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U. S. DEPARTMENT OF AGRICULTURE  
BUREAU OF BIOLOGICAL SURVEY  
E. W. NELSON, *Chief*

# NORTH AMERICAN FAUNA

## No. 41

[Actual date of publication, February 9, 1918]



### REVIEW OF THE GRIZZLY AND BIG BROWN BEARS OF NORTH AMERICA (GENUS URSUS)

WITH DESCRIPTION OF A NEW GENUS, VETULARCTOS

BY

C. HART MERRIAM

CONSULTING BIOLOGIST, BIOLOGICAL SURVEY  
RESEARCH ASSOCIATE, SMITHSONIAN INSTITUTION



WASHINGTON  
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1918

## NORTH AMERICAN FAUNAS.

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(Continued on page 3 of cover.)









WILD GRIZZLY IN NORTHWESTERN WYOMING.

Photograph made and used by permission of Frederick C. Poole.



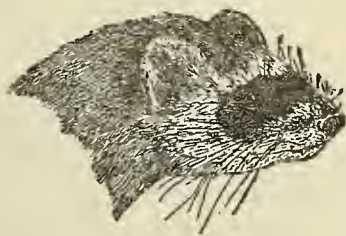
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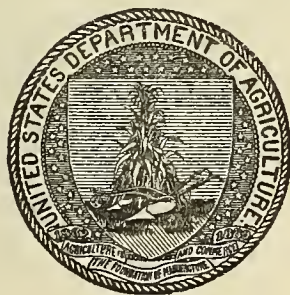
(GENUS *URSUS*)

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1918

## LETTER OF TRANSMITTAL.

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UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF BIOLOGICAL SURVEY,  
*Washington, D. C., July 18, 1917.*

SIR: I have the honor to transmit for publication as North American Fauna No. 41 a review of the grizzly and big brown bears of North America, by Dr. C. Hart Merriam, consulting biologist and former chief of the Biological Survey and research associate of the Smithsonian Institution. This review was prepared and originally submitted in September, 1916, but before composition was begun it was recalled from the printer in order that additional information, developed by the discovery of new material, might be included. The work is based largely upon material in the collection of the Biological Survey. Up to 20 years ago only 8 species of grizzly and big brown bears were known, but since then, largely through the investigations of Dr. Merriam, the number of recognizable forms has increased to 86. Additional study and material may solve certain points now in doubt, but it is not deemed advisable to delay further the publication of our present state of knowledge of this group of America's historic big game animals, now vanished from great stretches of their former domain. This review will be of material assistance to students and others interested in our native wild life, past and present.

Respectfully,

E. W. NELSON,  
*Chief, Biological Survey.*

HON. DAVID F. HOUSTON,  
*Secretary of Agriculture.*

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[The plates of skulls, owing to restriction of space, are limited to the side view, and consequently in some cases are misleading. Skulls having similar profiles often differ surprisingly when viewed from above or below, as would be seen at a glance were it practicable to give two views.]



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# REVIEW OF THE GRIZZLY AND BIG BROWN BEARS OF NORTH AMERICA

(GENUS *URSUS*)

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By C. HART MERRIAM.

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## INTRODUCTION.

When Audubon and Bachman published their great work on the Mammals of North America (1846-1854), and in fact up to the year 1857, it was commonly believed by naturalists as well as by hunters and the public generally that there was only a single species of grizzly bear—the one described by Lewis and Clark in 1804-5, and named *Ursus horribilis* by Ord in 1815. Baird, in 1857, described another species, from Coppermines, New Mexico, which he named *Ursus horriæus*.

Nearly 40 years later, in my "Preliminary Synopsis of the American Bears,"<sup>1</sup> eight grizzlies and big brown bears were recognized, of which five were described as new. It was not then suspected that the number remaining to be discovered was anything like so great as has since proved to be the case. The steady influx of specimens resulting from the labors of the Biological Survey, supplemented by the personal efforts of a number of hunter-naturalists, brought to light many surprises, most of which have been published; and beginning in the spring of 1910, a fund placed at my disposal made it possible to offer hunters and trappers sufficient inducement to tempt them to exert themselves in securing needed specimens. As a result, the national collection of bears has steadily grown until, in number of species represented, in completeness of series, and in number of type specimens, it now far excels all other collections in the world together. Nevertheless there are many gaps in the series.

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<sup>1</sup> Proc. Biol. Soc. Washington, X, pp. 65-83, April 13, 1896.

Knowledge of the big bears is by no means complete and many years must pass before the last word on the subject will be written. Many bears now roaming the wilds will have to be killed and their skulls and skins sent to museums before their characters and variations will be fully understood and before it will be possible to construct accurate maps of their ranges. Persons having the means and ambition to hunt big game may be assured that bears are still common in many parts of British Columbia, Yukon Territory, and Alaska, and that much additional material is absolutely required to settle questions still in doubt.

Among the localities from which specimens are greatly needed may be mentioned Lynn Canal and Lituya Bay, Alaska, and in fact the entire coast strip between Cross Sound and Yakutat Bay; the Cook Inlet and Susitna regions; the mountains between the Yukon and Tanana; the Endicott Range and other mountains between the Yukon and the Arctic coast all the way from Seward Peninsula to the Alaska-Yukon boundary; the Rocky Mountains of Canada, from British Columbia northward, including the sources of the Pelly, Macmillan, Stewart, and Porcupine Rivers; the Mackenzie River and Great Bear Lake region; the southwest corner of Yukon Territory; the western part of Alberta; and the interior of British Columbia. In the United States, skulls of adult males are much needed from all localities inhabited by grizzly bears, particularly in Colorado, Idaho, Montana, and Wyoming—including the Glacier and other National Park regions.

What is most needed to-day in this line is a series of adults collected by absolutely trustworthy persons and labeled on the spot for locality and sex. Many specimens in museums are not labeled for sex; others have the sex wrongly marked; and many either lack localities or the localities given are open to serious doubt. A specimen is of little value unless one can pin his faith on the label.

Some writers have advanced the view that the various species of bears freely interbreed. Let those so minded ask themselves the question, If promiscuous interbreeding were to take place, what would become of the species? From the nature of the case, the stability of species depends on the rarity of crossings with other species, for if interbreeding were to take place frequently the species so interbreeding would of course cease to exist, having merged into a common hybrid. Hybrids now and then occur, particularly in zoological gardens, but among wild animals in their native haunts they are exceedingly rare.

The number of species here given will appear to many as preposterous. To all such I extend a cordial invitation to visit the National



Museum and see for themselves what the bear skulls show. Recognition of species is a matter of interpretation. If the material is adequate there can be little room for difference of opinion; if inadequate, many important points must remain in doubt. It is not the business of the naturalist either to create or to suppress species, but to endeavor to ascertain how many Nature has established, and having discovered this, to point out their characters and learn as much as possible about them.

One of the unlooked-for results of the critical study of the American bears is the discovery that the big bears, like mice and other small mammals, split up into a large number of forms whose ranges in some cases overlap so that three or more species may be found in the same region.

Another surprising result is the discovery that Admiralty Island in Southeastern Alaska appears to be inhabited by no less than five distinct species, each of which is obviously related to and representative of an adjacent mainland species. The recognition of this very remarkable state of affairs makes it possible to understand what before had seemed a most anomalous condition, namely, the extraordinary diversity or variability of the skulls and teeth of the island bears. It was not until material essential for the determination of the mainland forms had been collected that it was possible to recognize and define the island forms.

The varying degrees of divergence of the island bears furnish an interesting index to the relative time when each obtained a foothold on the island. In this connection it is well to remember that the breadth of the strait separating Admiralty Island from the mainland at its narrowest point does not exceed 5 miles.

The mainland big bears with their representatives on Admiralty Island here provisionally recognized are:

MAINLAND SPECIES.

ADMIRALTY ISLAND SPECIES.

<i>Ursus dalli</i> .....	<i>Ursus shirasi</i> .
<i>Ursus stikeenensis</i> .....	<i>Ursus mirabilis</i> .
<i>Ursus tahlitanicus</i> .....	<i>Ursus insularis</i> .
<i>Ursus kwakiutl</i> .....	<i>Ursus neglectus</i> .
<i>Ursus caurinus</i> .....	<i>Ursus eulophus</i> .

GEOGRAPHIC DISTRIBUTION.

In early days grizzly bears were common in most parts of western North America, their range being nearly continuous from northern Mexico northward through the Western States and western Canada to northern Alaska; but now within the United States sev-

eral of the species are extinct, and those still living are confined in the main to remote or inaccessible mountain ranges, where two or more species not infrequently occur together. In many cases the original distribution areas overlapped, as they do to-day in parts of British Columbia, Yukon, and Alaska; in other cases, owing to the settlement of the country, species inhabiting easily accessible areas were either exterminated or forced into mountains where they now occupy the same ground with other species, so that it is impossible to ascertain what the original distribution was. As a rule, in cases where two or more species inhabit the same area, the species occurring together belong to different superspecific groups. Thus in the Yellowstone Park and Stikine River regions representatives of the *horribilis*, *absarokus*, *tahltanicus*, and *chelan* groups occur, so far as known, in the same localities.

#### SEXUAL DIFFERENCES.

In most species of bears the males are much larger than the females. In some the disparity in size is very remarkable, as in *middendorffi* of Kodiak Island and *magister* of southern California. In a few cases the difference is slight, as in *kidderi* of Alaska Peninsula.

#### AGE DIFFERENCES.

Bear skulls undergo a series of changes from early life to old age, and in most species do not attain their mature form until seven or more years of age. In species having the frontal shield highly elevated, as in *middendorffi*, *kluane*, *stikeenensis*, and *mirabilis*, the frontals reach their maximum of arching or bulging in early adult life (about the sixth year), after which they gradually become flatter.

#### MATERIAL EXAMINED.

It is a pleasure to express appreciation of the invaluable assistance rendered by the loan or presentation of skins and skulls of grizzly and brown bears utilized in the preparation of the accompanying descriptions. To Charles Sheldon, G. Frederick Norton, and the late Charles R. Cross, jr., and to J. H. Kidder, Robert P. Blake, Waldo Emerson Forbes, George Mixter, Samuel Mixter, Dr. William Jason Mixter, Charles S. King, and Homer E. Sargent, special thanks are due for their generosity in placing at my disposal the valuable specimens and notes obtained on their private hunting trips. Most of these specimens have been presented to the national collections. And to Miss Annie M. Alexander, of Oakland, California, special acknowledgment should be made for the loan of her collection of

Alaska bears, now in the Museum of Vertebrate Zoology of the University of California, and second only to that of the Biological Survey and National Museum.<sup>1</sup>

In conclusion it is only proper to state that the material on which the present publication is based could not have been brought together during my lifetime, nor the results prepared for publication, but for the generous assistance of Mrs. E. H. Harriman in establishing under the Smithsonian Institution a special research fund for my scientific work.

#### TECHNICAL TERMS.

In describing the skulls of bears a few terms are used in a special sense which it is desirable to understand.

The *frontal shield* is that part of the top of the skull extending from the base of the rostrum backward to the meeting point of the temporal impressions. It is elevated above the surrounding parts and is sharply defined. Its posterior point, confined between the temporal impressions, is longer in female than in male skulls, and up to a certain limit becomes shorter with age.

The *postorbital processes* stand out from the sides of the frontal shield, limiting the orbits posteriorly.

The term *sulcate* is applied to skulls having a longitudinal median depression or groove in the frontal shield, usually shallow and rather broad and without definite lateral limits.

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<sup>1</sup> Others who have helped by the presentation or loan of material are: C. E. Aiken, Dr. J. A. Allen, Dr. R. M. Anderson, Edward F. Ball, Dr. Arthur H. Bannon, Dr. William Bebb, H. C. Beggs, Mrs. C. C. Beggs, John P. Bird, W. C. Bradbury, J. Stanley-Brown, Fred K. Burnham, Mr. and Mrs. E. S. Cameron, Dr. Frank M. Chapman, R. H. Chapman, Elton Clark, James L. Clark, Charles B. Cory, Prof. Charles R. Cross, Heyward Cutting, Frank S. Daggett, E. W. Deming, Howard Eaton, Charles Farwell Edson, Lincoln Ellsworth, Lieut. G. T. Emmons, J. D. Figgins, J. Stanley Foster, Charles A. Gianini, Dr. J. B. Girard, Dr. Joseph Grinnell, Samuel Henshaw, Charles J. Hittell, Dr. W. J. Holland, Dr. R. Honston, James T. Jardine, Remington Kellogg, Francis Kermode, Charles S. King, Paul Kleineldam, Prof. S. H. Knight, Frederick Lambart, Edward H. Litchfield, Col. J. A. McGuire, John Murgatroyd, Prof. C. C. Nutting, Wilfred H. Osgood, John M. Phillips, the late W. Hallett Phillips, the late Warburton Pike, Wilson Potter, George D. Pratt, Dr. E. P. Richardson, Powhatan Robinson, Archibald Rogers, Carl Rungius, Homer E. Sargent, Prof. W. B. Scott, George Shiras 3d, George Shiras 4th, Dr. H. A. Sifton, Henry A. Stewart, Dr. Walter T. Swingle, P. A. Taverner, Prof. S. D. Thacher, Dr. Charles H. Townsend, Frederick K. Vreeland, E. R. Warren, A. Bryan Williams, and W. W. Wood.

Fullest acknowledgments are due the following institutions for their courtesy in loaning specimens: American Museum of Natural History, New York; Carnegie Museum, Pittsburgh; Colorado Museum of Natural History, Denver; Field Museum of Natural History, Chicago; Museum of Comparative Zoology, Cambridge; Museum of History, Science, and Art, Los Angeles; Museum of Vertebrate Zoology, University of California; Peabody Museum of Salem; Peabody Museum of Yale University; Provincial Museum, Victoria, British Columbia; U. S. National Museum, Washington; Victoria Memorial Museum, Ottawa; Zoological Society of Philadelphia; and the Museums of the Universities of Iowa, Kansas, Nebraska, and Wyoming.

For the frontispiece, showing a wild grizzly in a pine forest near Yellowstone Park, western Wyoming, thanks are due Frederick K. Vreeland, who was so fortunate as to take the photograph.

The term *dished* means that the nasal or fronto-nasal region is depressed, producing a change of angle from the plane of the anterior part of the nasals to the plane (or slope) of the frontal shield. Some skulls are strongly dished, some are flat, while some have the fronto-nasal region elevated and compressed, giving a very different outline from that of the normally dished skull.

The term *braincase* is loosely applied to the whole upper rounded part of the skull between the occiput and postorbital processes, but not including the wedge-shape posterior part of the frontal shield. Used in this way, it covers the parietal bones and posterior part of the frontals on each side of the temporal ridges, including not only the actual bony case inclosing the brain, but also its anterior continuation (the sinus case).

The term *sinus case* is applied more definitely to the smoothly rounded part of the frontals below the shield and in direct continuation of the braincase—the outer shell covering the large sinuses or air cells lying between the nasal chamber and the brain. It is not always discriminated from the braincase.

The term *bellied* is applied to the posterior part of the inferior border of the ramus of the underjaw to indicate a swelling or thickening common in many species.

The term *subangular border* is applied to the posterior part of the inferior border of the underjaw, immediately anterior to the angular process, and usually set off from the rest of the ramus by a step or small tubercle.

The term *keeled* is applied to a not uncommon condition of the upper part of the sinus case, in which the top or arch is compressed, rising rather narrowly into the anterior part of the sagittal crest and posterior part of the frontal shield. The condition is marked in *Ursus eulophus* and occurs in several other species. In most species, however, this part of the braincase is rather broadly rounded, the sagittal crest rising abruptly from the median line.

*Measurements* are always in millimeters unless otherwise specified.

The museum number of the skull, unless otherwise stated, is understood to be that of the United States National Museum.

#### CLASSIFICATION OF GRIZZLY AND BIG BROWN BEARS.

The differences formerly supposed to exist between the grizzlies and the big brown bears appear, in the light of the material now available, to distinguish certain groups of species from certain other groups, rather than the grizzlies collectively from the big brown bears collectively. In other words, the differences between the grizzlies on the one hand and the big brown bears on the other are

neither so great nor so constant as at one time believed. And there are species which in the present state of knowledge can not be positively referred to either group. In fact, it seems at least possible that certain species which appear to belong with the grizzlies are closely related to certain other species which clearly belong with the big brown bears. The typical brown bears differ from the typical grizzlies in peculiarities of color, claws, skull, and teeth. The color of the former is more uniform, with less of the surface grizzling due to admixture of pale-tipped hairs; the claws are shorter, more curved, darker, and scurfy instead of smooth; the skull is more massive; the fourth lower premolar is conical, lacking the sulcate heel of the true grizzlies. But these are average differences, not one of which holds true throughout the group. Most of the specimens in museums consist of skulls only, unaccompanied by skins or claws, leaving a doubt as to the external characters; and in old bears the important fourth lower premolar is likely to be so worn that its original form can not be made out. And, worst of all, some of the grizzlies lack the distinctive type of premolar, leaving only the skull as a guide to their affinities. The present classification, therefore, must be regarded as tentative and subject to revision.

#### RELATIVE VALUES OF CRANIAL AND DENTAL CHARACTERS.

In my judgment cranial characters among the bears of the genus *Ursus* are more permanent and of more significance from the standpoint of classification than minor tooth characters. The teeth are strongly modified by food and consequently in some cases present marked variations in the same group. Thus the skull of adult male *chelidonias* from the coast of southern British Columbia is almost indistinguishable from that of *imperator* from the Yellowstone Park, a member of the *horribilis* group; but *imperator* has very large molars, nearly as big as those of *horribilis* and *bairdi*, while *chelidonias*, being a fish eater, has such small molars that were it not for the skull no one would think of placing it in the *horribilis* group.

Cranial and dental characters among the big bears are very subtle. As a rule comparison of any two skulls of essentially the same size brings to light so many resemblances that one is likely to infer a far closer relationship than actually exists. This is because the big bears of the genus *Ursus* are such a closely interrelated group that the resemblances far outnumber the differences. Hence the greatest caution is necessary to avoid misleading conclusions.

The present paper is merely a review of the existing state of knowledge of the grizzlies and big brown bears of America and does not include either the polar or the black bears. It is not intended as a

monographic revision, but aims to supply a list of the species, together with descriptions and comparisons of adult skulls, chiefly males. Little is said of external characters, for the reason that little is known, only a few skins with claws being available for study.

List of Species and Subspecies of Grizzly and Big Brown Bears, with Type Localities.<sup>1</sup>

(Classification provisional.)

*Horribilis* group (pp. 17-34):

<i>Ursus horribilis horribilis</i> Ord.....	Missouri River, northeastern Montana.
<i>horribilis bairdi</i> Merriam.....	Blue River, Summit County, Colorado.
<i>horribilis imperator</i> Merriam.....	Yellowstone National Park, Wyoming.
<i>chelidonias nobis</i> .....	Jervis Inlet, British Columbia.
<i>atnarko nobis</i> .....	Atnarko River, British Columbia.
<i>kwakiutl</i> Merriam.....	Jervis Inlet, British Columbia.
<i>nortoni</i> Merriam.....	Southeastern side Yakutat Bay, Alaska.
<i>warburtoni</i> Merriam.....	Atnarko River, British Columbia.
<i>neglectus</i> Merriam.....	Near Hawk Inlet, Admiralty Island, Southeastern Alaska.
<i>californicus</i> Merriam.....	Monterey, California.
<i>tularensis</i> Merriam.....	Fort Tejon, California.
<i>colusus</i> Merriam.....	Sacramento Valley, California.
<i>dusorgus nobis</i> <sup>2</sup> .....	Jack Pine River, Alberta-British Columbia boundary.

*Planiceps* group (pp. 34-53):

<i>Ursus nelsoni</i> Merriam.....	Colonia Garcia, Chihuahua, Mexico.
<i>texensis texensis</i> Merriam.....	Davis Mountains, Texas.
<i>texensis navaho</i> Merriam.....	Navajo country near Fort Defiance, Ari- zona. (Probably Chuska Mountains.)
<i>planiceps nobis</i> .....	Colorado (exact locality uncertain).
<i>macrodon nobis</i> .....	Twin Lakes, Colorado.
<i>mirus nobis</i> .....	Yellowstone National Park, Wyoming.
<i>eltonclarki</i> Merriam.....	Near Freshwater Bay, Chichagof Island, Alaska.
<i>tahltanicus</i> Merriam.....	Klappan Creek (=Third South Fork Stikine River), British Columbia.
<i>insularis</i> Merriam.....	Admiralty Island, Alaska.
<i>orgilos</i> Merriam.....	Bartlett Bay, east side Glacier Bay, South- eastern Alaska.
<i>orgiloides nobis</i> .....	Italio River, Alaska.
<i>pallasi</i> Merriam.....	Donjek River, southwestern Yukon.
<i>rungiusi rungiusi nobis</i> .....	Rocky Mountains, headwaters Athabaska River, Alberta.
<i>rungiusi sagittalis nobis</i> .....	Champagne Landing, southwestern Yukon.
<i>macfarlani nobis</i> .....	Anderson River, 50 miles below Fort Anderson, Mackenzie.
<i>canadensis</i> Merriam <sup>2</sup> .....	Moose Pass, near Mount Robson, British Columbia.

<sup>1</sup> Nearly 130 years ago Prof. Zauschner proposed the name *Ursus caribur* for an animal "from the region of Canada" (*Bestimmung der Hundsart Krokute, und der Bärenart Saribur*, p. 8, 1788), but the species appears to be impossible of identification.

<sup>2</sup> Reference to group provisional.

*Arizona* group (pp. 53-76):

- Ursus arizonæ* Merriam.....Escudilla Mountains, Apache County, Arizona.
- idahoensis* nobis.....North Fork Teton River, eastern Idaho.
- pulchellus pulchellus* nobis.....Ross River, Yukon.
- pulchellus ereunetes* nobis.....Beaverfoot Range, Kootenay District, British Columbia.
- oribasus* nobis.....Upper Liard River, Yukon.
- chelan* Merriam.....East slope Cascade Mountains, Chelan County, Washington.
- shoshone* Merriam.....Estes Park, Colorado.
- kennerlyi* Merriam.....Mountains of northeastern Sonora, near Los Nogales, Mexico.
- utahensis* Merriam.....Salina Creek, near Mayfield, Utah.
- perturbans* nobis.....Mount Taylor, northern New Mexico.
- rogersi rogersi* nobis.....Upper Greybull River, Absaroka Mountains, Wyoming.
- rogersi bisonophagus* nobis.....Black Hills (Bear Lodge), northeastern Wyoming.
- pervagor* Merriam.....Pemberton Lake (now Lillooet Lake), British Columbia.
- caurinus* Merriam.....Berners Bay, east side Lynn Canal, Southeastern Alaska.
- eulophus* Merriam.....Admiralty Island, Southeastern Alaska.
- klamathensis* Merriam <sup>1</sup>.....Beswick, near mouth Shovel Creek, Klamath River, northern California.
- mendocinensis* Merriam <sup>1</sup>.....Long Valley, Mendocino County, California.
- magister* Merriam <sup>1</sup>.....Los Biacitos, Santa Ana Mountains, Southern California.

*Hylodromus* group (pp. 77-84):

- Ursus hylodromus* Elliot.....Rocky Mountains, western Alberta.
- kluane kluane* Merriam.....McConnell River, Yukon.
- kluane impiger* nobis.....Columbia Valley, British Columbia.
- pellyensis* nobis.....Ketz Divide, Pelly Mountains, Yukon.
- andersoni* nobis <sup>1</sup>.....Dease River, near Great Bear Lake, Mackenzie.

*Horriæus* group (pp. 84-88):

- Ursus apache* Merriam.....Whorton Creek, south slope White Mountains, eastern Arizona (a few miles west of Blue).
- horriæus* Baird.....Coppermines, southwestern New Mexico.
- henshawi* Merriam.....Southern Sierra Nevada, near Havilah, Kern County, California.

*Stikeenensis* group (pp. 88-94):

- Ursus stikeenensis* Merriam.....Tatletuey Lake, tributary to Finlay River, near head Skeena River, British Columbia.
- crassodon* nobis.....Klappan Creek (=Third South Fork Stikine River), British Columbia.
- crassus* nobis <sup>1</sup>.....Upper Macmillan River, Yukon.
- mirabilis* Merriam <sup>1</sup>.....Admiralty Island, Alaska.
- absarokus* Merriam <sup>1</sup>.....Little Bighorn River, northern Bighorn Mountains, Montana.

<sup>1</sup>Reference to group provisional.

*Alascensis* group (pp. 94-99):

- Ursus alascensis* Merriam.....Unalaklik River, Alaska.  
*t-klat* Merriam.....Head of Toklat River, north base Alaska  
 Range, near Mount McKinley, Alaska.  
*latifrons* Merriam.....Jasper House, Alberta.

*Richardsoni* group (pp. 99-106):

- Ursus richardsoni* Swainson.....Shore of Arctic Ocean, west side Bathurst  
 Inlet, near mouth of Hood River.  
*russelli* Merriam <sup>1</sup>.....West side Mackenzie River delta, Canada.  
*phaonyx* Merriam.....Glacier Mountain, Tanana Mountains,  
 Alaska (about 2 miles below source of  
 Comet Creek, near Fortymile Creek, be-  
 tween Yukon and Tanana Rivers).  
*internationalis* Merriam.....Alaska-Yukon boundary, about 50 miles  
 south of Arctic coast.  
*ophrus* Merriam.....Eastern British Columbia (exact locality  
 unknown).  
*washake* Merriam.....North Fork Shoshone River, Absaroka  
 Mountains, western Wyoming.

*Kidderi* group (pp. 106-110):

- Ursus kidderi kidderi* Merriam.....Chinitna Bay, Cook Inlet, Alaska.  
*kidderi tundrensis* Merriam.....Shaktolik River, Norton Sound, Alaska.  
*cximius* Merriam.....Head of Knik Arm, Cook Inlet, Alaska.

*Innuitus* group (pp. 110-115):

- Ursus innuitus* Merriam.....Golofnin Bay, south side Seward Penin-  
 sula, northwestern Alaska.  
*cressonus* Merriam.....Lakina River, south slope Wrangell Range,  
 Alaska.  
*alexandræ* Merriam <sup>1</sup>.....Kusilof Lake, Kenai Peninsula, Alaska.

*Townsendi* group (pp. 115-116):

- Ursus townsendi* Merriam.....Mainland of Southeastern Alaska (exact  
 locality uncertain).

*Dalli* group (pp. 116-124):

- Ursus dalli* Merriam.....Yakutat Bay (northwest side), Alaska.  
*hoots* Merriam.....Clearwater Creek, a north branch of Stikine  
 River, British Columbia.  
*sitkensis* Merriam.....Sitka Islands, Alaska.  
*shirasi* Merriam.....Pybus Bay, Admiralty Island, Alaska.  
*nuchek* Merriam <sup>1</sup>.....Head of Nuchek Bay, Hinchinbrook  
 Island, Prince William Sound, Alaska.

*Gyas* group (pp. 124-127):

- Ursus gyas* Merriam.....Pavlof Bay, Alaska Peninsula.  
*middendorffi* Merriam.....Kodiak Island, Alaska.

*Kenaiensis* group (pp. 127-131):

- Ursus kenaiensis* Merriam.....Cape Elizabeth, extreme west end Kenai  
 Peninsula, Alaska.  
*sheldoni* Merriam.....Montague Island, Prince William Sound,  
 Alaska.

*Vetulartcos* genus nobis (pp. 131-133):

- Vetulartcos inopinatus* nobis.....Rendezvous Lake, northeast of Fort Ander-  
 son, Mackenzie.

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<sup>1</sup>Reference to group provisional.



## DESCRIPTIONS OF SPECIES AND SUBSPECIES.

## Horribilis Group.

## URSUS HORRIBILIS HORRIBILIS ORD.

## BIG-PLAINS GRIZZLY.

(Pl. XIV.)

*Ursus horribilis* Ord, Guthrie's Geography, 2d Amer. Ed., pp. 291, 300, 1815 (Rhoads' reprint, 1894). Based on the white bear of Lewis and Clark, particularly the one from eastern Montana killed May 5, 1805, on the Missouri River, near the mouth of Poplar River (called by them Porcupine River, but not the same as the Porcupine of to-day, which is about 50 miles farther west).

*Ursus ferox* Rafinesque, Amer. Monthly Mag., I, p. 437, Oct., 1817 (*nomen nudum*).

"*Ursus ferox* Lewis & Clarck," Desmarest, Mammalogie, p. 164, Paris, 1820 (under *U. cinereus*).

*Ursus cinereus* Desmarest, Mammalogie, p. 164, Paris, 1820.

*Ursus griseus* Choris, Voyage Pittoresque autour du Monde, folio colored plate and text (unpaged), Paris, 1822.

*Ursus candescens* Ham. Smith, in Griffith's Cuvier, II, p. 229 and facing plate, 1827; *ibid.* V, p. 112, 1827.

*Type locality*.—Missouri River, a little above mouth of Poplar River, northeastern Montana.

*Characters*.—Size huge; skull long and massive; claws long, moderately or slightly curved, and smoothly polished; usually streaked lengthwise with whitish or yellowish, which increases with age until in some old individuals the claws are almost wholly white or whitish. Color variable, usually light.

*Cranial characters*.—*Old male* (topotype, No. 202739) from Breaks of Missouri River, about 100 miles north of Fort Miles, eastern Montana, April 4, 1890; killed and presented by E. S. Cameron and wife: Skull huge (total length, 400 mm.=15¾ inches); vault of cranium moderately arched; zygomata rather squarely spreading posteriorly, moderately outbowed, the squamosal part rather broadly expanded vertically; frontal shield rather broad, flattish, sloping gradually upward to apex, the posterior part broader than usual (not cut away on sides by incurving temporal ridges); sagittal crest long, straight on top, high posteriorly, reaching forward over posterior fourth of frontals; postorbital processes large, flat, and horizontally outstanding; rostrum high, ascending posteriorly; fronto-nasal region rather high but *distinctly dished* and somewhat sulcate; palate long, concave in cross section; postpalatal shelf broad and flat, well rounded on sides; underjaw large and rather massive; coronoid blade high, its apex not strongly produced posteriorly; ramus rather flat; diastema long.

Teeth large, especially lower canine and last upper and middle lower molar. *Skull of female* (No. 13245, from head of Big Porcupine Creek [not Poreupine River] between Musselshell and Yellowstone Rivers, eastern Montana): Of generalized grizzly type; large and rather massive; vault of cranium rather flat; braincase rather broad; frontal shield of moderate breadth, slightly convex, slightly depressed or sulcate between orbits, elongate-lyrate posteriorly; postorbital processes weak and slightly decurved; sagittal crest not yet reaching fronto-parietal suture; muzzle moderate or rather short; zygomata moderately spreading and rather angular; palate rather narrow. Teeth large;  $M^2$  large and subrectangular.

*Cranial comparisons.*—Adult male (No. 202739, topotype) compared with two adult males of *bairdi*, one from near Cheyenne, southeastern Wyoming (Yountz), the other from Blue River, Summit County, Colorado (No. 203805): Size slightly larger; fronto-nasal region (interorbitally) *dished* instead of *elevated*, not compressed in front of orbits; frontal shield slightly broader, rising from plane of nasals (in *bairdi* continuing plane of nasals); palate longer and broader; postpalatal shelf much broader and more rounded on sides; mastoids short, appressed, vertical (in *bairdi* longer and divergent); meatus tube compressed between mastoid and glenoid (in *bairdi* not compressed); underjaw longer; ramus longer and flatter (much less swollen on outer side); coronoid blade less falcate (notch shallower); lower canine and last upper molar larger.

Male adult compared with male adult *absarokus* (type): Size decidedly larger; vault of cranium less arched; frontal shield rising more gradually; rostrum longer; palate broader and much longer; ramus much longer; meatus tube compressed between mastoid and glenoid (in *absarokus* not compressed). Teeth much larger, especially lower canine, last upper molar, and middle lower molar.

*Remarks.*—Until recently the absence of authentic specimens from the neighborhood of the type locality, in connection with the presence of several species of grizzly in Montana, caused an embarrassing uncertainty as to which species was entitled to the name *horribilis*. But the slow accumulation of material during the long period in which I have been engaged in a study of the group made it possible to map the ranges of some of the species with some degree of confidence; and finally, through the generosity of Mr. and Mrs. E. S. Cameron, of Marsh, Montana, I have been presented with a splendid skull of an old male *horribilis* from the Breaks of the Missouri, about 100 miles north of Fort Miles, Montana (practically the type locality). This skull proves that the huge buffalo-killing grizzly of the Great Plains bordering the Missouri in eastern Montana and the Dakotas—the “White Bear” of Lewis and Clark—is really the species to which Ord in 1815 gave the name *Ursus horribilis*.

*Skull measurements.*—Old male (No. 202739, from Missouri Breaks, eastern Montana): Basal length, 351; occipito-nasal length, 350; palatal length, 192; zygomatic breadth, 247; interorbital breadth, 86.

URSUS HORRIBILIS BAIRDI MERRIAM.<sup>1</sup>

BAIRD GRIZZLY.

*Ursus bairdi* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 192-193, August 13, 1914.

*Type locality.*—Blue River, Summit County, Colorado.

*Type specimen.*—No. 203805, ♂ old, U. S. National Museum, Biological Survey collection (=3147, Warren collection).

*Range.*—Southern Rocky Mountain region from San Juan Mountains, southwestern Colorado, northward through Wyoming to Montana, and perhaps to southeastern British Columbia. Probably a mountain animal, while its neighbor *horribilis* was a plains species.

*Characters.*—Size large—in the Rocky Mountain region exceeded only, if at all, by *horribilis*; skull long, with narrow elevated fronto-nasal region; claws of moderate length, smooth.

*Cranial characters.*—*Old male* (type) from Blue River, Colorado, and a closely similar old male from Sabille Hole, Laramie County, southeastern Wyoming, a little north of Cheyenne: Size large; fronto-nasal region high and rather narrow; rostrum rather long, narrow, and strongly compressed in front of orbits; face long sloping; frontal shield flat, short pointed, faintly depressed medially; shield and nasals in essentially same plane except that anterior third of nasals is slightly upturned; postorbital processes large, outstanding, flat, and blunt; orbital rims prominent; sagittal crest moderately high posteriorly; temporal impressions short, incurved, beaded; zygomata strongly outbowed, squarely spreading posteriorly; lachrymal duct notching orbital rim; squamosal shelf short, arched over meatus, the free edge thickened; palate and postpalatal shelf of moderate breadth; mastoids rather long, divergent. Molars large, especially M<sup>2</sup>.

*Immature males*, up to at least the fifth or sixth year, have rather narrow convex frontal shields with weak decurved postorbital processes, and may be recognized at once by the form of the fronto-nasal region, which is *high, narrow, and strongly pinched in* immediately in front of the orbits.

*Cranial comparisons.*—Old male compared with old male *horribilis* (No. 202739, from Missouri Breaks, eastern Montana): Size essentially the same; frontal shield slightly lower posteriorly, higher anteriorly, the point lyrate and more slender; fronto-nasal region elevated (never dished or sulcate between orbits); base of rostrum much more com-

<sup>1</sup> Named for S. F. Baird, former Secretary of the Smithsonian Institution and founder of the U. S. National Museum.

pressed laterally in front of orbits; palate narrower; mastoids longer and more divergent; meatus tube broadly rounded and free (not compressed between mastoid and glenoid); underjaw shorter; ramus more swollen on outer side; inferior border of ramus shorter and less upturned; coronoid blade more recurved, the apex narrower and reaching farther backward. Teeth similar but slightly smaller;  $M^1$  and  $M^2$  smaller and less massive.

*Skull measurements.*—Old male (type): Basal length, 348; occipito-nasal length, 325; palatal length, 157; zygomatic breadth, 235; inter-orbital breadth, 81.

### URSUS HORRIBILIS IMPERATOR MERRIAM.

#### YELLOWSTONE PARK BIG GRIZZLY.

*Ursus imperator* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 180-181, August 13, 1914.

*Type locality.*—Lake Hotel, Yellowstone National Park, Wyoming.

*Type specimen.*—No. 176297, ♂ old, U. S. National Museum. Died in National Zoological Park.

*Range.*—Yellowstone National Park, Wyoming; limits unknown.

*Characters.*—Size large; skull massive, with large horizontally outstanding postorbitals; closely similar to *horribilis*.

*Cranial characters.*—Old male (type) and a much finer male (No. 216205): Size large (only slightly smaller than *horribilis*); skull massive; vault of cranium rather high; fronto-nasal region moderately dished; sagittal crest long, high, and straight; frontal shield exceedingly short, flattish, shallowly sulcate medially, slightly swollen over orbits, ending in short obtuse point about 30 millimeters behind plane of postorbitals; postorbitals long, peglike, horizontally outstanding; lachrymal duct opening on orbital rim; zygomata moderately outstanding and outbowed, the squamosal base broadly expanded; squamosal shelves broad, arched over meatus; palate moderate; postpalatal shelf rather long; occipito-sphenoid 91 mm.; mastoids short; underjaw large, long, and massive, with high vertical coronoid blade. Teeth large:  $M^2$  with long heel.

*Cranial comparisons.*—Two old males (Nos. 176297 and 216205) from near northern boundary of Yellowstone National Park<sup>1</sup> compared with an old male topotype of *horribilis* (No. 202739) from Missouri Breaks, eastern Montana: Size only slightly less, general appearance essentially same; frontal shield slightly broader inter-orbitally and decidedly broader across postorbital processes; postor-

<sup>1</sup> While both are old males, the type is the older of the two and the recessive changes incidental to senility have already begun. It differs from the other in having the frontal shield shorter pointed posteriorly (with consequent lengthening of sagittal crest), the rostrum narrower, the fronto-nasal region more strongly dished.

bital processes more widely outstanding horizontally; palate and postpalatal shelf narrower; mastoids less appressed (apex farther from glenoid surface, leaving broader space for tube of auditory meatus). Last upper molar somewhat smaller, heel equally long but narrower posteriorly; middle lower molar narrower.

Old males (type and topotype) compared with old male *bairdi*: Size essentially same; frontal shield broader throughout; distance between tips of postorbital processes much greater; fronto-nasal region more dished (in *bairdi* elevated) and less compressed; inion more strongly developed.

Old male (type) compared with adult male *absarokus* (type): Size slightly larger; frontal shield broader and flatter; postorbital processes longer and more widely outstanding; rostrum higher and more nearly horizontal (in *absarokus* lower anteriorly and more sloping); sagittal crest longer; squamosal root of zygoma very much more expanded vertically; palate much longer.

*Skull measurements.*—Old male (type): Basal length, 336; occipito-nasal length, 317; palatal length, 191; zygomatic breadth, 232; interorbital breadth, 90. Another and more perfect old male from Yellowstone Park (No. 216205): Basal length, 340;<sup>1</sup> occipito-nasal length, 332; palatal length, 186; zygomatic breadth, 230; interorbital breadth, 90.

#### URSUS CHELIDONIAS SP. NOV.

##### JERVIS INLET GRIZZLY.

*Type* No. 223133, ♂ old, U. S. National Museum, Biological Survey collection. Collected on river at head of Jervis Inlet, British Columbia, in 1916, by Forrest and Fred Johnstone.

*Characters.*—Size very large; external characters unknown; skull of male strikingly like that of *imperator* but teeth, especially upper molars, very much smaller, resembling those of *kwakiutl*.

*Cranial characters.*—*Adult male* (type): Skull very large, massive, flat on top, with horizontally outstanding or slightly uplifted postorbital processes; shield moderately broad, flat, the point long, reaching back to fronto-parietal suture; rostrum elevated in same plane with shield; sagittal crest short, confined to parietals; zygomata moderately outstanding and outbowed; nares small; postpalatal shelf rather broad; occipito-sphenoid unusually long (102); basicranial axis flat; mastoids long and spreading; meatus tubes large and free; underjaw large and massive; coronoid blade high and nearly vertical; ramus rather broad posteriorly, its inferior border concave under anterior molar, convex behind plane of last molar; subangular

<sup>1</sup> In part restored.

border short; canines moderate, rather small for size of skull; upper and lower molars small; heel of  $M^2$  short and rather broadly rounded; last lower premolar of grizzly type.

*Cranial comparisons.*—*Ursus chelidonias* requires comparison with only two species, *imperator* and *warburtoni*. Adult male (type) compared with equally old male *imperator* from Hell Roaring Creek near northern boundary of Yellowstone National Park: Size slightly greater; general form and proportions almost identical; point of shield somewhat longer; rostrum more completely in frontal plane; zygomata more outbowed anteriorly; basicranial axis flatter (in *imperator* somewhat arched); mastoids longer and more divergent; meatus tube longer; postpalatal shelf broader; coronoid blade higher; canines about same size; molars (both upper and lower) smaller, the difference most marked in  $M^1$ ,  $M^2$ , and  $M_7$ .

Compared with two adult males of *warburtoni*, one (No. 223946) from Iskut River near its junction with the Stikine; the other (No. 210142) from Chilkat River valley, Southeastern Alaska: Skull as a whole slightly larger; frontal shield more nearly horizontal, somewhat broader, and completely flat (in *warburtoni* slightly convex); zygomata more outbowed anteriorly; postpalatal shelf broader; basicranial axis flatter; occipito-sphenoid longer (102 mm., contrasted with 95); palate longer; postpalatal shelf broader; underjaw more massive; coronoid blade higher (posterior part of jaw more uplifted, raising condyle and coronoid); upper canines conspicuously more slender; lower canines much smaller; upper and lower molars smaller; middle lower molar not only shorter but differing markedly in proportions, the posterior moiety small and narrow (14.5) in comparison with the anterior (17);  $PM_7$  more distinctly of grizzly type;  $M_7$  with saddle open (cusplet on inner side nearly obsolete).

*Skull measurements.*—Old male (type): Basal length, 346; occipito-nasal length, 337; palatal length, 191; zygomatic breadth, 240; inter-orbital breadth, 91.

#### URSUS ATNARKO SP. NOV.

##### ATNARKO GRIZZLY.

*Type* No. 211452, ♂ ad., U. S. National Museum, Biological Survey collection. From Lonesome Lake,<sup>1</sup> Atnarko River, one of the upper forks of the Bella Coola, British Columbia. Collected in September, 1915, by E. H. Edwards.

<sup>1</sup> Lonesome Lake is about 80 miles from the junction of the Whitewater, or Talchawko, and the Atnarko, which two rivers unite to form the Bella Coola. The Bella Coola is about 45 miles long. Lonesome Lake is nearly on the fifty-second parallel, and by the river about 75 miles from the head of Burke Channel.

*Characters.*—Size large; external characters unknown; skull of male long and narrow, similar in general to that of *kwakiutl* but much narrower; skull of female surprisingly different from that of *kwakiutl*, being long, low, and very narrow, while *kwakiutl* is exceptionally high and broad.

*Cranial characters.*—*Adult male* (type): Skull long, low, and narrow, highest in posterior frontal region; braincase anteriorly keeling into sagittal crest; shield narrow and rather sharp pointed posteriorly; postorbitals moderate, horizontally outstanding; rostrum long and slender, rising gradually into plane of shield; zygomata not widely outstanding; sagittal crest long; palate and postpalatal shelf long and narrow; lower jaw long; coronoid blade moderate; subangular border short. Dentition weak: canines small for size of skull (as in *kwakiutl*); molars even smaller than in *kwakiutl*. *Adult female* (based on 3 adult and old females, Nos. 223177, 223182, and 223183) from Atnarko River: Skull long, low, slender, nearly flat on top; shield long and narrow, not rising above plane of rostrum; postorbitals weak, outstanding; rostrum long and slender, passing insensibly into frontal plane; zygomata appressed; palate long and narrow; coronoid blade moderate; subangular border short. Dentition weak.

*Cranial comparisons.*—Compared with *kwakiutl* the skull as a whole is longer and narrower; frontal shield much narrower and more evenly sloping (rising less abruptly from rostrum); postorbitals much less widely outstanding; posterior frontal region higher, keeling into sagittal crest; palate and postpalatal shelf notably longer and narrower.

Adult and old female compared with old female *kwakiutl* of slightly greater basal length: Breadth very much less (across postorbitals 105 or less, contrasted with 130); shield low, narrow, and flat instead of broad, high, and rising abruptly from rostrum; postorbitals much smaller and weaker; zygomata appressed instead of outstanding; palate, postpalatal shelf, and palatal notch very much narrower; sagittal crest much weaker.

*Remarks.*—The males of *kwakiutl* and *atnarko* are so much alike that their differences would naturally be regarded as of only subspecific weight; but the females are so strikingly different that it seems necessary to give them independent specific rank. Their specific distinctness is the more certain by reason of the geographic contiguity of the localities where they were killed, the type localities being on the same watercourse and not more than 75 miles apart.

*Skull measurements.*—*Adult male* (type): Basal length, 345;<sup>1</sup> occipito-nasal length, 325; palatal length, 199; zygomatic breadth, 214; interorbital breadth, 75.

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<sup>1</sup> Partly restored.

## URSUS KWAKIUTL MERRIAM.

## KWAKIUTL GRIZZLY.

*Ursus kwakiutl* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 143-144, September 6, 1916.

*Type locality*.—Jervis Inlet, coast of southern British Columbia.

*Type specimen*.—No. 211748, ♂ ad., U. S. National Museum, Biological Survey collection. Collected May 17, 1916, by Fred Mansell.

*Range*.—Coast region of British Columbia from southwestern corner (Burrard Inlet, Howe Sound, Jervis Inlet) northwesterly to or beyond the lower Bella Coola.

*Characters*.—Size large; color dark; ears densely furred; claws unknown; skull long, but little arched.

*Color*.—Skin of head of adult male (type): Nose brown; head and face from front of eyes posteriorly very dark brown, darkest on ears, slightly grizzled on occiput by golden-tipped hairs.

*Cranial characters*.—*Adult male* (type): Size large; skull long, rather low and narrow, with long high rostrum, gradually ascending frontal shield, rather low fronto-parietal region, and strongly outstanding postorbitals. Frontal shield of moderate breadth, shallowly sulcate medially, swollen over orbits, short pointed posteriorly; rostrum long, high, and rather narrow; nasals flattened, nearly horizontal; fronto-nasal region sloping gently in plane of shield; braincase long, its anterior part keeling into elongate sagittal crest; zygomata moderately spreading (becoming, of course, more strongly outbowed in old age); palate long, concave, slightly arched antero-posteriorly; postpalatal shelf large and broad, nearly square; dentition rather light for size of skull; underjaw long, its inferior border slightly sinuous (slightly bellied under last molars); coronoid blade broad at base, not very high, the apex slightly produced posteriorly but falling far short of plane of condyle.

*Old female* (No. 215432): The skull of an old female from Kwatna, on the lower Bella Coola, is obviously of this species. It is large and rugged for a female, with strongly dished fronto-nasal region and broad massive frontal shield rising abruptly from a very small rostrum; shield sulcate, swollen between sulcus and orbits, lyrate pointed, ending at fronto-parietal suture; postorbitals large and outstanding; zygomata outstanding; sagittal crest strongly developed for a female; palate and postpalatal shelf very broad; teeth small;  $PM_7$  badly worn but apparently subconical, as in a male (No. 215433) from the same locality.

*Cranial comparisons*.—The only species requiring comparison with *kwakiutl* are the much larger *nortoni* and the very different *pervagor*. Adult male (type) compared with adult male *nortoni* (No. 213705) from southeast side Yakutat Bay: Similar in general but much



shorter; rostrum slightly longer; *braincase materially shorter*; shield much less elevated; fronto-nasal region much less dished; *postpalatal length much less*. Compared with male *pervagor*: Skull longer and less highly arched; braincase and rostrum materially longer; frontal shield shorter pointed posteriorly; rostrum more elevated anteriorly; nasals more nearly horizontal, shorter posteriorly, longer anteriorly; postpalatal notch longer; underjaw decidedly longer and more massive, but inferior border of ramus from symphysis to tubercle of essentially same length; subangular border much longer. Dentition heavier (both upper and lower canines, incisors, and molars larger).

*Skull measurements*.—Adult male (type): Basal length, 340; occipito-nasal length, 330; palatal length, 184; zygomatic breadth, 212; interorbital breadth, 85.

URSUS NORTONI<sup>1</sup> MERRIAM.

YAKUTAT GRIZZLY.

(Pl. XIII.)

*Ursus nortoni* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 179-180, April 13, 1914.

*Type locality*.—Near Yakutat village, southeastern side Yakutat Bay, Alaska.

*Type specimen*.—No. 178763, ♀ ad., U. S. National Museum, Biological Survey collection. (Mother of ♂ cub of second year, No. 178764.) Collected May 15, 1910, by G. Frederick Norton.

*Range*.—Limited apparently to coastal plain on southeastern side of Yakutat Bay.

*Characters*.—A true grizzly, apparently of the *californicus-levakiutl* group; of large size, with smoothly polished horny claws. Fourth lower premolar large and of ultra-grizzly type (long heel with continuous sulcus and complete lateral ridges ending in up-turned posterior cusplets); molars, especially M<sup>2</sup>, small for size of skull. Coloration normal for a grizzly; skull large, massive, and very broad.

*Color*.—Of pale grizzly type; head grizzled yellowish or golden brown; muzzle pale brown; neck and shoulders to middle of back pale buffy from the long whitish buff-tipped hairs, giving the skin viewed from behind a decidedly whitish appearance; hinder back and rump dark, well washed with pale brown tips; lower part of legs and feet dark brown; back of fore feet browner and not so dark; underchin and throat pale soiled buffy whitish.

<sup>1</sup> Named for G. Frederick Norton, who collected and presented the type specimen.

*Cranial characters.*—*Adult male* (No. 213705, from southeast side of Yakutat Bay, northeast of Yakutat village): Skull large, long, massive, and strongly dished; braincase exceptionally long; facial part of skull relatively short; frontal shield rather broad, moderately convex transversely and sulcate medially (swollen between sulcus and postorbitals), rising strongly and abruptly from rostrum; postorbital processes well developed, slightly arched; rostrum rather short, horizontal; zygomata moderately spreading, outbowed; sagittal crest highly developed; squamosal shelves broad and long; palate and postpalatal shelf rather long and of moderate breadth; palate troughed between molar series; mastoids moderate; underjaw massive; coronoid blade high, broad, and not recurved; ramus long and straight. Teeth small for size of skull;  $M^2$  rather short, the heel evenly emarginate and broadly rounded posteriorly.

*Adult female* (type): Rather massive, moderately dished, broad, with large broadly rounded braincase, bowed (but not widely outbowed and not angular), moderately spreading zygomata; short weak sagittal crest confined to posterior half of parietals; rather broad lambdoid crest defining a rather broadly open groove or sulcus continuous with that of the deeply sulcate and broadly expanded horizontal shelf of the squamosal; squamosal base of zygoma moderately expanded; frontal shield broad and long, its lyrate point reaching back to middle of parietals, broadly sulcate between orbits; fronto-nasal region moderately dished; postorbital processes large and broadly outstanding, infraorbital process of jugal and infrajugal process of maxillary well developed (probably not constant); rostrum broad, short, and rather depressed; lachrymal opening within orbit; palate and postpalatal shelf broad, the palate rather deeply concave from incisive foramina to plane of hind molars; postpalatal notch broad and rather squarely truncate; occipito-sphenoid length 90 (about equal to distance from posterior rim of alveolus of outer incisor to front of last upper molar); basioccipital considerably longer than basisphenoid; occiput broad, rather low, truncate; coronoid blade rather high. Basicranial axis nearly straight and horizontal, parallel to palatal axis. Dentition light in both sexes; canines and molars rather small for size of skull;  $PM_{\frac{1}{4}}$  of ultra grizzly type, with slender cone, well-developed completely sulcate heel ending posteriorly in pair of upturned cusplets;  $PM^4$  large and broad; heel of  $M^2$  rather short, not strongly narrowed posteriorly, third cusp small; incisors rather large.

*Cranial comparisons.*—Male adult (type) compared with male adult *kwakiutl* (type): Similar in general *but very much longer* both basally and on top; rostrum slightly shorter; braincase *materially longer*; frontal shield rising higher and more abruptly from ros-

trum; fronto-nasal region more conspicuously dished; *postpalatal length very much greater*; underjaw longer and more massive; ramus longer; subangular border shorter; coronoid blade much larger and higher; teeth closely similar, but upper canines and upper molars slightly larger.

*Specimens examined*.—About a dozen specimens have been examined, mainly females and young, all from the coastal plain south-east of Yakutat Bay. Three (including type) were collected by G. Frederick Norton, and by him presented to the Biological Survey; others were collected by Miss Annie M. Alexander, and are in the Museum of Vertebrate Zoology, University of California; still others (including a splendid adult male) were obtained from Yakutat Indians by E. M. Axelson and purchased by me. The localities are: Peninsula between Yakutat and Disenchantment Bays (northeast of Yakutat village); near Yakutat village; front of Yakutat Glacier; Ankwow River; Setuk River; and Anklin River.

*Skull measurements*.—Adult male (No. 213705): Basal length, 353; occipito-nasal length, 346; palatal length, 185; zygomatic breadth, 241; interorbital breadth, 91. Adult female (type): Basal length, 306; occipito-nasal length, 284; palatal length, 165; zygomatic breadth, 210; interorbital breadth, 80.5.

#### URSUS WARBURTONI<sup>1</sup> MERRIAM.

##### WARBURTON PIKE GRIZZLY.

*Ursus kwakiutl warburtoni* Merriam, Proc. Biol. Soc. Washington, XXIX, p. 145, September 6, 1916.

*Type locality*.—Atnarko River, British Columbia.

*Type specimen*.—No. 210576, ♂ old, U. S. National Museum, Biological Survey collection. Collected July 15, 1915, by E. H. Edwards.

*Range*.—Coast region (but perhaps not the immediate coast strip) of Southeastern Alaska and adjacent parts of British Columbia from Chilkat River southeasterly to Atnarko River, one of the upper forks of the Bella Coola (skulls of adult males examined from Atnarko River, Stikine River, Iskut River near junction with Stikine, and Chilkat River valley).

*Cranial characters*.—*Adult males*: Skull large and massive, rather long and flattish on top, not arched. Similar to male *kwakiutl* but with much broader (less peglike) and flatter postorbitals, flatter frontal shield (not deeply concave in old age), much shorter sagittal crest, somewhat heavier dentition, especially broader and more massive

<sup>1</sup> Named in honor of the late Warburton Pike, author of *The Barren Grounds of Northern Canada*, and *The Subarctic Forest*, who obtained a fine large typical skull (No. 223946) on the Iskut a few miles from its junction with the Stikine.

M<sup>2</sup>. Easily distinguished from *stikeenensis* of the same region by the much greater length of skull and underjaw and lesser elevation of frontal region.

*Skull measurements.*—Old male (type): Basal length, 340; occipito-nasal length, 324; palatal length, 185; zygomatic breadth, 233; interorbital breadth, 85. Old male (No. 223946) from Iskut River, a branch of the Stikine: Basal length, 326; occipito-nasal length, 340; palatal length, 176; zygomatic breadth, 230; interorbital breadth, 86.5.

#### URSUS NEGLECTUS MERRIAM.

##### ADMIRALTY ISLAND GRIZZLY.

*Ursus kwakiutl neglectus* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 144-145, September 6, 1916.

*Type locality.*—Near Hawk Inlet, Admiralty Island, Southeastern Alaska.

*Type specimen.*—No. 209889, ♂ old, U. S. National Museum, Biological Survey collection. Collected April, 1914, by W. H. Spaulding.

*Cranial characters.*—Skull rather large and massive, flat topped, with rather broad outstanding postorbitals. Frontal shield moderate, flattish, shallowly sulcate, rather short pointed; fronto-nasal region elevated in plane of shield and slightly compressed; rostrum moderate, high; zygomata moderately outstanding and somewhat bowed; postpalatal shelf short and broad; notch rather broad. Underjaw rather short, ramus rather flat and broad vertically, especially posteriorly, strongly bellied posteriorly; coronoid blade high and narrow, its apex not reaching plane of condyle. Teeth moderate.

*Cranial comparisons.*—*Ursus neglectus* requires comparison with both *kwakiutl* and *warburtoni*. Old male (type) compared with adult male *kwakiutl* (type from Jervis Inlet): Size similar; shield flatter, more nearly horizontal and less sloping anteriorly; postorbitals broader and flatter on top; fronto-nasal region elevated instead of depressed; rostrum larger and more elevated; zygomata less outbowed; nasals more produced anteriorly, projecting broadly over nares (about 7 mm. beyond premaxillæ at point of contact); nares more truncate; underjaw and subangular border much shorter; coronoid blade narrower. Upper canines and crown of last upper molar longer.

Old male (type) compared with three old males of *warburtoni* (from Atnarko and Iskut Rivers and Chilkat Valley): Size slightly smaller but occipito-sphenoid length same; top of skull more nearly horizontal (shield anteriorly and rostrum more elevated); zygomata

less outbowed; nasals more projecting anteriorly; palate shorter; postpalatal shelf broader, flatter, and much shorter; mastoids shorter; underjaw slightly smaller; subangular border much shorter; coronoid blade narrower and more nearly vertical. Canines (especially upper) more slender;  $M^2$  narrower and less massive but difference not great.

*Skull measurements.*—Old male (type): Basal length, 322; occipito-nasal length, 325; palatal length, 177; zygomatic breadth, 229; interorbital breadth, 83.

### URSUS CALIFORNICUS MERRIAM.

#### CALIFORNIA COAST GRIZZLY.

[*Ursus horriæus*] subspecies *californicus* Merriam, Proc. Biol. Soc. Washington, X, pp. 76-77, April 13, 1896.

*Ursus californicus* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 186, 188, August 13, 1914.

*Type locality.*—Monterey, California.

*Type specimen.*—Skull No. 3630, ♂ old, U. S. National Museum.

*Range.*—Humid coast region of California from San Francisco Bay south about to San Luis Obispo (apparently passing into *tularensis* in the dryer interior).

*Characters.*—Size large; claws long and smooth; pelage variable. Dentition heavy; last upper molar large, its heel long and broad.

*Cranial characters.*—*Adult male*: Skull long and narrow; vault of cranium flat—not arched; frontal shield flat (or concave medially), short pointed posteriorly, gradually sloping almost in same plane with rostrum (dishing slight); temporal impressions beaded; postorbitals massive and moderately spreading; zygomata slightly bowed; rostrum long, slightly compressed in front of orbits; nasals nearly horizontal, slightly rising posteriorly in plane of shield; frontal shield moderately broad, slightly swollen over orbits, the point lost in sagittal crest 25 to 50 mm. anterior to fronto-parietal suture; postorbital processes strongly developed, subtriangular, rather massive, outstanding, and slightly decurved over orbits; sagittal crest strongly developed and nearly straight; squamosal shelf broad; squamosal base of zygoma vertically expanded in aged skulls; frontal part of braincase in young-adult skulls somewhat elevated and tending to “keel” into crest; mastoid processes long; interpterygoid fossa long and usually narrow; underjaw long and massive, ramus broad vertically. Teeth large and heavy;  $M^2$  subrectangular, heel long, broad posteriorly. *Skull of female*: Similar to that of male, but smaller.

*Cranial comparisons.*—Adult and old male compared with adult male *klamathensis* (type): Skull longer; zygomatic breadth essen-

tially the same; face and rostrum longer; rostrum more compressed in front of orbits; fronto-nasal region more dished; frontal shield more concave medially and more swollen at orbital rims; postorbital processes much more massive, slightly arched, the tips slightly decurved; temporal beads more strongly incurved; sagittal crest shorter posteriorly; lambdoid crest more outstanding laterally; occipital overhang much less; squamosal shelf behind zygoma much shorter; occipito-sphenoid and palate longer; mastoids much longer and more strongly outstanding. Underjaw much longer. Dentition heavier, the last upper and middle lower molar in particular much larger; heel of  $M^2$  very broad and broadly rounded posteriorly.

Old male from Monterey, compared with old male *colusus* (type, from Sacramento River): Fronto-nasal region slightly higher and less depressed; rostrum higher, less depressed, and less horizontal; postorbitals much larger and more swollen; orbital rims more swollen; orbits more nearly vertical, squamosal base of zygoma more expanded; palate narrower anteriorly; ramus much broader vertically, its inferior border less convex in middle part and more bellied posteriorly; apex of coronoid more produced posteriorly; angular process larger and longer; mastoids longer and directed less anteriorly, not reaching so near glenoid process. Dentition stronger and strikingly different: canines larger; upper incisors and both upper and lower molars very much larger; heel of  $M^2$  large and not normally emarginate.

*Skull measurements.*—Old male (type): Basal length, 361; occipito-nasal length, 346; palatal length, 196; zygomatic breadth, 224; interorbital breadth, 82.

#### URSUS TULARENSIS MERRIAM.

##### TEJON GRIZZLY.

*Ursus californicus tularensis* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 188, August 13, 1914.

*Type locality.*—Fort Tejon, Cañada de las Uvas, Tehachapi Mountains, California.

*Type specimen.*—No. 3536, ♂ old, U. S. National Museum. Collected by John Xantus.

*Range.*—Dry chaparral hills of interior coast ranges between the San Joaquin Valley and Los Angeles plain, comprising the Tehachapi, Tejon, Sierra Madre, and San Gabriel Ranges, and probably San Bernardino Mountains also, and ranging northward an unknown distance, doubtless covering the San Rafael and Gabilan Ranges, and southern part of the Diablo Range; limits unknown.

*Characters.*—Size large, but smaller than *californicus*; claws of grizzly type, but those of a female dark, thick, and broad for a fe-

male, rather straight (tips worn off), straighter and broader than in female *magister*.

*Color*.—Nearly full-grown male killed by Walter Richardson, near head of Tejunga Canyon, San Gabriel Mountains, Southern California, in 1897: General color very dark brown, almost dusky; grizzled on upperparts by admixture of pale-tipped hairs; muzzle reddish brown.

*Cranial characters*.—*Old male*: Skull large, rather broad and flat frontally, moderately dished, moderately high, with large outstanding postorbitals and beaded temporal ridges. Frontal shield rather broad, swollen, and somewhat elevated on orbital rims and base of postorbitals, depressed interorbitally, sloping gradually into rostrum; rostrum large and rather high; fronto-nasal region not depressed; sagittal crest rather short, elevated and produced posteriorly; occipital overhang marked; zygomata moderately spreading, subtriangular; palate and postpalatal shelf broad and flat, mastoids rather long and inclined strongly forward. Underjaw large and rather massive; ramus broad vertically, strongly bellied posteriorly; coronoid rather high, its apex not strongly recurved. Teeth large;  $M^2$  subrectangular, the long heel only slightly emarginate on outer side. *Adult and old females*: Skulls more easily distinguished than in males from their nearest relative, *californicus*. The skull of the female is much more like the normal female grizzly type, not resembling the males as does the female of *californicus*.

*Cranial comparisons*.—Adult and old females compared with female *californicus*: Skull decidedly smaller; frontal shield behind plane of postorbital processes more elevated and convex—not depressed and concave as in *californicus*; point of shield longer and broader; orbital rims more swollen; sagittal crest shorter and lower; palate at least 10 mm. shorter; occipito-sphenoid about 10 mm. shorter; underjaw smaller and lighter; last upper molar decidedly smaller. Normal  $M^2$  subrectangular as in *californicus* (in *henshawi* subtriangular and small).

Adult and old males compared with male *californicus*: Similar but smaller; base of cranium shorter; palate slightly shorter; occipito-nasal length decidedly less; braincase decidedly shorter; zygomatic breadth same or slightly greater—the skull as a whole relatively broader than in *californicus*; postpalatal shelf broader; underjaw materially shorter;  $M^1$  decidedly smaller (both shorter and narrower); lower series of teeth smaller,  $M_{\overline{1}}$  and  $M_{\overline{2}}$  particularly smaller, much narrower and less massive; heel of last upper molar less broad than in *californicus*.

Adult male compared with *henshawi* (type): Skull larger and more massive; fronto-nasal region much higher and much less dished; rostrum larger, higher, and not depressed; zygomata more

broadly spreading; postpalatal shelf broader; coronoid larger and less falcate; ramus broader vertically; last upper molar much larger, the heel long and broad posteriorly, contrasted with the short subtriangular heel of *henshawi*.

*Skull measurements.*—Average of two old males from Fort Tejon, California: Basal length, 329; occipito-nasal length, 320.5; palatal length, 179.5; zygomatic breadth, 228; interorbital breadth, 78. Old female from Fort Tejon: Basal length, 296; occipito-nasal length, 287; palatal length, 162; zygomatic breadth, 187; interorbital breadth, 75.

#### URSUS COLUSUS MERRIAM.

##### SACRAMENTO VALLEY GRIZZLY.

*Ursus colusus* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 187-188, August 13, 1914.

*Type locality.*—Sacramento River valley, California (probably between Colusa and Sacramento).

*Type specimen.*—No. 3837, ♂ old, U. S. National Museum. Collected by the Wilkes U. S. Exploring Expedition and marked "C. P. Ex. Ex. 6.16" (the numerals uncertain, there being indication of a figure in front of the first 6). The words "Grizzly Bear, Sacramento" are written on the right parietal in pencil.

*Range.*—Sacramento (and perhaps also San Joaquin) Valley and adjacent foothills; westerly in the hot inner coast mountains to Dobbins Creek canyon on the boundary between southeastern Humboldt and southwestern Trinity Counties.

*Characters.*—Size large, external characters unknown. Skull large and long, resembling that of *californicus*, but teeth smaller and last upper molar very different.

*Cranial characters.*—*Old male:* Skull large, long, and low, the frontal shield flat, postorbital processes moderate or small, fronto-nasal region moderately dished, palate long, sagittal crest high, temporal ridges beaded, and occipital overhang pronounced. In general resembling largest skulls of *californicus* but having very much smaller teeth and differing in numerous minor cranial characters. *Young-adult female:* One from San Jose Mission (No. 1143, Yale Museum) appears to be a not quite grown female *colusus*. The last upper molar is short and subtriangular, the heel emarginate on outer side.

*Cranial comparisons.*—Old male (type) compared with old male *californicus* (from Monterey): Fronto-nasal region slightly lower and more depressed; rostrum lower, more depressed and more nearly horizontal; postorbitals much smaller and less swollen; orbital rims less swollen; orbits less nearly vertical; squamosal base of zygoma less ex-



panded; palate broader anteriorly; ramus much less broad vertically, its inferior border more convex in middle part and less bellied posteriorly; apex of coronoid less produced posteriorly; angular process smaller and shorter; mastoids shorter and directed more anteriorly, reaching nearer to glenoid process. Dentition weaker and strikingly different: canines too badly broken to admit of satisfactory comparison, but obviously smaller; upper incisors and both upper and lower molars very much smaller; heel of  $M^2$  small and strongly emarginate on outer side, of same size and approximately same form as in *klamathensis* but even more strongly constricted on outer side immediately behind second cusp; lower molars of same size as in *klamathensis* though the jaw is much longer.

Old male (type) compared with *klamathensis*: Postorbitals, length of sagittal crest, form of zygomata, and dentition essentially the same, but skull longer; vault of cranium *much lower*; frontal shield narrower and much shorter; temporal beads much more strongly incurved; fronto-nasal region dished instead of elevated; rostrum much lower, more depressed, and more nearly horizontal; ramus longer, less broad vertically; diastema much longer.

*Skull measurements*.—Old male (type): Basal length, 352; occipito-nasal length, 337; palatal length, 185; zygomatic breadth, 228; interorbital breadth, 82.5.

#### URSUS DUSORGUS SP. NOV.<sup>1</sup>

##### RINDSFOOS GRIZZLY.

*Type* No. 217426, ♂ old, U. S. National Museum. From head of Jack Pine River near Mount Bess, Alberta (close to British Columbia boundary). Collected September 4, 1916, and presented to the National Museum by William Rindsfoos.

*Cranial characters*.—Skull large, broad, and massive, with flat gradually sloping frontal shield and high sagittal crest; shield broad, short pointed, slightly thickened at orbits, with horizontally outstanding slightly elevated postorbitals; fronto-nasal region faintly dished, the broad slightly depressed rostrum rising imperceptibly into shield; sinus case keeling into anterior part of sagittal crest, the crest rising above plane of top of skull and point of frontals and reaching forward nearly half way from fronto-parietal suture to postorbitals; temporal impressions strongly beaded; zygomata broadly outstanding; palate and postpalatal shelf rather broad; underjaw massive; ramus strongly bellied posteriorly; coronoid rather high. Teeth moderate; last upper molar long.

<sup>1</sup> Tentatively included in *horribilis* group. (See Introduction, pp. 12-13.)

*Cranial comparisons.*—So far as known *lusorgus* requires comparison with only a single species—*imperator* of western Montana and the Yellowstone Park region. Old male (type) compared with old male *imperator* (No. 216205): Similar in general but size somewhat less; vault of cranium, frontal region, and rostrum lower; shield flatter, more strongly sloping, and shorter pointed; rostrum more depressed; sagittal crest much higher anteriorly, rising well above point of shield; palate shorter; meatus tube longer; ramus of jaw shorter. Teeth similar but  $M^1$  smaller.

*Skull measurements.*—Old male (type): Basal length, 324; occipito-nasal length, 322.5; palatal length, 180; zygomatic breadth, 227; interorbital breadth, 86.

#### Planiceps Group.

#### URSUS NELSONI<sup>1</sup> MERRIAM.

#### NELSON GRIZZLY.

*Ursus nelsoni* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 190-191, August 13, 1914.

*Type locality.*—Colonia Garcia, Chihuahua, Mexico.

*Type specimen.*—No. 99657, ♀ ad., U. S. National Museum Biological Survey collection. Collected November 13, 1899, by H. A. Cluff.

*Range.*—Sierra Madre of Mexico from northwestern Chihuahua and northeastern Sonora south to southern Durango.

*Characters.*—Smallest of the grizzly bears. General color, pale buffy yellowish, varying to grayish white, grizzled from darker color of underfur. Specimens in worn pelage vary to yellowish brown and even rusty. Hairs of throat and flanks longer than elsewhere; belly sparsely haired, lacking the thick underfur of upperparts. Claws long, smooth, and moderately curved; brownish horn color streaked with yellowish. Longest claw 56 mm. from upper base to tip (tip worn off).

*Color.*—Type specimen in fresh fall pelage: Muzzle pale brown, much darker around eyes; top of head yellowish buff; back grayish brown, heavily overlaid with pale buffy gray tips (color more buffy across shoulders, more whitish gray on back); hump dark brown, small; rump grizzled grayish and brown, the light-tipped hairs failing posteriorly and on the sides, the dark brown ground color passing into blackish brown on thighs, legs, feet, and tail; forelegs also blackish brown; lips and point of chin yellowish buff, followed by area of dark brown; underneck and underparts generally long haired and grizzled, the prevailing color yellowish buff.

<sup>1</sup> Named for E. W. Nelson, who collected the original series in the type region.

*Cranial characters.*—*Adult male*: Skull small and wolflike. Similar in general to *texensis*, but smaller and more wolflike; rostrum strikingly narrow; frontal shield flat, narrow, and only faintly sulcate medially; temporal impressions not beaded; occipito-sphenoid length 82 mm. (in ♂ *texensis*, 86); palate very short (149 mm. contrasted with 171 in *texensis*); posterior root of zygoma slender; postorbital process slender, peglike, and outstanding horizontally. Teeth small.

*Skull measurements.*—Old male (No. 16025, Field Mus. Nat. Hist., Chicago, from Casas Grandes, Chihuahua): Basal length, 284; occipito-nasal length, 264; palatal length, 149; zygomatic breadth, 199; interorbital breadth, 65. Average of three adult females from Colonia Garcia, Chihuahua: Basal length, 260; occipito-nasal length, 243; palatal length, 138; zygomatic breadth, 168; interorbital breadth, 61.

URSUS TEXENSIS TEXENSIS MERRIAM.

TEXAS GRIZZLY.

*Ursus horriæus texensis* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 191, August 13, 1914.

*Type locality.*—Davis Mountains, Texas.

*Type specimen.*—No. 203198, ♂ old, U. S. National Museum, Biological Survey collection. Killed November 2, 1890, by C. O. Finley and John Z. Means.

*Range.*—Restricted, so far as known, to Davis Mountains, Texas, and mountains of southern Colorado.

*Characters.*—Size small; external characters unknown. Affinities with *shoshone* rather than with *horriæus*.

*Cranial characters.*—*Old male* (type): Size small; frontal shield low, narrow, flat (slightly depressed medially), short pointed posteriorly, gently sloping in same plane with rostrum; postorbital processes small, peglike, horizontally outstanding; fronto-nasal region elevated in fronto-facial plane; rostrum narrow; zygomata rather broadly outbowed, moderately expanded vertically, lachrymal duct wholly anterior to orbit; sagittal crest long and nearly straight; occipital overhang marked; palate broad, deeply excavated between molars (may be abnormal); postpalatal shelf broad and flat; postpalatal notch broad and short; meatus tube slightly recurved and markedly upturned. Underjaw light; inferior border of ramus long, slightly bellied posteriorly; subangular border rather short; coronoid blade high, its recurved apex falling short of plane of condyle. Teeth rather small; M<sup>2</sup> small, with small heel obliquely narrowed on outer side.

*Old female* (No. 213002, from Navajo Range, near Cromo, Colorado): Skull short, dished, the braincase broad; frontal shield nar-

row; zygomatica broadly spreading, slightly bowed; occiput truncate; and postorbitals slender, widely outstanding. Rostrum small, slender, tapering, rising posteriorly into flat lyrate shield; postorbital processes long, slender, and directed forward as well as outward; braincase rather broad and depressed; palate rather short; postpalatal shelf broad and flat. Teeth moderate; canines small and slender; molars nearly as large as in male, and  $M^2$  of same form.

*Cranial comparisons.*—Adult male (type) compared with adult male *planiceps* (type): Size smaller throughout; shield much narrower, less flat, and less nearly horizontal; fronto-nasal region dished (in *planiceps* not dished); rostrum much smaller and narrower; palate deeply concave between posterior molars (in *planiceps* flat); ramus of underjaw more tapering anteriorly; angular processes not bellied (in *planiceps* bellied); teeth smaller.

Old male (type) compared with male *shoshone*: Size smaller; vault of cranium lower and more nearly horizontal; frontal shield less sloping; anterior part of braincase broadly depressed (not compressed or keeling into crest); palate broader. Teeth smaller.

Old male (type) compared with old male *horriæus* (type): Skull similar in basal length, but materially smaller, lower, flatter, narrower, more smoothly rounded, broader across squamosals, much less massive, and with wholly different postorbitals. Postorbitals small, slender, peglike, and horizontally outstanding instead of large, broad, massive, and decurved; frontal shield narrower and flatter; orbital rims less swollen; rostrum smaller (shorter and more slender); fronto-nasal region even less dished; palate somewhat broader between molars and deeply excavated between last molars (slightly depressed in *horriæus*); interpterygoid canal shorter; zygomatica more widely outstanding posteriorly and bowed (in *horriæus* more angular and more outstanding anteriorly); inferior border of jaw (symphysis to subangular tubercle) much longer. Canines and molars smaller.

Old female (from Navajo Mountains) compared with old female *horriæus* (from mountains north of Silver City, N. Mex.): Skull as a whole and rostrum shorter; occiput doubtless more truncate (that of *horriæus* sawed off) frontal shield shorter and more dished; postorbitals longer, more slender, and directed anteriorly as well as outward; zygomatica much more broadly spreading, more swollen at anterior base, and distinctly bowed instead of angular; palate broader, flat instead of concave; lower jaw thicker and heavier.

*Skull measurements.*—Old male (type): Basal length, 308; occipito-nasal length, 301; palatal length, 171; zygomatic breadth, 218; interorbital breadth, 71.

## URSUS TEXENSIS NAVAHO MERRIAM.

## NAVAHO GRIZZLY.

*Ursus navaho* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 191-192, August 13, 1914.

*Type locality*.—Navajo country near Fort Defiance, Arizona (Mollhausen); type probably killed in 1856 in Chuska Mountains, on boundary between northeastern Arizona and northwestern New Mexico.

*Type specimen*.—No. 3500, ♂ old, U. S. National Museum.

*Range*.—Probably restricted to the isolated Chuska Mountains (including the so-called Lukachukki and Tunitcha elevations, and perhaps also the neighboring Carriso Mountains on the north).

*Characters*.—Size small; external characters unknown; skull short, broad and slightly dished.

*Cranial characters*.—*Old male* (type; badly damaged, only the front part with zygomata and underjaw remaining): Skull short; zygomata broadly spreading and outbowed, the anterior root much swollen, posterior root not expanded; frontal shield flat, short pointed; postorbital processes peglike and outstanding; temporal impressions finely beaded; rostrum short and small; nares rather small and nearly vertical; lachrymal duct opening on orbital rim, but more in than out; palate broad for so small a skull; postpalatal shelf broad; coronoid blade high. Teeth small:  $M^1$  very small;  $M^2$  short, with broadly rounded heel (tooth nearly as broad posteriorly as in middle and anteriorly).

*Cranial comparisons*.—Old male (type) compared with old male *texensis* (type): Size somewhat larger; frontal shield and rostrum broader; jugal longer posteriorly. Palate and postpalatal shelf much shorter (157 mm. contrasted with 173), and less deeply concave between posterior molars; postorbital processes slightly larger; anterior root of zygoma much more swollen (in *texensis* hardly swollen); nares much more truncate; underjaw straighter (less upcurved posteriorly); canines about same size; molar series slightly shorter;  $M^2$  of same length but heel broadly rounded posteriorly instead of obliquely truncate, the sides of tooth nearly parallel;  $M^1$ ,  $M_{1-}$ , and  $PM^4$  smaller.

*Skull measurements*.—Old male (type): Palatal length, 157.5; interorbital breadth, 81. Skull too badly broken to furnish other measurements.

## URSUS PLANICEPS SP. NOV.

## FLAT-HEADED GRIZZLY.

*Type* No. 13289, ♂ ad. (rather old), U. S. National Museum, from Colorado (exact locality unknown). Collected by Dr. F. V. Hayden.<sup>1</sup>

<sup>1</sup> Dr. Hayden worked in Colorado in 1869, mainly in the mountains and foothills of the east-central part of the State. Inasmuch as two other grizzlies, *bairdi* and *macrodon*, inhabit the higher mountains of Colorado it seems highly probable that the home of *planiceps* was in the foothills or along the western edge of the plains.

*Cranial characters.*—*Adult male* (type): Skull rather large, low, and flat; shield broad, flat, and nearly horizontal; postorbitals horizontally outstanding; rostrum broad, somewhat depressed; zygomata broadly outstanding and outbowed; palate, postpalatal shelf, and postpalatal notch broad; occipito-sphenoid long (95 mm.) Underjaw rather long; ramus flat and rather thin; condyle high, vertical; subangular border short; angular process bellied on underside. Canines moderate; molars rather large but much smaller than in *macrodon*.

*Cranial comparisons.*—*Ursus planiceps* requires comparison with its two neighbors, *macrodon* and *texensis*, of which its affinities are closest with *macrodon*. Old male (type) compared with old male *macrodon*: Size and vault of cranium about same; shield slightly broader and flatter; rostrum broader; zygomata very much more broadly outstanding and outbowed; palate, postpalatal shelf, and palatal notch much broader; posterior part of underjaw more up-curved, lifting condyle and coronoid; upper canines about same size; lower canines and upper and lower molars decidedly smaller.

Old male (type) compared with old male *texensis* (type): Size larger throughout; shield much broader, flatter, and more nearly horizontal; fronto-nasal region more elevated in plane of shield (not dished as in *texensis*); rostrum much larger, broader, and more massive; zygomata about the same but squamosal arm longer; palate flat (in *texensis* deeply concave between posterior molars); occipito-sphenoid longer; underjaw much more massive; ramus less tapering anteriorly; angular processes strongly bellied (in *texensis* not bellied); teeth larger.

*Skull measurements.*—Old male (type): Basal length, 319.5; occipito-nasal length, 305; palatal length, 173; zygomatic breadth, 215; interorbital breadth, 75.

#### URSUS MACRODON SP. NOV.

##### TWIN LAKES GRIZZLY.

*Type* skull No. 15707 (skin No. 12678), ♂ old, U. S. National Museum. From Twin Lakes, Colorado, July 28, 1876. Collected by C. W. Derry.

*Characters.*—*Old male* (type): Size large; hump evident; claws (worn short) large, broad, mainly yellowish on top, horn color on sides. Skull rather large and flat; last upper molar very large.

*Color.*—*Type specimen*: Peculiar for a grizzly, resembling some of the Alaska brown bears; general body color rich brown, almost reddish brown, darker on hump and lightly washed with pale tipped hairs on upper part of back; head rather uniform brown. *Adult female* (No. 203178) from South Branch Williams River, Colorado,

killed September 13, 1895: General color very dark, almost black. Muzzle reddish brown with a golden tinge on top, becoming very dark brown on cheeks, chin, and around eyes; top of head dusky, overlaid by deep rich glossy hazel or between hazel and chestnut; top of neck and upperparts generally blackish, moderately washed with golden-tipped hairs; hump marked and nearly black; legs and feet nearly black; the long hairs below ears and on sides of neck washed with golden. Claws long, slender, and smoothly polished; dark horn color, paler toward tips and on sides. Longest claw from upper base 61 mm. (tip worn off; greatest breadth of claws 8 mm.).

*Cranial characters.*—*Old male* (type): Skull long, low, flat, and rather narrow; shield narrow, flat, nearly horizontal, sloping gradually into rostrum without noticeable dishing; zygomata not broadly outstanding; squamosal root long but not vertically expanded; palate long and narrow; postpalatal notch narrow; underjaw long; ramus straight, swollen on outer side below premolars; coronoid blade high; subangular border rather short; angular process bellied; canines and molars large;  $M^2$  40 mm. in length; heel long, slightly emarginate.

*Female* from South Branch Williams River, Colorado (No. 203178, September 13, 1895, collected and presented by J. P. Bird): Skull similar to that of male but much smaller, with correspondingly narrower shield and rostrum, and slightly more dished fronto-nasal region; shield low, narrow, flat, and gently sloping, the point slender and remarkably short for a female, ending anterior to fronto-parietal suture; sagittal crest proportionately long but low anteriorly; post-orbital processes small, slightly elevated, and directed slightly backward; orbital rims somewhat thickened; rostrum small; nasals anteriorly horizontal, posteriorly rising slightly and passing into frontal shield in same plane; zygomata moderately spreading, angular; palate and postpalatal shelf short. Canines very small; molars large;  $M^2$  38 mm., which is materially larger than in males of *texensis* and *planiceps*.

*Cranial comparisons.*—Skull of old male (type) similar in general to old male *texensis* (type) but slightly larger, with longer, flatter, and more nearly horizontal frontal shield, and somewhat higher fronto-nasal region and rostrum; shield somewhat longer pointed; fronto-nasal region elevated in plane of shield (not dished as in *texensis*); postorbitals more broadly outstanding; rostrum broader and somewhat longer; opening of lachrymal duct within orbital rim (in *texensis* anterior to rim); zygomata less widely outstanding; squamosal root longer; postpalatal shelf narrower; palate flatter; underjaw more massive; ramus less tapering anteriorly; inferior border of angular process strongly bellied or keeled (may be individual); canines and molars very much larger throughout (especially  $M^2$ ).

*Remarks.*—In size and general appearance *macrodon* resembles *planiceps*, but the frontal shield is more nearly horizontal; postorbital processes less widely outstanding; *zygomata* much less broadly outstanding and not bowed; squamosal arm of zygoma longer; canines and molars, particularly  $M^2$ , decidedly larger. It may prove to intergrade with *planiceps*.

*Skull measurements.*—Old male (type): Basal length, 312; occipito-nasal length, 302; palatal length, 171; zygomatic breadth, 202; interorbital breadth, 72.

URSUS MIRUS SP. NOV.

YELLOWSTONE PARK GRIZZLY.

*Type* No. 206595, ♂ ad. (rather old), U. S. National Museum, Biological Survey collection. From Slough Creek, Yellowstone National Park, March 27, 1915. Collected by Henry Anderson.

*Cranial characters.*—Old male (type): Size medium; skull long, rather narrow and low arched; shield rather narrow and flat, nearly horizontal postorbitally, anteriorly sloping gently into rostrum; postorbitals long, slender, and horizontally outstanding; rostrum high, subterete above; nares high; zygomata widely outbowed; squamosal root arched and broadly expanded; palate and postpalatal shelf narrow; mastoids vertical; underjaw moderate, swollen on lower part of outer side under diastema; subangular border rather long and sloping upward posteriorly. Teeth of medium size.

*Cranial comparisons.*—Old male (type) compared with old male *tahltanicus* (type): Basal length and vault of cranium essentially same; occipito-nasal length greater; shield and rostrum flatter; zygomata more outbowed; squamosal arm of zygoma longer and more broadly expanded; underjaw slightly longer; coronoid blade narrower in middle part; inferior border of ramus of same length; subangular border longer.

Old male (type) compared with old male *planiceps* (type): Size essentially same except that the rostrum is decidedly narrower and more elevated anteriorly; point of shield slightly more elevated; shield more sloping; postorbitals longer; rostrum narrower, higher, and subterete instead of flattened above; palate and postpalatal shelf narrower; zygomata even more strongly outbowed; occipito-sphenoid shorter; subangular border of lowerjaw longer; angular processes not bellied; teeth about same size.

Old male (type) compared with old male *texensis* (type): Similar in general characters but somewhat larger; vault of cranium slightly higher; rostrum much higher anteriorly and more nearly horizontal; nares much higher; postorbitals more slender and much more widely outstanding (121 contrasted with 104); posterior frontal region less



elevated; zygomata more outbowed (less triangular); squamosal root of zygoma much more broadly expanded; postpalatal shelf narrower; underjaw larger and longer; ramus less tapering anteriorly; subangular border somewhat longer.

Old male (type) compared with old male *shoshone* (type), with which it agrees in basal length: Vault of cranium lower; shield lower posteriorly and much less strongly sloping; rostrum higher anteriorly and more nearly horizontal; nares higher; sinus case not definitely keeling into sagittal crest; zygomata much more broadly outstanding and outbowed; squamosal root much more broadly expanded; postpalatal length less; canines<sup>1</sup> and molars closely similar.

Compared with old male *idahoensis* (type): Skull, palate, and rostrum longer; basicranium and vault less arched; squamosal arm of zygomata longer and more broadly expanded.

*Remarks.*—The cranial characters indicate that *mirus* of the Yellowstone Park region is rather closely related to *tahltanicus* of the Stikine region, and also, though apparently less closely, to *planiceps* of Colorado and southern Wyoming. It is so much smaller and has teeth so much smaller than *horribilis* and *imperator* that comparison in detail is unnecessary; and compared with *absarokus* the skull is so much lower, flatter, and narrower and the teeth so much smaller that the two can not be confused.

*Skull measurements.*—Old male (type): Basal length, 315; occipito-nasal length, 307; palatal length, 174; zygomatic breadth, 220; interorbital breadth, 77.

#### URSUS ELTONCLARKI<sup>2</sup> MERRIAM.

##### SITKA GRIZZLY.

*Ursus eltonclarki* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 175-176, August 13, 1914.

*Type locality.*—Near Freshwater Bay, Chichagof Island, the more northern of the Sitka Islands, Alaska.

*Type specimen.*—No. 179066, ♂ ad., U. S. National Museum, Biological Survey collection. Collected May 19, 1912, by Elton Clark and by him presented to the Biological Survey.

*Range.*—The Sitka Islands, Baranof and Chichagof.

*Characters.*—A grizzly of medium or rather small size; skull small, long, narrow, and rather low, with flat frontal shield. Claws of true grizzly type, smoothly polished, strongly curved and rather short; longest claw (in type specimen) from upper base 70 mm.; dark bluish or plumbeous horn color streaked with whitish or yellowish.

<sup>1</sup> In the type specimen of *shoshone* the canines are absent, but they are present in a young male, No. 113410, from Marvine, Colorado, affording the desired comparisons.

<sup>2</sup> Named in honor of Elton Clark, of Boston, who killed and presented the type specimen.

*Color.*—Color of type very dark and rich. Nose pale brown, darkening just in front of eyes; face, head, and throat rich dark chocolate brown, with golden-brown wash in front of ears; ears and patch under each ear dusky; occiput and neck grizzled golden-brown; back pale, overlaid by buffy tips; legs and feet varying from blackish brown to brownish black.

*Cranial characters.*—*Adult male* (type): Skull elongate, narrow; zygomata moderately spreading, outbowed, rounded posteriorly, squamosal part not vertically expanded; frontal shield in same plane with rostrum, narrow, low, flat, or slightly concave, acutely rather short pointed posteriorly, the point entering sagittal crest about one-third the distance from fronto-parietal suture to postorbital process; sagittal crest moderate, reaching more than halfway from occiput to postorbital processes; postorbital processes rather thick, outstanding; fronto-nasal region elevated (not dished); rostrum high and sloping gently upward in plane of frontals; lachrymal opening within orbit; palate long and narrow; postpalatal shelf long; postpalatal notch long and narrow; occipito-sphenoid short, about 80 mm.; basisphenoid deeply concave, without trace of median ridge. Underjaw long. Teeth moderate; canines rather long;  $PM_{\frac{1}{4}}$  with moderately sloping heel slightly upturned at tip, sulcus very shallow;  $M_{\frac{1}{7}}$  rather short, with cusplet on inner side of saddle posteriorly;  $M_{\frac{2}{2}}$  with anterior moiety decidedly longer than posterior and twin cusps of entoconid small and not deeply notched;  $PM^{\pm}$  large and rather broad;  $M^1$  broad and rather short;  $M^2$  broad in anterior half, then narrowing strongly, the heel obliquely truncate on outer side; cusps rather weak.

*Adult female:* Similar, but, much smaller, distinctly dished, point of shield lyrate, zygomata more angular.

*Cranial comparisons.*—*Adult male* (type) compared with *adult orgilos* (type): Size essentially same; vault of cranium higher; rostrum and fronto-nasal region longer and more elevated; postorbital processes heavier and shorter; occipito-sphenoid much shorter (80 mm. contrasted with 90); mandible more massive. Canines larger and longer;  $M_{\frac{1}{7}}$  shorter;  $M^1$  and  $M^2$  shorter and broader ( $M^2$  broader in middle.)

*Remarks.*—*Ursus eltonclarki* falls in the *tahltanicus* group. Oddly enough, it resembles *mirus*, a geographically remote member of the group from the Yellowstone Park country, much more closely than it does *tahltanicus*. It agrees with *mirus* essentially in narrowness of skull as a whole, elevation and narrowness of rostrum and narrowness of palate, and even exceeds *mirus* in narrowness of shield and postpalatal notch. Even the underjaw agrees surprisingly with that of *mirus*, and the molar series are of approximately the same length, but the lower canines are materially larger.

*Skull measurements.*—Adult male (type): Basal length, 316; occipito-nasal length, 322; palatal length, 173; zygomatic breadth, 215; interorbital breadth, 69.

URSUS TAHLTANICUS MERRIAM.

TAHLTAN GRIZZLY.

*Ursus tahtanicus* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 181-182, August 13, 1914.

*Type locality.*—Klappan Creek (=Third South Fork Stikine River), British Columbia.

*Type specimen.*—No. 179928, ♂ old, U. S. National Museum, Biological Survey collection. Collected in September, 1906, and presented by G. Frederick Norton.

*Range.*—Middle and upper Stikine-Skeena region, limits uncertain.

*Characters.*—Size medium; skull of male slightly smaller than male *stikeenensis* and *canadensis*; skull of female about same size as female *stikeenensis*, decidedly larger than female *canadensis*. Color of type very dark.

*Color.*—*Type specimen*: Black (head absent, but entire body and legs almost coal black, lightly grizzled on shoulders and anterior part of back by tips of golden brownish).

*Cranial characters.*—*Adult and old males*: Rostrum rather narrow (in old age compressed in front of orbits); vault of cranium low, flattish; frontal shield of moderate breadth, flat or depressed (sometimes sulcate medially), rather short pointed, sloping gradually to plane of muzzle, and only slightly dished in fronto-nasal region; postorbital processes peglike, horizontally far outstanding; sagittal crest low, reaching forward a little more than halfway from inion to postorbitals; zygomata broadly spreading and bowed; palate of medium breadth; postpalatal shelf broad and flat; underjaw short—much shorter than in *stikeenensis*, *shoshone*, and *canadensis*—its ramus bellied and upcurved posteriorly, not flattened. Teeth rather small; canines and molars much smaller than in *stikeenensis*.

*Female*: Skull relatively large (about same length as female *stikeenensis* but much narrower); much larger than female *shoshone* and *canadensis*; vault of cranium moderately elevated, with tendency to a fronto-parietal hump; facial part of skull large and long; frontal shield long, rather narrow, lyre shaped posteriorly, meeting sagittal crest some distance posterior to fronto-parietal suture; fronto-nasal region well dished; palate and postpalatal shelf long; zygomata moderately spreading and conspicuously outbowed; underjaw long. *Young females* are best told by the teeth, especially the lower canines. In *tahtanicus* the lower canines are shorter and

more slender than those of *stikeenensis*. In the latter species they are longer and thicker, especially thick in middle.

*Cranial comparisons*.—Old male (type) compared with adult male *orgilos* (type): Size essentially same (basal length slightly less); top of skull higher; frontal shield broader and less flat; postorbital processes less slender; palate and postpalatal shelf shorter; zygomata less bowed but more widely outstanding; underjaw shorter, much more massive; inferior border of ramus shorter and more bellied posteriorly; coronoid blade more recurved.

Adult male compared with adult male *stikeenensis* (both inhabiting the same region): Basal length, zygomatic breadth, and frontal breadth essentially the same, but frontal region much lower, frontal shield not rising abruptly at orbits, but sloping gently in plane of rostrum; rostrum narrower, higher, and less nearly horizontal (appearing longer); postorbitals much smaller and more horizontally outstanding; palate shorter; underjaw shorter. Dentition lighter.

*Skull measurements*.—Old male (type): Basal length, 305;<sup>1</sup> occipito-nasal length, 304; palatal length, 163; zygomatic breadth, 220; interorbital breadth, 84.

#### URSUS INSULARIS MERRIAM.

##### ISLAND GRIZZLY.

*Ursus eltonclarki insularis* Merriam, Proc. Biol. Soc. Washington, XXIX, p. 141, September 6, 1916.

*Type locality*.—Admiralty Island, Alaska.

*Type specimen*.—No. 205186, ♂ old, U. S. National Museum, Biological Survey collection, 1914. Purchased from W. H. Case, of Juneau.

*Characters*.—An island grizzly, apparently related to *tahltanicus* and *orgilos* of the mainland, and to *eltonclarki* of Baranof and Chichagof Islands; in some respects a miniature of *hoots*.  $PM_{\frac{1}{4}}$  indistinctly of grizzly type. External characters unknown.

*Cranial characters*.—*Adult male* (type): Size medium; frontal shield broad and flattish, with *exceptionally large, broad, and flat postorbitals*; zygomata broadly outstanding; ramus of underjaw strongly upturned posteriorly, elevating coronoid and condyle. Teeth of medium size.

*Cranial comparisons*.—Adult male (type) compared with old male *tahltanicus* (type): Basal length, zygomatic breadth, breadth and form of frontal shield, breadth across postorbitals, truncation of nasals, and length of jaw essentially same, but postorbitals very much larger, especially broader and more decurved; fronto-nasal

<sup>1</sup>Restored.

region more dished; rostrum slightly longer; palate, postpalatal shelf, and postpalatal notch narrower; underjaw more massive and more upturned posteriorly; ramus longer; coronoid much higher; subangular border shorter. Molar series of approximately same length but more massive;  $M^1$  longer,  $M^2$  shorter.

Adult male (type) compared with adult male *eltonclarki* (type): Similar in general, agreeing essentially in basilar length, zygomatic breadth, length and narrowness of palate and postpalatal shelf, and narrowness of postpalatal notch, but differing widely in other characters. Vault of cranium less highly arched; frontal shield and postorbitals very much broader and more massive (shield interorbitally 82 mm. contrasted with 69), less flat, faintly sulcate medially; postorbital processes very much larger, broader, more widely outstanding (from tip to tip 120 mm. contrasted with 101) and more decurved; rostrum lower, broader, and shorter; nasals shorter (89 contrasted with 105—probably not constant). Underjaw more massive; inferior border of ramus longer, more swollen and more upcurved posteriorly; outer side of ramus not depressed or excavated below anterior base of coronoid; coronoid blade narrower and higher. Canines (both upper and lower) somewhat shorter; molars, especially  $M^1$ ,  $M^1$ , and  $M^2$  decidedly larger.

Compared with *orgilos* and *tahltanicus* of the mainland: Easily distinguished by great size of postorbitals and upturning of posterior part of ramus.

Compared with *kwakiutl*: Quickly told by general shortness of skull, including palate and underjaw, and by large size and breadth of postorbitals.

*Skull measurements.*—Old male (type): Basal length, 311; occipito-nasal length, 310; palatal length, 171; zygomatic breadth, 216; interorbital breadth, 82.

#### URSUS ORGILOS MERRIAM.

##### GLACIER BAY GRIZZLY.

*Ursus orgilos* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 176, August 13, 1914.

*Type locality.*—Bartlett Bay, east side of Glacier Bay, Southeastern Alaska.

*Type specimen.*—No. 180280, probably ♂, rather old, U. S. National Museum, Biological Survey collection. Collected August 22, 1912, by A. Hasselborg.

*Cranial characters.*—Size medium; skull long, rather narrow, low, flat on top, slightly dished. Frontal shield rather narrow, flat, concave between orbits, acute pointed posteriorly; postorbital processes long, slender, outstanding, slightly decurved and recurved (posteriorly);

rostrum normal or rather small; nasals nearly horizontal, slightly up-lifted and decurved anteriorly; braincase long and low; squamosal shelves long; zygomata moderately spreading and strongly outbowed, the broadest part more anterior than usual; sagittal crest straight and nearly horizontal, reaching only to fronto-parietal suture; palate long and rather narrow; postpalatal shelf long, flat, and rather broad for size of skull; jugal broad anteriorly, rising well above lachrymal duct; lachrymal duct opening within orbit; occipito-sphenoid long (90 mm.); underjaw long; coronoid blade broad at base, moderately high, the apex moderately recurved. Teeth of medium or rather small size.

*Cranial comparisons.*—*Ursus orgilos* needs to be distinguished from its neighbors, *orgiloides*, *tahltanicus*, and *pallasi*. Compared with *orgiloides*, with which it agrees essentially in size of skull and length of braincase: Shield narrower, gently sloping instead of rising strongly from rostrum; rostrum longer and narrower; palate narrower. Compared with *tahltanicus*: Skull and shield narrower; postorbitals more slender and delicate; zygomata much less outstanding; underjaw more slender and delicate. Compared with *pallasi*: Skull as a whole, braincase, and posterior part of frontal shield much longer; shield less elevated above rostrum; sagittal crest shorter.

*Skull measurements*—Probably old male (type): Basal length, 316; occipito-nasal length, 304; palatal length, 177; zygomatic breadth, 207; interorbital breadth, 75.

#### URSUS ORGILOIDES SP. NOV.

ALSEK GBIZZLY.

*Type* No. 223275, probably ♂, U. S. National Museum, Biological Survey collection. From Itatio River, Alaska. Collected November, 1916. Purchased from E. M. Axelson, of Yakutat.

*Range.*—Coast strip southeast of Yakutat Bay. Specimens have been received from near Yakutat village and from Ankow and Ankin Rivers and mouths of Alsek and Itatio Rivers.

*Cranial characters.*—Skull of medium size, long, low, and smoothly rounded, rather narrow, with long braincase, long-pointed shield, rather short rostrum, and large broadly rounded lambdoid crest; shield medium, *rising strongly from horizontal rostrum*, sulcate inter-orbitally and swollen between sulcus and orbits; point ending at or near fronto-parietal suture; postorbital processes moderate, somewhat decurved; sagittal crest rather short; occipital overhang and inion well developed; rostrum short, broad for size of skull; nares truncate; zygomata not widely outstanding and not bowed; palate long,

of moderate breadth; mastoids appressed; meatus tube large and free; underjaw long; coronoid blade moderate; apex only slightly recurved. Teeth rather small.

*Cranial comparisons.*—Adult male (type) compared with the type of *orgilos*: Size, length of braincase, and length of postorbital part of frontal shield essentially same; shield broader, *rising strongly from rostrum instead of sloping gradually into rostrum*, sulcate anteriorly and swollen between sulcus and orbits; rostrum shorter and broader; lachrymal duct opening on orbital rim instead of within rim; zygomatic arches more subtriangular (less bowed); palate broader; meatus tube much larger; lambdoid crest more highly developed and more broadly rounded. Teeth about same size;  $PM_{\frac{1}{2}}$  distinctly of grizzly type (in *orgilos* subconical).

Compared with the type of *pallasi*, which it strongly resembles: Length about an inch greater (mainly in posterior part of skull); braincase and point of shield much longer; sagittal crest much shorter; occipito-sphenoid and palate longer; mastoids appressed instead of divergent; underjaw much longer, but inferior border of ramus of essentially same length; subangular border slightly longer.

*Remarks.*—Unfortunately there is possible doubt as to the sex of the type specimens of *orgilos* and *orgiloides*, though both are believed to be males. Both skulls have the appearance of males, except that in *orgiloides* the point of shield is longer than usual in males and the canines are small for males of corresponding size.

*Skull measurements.*—Adult male (type): Basal length, 316.5; occipito-nasal length, 300; palatal length, 169; zygomatic breadth, 218; interorbital breadth, 81.5.

#### URSUS PALLASI MERRIAM.

##### PALLAS GRIZZLY.

*Ursus pallasi* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 149-150, September 6, 1916.

*Type locality.*—Donjek River, southwestern Yukon.

*Type specimen.*—No. 205160, ♂ old, U. S. National Museum, Biological Survey collection. Collected August, 1913, by T. A. Dixon.

*Range.*—Southwest corner of Yukon Territory, east of the St. Elias Range (Kluane Lake, Donjek River, St. Clair River) and adjacent eastern border of Alaska; easterly to McConnell River and Teslin Lake and south into northern British Columbia.

*Cranial characters.*—*Old male* (type): Size small, one of the smallest of the grizzlies; skull moderately elevated, flattish on top, with relatively broad frontal shield rising strongly at orbits. Frontal

shield flattish, exceedingly short pointed posteriorly, faintly depressed medially between orbits, slightly swollen on sides of median depression, strongly sloping to rostrum; postorbital processes small, peglike, horizontally outstanding; fronto-nasal region strongly dished; rostrum short, somewhat depressed and pugged; nasals rising anteriorly; nares small and subtruncate; sagittal crest long, reaching to halfway between fronto-parietal suture and plane of postorbitals; zygomatic arches moderately outstanding, narrow, and slender, not expanded vertically; palate and postpalatal shelf short and broad; mastoids long and spreading. Underjaw long for size of skull; coronoid narrow above, the apex not reaching plane of condyle; teeth rather large for size of skull.

*Old female* (No. 205162) from St. Clair River, Yukon; collected September 6, 1914, by A. Hoyt: Size very small; frontal shield remarkably broad for so small a skull, convex and medially sulcate interorbitally; fronto-nasal region strongly dished; postorbitals small, outstanding; rostrum short and depressed; palate and postpalatal shelf short and broad; zygomata rather strongly outstanding, subtriangular. Underjaw very small and light; coronoid moderate, apex strongly recurved; teeth very small, nearly as small as in *nelsoni*.

*Cranial comparisons.*—*Ursus pallasii*, owing to the number of species occurring in or adjacent to its range, should be known from *tahltanicus*, *orgilos*, *orgiloides*, *pulchellus*, and *kluane*. It may be related to *tahltanicus* but is easily distinguished by its low broad rostrum, strongly dished fronto-nasal region, very short shield, less elevated midfrontal region, long and rather high sagittal crest, and larger teeth; while *tahltanicus* has a higher and narrower rostrum, sloping fronto-nasal region, much longer shield, higher midfrontal region, shorter and lower sagittal crest, and smaller teeth. From *orgilos* and *orgiloides* it may be told by the shortness of the skull as a whole, shortness of braincase and point of frontal shield, and greater length of sagittal crest. From *pulchellus* it differs in lower vault of cranium, much broader shield and rostrum, shorter rostrum, broader palate and postpalatal shelf, longer underjaw, and smaller molars. From *kluane* it differs strikingly in much smaller size, much lower arch of cranium, conspicuously shorter braincase and sagittal crest; very much smaller, narrower, and less strongly decurved postorbitals; very much less elevated and more dished fronto-nasal region; much lower rostrum; much shorter palate and much shorter underjaw.

Adult female compared with adult female *kluane*: Size of skull essentially same or slightly smaller; canines smaller; *molars very much smaller*.



*Skull measurements.*—Old male (type): Basal length, 302.5; occipito-nasal length, 279; palatal length, 159; zygomatic breadth, 209; interorbital breadth, 72.5.

URSUS RUNGIUSI RUNGIUSI<sup>1</sup> SP. NOV.

RUNGIUS GRIZZLY.

*Type* No. 179893, ♂ young-adult, U. S. National Museum, Biological Survey collection. Collected September, 1910, in Rocky Mountains on headwaters of Athabaska River, Alberta, by Carl Rungius, and by him presented to the Biological Survey.

*Characters.*—*Young-adult male* (type): Size small; skull low and flat, with low depressed braincase, very broad depressed sinus case, medium or narrow and exceptionally short frontal shield, long sagittal crest, and long, peglike outstanding postorbital processes. *Fully adult males* differ somewhat. An old male from Fortress Lake, head of Athabaska River (No. 40091, Amer. Mus. Nat. Hist.), killed in May, 1916, by Malcolm S. Mackay; another old male (No. 1919, Ottawa Museum) from Kootenay Pass, Alberta; and a fully adult male (No. 209899) from Indian Point Creek, near Barkerville, B. C., present the following characters: Skull small, low, and nearly flat; shield low, of medium breadth, broadly flat-concave between orbits, sloping gradually into rostrum, very short pointed posteriorly; postorbitals peglike, outstanding, and elevated; orbital rims slightly thickened and everted; rostrum small, narrow, and rather high for so small a skull; zygomata widely outbowed; palate and postpalatal shelf narrow; base of cranium rather narrow; mastoids appressed (not outstanding); underjaw rather light; apex of coronoid recurved. Dentition moderate.  $PM_{\frac{1}{2}}$  distinctly of grizzly type. Canines and upper molars rather large for so small a skull.

*Cranial comparisons.*—Adult male (No. 209899), from Indian Point Creek, B. C., compared with adult male *macfarlani* (type): Size slightly less; skull as a whole much lighter; rostrum much smaller and less elevated; fronto-nasal region slightly dished; zygomata much less widely outbowed; palate and postpalatal shelf much narrower; sagittal crest shorter; base of skull narrower; underjaw much less massive; apex of coronoid more recurved. Dentition lighter (except  $M^2$ , which is of about same size in both);  $M_{\frac{1}{2}}$  less swollen;  $PM_{\frac{1}{2}}$  distinctly of grizzly type (not conical as in *macfarlani*).

Adult male (No. 209899, from Indian Point Creek, B. C.) compared with adult male *ophrus* (type): Size smaller; vault of cranium very

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<sup>1</sup> Named for the artist, Carl Rungius, of New York, who collected and presented the type specimen.

much lower and flatter; frontal shield broadly concave, not deeply sulcate medially; postorbital processes more slender and horizontal; orbital rims slightly or not swollen; fronto-nasal region not notably dished; rostrum lower; nares smaller; sagittal crest less highly developed and straighter (less convex); zygomata very much less outbowed and only slightly arched (in *ophrus* very highly arched) mastoids much shorter; underjaw much shorter; coronoid about the same size; upper canines and upper and lower molars about the same size; lower canines smaller.

Adult and old males compared with old male *hylodromus* (No. 205170), from Selkirk Mountains, B. C.: Skull shorter; shield flat-concave, rising at orbits and postorbitals (in *hylodromus* decurved laterally); posterior part of shield very much shorter; vault of cranium much lower; braincase more depressed; rostrum smaller, narrower, more nearly horizontal; zygomata more outbowed (less triangular); sagittal crest longer; postpalatal shelf narrower.

*Skull measurements.*—Young-adult male (type): Basal length, 293; occipito-nasal length, 282; palatal length, 162; zygomatic breadth, 190; interorbital breadth, 73. Adult male (No. 209899) from Indian Point Creek, B. C.: Basal length, 294;<sup>1</sup> occipito-nasal length, 278.5; palatal length, 161; zygomatic breadth, 198; interorbital breadth, 75. Old male (No. 40091 Amer. Mus. Nat. Hist.) from head Athabaska River, B. C.: Basal length, 295; occipito-nasal length, 276; palatal length, 166; zygomatic breadth, 214; interorbital breadth, 75.

#### URSUS RUNGIUSI SAGITTALIS SUBSP. NOV.

##### CRESTED GRIZZLY.

*Type* No. 210705, ♂ ad. (rather old), U. S. National Museum, Biological Survey collection. From Champagne Landing, southwestern Yukon. Collected in the fall of 1915. Purchased from Mackay & Dippie.

*Cranial characters.*—*Adult male* (type): Size small; skull low and narrow; shield flat or flat-concave, narrow, short pointed, sloping gradually into rostrum; postorbitals slender, outstanding; rostrum slender; nares large and oblique; zygomata moderately outstanding, subtriangular; sagittal crest long, high, and arcuate; palate narrow; underjaw long and slender; coronoid small and falcate; subangular border short. Dentition moderate.

*Cranial comparisons.*—Adult male (type) compared with adult male *rungiusi* (No. 209899): Skull similar in general but shield narrower and flatter; postorbitals more slender; orbital rims not thickened or everted; *nares larger and more oblique; sagittal crest very*

<sup>1</sup> Restored.

*much higher*, rising well above point of shield; squamoso-jugal suture much shorter; underjaw longer; coronoid smaller and more falcate; subangular border shorter. Canines slightly larger;  $M^2$  somewhat smaller.

Adult male (type) compared with *orgilos* (type): Skull about an inch shorter; braincase very much shorter: point of shield much shorter; sagittal crest longer, much higher, and arcuate instead of straight; rostrum much smaller; squamosal arm of zygoma much shorter; underjaw and ramus much shorter; subangular border nearly the same; coronoid blade narrower.

*Skull measurements.*—Adult male, old: Basal length, 295;<sup>1</sup> occipito-nasal length, 281; palatal length, 160; zygomatic breadth, 200; interorbital breadth, 71.5.

### URSUS MACFARLANI<sup>2</sup> SP. NOV.

#### MACFARLANE BEAR.

*Type* No. 6551, ♂ ad., U. S. National Museum. Collected on Anderson River, 50 miles below Fort Anderson, Mackenzie, May 8, 1863, by R. MacFarlane. (Original No. 551.)

*Characters.*—External characters unknown. Relationship apparently with *rungiusi*.

*Cranial characters.*—Size medium; skull of adult male (type) massive, low, broad, flat; tip of nose to point of shield in same plane without trace of dishing. Frontal shield low, flat-concave, rather broad, exceptionally short posteriorly, shallowly concave between orbits, not rising above plane of rostrum; postorbitals large, horizontally outstanding and slightly elevated; rostrum broad and high, large for size of skull; zygomata widely outbowed; sagittal crest long and low; palate and postpalatal shelf broad; underjaw massive, coronoid blade high, narrow, nearly vertical, obtusely rounded above; subangular border exceptionally short. Dentition heavy: Canines and molars large for size of skull;  $PM_4$  subconical;  $M_1$  swollen;  $M^2$  moderate, the heel slightly emarginate and rather broadly rounded posteriorly. In immature and young-adult males the frontal shield is less flat, the sides (between sulcus and orbits) strongly swollen (as shown by No. 7146, from Franklin Bay; and 2773, Ottawa Museum, from Stapyhton Bay).

*Cranial comparisons.*—Adult male (type) compared with adult male *rungiusi* (No. 209899) from Indian Point Creek near Barker-ville, B. C.: Skull slightly larger and *much more massive*, with higher

<sup>1</sup> Partly restored.

<sup>2</sup> Named in honor of Roderick MacFarlane, who collected the specimen and presented it to the Smithsonian Institution.

and much broader rostrum, and much more widely outbowed zygomatica; sagittal crest longer; palate, postpalatal shelf, and base of skull much broader; underjaw much more massive; coronoid blade more nearly vertical and less recurved at apex. Dentition heavier: Canines and molars, upper and lower, larger;  $M_1$  more swollen;  $PM_4$  subconical (not at all of grizzly type).

*Skull measurements.*—Adult male (type): Basal length, 303; occipito-nasal length, 283; palatal length, 164; zygomatic breadth, 218; interorbital breadth, 79.

### URSUS CANADENSIS MERRIAM.<sup>1</sup>

#### CANADA GRIZZLY.

*Ursus shoshone canadensis* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 184-185, August 13, 1914.

*Type locality.*—Moose Pass, near Mount Robson, British Columbia.

*Type specimen.*—No. 174511, ♂ ad., U. S. National Museum. Collected by N. Hollister and Charles D. Walcott, jr., July 23, 1911. (Original No. 3792, Hollister catalogue.)

*Range.*—Eastern British Columbia; limits unknown (type from near Mount Robson; and an adult female from Kootenay Lake).

*Characters.*—Size medium; color brown, grizzled with buff; claws short for a grizzly, rather thick, moderately curved, pale yellowish on upper surface and tips, brownish horn color on sides.

*Color.*—Muzzle very pale drab brown, changing to darker brown on head, face, and chin, darkest around ears; top of head, cheeks posteriorly,<sup>2</sup> ears, back, and thighs washed with buffy whitish from abundance of buffy-tipped hairs; foreleg and lower part of hind leg and feet very dark (almost blackish brown); long hairs of throat and axillary region pale yellowish, of rest of underparts dark brown.

*Cranial characters.*—*Adult male* (type): Skull of medium size, rather long, low, and narrow, flat in frontal region, with long, high sagittal crest rising above general level of top of cranium. Frontal shield small, flat, narrow, faintly depressed medially, short pointed posteriorly, gently sloping; postorbitals slender, peglike, horizontally outstanding; rostrum relatively high, tapering anteriorly; sagittal crest remarkably long, arcuate, and high, reaching nearly to midway between fronto-parietal suture and plane of postorbitals; zygomatica moderate, slightly outbowed, and only slightly expanded vertically; palate excavated between molar series; postpalatal shelf rather long and broad; notch medium or narrow. Underjaw rather massive;

<sup>1</sup> Tentatively included in *planiceps* group. (See Introduction, pp. 12-13.)

<sup>2</sup> The old whitish-tipped hairs of the old coat have fallen out on the cheeks and anterior part of head nearly to ears.

ramus moderately bellied posteriorly; coronoid blade broad and rather short, the apex cutting plane of condyle. Dentition rather heavy; canines thick and short; molars broad.

*Adult female* (No. 209902 from Kootenay Lake, British Columbia): Skull rather small, long, narrow, low, and slightly dished. Frontal shield *narrow*, flattish, slightly depressed medially between orbits, long pointed, the point reaching to midparietal region; post-orbitals moderate; rostrum long and slender, tapering; zygomata moderately spreading. Underjaw similar to that of male but much smaller; coronoid blade relatively narrower and higher. Dentition heavy; teeth similar to those of male and only slightly smaller; canines large and swollen; molars broad.

*Cranial comparisons.*—Adult male (type) compared with adult male *macrodon* (type): Size essentially same; shield more strongly sloping; postorbitals more slender; rostrum lower and more tapering; sagittal crest higher;inion much more strongly produced; subangular border of ramus shorter; angular process not bellied; canines smaller;  $M^2$  and  $M_2$  decidedly smaller.

*Skull measurements.*—Adult male (type): Basal length, 313; occipito-nasal length, 312; palatal length, 171; zygomatic breadth, 208; interorbital breadth, 74.

#### Arizona Group.

#### URSUS ARIZONÆ MERRIAM.

#### ARIZONA GRIZZLY.

(PL. XVI.)

*Ursus arizonæ* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 135-136, September 6, 1916.

*Type locality.*—Escudilla Mountains, Apache County, Arizona.

*Type specimen.*—No. 177332, ♂ ad., U. S. National Museum, Biological Survey collection. Collected September 3, 1911, by C. H. Shinn.

*Cranial characters.*—Size rather large; skull as a whole rather long and narrow, with broad rostrum; vault of cranium moderately elevated but not arched, highest about two-thirds distance from plane of postorbitals to fronto-parietal suture; frontal shield rather narrow, nearly flat, gently sloping in plane of rostrum, the posterior point in type specimen reaching to about 25 mm. in front of parietals (in older specimens shorter); postorbitals broad and broadly rounded, nearly horizontal, but not widely projecting; fronto-nasal region and rostrum elevated and swollen, continuing plane of frontal shield without trace of dishing, tapering anteriorly; zygomata not

widely outstanding, bowed, anterior roots swollen; palate rather short and broad; postpalatal shelf broad; meatus tube long; coronoid blade rather broad above, its recurved apex cutting plane of condyles. Teeth rather small for size of skull; canines of good size; molars rather small for size of skull, especially last upper molar.

*Cranial comparisons.*—Adult male (type) compared with old male *apache* (type): Basilar length, occipito-nasal length, length of palate, interorbital breadth, and occipito-sphenoid length essentially the same; zygomata very much less outstanding and subtriangular instead of bowed; frontal shield flatter, of essentially the same breadth interorbitally, but very much narrower across postorbital processes; postorbital processes much less broadly outstanding; orbital rims less swollen; fronto-nasal region much more elevated and swollen; rostrum much larger, broader, more swollen, and tapering instead of depressed basally, narrow, and horizontal; palate and postpalatal shelf much broader. Underjaw weaker; ramus less broad vertically; coronoid blade less high; molars slightly larger; heel of M<sup>2</sup> longer, more distinctly emarginate on outer side (less tapering).

*Skull measurements.*—Adult male (type): Basal length, 326; occipito-nasal length, 323; palatal length, 175; zygomatic breadth, 208; interorbital breadth, 82.

#### URSUS IDAHOENSIS SP. NOV.

##### IDAHO GRIZZLY.

*Type* No. 93, ♂ old, Merriam collection (=187888 U. S. National Museum), from North Fork Teton River, eastern Idaho, September 23, 1874. Killed by the late Richard Leigh (better known as "Beaver Dick").

*Characters.*—Size rather large, about equaling *arizonæ* (much smaller than *horribilis* and subspecies, and shorter than *rogersi*, *bisonophagus*, and *perturbans*); frontal shield convex both longitudinally and transversely; fronto-nasal region elevated and somewhat compressed (much as in *rogersi*, but rostrum much shorter); postorbital processes rather weak and decurved as in *rogersi* and *arizonæ*; sagittal crest rather short and not strongly developed; zygomata moderately outbowed; coronoid blade rather high, but less high than in *bisonophagus* and *rogersi*; ramus flattish, broad vertically, but much less broad and massive than in *rogersi*; dentition rather heavy; M<sup>2</sup> large, its heel elongate, emarginate, but not narrowed posteriorly, slightly everted; canines rather small, about as in *rogersi* and *arizonæ*.

An old female (No. 160153) from Wallowa Mountains, Oregon, is assumed to be typical of *idahoensis*. It has a long, low, slender, smoothly rounded skull with narrow zygomatic arches, narrow palate, rather broad postpalatal shelf, and very small teeth.

*Skull measurements.*—Old male (type): Basal length, 317; occipito-nasal length, 318; palatal length, 177; zygomatic breadth, 206; interorbital breadth, 81.

URSUS PULCHELLUS PULCHELLUS SP. NOV.

UPPER YUKON GRIZZLY.

*Type* No. 221599, ♂ ad., U. S. National Museum, Biological Survey collection, from Ross River, Yukon Territory, Canada. Collected July 20, 1916, by Fred E. Enevoldsen.

*Characters.*—Size small; frontal shield and rostrum narrow; vault of cranium well arched; base of cranium moderately arched; shield rising rather strongly from plane of rostrum, convex transversely but shallowly sulcate medially, short pointed posteriorly (point ending about halfway between plane of postorbitals and fronto-parietal suture); rostrum slender and high; fronto-nasal region dished; nasals nearly horizontal; sagittal crest only slightly developed, not high posteriorly, somewhat decurved; occiput rather low and shortly truncate; palate and postpalatal shelf rather narrow; zygomata subtriangular; squamosal root expanded vertically; occipito-sphenoid short (80 mm.); underjaw short, its inferior border straight; coronoid rather low, broad basally, apex strongly recurved; subangular border short. Teeth, particularly molars, large for so small a skull; last upper molar broadly quadrate anteriorly, the heel abruptly and strongly emarginate, narrowly rounded posteriorly;  $M^1$  large, broad, and massive.

*Cranial comparisons.*—*Ursus pulchellus* requires comparison with its near relative *ereunetes*, and also with *pallasi* and *kluane*. Adult male (type) compared with adult male *ereunetes* (type): Size slightly smaller; fronto-nasal region more dished; shield less flat; zygomata broad (in *ereunetes* slender); occipito-sphenoid shorter;  $M^1$  larger and more massive.

Compared with old male *pallasi* (type): Basal length slightly less; occipito-nasal length same; zygomatic breadth less; cranium higher and more arched; frontal shield and rostrum conspicuously narrower; palate and postpalatal shelf narrower; rostrum longer, higher, and more slender; squamosal root of zygoma more broadly expanded vertically; mastoids less elongate; underjaw shorter and less massive. Upper molars larger and more massive.

Compared with adult male *kluane*: Similar in general appearance but skull as a whole, braincase, palate, and underjaw *very much shorter*; frontal shield *very much narrower*; inferior border of ramus more abruptly upcurved; subangular border more nearly horizontal and much more sharply defined.

*Remarks.*—The type of *pulchellus* came from Ross River, a northern tributary of the Pelly. Skulls of males from the southwestern corner of Yukon (Donjek River and Champagne Landing) differ in greater occipito-nasal length, more highly arched cranium, more elevated rostrum, and less deeply emarginate heel of  $M^2$ .

I refer to *pulchellus* an adult female, No. 204187, from McConnell River, Yukon, and a still older female, No. 215113, from Ross Mountains.

*Skull measurements.*—Adult male (type): Basal length, 292; occipito-nasal length, 281; palatal length, 160; zygomatic breadth, 196; interorbital breadth, 66.

#### URSUS PULCHELLUS EREUNETES SUBSP. NOV.

##### KOOTENAY GRIZZLY.

*Type* No. 222323, ♂ ad., from Beaverfoot Range, Kootenay District, British Columbia. Collected October 1, 1916, by George Hill, of Field, British Columbia.

*Characters.*—Size rather small; occiput shortly truncate; vault of cranium and basicranial axis well arched; fronto-nasal region elevated, sloping gradually upward, not dished; rostrum small, rather narrow, rising gradually into shield; point of shield ending about two-thirds distance from plane of postorbitals to fronto-parietal suture; zygomata slender, rather broadly outbowed for size of skull. Last upper molar broad anteriorly, the anterior part of cingulum on inner side produced, the heel emarginate, narrowing posteriorly, subtriangular; middle lower molar large and massive.

Skull in general similar to that of *pulchellus* but slightly larger, with more elevated fronto-nasal region, flatter shield, much more slender zygomata, and much longer occipito-sphenoid; teeth as in *pulchellus* except that  $M^1$  is smaller, and  $M^2$  is less quadrangular anteriorly.

*Skull measurements.*—Adult male (type): Basal length, 297; occipito-nasal length, 278; palatal length, 165; zygomatic breadth, 203; interorbital breadth, 72.

#### URSUS ORIBASUS SP. NOV.

##### LIARD RIVER GRIZZLY.

*Type* No. 223991, ♂ ad. (rather old), U. S. National Museum, Biological Survey collection. From Upper Liard River, Yukon, near British Columbia boundary. Killed by J. Thompson in the spring of 1916. (Purchased from William Drury, of Whitehorse.)

*Characters.*—*Adult male* (type): Size large; hump absent or in-



conspicuous; color dark; claws long (longest 90 mm.<sup>1</sup>) and unusually straight; top convex in section, dark horn color, paler at tips and along upper surface; skull long, narrow, and arched, with elevated straight-sloping fronto-nasal region (much like that of *ereunetes* but much longer posteriorly). Frontal shield, rostrum, and molar teeth narrower than in any other member of the *shoshone* group.

*Color*.—General ground color dark brown to dusky; muzzle dull golden brown, becoming much darker between eyes; a dark ring around each eye; cheeks chestnut brown; top of head, nape, and shoulders strongly washed with yellowish buffy; back washed with soiled buffy; rump dark brownish dusky; legs and feet dusky blackish.

*Cranial characters*.—*Adult male* (type): Skull rather large, long, narrow, rather strongly arched both above and below, with high straight-sloping (not dished) fronto-nasal region. Frontal shield narrow, flat, gently sloping, the point reaching two-thirds distance from postorbitals to parietals; postorbitals rather small, horizontally outstanding; rostrum narrow and high, in same plane with frontal shield; braincase and sagittal crest long; inion and occipital overhang marked; zygomata well outstanding, strongly subtriangular, squamosal base broadly expanded; basicranium and palate arched; palate and postpalatal shelf narrow; occipito-sphenoid 92 mm.; mastoids large, divergent. Underjaw long; ramus long and flat; subangular border short and broad; coronoid blade narrow. Canines rather long; molars narrow and rather small; M<sup>2</sup> small, narrowly triangular, the heel small, thin, and pointed; PM<sub>4</sub> imperfectly of grizzly type.

*Cranial comparisons*.—Old male (type) compared with old male *chelan* and *idahoensis* (both types): Length, height, and arching essentially same; shield narrower, flatter, and more nearly horizontal; sinus case and rostrum narrower; top of rostrum higher and more completely in fronto-nasal plane; zygomatic arches shorter and more angular (less outbowed), the inclosed space (temporal fossa) much smaller. Underjaw shorter and weaker; subangular border shorter; coronoid blade narrower.

Old male (type) compared with adult male *ereunetes* (type): Similar in general appearance but *length much greater*; shield flatter; rostrum more elevated; braincase much longer; sagittal crest much longer and higher; inion more strongly produced; squamosal base of zygoma broadly expanded (in *ereunetes* not expanded). Canines longer; molars smaller and *very much narrower*.

<sup>1</sup> Claw of second or index finger longest, but second, third, and fourth practically subequal; claw of thumb very long. Claw measurements of right hand (those of left hand more worn at tips) from upper exposed base to tip: First, 82 mm.; second, 90; third, 88; fourth, 89; fifth, 68.

*Remarks.*—*Ursus oribasus* appears to be closely related to *pulchellus* and *ereunetes*, both of which have decidedly smaller skulls with larger teeth. It is related also to *idahoensis* and *chelan*, which are about the same size, but have much broader skulls and differ otherwise as already pointed out.

*Skull measurements.*—Adult male (type): Basal length, 310; occipito-nasal length, 304; palatal length, 172; zygomatic breadth, 215; interorbital breadth, 75.

#### URSUS CHELAN MERRIAM.

##### CHELAN GRIZZLY.

*Ursus chelan* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 136–137, September 6, 1916.

*Type locality.*—East slope Cascade Mountains, northern Chelan County, Washington.

*Type specimen.*—No. 205185, ♂ old, U. S. National Museum, Biological Survey collection. Killed in Township 30 N, Range 16 East, Willamette Meridian, Wenatchee National Forest. Collected September 1, 1913, by D. S. Rice.

*Range.*—Cascade and Cassiar Mountains from northern Washington to upper Stikine River and Dease Lake, British Columbia.

*Cranial characters.*—(External characters unknown). Skull of medium or rather large size; facial axis strongly deflected from basicranial axis; vault of cranium well arched, highest over posterior frontal region; sagittal crest long, high, arcuate, rising anteriorly above general level of top of cranium. Affinities apparently with *hylodromus* on the one hand, and with *shoshone* and *pervagor* on the other. Frontal shield narrow, flattened, short pointed posteriorly, ending about midway between fronto-parietal suture and plane of postorbitals, slightly sulcate medially; postorbital processes rather broad, flat, outstanding horizontally (not depressed or decurved); fronto-nasal region including posterior two-thirds of nasals sloping strongly, forming part of long fronto-facial plane; rostrum small, short, somewhat depressed, sloping anteriorly to nares, gradually rising posteriorly into frontal plane; braincase long, arched, frontal part keeled into sagittal crest; palate arched antero-posteriorly, slightly concave; postpalatal shelf broad; zygomata broadly spreading, rounded and outbowed posteriorly, vertically expanded and strongly arched; mastoids of medium length, spreading; under-jaw massive; ramus swollen on outer side over roots of  $M_{\frac{1}{2}}$  and  $M_{\frac{2}{3}}$ , bellied under last molars; coronoid blade high, its anterior border rather strongly recurved, the apex overarching high coronoid notch but barely reaching plane of front of condyle; teeth rather small for size of skull (so badly worn in type specimen that proportions of canines can not be determined).

*Cranial comparisons.*—Old male *chelan* differs from all its relatives in the degree of deflection of the facial part of the skull, and exceeds all except *hylodromus* in the arching of the palate.

Old male (type) compared with *pervagor* (type): Basal length slightly less; zygomatic breadth greater; frontal shield shorter pointed and flatter; postorbitals flatter and apparently broader; sagittal crest longer, higher anteriorly and more convex; rostrum shorter and more strongly sloping anteriorly; nares more truncate; zygomata more strongly outbowed, more arched, more expanded vertically, squamosal arm longer (squamoso-jugal suture much longer); palate shorter and more strongly arched; underjaw shorter, its inferior ramus much shorter; coronoid blade slightly higher and more falcate. Some of these differences may be due to age, the skull of the type of *chelan* being very old, while the type of *pervagor* is only adult. However, it differs rather conspicuously from equally old male *pervagor* from Bridge River (No. 4, Provincial Museum, Victoria, B. C.) as will be seen from the following: Basal length 20 mm. less; occipito-nasal length slightly greater; zygomatic breadth less; facial part strongly deflected (in *pervagor* not deflected); palate arched (in *pervagor* not arched); frontal shield shallowly sulcate medially (in *pervagor* broadly concave); postorbitals broad, flat, horizontally outstanding (in *pervagor* long, peglike, uplifted, and arched); braincase and sagittal crest arched (in *pervagor* straight and nearly horizontal); occipital overhang much greater; zygomata less widely outbowed.

Old male (type) compared with old male *hylodromus* (No. 205170) from Selkirk Mountains, British Columbia: Size larger (basal length only slightly greater but occipito-sphenoid and occipito-nasal lengths much greater, and skull as a whole distinctly larger); vault of cranium decidedly more highly arched; facial angle more strongly deflected from basicranial axis; zygomata much more widely spreading and outbowed and much more arched; frontal shield rising less abruptly from rostrum, more evenly sloping, rising higher posteriorly, and much shorter pointed; braincase and sagittal crest much longer, the crest higher and convex or arcuate anteriorly; occipital overhang greater; palate more strongly arched (antero-posteriorly); mastoids longer and strongly spreading. Underjaw longer and more massive, more swollen on outer side below middle and posterior molars; its inferior border more bellied posteriorly; coronoid blade very much higher.

Old male (type) compared with old male *washake* (type): Size slightly larger (basal length essentially the same, but upper part of skull much longer); vault of cranium more highly arched; frontal shield continuing to rise posteriorly (instead of flattened) and much shorter pointed; rostrum decidedly broader; postorbital processes

not elevated; lachrymal duct within orbit (not cutting rim as seen from front); braincase compressed and keeled anteriorly (in *washake* depressed); sagittal crest much longer and convex instead of straight; squamosal arm of zygoma longer and more broadly expanded vertically; palate concave and arched antero-posteriorly, instead of flat; postpalatal shelf longer and less broadly flattened; occipito-sphenoid longer; mastoids longer and more spreading. Molars smaller.

*Skull measurements.*—Old male (type): Basal length, 314; occipito-nasal length, 323; palatal length, 170; zygomatic breadth, 225; interorbital breadth, 86.

#### URSUS SHOSHONE MERRIAM.

##### SHOSHONE GRIZZLY.

*Ursus shoshone* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 184, August 13, 1914.

*Type locality.*—Estes Park, Rocky Mountains of northern Colorado.

*Type specimen.*—No. 203185, ♂ old, U. S. National Museum, Biological Survey collection.

*Range.*—Mountains of Colorado and Wyoming.

*Characters.*—Size medium or rather large, but much smaller than *horribilis* and *bairdi*—skull about same size as *absarokus*, but narrower and widely different. External characters unknown.

*Cranial characters.*—*Adult male* (type): Skull rather long and high, with flattish, short-pointed, long-sloping frontal shield continuing plane of rostrum to highest point, about midway between postorbitals and fronto-parietal suture; zygomata moderately spreading, outbowed; anterior (frontal) part of braincase keeling into sagittal crest; sagittal crest long and high; lambdoid crest high; postorbital processes peglike, outstanding, rather slender; nasal region slightly dished and sulcate in middle third (nasals dipping toward one another—may be individual); rostrum of moderate breadth, strongly ascending in plane of frontal shield; palate slightly dished between posterior molars; postpalatal shelf broad; postpalatal notch long and narrow; lachrymal duct cutting orbital rim but mainly on inner side. Underjaw rather long; ramus broad vertically, flattish, highest posteriorly; coronoid blade high, rather strongly sloping, the apex cutting plane of condyle. Canines (absent in type but present in other males) slender; molars medium; M<sup>2</sup> large with long heel.

*Adult female* (No. 203761, from Fort Fred Steele, Wyoming): Skull long, low, and rather slender; frontal shield narrow, long, lyre pointed posteriorly, flat interorbitally; postorbitals slender and

outstanding; rostrum slender; sagittal crest short, reaching only halfway from inion to fronto-parietal suture; lambdoid crest moderate; palate dished between posterior molars; postpalatal shelf broad; notch moderate; meatus tube short; ramus flat and light; apex of coronoid produced posteriorly, overhanging deep coronoid notch. Teeth rather small; upper molars relatively large,  $M^2$  with long heel, cut-turned posteriorly; lower molars narrow.

*Cranial comparisons.*—Adult male compared with adult male *horricæus*: Rostrum, nasals, and frontal shield more elevated and much more strongly ascending posteriorly (less flattened and less nearly horizontal); lambdoid much more strongly developed.

Adult male compared with adult male *absarokus*: Frontal shield flat, rising gradually in long continuous slope to highest point, about 25 mm. anterior to fronto-parietal suture (in *absarokus* arched, strongly convex, and rising suddenly to highest point, immediately behind orbits); postorbital processes more slender; fronto-nasal region only slightly dished; rostrum more slender; braincase narrower; breadth across squamosal shelves less.

*Remarks.*—Skulls from the Wind River and Absaroka Mountains have the last upper molar smaller, the heel less strongly developed.

*Skull measurements.*—Old male (type): Basal length, 320; occipito-nasal length, 317; palatal length, 166; zygomatic breadth, 208; interorbital breadth, 78.

#### URSUS KENNERLYI<sup>1</sup> MERRIAM.

##### SONORA GRIZZLY.

*Ursus kennerlyi* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 194, August 13, 1914.

*Type locality.*—Mountains of northeastern Sonora, near Los Nogales, Mexico.

*Type specimen.*—Skull No. 2086, ♂ old; skin No. 1047, U. S. National Museum. Collected in June, 1855, by Dr. C. B. Kennerly.

*Range.*—Nothing is known of the range of *kennerlyi* except that the type specimen came from mountains near Nogales, Sonora. Its affinities with *utahensis* suggest that formerly it may have had a disconnected distribution northward in the mountains of central Arizona.

*Characters.*—Size rather small. *Ursus kennerlyi* is a strongly marked member of the *arizonæ-utahensis* group, most nearly related to *utahensis* but *very much smaller*, although the teeth are about same size. The skull, though that of an old male, agrees in size (length) with that of female *utahensis*.

<sup>1</sup> Named in honor of Dr. C. B. Kennerly, who collected the type specimen.

*Color.*—The prevailing color is dull pale brownish yellow with amber tinge. The tips only are of this color, the basal and larger portion being of a dark chestnut-brown, passing into blackish, which extends nearly to yellowish tips, the blackish predominating along median line of back and posteriorly; legs blackish brown slightly tinged with chestnut (Baird).

*Cranial characters.*—Size rather small; skull long, narrow, and high, but not much arched; rostrum narrow and high, in same plane with shield; fronto-nasal region strongly elevated, making a convexity slightly above otherwise continuous plane of rostrum and frontal shield; rostrum and fronto-nasal region subterete, constricted (but not strongly pinched in) in front of orbits; nares much higher than broad; frontal shield flat, rather short pointed posteriorly, passing into sagittal crest about one-third distance from fronto-parietal suture to postorbitals; postorbital processes long, rather slender, outstanding, and slightly decurved; frontal part of brain-case elevated; zygomata moderately spreading and outbowed; palate long, somewhat concave; squamosal shelves broad; coronoid broadly falcate; ramus flat and broad vertically. Teeth of medium size (badly worn).

*Cranial comparisons.*—Old male (type) compared with old male *horriæus* (type): Size essentially the same; vault of cranium higher over posterior frontal region; frontal shield slightly convex (not sulcate or depressed between orbits or elsewhere), longer pointed posteriorly; fronto-nasal region markedly elevated instead of depressed; rostrum much higher posteriorly, rising in same plane with frontal shield and strongly compressed; postorbital processes more slender and less decurved; sagittal crest much shorter; angle of jaw shorter; inferior border of ramus decidedly longer; apex of coronoid more slender. Teeth so badly worn that detailed characters are lost; in size, however, they agree essentially with those of *horriæus* except that the large lower premolar is decidedly smaller.

*Skull measurements.*—Old male (type): Basal length, 314;<sup>1</sup> occipito-nasal length, 306; palatal length, 165; zygomatic breadth, 205; interorbital breadth, 75.

#### URSUS UTAHENSIS MERRIAM.

##### UTAH GRIZZLY.

*Ursus utahensis* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 193-194, August 13, 1914.

*Type locality.*—North Fork Salina Creek, 10 or 12 miles southeast of Mayfield, Utah.

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<sup>1</sup> Restored.

*Type specimen.*—No. 180193, ♂ old, U. S. National Museum, Biological Survey collection. Collected May 22, 1911, by Mart Martenson.

*Range.*—Southern Wasatch and Pine Valley Mountains; limits unknown.

*Characters.*—Size large; coloration apparently normal. Skull long, narrow, and high, but not arched; fronto-nasal region high and very narrow—strongly pinched in.

*Color.*—Skin of head of male killed on Pine Valley Mountain, southwest Utah (obtained from forest ranger, September 24, 1907, by Clarence Birdseye; original No. 989): Muzzle pale brown; face and throat, except pale lip edgings and long hairs of median line of throat, dark brown, becoming grizzled posteriorly; top of head very dark; grizzled posteriorly by brown-tipped hairs.

*Cranial characters.*—*Adult male* (type, and equally old male from northeast corner Sevier National Forest): Size large; skull very long, high, and exceedingly narrow; zygomata moderately spreading and outbowed; frontal shield narrow, flattened posteriorly, falling away laterally immediately in front of orbits, leaving a high fronto-nasal ridge; short pointed posteriorly; sagittal crest long and high, reaching anteriorly nearly to midway between fronto-parietal suture and plane of postorbital processes; postorbital processes very long, slender, peglike, and horizontally extended; rostrum long, high, rather narrow, and strongly compressed below nasals; palate and postpalatal shelf exceedingly long; postpalatal shelf and notch narrow; interpterygoid fossa exceptionally deep; basisphenoid strongly concave. Underjaw very long, ramus flat and exceedingly broad vertically; coronoid blade high and moderately recurved. Dentition light for so large a skull; canines rather small; upper and lower molariform series medium or rather small; middle lower molar decidedly narrow; M<sup>2</sup> small, the heel narrowed on outer side.

An imperfect skull of an *old male* (No. 167390) from Pine Valley Mountain, southwest Utah, differs from the type in having still smaller teeth both above and below, the molars, fourth premolar, and canines being but little larger than those of the female from the type locality.

*Adult female* (No. 180207, from type locality): Similar in general to male, but much smaller and somewhat less extreme. Skull long and narrow; frontals and fronto-nasal region essentially the same but sagittal crest shorter; zygomata relatively as well as actually much narrower (much less spreading) and not outbowed; rostrum narrowest anteriorly; molars smaller; canines much smaller.

*Cranial comparisons.*—Old male (type) compared with adult and old males of *bairdi* (the only neighboring species of approximately same size): Rostrum longer and decidedly narrower; base of rostrum in

front of orbits more compressed; postorbital processes longer and more slender; palate longer; postpalatal shelf narrower; interpterygoid canal much deeper; ramus of jaw longer, decidedly broader (vertically), flatter, and much thinner under  $M_2$  and  $M_3$ ; upper molariform teeth, middle lower molar, and lower canines much smaller.

*Skull measurements.*—Old male (type): Basal length, 348; occipito-nasal length, 337; palatal length, 194; zygomatic breadth, 226; inter-orbital breadth, 79.

#### URSUS PERTURBANS SP. NOV.

##### MOUNT TAYLOR GRIZZLY.

*Type* No. 222102, ♂ old, U. S. National Museum, Biological Survey collection. Collected near Mount Taylor, northern New Mexico, July 9, 1916, by Ed. Anderson.

*Characters.*—Size very large; skull long and narrow, with narrowly spreading zygomata and exceedingly high sagittal crest; affinities with *utahensis*, *idahoensis*, and more remotely with *arizonæ*. Claws moderate, slightly curved, mainly ivory whitish on top, darker on sides.

*Color.*—*Adult male* (type): General ground color dusky; face and head dark brown, becoming dusky around eyes; body dusky, back grizzled with dark golden tips; legs and feet black.

*Cranial characters.*—*Adult male* (type): Skull conspicuously long and narrow, the narrowness marked in braincase, frontal shield, rostrum, palate, postpalatal notch, and basicranial axis; postorbital processes moderately outstanding horizontally, frontal shield broadly and shallowly concave, becoming flat in old age, very short posteriorly, the point entering sagittal crest in midfrontal region (less than halfway from postorbital processes to fronto-parietal suture); fronto-nasal region very slightly dished; rostrum narrow and rather high in type specimen (somewhat broader in very old skull from Datil Mountains, No. 140086); frontal part of braincase keeling into crest; underjaw long; coronoid blade high; ramus straight, its inferior border slightly concave under  $M_1$ , only slightly upcurved posteriorly, and not broadly expanded vertically; diastema long.

Teeth of medium size, about as in *idahoensis* (much smaller than in *horribilis* and *bairdi*); heel of  $M^2$  long, flat, emarginate, and slightly everted, resembling that of *idahoensis*;  $PM_4$  strikingly small—much smaller than in any other known grizzly and no larger than in some of the black bears (*Euarctos*), its crown falling below plane of molar crowns. Upper canines rather small, as in *idahoensis* and *arizonæ*; lower canines more slender than in these species.



The skull of a still older male (No. 140086) killed some years ago at Kid Springs, Datil Mountains, New Mexico, 10 miles northeast of Datil, and secured for the Biological Survey by N. Hollister, in October, 1905, resembles the type in essential characters, but is even longer and owing to greater age has the frontal shield flatter, the fronto-nasal region less dished, the sagittal crest even more highly developed, the interpterygoid fossa even longer and narrower.

*Cranial comparisons.*—Old male (type) compared with old male *utahensis* (type): Size and general appearance similar, but underjaw widely dissimilar; nasals and fronto-nasal region less elevated; rostrum smaller; sagittal crest more highly developed; zygomata less spreading; palate and postpalatal shelf shorter; postpalatal shelf less narrowed; underjaw *very much smaller*, shorter, and lighter, the ramus *much less broadly expanded* vertically, its inferior border shorter and less upcurved posteriorly; coronoid blade much smaller and lower. Canines much smaller; molars decidedly larger, especially  $M_2$ ; heel of  $M_2$  much larger and broader posteriorly.

*Remarks.*—*Ursus perturbans* appears to have affinities in several directions. In length and slenderness of skull it resembles *utahensis* more closely than any other species, but the underjaw differs amazingly from that of *utahensis*, being relatively small and light, while that of *utahensis* is large and remarkably broad vertically. In dental characters, especially the form of  $M_2$ , it resembles *idahoensis*. In the great development of the sagittal crest it exceeds all known grizzlies, not excepting *horribilis*.

*Skull measurements.*—Old male (type): Basal length, 338; occipito-nasal length, 339; palatal length, 182.5; zygomatic breadth, 210; interorbital breadth, 83.

#### URSUS ROGERSI ROGERSI<sup>1</sup> SP. NOV.

##### ROGERS GRIZZLY.

*Type* No. 222983, ♂ ad., U. S. National Museum, Biological Survey collection. Collected high up on Greybull River, Absaroka Mountains, Wyoming, in the fall of 1890, by Archibald Rogers, and by him presented to the Biological Survey.

*Characters.*—Skull very large and long, the length of the adult male equalling or slightly exceeding that of *horribilis*, *bairdi*, *utahensis*, and *perturbans*; fronto-nasal region elevated and compressed, forming part of long fronto-nasal plane, as in *bairdi* and *utahensis*; frontal shield rather narrow, faintly convex transversely; post-orbitals rather weak and somewhat decurved; sinus case keeling into

<sup>1</sup> Named for Archibald Rogers, of New York, who collected and presented the type specimen.

sagittal crest; rostrum long and rather slender, high posteriorly, strongly sloping; palate narrow and very long; interpterygoid fossa narrow and very long; zygomata moderate, rather low, as in *utahensis* and *idahoensis*—not arched as in *horribilis*, *bairdi*, and *imperator*; underjaw long and massive with ramus rather broadly expanded posteriorly, but very much less so than in *utahensis*. Canines small; molars moderate. Relationships with *arizonæ*, *bisonophagus*, and *idahoensis*, but size much larger; and also with *utahensis*, with which it agrees essentially in size.

*Cranial comparisons.*—Adult male (type, perhaps not quite fully adult) compared with males of the three related forms, *arizonæ* (type, adult), *bisonophagus* (type, young-adult) and *idahoensis* (type, old): General appearance similar, but skull as a whole, palate, and interpterygoid fossa much longer; underjaw very much longer, larger, and more massive; coronoid blade broader and higher; canines of approximately same length but lower canines more massive basally; molars in general similar, but last upper molar longer, with heel rather broadly rounded posteriorly, instead of emarginate or subtriangular;  $M_1$  smaller; crown of  $M_3$  much longer. More detailed comparisons seem unnecessary, though it may be remarked that from *idahoensis*, its nearest neighbor on the west, it differs markedly not only in greater size, but also in very much longer, larger, and more massive underjaw, and in the following dental characters:  $M^1$  smaller; heel of  $M^2$  broader and not emarginate;  $M_3$  much longer.

Adult male (type) compared with old male *utahensis* (type): Size essentially the same though the basal length is greater; frontal shield somewhat broader; postorbitals less strongly developed, shorter, depressed instead of horizontally outstanding; rostrum larger and less compressed; interpterygoid fossa longer and less deep, palate and postpalatal shelf broader; underjaw of essentially same length, but ramus less broadly flattened. Canines apparently less elongate (in *utahensis* broken); last upper molar larger, the heel broader and more broadly rounded posteriorly; crowns of middle and last lower molars longer.

*Skull measurements.*—Adult male (type): Basal length, 353; occipito-nasal length, 345; palatal length, 193; zygomatic breadth, 211; interorbital breadth, 86.

#### URSUS ROGERSI BISONOPHAGUS SUBSP. NOV.

##### BLACK HILLS GRIZZLY.

*Type* No. 181089, ♂ young-adult, U. S. National Museum, Biological Survey collection. From Bear Lodge, Sundance National Forest, Black Hills, northeastern Wyoming. Collected in February, 1887, by Paul Kleineidam.

*Range.*—Black Hills of South Dakota and adjacent northeast corner of Wyoming.

*Characters.*—Size large; skull long, slender, and rather low, smoothly rounded on sides, with weak decurved postorbitals, and elevated fronto-nasal region. Affinities with *arizonæ* and *rogersi*. Claws of moderate length, strongly curved, smoothly polished, dark horn color, marked toward tips with pale yellowish, and most of them with whitish (superficially) on upper side of basal half.

*Color.*—*Type*: Muzzle pale brown (apparently old pelage); head and face blackish, becoming slightly grizzled posteriorly and on lower part of cheeks by wash of yellowish-brown-tipped hairs; entire body, legs, and feet very dark brown overlaid on back by wash of light tips.

*Cranial characters.*—*Young-adult male* (type): Similar in general to *rogersi*. Viewed from *above*: Closely similar except for smaller size and differences in the development of certain parts attributable in the main to lesser age (shield more convex transversely; postorbitals slightly less outstanding; fronto-nasal region slightly higher, almost forming a hump). Viewed from *below*: Palate and postpalatal shelf *very much shorter*; postpalatal notch less narrow; underjaw smaller and lighter; canines longer;  $M^1$  slightly larger;  $M^2$  with heel subtriangular, strongly narrowed on outer side as in *arizonæ* (in *rogersi* not narrowed but rather broadly rounded);  $M_T$  slightly larger;  $M_{\frac{2}{3}}$  much smaller. Fully adult skulls would doubtless show other differences.

*Cranial comparisons.*—*Young-adult male* (type) compared with adult male *arizonæ* (type): Skull and teeth similar but skull longer and narrower anteriorly; vault of cranium slightly less arched; rostrum narrower; fronto-nasal region slightly more compressed and more elevated, continuing frontal plane; frontal shield slightly narrower, somewhat more convex transversely, its sides more smoothly rounded (doubtless because slightly younger); postorbital processes less developed; lambdoid crest more strongly developed; postpalatal shelf smaller. Underjaw slightly longer; inferior border of ramus longer and more upcurved posteriorly; ramus more broadly expanded vertically; coronoid blade higher and flatter (fossa less deeply excavated), its anterior border more nearly vertical; upper molars somewhat larger; middle lower molars smaller; upper canines essentially the same; lower canines somewhat longer and more slender.

*Remarks.*—The range of *bisonophagus* appears to be completely isolated from that of its nearest relative *rogersi* of the mountains between Yellowstone Park and Bighorn Basin. On the other hand, its range appears to overlap parts of those of *absarokus*, *horribilis*, and *bairdi*. From *bairdi*, which it resembles in form of skull, it is easily

distinguished by decidedly smaller size and very much smaller canines and molars.

*Skull measurements.*—Young-adult male (type): Basal length, 331;<sup>1</sup> occipito-nasal length, 323; palatal length, 173; zygomatic breadth, 200; interorbital breadth, 80.

URSUS PERVAGOR MERRIAM.

LILLOOET GRIZZLY.

*Ursus pervagor* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 186-187, August 13, 1914.

*Type locality.*—Pemberton Lake (now Lillooet Lake), British Columbia.

*Type specimen.*—No. 187887, ♂ ad., U. S. National Museum (=No. 6510, Merriam collection). Collected in May, 1883, by John Fannin.

*Range.*—Interior of southwestern British Columbia; known only from Lillooet Lake and Bridge River.

*Characters.*—Size rather large. External characters unknown.

*Cranial characters.*—*Adult male* (type): Size large; skull long, rather narrow, high, moderately dished; zygomatic moderately spreading and outbowed; frontal shield of moderate breadth, rather flat, strongly sloping, shallowly sulcate medially, swollen on each side just behind plane of postorbitals; postorbital processes outstanding, thick, peglike; postpalatal shelf rather broad and flat; frontal part of braincase elevated and compressed, supporting posterior part of frontal shield; palate long; squamosal shelf long; mastoids long; interpterygoid fossa short and rather broad; underjaw long; coronoid broad and rather vertical; ramus long, swollen on outer side. Teeth small, particularly the canines and lower molars.

*Cranial comparisons.*—Adult male (type) compared with adult male *canadensis* (type): Considerably larger; vault of cranium much higher; frontal shield much broader, higher, more strongly sloping, and less flat; frontal part of braincase elevated and compressed, rising strongly to temporal impressions (in *canadensis* not compressed except at sagittal crest); postorbital processes much larger; rostrum more strongly ascending; occipito-sphenoid longer (98 mm. against 90); underjaw much longer; coronoid blade higher, its apex less recurved. Canines about same size; large upper premolar, upper molars, and  $M_1$  and  $M_2$  decidedly smaller.

Adult male (type) compared with adult male *caurinus*: Frontal shield broader, less elevated posteriorly; fronto-nasal region less strongly dished; coronoid blade less nearly vertical; upper canines slightly shorter; lower canines conspicuously smaller and shorter.

<sup>1</sup> Restored.

Adult male (type) compared with adult male *eulophus* (type and older skulls): Similar in general, both having the fronto-facial region long sloping and flattish, but differing in many characters. The skull of *pervagor* differs from that of *eulophus* in being slightly shorter, less highly arched, frontal shield less elevated posteriorly; postorbitals larger, more horizontally outstanding; sagittal crest shorter and straighter, not arched; braincase, rostrum, and palate shorter; squamosal shelf shorter; postpalatal shelf broader and shorter; interpterygoid notch broader; underjaw smaller and less massive; inferior border of ramus shorter and less broadly expanded; coronoid lower, the apex less narrowed and less recurved, with less development of inferior ridge of fossa; teeth (canines and molars) slightly smaller.

*Skull measurements.*—Adult male (type): Basal length, 330; occipito-nasal length, 322; palatal length, 178; zygomatic breadth, 224; interorbital breadth, 81.

#### URSUS CAURINUS MERRIAM.

##### LYNN CANAL GRIZZLY.

*Ursus caurinus* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 187, August 13, 1914.

*Type locality.*—Berners Bay, east side of Lynn Canal, Southeastern Alaska.

*Type specimen.*—No. 176591, ♀ ad., U. S. National Museum, Biological Survey collection. Collected June 8, 1911 by A. Hasselborg.

*Range.*—Coast of mainland of Southeastern Alaska from Chilkat River valley and Lynn Canal south an unknown distance.

*Characters.*—Very closely related to *eulophus* of Admiralty Island. Size rather large; skull long and rather narrow; canines long, the lower ones massive; claws smoothly polished.

*Color.*—Upperparts yellowish buff; face and most of head pale brown or drab; ears, hump, and underparts conspicuously darker; legs and feet dark brown or brownish black.

*Cranial characters.*—*Male and female:* Both skulls long and narrow, strongly arched posteriorly, moderately dished; frontal shield of medium breadth, strongly ascending; postorbital processes weak and decurved except in old age; frontal part of braincase elevated, forming an uplifted base for posterior part of frontal shield, behind which it keels into sagittal crest as in *eulophus*; palate long; postpalatal shelf rather narrow; squamosal shelf long; lachrymal duct opening within orbital rim; ramus of jaw broad and flattened, notably higher posteriorly than anteriorly. Teeth rather small for size of skull; last upper molar long and narrow, tapering posteriorly.

Unfortunately, no fully adult male *caurinus* has been obtained, but I have secured a skull of a young-adult male (No. 205169) from Berners Bay, Lynn Canal, and another (No. 210140) from Chilkat River valley. These present the following characters: Skull long, high, and narrow, rather highly arched and dished; frontals rising rather strongly from rostrum; frontal shield rather narrow, long sloping, convex transversely in these youngish skulls (doubtless flat-tish in adults), slightly sulcate medially; long pointed, the point nearly reaching parietals; postorbital processes rather broad and slightly decurved (doubtless more outstanding with age); fronto-nasal region dished; rostrum moderate; nasals nearly horizontal anteriorly, rising posteriorly into frontal shield; frontal part of braincase compressed and elevated, keeling into temporal impressions and anterior part of sagittal crest; squamosal shelves long. Underjaw rather long; ramus moderate, its inferior border bellied posteriorly; coronoid blade moderate and rather vertical; apex not strongly recurved; palate, postpalatal shelf and notch medium; teeth rather small for size of skull; molars only slightly larger than those of female;  $M^2$  rather narrow, with narrow slightly everted heel; canines, especially lower canines, decidedly thicker than those of female;  $M_1$  rather swollen in both male and female;  $M_2$  small and narrowest posteriorly;  $PM_4$  with main cusp rather small, conical, anterior, with gradually sloping incompletely sulcate heel, rarely with traces of posterior cusplets, sometimes with anterior cusplet on inner side of cingulum.

The Chilkat Valley male is a year older than the Berners Bay skull, and broader across the frontals; postorbital processes more outstanding, ramus of underjaw more bellied posteriorly; coronoid blade broader above;  $M_1$  smaller and thinner.

*Cranial comparisons.*—*Ursus caurinus* appears to be rather closely related to *pervagor* of the Lillooet region in the interior of British Columbia, and to *eulophus* of Admiralty Island, Southeastern Alaska, but unhappily no skulls of fully adult males are available for comparison.

Young-adult male (No. 210140, from Chilkat River valley) compared with adult male *eulophus* (type) and with a young adult *eulophus* (No. 203284), both from Admiralty Island: Frontal shield narrower anteriorly and *much narrower posteriorly* (narrowed behind postorbitals by usual incurving temporal ridges, while in *eulophus* the ridges are nearly straight and the posterior part of shield correspondingly broader); fronto-nasal region more strongly dished; underjaw longer; ramus thicker (more swollen on outer side); coronoid blade broader above and much less recurved. Canines essentially same;  $M_1$  smaller;  $M^2$  broader in middle and posteriorly.

Adult female (type) compared with young-adult female *eulophus* (No. 137470): Basal, occipito-nasal, and occipito-sphenoid lengths

essentially same; vault of cranium much less arched; frontal shield flatter, narrower interorbitally and postorbitally; postorbitals much smaller and outstanding instead of strongly decurved; fronto-nasal region scarcely dished; rostrum lower; nasals smaller; palate shorter; underjaw more massive; coronoid broader and less recurved;  $M_1$  thicker;  $M^2$  narrower throughout, the heel narrowed on outer side.

Young-adult male compared with adult male *pervagor*: Frontal shield narrower, more elevated posteriorly; fronto-nasal region more strongly dished; coronoid blade more nearly vertical.  $M^2$  narrower, with narrower heel. Upper canines slightly longer; lower canines conspicuously longer and larger.

*Skull measurements*.—Adult female (type): Basal length, 295; occipito-nasal length, 285; palatal length, 161; zygomatic breadth, 196; interorbital breadth, 66.

#### URSUS EULOPHUS MERRIAM.

##### ADMIRALTY ISLAND CRESTED BEAR.

*Ursus eulophus* Merriam, Proc. Biol. Soc. Washington, XVII, p. 153, October 6, 1904.

*Type locality*.—Admiralty Island, Southeastern Alaska.

*Type specimen*.—No. 81102, ♂ ad., U. S. National Museum, Biological Survey collection. Collected in 1896 by Lieut. G. T. Emmons.

*Range*.—Admiralty Island.

*Characters*.—Size large; color rich dark brown; claws blue-black, of moderate length; skull long, rather narrow, and high, with weak decurved postorbital processes.

*Color*.<sup>1</sup>—General color of head and body in fresh pelage, rich dark brown or seal brown; muzzle paler; legs, feet, and belly dusky or blackish; neck and shoulders sometimes grizzled by admixture of yellowish-tipped hairs.

*Cranial characters*.—*Adult males*: Skull large, long, high, and rather narrow; frontal shield long and rather narrow, shallowly grooved medially, gradually sloping (not abruptly elevated); temporal impressions long and only slightly incurved, meeting at fronto-parietal suture; postorbital processes weak and decurved; fronto-nasal region elevated in plane of shield; rostrum long and high; anterior third of nasals horizontal, posterior two-thirds rising in fronto-nasal plane; zygomata moderately spreading, subangular; squamosal root only slightly expanded; palate and postpalatal shelf long and narrow; ascending arms of maxillæ long, passing far beyond nasals and reaching back over anterior two-thirds of orbit; nares rather small; braincase long anteriorly, rather narrow, com-

<sup>1</sup> Color from skins in Mus. Vert. Zool., Univ. California, obtained on Admiralty Island by Miss Annie M. Alexander.

pressed, and keeling into sagittal crest; sagittal crest high, curved, and relatively short; ramus of jaw high vertically, its inferior border *strongly bellied* posteriorly; coronoid blade large and moderately high. Canines long; molars rather small for so large a skull.

*Cranial comparisons.*—Adult male (type) compared with adult male *pervagor* (type): Skull longer; arch of cranium higher; frontal shield longer sloping, rising higher posteriorly; rostrum longer; braincase longer; sagittal crest more convex; palate and postpalatal shelf longer; shelf and notch narrower; underjaw larger, longer, more massive; inferior border of ramus longer, more strongly bellied posteriorly and broader vertically; coronoid fossa deeper, its inferior border much more sharply defined by strongly developed ridge for muscular attachment. Canines and molars larger.

*Skull measurements.*—Adult male (type): Basal length, 346; occipito-nasal length, 343; palatal length, 190; zygomatic breadth, 221; interorbital breadth, 81.

### URSUS KLAMATHENSIS MERRIAM.<sup>1</sup>

#### KLAMATH GRIZZLY.

*Ursus klamathensis* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 185-186, August 13, 1914.

*Type locality.*—Beswick, near mouth of Shovel Creek, Klamath River, northern California.

*Type specimen.*—No. 178735, ♂ ad., U. S. National Museum, Biological Survey collection. Collected and presented by Charles Farwell Edson.

*Range.*—Siskiyou Mountains of northern California and southern Oregon, ranging north in recent times to Fort Klamath region and Rogue River valley; in early days to lower Willamette Valley (presumably same species); south in Sierra Nevada an unknown distance. (Skull from lower McCloud River referred to this species.)

*Characters.*—Size of male large; skull in general of the *idahoensis* type, but larger and with heavier canines. Claws moderate, rather strongly curved, horn color, washed with yellowish basally and with pale yellowish markings at tips, marked longitudinally with fine parallel striæ. Skin characters unknown.

*Cranial characters.*—Skull large and high, highest about 40 mm. in front of fronto-parietal suture; rostrum long, high, and ascending in plane of frontal shield; fronto-nasal region elevated, scarcely if at all dished; frontal shield broad, flat, sloping, and rather short pointed; postorbital processes moderate, peglike, horizontally outstanding; sagittal crest long and well developed; lachrymal duct

<sup>1</sup> Tentatively included in *arizonæ* group. (See Introduction, pp. 12-13.)



opening on orbital rim (rather posteriorly than anteriorly); zygomata moderately spreading, only moderately expanded vertically; anterior (frontal) part of braincase keeling into sagittal crest; occiput produced posteriorly (overhang much greater than in *californicus*); squamosal shelves long and broad; palate rather flat, slightly arched lengthwise; postpalatal shelf broad and flat; occipito-sphenoid short for so large a skull (length 89 mm.); basioccipital very broad anteriorly; mastoids vertical and short. Underjaw long; ramus exceptionally broad and flat vertically; coronoid blade large and high, broad basally. Canines very large; molars moderate; last upper molar relatively small, the heel emarginate or obliquely truncate on outer side; middle lower molar with anterior moiety much larger than posterior. Large upper premolar absent and no trace of alveolus.

*Cranial comparisons.*—Curiously enough *klamathensis* does not require close comparison with any of the other species inhabiting California, its only near relatives being members of the *shoshone-idahoensis* group of the Rocky Mountains, and *pervagor* of interior British Columbia.

Adult male (type) compared with old male *idahoensis* (No. 187888, =No. 93, Merriam collection, from North Fork Teton River, eastern Idaho): Similar in general form and proportions but larger (condylobasilar length 350 mm. contrasted with 335); vault of cranium somewhat higher; frontal shield broader and flatter; palatal length about the same; postpalatal length much greater (150 contrasted with 135); opening of lachrymal duct slightly more posterior; occipital overhang greater; basioccipital anteriorly very much broader; ramus of underjaw longer and much broader vertically; coronoid blade higher. Canines larger and longer; last upper molar shorter.

Adult male (type) compared with adult male *pervagor* (type): Similar in size and general characters; vault of cranium slightly higher; frontal shield flatter and somewhat broader; postorbitals not quite so large; fronto-nasal region more elevated (in *pervagor* slightly dished); rostrum broader anteriorly; occipital overhang greater; ramus of underjaw much more broadly expanded vertically and flatter; canines and molars very much larger.

Adult male (type) compared with old male *henshawi* (type): *Ursus klamathensis* and *U. henshawi* belong to widely different groups and do not require detailed comparison. *U. klamathensis* may be distinguished at a glance by its much larger size, much higher vault of cranium, highly elevated and continuously sloping fronto-nasal region and rostrum, and peglike postorbitals—in striking contrast to the much smaller, lower, and strongly dished skull of *henshawi*,

with its low depressed rostrum and large broadly rounded post-orbitals.

Adult male (type) compared with adult male *californicus* (from coast region south of San Francisco Bay): The differences are marked in the skull and striking in the teeth. In *klamathensis* the vault of the cranium is lower posteriorly and higher anteriorly; the frontal shield flatter laterally; the rostrum shorter; the base of the cranium (occipito-sphenoid) decidedly shorter. The last upper and middle lower molars are widely different, the heel of  $M^2$  in *californicus* large, long, and broad posteriorly, while in *klamathensis* it is small and emarginate on outer side; the anterior part of  $M_{\frac{2}{2}}$  in *californicus* is normal, while in *klamathensis* it is disproportionately large.

*Skull measurements*.—Adult male (type): Basal length, 331; occipito-nasal length, 337; palatal length, 175; zygomatic breadth, 223; interorbital breadth, 85.5.

#### URSUS MENDOCINENSIS MERRIAM.<sup>1</sup>

##### MENDOCINO GRIZZLY.

*Ursus mendocinensis* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 145-146, September 6, 1916.

*Type locality*.—Long Valley, Mendocino County, California.

*Type specimen*.—No. 206625, ♂ old, U. S. National Museum, Biological Survey collection. Obtained through Charles J. and Frank H. Hittell.

*Characters*.—Size rather large, about equaling *klamathensis* but apparently smaller than *californicus* and *colusus*; external characters unknown. Affinities with *klamathensis*, with which it may intergrade at the north.

*Cranial characters*.—Skull short, broad, highly arched, and strongly dished, with widely outstanding zygomata and truncate occiput. Frontal shield of moderate breadth, short pointed posteriorly, slightly convex between orbits, strongly sloping to rostrum; rostrum short, broad, and strongly depressed; postorbital processes moderate, sub-peglike, horizontally outstanding; sagittal crest high, thick, humped anteriorly, short posteriorly; occiput obliquely truncate; occipital overhang slight compared with that of *californicus* and *colusus*; palate short and rather broad; postpalatal shelf of moderate breadth, flat; postpalatal notch moderate; mastoids rather short, directed anteriorly. Underjaw absent. Teeth gone except left hind molar, which is short, with small heel, obliquely truncate on outer side (as in *klamathensis*).

<sup>1</sup> Tentatively included in *arizonæ* group. (See Introduction, pp. 12-13.)

*Cranial comparisons.*—Similar in general to *klamathensis* but fronto-nasal region strongly dished, *rostrum shorter, broader, flatter on top, and depressed instead of elevated*; zygomata more widely outstanding; palate broader; occipital overhang less.

*Skull measurements.*—Old male (type): Basal length, 327; occipito-nasal length, 323; palatal length, 183; interorbital breadth, 84.5.

URSUS MAGISTER MERRIAM.<sup>1</sup>

SOUTHERN CALIFORNIA GRIZZLY.

*Ursus magister* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 189, August 13, 1914.

*Type locality.*—Los Biacitos, head of San Onofre Canyon, Santa Ana Mountains, Southern California.

*Type specimen.*—No. 160155, ♂ old, U. S. National Museum, Biological Survey collection. Killed in August, 1900 or 1901, by Henry A. Stewart and by him presented to the Biological Survey.

*Range.*—Santa Ana or Trabuco Mountains, Cuyamaca and Santa Rosa Mountains, and probably San Jacinto Mountains. Believed to be extinct.

*Characters.*—Size of male huge (estimated weight over 1,400 pounds), largest of known grizzlies, considerably larger than *californicus* of the Monterey region, and even than *horribilis*, the great buffalo-killing grizzly of the Plains (only equaled by the largest *alexandrae* of Kenai Peninsula); sexual disparity great; skull of female hardly half the bulk of male; skull of male of a rather generalized type; not dished. Claws of old female from head of Trabuco Canyon, Santa Ana Mountains, exceedingly long, strongly curved, mainly yellowish above.

*Color.*—(Old female from head of Trabuco Canyon): General color dusky or sooty all over except head and grizzling of back. Muzzle gray or mouse brown, palest above; top of head and neck very dark brown, sparsely grizzled with pale-tipped hairs; back dusky grizzled with grayish; legs and underparts wholly blackish.

*Cranial characters.*—*Adult male* (type): Skull exceedingly large, long; vault of cranium arched, but not abruptly; rostrum long and high; fronto-nasal region elevated, in same plane with frontal shield and rostrum; frontal shield flattish-convex, faintly sulcate medially and slightly swollen on each side between postorbital processes, the point decurved and reaching fronto-parietal suture; zygomata only moderately spreading, angular, the posterior root expanded and rising abruptly from plane of squamosal shelf; sagittal crest rather short; palate scooped out anteriorly, forming a basinlike depression surrounding the anterior palatine foramina; occipito-sphenoid

<sup>1</sup> Tentatively included in *arizonæ* group. (See Introduction, pp. 12-13.)

length 103.5 mm. Underjaw long; ramus broad and flat vertically, its inferior border moderately bellied and incurved posteriorly; coronoid blade large, its apex strongly recurved, cutting plane of middle of condyle. Teeth large and broad but by no means disproportionate to large size of skull;  $M^1$  broad; last upper molar absent, but from its alveolus and its form in female, obviously broad, short, strongly triangular, the heel small, narrowed posteriorly, obliquely emarginate on outer side;  $PM_T$  broad, with rather short slightly sloping heel, narrow imperfect sulcus without posterior cusplets;  $M_T$  apparently normal (much worn in type specimen); middle lower molar absent in type specimen but apparently normal (judging from the female, in which, however, it is badly worn).

*Female* of extreme age (No. 156594, from Trabuco Canyon, killed January 5, 1908, by Andrew Joplin and Edward Adkinson): Size small; rostrum short and depressed; fronto-nasal region strongly dished; frontal shield flattish, slightly sulcate interorbitally, short pointed, beaded posteriorly by elevated temporal impressions, rising rather abruptly at orbits; sagittal crest long and nearly horizontal; palate and postpalatal shelf broad, flat posteriorly, concave anteriorly.

*Cranial comparisons.*—*Ursus magister* does not require close comparison with any other species. While the largest skulls of old male *californicus* equal it in basal length, they are so much lower, narrower, and smaller in every way that detailed comparisons are unnecessary. The species which it most nearly resembles is *bairdi* from the mountains of Colorado, but the resemblance is not close. It differs from *bairdi* in somewhat larger size, much more highly arched vault of cranium, much broader and more strongly sloping frontal shield, more posterior mastoids, longer underjaw with much more broadly flattened and less massive ramus, and in important tooth characters.

Between the two geographically is *utahensis*, which, like *magister*, has the ramus of the underjaw very broadly flattened vertically, but in form of cranium *utahensis* goes to the opposite extreme, the frontal shield, rostrum, and braincase being exceptionally narrow, and the fronto-nasal region compressed and elevated.

*Flesh measurements.*—Old male (type): Height at shoulder from flat of foot 4 ft. (=1,220 mm.); total length, snout to tail,  $9\frac{1}{2}$  ft.<sup>1</sup> (=2,900 mm.); sole of largest foot without claws: length 12 in. (=305 mm.); breadth 8 in. (=204 mm.). Length of old female from Trabuco Canyon, measured in the flesh by Andrew Joplin, 6 ft. 3 in.

*Skull measurements.*—Old male (type): Basal length, 365; occipito-nasal length, 366; palatal length, 197; zygomatic breadth, 236; interorbital breadth, 97.

<sup>1</sup> Apparently an error; possibly intended for snout to claws of extended hind foot.

## Hylodromus Group.

## URSUS HYLODROMUS ELLIOT.

## FOREST GRIZZLY.

(Plate XI.)

*Ursus hylodromus* Elliot, Field Columb. Mus. Pub. 87, Zool. Ser. III, pp 257-258, December, 1913. (Described as a black bear!) Purchased from Mackay & Dippie, taxidermists, Calgary.

*Ursus selkirki* Merriam, Proc. Biol. Soc. Washington, XXIX, p. 150, September 6, 1916. (From Selkirk Mountains, Upper Columbia River, British Columbia.)

*Type locality*.—Rocky Mountains of western Alberta (precise locality unknown).

*Type specimen*.—No. 19065, ♀ young-adult, Field Museum of Natural History.

*Range*.—Rocky Mountain region of western Alberta and eastern British Columbia, including Selkirk Range.

*Characters*.—Size of male large, of female small; external characters unknown.

*Cranial characters*.—*Young-adult female* (type<sup>1</sup>): Size small, skull short posteriorly (occiput less extended than in most species); moderately arched and dished; zygomata not outstanding and only slightly bowed; frontal shield of moderate breadth, rising rather strongly from rostrum, its apex sublyrate; postorbital processes large, outstanding; rostrum rather high, strongly ascending posteriorly; sagittal crest short, reaching only two-thirds distance from occiput to fronto-parietal suture; squamosal shelf narrow and nearly horizontal; postpalatal shelf rather broad.

*Old male* (No. 205170) from Selkirk Mountains, upper Columbia River, British Columbia (assumed to be typical): Size medium; skull long, low arched, highest immediately in front of fronto-parietal suture, and of medium breadth; braincase and palate arched; shield flattish, long pointed, sloping gradually from point to rostrum, faintly sulcate medially; postorbitals broadly subtriangular, flat on top and slightly decurved, convex posteriorly, concave anteriorly; rostrum moderate, nearly horizontal; fronto-nasal region rising very gradually into shield; sagittal crest short; palate of medium breadth, slightly troughed and arched; postpalatal shelf broad and flat; zygomata subtriangular, not widely outstanding, strongly arched antero-posteriorly; squamosal root long but not broadly expanded; mas-

<sup>1</sup> Through the courtesy of the officials of the Field Museum I have had the privilege of examining the type skull of *hylodromus* and comparing it with skulls in the National Museum collection.

toids short, not divergent; meatus tube large and free; ramus of underjaw straight; coronoid blade low, broad in middle part. Teeth of medium size (too badly worn to admit of description).

*Cranial comparisons.*—Old male (No. 205170, from Selkirk Mountains) compared with old male *kluane* (type): Size smaller; vault of cranium materially lower; top of skull lower and flatter throughout; shield narrower, much flatter, and longer pointed; sagittal crest much shorter and lower; occipital overhang and inion much less developed; zygomata more triangular (less bowed); braincase, palate, and underjaw much shorter; coronoid blade lower; subangular border shorter and more strongly defined. Teeth very badly worn but canines and molars evidently much smaller.

Compared with *idahoensis* and *chelan* (both types): Similar in general but smaller; vault of cranium *much lower*; frontal shield somewhat narrower, longer pointed posteriorly; postorbital processes broader basally but less widely outstanding; sagittal crest much shorter, its anterior part less distinctly keeled from sinus case; zygomata shorter and more sharply triangular; underjaw shorter; coronoid blade lower; subangular notch and border similar.

Compared with *latifrons*, whose range it approaches on the north but with which it does not appear to be related, it is easily distinguished by smaller size, flatter and very much narrower frontal shield, more elevated and evenly sloping fronto-nasal region, less outbowed and more triangular zygomata, much shorter underjaw and ramus, and much lower coronoid blade.

*Remarks.*—The type specimen of *hylodromus* is a skull of a young-adult female from western Alberta, exact locality unknown. Until recently so few males have been available from this region that I was long in doubt as to which was its proper mate. In the light of present material, however, it has been possible to match up males and females of most of the species of eastern British Columbia and western Alberta with some confidence, and I now feel reasonably certain that the type specimen of the species described by me as *Ursus selkirki* from the Selkirk Mountains on the upper Columbia River is in reality an old male *hylodromus*, the name *selkirki* thus falling as a synonym.

*Skull measurements.*—Old male (No. 205170) from Selkirk Mountains: Basal length, 305; occipito-nasal length, 306; palatal length, 169; zygomatic breadth, 206; interorbital breadth, 74. Female young-adult (type): Basal length, 275; occipito-nasal length, 257; palatal length, 154; zygomatic breadth, 173; interorbital breadth, 69.

## URSUS KLUANE KLUANE MERRIAM.

## KLUANE GRIZZLY.

*Ursus kluane* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 141-143, September 6, 1916.

*Type locality*.—McConnell River, Yukon.

*Type specimen*.—No. 204188, ♂ old, U. S. National Museum, Biological Survey collection. Collected by Smith and Geddis July 15, 1914.

*Range*.—Southwest corner of Yukon Territory east of the St. Elias Range, extending northwesterly in Alaska to Mount McKinley region (head of Toklat), easterly in Yukon Territory to McConnell River (north-northeast of Teslin Lake) and probably south into northwest corner of British Columbia.

*Cranial characters*.—*Adult male*: Skull medium, rather long, narrow, somewhat arched and dished, with long braincase, long convex sagittal crest, and unusually broad decurved postorbitals. Frontal shield of medium width, strongly convex both transversely and antero-posteriorly, rising rather strongly from rostrum, slightly sulcate medially and moderately swollen over orbits; very short pointed, the point ending about midway between parietals and plane of postorbitals; postorbitals broad, decurved, strongly convex anteriorly, concave posteriorly; fronto-nasal region somewhat depressed; rostrum high and narrow, rounded above (subterete); nares truncate; sagittal crest very long and arcuate; occipital overhang andinion well developed; zygomata not widely outstanding, somewhat bowed, rounded posteriorly; palate moderate; postpalatal shelf large and broad; notch rather broad and short; mastoids long and divergent; underjaw rather long; coronoid blade high and narrow, the apex rather strongly recurved; teeth too badly worn to admit of description (apparently large for size of skull).

*Adult female*: Size small, nearly as small as female *pallasi*; fronto-nasal region moderately dished and usually sulcate; braincase moderately arched, highest just in front of fronto-parietal suture; temporal impressions meeting over anterior part of parietals (probably somewhat more anteriorly in old skulls); zygomata moderately outbowed, subtriangular; frontal shield of medium breadth, lyrate pointed posteriorly; postorbital processes rather broad for so small a skull, moderately decurved; underjaw short; coronoid blade broad basally and rather short. Teeth (canines, incisors, and molars) rather large for size of skull, decidedly larger than in *pallasi*; molars, both upper and lower, very much larger.

*Cranial comparisons.*—The species requiring comparison with *kluane* are *toklat*, *pulchellus*, and *pallasi*. Old male (type) compared with old male *toklat*, from Alaska Range, near north base of Mount McKinley: Size slightly larger; occipito-nasal length, length of braincase, and length of sagittal crest very much greater; frontal shield more convex transversely; postorbital processes much larger and broader; rostrum higher, more rounded on top; nares more squarely truncate; underjaw longer; inferior border of ramus more convex posteriorly; coronoid blade decidedly higher, narrower above, the apex more strongly recurved; teeth badly worn in both, but canines decidedly longer in *kluane*; molars apparently somewhat larger.

Compared with adult male *pulchellus*: Similar in general, but skull as a whole, braincase, palate, and underjaw *very much longer*; frontal shield *very much broader*; inferior border of ramus less abruptly upcurved; subangular border less nearly horizontal and much less sharply defined.

Adult female compared with adult female *toklat* (comparison hardly necessary because of the great difference in size): Basal length at least 20 mm. less; vault of cranium and frontal shield lower; braincase less constricted anteriorly; posterior part of shield much longer and broader, reaching or passing the fronto-parietal suture; sagittal crest much shorter; postpalatal shelf less broad; underjaw and inferior border of ramus shorter; coronoid blade about same height; canines about same size; molariform series (upper and lower) about same length, but proportions of individual teeth different:  $M^1$  much larger;  $M^2$  with shorter heel;  $M_T$  larger.

Old male (type) compared with old male *pallasi* (type): Size decidedly greater; skull about an inch longer and much more highly arched, with conspicuously longer braincase and longer sagittal crest; crest strongly arched instead of nearly straight; postorbitals very much larger, broader, and more strongly decurved; fronto-nasal region much more elevated and less dished; rostrum much higher, rounded above instead of depressed; palate much longer, more arched and more concave; underjaw much longer; coronoid higher.

Adult female compared with adult female *pallasi*: Skulls very much alike in size and appearance (that of *kluane* slightly larger), but teeth strikingly different. In *kluane*, canines larger; molars very much larger.

*Skull measurements.*—Old male (type): Basal length, 317; occipito-nasal length, 324; palatal length, 177; zygomatic breadth, 210; interorbital breadth, 85.



## URSUS KLUANE IMPIGER SUBSP. NOV.

## INDUSTRIOUS GRIZZLY.

*Type* No. 210708, ♂, not quite fully adult. From Columbia Valley, British Columbia. Collected in April, 1914, by Mackay & Dippie.

*Cranial characters.*—*Adult male*: Similar in general to *kluane* (No. 221620, ♂ ad., Kluane River), but shield narrower and less sulcate, less swollen over orbits; nasals less elevated; palate much shorter and narrower; postpalatal shelf narrower; underjaw shorter; subangular border shorter; subangular notch and space much more strongly defined. Teeth smaller throughout, especially  $M^2$  and  $M_{\bar{2}}$ , but  $M_{\bar{1}}$  swollen as in *kluane*.

*Female young-adult* from Brisco,<sup>1</sup> Columbia Valley (No. 210707): Vault well arched; shield posteriorly broadly lyrate, elevated by rising sinus case; rostrum long and slender; fronto-nasal region dished; palate long, troughed; underjaw long and straight. Teeth large.

*Cranial comparisons.*—Male young-adult (type) compared with old male *hylodromus* from Selkirk Mountains (No. 205170): Vault of cranium much more highly arched and narrower, the narrow frontal shield rising higher and more strongly, but not abruptly, from rostrum; shield strongly convex (in old *hylodromus* nearly flat); postorbitals much more slender, outstanding, depressed, and somewhat decurved as in *kluane*; fronto-nasal region more dished; palate narrower; inferior border of underjaw much longer; subangular border shorter; coronoid blade higher.

Female young-adult (No. 210707) compared with female *kluane*: Skull as a whole, rostrum, occipito-sphenoid, palate, and underjaw much longer; ramus straighter; subangular border same; teeth essentially same except that  $M_{\bar{1}}$  is smaller. Compared with female *hylodromus* (type): Skull as a whole, rostrum, occipito-sphenoid, palate, and underjaw longer (but not so much longer as in comparison with female *kluane*); ramus straighter; subangular border shorter; teeth similar.

*Remarks.*—*Ursus hylodromus*, *U. impiger*, and *U. kluane* form a rather closely related group ranging from western Alberta and southeastern British Columbia northwesterly to southwestern Yukon. From the material now in hand *impiger* appears to be most nearly

<sup>1</sup> Skulls of females identified as *impiger* have been examined from Brisco, Columbia Valley, British Columbia (No. 210707); Morley, Alberta (No. 210706); Jasper, Alberta (No. 222745); and headwaters North Fork Blackfoot River, western Montana (No. 203188).

related to *kluane*, but additional skulls of adults may show that its affinities with *hylodromus* are equally close.

*Skull measurements.*—Adult male (type): Basal length, 309; occipito-nasal length, 293; palatal length, 162; zygomatic breadth, 197; interorbital breadth, 72.

URSUS PELLYENSIS SP. NOV.

PELLY GRIZZLY.

*Type* No. 215477, ♂ young-adult, U. S. National Museum, Biological Survey collection. From the Ketzka Divide, Pelly Mountains, Yukon. Collected September 30, 1915, by Fred E. Enevoldsen.

*Characters.*—Skull of medium size, rather long and narrow, apparently related to *hylodromus*: Frontal shield narrow, long pointed (point reaching fronto-parietal suture but in older specimens ending much more anteriorly), rising strongly from rostrum; rostrum rather narrow and high; fronto-nasal region dished; postorbitals broad, strongly decurved (in old skulls doubtless more outstanding); sinus case keeling into posterior part of shield; palate moderate (rather broad for so narrow a skull), slightly arched and slightly troughed; underjaw long for size of skull; inferior border of ramus long, not upturned; subangular border short; coronoid rather high; canines long, the lower ones large for size of skull; molars long and narrow, especially  $M_1$  and  $M_2$ ; anterior part of  $M_2$  exceptionally long and posterior part relatively narrower than in most species;  $PM_4$  subconical.

*Female skull* (based on four rather old specimens from Pelly and Ross Mountains, Nos. 215710, 215711, 215713, and 221600): Size small; frontal shield of moderate breadth, rather short pointed posteriorly, entering sagittal crest anterior to fronto-parietal suture; postorbital processes well developed, outstanding; rostrum rather small; frontal shield rising moderately from rostrum, shallowly sulcate medially; zygomata subtriangular. Dentition moderate; heel of last upper molar slightly emarginate, rounded posteriorly; canines small and slender.

*Cranial comparisons.*—Young-adult male (type) compared with young-adult male *hylodromus* (No. 210708 from Columbia Valley, British Columbia): Size smaller (basal length about 10 mm. less); vault of cranium less highly arched; sinus case more definitely keeled to support posterior part of shield; postorbitals broader, more decurved, less outstanding; palate broader; molar series about same; upper canines essentially same; lower canines larger; upper molar series essentially same length; lower molar series longer and narrower;  $M_1$  much longer and more slender.

Young-adult male (type) compared with adult male *pulchellus* from the neighboring Ross River (No. 221599): Size slightly greater; shield and rostrum broader (in *pulchellus* exceptionally narrow); postorbitals broader and more decurved; palate longer and broader; postpalatal notch much shorter; coronoid blade larger; molars, upper and lower, strikingly narrower and less massive.

Female *pellyensis* compared with female *toklat*: Size smaller; vault *much lower and depressed*—sinus case not keeled into front of sagittal crest; fronto-nasal region less strongly depressed and dished; rostrum and nasals flatter; palate about same length; postpalatal length much less; underjaw much shorter. Canines smaller; molar series shorter; heel of  $M^2$  less elongate.

*Skull measurements.*—Young-adult male (type): Basal length, 299; occipito-nasal length, 294; palatal length, 168; zygomatic breadth, 186; interorbital breadth, 73.

URSUS ANDERSONI<sup>1</sup> SP. NOV.<sup>2</sup>

ANDERSON BEAR.

*Type* No. 34402, ♂ ad. (rather old), American Museum of Natural History. Collected on east branch Dease River<sup>3</sup> near Great Bear Lake, Mackenzie, May 12, 1911, by Dr. R. M. Anderson.

*Characters.*—Size medium or rather large; frontal region including postorbitals rather flat and narrow as in *pellyensis* (in strong contrast with the broader swollen frontals and elevated outstanding postorbitals of *richardsoni*); vault moderately arched.

*Cranial characters.*—Frontal shield rather narrow, strongly sloping, flattened, short pointed posteriorly; postorbitals moderate (short in contrast with those of *richardsoni*), horizontal (not decurved); sagittal crest long and strongly developed, humped anteriorly, projecting posteriorly in prominent inion; rostrum narrow, rather high, compressed below middle of nasals; orbits strongly sloping (retreating); occipital overhang marked; squamosal shelf long; palate long and narrow; postpalatal shelf moderate; zygomata well outstanding and somewhat bowed. Underjaw moderate; coronoid blade strongly recurved, apex sharp pointed. Molars broad and rather large:  $M^1$  and  $M^2$ , together 62 mm. (in type skull); lower molars 74 mm. Canines large (too much broken to afford measurements).

*Cranial comparisons.*—The adult male resembles, though not very closely, both *pellyensis* and *tahltanicus*. Compared with the type specimen of *pellyensis*: Size essentially same; shield shorter and flatter with more horizontally outstanding postorbitals (differences

<sup>1</sup> Named for Dr. R. M. Anderson, who collected the type specimen.

<sup>2</sup> Tentatively included in *hylodromus* group. (See Introduction, pp. 12–13.)

<sup>3</sup> Not to be confused with the better-known Dease River of northern British Columbia.

attributable in large part at least to difference in age); zygomata much less broadly outstanding (also attributable to age); postpalatal notch decidedly longer; coronoid blade lower. Canines apparently larger (badly broken); molars broader and more massive. Compared with an old male (No. 134486) from Macmillan River, presumably old *pellyensis*, it is much smaller and narrower; shield narrower, flatter, and shorter posteriorly; postorbitals flatter and more nearly horizontal on top; rostrum narrower; sagittal crest longer and rising higher anteriorly; palate, postpalatal shelf, diastema, and occipito-sphenoid much shorter; underjaw much shorter; coronoid lower. Dentition heavier; canines and molars larger.

Compared with old male *tahltnicus* (type), with which it agrees essentially in size, height of vault of cranium, slope and flatness of shield, form of rostrum, spread and form of zygomata, and size and form of underjaw, it differs as follows: Shield narrower both inter-orbitally and across postorbitals; point of shield much shorter; fronto-nasal region slightly dished (in *tahltnicus* not dished); sagittal crest much longer, higher anteriorly, and keeled from sinus case. Dentition heavier; canines and molars much larger.

*Skull measurements.*—Adult male (type): Basal length, 300; occipito-nasal length, 285; palatal length, 165; zygomatic breadth, 211; interorbital breadth, 76.

#### Horriæus Group.

#### URSUS APACHE MERRIAM.

#### APACHE GRIZZLY.

*Ursus apache* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 134–135, September 6, 1916.

*Type locality.*—Whorton Creek, south slope of White Mountains, eastern Arizona (a few miles west of Blue).

*Type specimen.*—No. 212436, ♂ ad., U. S. National Museum, Biological Survey collection. Collected April 3, 1913, by B. V. Lilly.

*Cranial characters.*—Skull short, broad, and low, rather massive, moderately dished, with broad frontal shield and exceedingly broad outstanding postorbitals. Frontal shield broad, shallowly sulcate medially between orbits; very slightly and rather flatly swollen over orbits; long pointed posteriorly, meeting short sagittal crest at fronto-parietal suture; rostrum short, high, and rather narrow; zygomata strongly outbowed and outstanding anteriorly as well as posteriorly; ramus of jaw rather short, bellied under last molars; coronoid blade high, sloping strongly outward, the apex overarching shallow coronoid notch, but not cutting plane of condyle; dentition moderate.

*Cranial comparisons.*—Old male (type) compared with old male *horriæus* (type): Size somewhat greater; vault of cranium materially

higher; shield much broader both interorbitally and across postorbital processes; the posterior part much longer and horizontal or sloping posteriorly (in *horriæus* short and sloping strongly forward from apex of posterior point); sagittal crest very much shorter; palate broader and flat (in *horriæus* concave and arched); zygomata broadly outbowed (in *horriæus* narrowly triangular); meatus tube strongly compressed between mastoid and glenoid (in *horriæus* large and free); underjaw much more massive; ramus longer; broadly expanded vertically and upcurved posteriorly; coronoid blade higher. Teeth apparently similar (in *horriæus* badly worn).

Compared with adult male *absarokus*, to which it appears to be related, the skull of *apache* differs as follows: Vault of cranium lower, less arched; frontal shield broader and flatter; postorbitals much broader and flatter, standing out more horizontally; fronto-nasal region more depressed; rostrum shorter; *orbits notably smaller* (lower vertically); squamosal trough shorter antero-posteriorly; zygomata very much more strongly outbowed and conspicuously more outstanding anteriorly; underjaw and inferior border of ramus shorter; coronoid blade of equal height; teeth slightly smaller (difference slight).

Old male (type) compared with adult male *arizonæ* (type): Basal length, occipito-nasal length, length of palate, interorbital breadth, and occipito-sphenoid length essentially the same; zygomata very much more outstanding and bowed instead of subtriangular; frontal shield less flat, of essentially the same breadth interorbitally as in *arizonæ*, but very much wider across postorbital processes, rising strongly from plane of rostrum; postorbital processes much more broadly outstanding; orbital rims more swollen; fronto-nasal region much less elevated; rostrum much smaller, narrower, less swollen, depressed basally, and horizontal instead of tapering; palate and postpalatal shelf much narrower. Underjaw stronger; ramus broader vertically; coronoid blade higher; molars slightly smaller; heel of  $M^2$  shorter, less distinctly emarginate on outer side (more tapering).

*Skull measurements.*—Adult male (type): Basal length, 325; occipito-nasal length, 315; palatal length, 171.5; zygomatic breadth, 234; interorbital breadth, 89.

#### URSUS HORRIÆUS BAIRD.

##### NEW MEXICO GRIZZLY.

(Pl. XV.)

*Ursus horribilis* var. *horriæus* Baird, Mammals North Amer., Pacific RR. Reports, VIII, pp. 224, 225, 1857 (name, type locality, and measurements).

*Ursus horribilis* var. *horriæus* Baird, Mammals Mexican Boundary Survey, pp. 24–29, 1859. (Full description, including a specimen from Nogales, since made the type of another species—*kennerlyi*.)

*Ursus (Danis) horriaceus* Gray, Catalog. Carn., Pach., and Edent., British Museum, p. 229, 1869.

*Type locality*.—Coppermines, southwestern New Mexico.

*Type specimen*.—No. 990, ♂ old, U. S. National Museum. Collected in 1855, by J. H. Clark.

*Range*.—Parts of New Mexico, south to Casas Grandes, Chihuahua, Mexico; probably extending into eastern Arizona.

*Characters*.—Size medium; external characters unknown; skull low and flat with broad outstanding postorbital processes.

*Cranial characters*.—*Old male* (type): Skull long, low, narrow, and flat; frontal shield short pointed posteriorly, temporal impressions conspicuously beaded, curving strongly inward, and meeting half-way between plane of postorbital processes and fronto-parietal suture; frontal shield flattish, shallowly concave, swollen over orbits; postorbital processes large, broad, widely outstanding and moderately decurved; fronto-nasal region slightly dished; rostrum narrow; sagittal crest long and rather high; occipital overhang and inion marked; zygomatic arches angular, rather squarely but not widely spreading posteriorly; squamosal root of zygoma moderately expanded vertically; lachrymal duct cutting orbital rim anterior to orbit; palate and interpterygoid fossa rather narrow. Teeth of medium size (badly worn in type).

An *old female* (No. 67405, from mountains north of Silver City, New Mexico, near type locality), collected in 1893 by Dr. A. K. Fisher, is assumed to be *horriæus*. Unfortunately the occipital region is absent so that measurements of length can not be taken. Skull low, with moderately spreading angular zygomata, flat long-pointed frontal shield, elevated flat fronto-nasal region (in plane of shield), and narrow rostrum, without trace of dishing except slight change of angle at middle of nasals; highest point of cranium about 25 mm. anterior to fronto-parietal suture; postorbital processes moderate or weak, subtriangular, slightly decurved; lachrymal duct cutting orbital rim anteriorly; rostrum somewhat compressed a little below nasals; palate short (145), concave between last molars; postpalatal shelf moderately broad, short, and flat. Teeth small.

*Cranial comparisons*.—*Old male* (type) compared with *old male apache* (type): Size somewhat smaller; vault of cranium lower; shield much narrower, the point much shorter; palate concave and arched instead of flat; zygomata narrowly triangular instead of broadly out-bowed; ramus of jaw shorter.

*Old male* (type) compared with *adult male shoshone* (type): Size essentially the same (basal length slightly less but occipito-nasal length same); vault of cranium much lower and flatter; frontal shield much lower and more nearly horizontal, less strongly sloping,

slightly broader, more swollen over orbits, and broadly depressed interorbitally instead of flat or slightly convex; postorbital processes very much larger, broader, and more widely outstanding; frontal part of braincase broader and depressed—not keeling into sagittal crest; zygomata angular—not outbowed; occipito-sphenoid shorter; lachrymal duct more anterior; inferior border of ramus shorter; coronoid blade less high.

Old female compared with old females of *nelsoni*: Size larger (basal length about 10 mm. longer); vault of cranium higher over posterior frontal region; frontal shield broader, flatter anteriorly; zygomatic arches slightly more spreading. Teeth, especially canines and molars, materially larger.

*Skull measurements.*—Old male (type): Basal length, 312; occipito-nasal length, 310; palatal length, 169; zygomatic breadth, 207; interorbital breadth, 79.

#### URSUS HENSHAWI<sup>1</sup> MERRIAM.

##### HENSHAW GRIZZLY.

*Ursus henshawi* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 190, August 13, 1914.

*Type locality.*—Southern Sierra Nevada, near Havilah, Kern County, California.

*Type specimen.*—No. 15671, ♂ old, U. S. National Museum. Collected in 1875 by Dr. J. T. Rothrock and Henry W. Henshaw.

*Range.*—Lower slopes of southern part of Sierra Nevada; limits unknown.

*Characters.*—Size rather small—by far the smallest of the California grizzlies; size and general cranial characters as in *horriæus*, but fronto-nasal region strongly dished and rostrum strongly depressed. Last upper molar short and broad, the heel short and subtriangular. Skin characters unknown.

*Cranial characters.*—Old male (type): Skull long, narrow, and rather low; zygomata subtriangular, narrowly spreading; frontal shield gently sloping, flat-concave; postorbital processes massive, and somewhat arched; orbital rims swollen; fronto-nasal region strongly depressed and dished; rostrum low, depressed.

*Cranial comparisons.*—Compared with an equally old male *horriæus* (type, from Coppermines, New Mexico): Surprisingly similar in general, with similar broad outstanding postorbitals, but rostrum strongly depressed; nasals flattened and horizontal anteriorly; fronto-nasal region concave and strongly dished (in *horriæus* rather high and not dished); frontal shield strongly and broadly concave between orbits and between postorbital processes (only faintly depressed medi-

<sup>1</sup> Named for Henry W. Henshaw, formerly chief of the Biological Survey.

ally in *horriæus*); more strongly sloping anteriorly; postorbital processes shorter and blunter; orbital rims more prominent, relatively thin, somewhat everted, continuing to lachrymal notch—their prominence anteriorly due in part to presence of a broad sulcus in ascending arm of maxillary immediately in front of orbit; lachrymal duct opening in orbit posterior to orbital rim (in *horriæus* on or anterior to rim); anterior nares broader than high (contrary true in *horriæus*); lambdoid crest higher; sagittal crest and inion much shorter; occipital overhang much less; palate decidedly broader; interpterygoid canal shorter; mastoid processes much longer and more divergent; anterior part of pterygoids more broadly expanded vertically and articulating with a like expansion of posterior arms of palatines (probably not constant). Upper molars decidedly broader (canines broken off).

Compared with two old males of *tularensis* (type, No. 3536, and No. 3537, from Fort Tejon, California): Size smaller; occipito-sphenoid length and frontal breadth essentially the same; vault of cranium and rostrum very much lower; fronto-nasal region more deeply concave, more strongly sloping, and strikingly more dished; rostrum smaller, lower, and strongly depressed instead of elevated; occipital overhang and development of inion conspicuously less; posterior part of sagittal crest not elevated or produced. Under-jaw decidedly shorter, ramus much less broadly flattened vertically and more strongly bellied posteriorly. Last upper molar much smaller, the heel conspicuously shorter and narrowed on outer side.

*Skull measurements*.—Old male (type): Basal length, 318; occipito-nasal length, 305; palatal length, 173; zygomatic breadth, 204; interorbital breadth, 76.

#### Stikeenensis Group.

#### URSUS STIKEENENSIS MERRIAM.

#### STIKINE GRIZZLY.

(Pl. IX.)

*Ursus stikeenensis* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 178-179, August 13, 1914.

*Type locality*.—Tatletuey Lake, tributary to Finlay River, near head of Skeena River, northern British Columbia.

*Type specimen*.—No. 202794, ♂ ad., U. S. National Museum, Biological Survey collection. Collected September 23, 1913, by Charles R. Cross, jr., and Edward A. Preble; original No. 5772.

*Range*.—Region about head of Finlay River, and Dease Lake region, northern British Columbia, and northerly in Yukon.



*Characters.*—*Adult male* (type): Size medium; skull short, broad, and highly arched; face strongly pugged from abrupt rising of frontal region; claws short and strongly curved for a grizzly (longest 60 mm.—tips worn by digging), dark, marked with yellowish on tips and sides. Upper molars large. Total length before skinning 1,830 mm.; hind foot 267 mm.; estimated height at shoulder 990 mm. (39 inches).

*Color.*—*Type specimen*: General ground color dark brown, grizzled and washed with pale-tipped hairs. Muzzle pale brown, becoming darker between eyes and on sides of face; top of head in front of ears washed with yellowish brown, almost forming a golden brown band between the darker ungrizzled frontal region and the more whitish color of the neck; general ground color of body very dark, bountifully overlaid on neck and back by pale buffy-tipped hairs which give a whitish cast to the neck; ears dark; legs and feet blackish; underparts dark brown; hairs on sides of throat long and grizzly.

*Cranial characters.*—*Adult male* (type): Size medium or large; skull short posteriorly, broad, highly arched, strongly dished, with abruptly ascending frontals and large molar teeth. Rostrum short, broad, broadening and strongly ascending posteriorly; nasals strongly upturned posteriorly; frontal shield rather broad, rising abruptly and swollen in front of and above orbits, sulcate medially, short pointed, the point ending in sagittal crest about 30 mm. anterior to fronto-parietal suture; postorbital processes large, broad, subtriangular, and decurved (more broadly rounded and more outstanding in older skull); braincase long for size of skull; zygomata rather broadly spreading, subtriangular, not much expanded vertically; palate and postpalatal shelf broad. Underjaw and inferior border of ramus very short. Molars large and broad.

*Cranial comparisons.*—*Adult male* compared with *adult male absarokus*: Size nearly the same though *absarokus* appears the larger; basal length and frontal breadth approximately the same, but occipito-nasal length much greater in *absarokus*. In *stikeenensis* rostrum lower, flatter, and more nearly horizontal; frontal shield and posterior part of nasals rising much more abruptly; frontals much more swollen in front of upper part of orbits; point of shield much shorter (ending midway between plane of postorbitals and fronto-parietal suture, while in *absarokus* it reaches posteriorly to suture); inion short; palate broader; underjaw shorter; coronoid lower.

*Adult male* compared with *adult male tahltanicus* (both inhabiting the same region): Basal length, zygomatic breadth, and frontal breadth essentially the same, but frontal region much higher and rising abruptly at orbits instead of sloping gently in plane of rostrum; rostrum broader, flatter, and more nearly horizontal (appear-

ing shorter); postorbitals much larger and less horizontally outstanding; palate longer; underjaw longer. Dentition heavier.

*Skull measurements.*—Adult male (type): Basal length, 321; occipito-nasal length, 305; palatal length, 171; zygomatic breadth, 217; interorbital breadth, 84.

URSUS CRASSODON SP. NOV.

BIG-TOOTH GRIZZLY.

*Type* No. 171049, ♂ old, U. S. National Museum, Biological Survey collection. Collected on Klappan Creek (=Third South Fork Stikine River), September, 1907, by Dr. E. P. Richardson, of Boston.

*Cranial characters.*—*Old male* (type): Frontal shield broad, lyrate posteriorly, the point reaching or slightly passing fronto-parietal suture; shield rising abruptly from rostrum, sulcate anteriorly but nearly flat between postorbitals; postorbitals broadly rounded and horizontally outstanding; rostrum of medium breadth, nearly horizontal; braincase short; sinus case rising to support postorbital part of shield; zygomata moderately outstanding, subtriangular, the squamosal root not broadly expanded; squamosal shelf narrow; palate and postpalatal shelf moderate; ramus short; coronoid blade rather small, moderately recurved at apex; canines rather large; *molars enormous* for size of skull;  $M^1$  and  $M^2$  very broad; heel of  $M^2$  subtriangular, narrowing posteriorly.

I refer to this species two young males from Yukon, one (No. 209896) from White River, the other (No. 1839, Ottawa Museum) from Wolf Lake near Teslin Lake, both in the third year; and an old female (No. 202792) from Tatletuey Lake on the upper Finlay. Besides these, two very old male skulls from southern Yukon (No. 223760 from Glenlyon Mountains and No. 223767 from Quiet Lake at head of Big Salmon River) are provisionally referred to the species, but not without considerable hesitation. Both are high, short, and broad as in *crassodon*, but the teeth are too much worn to admit of reliable comparison. One (No. 223760) is so extremely aged that the roots of the canines have worked down and become absorbed basally, leaving the middle part of the rostrum narrower than normal.

*Skull measurements.*—*Old male* (type): Basal length, 320;<sup>1</sup> occipito-nasal length, 306;<sup>1</sup> palatal length, 175; zygomatic breadth, 222; interorbital breadth, 84.

URSUS CRASSUS SP. NOV.<sup>2</sup>

THICKSET GRIZZLY.

*Type* No. 225473, ♂ ad., U. S. National Museum, Biological Survey collection. From upper Macmillan River, Yukon. Collected in September, 1916, by William Drury.

<sup>1</sup> Partly restored.

<sup>2</sup> Tentatively included in *stikkeenensis* group. (See Introduction, pp. 12-13.)

*Characters.*—Size large; hump apparent but not conspicuous; general color dark; claws of medium length, narrow, moderately curved, smooth, whitish above, with dark sides.

*Color.*—Muzzle pale brownish; top of head and neck strongly washed with yellowish or golden buffy; shoulders and back lightly tipped with same on dark background; legs and feet dusky.

*Cranial characters.*—*Adult male* (type): Skull rather large, short, broad, rather high, but not highly arched, and unusually massive. Shield broad, convex, faintly sulcate, sloping gradually into rostrum, the point reaching fronto-parietal suture; postorbitals rather broad, decurved in convexity of shield; rostrum large and high, rising in plane of shield; sagittal crest short; zygomata moderate; palate narrow and strongly troughed; postpalatal shelf short; underjaw rather short, massive; coronoid blade high and nearly vertical; subangular border short. Teeth large; canines massive;  $M^2$  very long, its heel exceptionally long and flat, slightly emarginate and everted.

*Cranial comparisons.*—The skull of the adult male (type) viewed from above bears a striking likeness to that of adult male *hoots*, but when turned over the likeness ceases. It agrees with *hoots* essentially in size, massiveness, arching of vault of cranium, and frontal breadth; but frontal shield is more convex; postorbitals more decurved; rostrum somewhat more ascending (higher posteriorly); orbital rims less swollen; palate decidedly narrower and troughed instead of flat; coronoid more nearly vertical; subangular border shorter; teeth strikingly larger throughout—incisors, canines, and molars. The teeth of *hoots* are small for size of skull, those of *crassus* exceptionally large.

Male adult (type) compared with male adult *crassodon* (type): Size slightly greater; frontal shield much broader, more gently sloping, and more convex transversely, with decurved postorbitals (in *crassodon* shield flattish, nearly horizontal, with horizontally outstanding postorbitals and descending abruptly to rostrum); rostrum very much larger and higher and sloping gradually into shield; ramus much longer; subangular border shorter; coronoid larger and higher. Upper canines about same; lower canines much larger; upper and lower molar series of about same length but upper molars much narrower and less massive.

*Remarks.*—The skull of an immature male (No. 6552) collected by R. MacFarlane, May 1, 1863, on Anderson River, 50 miles southeast of old Fort Anderson, has very large teeth, especially  $M^2$ , thus differing widely from any adult Barren Ground bear thus far examined. Two still younger skulls collected on the Barren Grounds in 1911, by Dr. R. M. Anderson (No. 34411 Amer. Mus. Nat. Hist. from Horton River, and 34413 from Langton Bay), also have the crown of  $M^2$  very long. These three skulls I provisionally refer to *crassus*.

It is a singular fact, in view of the wide dissimilarity of the skulls, that the teeth of male *crassus* and male *kluane* are very much alike.

*Skull measurements.*—Adult male (type): Basal length, 325; occipito-nasal length, 322; palatal length, 171; zygomatic breadth, 224; interorbital breadth, 94.

#### URSUS MIRABILIS MERRIAM.<sup>1</sup>

##### STRANGE GRIZZLY.

*Ursus mirabilis* Merriam, Proc. Biol. Soc. Washington, XXIX, p. 146, September 6, 1916.

*Type locality.*—Admiralty Island, Alaska.

*Type specimen.*—No. 137471, ♂ ad., U. S. National Museum, Biological Survey collection. Collected June 26, 1905, by Cyrus Catt.

*Characters.*—A true grizzly, of medium size, related to *stikeenensis* of the mainland, and having the same high bulging forehead; external characters unknown.

*Cranial characters.*—*Adult male* (type): Skull of medium size, short, with rather broadly spreading zygomata and highly arched (almost domed) frontal region. Frontal shield of moderate breadth, short pointed posteriorly, rising abruptly from rostrum, convex both antero-posteriorly and transversely, slightly sulcate medially, moderately swollen on each side of sulcus; postorbital processes moderate, broader than peglike, slightly decurved (continuing convexity of frontals); fronto-nasal region strongly dished; rostrum high, narrow, strongly sloping; zygomata rather broadly outstanding, slightly bowed; palate and postpalatal shelf rather broad; underjaw short; ramus bellied posteriorly; coronoid blade high and rather vertical, the apex not reaching plane of condyle. Upper canines rather long; molars rather broad and short.

*Cranial comparisons.*—*Ursus mirabilis* requires comparison with only a single species—*stikeenensis* of the neighboring mainland: Size smaller; frontal shield narrower and more bulging anteriorly, rising more abruptly from rostrum; rostrum narrower, materially higher, and more sloping; zygomata more widely outstanding; occipital overhang more pronounced; palate and postpalatal shelf similar; underjaw less massive; coronoid blade narrower and higher; teeth similar, but heel of last upper molar much shorter.

*Skull measurements.*—Adult male (type): Basal length, 308; occipito-nasal length, 310; palatal length, 168; zygomatic breadth, 230; interorbital breadth, 81.

<sup>1</sup> Tentatively included in *stikeenensis* group. (See Introduction, pp. 12-13.)

URSUS ABSAROKUS MERRIAM.<sup>1</sup>

## ABSAROKA GRIZZLY.

*Ursus absarokus* Merriam, Proc. Biol. Soc. Washington, XXVII, p 181, August 13, 1914.

*Type locality*.—Near head of Little Bighorn River, northern part of Bighorn Mountains, Montana.

*Type specimen*.—No. 67391, ♂ ad., U. S. National Museum, Biological Survey collection. Collected in May, 1893; purchased for Biological Survey by J. Alden Loring.

*Range*.—Laramie and Bighorn Mountains, eastern Wyoming, Black Hills region, South Dakota, and northward along Little Missouri to Missouri and Yellowstone Rivers.

*Characters*.—Size large, but much less than *horribilis* and with much smaller molars—especially M<sup>2</sup>.

*Color*.—Head of young-adult (No. 203524) killed by Howard Eaton on the Little Missouri at mouth of Bear Creek, near Middle or "Bullion" Butte, October 27, 1880: Muzzle pale brown, changing to grizzled dark brown on head and face; a large patch of dark brown free from grizzling on side of face extending from eye to angle of jaw; chin and gular region dark brown (except anterior part of chin, which has not yet molted the pale old coat); top and sides of neck and doubtless body also, strongly grizzled.

*Cranial characters*.—*Adult male* (type specimen, and other males from Bighorn and Laramie Mountains): Vault of cranium rather highly arched; zygomata moderately outstanding and slightly bowed; frontal shield rather broad, rising strongly from rostrum, convex both antero-posteriorly and transversely; slightly swollen on each side of median line just behind plane of orbits, faintly depressed medially between orbits; postorbital processes large, outstanding, and slightly decurved, the tips bluntly rounded; sagittal crest nearly straight, reaching anteriorly to fronto-parietal suture; rostrum large and high, rising strongly into frontal shield; post-palatal shelf broad and flat; nasals large and long; top of coronoid high and broadly rounded, its apex short, not reaching posteriorly to plane of condyle. Teeth rather large, especially M<sup>2</sup> which is long and broad, the heel emarginate on outer side.

*Cranial comparisons*.—*Adult male* (type) compared with adult male *shoshone* (type): Basal length essentially the same but skull somewhat larger and more massive, broader, highest point more

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<sup>1</sup> Tentatively included in *stikeenensis* group. (See Introduction, pp. 12-13.)

anterior; frontal shield broader, domed (strongly convex both antero-posteriorly and transversely) and rising rather abruptly from plane of rostrum (in *shoshone* flat); point of shield much longer posteriorly, reaching to or nearly to fronto-parietal suture. Molars larger—especially M<sup>2</sup>.

*Skull measurements.*—Adult male (type): Basal length, 322; occipito-nasal length, 322; palatal length, 172; zygomatic breadth, 218; interorbital breadth, 88.

Alascensis Group.

URSUS ALASCENSIS MERRIAM.

ALASKA GRIZZLY.

(Pl. XII.)

*Ursus horribilis alascensis* Merriam, Proc. Biol. Soc. Washington, X, pp. 74-75, April 13, 1896.

*Type locality.*—Unalaklik River, Alaska.

*Type specimen.*<sup>1</sup>—No. 76466, ♂ old, U. S. National Museum, Biological Survey collection. Collected in 1895, by the late Rudolf Neumann, of Iliuliuk, Alaska.

*Range.*—Norton Sound region, Alaska (Unalaklik and Shaktolik Hills) southerly over the Nushagak and Kuskokwim Rivers to Chinitna on Cook Inlet. Limits unknown.

*Cranial characters.*—*Old male* (type): Size small; braincase broad anteriorly; frontal shield rather broad, flattish, very short pointed posteriorly with correspondingly elongate sagittal crest, moderately sulcate interorbitally, otherwise convex in cross section, rising rather strongly from facial plane; postorbitals rather small, moderately decurved; fronto-nasal region moderately dished; zygomata sub-triangular, not broadly outstanding; palate rather broad and concave; postpalatal shelf broad and short; notch rather broad; jaw rather long; inferior border of ramus long, moderately convex posteriorly; coronoid blade moderate, rather high, the apex recurved. Teeth moderate; last upper molar broad and short, with short obliquely truncate heel; first lower molar sinuous, a strong concavity on outer side.

*Adult female.*<sup>2</sup> Long and high; vault of cranium well arched, highest about midway of frontals; frontal shield rather narrow, not flattened but arching high above facial plane; swollen between me-

<sup>1</sup> In describing this bear 20 years ago I neglected to designate a type, and the original material included skulls of more than one species. I take this opportunity therefore to fix the type of *Ursus alascensis* on one of the original specimens (No. 76466, U. S. National Museum, Biological Survey collection) and to redefine the species.

<sup>2</sup> In the absence of skulls of adult females from the type region it is assumed that females from the Nushagak, Kuskokwim, and Chinitna Rivers are fairly typical of *alascensis*.

dian sulcus and orbits; postorbital processes decurved; palate and postpalatal shelf long. Last upper molar with short heel.

*Cranial comparisons.*—Old male (type) compared with old male *toklat* (No. 158811, collected by Charles Sheldon at head of Toklat River near northern base of Mount McKinley): Size and general appearance essentially the same, but vault of cranium less elevated; frontal shield narrower and shorter (the point reaching about half-way from plane of postorbitals to parietals); sagittal crest longer; zygomata *much less broadly outstanding*, less arched; underjaw decidedly longer; inferior border of ramus longer; coronoid decidedly higher; heel of last upper molar *very much shorter*.

Adult female compared with adult female *toklat*: Skull decidedly larger; vault of cranium much higher and more arched (in *toklat* low and flat), highest about middle of frontals instead of at hinder end; rostrum larger (longer, broader, and higher); face more sloping (nasals less nearly horizontal); frontals much more swollen between sulcus and orbits; postorbital processes more decurved; palate, postpalatal shelf, and occipito-sphenoid notably longer; last upper molar very much shorter.

Adult male compared with adult male *tundrensis* of same region: Size smaller (basilar and occipito-nasal lengths fully an inch less); skull less massive; frontals narrower, rising more abruptly from facial plane and more swollen over orbits; rostrum more slender; palate less flattened; ramus of jaw less swollen posteriorly; coronoid less falcate; canines smaller, decidedly shorter, and more curved; molars decidedly smaller.

*Skull measurements*—Old male (type): Basal length, 310; occipito-nasal length, 298.5; palatal length, 166; zygomatic breadth, 206; interorbital breadth, 79.

#### URSUS TOKLAT MERRIAM.

##### TOKLAT GRIZZLY.

*Ursus toklat* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 182-183, August 13, 1914.

*Type locality.*—Head of Toklat River, north base of Alaska Range, near Mount McKinley, Alaska.

*Type specimen.*—No. 158813, ♀ ad., U. S. National Museum, Biological Survey collection. Collected May 24, 1908, by Charles Sheldon, and by him presented to the Biological Survey; original No. 324. Mother of cub No. 158814 (original No. 325).

*Range.*—So far as known, restricted to Alaska Range.

*Characters.*—Size medium; skulls of both male and female rather highly arched and dished, that of female much smaller and lower than male. Last upper molar large; heel very long. Claws horny and smooth.

*Color.*—Color variable, upperparts ranging from ordinary “grizzly bear color” to creamy white; claws usually dark throughout, but in many cases more or less marked with white.

*Cranial characters.*—*Adult males:* Size medium; rostrum high, subterete above, nearly horizontal; frontal shield abruptly elevated, convex or domed, swollen over orbits, sulcate medially, rather long pointed (reaching fronto-parietal suture); postorbital processes rather small and strongly decurved; squamosal shelves short; palate arched and excavated longitudinally; postpalatal shelf rather broad; zygomata very broadly spreading and angular (zygomatic breadth in proportion to basal length much greater than in any other true grizzly, about equaling that of *sheldoni*); sagittal crest short. Last upper molar large, its heel normally very long. *Adult female:* Skull rather long and narrow, with broadly spreading zygomata and strongly dished fronto-nasal region; frontal shield rather flat, sulcate between orbits, varying from lyre pointed to short pointed; postorbital processes outstanding horizontally; rostrum rather slender, nearly horizontal. In most specimens the highest point of cranium culminates in a rather abrupt change of angle at or near the fronto-parietal suture, forming a sort of “hump,” a condition usual also in skulls of female grizzlies from the upper Yukon and northern British Columbia.

*Cranial comparisons.*—Old male compared with old male *alascensis*: Frontal region more elevated; sagittal crest shorter; zygomatic breadth much greater; heel of last upper molar much longer.

Adult female compared with female *alascensis*: Size smaller; vault of cranium decidedly lower, highest over posterior part of frontals instead of over middle of frontals; frontal shield narrow, flattened, sloping (not arched and not materially swollen over orbits); postorbital processes outstanding horizontally; palate, postpalatal shelf, and occipito-sphenoid shorter; M<sup>2</sup> with heel much longer.

Adult female compared with adult female *phaonyx*: Size decidedly greater; teeth much larger, especially the canines and last upper molars.

Adult female compared with adult female *kluane*: Length much greater; facial part of skull about the same; braincase and postpalatal parts much longer; vault of cranium higher; sagittal crest longer and higher, reaching forward over posterior frontals; point of shield much shorter; underjaw and inferior border of ramus much longer; teeth about the same size but M<sup>1</sup> usually smaller; heel of M<sup>2</sup> longer.

*Skull measurements.*—Old male (No. 158811, from head Toklat River, Alaska): Basal length, 304; occipito-nasal length, 298; palatal



length, 169.5; zygomatic breadth, 222; interorbital breadth, 80. Old female (type): Basal length, 283; occipito-nasal length, 267; palatal length, 157; zygomatic breadth, 187; interorbital breadth, 73.

URSUS LATIFRONS MERRIAM.

BROAD-FRONTED GRIZZLY.

*Ursus phæonyx latifrons* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 183-184, August 13, 1914.

*Type locality*.—Jasper House, Alberta.

*Type specimen*.—No. 75612, ♂ old, U. S. National Museum, Biological Survey collection. Collected September 15, 1895, by J. Alden Loring. Original No. 3270.

*Range*.—Rocky Mountains of western Alberta and eastern British Columbia from Jasper House northwesterly to region between headwaters of Parsnip and Great Bend of Fraser River and thence to extreme headwaters of Stikine River; limits of range unknown.

*Characters*.—Size medium or rather large. External characters unknown. Affinities with the geographically remote *toklat*.

*Cranial characters*.—*Adult male* (type): Size medium; base elongate posteriorly; vault of cranium rather low, only slightly arched, top flattish; frontal shield very broad (interorbitally 93 mm., between tips of postorbitals 130), rising from rostrum rather abruptly, broadly but shallowly depressed medially, swollen over orbits, the point ending in sagittal crest some distance (apparently more than an inch) anterior to fronto-parietal suture; postorbital processes *broad*, outstanding, and only slightly depressed; fronto-nasal region slightly dished; rostrum rather high, nearly horizontal, rounded above; postpalatal shelf rather broad; notch rather narrow; zygomata strongly outbowed but not widely spreading; underjaw long; coronoid blade broad basally, rather low, its anterior border sloping strongly backward. Teeth too badly worn to admit of description. *Adult female* (No. 209378) collected by F. K. Vreeland, September 17, 1915, near head of Big Salmon or North Fork Fraser River between Big Bend of the Fraser and headwaters of the Parsnip: Similar in general to that of male with the usual sexual difference in frontal shield, which is lyrate pointed posteriorly; frontal shield broad—broadly depressed medially between orbits, swollen over orbits; postorbital processes strongly developed, outstanding, slightly decurved; sagittal crest short, high posteriorly, covering about three-quarters of suture between parietals; postpalatal shelf rather broad and flat; mastoids short and appressed; postpalatal notch short, of moderate breadth; zygomata moderately outstanding, less bowed than in the male; coronoid blade broad basally, rather low, recurved

at apex; canines of medium size; molars large, especially last upper molar.

*Cranial comparisons.*—Old male (type) compared with old male *toklat* (from type locality): Frontal shield much broader and less elevated; braincase less arched; palate flatter (in *toklat* distinctly arched antero-posteriorly); zygomata more rounded basally and more *outbowed* (less angular); underjaw slightly longer; inferior border of ramus much longer; coronoid blade broader and higher. The basal part of the skull is longer in *latifrons* than in *toklat*. This is apparent whether the skull is viewed from above or below. In *latifrons*, seen from above, the distance from occipital crest to postorbital process is materially greater; while seen from below, the distance from occipital condyle to postpalatal notch is likewise greater. Another difference appears rather strikingly when the skull is viewed from below: in *latifrons* the squamosal base of the zygoma slopes gradually forward, while in *toklat* the curve is much shorter and more abrupt, so that the bases of the zygomata stand out much more squarely, practically at right angles to cranial axis.

While skulls of adult male *latifrons* differ strikingly from those of male *toklat*, skulls of the adult females are surprisingly alike, agreeing in general appearance, basal length, breadth of palate, and large size of last upper molar, though in *latifrons* this tooth is actually broader than in most specimens of *toklat*. The two agree essentially also in lower molars and canines. The underjaw in *latifrons*, however, is shorter, and coronoid blade lower than in *toklat*.

Old male compared with old male *kluane*: Frontal region much broader and flatter; postorbital processes much less decurved; sagittal crest shorter and straight instead of arched; rostrum less elevated and less narrowly rounded above; nasals flatter; zygomata more widely spreading and more strongly outbowed posteriorly; coronoid blade broader at base.

Adult female compared with adult female *kluane*: Skull much larger, longer, and more massive; frontal shield *much broader*; vault of cranium flatter (less arched over posterior frontals); rostrum higher; zygomata more widely outstanding; palate much broader; last upper molar much larger; lower molars and canines approximately same size. While the skull of female *latifrons* is much larger than that of female *kluane*, the underjaw is only slightly larger.

Adult female compared with adult female *phaonyæ*: Size much larger; frontal region much broader; rostrum broader; nasals more nearly horizontal; arch of cranium more depressed; underjaw longer; coronoid blade broader; molars much larger. (Comparison of males is unnecessary, the male of *phaonyæ* having a large, broad, massive skull resembling that of *dalli*.)

*Skull measurements.*—Old male (type): Basal length, 324; occipito-nasal length, 312; palatal length, 173; zygomatic breadth, 214.5; interorbital breadth, 94.

Richardsoni Group.

URSUS RICHARDSONI SWAINSON.

BARREN GROUND BEAR.

*Ursus Richardsoni* Swainson, *Animals in Menageries*, pp. 54–56, 1838.

*Type locality.*—Shore of Arctic Ocean, on west side of Bathurst Inlet near mouth of Hood River.<sup>1</sup>

*Characters.*—Size medium; color variable, from yellowish to grizzly brown; foreclaws of medium length, smooth; skull medium or small, with broadly spreading zygomata.

*Cranial characters.*—*Adult males:* Two adult or rather old male skulls collected by Dr. R. M. Anderson in 1915, and loaned me by the Museum of the Geological Survey of Canada, at Ottawa (one No. 2774 from Dolphin and Union Straits, the other No. 2776 from near mouth of Coppermine River), are assumed to be typical: Size medium; cranium high in relation to size, but not much arched; basi-cranium flat; shield rising abruptly from rostrum, of medium breadth, broadly and strongly sulcate medially, swollen over orbits, short pointed; postorbital processes massive, outstanding, arched over orbits and slightly decurved; orbits nearly vertical; rostrum moderate, rather high and narrow, sloping into sulcus of shield; orbits prominent, rising well above fronto-nasal plane; zygomata moderate, somewhat outbowed; nares subrectangular, broader than high; palate rather short; postpalatal shelf moderate or rather broad; squamosal shelf weak posteriorly; underjaw rather short; infra-angular border of ramus short; apex of coronoid only slightly recurved, falling short of plane of condyle; angular process projecting beyond condyle. Teeth medium; canines rather large; M<sup>2</sup> with moderate heel, narrowing posteriorly; cusps of posterior molars weak, those of inner side of M<sup>2</sup> nearly obsolete (in striking contrast with the highly developed cusps of both upper and lower molars of *pellyensis*).

An exceedingly old male in the National Museum (No. 6255), collected on Anderson River by R. MacFarlane, has the shield less swollen over and in front of orbits, and even shorter pointed poste-

<sup>1</sup> Swainson's description was based on and largely quoted from Richardson's account of "an old and lean male, killed on the shores of the Arctic Sea on the 1st of August, 1821." (Article on the Barren Ground Bear, in *Fauna Boreali-Americana*, pp. 21–24, 1829.) And in Franklin's "Narrative of a Journey to the Shores of the Polar Sea," p. 373, 1823, under date of August 1, 1821, the party being at the mouth of Hood River on Bathurst Inlet, the killing of a lean male brown bear is chronicled in some detail. It appears therefore that the type locality of *Ursus richardsoni* is Hood River, Bathurst Inlet.

riorly; rostrum more depressed; sagittal crest longer and somewhat higher (but still not high) and somewhat humped over posterior frontals; zygomata more broadly outstanding.

*Skull measurements.*—Old male (No. 6255) from Anderson River: Basal length, 311; occipito-nasal length, 286; palatal length, 163; zygomatic breadth, 227; interorbital breadth, 72.5. Old male (No. 2774, Ottawa Museum) from Dolphin and Union Strait: Basal length, 316; occipito-nasal length, 290; palatal length, 170; zygomatic breadth, 211; interorbital breadth, 79. Adult male (No. 2776, Ottawa Museum) from near mouth Coppermine River: Basal length, 299; occipito-nasal length, 288; palatal length, 163; zygomatic breadth, 217; interorbital breadth, 82.5.

### URSUS RUSSELLI<sup>1</sup> MERRIAM.<sup>2</sup>

#### MACKENZIE DELTA GRIZZLY.

*Ursus russelli* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 178, August 13, 1914.

*Type locality.*—West side Mackenzie River delta, Canada.

*Type specimen.*—No. 21301, ♂ old, University of Iowa Museum. Collected June 28, 1894, by Frank Russell. Mounted skin with skull separate.

*Range.*—Lower Mackenzie region; limits unknown.

*Characters.*—Size rather small. Color a curious pale drab-brown, somewhat darker on legs and feet; ears conspicuously hairy. Claws smooth, moderately to strongly curved; brownish horn color with paler (almost amber) tips. Teeth large; last upper molar of great size and peculiar glassy texture in type skull. Affinities uncertain.

*Cranial characters.*—*Adult male* (type): Skull of medium size, about equaling old male of *alascensis*; rather short; fairly broad across zygomata; frontal shield sloping strongly upward, moderately sulcate, swollen over orbits, but orbits not everted; posterior point of shield rather short, ending about one-third the distance from fronto-parietal suture to postorbital processes; postorbital processes peglike, standing out nearly horizontally—not depressed as in *alascensis*; muzzle rather narrow and high; zygomata slender, the posterior roots not expanded vertically; palate flat, not excavated or arched as in several species; underjaw massive, heavier under  $M_{\frac{2}{2}}$  and  $M_{\frac{3}{3}}$  than in *alascensis*; coronoid blade falcate but not narrowly so.

*Cranial comparisons.*—From *richardsoni*, its neighbor on the east, with which it agrees in size and in certain dental characters, it differs in much more highly vaulted cranium; more highly sloping (less

<sup>1</sup> Named for Frank Russell, who collected the type specimen.

<sup>2</sup> Tentatively included in *richardsoni* group. (See Introduction, pp. 12-13.)

nearly horizontal) braincase; much more elevated frontal region, and very much narrower rostrum. The frontal shield is much longer than in *richardsoni*, the temporal impressions curving backward to meet one another about one-third the distance between postorbital processes and fronto-parietal suture, instead of turning abruptly inward; postorbital processes more slender than in *richardsoni*; sagittal crest shorter and less nearly horizontal; upper molars *very much larger*, particularly broader. Zygomatic arches bowed outward in both species—not sharply angular as in many large bears.

*Skull measurements.*—Old male (type): Basal length, 310; occipito-nasal length, 300; palatal length, 163; zygomatic breadth, 220; interorbital breadth, 79.5.

#### URSUS PHÆONYX MERRIAM.

##### TANANA GRIZZLY.

*Ursus horribilis phæonyx* Merriam, Proc. Biol. Soc. Washington, XVII, p. 154, October 6, 1904.

*Type locality.*—Glacier Mountain, Tanana Mountains, Alaska (about 2 miles below source of Comet Creek, near Fortymile Creek, between Yukon and Tanana Rivers).

*Type specimen.*—No. 133231, ♀ ad., U. S. National Museum, Biological Survey collection. Collected July 12, 1903, by W. H. Osgood.

*Range.*—Tanana Mountains between Tanana and Yukon Rivers.

*Characters.*—Size of male large; of female small (sexual disparity great, much greater than in *dalli*).

*Color.*—Upperparts varying from creamy or buffy to dark “grizzly color”; underparts and muzzle pale brown; legs very dark brown, varying to blackish brown; claws horny and smooth, usually dark but sometimes marked with whitish. Last upper molar of medium size or rather small.

*Cranial characters.*—*Old male* (No. 201586, from Ketchumstock, assumed to be typical of *phæonyx*): Size medium or rather large; skull broad and short, moderately arched and dished, with broadly outstanding zygomata and rather deeply sulcate strongly sloping frontal shield. Frontal shield of moderate breadth, strongly swollen over orbits and bases of postorbitals, short pointed posteriorly, the point ending midway between fronto-parietal suture and plane of postorbitals; postorbitals triangular, broad basally, convex posteriorly, straight or concave anteriorly; rostrum moderate, nearly horizontal, sulcate-depressed on top; fronto-nasal region distinctly dished; squamosal shelves broad and rather short, the outer margin arched and upturned; middle part of zygomata moderately expanded vertically; palate broad and short; postpalatal shelf broad; notch relatively narrow. Underjaw long for size of skull, massive;

coronoid blade high, rather narrow, and rather vertical, the recurved apex not reaching plane of condyle. Teeth medium.

*Adult female* (type): Size small; vault of cranium well arched posteriorly, highest point 25 to 30 mm. in front of fronto-parietal suture; braincase rather broad, not much constricted anteriorly, not compressed, and with no tendency to keel into anterior part of sagittal crest; frontal shield moderately flattened, shallowly sulcate medially and slightly swollen on each side of median depression, gently sloping into rostrum posteriorly, the lyrate point reaching nearly to parietals; rostrum rather small; zygomata moderately outstanding; palate medium; postpalatal shelf rather broad and short. Underjaw long; inferior border of ramus long and straight; coronoids rather small, the apex strongly recurved, cutting plane of condyle.

*Cranial comparisons.*—Old female (type) compared with adult female *kluane*: Size somewhat larger; braincase broader anteriorly; frontal shield broader; palate and postpalatal shelf broader; occipito-sphenoid and postpalatal lengths much greater. Underjaw much longer; inferior border of ramus longer and straighter. Teeth too badly worn to admit of description but apparently about same size as in *kluane*.

Old female (type) compared with adult female *toklat* from Alaska Range, near Mount McKinley: Basal length somewhat less; braincase less contracted and much broader anteriorly (not compressed and with no tendency to keel into anterior part of sagittal crest); frontal shield less deeply sulcate anteriorly and much longer pointed posteriorly; fronto-nasal region less depressed; underjaw shorter; ramus straighter and lighter; coronoid much smaller, narrower, and lower; upper canines apparently about the same; last upper molar smaller; lower canines more slender; lower molars apparently about the same, but so completely worn off in type specimen that comparison is impossible.

*Remarks.*—The skull of the adult male *phaonyx* (if the sexes are correctly mated) is large, broad, and rather massive, requiring comparison with only a single known species, *Ursus dalli*. The female on the other hand is small and resembles in a general way the females of the still smaller *kluane*, *pulchellus*, and *pallasi*.

*Skull measurements.*—Old male (No. 205186, from Ketchumstock, Alaska): Basal length, 327; occipito-nasal length, 309; palatal length, 176; zygomatic breadth, 242; interorbital breadth, 85. Old female (type): Basal length, 280; occipito-nasal length, 267; palatal length, 148; zygomatic breadth, 189; interorbital breadth, 68.

## URSUS INTERNATIONALIS MERRIAM.

## ALASKA BOUNDARY GRIZZLY.

*Ursus internationalis* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 177-178, August 13, 1914.

*Type locality*.—Alaska-Yukon Boundary, about 50 miles south of Arctic coast (lat. 69° 00' 30'').

*Type specimen*.—No. 1763, ♂ ad., Ottawa Museum. Killed July 3, 1912, by Frederick Lambart, of Canadian Boundary Survey.

*Range*.—Region bordering Arctic coast along international boundary, and doubtless adjacent mountains, between the coast and the Yukon-Porcupine; limits unknown.

*Characters*.—Size medium or rather large; affinities doubtful. Color a peculiar pale yellowish brown. Head strongly arched; muzzle and frontal region broad. Large lower premolar strictly conical, without heel, as in the brown bears.

*Cranial characters*.—Skull of medium size, massive, strongly arched and dished, highest over anterior part of braincase; frontal shield broad, very short pointed posteriorly, sulcate medially and swollen over orbits; postorbitals bluntly rounded, strongly decurved, not widely projecting; fronto-nasal region strongly dished; rostrum large and broad; sagittal crest long but feebly developed; zygomata subtriangular, not widely outstanding, and not much expanded vertically; palate and postpalatal shelf rather broad; notch moderate. Teeth rather small for size of skull; heel of last upper molar small and obliquely truncate on outer side; large lower premolar strictly of brown-bear type—a single cone without heel, sulcus, or posterior cusplets; first lower molar broad and somewhat sinuous; middle lower molar narrow and short posteriorly.

*Skull measurements*.—Adult male (type): Basal length, 309; occipito-nasal length, 293; palatal length, 169; zygomatic breadth, 203.5; interorbital breadth, 82.

URSUS OPHRUS<sup>1</sup> MERRIAM.

## HIGH-BROW GRIZZLY.

(Pl. X.)

*Ursus ophrus* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 148-149, September 6, 1916.

*Type locality*.—Eastern British Columbia (exact locality unknown).

*Type specimen*.—No. 210252, ♂ old, U. S. National Museum, Biological Survey collection. Collected in 1915, by E. W. Darbey.

<sup>1</sup> *Ophrus*, with reference to the unusual brows.

*Cranial characters.*—Skull short, strongly dished, remarkably high, the deeply sulcate frontal shield rising abruptly high over orbits, with thickened brows and large outstanding arched postorbital processes. Frontal shield of moderate breadth; deeply and broadly concave between orbits, swollen over orbits and passing out into strongly outstanding postorbitals, short pointed posteriorly; fronto-nasal region deeply sulcate; middle part of nasals flat; sagittal crest high and reaching anteriorly nearly midway from fronto-parietal suture to plane of postorbitals; rostrum rather small and narrow; palate rather narrow; postpalatal shelf rather broad; zygomata broadly and strongly outbowed; mastoids rather long. Underjaw long, its inferior margin rather long and nearly straight; subangular tubercle considerably posterior to inferior dental foramen; coronoid blade broad, its apex only moderately recurved, ending anterior to plane of condyle; canines of medium size, the lower ones rather massive; molars of medium size, the upper rather small for size of skull.

*Skull measurements.*—Old male (type): Basal length, 323;<sup>1</sup> occipito-nasal length, 304; palatal length, 175; zygomatic breadth, 229; interorbital breadth, 85.

#### URSUS WASHAKE MERRIAM.

##### WASHAKIE GRIZZLY.

*Ursus washake* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 152-154, September 6, 1916.

*Type locality.*—North Fork Shoshone River, Absaroka Mountains, western Wyoming (between Bighorn Basin and Yellowstone National Park).

*Type specimen.*—No. 213005, ♂ ad., U. S. National Museum, Biological Survey collection. Killed September, 1913, by Col. J. A. McGuire.

*Cranial characters.*—*Old male* (type): Size medium, about equaling male *shoshone* and male *horriæus*; skull rather short and high, moderately arched, with broad, elevated postorbitals and rather broadly outbowed zygomata. Frontal shield rather narrow, sloping strongly upward anteriorly, highest at postorbital processes, horizontal posteriorly, broadly concave between postorbital processes; postorbital processes large, broad, subtriangular as viewed from above, outstanding, elevated and slightly arched, rising well above frontal plane and passing anteriorly into thickened orbital rims; fronto-nasal region dished (change of angle about middle of nasals); rostrum rather small, strongly compressed horizontally between nasals and roots of canines, making nasals appear elevated; anterior nares small; zygomata rather slender, broadly spreading, rounded

<sup>1</sup> Restored.



and strongly outbowed posteriorly, only slightly expanded vertically; sagittal crest low; postpalatal shelf broad, flat, and rather short; occipito-sphenoid 87 mm. (=distance from front of canine to or slightly beyond middle of  $M^1$ ). Underjaw moderate; ramus bellied posteriorly; coronoid blade high and rather falcate, the apex cutting plane of condyle (line from apex to tip of angular process passing well behind condyle). Teeth moderate or rather large;  $M^2$  large.

*Cranial comparisons.*—Old male (type) compared with adult male *ophrus* (type): Size about the same, but appearing smaller; frontal shield less elevated and less deeply concave; fronto-nasal region elevated instead of sulcate-dished; zygomata less widely outbowed; postorbitals much broader and less elevated; orbital rims less swollen; postpalatal shelf shorter and broader; mastoids shorter; nares smaller and lower. Underjaw more massive; inferior border of ramus more swollen and much more bellied posteriorly; coronoid blade higher and more falcate, the apex reaching much farther posteriorly (cutting plane of hinder part of condyle).

Compared with adult male *canadensis* (type), to which it is not related but with which it agrees essentially in basal and occipito-sphenoid length: Frontal shield less flat, more elevated laterally, highest at postorbitals instead of at posterior point; fronto-nasal region more dished; rostrum smaller, narrower basally, more strongly compressed below nasals; postorbital processes very much larger, broader, and more massive, elevated, arched, and subtriangular, instead of slender and narrowly peglike; zygomata more outbowed and arched; sagittal crest low and straight instead of high and arched; inion less developed; braincase anteriorly broader and more depressed—not tending to “keel” into sagittal crest as in *canadensis*; occipito-nasal length less, although basal length of skull is essentially the same in both. Underjaw longer; inferior border of ramus shorter and more strongly bellied; coronoid blade higher and more falcate, its apex reaching farther posteriorly; distance from angle to subangular process much greater; diastema in both jaws much longer. Last upper and middle lower molars not quite so broad.

Compared with adult male *absarokus* (type): Size smaller; vault of cranium decidedly lower; braincase anteriorly broadly depressed; frontal shield narrower, lower, and flatter, concave instead of convex between postorbital processes; postorbital processes (viewed from above) *broadly triangular, uplifted, and somewhat arched* instead of pegshape; orbital rims more thickened and elevated; rostrum smaller, lower, more slender, and much more compressed horizontally between nasals and roots of canines, making the nasals appear elevated; sagittal crest lower; occipito-sphenoid shorter; occiput lower; anterior nares smaller. Underjaw shorter; inferior border of

ramus much shorter; coronoid blade more falcate, its apex reaching farther posteriorly; angular process more slender and more produced posteriorly (line connecting apex of coronoid with angle passing well behind condyle—in *absarokus* cutting condyle near middle). Molars smaller.

*Skull measurements.*—Adult male (type): Basal length, 310; occipito-nasal length, 305; palatal length, 170; zygomatic breadth, 217; interorbital breadth, 76.

#### Kidderi Group.

#### URSUS KIDDERI KIDDERI<sup>1</sup> MERRIAM.

#### KIDDER BEAR.

#### (Pl. VIII.)

*Ursus kidderi* Merriam, Proc. Biol. Soc. Washington, XV, p. 78, March 22, 1902.

*Type locality.*—Chinitna Bay, Cook Inlet, Alaska.

*Type specimen.*—No. 116562, ♂ young (not fully grown), U. S. National Museum, Biological Survey collection. Collected June 9, 1901, by James H. Kidder.

*Range.*—Alaska Peninsula for its entire length.

*Characters.*—Size medium—small compared with *gyas* of the same region; sexual disparity small, female nearly as large as male; skull of adult male hardly half the bulk of male *gyas*; skull of adult female nearly the same size as that of female *gyas*; color yellowish brown; claws rather short, blue-black.

*Color.*—June specimens (in left-over winter pelage): General color yellowish brown, darkest on belly and legs, legs much darker than body. Most of the Kidder bears in the National Zoological Park are pale buffy yellowish, or yellowish cream color.

*Cranial characters.*—*Adult male*: Skull long, rather low, narrow, and massive; frontal shield narrow, moderately sloping; swollen over orbits and rather deeply sulcate or troughed medially; fronto-nasal region slightly dished; rostrum and nasals high and rather long; postorbital processes peglike, outstanding; braincase elongate; zygomata angular, only moderately spreading; sagittal crest long; palate long; mastoids long; underjaw long, with long ramus and moderate or low coronoid blade. *Adult female*: Skull in general like that of male but slightly smaller and with more slender rostrum and slightly smaller teeth. The sagittal crest extends much farther forward than in the females of most species, in this respect also resembling the male. The sexual difference in size of teeth appears to be covered by individual variation.

<sup>1</sup> Named for James H. Kidder, who collected and presented the type specimen.

*Cranial comparisons.*—Adult male and female compared with adult female *gyas*: Adult males require no comparison, owing to the great difference in size of skull and teeth, but with the females the case is very different, the size being essentially the same. In *fully adult* females *kidderi* is easily distinguished by the *lowness* of the vault of the cranium and *greater length of the sagittal crest*—female *gyas* being rather highly domed and having the short sagittal crest of most female bears.

Males of *kidderi* are sometimes hard to tell from females of *gyas*, but in the case of fully adult skulls they may be distinguished as follows: Male *kidderi* averages longer, both in basal and occipito-nasal length, is much less highly arched, and is more obliquely truncate posteriorly so that the occiput overhangs, giving the effect of a longer braincase. The rostrum also is somewhat longer. The frontal shield is quite different, being very much shorter posteriorly, ending about an inch in *front* of the parietals, whereas in female *gyas* the posterior point of the shield extends posteriorly to about the same distance *behind* the fronto-parietal suture. Thus in adult male *kidderi* the frontal shield is horizontal or *slopes forward* from its most posterior point, while in adult female *gyas* it *slopes backward* for some distance—from a point at least an inch in front of the fronto-parietal suture—the shield thus overreaching the highest point of the arch of the skull and sloping downward in both directions. The occipito-sphenoid length is slightly greater in female *gyas* than in male *kidderi*.

Comparison of cubs of the second, third, and fourth years: Cubs of *kidderi* after the molars are in position and the permanent canines partly exposed, are easily told from those of male *gyas* of corresponding age by the relatively small size of the teeth, especially the canines, molars, and outer upper incisors. It is not so easy, however, to tell them from female *gyas*, and in some cases it may be impossible. The most constant character appears to be the *length of the canines*, and this can not be determined in cubs less than three or three and a half years of age. The canines are slightly longer in male *kidderi* than in female *gyas*, and their diameter also is usually, but not always, greater. As a rule, also, the crowns of the molars are larger, especially longer, in male *kidderi* the combined length of the first and second lower molars averaging about 4 mm. greater than in female *gyas*. As the teeth become worn with use the differences become less and less obvious, so that after the third year the distinctions are not easy of recognition.

*Skull measurements.*—Average of 3 males from Belkofski, Alaska Peninsula: Basal length, 330; occipito-nasal length, 312; palatal length, 177; zygomatic breadth, 207; interorbital breadth, 74.

Average of 4 females from Pavlof Bay, Alaska Peninsula: Basal length, 330; occipito-nasal length, 312; palatal length, 181.5; zygomatic breadth, 218; interorbital breadth, 80.5.

URSUS KIDDERI TUNDRENSIS MERRIAM.

TUNDRA BEAR.

*Ursus kidderi tundrensis* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 196, August 13, 1914.

*Type locality*.—Shaktolik River, Norton Sound, Alaska.

*Type specimen*.—No. 76470, ♂ ad., U. S. National Museum, Biological Survey collection. Collected by natives, September, 1894, and secured through the late Rudolf Neumann, then of Iliuliuk, Unalaska.

*Range*.—Tundra region of northwestern Alaska from Shaktolik River on Norton Sound, southerly across the lower Yukon, Kuskokwim, and Nushagak Rivers to Bristol Bay and north side of base of Alaska Peninsula.

*Characters*.—Size medium (small in contrast with *gyas*), about equaling *kidderi*. External characters unknown, but doubtless little different from *kidderi*. Known to the natives as "Red Bear."

*Cranial characters*.—Size medium, about as in *kidderi*; skull rather long and heavy; frontals broad and flat, broadly but not deeply sulcate medially; postorbital processes small; coronoid blade falcate and rather high.

*Cranial comparisons*.—Similar to *kidderi* in essential cranial and dental characters, but differing in having the frontal shield and postorbital processes *very much broader and flatter*, and the frontal sulcus less marked. As in *kidderi* there is little difference in the sexes except that the females have narrower muzzles and narrower frontal shields. A young male (No. 16375) from Andreafski on the lower Yukon, collected by E. W. Nelson, has somewhat shorter canines than the others.

From *alascensis*, the grizzly of the same general region, skulls of *tundrensis* (adult males in both cases) may be distinguished by the following characters: Size larger (basilar and occipito-nasal lengths fully an inch greater); skull as a whole much more massive; frontals broader, rising less abruptly from facial plane, less swollen over orbits; rostrum less slender; palate more flat; ramus of jaw thicker under  $M_{\frac{2}{2}}$  and  $M_{\frac{3}{3}}$ ; coronoid blade more falcate; canines larger, decidedly longer, and somewhat less curved; molars decidedly larger.

*Skull measurements*.—Adult male (type): Basal length, 333; occipito-nasal length, 317; palatal length, 178; zygomatic breadth, 228; interorbital breadth, 93.

## URSUS EXIMIUS MERRIAM.

## KNIK BEAR.

*Ursus eximius* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 139-140, September 6, 1916.

*Type locality*.—Head of Knik Arm, Cook Inlet, Alaska.

*Type specimen*.—No. 122495, ♂ ad., U. S. National Museum. Collected by G. W. Palmer.

*Characters*.—Size rather large; color uniform rich dark brown suggesting seal brown; muzzle brown, paler than rest of head; back of head and neck lightly sprinkled with pale-tipped hairs; claws of medium thickness, only slightly curved, decidedly short, probably from wear, smooth, very dark horn color, becoming paler on sides toward tip. Skull long and narrow, with narrow highly arched frontals. Related to *kidderi*.

*Cranial characters*.—*Adult male* (type): Skull long, extremely narrow in fronto-nasal region, rather highly arched and strongly dished. Frontal shield exceedingly narrow, convex, shallowly sulcate medially, strongly arched anteriorly, horizontal posteriorly, long-pointed, the point nearly reaching fronto-parietal suture; postorbital processes slender, peglike, moderately outstanding; fronto-nasal region strongly dished; rostrum long, narrow, high, compressed between nasals and canine roots; zygomata moderately outstanding, subtriangular; palate long and narrow; postpalatal shelf relatively broad; notch rather broad; mastoids long, strongly divergent; under-jaw long, moderately massive, the ramus broad vertically; coronoid blade rather broad, the apex not strongly recurved; teeth of medium size;  $M^2$  with rather long heel, not much narrowed posteriorly;  $M^1$  relatively large and broad;  $PM_{\frac{1}{4}}$  a single cone without distinct heel but sulcate posteriorly.

*Adult female* (No. 205176, from type locality): Skull long and narrow; vault of cranium moderately arched, the highest part forming a hump at fronto-parietal suture; frontal shield narrow, flattish, sulcate medially, the point reaching fronto-parietal suture; postorbitals weak, subtriangular, not decurved; fronto-nasal region moderately dished; rostrum narrow, compressed between nasals and canine roots; zygomata moderately spreading, subtriangular; postpalatal shelf relatively broad; notch moderate; inferior border of ramus convex from plane of front molar posteriorly; coronoid blade broad and low.

*Cranial comparisons*.—*Ursus eximius* appears to be related to only a single species, *kidderi* of Alaska Peninsula. Adult male (type) compared with a series of *kidderi* from various points on Alaska Peninsula: Size about the same; vault of cranium more highly arched; frontal shield narrower, more strongly convex in cross sec-

tion, less deeply sulcate; postpalatal processes more slender, peglike, and outstanding; fronto-nasal region more dished; rostrum more slender; nasals longer posteriorly, more completely wedge-shaped, reaching posteriorly to plane of postpalatal processes; mastoids longer and more divergent.

Adult female (No. 205176, from head of Knik Arm) compared with adult female *kidderi*: Size materially smaller; frontal shield and rostrum much narrower; vault of cranium notably higher over fronto-parietal suture; braincase narrower; nasals longer posteriorly; underjaw smaller and lighter.

Adult male (type) compared with adult male *alascensis* (No. 76466, from Unalaklik River, Norton Sound, Alaska): Skull much longer, more highly arched, and narrower throughout. Frontal shield much more elevated, narrower, and longer posteriorly; fronto-nasal region more strongly dished; rostrum narrower and higher; lambdoid crest more strongly developed; palate and postpalatal shelf much longer; occipito-sphenoid much longer; mastoids much longer and strongly divergent; underjaw longer; coronoid blade much higher; teeth larger; heel of M<sup>2</sup> much longer.

Adult female compared with female *alascensis*: Length essentially the same; skull narrower throughout; frontal shield lower, much narrower and flatter, rising less abruptly from rostrum; fronto-nasal region sulcate but less strongly dished; rostrum slightly more slender; postpalatal shelf narrower. Underjaw about same length; inferior border of ramus more evenly convex (less abruptly bellied); coronoid blade broader; canines about same size; molars somewhat larger.

*Skull measurements*.—Adult male (type): Basal length, 331; occipito-nasal length, 319; palatal length, 185; zygomatic breadth, 215; interorbital breadth, 71.

#### Innuitus Group.

#### URSUS INNUITUS MERRIAM.

#### INNUIT BEAR.

#### (Pl. VII.)

*Ursus innuitus* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 177, August 13, 1914.

*Type locality*.—Golofnin Bay, south side of Seward Peninsula, northwestern Alaska.

*Type specimen*.—No. 179780, ♂ old, U. S. National Museum, Biological Survey collection. Collected in 1886, by Edward F. Ball.

*Range*.—Coastal region of Norton Sound, Alaska, from Unalaklik northward and westward; limits unknown.

*Characters.*—Size large; external characters unknown. Molars large and massive, especially M<sup>2</sup>. Large lower premolar subconical, apparently of the brown bear type. But in the north the grizzly type of premolar often fails in true grizzlies; hence not having seen the claws, it is at present impossible to say whether *innuitus* is a brown bear or a grizzly.

*Cranial characters.*—*Old male* (type): Skull large; basal length essentially the same as in *horribilis* and *alexandræ* but occipito-nasal length much less, owing to shortness of occiput; fronto-nasal region strikingly dished; rostrum short, exceedingly broad (of same breadth as in *alexandræ*, very much broader than in *horribilis*), strongly depressed; frontal shield exceedingly broad interorbitally, rising high and abruptly from rostrum, nearly horizontal behind plane of post-orbital processes, rather deeply sulcate medially and strongly swollen over orbits; postorbital processes large, subtriangular, outstanding and decurved; nasals nearly horizontal; palate and post-palatal shelf broad; postpalatal notch of medium width; zygomata broadly spreading and somewhat outbowed posteriorly, acute anteriorly; nares broader than high; sagittal crest short, extending only about 25 mm. beyond fronto-parietal suture, straight (not arched), high posteriorly; lambdoid crest large and full; coronoid blade narrow and high; ramus long and flat. Canines badly broken, apparently long; last lower premolar broad, broader posteriorly than anteriorly, the cusp small and sloping posteriorly without heel or marginal cusplets, but with pit and indication of narrow sulcus; molars exceptionally large and broad, the last upper one with heel strikingly long and broad, agreeing almost exactly with that of true *horribilis* from eastern Montana.

Two youngish skulls from Unalaklik (No. 82024, third year and No. 210554, fourth year) are believed to be females of this species. They are not old enough to show adult cranial characters except that the postpalatal shelf is broad and flat and the notch broad, but the teeth are perfect, full grown, and unworn. Canines of medium size (in the type badly broken and hence not available for comparison); molars large but smaller and less massive than those of type; M<sup>2</sup> large, cusps on inner side nearly obsolete (presenting little more than an undulating line), heel long and broad with large flat granular grinding surface.

*Cranial comparisons.*—The only species needing comparison with *innuitus* are *alexandræ* and *ressonus*. The old male skull resembles certain old skulls of *alexandræ* from Kenai Peninsula, but differs rather strikingly in truncation of occiput (the occipital overhang being very much less) and corresponding shortening of braincase and sagittal crest. The crest moreover is straight instead of arcuate

or arched, and the molars, especially  $M^1$  and  $M^2$  are very much larger.

Compared with old male *cressonus* (type): Basal length and zygomatic breadth essentially same; occipito-nasal length much less; frontal shield broader, much less elevated over orbits; rostrum much broader and lower; occipital overhang much less; braincase and sagittal crest much shorter; postpalatal shelf broader and flatter.

*Skull measurements.*—Old male (type): Basal length, 353; occipito-nasal length, 331; palatal length, 194; zygomatic breadth, 251; interorbital breadth, 104.

#### URSUS CRESSONUS MERRIAM.

##### CHITINA BEAR.

*Ursus cressonus* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 137-139, September 6, 1916.

*Type locality.*—Lakina River, south slope of Wrangell Range, Alaska.

*Type specimen.*—No. 206529, ♂ old, U. S. National Museum, Biological Survey collection. Collected by Captain J. P. Hubrick, of McCarthy, Alaska, 1914.

*Range.*—Chitina River valley and adjacent slopes of Skolai and Wrangell Mountains, westerly doubtless through Chugach Mountains to the west side of Cook Inlet; occurs as far south as the Iliamna region.

*Cranial characters.*—Old male (type): Skull peculiar and distinctive; size large (basal length 357 mm.); skull long, narrow, high, and strongly dished; frontal shield highly elevated, rising abruptly from rostrum, rather broad, deeply sulcate throughout medially, swollen over orbits, short pointed posteriorly; orbits nearly vertical; postorbital processes small and strongly decurved; fronto-nasal region sulcate and strongly dished; rostrum rather short and narrow; nasals horizontal except posteriorly, where they rise strongly; braincase exceedingly long; sagittal crest high posteriorly, straight, and long, reaching anteriorly to halfway between parietals and plane of postorbitals; zygomatic arches moderately spreading, subtriangular (not outbowed), expanded vertically; palate and postpalatal shelf relatively long and narrow for so large a skull; postpalatal notch rather narrow and short; occipito-sphenoid long (about 103 mm.); mastoids outstanding; anterior nares rather small, subtruncate, and broader than high in type skull, higher and less truncate in the Iliamna skulls. Underjaw absent in type specimen, but in an old male from Iliamna on north side of Cook Inlet (No. 209885) which



in most respects closely matches the type, the ramus is broadly flattened vertically, much broader posteriorly than anteriorly, and the coronoid blade is high and rather vertical. In younger skulls from Iliamna the coronoid is broader basally and less high. Canines large and massive; molars moderate. The last upper molar is large in the type, smaller and more cut away on outer side of heel in the Iliamna specimens. No. 209885 from Iliamna agrees with the type, except that the nares is higher and less truncate, and the last upper molar smaller, with heel more cut away on outer edge.

*Old female* (No. 209881, from head of Chitina River, 80 miles from McCarthy, Alaska; collected by Capt. J. P. Hubrick): Size medium; cranium moderately arched; frontal shield broad, deeply sulcate anteriorly, strongly swollen over and posterior to orbits, the point lyrate and reaching parietals; postorbitals rather large, blunt, and somewhat decurved; fronto-nasal region strongly dished and depressed medially; rostrum rather large and high, nearly horizontal; palate and postpalatal shelf broad; postpalatal notch moderate and rather broad. Underjaw long; coronoid blade high and rather narrow, its apex only slightly recurved. Dentition light; canines small and short; molars rather narrow, apparently normal (too badly worn to admit of description, except that the heel of  $M^2$  is moderately long and rather broadly rounded posteriorly).

*Cranial comparisons.*—Old male (type) compared with old male *dalli*: Size about the same; vault of cranium and frontal shield much more elevated, less flat, less nearly horizontal, and much more swollen over orbits; shield more deeply sulcate; postorbitals weak and decurved (in *dalli* larger and more horizontally outstanding); fronto-nasal region more strongly dished; rostrum narrower and longer; zygomata much less widely outstanding and much less bowed; palate longer; molars very much larger.

Old male (type) compared with adult male *nuchek* (type): Size, elevation of vault of cranium, and zygomatic breadth about the same; frontal shield somewhat broader, much more highly arched, much more swollen over orbits, much more deeply sulcate medially, shorter and more acutely pointed posteriorly; postorbitals smaller and more decurved; fronto-nasal region strongly dished; rostrum more depressed; nares more truncate; last upper molar of normal form, large, and with long posteriorly rounded heel, differing widely from the short, broad-in-the-middle, obliquely truncate tooth of *nuchek*.

*Skull measurements.*—Old male (type): Basal length, 357; occipito-nasal length, 354; palatal length, 199; zygomatic breadth, 244; interorbital breadth, 97.

URSUS ALEXANDRÆ<sup>1</sup> MERRIAM.<sup>2</sup>

ALEXANDER GRIZZLY.

*Ursus alexandrae* Merriam, Proc. Biol. Soc. Washington, XXVII, pp. 174-175, August 13, 1914.

*Type locality*.—Kusilof Lake, Kenai Peninsula, Alaska.

*Type specimen*.—Skull No. 4752, ♂ old, Museum of Vertebrate Zoology, University of California; original No. 218. Collected September, 1906. (Skull, skin, and skeleton complete.)

*Range*.—Kenai Peninsula, Alaska.

*Characters*.—Size very large; skull long and narrow; rostrum exceptionally broad for a grizzly; pelage very uniform in color, scarcely or not grizzled; claws enormous (second foreclaw of type specimen measuring: length from upper base, 91 mm; height at base, 25; breadth, 11.5). The longest claw in a specimen collected by Wilson Potter measures 120 mm.; in a male killed by Dall DeWeese, 110 mm.

*Color*.—Type, very old male, in fresh short fall pelage: General color pale, almost grayish brown, becoming yellowish brown between ears, contrasting with pale brown of muzzle; legs and feet only slightly darker than back; entire animal remarkably unicolor; underfur plumbeous, crinkled, and wooly. Another male, killed by Wilson Potter, of Philadelphia, in May, 1912 (belonging to skull No. 181102, presented by Wilson Potter), is pale buffy inclining to light reddish brown throughout, without grizzly appearance; legs only slightly darker. One killed by Dall DeWeese, of Canyon City, Colorado, September 7, 1897, is described by him as "grayish-yellow," with legs and sides chocolate-brown.

*Cranial characters*.—Skull large, long, rather narrow, with moderately spreading zygomata, short flattish frontal shield, outstanding postorbitals (with age); very broad rostrum for a grizzly, and long and high sagittal crest. Frontal shield not markedly elevated above plane of rostrum; posterior root of zygoma not expanded. Canines large and long.

*Cranial comparisons*.—Adult male compared with adult male *kenaiensis*: Basal length, palate, and occipito-sphenoid length essentially the same; skull as a whole much narrower, frontal shield interorbitally and across postorbital processes much narrower, flatter, more nearly horizontal, not materially elevated above plane of rostrum; zygomata much less widely spreading, squamosal part much narrower (not expanded); sagittal crest much longer, reaching anteriorly over posterior third of frontals (in *kenaiensis* ending on or near frontoparietal suture); posterior third of frontals compressed, rising in

<sup>1</sup> Named for Annie M. Alexander, founder of the Museum of Vertebrate Zoology, University of California, Berkeley.

<sup>2</sup> Tentatively included in *inuitus* group. (See Introduction, pp. 12-13.)

a keel to sagittal crest. Canine teeth, both upper and lower, but especially the lower, much larger and longer.

*Remarks.*—The skull of *alexandræ* is of a generalized type, lacking the special distinctive features that characterize several of its neighbors—as *kenaiensis*, *sheldoni*, and others—none of which are true grizzlies. Among the grizzlies it stands alone in the great breadth of the rostrum, which in bears of its size is only exceeded by the widely different *kenaiensis*. *Ursus alexandræ* attains the largest size known among the grizzly bears, the biggest skulls equaling those of the huge *magister* of Southern California.

*Skull measurements.*—Old male (type): Basal length, 355; occipito-nasal length, 358; palatal length, 191; zygomatic breadth, 252; interorbital breadth, 87.

#### Townsendi Group.

#### URSUS TOWNSENDI<sup>1</sup> MERRIAM.

#### TOWNSEND BEAR.

*Ursus townsendi* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 151-152, September 6, 1916.

*Type locality.*—Mainland of Southeastern Alaska (exact locality uncertain).

*Type specimen.*—No. 216643, ♂ old, U. S. National Museum. Purchased at Sitka, in 1889, by Dr. Charles H. Townsend.

*Cranial characters.*—Skull large, long, massive, rather low, and flat topped, dished, with extremely small teeth. Shield broad, flat, slightly depressed medially, the point ending anterior to parietals, sides reaching out broadly into very broad postorbitals, strongly sloping to rostrum; rostrum moderate, flat or depressed on top; nares truncate; zygomata moderately outstanding and moderately bowed; squamosal base broadly and abruptly expanded vertically; palate and postpalatal shelf moderate; notch rather narrow; mastoids long; occipito-sphenoid 95 mm.; basisphenoid rather deeply concave. Underjaw long; ramus broad and flat vertically; coronoid of moderate height, narrowing above, sloping strongly backward, apex cutting plane of posterior part of condyle; upper two-thirds of anterior border strongly inflected.

*Cranial comparisons.*—Old male (type) compared with male *caurinus*: Skull much larger, broader, more massive, and less arched; teeth smaller. Frontal shield very much broader interorbitally and postorbitally (interorbitally 91 mm. contrasted with 81 or less;

<sup>1</sup> Named for Dr. Charles H. Townsend, formerly naturalist of the Fish Commission steamer *Albatross*, now director of the New York Aquarium, who collected the specimen and presented it to the U. S. National Museum.

across postorbitals 130 contrasted with 116); postorbitals very much broader and flatter; rostrum more nearly horizontal; nares truncate instead of sloping; zygomata more widely outstanding and more broadly expanded vertically.

*Skull measurements.*—Old male (type): Basal length, 348; occipito-nasal length, 353; palatal length, 183; zygomatic breadth, 245; interorbital breadth, 91.5.

#### Dalli Group.

#### URSUS DALLI<sup>1</sup> MERRIAM.

#### DALL BROWN BEAR.

*Ursus dalli* Merriam, Proc. Biol. Soc. Washington, X, pp. 71-73, April 13, 1896.

*Type locality.*—Yakutat Bay (northwest side), Alaska.

*Type specimen.*—No. 75048, ♂ old, U. S. National Museum.

*Range.*—Malaspina Glacier and region northwest of Yakutat Bay, Alaska.

*Characters.*—Size very large; skull without very pronounced characters, although differing sufficiently from its neighbors. General color dark brown, strongly grizzled.

*Color.*—*Adult male* (from Malaspina Glacier, belonging to skull No. 210293, killed by G. Frederick Norton): Muzzle pale brown, becoming much darker on head and sides of face; general body color dark brown, moderately grizzled with pale-tipped hairs, the grizzling beginning on top of head a little in front of plane of ears and extending posteriorly to middle part of back.

*Cranial characters.*—*Adult male*: Skull large, vault of cranium fairly high but not arched; frontal shield broad, rather flat, broadly sulcate or concave medially, rather short pointed posteriorly, with large, rounded, broadly outstanding postorbital processes; fronto-nasal region moderately dished; rostrum broad and short, in some skulls slightly depressed; sagittal crest of medium length, rather high and nearly straight; zygomata rather broadly outstanding and strongly outbowed; squamosal root expanded in old age; squamosal shelf broad; braincase narrow anteriorly, tending to keel into sagittal crest; nares small.

*Note.*—The type skull of *dalli* (No. 75048, ♂ old) is abnormal: abnormally large, abnormally high (vault of cranium abnormally arched); fronto-nasal region abnormally elevated—not dished as usual; and underjaw abnormally long. No. 75047 (old ♂) and No. 210293 (adult ♂) are far more typical.

<sup>1</sup> Named for William H. Dall, of the Smithsonian Institution.

*Adult females* (No. 140085, from Copper River delta, July, 1905, A. G. Maddren; and old female, No. 210308, from Bering Lake, 1915, J. L. Hill): Size, medium; skull broad and short for a female; moderately arched, and moderately dished, with rather broad frontal shield and broad rostrum. Frontal shield rather broad, strongly sulcate medially, swollen over orbits; postorbital processes rather weak and strongly decurved; point of shield ending at fronto-parietal suture; fronto-nasal region strongly sloping, rostrum large, broad, and rather short; sagittal crest confined to parietals, high for a female; postpalatal shelf medium or broad, strongly rounded on sides; zygomata moderately spreading, subtriangular, the posterior base somewhat bowed and vertically expanded; underjaw rather short; coronoid high, falcate, the apex cutting or overreaching plane of condyle; teeth medium; heel of  $M^2$  rather long, slightly emarginate on outer side, the extreme tip with tendency to turn outward.

*Cranial comparisons.*—Adult and old males (Nos. 75047 and 210293) compared with adult male *nuchek* (No. 146459, type): Size about the same (basal length essentially same, but occipito-nasal length decidedly less); frontal shield broader and more acutely pointed; vault of cranium less high and more nearly horizontal; postorbitals more outstanding; rostrum slightly shorter and more depressed (appearing broader); zygomata more outbowed (less triangular); palate somewhat shorter; mastoids more appressed, closer to glenoid processes, constricting meatus tube (in *nuchek* more outstanding, leaving wide postglenoid space with correspondingly large open meatus); coronoid blade broader above (less falcate). Canines almost the same; molars decidedly smaller and less massive and in details quite different (as stated under *nuchek*).

Adult female (No. 140085, from Copper River delta) compared with female *nuchek* (No. 44049, from near Mount St. Elias): Skulls so different as not to require close comparison, that of *dalli* being massive, broadly arched or domed, and with massive underjaw, while that of *nuchek* is light, slender, and narrow, with low narrow flattened frontal region, long slender rostrum, and light underjaw. The teeth also differ strikingly.

Adult and old male compared with old male *ressonus* (type): Size about the same; vault of cranium and frontal shield much less elevated, flatter, more nearly horizontal, and much less swollen over orbits; shield less deeply sulcate; postorbitals larger and more horizontally outstanding (in *ressonus* weak and decurved); fronto-nasal region less strongly dished; rostrum broader and shorter; zygomata much more widely outstanding and much more bowed; palate shorter; molars very much smaller.

Adult and old female compared with old female *cressonus*: Skull larger, broader, and more highly arched; frontal shield broader, less deeply sulcate and less swollen over orbits; fronto-nasal region more strongly dished; rostrum smaller and lower; zygomata less outstanding, less arched, much less expanded vertically and more sharply angular; underjaw much shorter and lighter; coronoid smaller and lower. Teeth smaller throughout.

Adult and old male compared with adult and old male *kenaiensis*: Size the same or somewhat smaller; skull much less massive; braincase conspicuously narrower; frontal shield interorbitally narrower, shorter pointed posteriorly; fronto-nasal region normally more strongly dished; postorbital processes less broadly rounded; rostrum less massive and less elevated; sagittal crest much longer; occipito-sphenoid shorter; mastoids usually less outstanding.

*Skull measurements*.—Old male (No. 75047, from Yakutat Bay, Alaska): Basal length, 345;<sup>1</sup> occipito-nasal length, 342; palatal length, 190; zygomatic breadth, 263; interorbital breadth, 91.5. Old male (No. 210293, from Malaspina Glacier): Basal length, 345; occipito-nasal length, 338; palatal length, 188; zygomatic breadth, 248; interorbital breadth, 96.

#### URSUS HOOTS<sup>2</sup> MERRIAM.

##### STIKINE BROWN BEAR.

*Ursus hoots* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 140-141, September 6, 1916.

*Type locality*.—Clearwater Creek, a north branch of Stikine River, British Columbia.

*Type specimen*.—No. 206136, ♂ ad., U. S. National Museum, Biological Survey collection. Collected by John Hyland; presented by Lincoln Ellsworth.

*Cranial characters*.—Size medium or large; skull massive; slightly dished, rather short, flattish on top, very broad across frontals and rostrum. Frontal shield broad, nearly flat, long pointed; broadly and shallowly sulcate medially as far back as posterior plane of postorbitals; postorbitals large, broad, and horizontally outstanding; fronto-nasal region sloping; rostrum broad and rather high; palate and postpalatal shelf broad; postpalatal notch moderate; sagittal crest short, ending at fronto-parietal suture; zygomata moderately outbowed, not broadly spreading; underjaw rather massive; ramus broad vertically, its inferior border upcurved posteriorly; coronoid blade broad at base, rather high and subfalcate, the apex curving strongly backward, cutting plane of condyle; dentition remarkably

<sup>1</sup> Restored.

<sup>2</sup> *Hoots*, the native Indian name for the big brown and grizzly bears of the coast region.

light for so large a skull; canines and molars (both upper and lower) surprisingly small.

*Remarks.*—*Ursus hoots* does not appear to be related to any of the other mainland species except the newly discovered *crassus* from the mountains on the upper Macmillan River, Yukon, from which it may be distinguished at a glance by the small size of its molar teeth. It may be related also to *sitkensis* of Baranof and Chichagof Islands, but differs in somewhat smaller size; less elevated posterior frontal region; broader postorbital processes; less broadly spreading zygomata; shorter and less spreading mastoids; less nearly vertical and more strongly recurved coronoid blade, the apex over-arching a well-defined coronoid notch; smaller molars (both upper and lower); and smaller upper incisors. The large lower premolar has the upturned heel of the Sitka bear, but lacks the posterior sulcus and pair of cusplets of the grizzlies. Two additional old male skulls of *hoots* have been recently received from the Stikine River region. One of these (No. 224841) from Clearwater branch of Stikine—the type locality—agrees closely with the type specimen in size and form, but has slightly larger and especially broader molars (difference most marked in M ). The skull is older than that of the type and the mastoids are more strongly developed and divergent. The other (No. 224839) is still older and was killed low down the Stikine. It is of approximately the same size as the type, but considerably older; the frontal shield is more broadly concave interorbitally and shorter pointed posteriorly; sagittal crest more strongly developed; squamosal base of zygoma much more broadly expanded; mastoids much longer and strongly divergent; postpalatal shelf flatter; coronoid blade broader at and above middle; molars slightly larger. An adult female from the type locality (No. 180883, from Clearwater branch of Stikine) resembles the male type very closely except for the smaller size of skull and teeth, and therefore needs no special description. A feature deserving mention is that in both sexes the point of the frontal shield ends at the fronto-parietal suture.

*Skull measurements.*—Adult male (type): Basal length, 333; occipito-nasal length, 325; palatal length, 179; zygomatic breadth, 228; interorbital breadth, 96.

#### URSUS SITKENSIS MERRIAM.

##### SITKA BROWN BEAR.

*Ursus sitkensis* Merriam, Proc. Biol. Soc. Washington, X, p. 73, April 13, 1896.

*Type locality.*—Sitka Islands, Alaska.

*Type specimen.*—No. 187891, ♂ ad., U. S. National Museum (No. 6543, Merriam collection). Collected by an Indian; purchased at Sitka, Alaska, and presented to C. Hart Merriam by J. Stanley-Brown.

*Range.*—Sitka Islands (Baranof and Chichagof), Alaska.

*Characters.*—Size large; coloration very dark; claws of moderate length, curved, dark blue-black, scurfy; skull broad and massive.

*Color.*—Dark; muzzle dark brown, sometimes chocolate brown or even sooty, paler in faded summer pelage; head and body very dark brown or even dusky, varying to dull brown in summer, washed on back of head, neck, and shoulders with yellowish or golden.

*Cranial characters.*—*Adult male:* Skull large, massive, dished, vault moderately elevated, frontal shield (normally) broad, strongly sloping, sulcate medially; postorbitals outstanding, broadly rounded; rostrum normally rather short and somewhat depressed; sagittal crest massive, straight; zygomata broadly outstanding and out-bowed; palate moderate; postpalatal shelf normally rather long and of medium breadth; notch moderate or rather narrow; basioccipital broad; mastoids long and spreading.

*Cranial comparisons.*—Adult and old males compared with adult and old male *dalli*: Frontal shield higher posteriorly (in *dalli* highest at or immediately behind postorbitals), flatter and more sloping at base of postorbitals, thus tilting postorbital plane forward (in *dalli* looking more directly upward); a distinct thickening or hump present on each side of median sulcus behind plane of postorbitals (lacking in *dalli*); basioccipital usually broader; inion less strongly developed; mastoids longer, usually more outspreading and more distant from glenoid processes, leaving broader space for audital canal; auditory meatus larger; rostrum somewhat broader basally; distance from last lower molar to middle of condyle usually less; last upper molar somewhat longer and more nearly rectangular, the outer side of heel less oblique;  $M_1$  normally with open saddle between posterior and anterior parts (in *dalli* a cusplet occupies the inner side of the saddle);  $PM_2$  in *sitkensis* normally tricuspidate as seen in profile, there being both anterior and posterior cusplets on the cingulum (in *dalli* the anterior and posterior cusplets are absent and the main cusp is larger and higher and slopes posteriorly without horizontal heel).

*Skull measurements.*—Average of 2 adult males from Chichagof Island: Basal length, 358.5; occipito-nasal length, 354.5; palatal length, 189; zygomatic breadth, 260; interorbital breadth, 93.5.

#### URSUS SHIRASI<sup>1</sup> MERRIAM.

##### SHIRAS BROWN BEAR.

(Pl. VI.)

*Ursus shirasi* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 195, August 13, 1914.

*Type locality.*—Pybus Bay, Admiralty Island, Alaska.

<sup>1</sup>Named for George Shiras, 4th, who collected and presented the specimen.



*Type specimen.*—No. 203030, ♂ old, U. S. National Museum, Biological Survey collection. Killed September 16, 1913, by George Shiras, 4th, and presented to the Biological Survey.

*Range.*—Restricted to Admiralty Island.

*Characters.*—A huge brown bear larger than the largest *sitkensis*; head highly arched; color black, except muzzle, which is dull brown; claws dark blue-black, dull, slightly scurfy (not smoothly polished as in the grizzlies), rather strongly curved and of moderate length (middle claw over curve, 92 mm.; from top of base to apex, 75), fourth and fifth rounded off on outer side.

*Color.*—Entire animal, except muzzle, coal black, showing when examined closely a brownish wash along middle of back; muzzle from nose pad to between eyes dull brown.

*Cranial characters.*—Old male (type): Skull large, broad, massive, strongly dished, and highly arched; zygomata large, broadly out-bowed and rounded anteriorly as well as posteriorly; frontal shield remarkably short and broad (nearly twice as broad as long), deeply and broadly concave in cross section, with huge uplifted<sup>1</sup> broadly outstanding postorbital processes which arch over the orbits and are strongly decurved apically, completely roofing the orbits; temporal ridges beaded, short, meeting far forward (at least 25 mm. in front of fronto-parietal suture); sagittal crest long and high, humped over fronto-parietal suture; fronto-nasal region strongly concave; rostrum broad and short, rising strongly to meet frontal shield; palate broad; basioccipital and basisphenoid subequal; ramus strongly bellied under posterior molars; coronoid blade broad and high.

*Dental characters.*—Dentition heavy; canines large, the upper 47 mm. high above enamel line of outer side; molars large and rather broad;  $M^2$  with large and broad heel;  $M_1$  with strongly developed cusplet on inner side of saddle.

*Remarks.*—*Ursus shirasi* is a very large member of the brown bear group. Whether it is always black, like the type specimen, is not known. But of all the American bears its skull is the most striking and distinctive. The short broad frontal shield rising on each side into huge postorbital processes, which arch broadly over the orbits, serve to distinguish it at a glance from all other species, rendering close comparisons unnecessary. In this connection it is interesting to observe that *shirasi* and its neighbor *eulophus*, an inhabitant of the same island, present opposite extremes of departure from the normal ursine type—*eulophus* having a long narrow skull with slender elongate rostrum, long and narrow frontal shield, and

<sup>1</sup> Additional skulls of adult males recently received have the postorbitals equally large but less uplifted, not rising above frontal plane.

*Range.*—Sitka Islands (Baranof and Chichagof), Alaska.

*Characters.*—Size large; coloration very dark; claws of moderate length, curved, dark blue-black, scurfy; skull broad and massive.

*Color.*—Dark; muzzle dark brown, sometimes chocolate brown or even sooty, paler in faded summer pelage; head and body very dark brown or even dusky, varying to dull brown in summer, washed on back of head, neck, and shoulders with yellowish or golden.

*Cranial characters.*—*Adult male:* Skull large, massive, dished, vault moderately elevated, frontal shield (normally) broad, strongly sloping, sulcate medially; postorbitals outstanding, broadly rounded; rostrum normally rather short and somewhat depressed; sagittal crest massive, straight; zygomata broadly outstanding and out-bowed; palate moderate; postpalatal shelf normally rather long and of medium breadth; notch moderate or rather narrow; basioccipital broad; mastoids long and spreading.

*Cranial comparisons.*—Adult and old males compared with adult and old male *dalli*: Frontal shield higher posteriorly (in *dalli* highest at or immediately behind postorbitals), flatter and more sloping at base of postorbitals, thus tilting postorbital plane forward (in *dalli* looking more directly upward); a distinct thickening or hump present on each side of median sulcus behind plane of postorbitals (lacking in *dalli*); basioccipital usually broader; inion less strongly developed; mastoids longer, usually more outspreading and more distant from glenoid processes, leaving broader space for audital canal; auditory meatus larger; rostrum somewhat broader basally; distance from last lower molar to middle of condyle usually less; last upper molar somewhat longer and more nearly rectangular, the outer side of heel less oblique;  $M_7$  normally with open saddle between posterior and anterior parts (in *dalli* a cusplet occupies the inner side of the saddle);  $PM_2$  in *sitkensis* normally tricuspidate as seen in profile, there being both anterior and posterior cusplets on the cingulum (in *dalli* the anterior and posterior cusplets are absent and the main cusp is larger and higher and slopes posteriorly without horizontal heel).

*Skull measurements.*—Average of 2 adult males from Chichagof Island: Basal length, 358.5; occipito-nasal length, 354.5; palatal length, 189; zygomatic breadth, 260; interorbital breadth, 93.5.

#### URSUS SHIRASI<sup>1</sup> MERRIAM.

##### SHIRAS BROWN BEAR.

(Pl. VI.)

*Ursus shirasi* Merriam, Proc. Biol. Soc. Washington, XXVII, p. 195, August 13, 1914.

*Type locality.*—Pybus Bay, Admiralty Island, Alaska.

<sup>1</sup>Named for George Shiras, 4th, who collected and presented the specimen.

*Type specimen.*—No. 203030, ♂ old, U. S. National Museum, Biological Survey collection. Killed September 16, 1913, by George Shiras, 4th, and presented to the Biological Survey.

*Range.*—Restricted to Admiralty Island.

*Characters.*—A huge brown bear larger than the largest *sitkensis*; head highly arched; color black, except muzzle, which is dull brown; claws dark blue-black, dull, slightly scurfy (not smoothly polished as in the grizzlies), rather strongly curved and of moderate length (middle claw over curve, 92 mm.; from top of base to apex, 75), fourth and fifth rounded off on outer side.

*Color.*—Entire animal, except muzzle, coal black, showing when examined closely a brownish wash along middle of back; muzzle from nose pad to between eyes dull brown.

*Cranial characters.*—Old male (type): Skull large, broad, massive, strongly dished, and highly arched; zygomata large, broadly out-bowed and rounded anteriorly as well as posteriorly; frontal shield remarkably short and broad (nearly twice as broad as long), deeply and broadly concave in cross section, with huge uplifted<sup>1</sup> broadly outstanding postorbital processes which arch over the orbits and are strongly decurved apically, completely roofing the orbits; temporal ridges beaded, short, meeting far forward (at least 25 mm. in front of fronto-parietal suture); sagittal crest long and high, humped over fronto-parietal suture; fronto-nasal region strongly concave; rostrum broad and short, rising strongly to meet frontal shield; palate broad; basioccipital and basisphenoid subequal; ramus strongly bellied under posterior molars; coronoid blade broad and high.

*Dental characters.*—Dentition heavy; canines large, the upper 47 mm. high above enamel line of outer side; molars large and rather broad; M<sup>2</sup> with large and broad heel; M<sub>1</sub> with strongly developed cusplet on inner side of saddle.

*Remarks.*—*Ursus shirasi* is a very large member of the brown bear group. Whether it is always black, like the type specimen, is not known. But of all the American bears its skull is the most striking and distinctive. The short broad frontal shield rising on each side into huge postorbital processes, which arch broadly over the orbits, serve to distinguish it at a glance from all other species, rendering close comparisons unnecessary. In this connection it is interesting to observe that *shirasi* and its neighbor *eulophus*, an inhabitant of the same island, present opposite extremes of departure from the normal ursine type—*eulophus* having a long narrow skull with slender elongate rostrum, long and narrow frontal shield, and

<sup>1</sup> Additional skulls of adult males recently received have the postorbitals equally large but less uplifted, not rising above frontal plane.

insignificant postorbital processes, while *shirasi* has an exceptionally broad skull with broad short rostrum, excessively broad and short frontal shield, and huge massive postorbital processes.

*Skull measurements.*—Adult male (type): Basal length, 355; occipito-nasal length, 348; palatal length, 191; zygomatic breadth, 259; interorbital breadth, 104.5.

### URSUS NUCHEK MERRIAM.<sup>2</sup>

#### NUCHEK BROWN BEAR.

*Ursus nuchek* Merriam, Proc. Biol. Soc. Washington, XXIX, pp. 146–148, September 6, 1916.

*Type locality.*—Head of Nuchek Bay, Hinchinbrook Island, Prince William Sound, Alaska.

*Type specimen.*—No. 146459, ♂ old, U. S. National Museum, Biological Survey collection. Collected September 15, 1905, by C. Swanson.

*Range.*—Prince William Sound easterly to Mount St. Elias; limits unknown.

*Characters.*—Size large; external characters unknown; skull long, narrow, and moderately high; molars peculiar.

*Cranial characters.*—*Adult male* (type): Large, elongate; frontal shield relatively narrow, flattish, moderately depressed between orbits; orbital rims thickened; postorbital processes broad and flattish, moderately outstanding; posterior part of shield broad, ending about two-thirds distance from plane of postorbitals to frontoparietal suture; sagittal crest rather long, straight, high posteriorly; rostrum long, high, rather narrow; fronto-nasal region sloping in facial plane; nasals slightly elevated anteriorly; zygomata moderately spreading, subtriangular, not much expanded vertically; postpalatal shelf moderate, its sides rounded; notch long and narrow; anterior nares small; meatus tube short and large. Underjaw massive; coronoid blade narrow and falcate. Teeth of medium size; molars broad (more massive than in *dalli*); last upper molar exceptionally short, broadest in middle, heel short and obliquely truncate on outer side; M<sup>1</sup> large, much broader posteriorly than anteriorly; middle lower molar peculiar: twin cusps of entoconid very small, low, and close together; main cusp of inner side large and high, reducing the posterior moiety of the tooth to about a third the length of the crown instead of about half as usual.

*Young-adult female* (No. 44049, from Chaix Hills near Mount St. Elias, Alaska; killed July 4, 1891, by the late Prof. I. C. Russell): Skull long, narrow, rather low, with narrow frontals, narrow ros-

<sup>2</sup> Tentatively included in *dalli* group. (See Introduction, pp. 12–13.)

trum, and moderately outstanding subtriangular zygomata. Frontal shield flattish, medially depressed interorbitally, sloping gradually into rostrum, rather short pointed posteriorly (ending about 15 mm. in front of parietals; in fully adult and old females it would be still shorter); postorbital processes moderate, horizontally outstanding, the tips rounded (not fully grown); palate concave, postpalatal shelf rather long and broad; notch rather narrow; basisphenoid strongly concave antero-posteriorly and transversely; underjaw long and slender. Canines long and slender; molars and large premolars with rather high cusps; last upper molar short, much broader in middle than anteriorly, heel short and obliquely truncate on outer side.

*Cranial comparisons.*—*Ursus nuchek* evidently overlaps the range of *dalli* and may come in contact with *cressonus*, necessitating comparisons with both.

Adult male (type) compared with adult and old male *dalli* (Nos. 75047 and 210293): Size about the same; basal length essentially the same, but occipito-nasal length decidedly greater; skull appearing longer and narrower; more elevated behind orbits and much more strongly sloping posteriorly; frontal shield narrower, the point broader posteriorly; vault of cranium higher and less nearly horizontal; postorbitals less outstanding; fronto-nasal region less dished; rostrum longer and not depressed (appearing narrower); zygomata less outbowed (more triangular); palate somewhat longer; postpalatal notch longer and narrower; mastoids less appressed, leaving wide postglenoid space with correspondingly large open meatus (in *dalli* closer to glenoid process, pressing on and contracting meatus tubes); coronoid blade narrower above (more falcate). Canines about the same; molars, both upper and lower, decidedly larger and more massive and in details quite different:  $M^2$  exceptionally short and much broader in middle than elsewhere, the heel short and obliquely truncate on outer side;  $M^1$  large, much broader posteriorly than anteriorly; middle lower molar peculiar, the twin cusps of entoconid very small, low, and close together; metaconid exceptionally large and high, reducing the posterior moiety of the crown to about one-third its length, instead of about half as in *dalli* and most species.

Young-adult female (No. 44049, from near Mount St. Elias) compared with adult female *dalli* (No. 140085, from Copper River delta): Skulls so strikingly different as not to require close comparison, that of *nuchek* being light, slender, narrow, with low narrow flattened frontal region, long slender rostrum, and light underjaw, while that of female *dalli* is massive, broadly arched or domed, and with massive underjaw. The teeth also differ strikingly.

Young-adult female (No. 44049) contrasted with old female *cressonus* (No. 209881): Size slightly smaller (when fully adult probably the same); frontal shield much narrower and flatter, much less deeply sulcate, much less swollen over orbits, and much shorter posteriorly; fronto-nasal region in same plane (in ♀ *cressonus* strongly dished); sagittal crest longer; nares smaller; canines (upper and lower) much longer; molars more massive; M<sup>2</sup> extremely short, much the broadest in middle, with short obliquely truncate heel (in *cressonus* normal).

Female (No. 44049) compared with female *kenaiensis* (No. 133244): Basal length essentially the same; cranium narrower, with narrower braincase, narrower shield, and narrower rostrum; zygomata less broadly spreading (would be more broadly spreading with age); occipito-sphenoid shorter; palate essentially same length but narrower; postpalatal shelf narrower; ramus more slender (conspicuously thinner below M<sub>2</sub> and M<sub>3</sub>); its inferior border straighter, less upcurved posteriorly; coronoid lower and less narrowed above; cusps of larger premolars above and below much more highly developed; main cusp of upper premolars very much higher relative to posterior cusp; molar cusps also more strongly developed; last upper molar shorter and of peculiar form, as in the male.

*Skull measurements.*—Old male (type): Basal length, 360;<sup>1</sup> occipito-nasal length, 358; palatal length, 191; zygomatic breadth, 248; interorbital breadth, 88.

#### Gyas Group.

#### URSUS GYAS MERRIAM.

#### PENINSULA GIANT BEAR.

(Pl. 11.)

*Ursus dalli gyas* Merriam, Proc. Biol. Soc. Washington, XV, p. 78, March 22, 1902.

*Ursus merriami* Allen, Bull. Amer. Mus. Nat. Hist., XVI, p. 141, April 12, 1902.

*Type locality.*—Pavlof Bay, Alaska Peninsula.

*Type specimen.*—No. 91669, ♂ ad., U. S. National Museum, Biological Survey collection.

*Range.*—Entire length of Alaska Peninsula from Cook Inlet to Isanotski Strait and adjacent Unimak Island.

*Characters.*—Size huge, either largest living bear or second only to the great Kadiak bear (*middendorffi*). Claws rather long and smooth, dark when young, pale when old. Color variable, from grizzled brown to pale yellowish. Skull of male large, long, and massive, but not highly arched. Sexual disparity great.

<sup>1</sup> Restored.

*Cranial characters.*—*Adult males:* Skull large, long, and massive; frontal region moderately elevated, sloping gradually into rostrum, strongly depressed or troughed medially; slightly swollen over orbits and bases of postorbitals; postorbitals rather large, subtriangular, moderately outstanding; zygomata moderately outstanding and bowed; palate long and relatively narrow. Underjaw long and massive; coronoid blade very broad basally. Molars light for so large a skull. Viewed from behind, the posterior frontal region, with its depressed median trough and massive, outstanding, and elevated postorbital processes, suggests the spread wings of a bat or a butterfly.

Skulls of adult males which it seems necessary to call *gyas* present a surprisingly wide range in size and form. Among them are three quite different types which if isolated would undoubtedly develop into very distinct species.

1. *Typical form, with large elongate skull.*—Skull and teeth large and massive; zygomata widely spreading; sagittal crest high; frontals moderately elevated, broadly sulcate medially, swollen laterally; postorbital processes thick, massive, subtriangular, and decurved; nasal opening and rostrum proportionate to size of skull (but anterior nares very much smaller than in *middendorffi*). Teeth large; lower canines averaging about 19 mm. in diameter at base of enamel. This large form ranges over the entire length of Alaska Peninsula from Cook Inlet (where it was obtained at Chinitna by Kidder and Blake) to Morzhovoi Bay and Unimak Island. *Departures from normal:* The series of skulls at hand shows two prominent departures from typical *gyas*—one larger and more massive, the other smaller and lighter.

2. *Giant form, with exceptionally broad rostrum.*—Huge skulls with *broad massive rostrum* and exceedingly heavy jaws. This type is represented in the Biological Survey collection by two specimens, No. 91694 from Cold Bay, and No. 91704 from Belkofski Bay. The entire skull is larger and more massive, but the differences are most pronounced in the face and jaws. The frontal shield and postorbital processes are not broader than in some skulls of typical *gyas*, but the postorbital processes are *abruptly deflexed* at the tips, forming a thick massive hook over the orbit, much as in *middendorffi*. The rostrum is extraordinarily broad and massive, giving the skull, viewed from the front, a most peculiar aspect. The occipital flange (lambdoid crest) also is largely developed. The peculiarities of the underjaw are as striking as those of the rostrum. The inferior part of the ramus is greatly thickened anteriorly, and the posterior half is *strongly everted*, forming a broad lip, unlike anything seen in typical *gyas*. By reason of this peculiarity the jaws flare strongly outward under the last molars, and the flaring is so great that it is conspicuous even when looked at from above.

3. *Small form, with narrow rostrum.*—Smaller skulls, with narrower rostrum, more slender, horizontally outstanding postorbital processes and much smaller canines (exemplified by Nos. 82003 and 82004 from Pavlof Bay, and No. 91699 from Belkofski Bay). Compared with typical *gyas*, the skull as a whole is considerably smaller, shorter, and lighter; vault of cranium rather more flattened; rostrum decidedly narrower; canine teeth above and below decidedly more slender; last upper molar narrower. But the most conspicuous difference is in the postorbital processes, which instead of being broadly tri-

angular, massive, and decurved, are elongate, peglike, and stand out horizontally.

The above description applies to fully adult males of the form described by Allen under the name *Ursus merriami*, the type of which was an immature male. Unfortunately for *merriami*, the typical form seems to be connected with *gyas* by a series of intergrades. Thus, skull No. 862, Field Mus. Nat. Hist., has the small teeth and narrow muzzle of *merriami*, but the postorbital processes are broader posteriorly and slightly decurved; and Nos. 91691, 147630, 91675, U. S. Nat. Mus., Biological Survey collection, and No. 4585, Mus. Vert. Zool., Univ. California, complete the chain of intergrades, so that it is difficult to tell just where to draw a line between them.

Skulls of adult males of the small form have been examined from various localities from Cold Bay and Ugashik Lake and River westerly to Pavlof, Belkofski, Bear Bay, and Tonki Point.

*Adult females*: Skull of moderate size, conspicuously smaller than male; frontal region normally *elevated, domed, and rounded off*, the postorbital processes somewhat decurved, the frontal shield sulcate medially. Skulls of adult females differ among themselves in degree of elevation and doming of frontal shield, depth of median groove, relative massiveness, and other characters, but in the present imperfect state of knowledge it is impossible to assign positively any particular female to either of the above-described types of males.

*Cranial comparisons*.—Old male compared with old male *middendorffi* of essentially same size: Vault of cranium much less highly arched and never domed; postorbital processes more strongly developed and less decurved; zygomata less widely outstanding and far less bowed (ratio of zygomatic breadth to basal length much less); anterior nares normal, not flaring; coronoid blade less high. Last upper molar shorter and of different form, the heel obliquely truncate on outer side, narrowing posteriorly; lower molars broader and heavier.

*Skull measurements*.—Old male (type): Basal length, 380; occipito-nasal length, 394; palatal length, 206; zygomatic breadth, 286; interorbital breadth, 96.

#### URSUS MIDDENDORFFI MERRIAM.

##### KADIAK BEAR.

(Pl. III.)

*Ursus middendorffi* Merriam, Proc. Biol. Soc. Washington, X, pp. 67-69, April 13, 1896.

*Ursus kadiaki* Kleinschmidt, Outdoor Life, XXVII, p. 3, January, 1911.

*Type locality*.—Kodiak Island, Alaska.

*Type specimen*.—No. 54793, ♂ young-adult, U. S. National Museum, Biological Survey collection. Collected July 3, 1893, by B. J. Bretherton (original No. 176).

*Range*.—Kodiak and adjacent islands, Afognak and Shuyak; not known from mainland.



*Cranial characters.*—Size huge; skull of male exceedingly broad, high, and relatively short; frontal shield domed, sulcate medially and swollen over orbits (obliquely flattened in extreme age), rather short pointed posteriorly, passing into sagittal crest in fully adult skulls anterior to fronto-parietal suture; fronto-nasal region dished; postorbitals decurved and weak, small for size of skull; rostrum rather short and of medium breadth; anterior nares flaring; zygomatica *extraordinarily outstanding and strongly outbowed*; palate rather broad; postpalatal shelf rather narrow; mastoids long and divergent. Underjaw large, massive, and rather short; coronoid blade high and moderately recurved; molars small for size of skull.

*Cranial comparisons.*—Old male compared with old male *gyas* of essentially same size: Vault of cranium much more highly arched and usually domed; postorbital processes weak and decurved; zygomatic arches much more widely outstanding and far more strongly bowed (ratio of zygomatic breadth to basal length much greater); anterior nares strongly flaring (in *gyas* not flaring); coronoid blade higher. Last upper molar with heel more broadly rounded; lower molars narrower.

*Flesh measurements.*—Young-adult male killed by J. H. Kidder on Shuyak Island, off Afognak, Alaska, July, 1901: Total length, nose to end of tail vertebræ, 8 ft.; nose to base of tail, 7 ft. 8½ in.; height at shoulders, 4 ft. 5½ in.; length of forefoot, including claws, 1 ft. 2½ in.; hind foot, 1 ft. 4 in.; width of forefoot, 8¼ in.; width of hind foot, 7½ in.; length of fore claws, 4¼ in.; girth of body behind shoulders, 5 ft. 1½ in.; girth of neck, 3 ft. 2 in.; girth of head at ears, 3 ft. 1¼ in.; nose to tip of hind foot (animal lying on one side), 9 ft. 11 in. The body after the skin was removed was the size of a big ox.

*Skull measurements.*—No. 134407, largest of the males: Basal length, 392; occipito-nasal length, 369; palatal length, 211; zygomatic breadth, 306; interorbital breadth, 101.

#### Kenaiensis Group.

#### URSUS KENAIENSIS MERRIAM.

#### KENAI GIANT BEAR.

(Pl. IV.)

*Ursus kenaiensis* Merriam, Proc. Biol. Soc. Washington, XVII, p. 154, October 6, 1904.

*Type locality.*—Cape Elizabeth, at extreme west end of Kenai Peninsula, Alaska.

*Type specimen.*—No. 128672, ♀ ad., U. S. National Museum, Biological Survey collection. Collected in 1903 by C. A. Lambert.

*Range.*—Kenai Peninsula.

*Characters.*—Size large; appearance that of a big grizzly; coloration rather dark; claws moderately curved, dark, usually marked with whitish streaks on sides and near tip; longest claw in three adults 82–90 mm. Skull broad and massive, that of male strikingly larger than female.

*Color.*—Old male killed in October, 1912, by Wilson Potter, of Philadelphia (skull 181099): Muzzle pale fulvous-brown; cheeks and forehead similar but hairs longer and with pale tips; ground color of top of head, neck, and back much darker but deeply washed on tips with buffy or buffy whitish, giving these parts the look of a grizzly; legs and feet (but not belly) much darker.

*Cranial characters.*—*Adult male:* Skull large, broad, and massive, with broad frontal shield and rostrum, widely outbowed zygomata, large outstanding bluntly rounded postorbitals, and small anterior nares. Frontals broad throughout (interorbitally, postorbitally, and across postorbital processes); frontal shield well elevated above plane of rostrum, shallowly sulcate medially between orbits, slightly swollen over orbits, long pointed posteriorly; sagittal crest short, not reaching anteriorly beyond fronto-parietal suture; braincase broad anteriorly; rostrum broad throughout but much broader posteriorly than anteriorly; zygomata abruptly and widely outbowed, the squamosal root vertically expanded; palate very broad; underjaw large and massive, coronoid blade large and high, scarcely recurved. Canines small and short. *Adult female:* Skull broad, flat, and massive, with exceedingly broad rostrum, broadening posteriorly; zygomata broadly spreading; jugal broad anteriorly; frontals flattened, depressed, low posteriorly; postorbital processes large, blunt, and horizontally outstanding; palate exceedingly broad; nasals large and broad; anterior nares small. Canines small.

*Cranial comparisons.*—Adult male compared with adult male *alexandræ*: Length essentially the same, but *kenaiensis* much broader and more massive throughout; frontal shield broader throughout (interorbitally, postorbitally, and across postorbital processes), more elevated, convex (not flat) antero-posteriorly, shallowly sulcate interorbitally, slightly swollen over orbits; longer pointed posteriorly, with correspondingly shorter sagittal crest ending anteriorly at fronto-parietal suture; postorbital processes more massive and outstanding; frontal part of braincase not keeled or compressed; rostrum much broader, especially posteriorly; nasals shorter anteriorly; zygomata much more widely and abruptly spreading posteriorly, outbowed instead of angular; squamosal part rising abruptly and broadly expanded vertically, differing strikingly from the more slender and gently curving form in *alexandræ*; palate broader; mastoids more outstanding; ramus longer and more massive; coronoid blade more

nearly vertical, higher, broader in upper third, less recurved, not ending in posterior point. Canines, both upper and lower, smaller and shorter.

Adult female compared with adult female *alexandræ*: Skull shorter, both basally and on top; vault of cranium and rostrum lower; fronto-nasal region more dished; rostrum very much broader basally, its sides sloping anteriorly; braincase shorter (less occipital overhang); sagittal crest lower; occipito-sphenoid and base of skull shorter; palate broader; ramus more massive. Canines smaller (the lower notably more slender).

Adult and old males compared with adult and old male *dalli*: Size the same or somewhat larger; skull much more massive; braincase conspicuously broader; frontal shield interorbitally broader, longer pointed posteriorly; fronto-nasal region normally less strongly dished; postorbital processes more broadly rounded; rostrum more massive and more elevated; sagittal crest much shorter; occipito-sphenoid longer; mastoids usually more outstanding.

*Skull measurements*.—Average of 2 old males from Kenai Peninsula: Basal length, 367; occipito-nasal length, 360; palatal length, 197; zygomatic breadth, 263.5; interorbital breadth, 205. Adult female (type): Basal length, 288.5; occipito-nasal length, 285; palatal length, 158; zygomatic breadth, 214; interorbital breadth, 78.

#### URSUS SHELDONI<sup>1</sup> MERRIAM.

##### MONTAGUE ISLAND BEAR.

(Pl. V.)

*Ursus sheldoni* Merriam, Proc. Biol. Soc. Washington, XXIII, pp. 127-130, September 2, 1910.

*Type locality*.—Montague Island, Prince William Sound, Alaska.

*Type specimen*.—No. 137318, ♂ young-adult, U. S. National Museum, Biological Survey collection. Collected May, 1905, by Charles Sheldon.

*Characters*.—Size large; teeth and claws of the grizzly type; color variable, from dark to light brown. Skull broad and massive; vault of cranium domed; hairs over shoulders elongated to form a small but distinct hump.

*Color*.—General color brownish, varying from pale to dark, the hairs of the back sometimes yellowish tipped, those of the head grizzled; color darkest (almost blackish) on belly, legs, and feet; ears dark with whitish tips. An old she-bear killed by Sheldon, May 18,

<sup>1</sup> Named for Charles Sheldon, of New York, who collected and presented the type and other specimens.

1905, is very pale grizzled gray on the upperparts, and only moderately darker on the legs and feet. The cub of this bear, killed the same day, was in its second year (about 16 months old) and is very pale—almost buffy gray—with dark feet and legs, and a strongly marked hump.

*Cranial characters.*—*Adult male* (type): Large, massive, exceptionally broad, with broadly outbowed zygomata. Frontal shield long and broad, nearly horizontal from postorbitals posteriorly (actually sloping downward posteriorly); broadly sulcate medially between postorbital processes, moderately swollen on each side, the posterior part long and broad (temporal ridges in type specimen not curving inward as in most skulls), the point falling over middle of parietals (in old age doubtless more anterior); sagittal crest exceptionally short, confined in type skull to posterior half of parietals; fronto-nasal region elevated, forming a convexity instead of the usual depression between plane of rostrum and that of frontal shield; rostrum broad and short; nasals strongly sloping, dished at junction of anterior and middle thirds, the anterior third horizontal or slightly upturned; palate and postpalatal shelf very broad; notch rather broad; zygomata broadly outstanding, rounded posteriorly, somewhat bowed, not much expanded vertically (doubtless more broadly expanded in old age); squamosal shelves exceptionally broad; braincase narrowest on anterior part of parietals instead of on frontals. Underjaw large and massive; ramus broad vertically, broadest under posterior molars; coronoid blade elevated, moderate, vertical, the apex only slightly recurved. Dentition light; canines and molars small for size of skull.

*Old female* (No. 137316, mother of cub No. 137315) from Montague Island, May 18, 1905, collected and presented by Charles Sheldon: Skull of medium size, broad, flattish on top. Frontal shield flat, nearly horizontal, the posterior part broad and long, reaching past middle of parietals; postorbital processes strongly developed, almost peglike, horizontally outstanding; fronto-nasal region elevated in fronto-facial plane; rostrum short, rather broad; palate and postpalatal shelf broad; zygomata broadly outstanding, subtriangular, rounded posteriorly. Underjaw rather massive; coronoid moderate, the apex only slightly recurved; teeth small for size of skull; braincase very broad.

*Cranial comparisons.*—Skull in general similar to that of *kenaiensis* but basisphenoid broader and flatter, its length nearly equal to that of basioccipital; posterior roots of interpterygoid fossa more widely spreading; condyle of jaw more exerted (in *kenaiensis* sessile), reaching so far back that a line dropped from peak of coronoid to tip of angle touches or traverses it (in *kenaiensis* this line passes freely behind the condyle); coronoid, in females of same age, smaller

and lower, its area for muscular attachment less; ramus of jaw strongly bellied posteriorly, its inferior border below the coronoid strongly convex downward and curving evenly, with only a very slight break, to angular process. (In *kenaiensis* the inferior border of ramus is nearly straight, not appreciably bellied under coronoid, and ends abruptly in a step or jog at some distance behind the angle.)

In general form and appearance skulls of females closely resemble those of female *kenaiensis*, differing chiefly in the characters above mentioned and in certain dental peculiarities, notably the smaller size and more pointed heel of the last upper molar, and the oblique truncation of  $M^1$ .

*Dental characters.*—Teeth in general of the grizzly type. Last (fourth) lower premolar normally with horizontal heel, slightly upturned at posterior end, the shallow median sulcus reaching from cusp to end of heel, its defining ridges ending in slightly developed posterior cusplets. (In *kenaiensis* the last lower premolar is more conical, the heel sloping, the sulcus incomplete, with only a single posterior cusplet—on inner side of main cusp posteriorly.) First upper molar peculiar, having both ends obliquely truncate and parallel, sloping strongly from outer angles backward and inward; inner row of cusps pushed back so that each falls behind plane of corresponding cusp on outer side; tooth as a whole more nearly rectangular, its inner corners more nearly square (less rounded), and inner side more flattened and much less convex than in *kenaiensis*.

In the females the last lower molar is conspicuously smaller than in *kenaiensis*, and the last upper molar is smaller, narrower, more wedge-shape, and more pointed posteriorly. In one of the males it is similar. In the other three males the last upper molar is larger and less acute posteriorly than in the females, and the third cusp on the inner side is better developed.

*Skull measurements.*—Adult male (type): Basal length, 269; occipito-nasal length, 315; palatal length, 198; zygomatic breadth, 270; interorbital breadth, 102.5.

#### VETULARCTOS, A NEW GENUS RELATED TO URSUS.

*Generic characters.*—Skull like that of *Ursus*.<sup>1</sup> Teeth in the main like those of *Ursus*, but  $M_{\frac{2}{2}}$  quite different, presenting a broad flat squarish grinding surface with suppression of the hypoconid and entoconid, and absence of the usual posterior cusp and notch on outer side.  $M^2$  with outer cusps (paracone and metacone) normal; inner cusps (protocone and hypocone) obsolete.  $M_{\frac{2}{2}}$  with anterior part (protoconid and metaconid) normal but rather low; posterior

<sup>1</sup> The type is a young-adult female. Skulls of adult males may show cranial differences.

part occupying more than half of crown, a flat rectangular platform, truncate posteriorly, and bordered by a low marginal rim bearing a single small cusp on inner side immediately behind the metaconid; hypoconid absent; entoconid obsolete; outer side of tooth nearly flat, without sulcus or reentrant angle and without notch between protoconid and hypoconid.

In the reduction or suppression of the inner cusps of  $M^1$  and  $M^2$ , and of both inner and outer cusps of the large posterior moiety of  $M_7$ , together with the absence of a reentrant angle and notch on the outer side of  $M_2$ , *Vetularctos* resembles *Arctotherium* and *Tremarctos*. The details of these and other teeth in the three genera, however, are quite different and the genera have little in common. Nevertheless the resemblances are sufficient to suggest that *Vetularctos* may claim a rather ancient line of descent, from which *Arctotherium* and *Tremarctos* also arose—a line quite different from the one culminating in *Ursus* proper.

*Type species.*—*Vetularctos inopinatus*.

#### VETULARCTOS INOPINATUS SP. NOV.

##### PATRIARCHAL BEAR.

*Type*, skull No. 7149 (skin No. 8706), ♀ nearly adult, U. S. National Museum, from Rendezvous Lake, northeast of Fort Anderson, Mackenzie. Collected June 24, 1864, by R. MacFarlane. Original No. 1979. Teeth practically unworn.

*Color.*—General color varying from whitish buff to pale yellowish buff (yellowest on back of head and neck), darkening to dull reddish brown on ankles, feet, and median line of belly. The pale body color covers the entire body from between eyes to base of tail and reaches down over thighs and upper part of legs. Muzzle golden brown, becoming dull fulvous-brown around eyes; top of head from between eyes posteriorly soiled buff; long hairs of cheeks washed with buffy; ears pale buffy. Fur everywhere full, soft, and woolly; basal fur of upperparts varying from grayish to grayish brown, but distal half or more than half, pale buffy, so the animal as a whole appears to be buffy whitish.

*Cranial and dental characters.*—Skull small, moderately arched above; basicranial axis arched, palate strongly arched and slightly concave longitudinally. Teeth peculiar, presenting a combination of long canines and well-developed cusps for seizing (main cusp of  $PM^1$  and  $PM_2$ , outer cusps of  $M^1$  and  $M^2$  and anterior cusps of  $M_7$ ) with broadly flattened surfaces for crushing (in  $M^2$ ,  $M_2$ , and  $M_3$ ). Incisors, canines, and premolars as in *Ursus*; posterior molars peculiar, showing a strong tendency toward the suppression of cusps, particularly those of the inner side. Crown of  $M^1$  with outer cusps

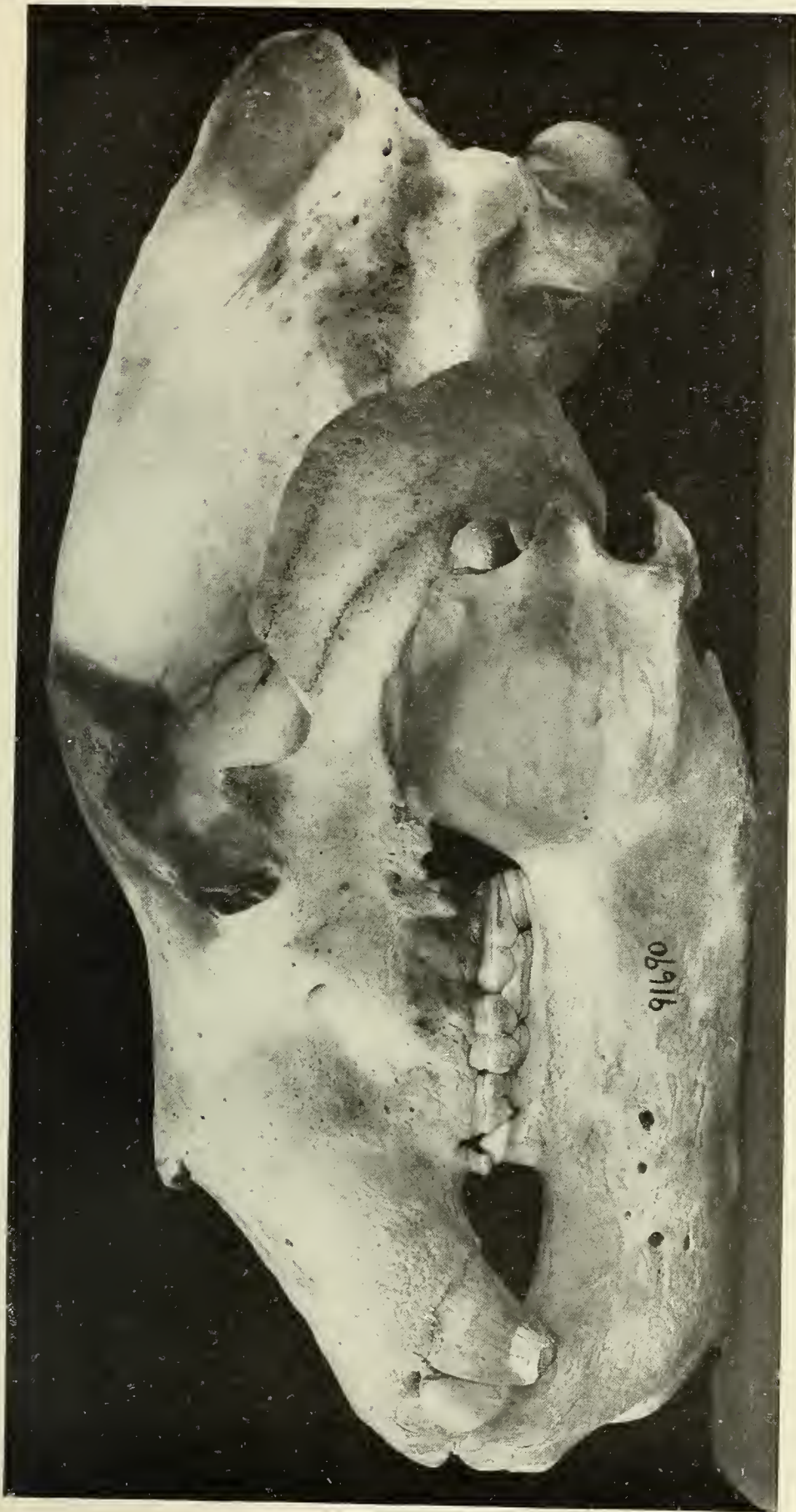
(paracone and metacone) normal; inner cusps (protocone and hypocone—slightly worn) low, scarcely rising above level of median part of tooth; no middle cusplet. Crown of  $M^2$  with outer cusps (paracone and metacone) normal; inner cusps (protocone and hypocone) obsolete, represented by a low ridge scarcely projecting above the granular surface of the interior of the crown. Crown of  $M_1$  normal, but anterior part higher than posterior. Crown of  $M_2$  very remarkable (see description of genus). Crown of  $M_3$  flat, with only insignificant marginal thickenings to represent protoconid and metaconid, the flat crown forming a direct continuation of the large crushing platform of the preceding tooth.

*Skull measurements.*—Young-adult female (type): Basal length, 268; occipito-nasal length, 255; palatal length, 148; zygomatic breadth, 181; interorbital breadth, 70.

*Tooth measurements.*— $PM^4$ , 17 x 14;  $M^1$ , 22.5 x 17;  $M^2$ , 35.5 x 19;  $PM_4$ , 14 x 8;  $M_1$ , 24.5 x 12;  $M_2$ , 27 x 17;  $M_3$ , 21 x 16; upper molariform series, 73; upper molars, 59; lower molars, 72; diameter of lower canine, 13; upper incisors (series), 40.

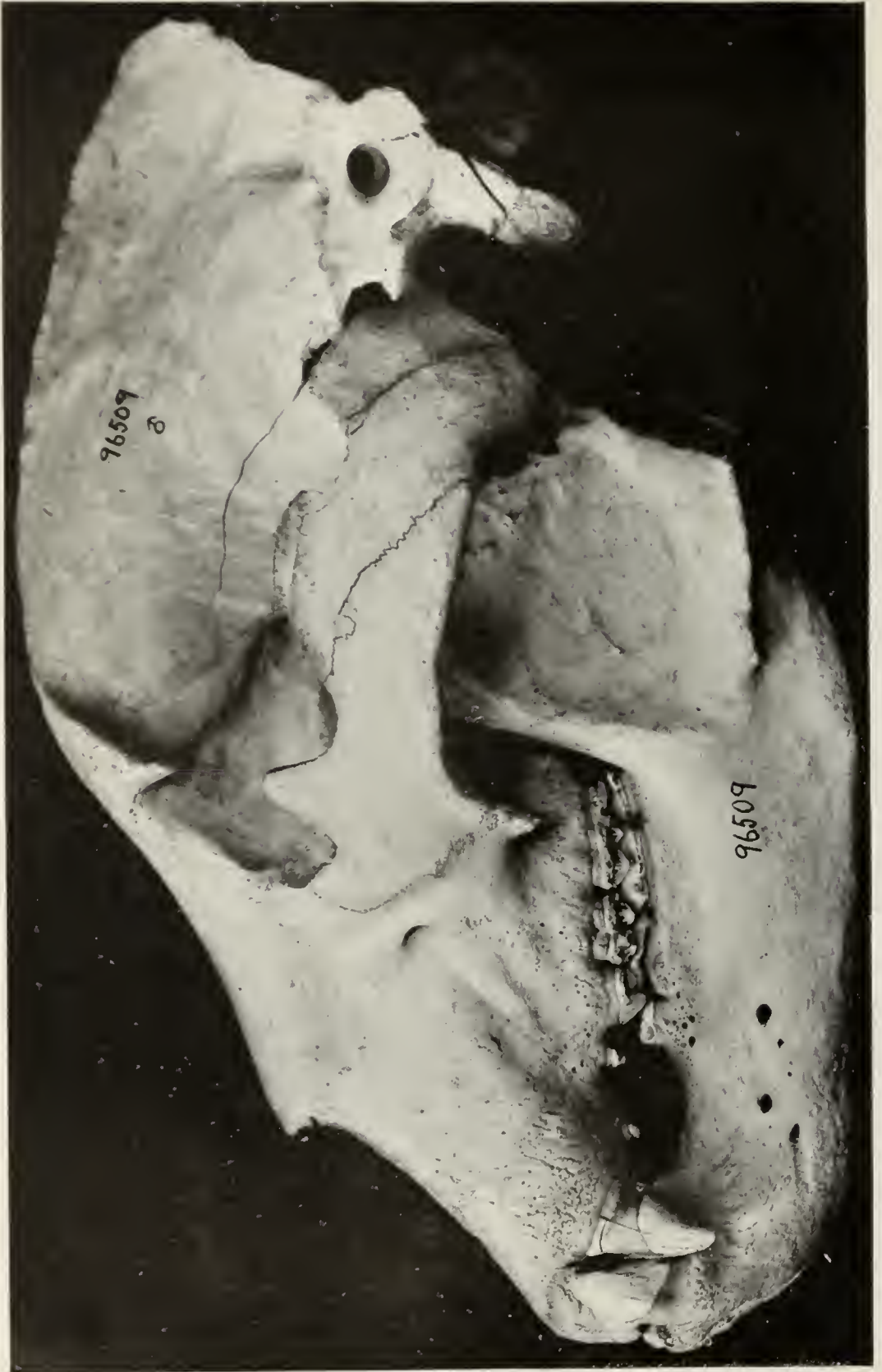






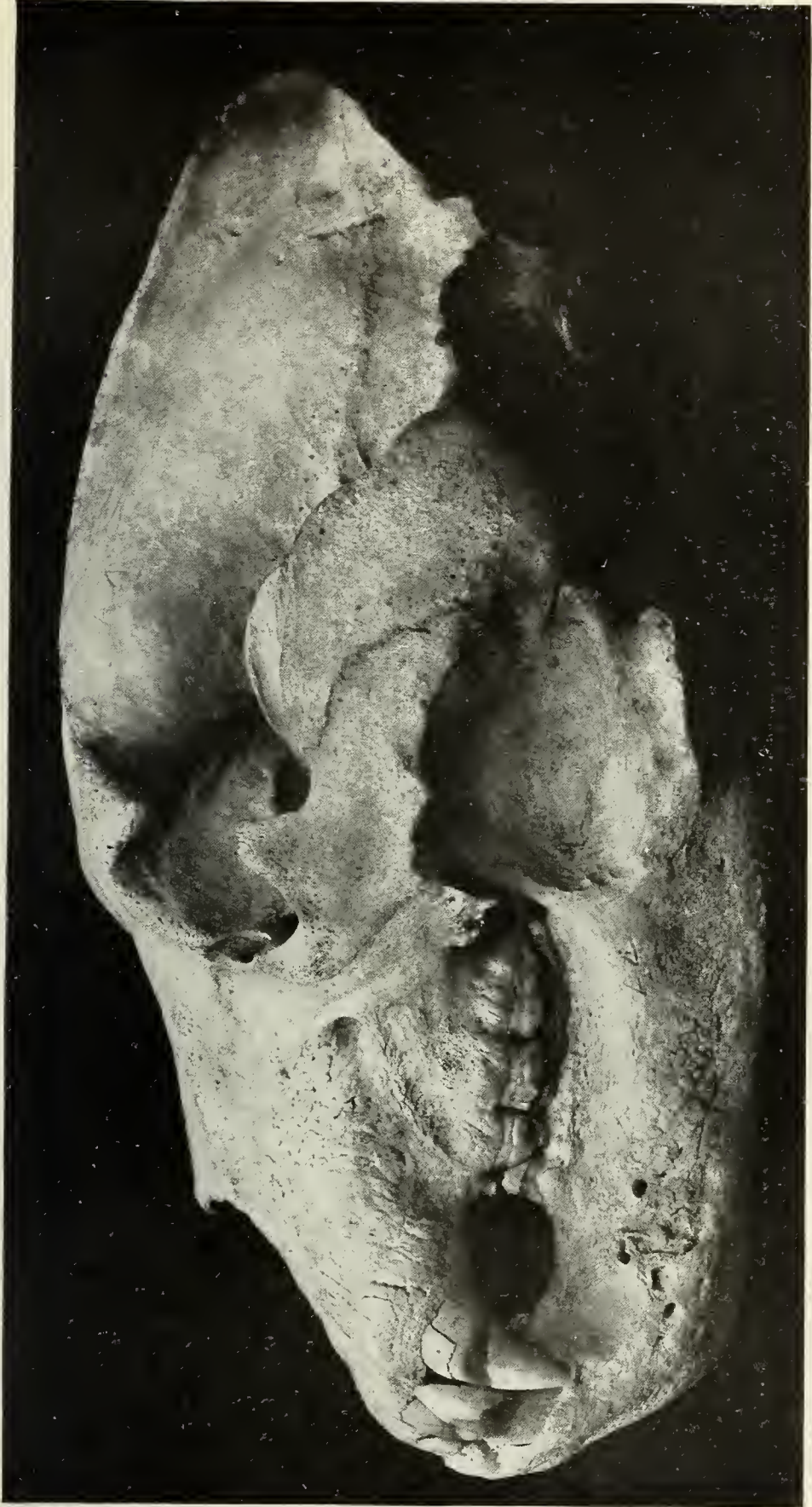
SKULL OF *URSUS GYAS*.

Old ♂ from Bear Bay, Alaska Peninsula. No. 91690. (Seven-sixteenths natural size.)



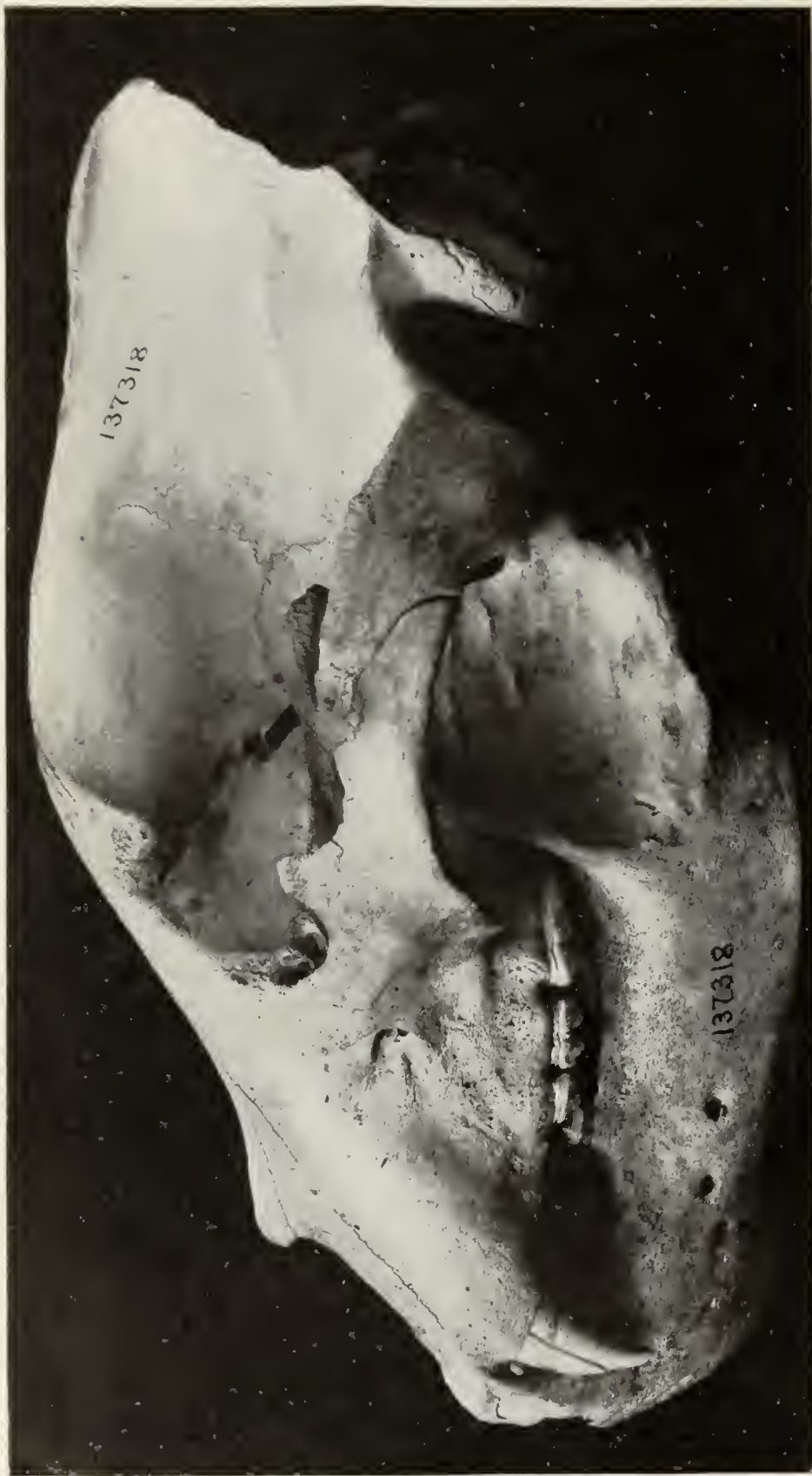
SKULL OF *URSUS MIDDENDORFFI*.

Old ♂ from Chiniak Point, Kodiak Island, Alaska. No. 96509. (Seven-sixteenths natural size.)



SKULL OF *URSUS KENAIENSIS*.

Old ♂ from Kenai Peninsula, Alaska. No. 210291. (Seven-sixteenths natural size.)



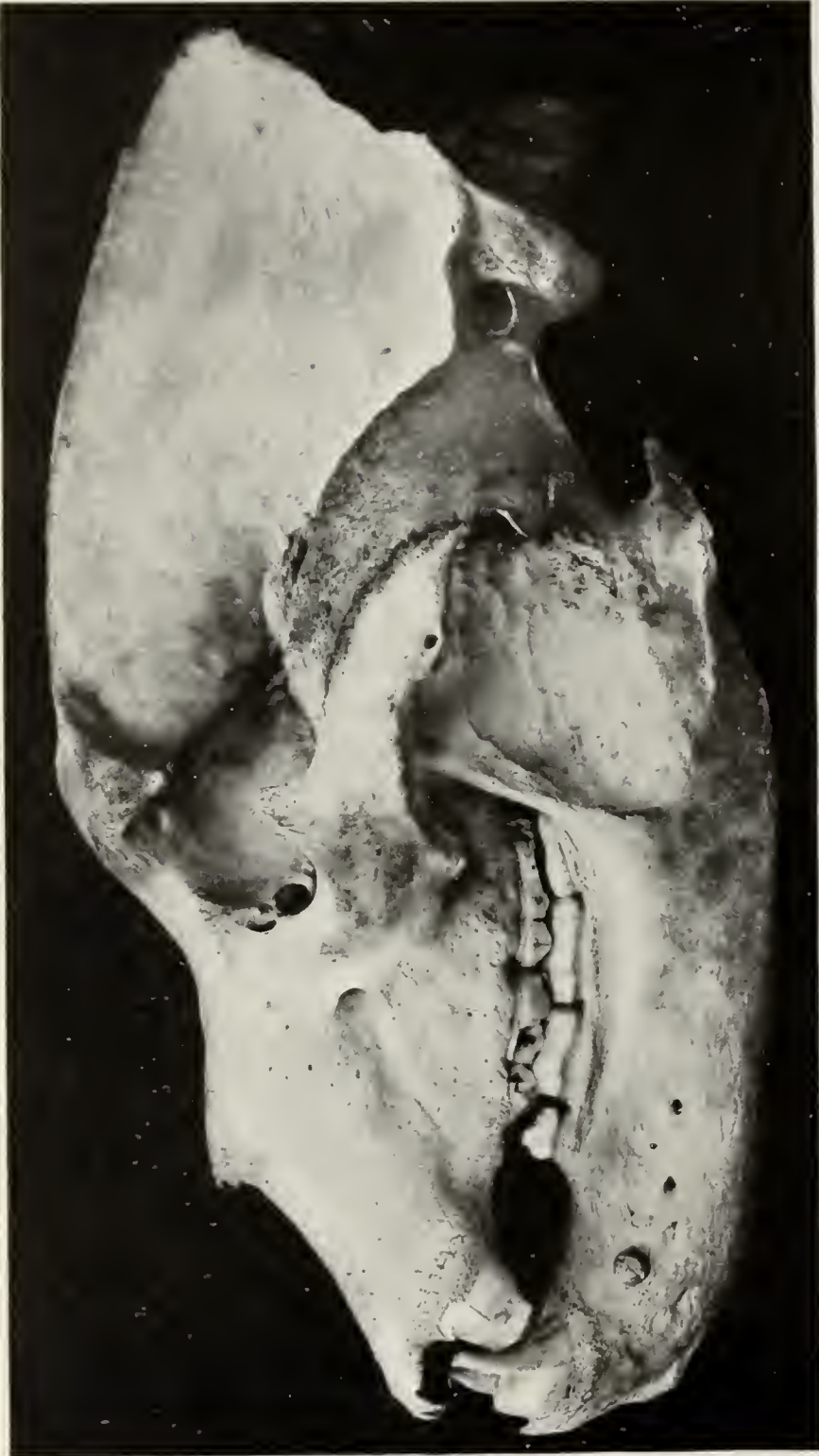
SKULL OF *URSUS SHELDONI*.

Adult ♂ from Montague Island, Prince William Sound, Alaska. No. 137318 (type). (Seven-sixteenths natural size.)



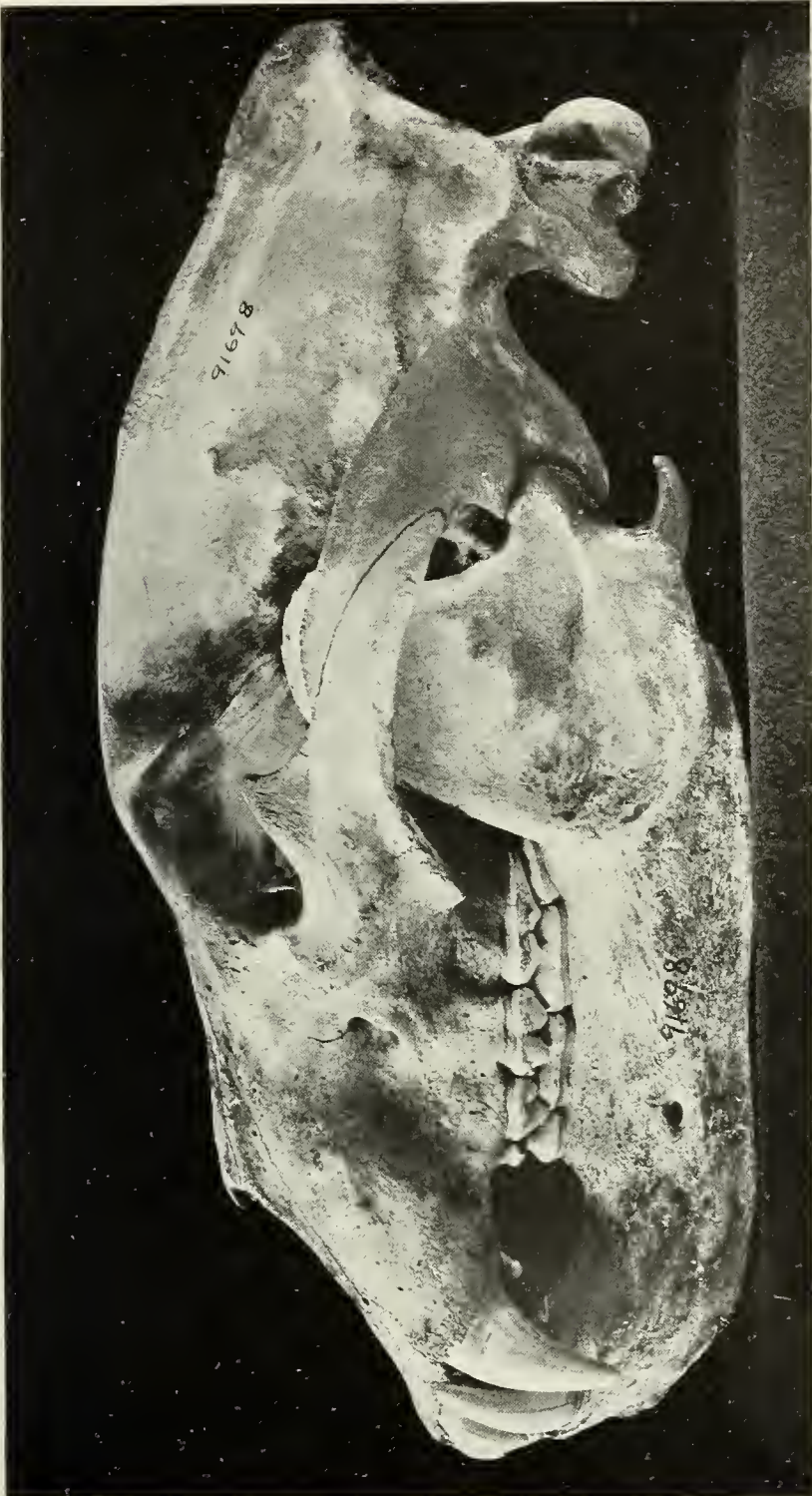
SKULL OF *URSUS SHIRASI*.

Old ♂ from Admiralty Island, Alaska. No. 203080 (type). (Seven-sixteenths natural size.)



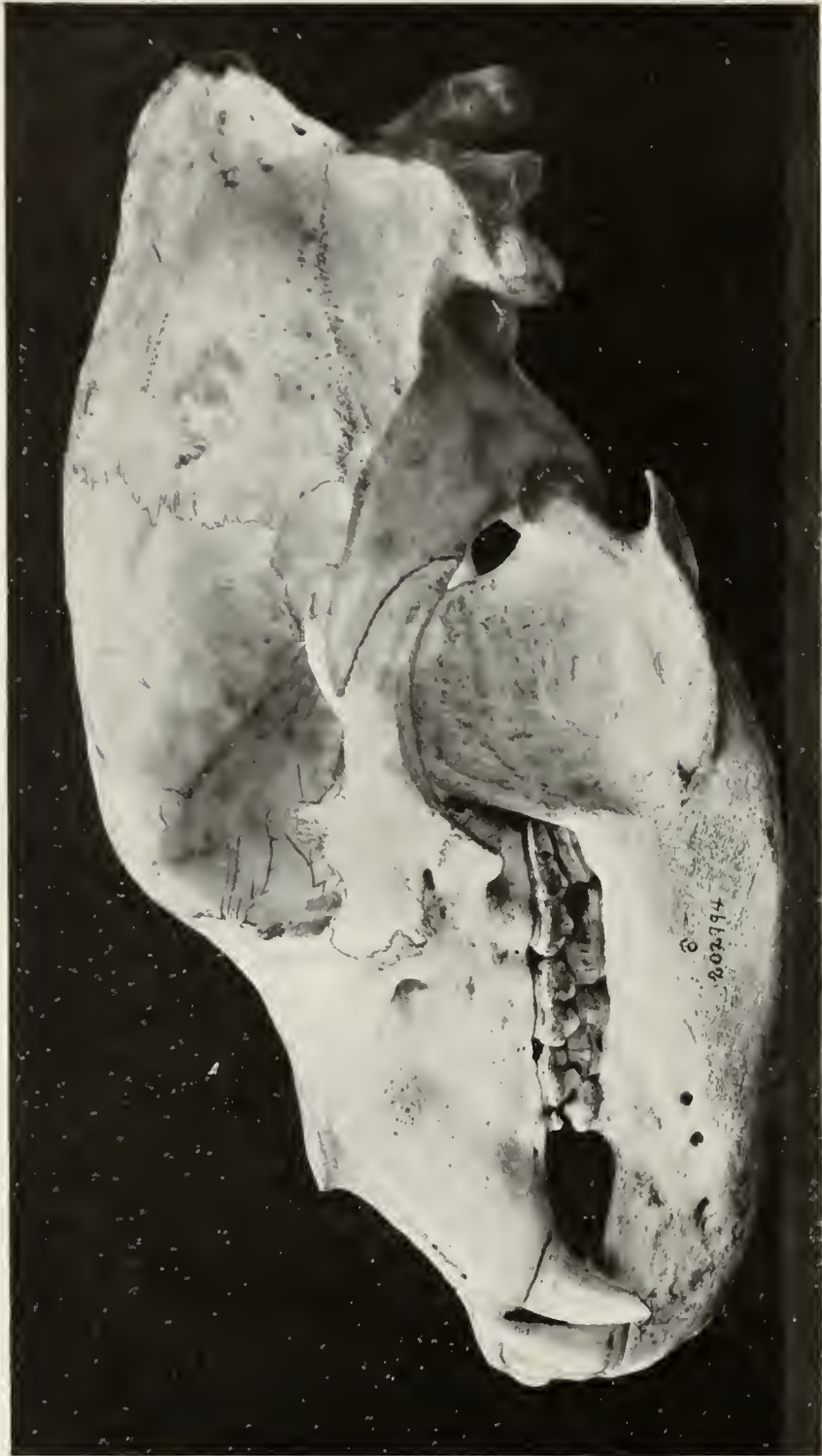
SKULL OF *URSUS INNUITUS*.

Old ♂ from Golofnin Bay, Alaska. No. 179780 (type). (Seven-sixteenths natural size.)



SKULL OF *URSUS KIDDERI* KIDDERI.

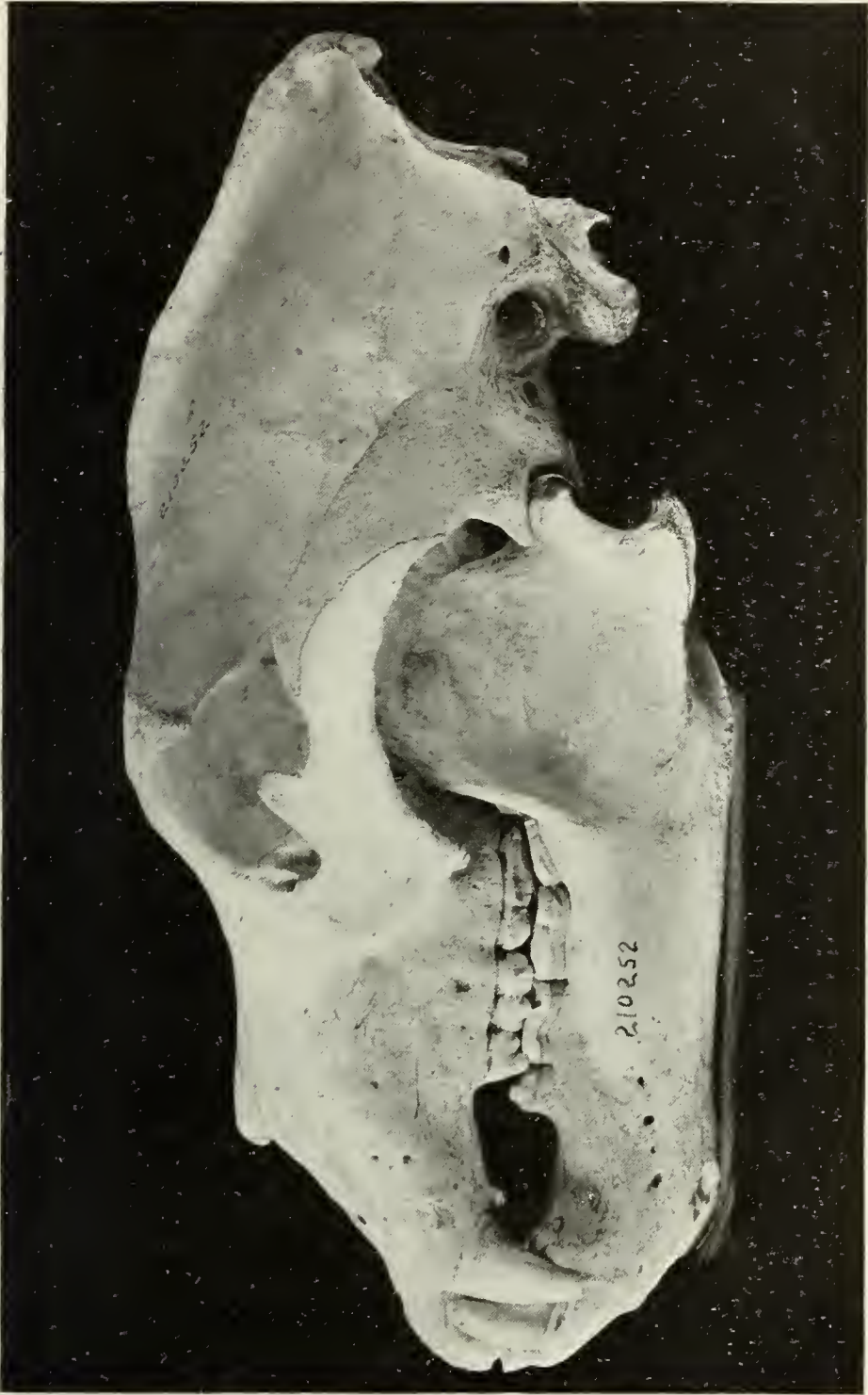
Old ♂ from Belkofski, Alaska Peninsula. No. 91698. (Seven-sixteenths natural size.)



SKULL OF *URSUS STIKEENENSIS*.

Adult ♂ from Tatletuey Lake, near head of Skeena River, British Columbia. No. 202794 (type). (Seven-sixteenths natural size.)



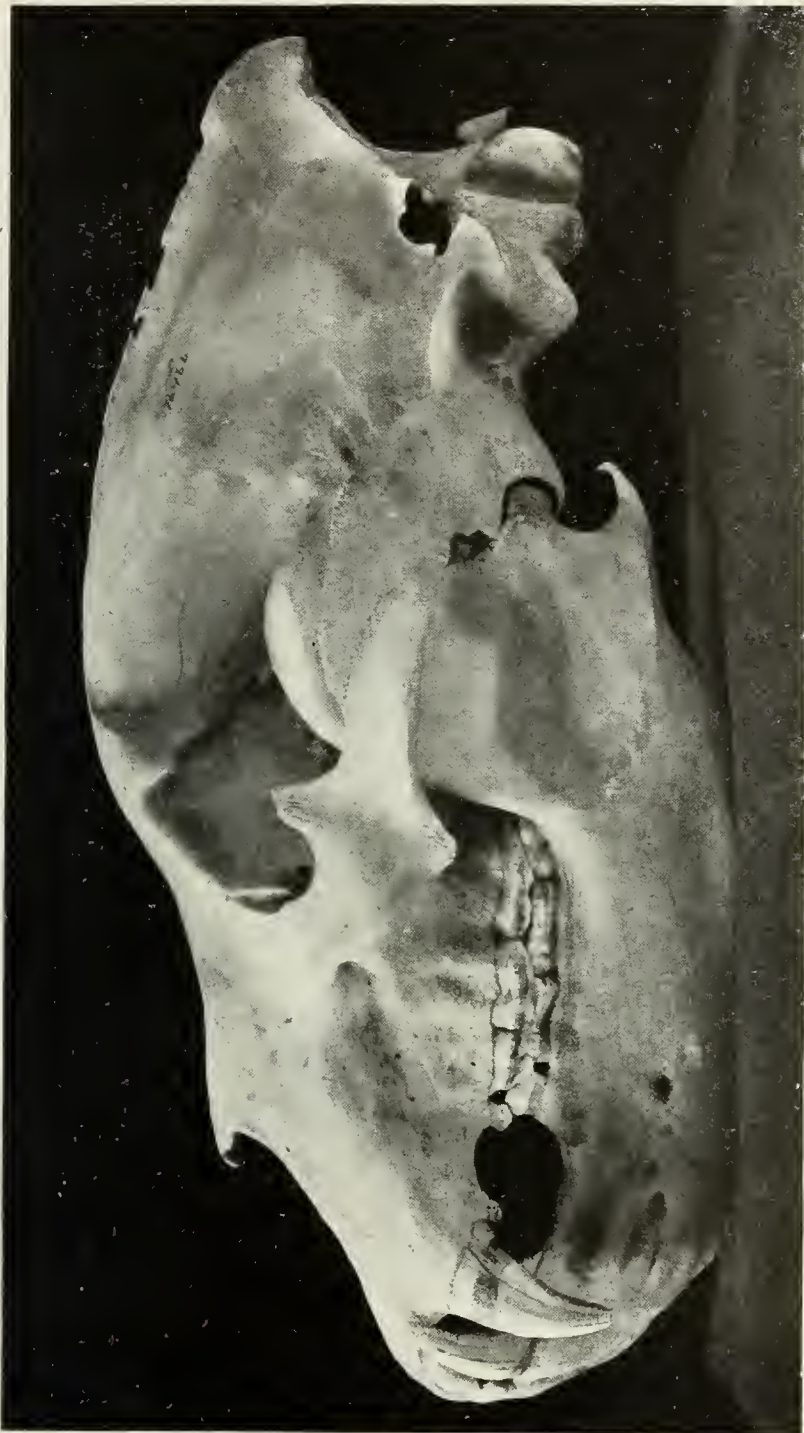


SKULL OF *URSUS OPHRUS*.  
Old ♂ from eastern British Columbia. No. 210252 (type). (Seven-sixteenths natural size.)



SKULL OF *URSUS RINGIUSI RINGIUSI*.

Old ♂ from Indian Point Creek, near Barkerville, British Columbia. No. 209899. (Seven-sixteenths natural size.)



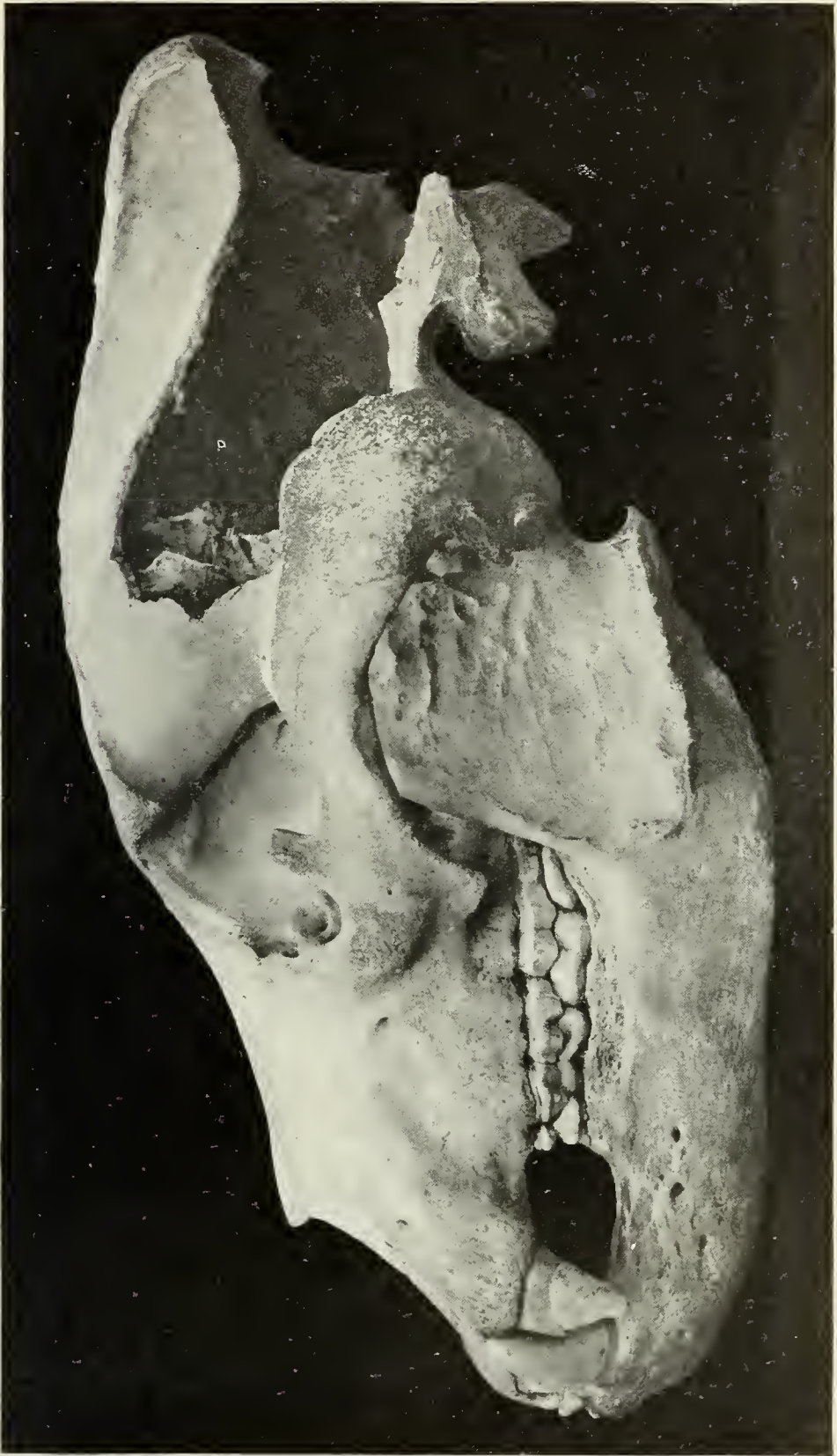
SKULL OF *URSUS ALASCENSIS*.

Old ♂ from Unalakliik River, Alaska. No. 76466 (type). (Seven-sixteenths natural size.)



SKULL OF *URSUS NORTONI*.

Old ♀ from Yakutat, Alaska. No. 178763 (type). (Seven-sixteenths natural size.)



SKULL OF *URSUS HORRIBILIS HORRIBILIS*.

Old ♂ from Missouri Breaks, eastern Montana. No. 202739. (Seven-sixteenths natural size.)



SKULL OF *URSUS HORRIÆUS*.

Old ♂ from Coppermines, New Mexico. No. 990 (type). (Seven-sixteenths natural size.)



SKULL OF *URSUS ARIZONÆ*.

Adult ♂ from Escondido Mountains, Apache County, Arizona, No. 177332 (type). (Seven-sixteenths natural size.)





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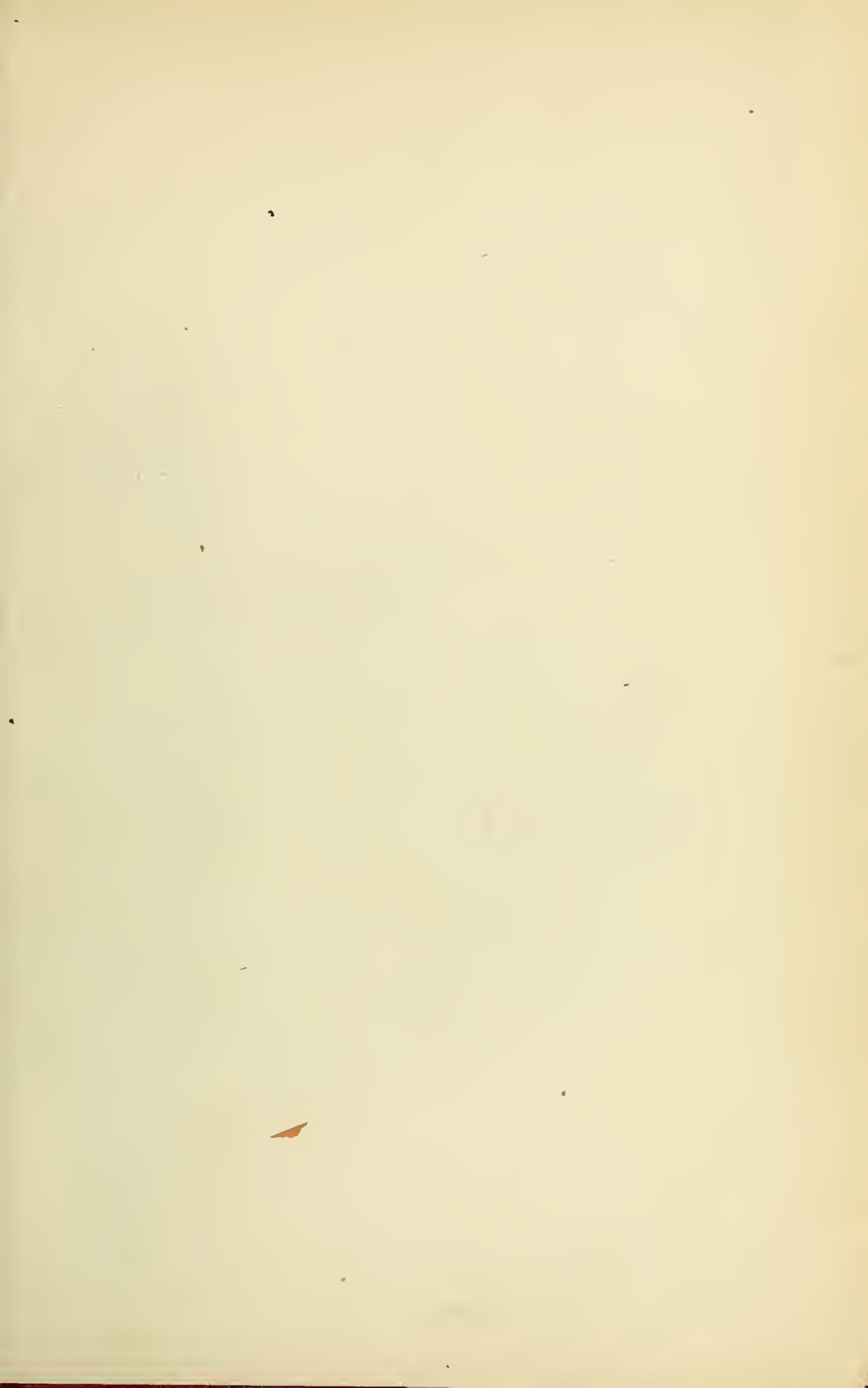
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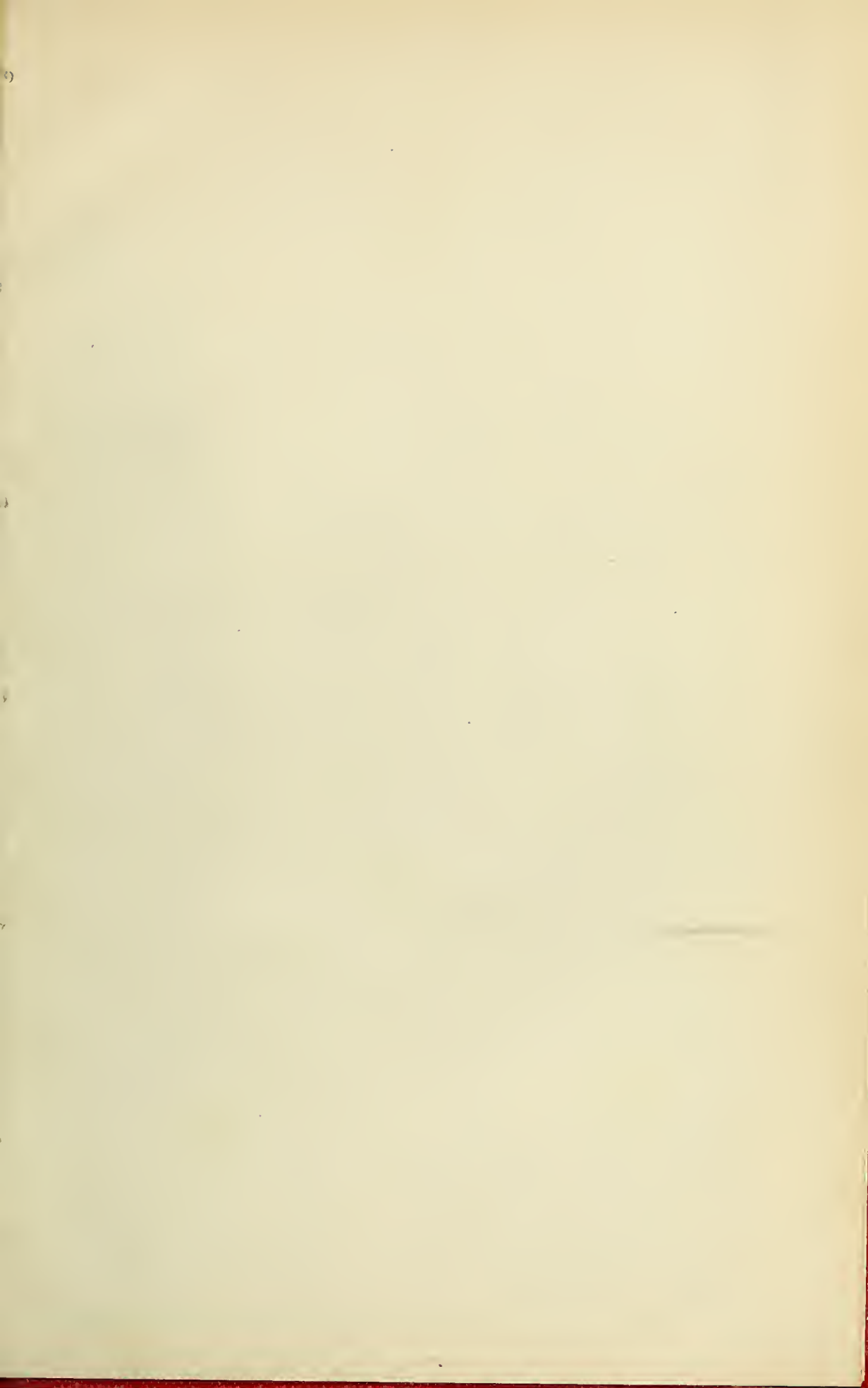
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