

BULLETIN
OF THE
American Museum of Natural
History.

Vol. XXXII, 1913.

EDITOR, J. A. ALLEN.

NEW YORK:
Published by order of the Trustees.
1913.

FOR SALE AT THE MUSEUM.

(Continued from 3d page of cover.)

PART II.—Mythology of the Thompson Indians. By James Teit. Pp. 199–416. 1912. Price, \$2.70.

PART III.—The Eskimos of Siberia. By Waldemar Bogoras. Pp. 417–456. 1913. Price, \$0.60.

Vol. XIII Anthropology (not yet completed).

** Jesup North Pacific Expedition, Vol. IX.*

PART I.—The Yukaghir and the Yukaghirized Tungus. By Waldemar Jochelson. Pp. 1–133, pll. i–vii, 1 map, 1910. Price, \$3.40.

Vol. XIV. Anthropology.

** Jesup North Pacific Expedition, Vol. X.*

PART I.—Kwakiutl Texts. Second Series. By Franz Boas and George Hunt. Pp. 1–269. 1906. Price, \$2.80.

PART II.—Haida Texts. By John R. Swanton. Pp. 271–802. 1908. Price, \$5.40.

MEMOIRS.

New Series, Vol. I.

PART I.—Crania of Tyrannosaurus and Allosaurus. By Henry Fairfield Osborn, pp. 1–30, pll. i–iv and text figures 1–27. 1912.

PART II.—Integument of the Iguanodont Dinosaur Trachodon. By Henry Fairfield Osborn. Pp. 31–54, pll. v–x, and text figures 1–13. 1912. Parts I and II are issued under one cover. Price, \$2.00.

PART III.—Cranimetry of the Equidae. By Henry Fairfield Osborn. Pp. 55–100, text figures 1–17. 1912. Price, 75 cents.

PART IV.—Orthogenetic and other Variations in Muskoxen, with a Systematic Review of the Muskox Group, Recent and Extinct. By J. A. Allen. Pp. 101–226, 8 plates, and 45 text figures. 1913. Price, \$2.50.

ETHNOGRAPHICAL ALBUM.

Jesup North Pacific Expedition.

Ethnographical Album of the North Pacific Coasts of America and Asia. Part 1, pp. 1–5, pll. 1–28. August, 1900. Sold by subscription, price, \$6.00.

BULLETIN.

The matter in the 'Bulletin' consists of about 24 to 36 articles per volume, which relate about equally to Geology, Palæontology, Mammalogy, Ornithology, Entomology, and (in former volumes) Anthropology, except Vol. XI, which is restricted to a 'Catalogue of the Types and Figured Specimens in the Palæontological Collection of the Geological Department,' and Vols. XV, XVII, and XVIII, which relate wholly to Anthropology, Volume XXIII and the later volumes contain no anthropological matter, which is now issued separately as 'Anthropological Papers.'

Volume	I, 1881–86.....	Out of print	Volume XVII, Part IV, 1905	Price, \$.75
"	II, 1887–90.....	Price, \$4.75	" " V, 1907	" 1.25
"	III, 1890–91.....	" 4.00	" XVIII, " I, 1902	" 2.00
"	IV, 1892.....	" 4.00	" " II, 1904	" 1.50
"	V, 1893.....	" 4.00	" " III, 1905	Out of print
"	VI, 1894.....	" 4.00	" " IV, 1907	Price \$2.00
"	VII, 1895.....	" 4.00	" XIX, 1903.....	" 6.00
"	VIII, 1896.....	" 4.00	" XX, 1904.....	" 5.00
"	IX, 1897.....	" 4.75	" XXI, 1905.....	" 5.00
"	X, 1898.....	" 4.75	" XXII, 1906.....	" 6.00
"	XI, 1898–1901.....	" 5.00	" XXIII, 1907.....	" 9.00
"	XII, 1899.....	" 4.00	" XXIV, 1908.....	" 6.00
"	XIII, 1900.....	" 4.00	" XXV, Part I, 1908.....	" 1.50
"	XIV, 1901.....	" 4.00	" XXVI, 1909.....	" 6.00
"	XV, 1901–1907.....	" 5.00	" XXVII, 1910.....	" 5.00
"	XVI, 1902.....	" 5.00	" XXVIII, 1910.....	" 4.00
"	XVII, Part I, 1902	" 1.50	" XXIX, 1911.....	" 4.50
"	" " II, " "	" .75	" XXX, 1911.....	" 4.00
"	" " III, 1905	Out of print	" XXXI, 1912.....	" 4.00

ANTHROPOLOGICAL PAPERS.

Vols. I–XII, 1908–1913 — \$3.50 per Vol.

AMERICAN MUSEUM JOURNAL.

The 'Journal' is a popular record of the progress of the American Museum of Natural History, issued monthly, from October to May inclusive. Price, \$1.50 a year. Volumes I–XIII, 1900–1913.

*The Anatomy of the Common Squid. By Leonard Worcester Williams. Pp. 1–87, pll. i–iii, and 16 text figures. 1909.

*Chinese Pottery of the Han Dynasty. By Berthold Laufer. Pp. 1–339, pl. i–lxxv, and 55 text figures. 1909.

For sale at the Museum.

*Published by E. J. Brill, Leiden, Holland. Not on sale at the Museum. American Agent, G. E. Stechert, 129 West 20th Street, New York City.

BULLETIN

OF THE

AMERICAN MUSEUM OF NATURAL HISTORY.

VOL. XXXII, 1913.

EDITOR, J. A. ALLEN.

NEW YORK:

PUBLISHED BY ORDER OF THE TRUSTEES.

1913.

FOR SALE AT THE MUSEUM.

American Museum of Natural History.

Seventy-seventh Street and Central Park West, New York City.

BOARD OF TRUSTEES.

President.

HENRY FAIRFIELD OSBORN.

First Vice-President.

CLEVELAND H. DODGE.

Second Vice-President.

J. P. MORGAN,

Treasurer.

CHARLES LANIER.

Secretary.

ADRIAN ISELIN, JR.

EX-OFFICIO.

**THE MAYOR OF THE CITY OF NEW YORK.
THE COMPTROLLER OF THE CITY OF NEW YORK.
THE PRESIDENT OF THE DEPARTMENT OF PARKS.**

ELECTIVE.

**ALBERT S. BICKMORE.
GEORGE S. BOWDOIN.
FREDERICK F. BREWSTER.
JOSEPH H. CHOATE.
THOMAS DEWITT CUYLER.
JAMES DOUGLAS.
MADISON GRANT.
ANSON W. HARD.
ARTHUR CURTISS JAMES.**

**WALTER B. JAMES.
A. D. JUILLIARD.
SETH LOW.
OGDEN MILLS.
PERCY R. PYNE.
WILLIAM ROCKEFELLER.
JOHN B. TREVOR.
FELIX M. WARBURG.
GEORGE W. WICKERSHAM.**

EXECUTIVE OFFICERS.

Director.

FREDERIC A. LUCAS.

Assistant-Secretary.

GEORGE H. SHERWOOD.

Assistant-Treasurer.

THE UNITED STATES TRUST COMPANY OF NEW YORK.

Scientific Staff.

DIRECTOR.

FREDERIC A. LUCAS, Sc.D.

GEOLOGY AND INVERTEBRATE PALÆONTOLOGY.

EDMUND OTIS HOVEY, Ph.D., Curator.
CHESTER A. REEDS, Ph.D., Assistant Curator.

MINERALOGY.

L. P. GRATACAP, A.M., Curator.
GEORGE F. KUNZ, Ph.D., Honorary Curator of Gems.

INVERTEBRATE ZOÖLOGY.

HENRY E. CRAMPTON, Ph.D., Curator.
ROY W. MINER, A.B., Assistant Curator.
FRANK E. LUTZ, Ph.D., Assistant Curator.
L. P. GRATACAP, A.M., Curator of Mollusca.
JOHN A. GROSSBECK, Assistant.
A. J. MUTCHLER, Assistant.
WILLIAM MORTON WHEELER, Ph.D., Honorary Curator of Social Insects.
AARON L. TREADWELL, Ph.D., Honorary Curator of Annelata.
CHARLES W. LENG, B.S., Honorary Curator of Coleoptera.

ICHTHYOLOGY AND HERPETOLOGY.

BASFORD DEAN, Ph.D., Curator Emeritus.
LOUIS HUSSAKOF, Ph.D., Associate Curator of Fishes.
JOHN T. NICHOLS, A.B., Assistant Curator of Recent Fishes.
MARY CYNTHIA DICKERSON, B.S., Associate Curator of Herpetology.

MAMMALOGY AND ORNITHOLOGY.

J. A. ALLEN, Ph.D., Curator.
FRANK M. CHAPMAN, Sc.D., Curator of Ornithology.
ROY C. ANDREWS, A.M., Assistant Curator of Mammalogy.
W. DEW. MILLER, Assistant Curator of Ornithology.

Scientific Staff.

VERTEBRATE PALÆONTOLOGY.

HENRY FAIRFIELD OSBORN, Sc.D., LL.D., D.Sc., Curator Emeritus.
W. D. MATTHEW, Ph.D., Curator.
WALTER GRANGER, Associate Curator of Fossil Mammals.
BARNUM BROWN, A.B., Associate Curator of Fossil Reptiles.
WILLIAM K. GREGORY, Ph.D., Assistant Curator.

ANTHROPOLOGY.

CLARK WISSLER, Ph.D., Curator.
PLINY E. GODDARD, Ph.D., Associate Curator.
ROBERT H. LOWIE, Ph.D., Associate Curator.
HERBERT J. SPINDEN, Ph.D., Assistant Curator.
NELS C. NELSON, M.L., Assistant Curator.
CHARLES W. MEAD, Assistant Curator.
ALANSON SKINNER, Assistant Curator.
HARLAN I. SMITH, Honorary Curator of Archæology.

ANATOMY AND PHYSIOLOGY.

RALPH W. TOWER, Ph.D., Curator.

PUBLIC HEALTH.

CHARLES-EDWARD AMORY WINSLOW, M.S., Curator.
ISRAEL J. KLIGLER, B.S., Assistant.

WOODS AND FORESTRY.

MARY CYNTHIA DICKERSON, B.S., Curator.

BOOKS AND PUBLICATIONS.

RALPH W. TOWER, Ph.D., Curator.
IDA RICHARDSON HOOD, A.B., Assistant Librarian.

PUBLIC EDUCATION.

ALBERT S. BICKMORE, Ph.D., LL.D., Curator Emeritus.
GEORGE H. SHERWOOD, A.M., Curator.
G. CLYDE FISHER, Ph.D., Assistant Curator.
AGNES ROESLER VAUGHAN, Assistant.

CONTENTS OF VOLUME XXXII.

	Page
Title-page.....	i
Officers and Trustees.....	iii
Scientific Staff.....	iv
Contents.....	vii
Dates of Publication of Author's Separates.....	ix
List of Illustrations.....	x
List of New Names of Genera, Subgenera, Species, and Subspecies.....	xv
Errata.....	xix
ART. I.—Mammals of northern Malheur County, Oregon. By H. E. ANTHONY. (Plates I and II.).....	
	1
II.—Notes on the Embryos of several species of Rays, with remarks on the northward summer Migration of certain tropical forms observed on the coast of North Carolina. By RUSSELL J. COLES. (Plate III, and two text figures.).....	
	29
III.—Insects of Florida. By CHARLES W. JOHNSON.....	
	37
IV.— <i>Tyrannosaurus</i> , restoration and model of the skeleton. By HENRY FAIRFIELD OSBORN. (Plates IV–VI.).....	
	91
V.—New Acarina. By H. E. EWING. (Plates VII and VIII, and nine text figures.).....	
	93
VI.—Review of the Fossil Fauna of the Desert Region of Oregon, with a description of additional material collected there. By R. W. SHUFELDT. (Plates IX–XLIII.).....	
	123
VII.—Notes on Teleosts collected by Roy C. Andrews in Japan, with descriptions of two new species. By JOHN TREADWELL NICHOLS. (Three text figures.).....	
	179
VIII.—Echinoderms from Lower California, with descriptions of new species. By HUBERT LYMAN CLARK. (Plates XLIV–XLVI.).....	
	185
IX.—Two new Fossorial Hymenoptera. By NATHAN BANKS.....	
	237
X.—Ants collected in the West Indies. By WILLIAM MORTON WHEELER.....	
	239
XI.—Descriptions of four new Palæozoic Fishes from North America. By L. HUSSAKOF. (Plate XLVII, and two text figures.).....	
	245
XII.—Descriptions of new species of Monkeys of the genera <i>Seniocebus</i> and <i>Aotus</i> from Colombia, S. A. By D. G. ELLIOT..	
	251
XIII.—New and rare Spiders from within fifty miles of New York City. By J. H. EMERTON. (Plate XLVIII, and one text figure.).....	
	255
XIV.— <i>Eomoropus</i> , an American Eocene Chalcid. By HENRY FAIRFIELD OSBORN. (Eleven text figures.).....	
	261

	PAGE.
XV.—A new Phytosaur from the Palisades near New York. By FRIEDRICH VON HUENE. (Plates XLIX and L, and fourteen text figures.)	275
XVI.—Further studies of Fossil Birds with descriptions of new and extinct species. By R. W. SHUFELDT. (Plates LI-LIX.)	285
XVII.—A Zalambdodont Insectivore from the Basal Eocene. By W. D. MATTHEW. (Plates LX and LXI, and six text figures.)	307
XVIII.—The Skull Elements of the Permian Tetrapoda in the American Museum of Natural History, New York. By FRIEDRICH VON HUENE. (Fifty-seven text figures.)	315
XIX.—The Skeleton of <i>Saurolophus</i> , a Crested Duck-billed Dinosaur from the Edmonton Cretaceous. By BARNUM BROWN. (Plates XLII and XLIII, and one text figure.)	387
XX.—A new Trachodont Dinosaur, <i>Hypacrosaurus</i> , from the Edmonton Cretaceous of Alberta. By BARNUM BROWN. (Eight text figures.)	395
XXI.—Lower Eocene Titanotheres. Genera <i>Lambdotherium</i> , <i>Eotitanops</i> . By HENRY FAIRFIELD OSBORN. (Nine text figures.)	407
XXII.—The Skull of <i>Bathyopsis</i> , Wind River Uintathere. By HENRY FAIRFIELD OSBORN. (Plates LXIV-LXVI, and four text figures.)	417
XXIII.—New American Philanthidæ. By NATHAN BANKS. (Plate LXVII.)	421
XXIV.—Mammals collected in Korea. By J. A. ALLEN and ROY C. ANDREWS.	427
XXV.—Notes on <i>Equus capensis</i> Broom. By R. BROOM. (One text figure.)	437
XXVI.—On some new genera and species of Dicynodont Reptiles, with notes on a few others. By R. BROOM. (Nineteen text figures.)	441
XXVII.—On the origin of the Cheiropterygium. By R. BROOM. (Six text figures.)	459
XXVIII.—On evidence of a mammal-like dental succession in the Cynodont Reptiles. By R. BROOM. (One text figure.)	465
XXIX.—New Mammals from Colombia and Ecuador. By J. A. ALLEN. (Sixteen text figures.)	469
XXX.—Descriptions of new parasitic Hymenoptera from British Guiana. By CHARLES T. BRUES and C. H. RICHARDSON. (Five text figures.)	485
XXXI.—The Trachea of <i>Ogmorhinus</i> , with notes on other soft parts. By ROBERT CUSHMAN MURPHY. (One text figure.)	505
XXXII.—On the squamosal and related bones in the Mosasaurs and Lizards. By R. BROOM. (Two text figures.)	507
XXXIII.—On the Structure and Affinities of <i>Bolosaurus</i> . By R. BROOM. (Five text figures.)	509
XXXIV.—Glaucophane from eastern Pennsylvania. By ELEANORA F. BLISS. (Five text figures.)	517

	PAGE.
XXXV.— On the Cotylosaurian genus <i>Pantylus</i> Cope. By R. BROOM. (Four text figures.).....	527
XXXVI.— Revision of the <i>Melanomys</i> group of American Muridæ. By J. A. ALLEN. (Plate LXVIII.).....	533
XXXVII.— On some new carnivorous Therapsids. By R. BROOM. (Four text figures.).....	557
XXXVIII.— Studies on the Permian Temnospondylous Stegocephalians of North America. By R. BROOM. (Twenty-one text figures.).....	563
XXXIX.— New South American Muridæ. By J. A. ALLEN.	597
XL.— A new Pleisiosaur, <i>Leurospondylus</i> , from the Edmonton Cre- taceous of Alberta. By BARNUM BROWN. (Seven text figures.).....	605
XLI.— A new Slug from the Himalaya Mountains. By T. D. A. COCKERELL. (Seven text figures.).....	617

DATES OF PUBLICATION OF AUTHOR'S SEPARATES.

The edition of author's separates is 300 copies, of which about 100 are mailed on the date of issue, and the others placed on sale in the Library.

Art. I,	March 7, 1913.	Art. XXII,	Sept. 2, 1913.
" II,	" 7, 1913.	" XXIII,	" 2, 1913.
" III,	" 21, 1913.	" XXIV,	" 2, 1913.
" IV,	April 11, 1913.	" XXV,	" 13, 1913.
" V,	May 31, 1913.	" XXVI,	" 13, 1913.
" VI,	July 9, 1913.	" XXVII,	" 23, 1913.
" VII,	" 9, 1913.	" XXVIII,	" 23, 1913.
" VIII,	" 9, 1913.	" XXIX,	" 25, 1913.
" IX,	" 9, 1913.	" XXX,	Oct. 7, 1913.
" X,	" 9, 1913.	" XXXI,	" 7, 1913.
" XI,	" 14, 1913.	" XXXII,	" 7, 1913.
" XII,	" 14, 1913.	" XXXIII,	" 7, 1913.
" XIII,	Aug. 1, 1913.	" XXXIV,	" 13, 1913.
" XIV,	July 25, 1913.	" XXXV,	" 25, 1913.
" XV,	Aug. 19, 1913.	" XXXVI,	Nov. 17, 1913.
" XVI,	" 4, 1913.	" XXXVII,	" 17, 1913.
" XVII,	July 25, 1913.	" XXXVIII,	" 26, 1913.
" XVIII,	Sept. 23, 1913.	" XXXIX,	Dec. 3, 1913.
" XIX,	Aug. 19, 1913.	" XL,	" 9, 1913.
" XX,	" 19, 1913.	" XLI,	" 12, 1913.
" XXI,	Sept. 2, 1913.		

LIST OF ILLUSTRATIONS.

PLATES.

- I.—View of Ironside, Malheur Co., Oregon.
 II.—*Brachylagus idahoensis* and favorite haunts.
 III.—*Aetobatus narinari* and embryos.
 IV–VI.—*Tyrannosaurus* group.
 VII–VIII.—New Acarina.
 IX–XLIII.—Fossil fauna of the desert region of Oregon.
 XLIV.—*Zoroaster platyacanthus* and *Pedicellaster hyperonicus* spp. nov.
 XLV.—*Diopederma axiologum* gen. et sp. n., and *Ophiura oligopera* sp. nov.
 XLVI.—*Urechinus reticulatus* sp. n.
 XLVII.—New Palæozoic Fishes.
 XLVIII.—Spiders from vicinity of New York City.
 XLIX.—*Rutiodon carolinensis* Emmons.
 L.—*Rutiodon manhattanensis* sp. nov.
 LI–LIV.—*Diatryma ajax* and *Diatryma gigantea*.
 LV.—Fossil birds (various species).
 LVI.—*Bonasa* sp.?
 LVII.—Indetermined Gallinaceous Bird.
 LVIII.—*Meleagris gallopavo* and *Palæophasianus meleagroides* sp. nov.
 LIX.—*Meleagris gallopavo*.
 LX–LXI.—*Palæoryctes puericensis* sp. nov.
 LXII–LXIII.—*Saurolophus osborni* Brown (type).
 LXIV–LXVI.—*Bathyopsis* (?) *fissidens*.
 LXVII.—New American Philanthidæ.
 LXVIII.—Skulls of species of *Melanomys*.

TEXT FIGURES.

	PAGE.
<i>Aetobatus narinari</i> , female.....	30
“ “ embryo.....	31
<i>Rhyncholopus robustus</i> , dorsal view.....	99
<i>Oribata maxima</i> , ventral view of mouth-parts.....	100
<i>Tetranchus telarius</i> , mouth-parts.....	100
<i>Margaropus annulatus</i> , capitulum of male, and dorsal view of body.....	100
<i>Dermacentor occidentalis</i> , stigmal plate of male.....	100
<i>Oribata illinoisensis</i> , dorsal view.....	101
<i>Gamasus magnicornutus</i> , palpi.....	102
<i>Uropoda pennsylvanica</i> , ventral view of part of body of female.....	102
<i>Tyroglyphus lintneri</i> , ventral view.....	103
<i>Notædres notædres</i> , dorsal view.....	104
<i>Hermanniella subnigra</i> , part of abdomen.....	105

	Page.
<i>Nothrus quadripilus</i> , part of abdomen	105
<i>Tetranychus telarius</i> , tip of tarsus of leg 1	105
<i>Notophallus dorsalis</i> , distal end of tarsus of leg 1	105
<i>Epinephelus lobotoides</i> Nichols, sp. nov.	180
<i>Sciæna ogivara</i> Nichols, sp. nov.	180
<i>Draciscus sachi</i> Nichols, sp. nov.	182
<i>Dinomylostoma beecheri</i> Eastman, oral views of the right mandibles	246
" <i>eastmani</i> n. sp., " " " " " " " "	246
<i>Apateacanthus peculiaris</i> n. sp., reconstruction of spine	248
<i>Atypus niger</i> , back, palpi, ventral and side views	200
<i>Eomoropus amarorum</i> , skull (three views) and cervical vertebræ	262
<i>Moropus</i> sp., skull, superior view	263
<i>Schizotherium</i> (<i>Ancylotherium</i>) <i>priscum</i> , type	265
<i>Schizotherium</i> (<i>Chalicotherium</i>) <i>modicum</i> , type	266
Lower jaws of <i>Chalicotheres</i>	267
<i>Eomoropus amarorum</i> , manus and pes	269
<i>Eomoropus</i> and <i>Moropus</i> , metacarpals	270
<i>Eomoropus</i> , femur (type)	271
<i>Moropus</i> and <i>Eomoropus</i> , tibiæ	272
<i>Eomoropus</i> , right innominate bone (type)	273
<i>Pernatherium rugosum</i> , calcaneum and metatarsal	276
<i>Mystriosuchus planirostris</i> , middle cervical vertebræ	278
<i>Phytosaurus kapffi</i> , cervical vertebræ	278
<i>Mystriosuchus planirostris</i> , dorsal vertebræ	279
<i>Phytosaurus kapffi</i> , dorsal vertebræ	279
" " anterior caudal vertebra	280
" " interclavicle	280
<i>Mystriosuchus planirostris</i> , caudal vertebra	280
" " interclavicle	280
" " left ilium	281
" <i>plieningeri</i> , left femur	281
<i>Phytosaurus kapffi</i> , left ilium and right femur	281
" " dorsal armature	282
<i>Rutiodon manhattanensis</i> , diagram of parts preserved in Fort Lee specimen	283
Distribution of <i>Zalambodonta</i>	307
<i>Palæoryctes puericensis</i> , side view of skull and jaws	309
" " palatal view of type skull	310
<i>Palæictops bicusps</i> , upper teeth	311
<i>Didelphodus absaroka</i> , crown view of upper teeth and side view of lower teeth	311
Upper molar tooth construction in <i>Chrysospalax</i> , <i>Potamogale</i> , <i>Palæoryctes</i> , <i>Didelphodus</i> , <i>Palæictops</i> , and <i>Tritemnodon</i>	312
<i>Eryops megacephalus</i> , forepart of skull	318
" " occiput	318
" " base of cranium	319
" " " " " " " " " "	320
" " lateral wall of braincase	321
" " longitudinal sections of braincase	321
<i>Lysorophus tricarinatus</i> , lower jaw and suspensorium	322

	PAGE.
<i>Lysorophus tricarinatus</i> , skull-tops	323
" " occiput	324
" " underside of skull	325
<i>Gymnarthrus willoughbyi</i> , skull-tops	327
" " side of skull	328
" " occiput	329
" " underside of skull	330
<i>Diadectes molaris</i> , skull-top	332
" sp., back part of skull-top	333
" <i>molaris</i> , right side of skull	334
" cross section through the quadrate and cross section of lower end of the squamosal end of the quadrate	334
? <i>Nothodon lentus</i> , occiput viewed from above and from the inside	335
<i>Diadectes molaris</i> , skulls showing openings in the temporal region	336
" " underside of skull	337
" <i>phaseolinus</i> , back of skull	339
" basisphenoid from below and rear view of same	339
" fragment of braincase	340
" <i>phaseolinus</i> , orbital region	341
" sp., imperfect braincase	341
" lower jaw	342
" " "	343
" " " viewed from below	344
<i>Bolbodon tenuitectus</i> , side view of skull	345
<i>Chilonyx rapidens</i> , posterior part of skull-top and occiput	346
<i>Captorhinus angusticeps</i> , skull	347
" " skull-top and top of occiput	348
" " occiput	349
" " under side of skull	350
<i>Labidosaurus hamatus</i> , border of occiput and skull-top	352
" " underside of skull, with lower jaw	353
<i>Pariotichus brachyops</i> , imperfect skull	353
<i>Isodectes megalops</i> , imperfect skull	354
<i>Pantylus cordatus</i> , right side, top, and underside of skull	355
" " imperfect lower jaw	356
<i>Dimetrodon incisivus</i> , back part of skull and of lower jaw	357
" " oblique rear view of left quadrate and quadratojugal	358
" " occiput, and the same viewed obliquely from above	359
" " right pterygoid, etc., outer side view	360
" " palatal region as preserved; reconstruction of palatal region	361
" " lower jaw, right ramus	362
<i>Naosaurus (Edaphosaurus) pogonias</i> , crushed skull, upper surface	363
" " " crushed occiput	364
<i>Diplocaulus limbatus</i> , skull-top	366
<i>Cricotus crassidiscus</i> , skull-top	367
<i>Seymouria (= Conodectes) favosus</i> , imperfect skull	368
<i>Diesorophus mimeticus</i> , side and top of skull	369

	PAGE.
<i>Zatrachys microphthalmus</i> , skull-top	370
<i>Acheloma cumminsi</i> , side and top of skull	371
<i>Trimerorhachis mesops</i> , part of skull	372
" <i>insignis</i> , top and underside of skull	373
<i>Saurolophus osborni</i> and <i>Trachodon mirabilis</i> , outlines of pelves	390
<i>Hypacrosaurus altispinus</i> , dorsal and caudal vertebræ and pelvis of type	397
" " mid-dorsal vertebræ of paratype	399
" " anterior caudal vertebræ of type	400
" " ilium and pubis	401
" " ischium of type	402
<i>Trachodon annectens</i> and <i>Hypacrosaurus altispinus</i> , right fore limbs three-quarters front view	403
" <i>mirabilis</i> and <i>Hypacrosaurus altispinus</i> , left hind limbs, front view	404
" " and <i>Hypacrosaurus altispinus</i> , metatarsals in position	405
<i>Eotitanops gregoryi</i> (type), second and third left upper molars and right lower premolar-molar series	407
<i>Eotitanops brownianus</i> (Cope), type jaw	409
" <i>borealis</i> , reconstruction of skull	410
<i>Lambdotherium</i> and <i>Eotitanops</i> , lower jaws	411
<i>Eotitanops</i> , median metatarsal	412
" <i>major</i> , median metatarsal	412
<i>Lambdotherium</i> , incomplete lower jaws and dentition	413
" mutations of cusp addition in the premolar evolution	414
" <i>progressum</i> (type), outer side view of jaw and teeth	415
<i>Bathyopsis fissidens</i> , skull and jaw	417
<i>Elachoceras parvum</i> , type skull	418
" " occiput	419
" " superior grinding series of type	420
<i>Equus capensis</i> , upper premolars	438
<i>Eocyclops longus</i> , side view of skull	442
" " the pineal foramen and its relations	442
<i>Dicynodon whaiti</i> , relationships of the preparietal	443
" <i>platyceps</i> , the relationships of the preparietal	444
" <i>ictidops</i> , side view of skull	446
" " preparietal region	446
" <i>moschops</i> , side view of skull	447
" " the pineal foramen and its relations	448
" <i>tylorhinus</i> , upper and side views of snout	449
" <i>lissops</i> , top of part of skull	450
" <i>leontops</i> , preparietal region	451
" <i>planus</i> , skull	452
" " preparietal region	453
<i>Diictodon galeops</i> , the preparietal and its relations	453
<i>Emydops minor</i> Broom, <i>Emydops longiceps</i> n. sp., and <i>Emydops arctatus</i> (Owen) fronto-parietal region	455
<i>Emydorrhynchus palustris</i> , outline of the skull	456
<i>Eusthenopteron</i> , pectoral limb	460
<i>Sauripteris taylora</i> , the scapulocoracoid and cleithrum	460

	PAGE.
<i>Sauripteris taylori</i> , section of large mandibular tooth.....	461
" " " " one of the small maxillary teeth.....	461
" " pectoral limb.....	462
Fin representing the supposed pre- <i>Sauripteris</i> stage.....	463
<i>Diademodon platyrhinus</i> , lower jaw showing successional canines and premolar.....	466
<i>Cholæpus hoffmanni</i> Peters, skull from above.....	471
" <i>didactylus</i> (Linné) " " ".....	471
" <i>florenciæ</i> sp. nov. " " ".....	471
" <i>agustinus</i> sp. nov. " " ".....	471
" <i>capitalis</i> sp. nov. " " ".....	471
" <i>andinus</i> sp. nov. " " ".....	471
" <i>hoffmanni</i> Peters, side view of skull.....	473
" <i>didactylus</i> (Linné) " " " ".....	473
" <i>florenciæ</i> sp. nov. " " " ".....	473
" <i>agustinus</i> sp. nov. " " " ".....	473
" <i>capitalis</i> sp. nov. " " " ".....	473
" <i>andinus</i> sp. nov. " " " ".....	473
" <i>hoffmanni</i> Peters, skull from below.....	475
" <i>didactylus</i> (Linné) " " " ".....	475
" <i>florenciæ</i> sp. nov. " " " ".....	475
" <i>agustinus</i> sp. nov. " " " ".....	475
" <i>capitalis</i> sp. nov. " " " ".....	475
" <i>andinus</i> sp. nov. " " " ".....	475
<i>Ophionocryptus nigrans</i> sp. nov., female.....	487
<i>Crypturopsis dilaticornis</i> sp. nov., antenna of female.....	490
<i>Neomesostenus gracilipes</i> sp. nov., female.....	493
<i>Athyreodon cyaneiventris</i> sp. nov., male.....	497
<i>Promicrogaster terebrator</i> sp. nov., female.....	500
<i>Ogmorhinus</i> , tracheal cartilage.....	506
<i>Platycarpus</i> sp., right tibulare and related bones.....	508
<i>Bolosaurus striatus</i> , skull.....	511
<i>Ophiodeirus casei</i> , cervical and dorsal vertebræ.....	513
" " coracoid, both precoracoids, interclavicle and right humerus.....	513
<i>Bolosaurus striatus</i> , pelvis.....	514
<i>Pæcilospondylus francisi</i> Case, pelvis.....	515
Pre-Cambrian areal geology of Boyertown region.....	518
Hornblende crystal with glaucophane filling cracks.....	521
Actinolite surrounded by a fringe of glaucophane.....	521
Basal section of hornblende with halo of glaucophane.....	521
Hornblende with terminal growth of glaucophane.....	521
<i>Pantylus cordatus</i> Cope, skull.....	527
" " " left mandible, four views.....	529
" " " sections across the mandible.....	530
<i>Lycognathus ferox</i> , side view of skull.....	557
<i>Scymnognathus angusticeps</i> , side view of skull.....	558
" <i>minor</i> , side view of snout.....	559
<i>Ictidorhinus martinsi</i> , side view of skull.....	560
<i>Cricotus crassidiscus</i> Cope, skull.....	565

	PAGE.
<i>Cricotus hypantricus</i> Cope, restoration of two dorsal vertebræ.....	566
“ <i>crassidiscus</i> Cope, right ilium.....	567
<i>Trimerorhachis insignis</i> Cope, upper view of skull.....	569
“ “ “ front half of skull.....	570
“ “ “ occiput.....	572
“ “ “ basicranial region, etc.....	573
“ “ “ mandible.....	575
“ “ “ details of the mandible.....	577
“ <i>medius</i> , skull.....	578
<i>Eryops megacephalus</i> Cope, skull.....	579
“ “ “ palate.....	581
“ “ “ occiput.....	583
“ “ “ basicranial axis.....	585
“ “ “ transverse section of braincase.....	586
“ “ “ transverse sections through the sphenethnoid and parasphenoid.....	588
<i>Dicynodon</i> sp., section across the skull.....	589
<i>Eryops megacephalus</i> Cope, mandible.....	590
“ <i>anatinus</i> Broom, skull.....	591
“ “ “ side view of skull.....	591
<i>Zatrachys microphthalmus</i> Cope, skull.....	593
<i>Leurospondylus ultimus</i> , vertebral column, side view.....	607
“ “ “ vertebral centra side, dorsal and anterior end views..	608
“ “ “ coracoids in position.....	611
“ “ “ left humerus and left femur.....	612
“ “ “ pelvic girdle.....	613
“ “ “ ischium.....	614
<i>Anadenus beebeyi</i> Cockerell, structural details.....	618

LIST OF GENERA, SUBGENERA, SPECIES, AND SUBSPECIES DESCRIBED OR RENAMED IN THIS VOLUME.

GENERA AND SUBGENERA.

	PAGE
<i>Euryneurasoma</i> Johnson.....	51
<i>Diopederma</i> Clark.....	206
<i>Lætmenæcus</i> Clark.....	230
<i>Cosilella</i> Banks.....	237
<i>Eomoropus</i> Osborn.....	264
<i>Palæophasianus</i> Shufeldt.....	291
<i>Proictinia</i> Shufeldt.....	301
<i>Palæoryctes</i> Matthew.....	309
<i>Hypacrosaurus</i> Brown.....	395

	PAGE.
<i>Oclocletes</i> Banks	423
<i>Eocylops</i> Broom	441
<i>Diictodon</i> Broom	453
<i>Emydorhynchus</i> Broom	456
<i>Parophionellus</i> Brues and Richardson	495
<i>Promicrogaster</i> Brues and Richardson	499
<i>Ophiodeirus</i> Broom	510
<i>Lycognathus</i> Broom	557
<i>Ictidorhinus</i> Broom	560
<i>Leurospondylus</i> Brown	606

SPECIES AND SUBSPECIES.

<i>Eutamias amoenus propinquus</i> Anthony	6
<i>Onychomys leucogaster fuscogriseus</i> Anthony	11
<i>Microtus (Lagurus) curtatus artemisiæ</i> Anthony	14
<i>Pachyrhina pruinosa</i> Johnson	42
<i>Tipula subeluta</i> Johnson	42
<i>Psychoda annulipes</i> Johnson	43
" <i>squamosa</i> Johnson	43
<i>Nemotelus quadrinotatus</i> Johnson	50
<i>Euryneurasma slossonæ</i> Johnson	51
<i>Chrysops vittatus</i> var. <i>floridanus</i> Johnson	52
<i>Spogostylum slossonæ</i> Johnson	55
" <i>grossbecki</i> Johnson	56
" <i>occidentalis</i> Johnson	56
<i>Leptogaster floridensis</i> Johnson	60
<i>Pegomyia gopheri</i> Johnson	77
<i>Trigonometropus reticulatus</i> Johnson	81
<i>Chatopsis hendeli</i> Johnson	83
<i>Chiliza similis</i> Johnston	85
<i>Phortica hirtifrons</i> Johnson	88
<i>Bdella robustirostris</i> Ewing	112
" <i>tessellata</i> Ewing	112
" <i>muscorum</i> var. <i>minnesotensis</i> Ewing	113
<i>Scirus laticis</i> Ewing	113
<i>Trombicula splendens</i> Ewing	113
<i>Gamasus bifurcus</i> Ewing	114
<i>Macrocheles tridentifer</i> Ewing	114
<i>Podicium guthriei</i> Ewing	115
<i>Uroseius tumidus</i> Ewing	115
<i>Pelops minnesotensis</i> Ewing	116
<i>Oribata corticis</i> Ewing	117
" <i>salicis</i> Ewing	117
" <i>juniperi</i> Ewing	118
" <i>minnesotensis</i> Ewing	118
" <i>boletorum</i> Ewing	119

	PAGE.
<i>Oribatella achipteroides</i> Ewing	119
<i>Dæmeus globifer</i> Ewing	120
<i>Lucoppia boletorum</i> Ewing	120
<i>Notaspis pyristigma</i> var. <i>fusca</i> Ewing	120
<i>Colymbus parvus</i> Shufeldt	136
<i>Podilymbus magnus</i> Shufeldt	136
<i>Olor matthewi</i> Shufeldt	151
<i>Epinephelus lobotoides</i> Nichols	179
<i>Sciæna ogiware</i> Nichols	180
<i>Zoroaster platyacanthus</i> Clark	199
<i>Pedicellaster hyperoncus</i> Clark	201
<i>Diopederma axiologum</i> Clark	206
<i>Ophiura oligopora</i> Clark	210
<i>Urechinus reticulatus</i> Clark	224
<i>Læmenæcus scoloeides</i> Clark	231
<i>Stichopus parvimensis</i> Clark	234
<i>Cerceris gnarina</i> Banks	237
<i>Cosila</i> (<i>Cosilella</i>) <i>plutonis</i> Banks	237
<i>Pheidole mærens dominicensis</i> Wheeler	241
<i>Rhopalothrix</i> (<i>Octostruma</i>) <i>lutzi</i> Wheeler	241
<i>Iridomyrmex melleus dominicensis</i> Wheeler	242
<i>Strumigemys alberti</i> var. <i>intermedia</i> Wheeler	242
<i>Azteca delini</i> subsp. <i>antillana</i> var. <i>dominicensis</i> Wheeler	243
<i>Camponotus maculatus</i> subsp. <i>dominicensis</i> Wheeler	244
<i>Dinomylostoma eastmani</i> Hussakof	245
<i>Apateacanthus peculiaris</i> Hussakof	247
<i>Stethacanthus humilis</i> Hussakof	248
“ <i>exilis</i> Hussakof	249
<i>Aotus aversus</i> Elliot	251
“ <i>pervigilis</i> Elliot	252
<i>Seniocebus pegasis</i> Elliot	252
<i>Theridium pennsylvanicum</i> Emerton	255
<i>Lophocarenum littorale</i> Emerton	256
<i>Tmeticus acuminatus</i> Emerton	256
“ <i>digitatus</i> Emerton	256
<i>Hahnia flaviceps</i> Emerton	257
<i>Pardosa atlantica</i> Emerton	258
<i>Pellenes longimanus</i> Emerton	258
<i>Rutiodon manhattensis</i> von Huene	277
<i>Diatryma ajax</i> Shufeldt	287
<i>Palæophasianus meleagroides</i> Shufeldt	291
<i>Aquila antiqua</i> Shufeldt	297
“ <i>ferox</i> Shufeldt	297
“ <i>lydekkeri</i> Shufeldt	298
<i>Proictinia gilmorei</i> Shufeldt	301
<i>Palæoryctes puercensis</i> Matthew	309
<i>Hypacrosaurus altispinus</i> Brown	305
<i>Eotitanops gregoryi</i> Osborn	408
“ <i>princeps</i> Osborn	410

	PAGE.
<i>Eotitanops major</i> Osborn.....	412
<i>Lambdotherium priscum</i> Osborn.....	413
<i>Philanthus hermosus</i> Banks.....	421
“ <i>insignatus</i> Banks.....	421
“ <i>carolinensis</i> Banks.....	422
“ <i>assimilis</i> Banks.....	422
“ <i>texanus</i> Banks.....	422
<i>Cerceris grandis</i> Banks.....	423
<i>Oclocletes nitens</i> Banks.....	423
<i>Cerceris astarte</i> Banks.....	424
“ <i>nitida</i> Banks.....	424
“ <i>atramontensis</i> Banks.....	425
<i>Ochotona (Pika) coreanus</i> Allen and Andrews.....	429
<i>Meles melanogenys</i> Allen and Andrews.....	433
<i>Eocyclops longus</i> Broom.....	441
<i>Dicynodon whaitsi</i> Broom.....	443
“ <i>platyceps</i> Broom.....	444
“ <i>ictidops</i> Broom.....	446
“ <i>moschops</i> Broom.....	446
“ <i>tylorhinus</i> Broom.....	448
“ <i>lissops</i> Broom.....	450
“ <i>leoniops</i> Broom.....	451
“ <i>planus</i> Broom.....	452
<i>Diictodon galeops</i> Broom.....	453
<i>Emydops longiceps</i> Broom.....	455
<i>Emydorhynchus palustris</i> Broom.....	456
<i>Cholæpus florenciæ</i> Allen.....	469
“ <i>agustinus</i> Allen.....	470
“ <i>andinus</i> Allen.....	472
“ <i>capitalis</i> Allen.....	472
<i>Sylvilagus (Tapeti) salentus</i> Allen.....	476
<i>Tayassu niger</i> Allen.....	476
<i>Myoprocta milleri</i> Allen.....	477
<i>Coendu guichua richardsoni</i> Allen.....	478
<i>Sigmodon chonensis</i> Allen.....	479
<i>Proechimys o'connelli</i> Allen.....	479
<i>Akodon tolimæ</i> Allen.....	480
<i>Potos flavus tolimensis</i> Allen.....	481
<i>Nasua olivacea lagunetæ</i> Allen.....	483
<i>Tayra barbara senilis</i> Allen.....	484
<i>Microjoppa lutzii</i> Brues and Richardson.....	485
<i>Protocryptus femoratus</i> Brues and Richardson.....	486
<i>Ophionocryptus nigrans</i> Brues and Richardson.....	487
“ <i>hastulatus</i> Brues and Richardson.....	488
<i>Crypturopsis dilaticornis</i> Brues and Richardson.....	489
“ <i>grandis</i> Brues and Richardson.....	490
<i>Neomesostenus caeteurensis</i> Brues and Richardson.....	491
“ <i>gracilipes</i> Brues and Richardson.....	492
“ <i>tuheitensis</i> Brues and Richardson.....	494

	PAGE.
<i>Epimeces neotropica</i> Brues and Richardson	495
<i>Athyreodon cyaneiventris</i> Brues and Richardson	497
<i>Spathius maculiceps</i> Brues and Richardson	498
<i>Promicrogaster terebrator</i> Brues and Richardson	500
<i>Disophrys cramptoni</i> Brues and Richardson	501
<i>Optus levinotum</i> Brues and Richardson	502
<i>Bolosaurus major</i> Broom	510
<i>Ophiodeirus casei</i> Broom	510
<i>Melanomys caliginosus oroensis</i> Allen	538
“ <i>affinis monticola</i> Allen	540
“ <i>phæopus vallicola</i> Allen	544
“ <i>lomilensis</i> Allen	545
“ <i>phæopus tolimensis</i> Allen	545
“ <i>buenavista</i> Allen	547
<i>Lycognathus ferox</i> Broom	557
<i>Scymnognathus angusticeps</i> Broom	558
“ <i>minor</i> Broom	559
<i>Ictidorhinus martinsi</i> Broom	560
<i>Trimerorhachis medius</i> Broom	577
<i>Eryops anatinus</i> Broom	591
<i>Oryzomys helvolus</i> Allen	597
“ <i>o'connelli</i> Allen	597
“ <i>incertus</i> Allen	598
“ <i>vicencianus</i> Allen	598
<i>Zygodontomys fraterculus</i> Allen	599
“ <i>griseus</i> Allen	599
<i>Akodon chapmani</i> Allen	600
<i>Rhipidomys quindianus</i> Allen	600
“ <i>caucensis</i> Allen	601
“ <i>venezuela yuruanus</i> Allen	601
“ <i>milleri</i> Allen	602
<i>Œcomys caicaræ</i> Allen	603
“ <i>mincæ</i> Allen	603
<i>Leurospondylus ultimus</i> Brown	606
<i>Anadenus beebei</i> Cockerell	617

ERRATA.

Pages 29, 30, 32, for *Rhinoptera bonasus* read *Myliobatis fremenwilli*.

Page 76, line 2 from bottom, for *Lomnophora* read *Limnophora*.

“ 113, “ 8, for *Sciris* read *Scirus*.

“ 155, “ 20, for *erythrochynchus* read *erythrorhynchus*.

“ 239, for F. O. Hovey read E. O. Hovey.

“ 392, change footnote to read: 1, *Saurolophus osborni*; 2, *Trachodon mirabilis*; 3, *Trachodon (Claosaurus) annectens*.

“ 521, the scale for Figs. 2-5 should be $\times 34$, not $\times 50$.

“ 531, line 16, for *Zatrachis* read *Zatrachys*.

“ 583, Fig. 13, for *magacephalus* read *megacephalus*.

“ 599, line 9 from bottom, for *Zygodontomys* read *Thomasomys*, and, in same line, for *Z.* read *T.*

BULLETIN
OF THE
AMERICAN MUSEUM OF NATURAL HISTORY.

VOLUME XXXII, 1913.

59.9(79.5)

Article I.—MAMMALS OF NORTHERN [MALHEUR COUNTY,
OREGON.

BY H. E. ANTHONY.

PLATES I AND II.

DURING the month of August and till September 19, 1912, I was engaged in collecting mammals and birds in northern Malheur County, Oregon, for the American Museum of Natural History. Previous to this time I had collected and taken notes in this district at two different intervals during 1911 — May and September. As practically nothing has been published on the fauna of this part of the State, the only references to it being in papers dealing with the whole general region which takes in parts of Oregon, Washington, Nevada, Idaho and California and is known as the great basin, the results of my collecting there may thus serve to extend a little our knowledge of the western fauna.

Ironside, the point from which collecting was done, is in the northern part of Malheur County, about 40 miles west of the Snake River. It is just to the east (from 4 to 6 miles) of the Burnt River Mountains and thus is on the meeting place of the higher timbered country and the open sage-brush hills and flats. The nearest timber is about four miles distant. Willow Creek, which flows through this region, draining into the Malheur River, has an altitude of about 3750 feet at Ironside P. O. The benches and hills back from the Creek average 3850 to 4000 feet. They are covered with sage-brush (*Artemisia tridentata*) and occasional clumps of rabbit-brush (*Chrysothamnus* sp. ?).

The general contour of the country is that of extensive flats alternating with rolling hills and ridges. Like nearly all the dry sage-brush lands of the

West, the soil is very fertile and ranching is extensively carried on, the greater part of the land under cultivation being along Willow Creek and its tributaries where water may be procured. Here the principal crop is hay, alfalfa, of which several cuttings a year are secured, and the native wild hay of the moist creek bottoms being the main varieties. Grain is quite commonly grown, the crops comprising wheat, oats and rye principally; and many of the ranchers have orchards of apples, pears, prunes, plums, peaches, and cherries. Quite often, however, frosts persist late enough in the spring to interfere with the fruit. The frosts begin again in the late summer or early in September and sometimes damage late crops of potatoes, corn, etc. On the whole the climate is quite equable, becoming rather warm in summer when the dry atmosphere, however, serves to mitigate high temperature and to produce the effect of milder warmth, and the nights are invariably cool. There is a moderate amount of snow in the winter. This part of the country, before the timbered hills are reached, belongs in high upper Sonoran and Transition zones as will be shown later by the species listed.

The Burnt River Mountains to the west of Ironside present a totally different set of conditions. The mean altitude may be taken as about 5000 feet, although Ironside Mountain itself reaches 7500 feet. Timber begins at about 4200 feet and is somewhat scattering until one penetrates back of the first line of lower hills. Fair sized bodies of timber are then not uncommon and as the mountains extend westward to merge into the Blue Mountains, large areas of timber are encountered. The timber for the most part is yellow pine (*Pinus ponderosa*), western larch (*Larix occidentalis*), Douglas fir (*Pseudotsuga mucronata*), and white fir (*Abies lasiocarpa*). In the lower foothills junipers (*Juniperus occidentalis*) are found, and mountain mahogany (*Cercocarpus ledifolius*) grows in rather extensive areas on the open hillsides among the conifers. Groves of aspens (*Populus tremuloides*) grow along the gulches and in the pockets on the hillside. Willows and thorn (*Crataegus* sp.?) line the lower reaches of the running creeks. Serviceberry (*Amelanchier florida*), choke cherry (*Prunus demissa*), maple (*Acer* sp.?) birches (*Betula occidentalis* and *Betula piperi*?), and alder (*Alnus tenuifolia*) grow in suitable localities. Among the sage-brush occasional clumps of a low growing wild cherry (*Prunus* sp.?) are found.

Among the plants a species of *Calichortus*, several species of *Helianthus*, *Lupinus* sp.?, *Epilobium* sp.? and *Castilleja* sp.? may be mentioned as being on the timbered hills and higher foothills.

The mountains run from transition zone along the foothills to Canadian zone throughout the greater part of the main ranges. No evidence of Hudsonian zone conditions was noted, the altitude being rather too low for this. The mountain slopes are utilized for grazing horses, cattle and sheep.

The bird-life about Ironside is prolific and a brief list of the more important breeding forms will help to show zonal relationships. The sagebrush country is the home of such species as:

<i>Colymbus nigricollis californicus</i>	<i>Otocoris alpestris merrilli</i>
<i>Centrocercus urophasianus</i>	<i>Pica pica hudsonia</i>
<i>Pediocetes phasianellus columbianus</i>	<i>Corvus corax principalis</i>
<i>Zenaidura macroura carolinensis</i>	<i>Carpodacus mexicanus frontalis</i>
<i>Buteo borealis calurus</i>	<i>Poocetes gramineus affinis</i>
<i>Buteo swainsoni</i>	<i>Chondestes grammacus strigatus</i>
<i>Falco mexicanus</i>	<i>Spizella pallida</i>
<i>Falco sparverius phalæna</i>	<i>Amphispiza nevadensis</i>
<i>Speotyto cunicularia hypogæa</i>	<i>Lanius ludovicianus gambeli</i>
<i>Phalænoptilus nuttalli</i>	<i>Oreoscoptes montanus</i>
<i>Chordeiles virginianus henryi</i>	<i>Salpinctes obsoletus</i>

Along Willow Creek, in the willows and alders and in the adjacent meadows, the following species are found in addition to the above:

<i>Anas platyrhynchos</i>	<i>Corvus brachyrhynchos hesperis</i>
<i>Nettion carolinense</i>	<i>Dolichonyx oryzivorus</i>
<i>Querquedula cyanoptera</i>	<i>Molothrus ater obscurus</i>
<i>Botaurus lentiginosus</i>	<i>Xanthocephalus xanthocephalus</i>
<i>Ardea herodias herodias</i>	(fall visitor)
<i>Nycticorax nycticorax nævius</i>	<i>Agelaius phœniceus caurinus</i>
<i>Porzana carolina</i>	<i>Sturnella neglecta</i>
<i>Fulica americana</i>	<i>Icterus bullocki</i>
<i>Steganopus tricolor</i>	<i>Euphagus cyanocephalus</i>
<i>Gallinago delicata</i>	<i>Astragalinus tristis pallidus</i>
<i>Helodromas solitarius cinnamomeus</i>	<i>Passerculus sandwichensis alaudinus</i>
<i>Actitis macularia</i>	<i>Melospiza melodia montana</i>
<i>Oxyechus vociferus</i>	<i>Melospiza lincolni</i>
<i>Oreortyx pictus plumifera</i>	<i>Zamelodia melanocephala</i>
<i>Circus hudsonius</i>	<i>Passerina amoena</i>
<i>Accipiter velox</i>	<i>Petrochelidon lunifrons</i>
<i>Accipiter cooperi</i>	<i>Hirundo erythrogastra</i>
<i>Astur atricapillus striatulus</i>	<i>Tachycineta thalassina lepida</i>
(rare winter visitant)	<i>Iridoprocne bicolor</i>
<i>Falco columbarius richardsoni</i>	<i>Stelgidopteryx serripennis</i>
<i>Asio wilsonianus</i>	<i>Vireosylva gilva swainsoni</i>
<i>Otus flammeolus idahoensis</i> (?)	<i>Dendroica æstiva</i>
<i>Bubo virginianus pallescens</i>	<i>Dendroica auduboni</i>
<i>Ceryle alcyon</i>	<i>Dendroica nigrescens</i>
<i>Sphyrapicus varius nuchalis</i>	<i>Oporornis tolmiei</i>
<i>Colaptes cafer collaris</i>	<i>Geothlypis trichas occidentalis</i>
<i>Selasphorus rufus</i>	<i>Icteria virens longicauda</i> (rare)
<i>Tyrannus tyrannus</i>	<i>Setophaga ruticilla</i>
<i>Tyrannus verticalis</i>	<i>Telmatodytes palustris plesius</i>
<i>Sayornis sayus</i>	<i>Troglodytes ædon parkmani</i>
<i>Empidonax wrighti</i>	<i>Penthestes gambeli</i>
<i>Empidonax minimus</i>	<i>Planesticus migratorius propinquus</i>

In the timber species are met with additional to those that frequent Willow Creek, as follows:

<i>Dendragapus obscurus</i>	<i>Zonotrichia leucophrys gambeli</i>
<i>Bonasa umbellus umbelloides</i>	<i>Junco hyemalis connectens</i>
<i>Cathartes aura septentrionalis</i>	<i>Passerella iliaca schistacea</i>
<i>Aquila chrysaetos</i>	<i>Pipilo maculatus megalonyx</i>
<i>Dryobates villosus</i> subsp.?	<i>Oreospiza chlorura</i>
<i>Phloeotomus pileatus abieticola</i>	<i>Piranga ludoviciana</i>
<i>Asyndesmus lewisi</i>	<i>Sitta canadensis</i>
<i>Cyanocitta stelleri annectens</i>	<i>Sitta carolinensis aculeata</i>
<i>Nucifraga columbiana</i>	<i>Sitta pygmaea</i>
<i>Carpodacus cassini</i>	<i>Regulus calendula</i>
<i>Loxia curvirostra stricklandi</i>	<i>Myadestes townsendi</i>
<i>Spinus pinus</i>	<i>Sialia mexicana occidentalis</i>

There was no opportunity for determining whether or not all of the species above listed for the different localities about Ironside are breeding species, but, as the records were taken in May, August and early September, it is safe to assume that most of them nest about Ironside, or in the mountains upon which this district borders.

1. *Odocoileus hemionus hemionus* (Rafin.).

MULE DEER; BLACK-TAILED DEER.

Deer are not uncommonly found in the wooded mountains of the Burnt River range. They spend the summer well back in the more inaccessible parts of the range; but in the fall, when the weather turns colder, they start south for the lower country where they winter. The first snows see them well on their way. It is at this time that they are hunted and a fair number have been killed each year of late. Formerly they were quite abundant. Not infrequently they get caught in the foothills by bad weather and sometimes come into the ranch meadows, either leaping the barb-wire fence, breaking through it, or as I have been told, going through between the wires in some inexplicable manner.

September 15, I spent the day hunting for deer on Ironside Mountain, but saw no sign whatever of their presence in that locality. It was, however, probably too early for the animals to have come out so far on the fall migration.

2. *Antilocapra americana americana* (Ord).

PRONG-HORN.

Formerly antelope ranged the open country of northern Malheur County in large numbers. I was told that up to as late as 1908 they had been reported near Ironside, where a band of 15 or 20 had ranged for several summers, about six miles to the south in suitable country. This band would work south in the fall to spend the winter about some springs where favorable winter forage existed. In the springtime they would return and be seen at intervals back on their summer range. However, there came a summer when none returned and to-day their old range knows them not. It is presumed that they were exterminated while in their winter quarters, since it is customary for antelope always to return to a chosen district unless persistently molested.

3. *Ovis cervina cervina* Desm.

MOUNTAIN SHEEP.

A fair-sized horn sheath of this species was seen on Ironside Mountain at an elevation of about 7000 feet, September 15. It was old and weathered and serves as one of the last reminders of a once abundant animal. The open, rocky ridges along the foothills were favorite haunts for this fine species in the earlier days, but it has been some years since the last one was seen in Malheur County.

4. *Sciurus hudsonicus richardsoni* (Bachm.).

RICHARDSON'S CHICKAREE; "PINE SQUIRREL."

Specimens of the "pine squirrel" from Ironside prove this form to be *S. h. richardsoni*. The specimens are fairly typical but the general coloration of the upper parts is darker and with less rufous than specimens from the Wallowa Mountains to the northward in Baker County.

The "pine squirrel" or "chickaree" is a fairly common denizen of the Burnt River Mountains. Here it is found among the pine and fir timber and scattered piles of cone trimmings attest its industry. The squirrels that I found seemed to be rather shy and timid, and were hard to collect, two being all that I was able to secure in the short time I was in the tree zone. They were much oftener heard than seen. Occasionally individuals

follow down the creeks and are then seen as far as four or five miles from the nearest conifers. I collected one such in May, 1911, finding it among the willows along Willow Creek. I have noticed this wandering trait of the "pine squirrel" once before when I found it under similar circumstances in the Highwood Mountains of Montana while working for the U. S. Biological Survey.

5. **Eutamias amoenus propinquus** subsp. nov.

ALLIED CHIPMUNK.

Type No. 33392, ♀ ad., Ironside, Malheur County, Oregon. Alt. 4500 feet, Sept. 10, 1912. Collector H. E. Anthony.

The type is in full mid-summer pelage, the post-breeding phase. Its closest relationships are with *E. amoenus* Allen, from which it differs in constant character of coloration. Color in general more strongly orange. Sides of neck and shoulders and sides to hips, deep ochraceous orange and color of sides infringing more or less on under parts. Under side of tail, as well as lateral edging of tail, same color as sides. Dark dorsal stripes five, intense black throughout posterior half, rather near to color of sides from mid-dorsal region to posterior part of neck where the stripes become indistinct and are lost. All the dark stripes are of nearly equal intensity; outer stripes about as inner. Facial stripes brown, almost black. Light dorsal stripes with inner two ochraceous, outer pair buffy white.

The rest of a series of 19 specimens (Aug. 7–September 10) bear out the above description but vary from the ochraceous orange pelage of mid-summer to the vinaceous gray of the fall pelage.

The fall pelage has the ochraceous orange suffusion of the dorsal region replaced by grizzled grayish, which is slightly washed with vinaceous on the rump. The pelage of the nearly full grown young has the dorsal region with dark slate gray replacing the ochraceous orange of the adults, the white facial markings broader and under side of tail yellowish with less orange.

The series compared as a whole with a series of *amoenus* from northern California and Klamath Lake, Oregon (one specimen, topotype), shows to a marked extent the richer coloring of the eastern Oregon form. The best character of separation is the under side and lateral edgings of the tail which in the Ironside series is consistently a pronounced ochraceous orange (in adults) and in *amoenus* is always several shades weaker and generally with no suggestion of orange. Sides and under parts of *amoenus* have weaker shades of ochraceous; the dirty yellow white underparts of *amoenus* differ perceptibly from the slightly buffy underparts of *propinquus* with its ochraceous encroachments from the sides. In cranial characters the two forms are indistinguishable.

Measurements of type (from flesh): Total length, 207; tail, 90; hind

foot, 32. Average of 19 specimens: Total length, 205.5; tail, 90.8; hind foot, 32.2.

The range of this form is probably the eastern slope (at least) of the Blue Mountains, of which the mountains about Ironside may be considered a part. A series of chipmunks collected to the northward in the Powder River Mountains, Baker County, although not at present accessible for comparison, will prove I think, referable to this subspecies. Between the type locality of *amoenus* and its adjacent range in Oregon and California and the mountain system of which Ironside Mountain is a part, there seems to be a sufficient barrier in the way of arid sage-brush wastes and alkaline stretches to preclude the possibility of the same form occupying both regions. Indeed subsequent investigation may warrant raising the eastern Oregon form to a full species, but under the present status a subspecific separation seems best.

This active little species is the most abundant mammal in the timber. It is first met with on the lower foothills, where it meets the range of its sage-brush relative *E. minimus pictus*. Here service-berries, choke-cherries, and the seed-pods of numerous weeds, furnish it with an abundance of forage. In the timber, their favorite haunts are about old logs or brush piles. They are rather more curious than *pictus*, but have tempered this fault with a fair degree of caution, so that very close approach is not tolerated. They were seen up the trunks of the pines on several occasions, and were often seen opening service-berries while seated in the tops of the bushes.

A rattlesnake killed September 10 had one of these chipmunks in its stomach.

6. *Eutamias minimus pictus* (Allen).

PAINTED CHIPMUNK; "SAGE-BRUSH CHIPMUNK."

Desert chipmunks from Ironside are fairly typical *pictus*; although the series ranges from individuals with the dark dorsal stripes typical (inner dark stripe blackish and outer ones dark chestnut) to specimens with all of the dark dorsal stripes black and the general coloration much darker than normal.

This little chipmunk is quite common all through the sage-brush districts. It is a shy, timid animal, quickly taking fright; and when it scampers away it seldom stops before one has lost it. When anything excites the curiosity of this little stripe-bearer, he mounts to the top of a handy sage-bush, if the disturbance is at a safe distance, and utters his sharp scolding chatter, giving due emphasis by nervous twitches of his tail. He always has his line of retreat selected and loses no time in testing it.

For this reason, more can be taken in traps set among the brush than can be collected with a gun by most diligent hunting. A good place to look for this chipmunk is in gulches or pockets where a species of low growing cherry is found, also where the sage-brush is particularly rank. Around corrals and fence corners also seem favorite spots.

7. *Citellus oregonus* (Merriam).

OREGON SPERMOPHILE; OREGON "GROUND-SQUIRREL."

The spermophiles collected in eastern Oregon are referred to *oregonus* on the basis of the original description (Proc. Biol. Soc. Washn., Vol. XII, p. 69, C. H. Merriam) as no specimens of *oregonus* were on hand for comparison. Measurements and pelage agree well with the description, but when the skulls were considered a discrepancy was discovered. In the original description, *oregonus* is differentiated from *beldingi* by the following: "palatine bones shorter anteriorly, reaching only to plane of middle of 2d molars (in *beldingi* they reach plane of interspace between 1st and 2d molars)." Also *oregonus* has ascending arms of premaxillæ narrower than *beldingi*, according to the original description. A complete reversal of these conditions was noted when the Ironside specimens of *oregonus* were compared with specimens of *beldingi* from Silver Lake, Amador County, Cal. (American Museum Nos. 11501, 11502). Otherwise the agreement with the description places the series as *oregonus*.

These ground squirrels are very abundant anywhere in the open country. They colonize to quite an extent, and wherever they are not rigidly kept in hand by shooting, trapping, etc., their colonies become quite extensive. They are a great menace to the rancher and the damage done to young grain is a serious loss in the aggregate. They come out in the spring from their long hibernation often through several inches of snow, and from that time until they are ready to hole up in the fall, they work on the crops of alfalfa, wheat, rye, oats, etc. The tender sprouts of the grain are levelled to the ground and the squirrels soon wax fat on such a diet. It often happens that a late spring brings the squirrels out of their winter quarters before vegetation has yet started; in that event, the animals die in hundreds and thousands from starvation, for the long winter sleep leaves them ill-fitted for long fasts. Early in the season, about the latter part of April and early May, the younger generation arrive; and five or six tiny, slow-moving youngsters may be seen about the entrance to each burrow on a bright day. They grow rapidly and soon are able to do all the damage that the adults are capable of. By the first of July, the squirrels have become quite fat

and by the 20th of the month, excessively so. By the 1st of August they have begun to hole up and the next ten days sees them all stowed away until the next spring. Occasionally one comes out on a bright sunny day and basks before the entrance of his burrow. The ranchers have declared eternal warfare on this species and shoot, trap, and poison them, from the time they come out until they go in again. So prolific are they, however, that if a truce is declared for one season, the middle of the next finds the fields teeming with busy squirrels.

8. *Callospermophilus chrysodeirus chrysodeirus* (Merriam).

GOLDEN-NECK SPERMOPHILE; "BIG TIMBER CHIPMUNK."

A series of nine specimens of *Callospermophilus* was taken near Ironside, which seems most referable to true *chrysodeirus*. In cranial characters the Ironside series is fairly typical; and the coloration of pelage, on the whole, is as in *chrysodeirus*, but with rather less orange or golden in the mantle. From the description of *Callospermophilus trepidus* Taylor (Univ. Cal. Publ. in Zool., Vol. 5, p. 283), no characters could be drawn to warrant placing the eastern Oregon specimens under *C. trepidus*, although the range of the latter is in a district very similar to that about Ironside.

This handsome squirrel was fairly common back among the timbered hills, where it frequented log-strewn spots and rocky out-croppings. I found it in such localities on August 7, September 2 and September 10, the latter date being exceedingly late for one of the *Callospermophilus* group to be above ground in this latitude. From previous experience with this group, I have found them early hibernators, going into winter quarters about August 1. On September 10, I secured five specimens and saw several more, which would seem to indicate delay in hibernating, unless this is the regular habit for the species in this locality. These animals were very shy and were secured only by careful stalking. When alarmed they ran to their burrows and did not stop until they were at the bottom of them.

9. *Marmota flaviventer*, subsp. (Aud. & Bach.).

YELLOW-BELLIED WOODCHUCK; "GROUND-HOG."

Marmots are found in the rocks which crop out along some of the ridge crests about Ironside. These animals were in hibernation at the time when I collected there and so none were secured.

10. *Castor canadensis canadensis* Kuhl.

CANADA BEAVER.

The beaver have held their own along Willow Creek and to-day their dams and evidences of their work can be seen at every bend. The ranchers, in general, believe in their protection; and, freed from molestation, the few that were left on the creek, when active trapping for their fur ceased some years ago, have increased to quite a respectable number. The whole valley of the creek shows the results of beaver work. The soil, in places, indicates conditions that only generations of beaver dams produce by inundation; and most of the creek bottoms are moist from sub-irrigation induced by beaver work. The ranchers consider these animals an important asset to their holdings; so much so, in fact, that when stock is occasionally lost through becoming bogged down and drowning in some dam, they do not molest the beavers, but charge up the loss to accident. For the beaver is responsible for the heavy hay crops in the creek valley through his system of sub-irrigation. His dams raise the level of the waters and his burrows, dug deep into the banks, provide a ready outlet into the fields for the back-water. In most cases, the water does not appear in the meadows as surface moisture, but may be found at varying depths of several inches. The value of this has been demonstrated by the former uncertainty of hay crops when the beaver were scarce; and by the increase in yield as the beaver multiplied and their work became a greater factor.

An interesting modification in food habits, due to the cultivation of the creek meadows, was noted. The beaver were found to have numbers of well defined paths into the alfalfa; and every morning, mud and water along these attested to their constant use. The alfalfa would be cleared away for some distance from the creek bank by the time the meadow was ready for cutting. After the field was mowed, the beaver brought in bundles of the cut hay and used it even when it was fairly dry. A few cut willows were generally to be seen floating in the dead water at each dam.

Very rarely were beaver houses noted; these animals seemed to prefer living in holes in the bank, with the entrances under water.

11. *Mus musculus musculus* Linn.

HOUSE MOUSE.

This little cosmopolitan is not uncommon at Ironside, for I have taken it at haystacks in the meadows and also out in the sage-brush where I was trapping for *Perognathus*. Both localities were some distance from dwellings.

12. ***Onychomys leucogaster fuscogriseus*** subsp. nov.

GRAY SCORPION MOUSE.

Type No. 33544, ♀ ad., Ironside, Malheur Co., Oregon, altitude 4000 feet, August 20, 1912; coll. H. E. Anthony.

Most like *O. l. brevicaudus* but differing markedly from it in color, the buffy of *brevicaudus* being replaced by dark gray washed with dark brown. The type has the color of upper parts dark gray with intermixture of dark brown and slate colored hairs, the brown strongest on top of head and along the indistinct dorsal area. Orbital ring, spot just above nostrils, and a small patch in front of eye and at base of whiskers, with short black hairs. Subauricular tufts white, conspicuous, and in marked contrast with the upper anterior half of ear which is brownish black. Fur of underparts clear white, with slaty under fur. Tail bicolor, with contrast between the grizzled gray of upper part and the clear white of the under surface fairly sharp. Distal third of tail white, unicolor. Faint medial stripe of darker gray on upper surface of tail. Color of four other adults as in the type, with a little variation in intensity of the dusky wash.

Immature pelage uniform slate gray on upper parts with less contrast between the weak black of the upper ear and the grayish white of the subauricular tufts. Little black about face. Bicolor quality of tail scarcely developed.

A specimen in transition from immature to adult stage (No. 33538) has head and neck of the slate gray of the immature pelage, meeting the adult phase on the back in an irregular line. Posterior two thirds of upper surface brownish gray with slight vinaceous cast in some lights.

Cranial characters as in *O. l. brevicauda*. Skull of same size as *brevicauda* with nasals averaging rather more convex laterally at anterior end.

Measurements of type (in flesh): Length, 140; tail, 34; hind foot, 20. Average of ten specimens from type locality: Length, 129.9; tail, 34.6; hind foot 19.8.

This mouse is represented by a series of ten skins with skulls, all from Ironside, and of this series five are mature animals. None have the molars worn to any great extent, the type, which is evidently the oldest, having the sharp points and angles fairly well rounded by wear.

The transition from the immature to the adult stage is well marked, both in pelage and skull, leaving little doubt of the maturity of five of the series, a doubt which might have arisen from the fact that the teeth show little wear.

The relationship of this form to *O. l. brevicaudus* is readily apparent, but the striking difference in color of the pelage warrants the establishment of a new subspecies.

The scorpion mouse was taken sparingly in suitable localities at Ironside. A sage-covered slope was found to be such a spot, and here traps set at the old badger holes, at the burrows made by small rodents, and beneath clumps of sage would take an occasional *Onychomys*. Evidence of their

presence would be sometimes shown in the condition of *Perognathus* and *Peromyscus* caught in the traps during the night. This mouse with his carnivorous propensities would dine off the victim and only a mangled fragment would be left in the trap. As the other mice, notably *Microtus* and *Peromyscus*, at times become addicted to this habit it was not possible to tell how much of this work could be attributed to *Onychomys*.

13. ***Peromyscus maniculatus sonoriensis* (LeConte).**

SONORA WHITE-FOOTED MOUSE.

The *Peromyscus* collected about Ironside have a rather puzzling status. The series, 75 specimens, is large enough to include a number of pelages and ages. No typical characteristics of any one subspecies could be consistently followed out, but the strongest affiliations seem to be with *sonoriensis*, with a marked tendency, however, towards *m. artemisiae*. Only two specimens were taken in the adjacent mountain district, so there is insufficient material to determine the form there; but it is quite likely that the mountain subspecies is *artemisiae*, or possibly *m. gambeli*, and that the Ironside series is from the meeting ground of the mountain mouse with the desert *sonoriensis*. This would produce a variety of intergrades. *Sonorien-sis* taken by me in southern Malheur County presented much more typical characteristics. Also *artemisiae* has been taken to the north of Ironside in Baker County, where its relationships showed a tendency toward *gambeli*. Thus the possibilities are presented for a mixture of characters, a fact which the series substantiates.

The white-footed mouse is the commonest of the rodents of this region. Everywhere, from the dry sage-brush lands where desert conditions prevail in the summer, to the luxurious vegetation of the creek bottom where willows and lush grass concealed them, this mouse was the commonest of the trapped mammals. Individuals in all stages of pelage and age were taken. Pink, short-haired baby mice were found August 20. This mouse with its omnivorous appetite was taken readily on either grain or meat baits.

14. ***Neotoma cinerea occidentalis* (Baird).**

WESTERN BUSHY-TAILED WOOD RAT.

The wood rats taken at Ironside are *occidentalis* with but little tendency toward intergradation with true *cinerea*.

Wood rats are quite common about Ironside. Every rocky ledge has its

colony and often the animals take up their abode about the ranch buildings. In the fall especially, the rats from localities which are near to ranches move in for the winter and become pensioners. On account of their mischievous habits, they are great pests and are trapped and shot whenever occasion offers. During the month of July, at my father's ranch, he had trapped fully twenty-five wood rats out of one barn. On my arrival, I continued the trapping for specimens and took fifteen more. The barn was of ordinary size and the rats were taken in unbaited traps set along the beams, a large number of those taken being young of the year. The habits of this subspecies are extremely interesting and varied, but differ little from those of the Rocky Mountain *cinerea*.

15. ***Microtus nanus canescens* Bailey.**

GRAY MEADOW MOUSE.

Two species of *Microtus* were taken along Willow Creek. Representatives of the series were sent to Mr. Vernon Bailey of the U. S. Biological Survey, who kindly identified them for me. The shorter-tailed specimens he placed as fairly typical *M. n. canescens*. This form was rather in the minority and only about one quarter of the total number of *Microtus* taken were *canescens*.

16. ***Microtus mordax mordax* (Merriam).**

CANTANKEROUS MEADOW MOUSE.

The long-tailed *Microtus* of the series Mr. Bailey has referred to *M. mordax* of which it is fairly typical. This form, which ordinarily prefers Canadian and higher Transition zones, has evidently used the convenient highway of Willow Creek to invade the lower zone sage-brush country. Both *mordax* and *nanus canescens* were taken in the same trap on different nights and probably use the same runways to a certain extent. However, I think that *nanus canescens*, in general, affects the meadowlands and fields bordering the creek, while *mordax* is restricted to the willow thickets and rank growths of grass, nettles, etc., which immediately line the cold creek waters. The greater part of a good-sized series of *Microtus* from along Willow Creek are *mordax*.

Meadow mice were quite abundant in the hay meadows and the moist creek bottoms. Here their runways were plainly discernable and traps set

in them yielded a fair number of specimens. As is usually the case with this genus, all sizes and ages of these mice were taken. During the haying, great numbers of meadow mice are driven out into the stubble by the mower and rake, and a good idea of their abundance may be then obtained. At this time, when the short stubble affords poor chances for concealment, the meadow mice are preyed upon by a formidable array of enemies. Hawks, owls, weasels, coyotes and skunks are the most energetic of these. Swainson's, the western red-tail, the sharp-shinned, Cooper's, and the marsh hawk, work the meadows by day; while at dusk, the long-eared and great horned owls turn their fierce eyes in quest of *Microtus*. In one instance, the long-eared owl was seen by day, watching from a fence post for one last mouse before he retreated for the day. At this season, from the 1st of August until the end of harvesting (about the 1st of October) the coyotes are frequently seen hunting the short stubble for these mice. Weasels and skunks were noted on several occasions in localities that showed their fondness for meadow mice. Large flocks of crows work over the meadows at this time of year, primarily after grasshoppers, but probably pick up a number of mice in the short stubble. Ravens also were seen in a number of instances, watching from fence posts, and an opportunity to catch meadow mice would surely not be passed by. Despite this continual war of extermination, meadow mice are one of the surest crops of the district.

17. *Microtus* (*Lagurus*) *curtatus artemisiæ* subsp. nov.

SAGE-BRUSH MEADOW MOUSE.

Type No. 33547, ♀ ad., Ironside, Malheur Co., Oregon, altitude 4000 ft., August 9, 1912; coll. H. E. Anthony.

Very similar to *M. curtatus*, but averaging smaller; color about as in *curtatus*. The type is in the light gray pelage. Upperparts pale gray with light irregular wash of bistre brown on crown and rump. Base of tail and lower rump buffy. Transition from upper to lower parts gradual. Ears blackish with a few buffy hairs at base. Underparts silvery white. Tail faintly bicolor, color of back above, buffy white beneath.

Two other specimens (33548 and 33549) about as in the type but color of the upperparts with stronger buffy brown wash and with buffy ear edgings. No. 33549 has white of the underparts suffused with buff.

Skull nearly the same size as *curtatus*, larger than in *M. pauperrimus*. Bullæ inflated, fully as large as in *curtatus*, much larger than in *pauperrimus*. Superior outline of skull nearly flat, with little evidence of the concavity, postorbitally, of *pauperrimus*. Molars large, with pattern as in all the species of the subgenus. Compared with skulls of *curtatus* (U. S. Biol. Surv. Nos. 41018 ♂ and 40441 ♀, Mt. Magruder, Nevada) the Ironside skulls are slightly shorter but of approximately

the same mastoid breadth. Width of the upper molar series fully as great as in *curtatus* and even approaching the width in *M. pallidus* (Biol. Sur. 110803, Glenullin, N. Dak.). Width of the lower molar series greater than in *curtatus*.

Audital bullæ relatively larger, actually as large as in *curtatus*. Interpterygoid fossa averaging wider posteriorly in *curtatus*. Parietals averaging more convex laterally in the Ironside specimens giving the brain-case a rounded, inflated appearance. Hamular process of mandible as in *curtatus*.

The same characters which separate *curtatus* from *pallidus* will separate *M. c. artemisiæ* from *pallidus*.

Compared with skulls of *pauperrimus* (Nat. Mus. 78535, 78543, 148169, from Antelope, Ore. and Lily, Colo.) the most striking difference is in the size of the audital bullæ which are much larger in the Ironside skulls. The mastoid breadth is greater in the Ironside series.

The relations of the Ironside series with the other forms of the subgenus are clearly shown in cranial characteristics. Although the series comprises only three skins with skulls, the characters set forth above are constant. As the external appearance of all the species of *Lagurus* is very similar the Ironside skins might be matched by skins of any of the other forms. A glance at the skulls, however, immediately places their relationship with *curtatus*. From *curtatus*, however, sufficient differences have been noted to justify making a subspecies of the new form. No opportunity for comparing with *M. (Lagurus) intermedius* Taylor (Univ. of Calif. Pub. Zool. Vol. VII, p. 263) was had; but, as this form is described as having smaller bullæ and narrower rostrum, among other distinctions, than *curtatus*, it cannot conflict.

The range of *M. curtatus* is the Transition zone of the lower mountains of western Nevada and adjacent parts of California, the altitude given on the skins loaned by the Biological Survey being 8200 feet. The Ironside specimens were all taken at a little under 4000 feet, on dry, sage-covered flats where upper Sonoran conditions prevail. As country of similar character to that about Ironside extends to the southward until the western Nevada habitat of *curtatus* is reached, it seems safe to assume that somewhere between the two regions intergradation takes place.

This pale gray mouse was found but sparingly. Traps set at fresh appearing burrows among the sage-brush yielded but three specimens; several more were taken but were destroyed while in the trap by other mice. This mouse was taken on several occasions during the day. No signs of runways were noted, as practically no grass grew about the bases of the sage-brush. I am inclined to think that this mouse lives in small, isolated colonies and is rather rare, as a special effort to extend the series taken resulted in failure. On August 9, a rattlesnake was killed which had one of these short-tailed mice in its stomach.

Comparative Measurements of *Microtus curtatus*, *M. c. artemisiae*, and *M. pauperimus*.

		Total length	Tail	Hind foot	Basal length of skull	Length of nasals	Zygomatic breadth	Mastoid breadth	Alveolar length of upper molars	Greatest length of bullae	Greatest breadth of bullae	Product of length of bullae by breadth of bullae
<i>Microtus c. artemisia</i>	33547	129	24	17	22.5	6.5	14.2	12.8	6.1	8	6.8	52.8
	33548	127	26	17	22.9	6.75	14	12	6	8.1	6.2	50.22
	33549	120	19	17	21.75	6.2	14	12	5.7	7.5	6.2	46.5
Averages of <i>M. c. artemisia</i>		125.3	23	17	22.38	6.48	14.06	12.26	5.9	7.86	6.4	49.92
¹ Averages of <i>M. curtatus</i>		141	27	17.6	23.2 ¹	6.53	14.5	12.6	6	8.1	6.38	51.51
Averages of <i>M. pauperimus</i>		115	20	16	20.7 ¹	5.8	13.22	11.22	5.62	7.4	5.83	43.14

18. *Fiber zibethicus osoyoosensis* Lord.

ROCKY MOUNTAIN MUSKRAT.

Musk rats are quite common along Willow Creek, where they use to a greater or less extent the ponds built up by *Castor*. Their runways were found in several localities running back from the ponds into the long meadow grass and into the alfalfa fields. This species was noted several times swimming about during the day, but attempts to secure specimens failed because the wounded animal succeeded in diving and losing itself in the tangle of submerged brush which characterizes Willow Creek. These animals are hunted in the winter for their fur and many are secured. The great horned owls probably catch a number of rats, as owls were seen watching the beaver ponds from some point of vantage in the willows.

19. *Thomomys fuscus fisheri* Merriam.

FISHER'S POCKET GOPHER.

A series of gophers taken along Willow Creek is nearest *fisheri*, but furnishes many points of intergradation with true *fuscus*. In coloration

¹ Averages of skin measurements taken from North Am. Fauna No. 17, Revision of American Voles of the Genus *Microtus*, by Vernon Bailey.

² Averages of cranial measurements from two skulls from type locality (Biol. Surv. Nos. 40441, 41018) and from measurements of one skull in above revision.

³ Averages of cranial measurements from four adult skulls from Oregon localities.

some of the series match *fisheri* (U. S. Biol. Surv. Nos. 24297, Umatilla, Oregon; 101244, Sierra Valley, Cal.; and 80719, Cottonwood Range, Nevada) quite closely; while others more nearly resemble typical *fuscus* (U. S. Biol. Surv. Nos. 90595, Wallowa Mts., Oregon; 23674 and 23537, Salmon River Mts., Idaho). The skulls are most like *fisheri*, having the square, flaring zygomatic arch.

The pocket gopher is quite a common mammal of the creek bottom where suitable conditions of soil and vegetation prevail. The dryer, sage-covered benches and flats do not furnish much forage and here their mounds are rarely seen, but in the meadows by the creek their mounds are very numerous. On account of their small size, these animals are very difficult to trap, and the traps are more often sprung and plugged with earth than successful. Most of their work is done evenings and early mornings; only rarely were open burrows seen in midday.

20. *Perognathus parvus parvus* (Peale).

OREGON POCKET MOUSE.

My series of thirty-three specimens of *Perognathus* agrees in all essential particulars with the description of *parvus* (Osgood: N. A. Fauna No. 18), and with skins of *parvus* loaned by the U. S. Biol. Surv. (Nos. 57107 and 91816, the Dalles, Oregon, type locality). All of the specimens are in the gray phase and are rather dark gray. Some of the skins have a tendency toward the buffy phase as represented by the Survey skins. The cranial characters are quite typical in the eastern Oregon specimens.

Pocket mice are fairly common throughout the flats where sage-brush grows. They do not seem to make the burrows or trails which characterize the genus farther south; but evidently use to a certain extent holes already dug. A few fresh looking burrows were found in among the brush, placed so that the base of the brush effectually concealed them. Rolled oats proved an attractive bait and invariably the trapped animal had its cheek pouches filled with the oats.

21. *Zapus princeps princeps* Allen.

ROCKY MOUNTAIN JUMPING MOUSE.

Nine specimens of *Zapus* were taken at Ironside. The Ironside mouse is decidedly not typical *princeps* and shows a strong tendency toward *princeps oregonus*, but its closer affinities seem to be with *princeps*. In

coloration, the eastern Oregon *Zapus* has the ochraceous lateral coloration of *oregonus* replaced by yellowish. The tail is distinctly bicolor. The skulls of the Ironside series are very near *princeps*. The first upper pre-molar is small, never functional in any of the skulls and in one (No. 33622) is completely missing, no trace of an alveolus being apparent. The audital bullæ are as in *princeps* and the upper and lower tooththrows divaricate posteriorly, perceptibly more than in *p. oregonus*.

Jumping mice were found to be rather more common than species of this genus are wont to be. A series of nine specimens was taken in the tall grass and willows along the creek. Although the animals were in good condition, they lacked the heavy layer of fat beneath the skin which is assumed for hibernation, as a rule, about this time of year (August to September). It is not improbable that in this locality hibernation is delayed, for the good weather continues until late.

22. **Erethizon epixanthum epixanthum** Brandt.

WESTERN PORCUPINE.

No specimens of this animal were taken, but remains of one were found in a rocky ledge. In winter they are not uncommon in the willows along Willow Creek.

23. **Lepus campestris townsendi** Bachman.

TOWNSEND'S HARE; "WHITE-TAILED JACK RABBIT."

Specimens taken at Ironside prove practically typical in pelage and cranial characteristics.

White-tailed jacks, as this species is known to the plainsman, are quite abundant in northern Malheur County. During the summer months, these rabbits stay along the higher foothills and thus are seldom seen. The few that remain in the lower country where the black-tail, *L. californicus wallawalla*, range, generally choose a different character of feeding ground. The white-tails prefer the open flats and the rye-grass fields or stubble, after haying, and lie very close when one approaches. The black-tail prefers sage-brush and seldom allows a close approach. Besides the difference in build of the two species and the dissimilarity in tail pattern, the gaits of the two forms, when aroused from cover, serve to distinguish them as far as they can be seen. *Townsendi* runs with a halting, one-sided lope, looking back over the shoulder; while *wallawalla* runs smoothly and evenly

and generally stops to look back. *Townsendi* when thoroughly frightened, attains a burst of speed far in excess of the powers of *wallawalla*. In winter, when these rabbits are white, they come down from the hills to feed about the hay stacks. On moonlight nights the ranchers hunt them here and can often kill ten or a dozen in an evening. At this season their flesh is often used for food.

24. *Lepus californicus wallawalla* Merriam.

WALLAWALLA JACK RABBIT; "BLACK-TAILED JACK RABBIT."

Black-tailed jack rabbits from Ironside are referable to the above form. The pelage may be considered typical, as may also the cranial characters, though some tendency toward intergradation with *c. deserticola* is shown in the shape of the audital bullæ and jugals.

Black-tails are the most abundant of the Leporidæ at Ironside, their numbers being far in excess of the other three species combined. They range everywhere over the sage-brush hills and their destruction of crops makes them one of the worst enemies of the ranchman. One of their most pernicious habits is browsing on the young fruit trees when first set out. So-called rabbit proof fence affords little protection from this species, for it can seemingly go anywhere its head can enter, a small space between the wires yielding ready entrance.

This rabbit, as well as the other three species of the Leporidæ found in this region, suffers greatly from parasites. Without exception, every rabbit shot had from one to half a dozen worms just under the skin, ranging in size from the diameter of a grain of rice to a full half inch. Ticks in considerable numbers were also found.

The greater part of the rabbits seen during the late summer months were young of the year, about three-quarters grown. They were rather tame and curious, but the adults were quite shy and suspicious.

25. *Sylvilagus nuttalli nuttalli* (Bachman).

NUTTALL'S COTTON-TAIL.

For all practical purposes the series of *Sylvilagus* taken at Ironside might be considered topotypes. The supposed type locality, the mouth of the Malheur River, is approximately fifty miles to the northeast, with the character of the intervening country the same as that of Ironside. The specimens taken bear out the description given in Nelson's Revision (N. A.

Fauna No. 29). Nelson in his revision gives the vertical range of *nuttalli* as up to 3000 feet (*l. c.*, p. 201). But it reaches 4000 feet at Ironside and has been noted, not uncommonly, among the foothills almost to 5000 feet; thus placing a large part of its range in northern Malheur County at 4000 feet and above.

Cotton-tails are fairly common about Ironside. They frequent brushy draws and spots affording rather more cover than the open sage-flats. The adults are rather shy and, when once started, generally run until they have reason to believe themselves safe. The younger animals at times are ridiculously tame and merely keep out from underfoot. This species rarely enters a burrow, when started from cover, unless hard pressed.

26. *Brachylagus idahoensis* (Merriam).

IDAHO PIGMY RABBIT; "BRUSH RABBIT."

The series of *Brachylagus* collected at Ironside may be considered fairly typical *idahoensis*. The series, ten in number, includes both immature and adult pelages, as well as the mid-summer and fall phases. Between these extremes are specimens showing gradation from one to the other, a range so wide that the extremes suggest different races.

Since my return from Eastern Oregon, five specimens of *Brachylagus idahoensis*, collected at Ironside, by A. W. Anthony, from November 18 to December 17, 1912, have been received at the Museum. These skins are undoubtedly in the winter pelage but differ so markedly from what was supposed before to be the winter pelage (specimens taken September 8), that a comparison of the different pelages as represented in the Ironside series seems called for.

The summer pelage, as in the Ironside series, is fairly constant when one takes into consideration the different stages of wear. The upper parts, in the adult, are a grizzled brownish gray with more or less blackish hairs according to the state of wear. In worn summer pelage the black is lost and the dorsal region has a stronger brownish tinge. This is due to the fact that the hairs of the upper parts have several distinct colors throughout their length. The blackish hairs of the early summer are black only on the tips. Just beneath the black is a short band of gray, while following the gray is a band of rufous or vinaceous. The basal half or two-thirds of the hair is slate gray. A slight intermixture of hairs light gray for their entire length is found in the summer skins. Two specimens collected August 10, are taken as summer examples. The different stages of wear in this pelage, as the different colored tips to the hairs disappear, produce a phase that

begins with considerable black in the upper parts and ends with these parts nearer a monotone of gray with a wash of rufous along the dorsal line.

By early September (judging from two specimens taken Sept. 8) *idahoensis* has assumed a full, heavy pelage of much longer, silkier hair than that which makes up the summer coat. The upper parts, posterior to the rufous neck patch, have a pronounced vinaceous tinge that makes the animal look entirely different. In this pelage the long hairs have tips of vinaceous gray, the gray becoming purer and lighter toward the base, with a suggestion of a subterminal band of blackish, followed by a band several millimeters wide of brownish buff and with the basal two-thirds bluish slate. A few of the hairs have blackish tips, especially in the mid-dorsal region. The two specimens of Sept. 8 have this pelage except for the head and ears back to the shoulders. A specimen taken November 18 has this same pelage complete, and differs from the September skins in having a slightly less orange nape. A specimen taken November 26 differs in having more black-tipped hairs and practically no vinaceous tinging of the gray hairs, giving upper parts with clear gray and black intermixture.

By the middle of December fading has brought about another change in color. A specimen with the label bearing the date of December 13, has nearly all the blackish hair tips gone from the upper parts and the vinaceous cast so weakened that it appears as a buff. A specimen taken December 17 is much the same, but has perhaps a lighter appearance. A specimen of December 14 presents the maximum fading and consequently the most striking appearance. This skin is almost a clear silver gray and in life must have served the animal as a protective color on the snow. The long hairs have everywhere faded to clear gray and only the slightest suggestion of buff remains. The head is gray and as the ears fully cover the orange yellow nape the whole upper surface of the body is silver gray. The feet have retained their orange coloration and there is an indefinite band of brownish black along the anterior border of the ear. Except for difference in the length of the hair the only changes in the pelage of the under parts from summer to winter is that the winter specimens have the white clearer and with less buffy or orange washings.

Taken all together the winter pelage when it has reached its lightest phase is a most peculiar one, and would seem to most resemble the transition pelage of the varying hares when the white coat of winter prevails over the summer coat.

The Idaho pygmy rabbit, rarest of the Leporidae in the United States, is a not uncommon species about Ironside. I first noted it in September, 1911, when I secured five specimens: later, August to September, 1912, I took ten more. A special effort was made to ascertain something of the habits of this little known rabbit and the following facts were noted.

This rabbit seemed to be quite generally distributed throughout the district, where it is recognized by ranchers as being distinct from the cotton-tail. It has a decided preference for little draws and flats where the sage-brush grows thickly, and where rabbit-brush (*Chrysothamnus*) occurs in extensive patches. In fact, the best way to hunt this animal was to look for the bright yellow of *Chrysothamnus* and then work that vicinity. Very rarely could one be found at any distance from rabbit-brush. This may have been only a coincidence, for spots where the rabbit-brush grows are generally more luxuriant in vegetation than adjacent localities, but it remains a fact that a dozen rabbits were seen in places as described above to every one that could be found out on the sparsely brushed flats and hills. It was mere accident if one *idahoensis* was found where the low sage grew and conditions suited the other species of the Leporidae, but one might be reasonably sure of seeing several in any extensive growth of rabbit-brush and tall sage. Here they appeared to colonize and as many as eight or ten were seen in a forenoon, on several occasions. On account of the thick growth and the animal's habit of circling about under cover an accurate count of the inhabitants of such a locality was difficult to obtain.

The pygmy did not seem to be as wild as the *Sylvilagus nuttalli* often found in the same spot. *Idahoensis* would start from under a bush and in a series of leisurely hops or short runs, if not too greatly alarmed, melt away into the thick cover. Careful following on the trail would discover a ball of brownish fur at the foot of some clump, with eyes watching the back trail and nervous ears on the alert. Cautious movements would permit approach to within ten or twelve feet. In fact, one great drawback in securing specimens was this close proximity of the animals. In the thick growth they affect, the hunter does not see one until it has started from under his very feet, where it is manifestly impossible to shoot it; and, before it has reached a distance where it would not be uselessly mangled, the animal has interposed brush between itself and the danger. Pursuit only brings a repetition of this or finds the rabbit motionless at ridiculously close range.

The social instinct might, at first glance, appear to be rather more developed in *Brachylagus* than in the other Leporidae of the region because of this habit of preference for restricted areas, and observations seem to bear this out. Not infrequently two of the animals were put out from the same clump of brush, and it was generally noted that the residents of each particular area would be found more or less congregated at one part of their chosen district. This was not due to conditions of food supply, evidently, for the next visit might discover them at the opposite end. When one rabbit was seen, more often than not, others would scurry out too, before any great distance was traversed.

Doctor Merriam in his remarks on the species when he described it, mentioned the fact that *idahoensis* runs differently from the other rabbits. This point was well borne out by my observations. The pygmy runs more in a scurrying manner like a ground squirrel, keeping close to the ground and rarely leaping as *Sylvilagus* is wont to do. When moving at their leisure these animals would progress in short hops but when speed was their desire they scuttled low to earth. The statement however, made in the same paper, that *idahoensis* is almost exclusively nocturnal, was not substantiated, as far as I could note, nor did I get the impression that this rabbit was in the habit of using badger holes for their homes to an extent that would make them difficult to find in the day time. I could be as reasonably certain of seeing *Brachylagus* in the day time as I could be of finding *Sylvilagus*, and the same feeding habits and hours seem to apply to the one as to the other. As an instance of their being abroad in the day time, feeding, several were shot in fairly open spots where the nature of the surroundings made their dwelling in old badger holes a necessity; and each time the animal was seen at the entrance to the burrow, but far enough outside to show that he had just run up to the burrow from his feeding quarters, on the approach of danger. Where their favorite conditions prevail, none were seen at burrows, and I think that here the thick brush affords ample protection and the surface form answers all the requirements for a home, at least during the summer. In such a spot, rabbits when seen were always started from under the brush and rarely did I drive one to a burrow, as the animal would double and turn and seek to hide in the brush, a proceeding he would not be apt to resort to if he had a burrow near by in which he was accustomed to seek refuge. But, when he lacked the cover to hide in, as did a few which were seen in more open localities, his one idea was to escape down the first old badger hole he could find, precisely what one would expect *Sylvilagus* to do under the same circumstances. Once or twice, the rabbits of a *Chrysothamnus* patch, three or four in number, were found at the very outskirts of the cover and made for the deeper brush when I alarmed them. This was in the late forenoon and it would appear that the animals were feeding and had not yet retired to the denser cover for the mid-day.

Young cotton-tails and black-tail rabbits were often seen in the same thick cover with *Brachylagus*, but so distinctive was the pygmy that, if one good glimpse was obtained, no doubt as to identity could exist. *B. idahoensis* appears in life to be quite bluish-gray or rufous brown, accordingly as the animal has changed its pelage, and its apparent lack of a tail sets it apart from the young *S. nuttalli* with his twinkling tuft of cotton.

Young of *idahoensis* were seen fairly often, and nearly full-grown speci-

mens were secured. Most of those noted ranged from two thirds grown to the mature of the year. One was seen however about the size of a man's fist August 21 but was lost in thick brush before it could be secured.

At no time was *B. idahoensis* heard to utter a sound.

27. ***Felis ruffa* *Güldenstädt*, subsp.?**

BOB-CAT.

Wild cats are not uncommon in the rocky breaks about Ironside. One quite frequently hears of their being killed there.

28. ***Canis lestes* *Merriam*.**

COYOTE.

Coyotes are very abundant in Malheur County. In favored localities they could be seen almost daily but were extremely wild and suspicious. Their chosen hunting grounds were the wide meadows and hayfields, where one could see them catching mice and grasshoppers. The one specimen secured was shot at daybreak, near a haystack, where in company with another of his kind he had been digging in the moist earth; presumably for *Microtus*. Coyotes catch a great many of the chickens, ducks, geese, turkeys, and sheep of the ranchers and are shot whenever opportunity offers.

29. ***Vulpes macrourus* *Baird*.**

LONG-TAILED FOX.

Foxes occur in this region, but none were noted.

30. ***Ursus altifrontalis* *Elliot*.**

AMERICAN BLACK BEAR.

A bear was seen at the base of Ironside Mountain during my stay at Ironside.

31. ***Taxidea americana neglecta* *Mearns*.**

CALIFORNIA BADGER.

Badgers are very common in Malheur County and their burrows are to be seen everywhere. One was seen at the mouth of a freshly dug burrow,

basking in the warm sunshine, but retreated into its depth upon my approach.

32. ***Mephitis occidentalis major*** (*Howell*).

GREAT BASIN SKUNK.

A skunk was seen on two different occasions in a meadow along Willow Creek. It was late afternoon, and the second time I saw the animal he was digging for beetles by a pile of fence rails. As I had no gun with me, he was not secured for a specimen.

33. ***Spilogale phenax latifrons*** *Merriam*.

BROAD-HEADED SPOTTED SKUNK; "POLE-CAT."

A small striped skunk was killed at a neighbor's, while I was at Ironside, but was destroyed before I learned of it in time to secure it as a specimen.

34. ***Lutreola vision energumenus*** (*Bangs*).

NORTHWESTERN MINK.

Mink are not infrequently seen along Willow Creek. I saw one in a beaver pond, August 20, seemingly in pursuit of a muskrat. My notes on his method follow:

"The dam made a large, still pool grown up about most of the margin by willows. Large clumps of dead willows were in the pond and low rank grass on the side I approached. Heard something drop off into the water when I came up, and marked the animal's progress through the shallow, grass encumbered water by the movement of the grass tops. Presently from my right (the first animal had made off to the left), about two minutes later, a slight noise disclosed the approach of something. It came following the low, grass overhung bank to within six or eight feet of me, the vegetation hiding it. Then the animal came ashore and darted yet closer through the grass, the movement of the tops showed quick, hurried motion below. Back then, the way it had come, and the hasty glimpse I secured showed a fine large mink. All of his movements seemed so quick and businesslike I think he must have been trailing some animal, probably a muskrat, for their burrows and runways were quite plentiful in this vicinity."

Beyond a doubt, the first animal I heard, was the muskrat, which would surely have been caught had I not taken his place; for the mink came

straight to where I stood, in his blood-thirsty quest. Although I waited some minutes for a shot, expecting him to appear farther down the bank, I never saw him again.

35. ***Mustela arizonensis*** (Mearns).

ARIZONA WEASEL; MOUNTAIN WEASEL.

Two fine weasels were secured during my stay at Ironside. One was shot while watching a haying crew from between the rails of a fence, and the other was secured out among the sage-brush. Still another was shot at the mouth of a ground squirrel's burrow, but fell back into the hole and escaped.

36. ***Sorex vagrans vagrans*** Baird.

WANDERING SHREW.

The shrews collected about Ironside are *vagrans* approaching *v. dobsoni*. A strong resemblance to *vagrans* is found in cranial characters, in the size of the teeth, width of the palate, and in pigmentation; while a tendency towards *v. dobsoni* is indicated by the size of the third upper unicuspid. In external measurements, the series is nearest *dobsoni*.

Shrews were taken in traps set in *Microtus* runways in the high grass and rank vegetation along Willow Creek. They seemed to be not uncommon and were taken on baits of rolled oats as well as by meat bait. But few were taken in the day time, the greater number being caught at night. Needless to say, shrews were not taken away from the moist creek bottom. Where *Sorex* was taken, the creek runs through the sage-brush country, upper Sonoran stretches where one could hardly expect this higher zone shrew. However, Willow Creek brings down into this district a good many of the mountain species, as its banks are lined with thick willow groves and smaller trees (alders, beeches, etc.), thus forming practically a continuous strip of high Transition zone but a few yards wide, from the timbered mountain slopes well out into upper Sonoran regions.

37. ***Myotis lucifugus longicrus*** (True).

TRUE'S BAT.

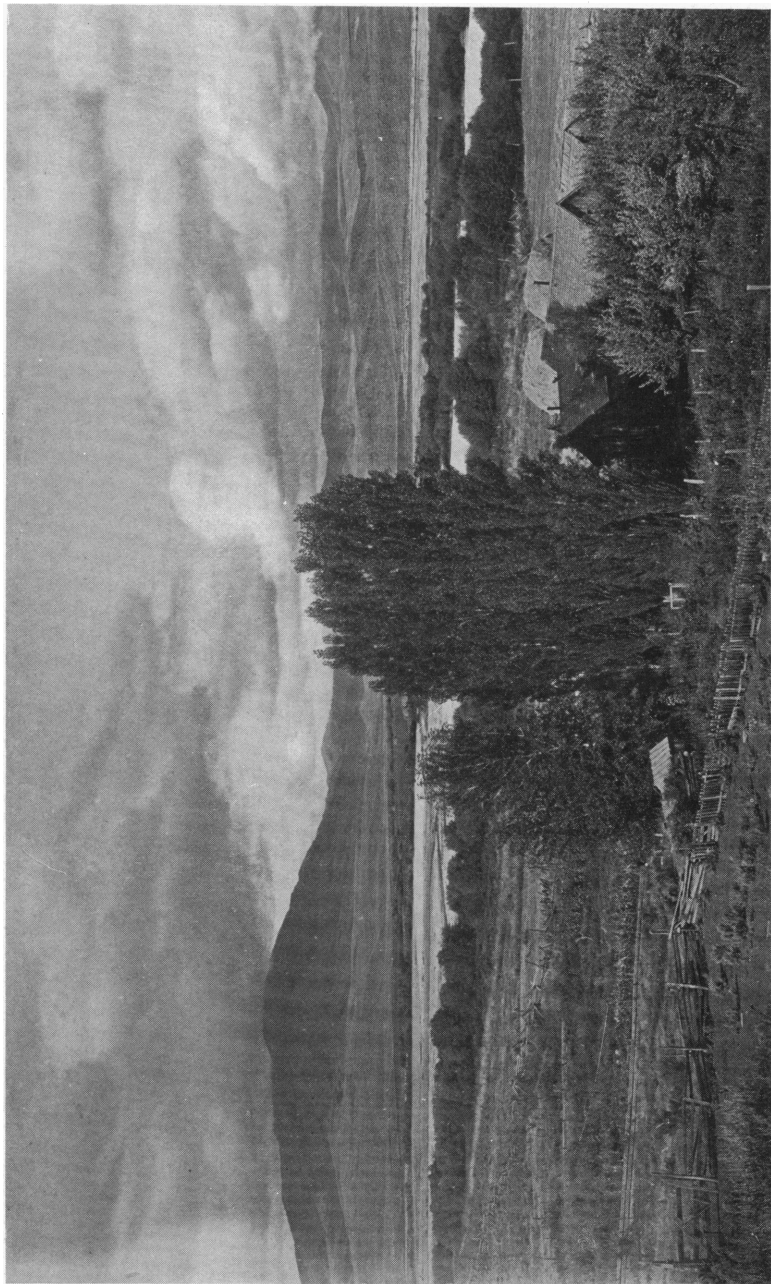
At Ironside but few bats were noted. On several occasions one or two were seen at dusk along the creek and in the orchard. One specimen was secured.

38. ***Eptesicus fuscus fuscus*** (*Beauvois*).

BROWN BAT.

Seen once or twice at dusk flying about in orchards or along Willow Creek, but none were captured.

In conclusion the author wishes to acknowledge the valuable help and advice given him by Dr. J. A. Allen, Curator of the Department. Material assistance was also rendered through the U. S. Biological Survey by Mr. H. W. Henshaw who loaned specimens of forms not well represented in the Museum collection; by Mr. Vernon Bailey, who identified the series of *Microtus nanus canescens* and *M. mordax*, and by Mr. E. W. Nelson who compared my winter specimens of *Brachylagus idahoensis* with the series at Washington.



Ironside, Malheur Co., Oregon, at and near which point the mammals were collected which form the basis of the present paper. Willow Creek in the mid-distance (see p. 1).



Fig. 1. FAVORITE HAUNT OF *Brachylagus idahoensis* IN FOREGROUND.



Fig. 2. *Brachylagus idahoensis*.

