 81 | 53 | 55 | 57 | 50 |
| | Max. | 202 | 196 | 100 | 83.6 | 59.3 | 60 | 60 | 52.2 |
| M. zetta Type and topotype | 1 ♀, 1 ♀ | — | 188.5 | — | — | — | — | 60.5 | — |
| M. zetta Gallera specimen | 1 ♀ | 200 | 188 | 100 | 88 | 60.5 | 60 | 60 | 50 |
| M. gualea | 1 ♀ | 195 | 185 | 96.5 | 86.5 | 65 | 60 | 58 | 52.2 |
| M. fuscata | 1 ♂ | 210 | 200 | 105 | 96 | 64 | 61.5 | 65 | 52.5 |
| M. simplicicornis | 1 ♂ | 195 | 183 | 99 | 86 | 61 | 58 | 54 | 54.1 |
| M. murelia | 1 ♀ | 174 | 163 | 88 | 74 | — | 63 | 54 | 54 |
| M. nemorivaga | 1 ♀ | 188 | 178 | 95.5 | 76 | 53.2 | 56 | 50.5 | 53.7 |
| M. cita cita | 1 ♀ | 184.5 | 177 | 92 | 81 | 55 | 54.5 | 58.5 | 50 |
| M. c. sanctæ-martæ | 5 ♂, 7 ♀ | 181 | 171.8 | 89 | 78.2 | 51.8 | 55.7 | 55.3 | 51 |
| | Min. | 175 | 165 | 83 | 75 | 50 | 51.4 | 53 | 50 |
| | Max. | 187 | 181 | 93.5 | 82 | 55 | 60 | 58 | 52.7 |
| M. pandora | 1 ♀ | 181 | 171 | 86 | 79 | 60 | 55.5 | 53 | 53.7 |