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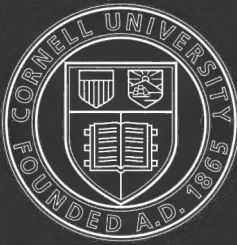
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University of the State of New York

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OF THE

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FREDERICK J. H. MERRILL *Director*

No. 38 Vol. 8

October 1900

KEY TO THE LAND MAMMALS

OF

Northeastern North America

BY

GERRIT S. MILLER JR

ALBANY

UNIVERSITY OF THE STATE OF NEW YORK

1900

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CONTENTS

	PAGE
Introduction.....	61
Life zones.....	61
Arctic zones.....	62
Hudsonian zone.....	62
Canadian zone.....	62
Transition zone.....	62
Upper austral zone.....	62
Species and subspecies.....	63
General plan of key.....	63
Synopsis.....	65
Key.....	76
Index.....	153

KEY TO THE LAND MAMMALS OF NORTH- EASTERN NORTH AMERICA

INTRODUCTION

Originally outlined as part of my recently published *Preliminary list of the mammals of New York*¹, this "key" soon grew to the proportions of an independent paper. As first planned it was intended to furnish a ready means for finding—with the minimum of technical requirements—the name of any wild mammal taken in New York. When the "key" was separated from the "list" its scope was extended to include the entire mammalian fauna of the Atlantic slope of North America north of the southern boundary of the upper austral zone. At the same time the whales and porpoises were omitted. It is thus practically a key to the land mammals of the Atlantic division of the life zones represented in New York state, since the upper austral zone is the southernmost of these, and the arctic zone, florally at least, may almost be said to touch the higher Adirondack peaks. Throughout I have endeavored to write as non-technically as the subject will permit, that is to use no unexplained terms not to be found in a pocket dictionary.

Life zones

While the subject of life zones has been dealt with at considerable length in the paper just referred to, a few words of definition are necessary here. A life zone is simply an extended area over which the fauna and flora are relatively homogeneous. As such areas are limited chiefly by temperature, and their boundaries consequently determined by isothermal lines, they normally assume the form of belts stretching from east to west, or, to speak more exactly, arranged concentrically around the poles. Therefore in passing from pole to equator a certain number of these belts must be crossed. The forms of the life zones are distorted by irregularities in the surface of the earth with their accompanying variations in temperature. In the northern hemisphere mountain chains

carry the northern zones southward, and hot, dry plains bend the southern zones toward the north. Finally a zone may become locally broken into islands, as when a cool mountain chain is interrupted by warm valleys and plains, or cold swamps are scattered in hot lowlands. In North America there are seven of these life areas, each characterized by the predominance of a particular assemblage of animals and plants. Beginning at the north they are the arctic zone, Hudsonian zone, Canadian zone, transition zone, upper austral zone, lower austral zone and tropical zone. The last two lie south of the region included within the scope of this paper. The areas covered by the Atlantic divisions of the five others are as follows:

Arctic zone. Treeless northeastern coasts of Labrador and Newfoundland; above timber line on the highest mountain peaks of New England, and perhaps of the Adirondacks also.

Hudsonian zone. Wooded portions of Labrador, Newfoundland, northern Ontario, northern and eastern Quebec and northern New Brunswick; region immediately below timber line on the mountains of New England and New York and possibly in the highest southern Alleghanies.

Canadian zone. Eastern Nova Scotia; the greater part of New Brunswick; southern Quebec; eastern central Ontario; northern and western Maine; the higher parts of New Hampshire, Vermont and western Massachusetts; the Adirondacks, Catskills and higher parts of the Alleghanies.

Transition zone. Western Nova Scotia; eastern and southern Maine; southern Ontario (except north shore of Lake Erie); the greater part of the lowlands of New York, Vermont, New Hampshire, Massachusetts, Connecticut and Pennsylvania; the lower slopes of the Alleghanies to their extreme southern limit.

Upper austral zone. North shore of Lake Erie in southern Ontario; south shore of Lake Ontario, "lake region", lower Hudson valley and western end of Long Island in New York; southern Connecticut; lowlands of New Jersey, Delaware, eastern Pennsylvania, eastern Maryland and northeastern Virginia; belt (extending northeast and southwest) in Virginia, North Carolina, South Carolina and Georgia, covering the higher land east of the mountains.

Species and subspecies

In this paper subspecies are treated as the component parts of species, not, as is now too often the custom, as independent forms intergrading with species. The relationship of species and subspecies is thus maintained exactly parallel with that between genus and subgenus or family and subfamily.¹ The separate keys to the subspecies under each species will help to emphasize this conception. I have attempted to apply a system of English names that will coincide with this treatment of species and subspecies, but in certain cases perfect adherence to this principle has not been possible.

General plan of the key

Beginning with the definition of the class *Mammalia*, this paper consists of a series of keys and definitions, interspersed with brief statements of range, habitat and extent of groups. Keys are given under each order to its families, under each family to its genera, under each genus to its species and under each species to its subspecies. Suborders, subfamilies and subgenera are not included in this scheme, but their characters are referred to in the sections of the keys or elsewhere, and their names are inserted in the synopsis placed before the "key" proper (p. 65-76). Under each species and subspecies will be found references to, 1) the first publication of the specific or subspecific name, 2) first use of the binomial or trinomial combination, and 3) a recent monographic paper in which the form is described in detail. Absence of the second reference shows that the binomial or trinomial was used by the original describer of the form, or that it is now for the first time published. Absence of the third reference, in cases where the second and third are

1 An example may make the matter more clear. Squirrels of the genus *Sciurus* occur throughout the greater part of the wooded portion of the northern hemisphere. The species vary much in form, and the variations tend to group themselves in such a way that the different groups are recognizable as subgenera, all, however, falling within the definition of the genus *Sciurus*. To the one of these groups of species containing the type species of the genus the name *Sciurus* in a subgeneric sense is restricted. It happens that this subgenus *Sciurus* is confined to the old world, and that within our limits the genus is represented by the three subgenera *Tamiasciurus*, *Neosciurus* and *Parasciurus*. No one would on this account deny that the genus *Sciurus* occurs in eastern North America. A species of this genus, *Sciurus ludovicianus*, is widely distributed in the southern United States. Individuals of this species vary considerably in size and color, and the variations so group themselves that several subspecies are recognizable, each restricted to a particular part of the range of the species, and all included within the definition of the species. The one of these which was first named (that of the Mississippi valley) and which consequently gives its name to the species as a whole, is not found east of the Alleghenies, where it is replaced by *S. ludovicianus vicinus*. The species *Sciurus ludovicianus* is nevertheless as truly a member of the fauna of the eastern United States as is the genus *Sciurus*.

not identical, shows that nothing of importance has been published on the animal during the present phase of the study of North American mammals, a period dating from 1889. The type locality of each form is given in parenthesis after the first reference. The accented syllable of all technical names is marked with an acute accent; and the derivation of each name is placed in parenthesis at the end of the diagnosis (Lat. Latin, N. Lat. New Latin, Gk. Greek). All measurements are in millimeters followed (in parenthesis) by an approximate equivalent in inches and sixteenths.

As in the *List of the mammals of New York*, my aim is to present the subject as it stands today rather than to attempt to reach final conclusions. Numerous forms are therefore admitted the status of which is still in question. Though this course has its disadvantages, it seems the one least open to objection at the present time, when any revisionary work would necessarily be imperfect.

The use of keys in botany and zoology is now too well understood to require any special explanation. It must be remarked, however, that no keys can be made by which single specimens of closely related subspecies can be invariably named. Certain species even differ from each other by characters that can not be set down in a single line of print. I have endeavored to base keys and diagnoses on the most tangible characters available; but where the way is hard for the specialist it can not be made easy for the beginner.

Individuals affected with albinism, melanism and other abnormalities frequently occur in all species. Compared with the place they hold in popular estimation their interest is slight. They should be carefully guarded against as extremely liable to cause difficulty in identification. Such individuals seem possessed of a peculiar faculty for bringing themselves to notice.

SYNOPSIS¹

Class **MAMMALIA** : mammals, p. 76

Subclass **METATHERIA** : marsupials, p. 76

Order **MARSUPIALIA** : marsupials, p. 77-78

Suborder **POLYPROTODONTIA** : polyprotodont marsupials

Family **DIDELPHIDIDAE** : opossums, p. 77-78

Genus **Didelphis** Linnaeus: p. 78

1 **Didelphis virginiana** Kerr: opossum, p. 78

Represented by:

Didelphis virginiana virginiana Kerr: northeastern opossum, p. 78

Subclass **EUTHERIA** : placental mammals, p. 76

Order **UNGULATA** : hoofed mammals, p. 78

Suborder **ARTIODACTYLA** : even-toed hoofed mammals, p. 78

Family **BOVIDAE** : cattle, p. 79

Genus **Bison** Hamilton Smith: p. 79

2 **Bison bison** (Linnaeus): American bison, p. 79

Represented by:

Bison bison bison (Linnaeus): American plains bison, p. 79

Family **CERVIDAE** : deer, p. 79

Genus **Rangifer** Hamilton Smith: p. 80

3 **Rangifer caribou** (Gmelin): woodland caribou, p. 80

4 **Rangifer terraenovae** Bangs: Newfoundland caribou, p. 81

5 **Rangifer arcticus** (Richardson): barren ground caribou, p. 81

Genus **Alces** Jardine: p. 81

6 **Alces americanus** Jardine: eastern moose, p. 81

Genus **Cervus** Linnaeus: p. 82

7 **Cervus canadensis** (Erxleben): east American wapiti, p. 82

Genus **Odocoileus** Rafinesque: p. 82

8 **Odocoileus americanus** (Erxleben): Virginia deer, p. 82

Represented by:

Odocoileus americanus americanus (Erxleben): southern Virginia deer, p. 83

Odocoileus americanus borealis Miller: northern Virginia deer, p. 83

¹The arrangement of the higher groups is that adopted by Flower and Lydekker.

Order **GLIRES** : rodents, p. 83

Suborder **SIMPLICIDENTATA** : true rodents, p. 84

Family **SCIURIDAE** : squirrels, p. 84

Genus **Sciurus** Linnaeus : p. 85

Subgenus **Tamiasciurus** Trouessart : p. 85

9 **Sciurus hudsonicus** Erxleben : red squirrel, p. 85

Represented by :

Sciurus hudsonicus hudsonicus Erxleben : Hudsonian red squirrel, p. 86

Sciurus hudsonicus gymnicus Bangs : Canadian red squirrel, p. 85

Sciurus hudsonicus loquax Bangs : southeastern red squirrel, p. 86

Subgenus **Neosciurus** Trouessart : p. 85

10 **Sciurus carolinensis** Gmelin : gray squirrel, p. 86

Represented by :

Sciurus carolinensis carolinensis Gmelin : southeastern gray squirrel, p. 86

Sciurus carolinensis leucotis Gapper : northeastern gray squirrel, p. 87

Subgenus **Parasciurus** Trouessart : p. 85

11 **Sciurus ludovicianus** Custis : fox squirrel, p. 87

Represented by :

Sciurus ludovicianus vicinus Bangs : northern fox squirrel, p. 87

Genus **Tamias** Illiger : p. 88

12 **Tamias striatus** (Linnaeus) : eastern chipmunk, p. 88

Represented by :

Tamias striatus striatus (Linnaeus) : southeastern chipmunk, p. 88

Tamias striatus lysteri (Richardson) : northeastern chipmunk, p. 88

Genus **Arctomys** : Schreber : p. 89

13 **Arctomys monax** (Linnaeus) : woodchuck, p. 89

Represented by :

Arctomys monax monax (Linnaeus) : southeastern woodchuck, p. 89

Arctomys monax canadensis (Kuhl) : northeastern woodchuck, p. 89

- 14 **Arctomys ignavus** Bangs: Labrador woodchuck, p. 89
Genus **Sciuropterus** F. Cuvier: p. 90
- 15 **Sciuropterus volans** (Linnaeus): southern flying squirrel, p. 90
Represented by:
Sciuropterus volans volans (Linnaeus): southern flying squirrel, p. 90
- 16 **Sciuropterus sabrinus** (Shaw): northern flying squirrel, p. 90
Represented by:
Sciuropterus sabrinus sabrinus (Shaw): Hudsonian flying squirrel, p. 91
Sciuropterus sabrinus macrotis Mearns: Canadian flying squirrel, p. 91
Family **CASTORIDAE**: beavers, p. 91
Genus **Castor** Linnaeus: p. 35
- 17 **Castor canadensis** Kuhl: American beaver, p. 92
Represented by:
Castor canadensis canadensis Kuhl: northeastern beaver, p. 92
Castor canadensis carolinensis Rhoads: southeastern beaver, p. 92
Family **MURIDAE**: mice, p. 92
Subfamily **MURINAE**: old world mice, p. 93
Genus **Mus** Linnaeus: p. 94
- 18 **Mus musculus** Linnaeus: house mouse, p. 94
- 19 **Mus rattus** Linnaeus: black rat, p. 95
- 20 **Mus decumanus** Pallas: house rat, p. 95
Subfamily **CRICETINAE**: new world mice, p. 93
Genus **Reithrodontomys** Giglioli: p. 95
- 21 **Reithrodontomys leontii** (Audubon & Bachman): harvest mouse p. 95
Represented by:
Reithrodontomys leontii impiger Bangs: Virginia harvest mouse, p. 96
Genus **Oryzomys** Baird: p. 96
- 22 **Oryzomys palustris** (Harlan): ricefield mouse, p. 96
Represented by:
Oryzomys palustris palustris (Harlan): northern ricefield mouse, p. 96
Genus **Peromyscus** Gloger: p. 96
Subgenus **Peromyscus** Gloger: p. 96

- 23 **Peromyscus canadensis** (Miller): Canadian white-footed mouse,
p. 97
Represented by:
Peromyscus canadensis abietorum Bangs: Hudsonian
white-footed mouse, p. 97
Peromyscus canadensis canadensis (Miller): Canadian
white-footed mouse, p. 97
Peromyscus canadensis nubiterrae (Rhoads): Cloud-
land white-footed mouse, p. 98
- 24 **Peromyscus leucopus** (Rafinesque): deer mouse, p. 98
- 25 **Peromyscus maniculatus** (Wagner): Labrador white-footed
mouse, p. 98
Subfamily **NEOTOMINAE**: wood rats, p. 93
Genus **Neotoma** Say & Ord: p. 98
Subgenus **Neotoma** Say & Ord: p. 98
- 26 **Neotoma pennsylvanica** Stone: Allegheny cave rat, p. 99
Subfamily **MICROTINAE**: voles and lemmings, p. 93
Genus **Synaptomys** Baird: p. 99
Subgenus **Synaptomys** Baird: p. 99
- 27 **Synaptomys cooperi** Baird: Cooper's lemming, p. 100
- 28 **Synaptomys fatuus** Bangs: Bangs's lemming, p. 100
Subgenus **Mictomys** True: p. 99
- 29 **Synaptomys innuitus** (True): True's lemming, p. 100
- 30 **Synaptomys sphagnicola** Preble: Preble's lemming, p. 100
Genus **Dicrostonyx** Gloger: p. 101
- 31 **Dicrostonyx hudsonius** (Pallas): Labrador lemming, p. 101
Genus **Fiber** Cuvier: p. 101
- 32 **Fiber zibethicus** (Linnaeus): muskrat, p. 101
Represented by:
Fiber zibethicus zibethicus (Linnaeus): northeastern
muskrat, p. 101
Fiber zibethicus aquilonius Bangs: Labrador muskrat,
p. 102
- 33 **Fiber obscurus** Bangs: Newfoundland muskrat, p. 101
Genus **Microtus** Schrank: p. 101
Subgenus **Pitymys** McMurtrie: p. 102

- 34 **Microtus pinetorum** (Le Conte): pine mouse, p. 103
 Represented by:
Microtus pinetorum scalopsoides (Audubon and Bachman): northern pine mouse, p. 103
 Subgenus **Microtus** Schrank: p. 103
- 35 **Microtus terraenovae** Bangs: Newfoundland vole, p. 104
- 36 **Microtus chrotorrhinus** (Miller): rock vole, p. 104
 Represented by:
Microtus chrotorrhinus chrotorrhinus (Miller): southern rock vole, p. 104
Microtus chrotorrhinus rarus Bangs: Labrador rock vole, p. 105
- 37 **Microtus breweri** (Baird): Muskeget island vole, p. 105
- 38 **Microtus enixus** Bangs: Hamilton inlet vole, p. 105
- 39 **Microtus pennsylvanicus** (Ord): field mouse, p. 105
 Represented by:
Microtus pennsylvanicus pennsylvanicus (Ord): common eastern field mouse, p. 106
Microtus pennsylvanicus labradorius Bailey: Labrador field mouse, p. 106
Microtus pennsylvanicus fontigenus (Bangs): northern field mouse, p. 107
Microtus pennsylvanicus acadicus Bangs: Acadian field mouse, p. 107
- 40 **Microtus nesophilus** Bailey: Gull island mouse, p. 107
 Genus **Phenacomys** Merriam: p. 108
- 41 **Phenacomys celatus** Merriam: large yellow-faced phenacomys, p. 108
- 42 **Phenacomys latimanus** Merriam: small yellow-faced phenacomys, p. 108
 Genus **Evotomys** Coues: p. 109
- 43 **Evotomys ungava** Bailey: ungava redbacked mouse, p. 109
- 44 **Evotomys carolinensis** Merriam: Carolina redbacked mouse, p. 109
- 45 **Evotomys proteus** Bangs: variable redbacked mouse, p. 110

- 46 **Evotomys gapperi** (Vigors): common redbacked mouse, p. 110
 Represented by:
Evotomys gapperi gapperi (Vigors): eastern redbacked mouse, p. 110
Evotomys gapperi ochraceus Miller: Mount Washington redbacked mouse, p. 111
- 47 **Evotomys rhoadsi** (Stone): New Jersey redbacked mouse, p. 111
 Family **DIPODIDIAE**: jerboas, jumping mice etc. p. 111
 Subfamily **ZAPODINAE**: jumping mice, p. 111
 Genus **Zapus** Coues: p. 112
- 48 **Zapus hudsonius** (Zimmermann): meadow jumping mouse, p. 112
 Represented by:
Zapus hudsonius hudsonius (Zimmermann): northern meadow jumping mouse, p. 113
Zapus hudsonius americanus (Barton): southern meadow jumping mouse, p. 112
Zapus hudsonius ladas Bangs: Labrador meadow jumping mouse, p. 113
 Genus **Napaeozapus** Preble: p. 113
- 49 **Napaeozapus insignis** Miller: woodland jumping mouse, p. 113
 Represented by:
Napaeozapus insignis abietorum Preble: northern woodland jumping mouse, p. 114
Napaeozapus insignis insignis Miller: southern woodland jumping mouse, p. 114
Napaeozapus insignis roanensis Preble: mountain woodland jumping mouse, p. 114
 Family **ERETHIZONTIDAE**: American porcupines, p. 115
 Genus **Erethizon** F. Cuvier: p. 115
- 50 **Erethizon dorsatus** (Linnaeus): Canadian porcupine, p. 115
 Suborder **DUPLICIDENTATA**: hares and pikas, p. 84
 Family **LEPORIDAE**: hares, p. 115
 Genus **Lepus** Linnaeus: p. 115
 Subgenus **Lepus** Linnaeus: p. 116
- 51 **Lepus labradorius** Miller: Labrador arctic hare, p. 116
- 52 **Lepus bangsi** (Rhoads): Newfoundland arctic hare, p. 116

- 53 **Lepus americanus** Erxleben: American varying hare, p. 116
 Represented by:
Lepus americanus struthopus Bangs: Nova Scotia
 varying hare, p. 117
Lepus americanus americanus Erxleben: northern
 varying hare, p. 117
Lepus americanus virginianus (Harlan): southern
 varying hare, p. 117
 Subgenus **Sylvilagus** Gray: p. 116
- 54 **Lepus floridanus** Allen: cottontail, p. 118
 Represented by:
Lepus floridanus transitionalis Bangs: northeastern
 cottontail, p. 118
Lepus floridanus mearnsi (Allen): eastern prairie cotton-
 tail, p. 118
Lepus floridanus mallurus (Thomas): southeastern cot-
 tontail, p. 119
 Order **FERAE**: flesh-eaters, p. 119
 Suborder **PINNIPEDIA**: seals and their allies, p. 120
 Family **ROSMARIDAE**: walruses, p. 120
 Genus **Rosmarus** Scopoli: p. 120
- 55 **Rosmarus rosmarus** (Linnaeus): Atlantic walrus, p. 120
 Family **PHOCIDAE**: earless seals, p. 121
 Genus **Cystophora** Nilsson: p. 121
- 56 **Cystophora cristata** (Erxleben): hooded seal, p. 121
 Genus **Halichoerus** Nilsson: p. 121
- 57 **Halichoerus grypus** (Fabricius): gray seal, p. 122
 Genus **Phoca** Linnaeus: p. 122
 Subgenus **Pagophilus** Gray: p. 122
- 58 **Phoca groenlandica** Fabricius: harp seal, p. 122
 Subgenus **Pusa** Scopoli: p. 122
- 59 **Phoca hispida** Schreber: ringed seal, p. 123
 Subgenus **Phoca** Linnaeus, p. 122
- 60 **Phoca vitulina** Linnaeus: harbor seal, p. 123
 Suborder **FISSIPEDIA**: true carnivores, p. 120
 Family **FELIDAE**: cats, p. 123
 Genus **Felis** Linnaeus: p. 123

- 61 **Felis oregonensis** Rafinesque: puma, p. 123
 Represented by:
Felis oregonensis hippolestes Merriam: northern puma, p. 124
 Genus **Lynx** Kerr: p. 124
 Subgenus **Lynx** Kerr: p. 125
- 62 **Lynx canadensis** Kerr: Canada lynx, p. 126
- 63 **Lynx subsolanus** Bangs: Newfoundland lynx, p. 125
 Subgenus **Cervaria** Gray: p. 125
- 64 **Lynx ruffus** (Gueldenstaedt): bay lynx, p. 125
 Represented by:
Lynx ruffus ruffus (Gueldenstaedt): northeastern bay lynx, p. 125
- 65 **Lynx gigas** Bangs: Nova Scotia lynx, p. 126
 Family **CANIDAE**: dogs, p. 126
 Genus **Canis** Linnaeus: p. 126
- 66 **Canis albus** (J. Sabine): arctic wolf, p. 127
- 67 **Canis occidentalis** (Richardson): American wolf, p. 127
 Genus **Vulpes** Richardson: p. 127
- 68 **Vulpes lagopus** (Linnaeus): arctic fox, p. 128
- 69 **Vulpes fulvus** (Desmarest): red fox, p. 128
 Represented by:
Vulpes fulvus fulvus (Desmarest): southeastern red fox, p. 128
Vulpes fulvus rubricatus Bangs: Nova Scotia red fox, p. 128
- 70 **Vulpes deletrix** Bangs: Newfoundland red fox, p. 129
 Genus **Urocyon** Baird: p. 129
- 71 **Urocyon cinereoargenteus** (Müller): gray fox, p. 129
 Represented by:
Urocyon cinereoargenteus cinereoargenteus (Müller): eastern gray fox, p. 129
 Family **MUSTELIDAE**: weasels, p. 129
 Genus **Lutra** Brisson: p. 130
- 72 **Lutra hudsonica** (Desmarest): North American otter, p. 130
 Represented by:
Lutra hudsonica hudsonica (Desmarest): northeastern otter, p. 130
Lutra hudsonica lataxina (F. Cuvier): southeastern otter, p. 131

- 73 **Lutra degener** Bangs: Newfoundland otter, p. 131
Genus **Gulo** Storr: p. 131
- 74 **Gulo luscus** (Linnaeus): wolverine, p. 131
Genus **Mustela** Linnaeus: p. 132
- 75 **Mustela pennanti** Erxleben: fisher, p. 132
Represented by:
Mustela pennanti pennanti Erxleben: eastern fisher,
p. 132
- 76 **Mustela brumalis** Bangs: north Labrador marten, p. 132
- 77 **Mustela americana** Turton: eastern marten, p. 132
- 78 **Mustela atrata** Bangs: Newfoundland marten, p. 133
Genus **Putorius** Cuvier: p. 133
Subgenus **Lutreola** Wagner: p. 133
- 79 **Putorius vison** (Schreber): mink, p. 133
Represented by:
Putorius vison vison (Schreber): northeastern mink, p. 134
Putorius vison lutrecephalus (Harlan): southeastern
mink, p. 134
Subgenus **Arctogale** Kaup: p. 133
- 80 **Putorius cicognanii** (Bonaparte): brown weasel, p. 134
Represented by:
Putorius cicognanii cicognanii (Bonaparte): eastern
brown weasel, p. 135
- 81 **Putorius occisor** Bangs: slender-tailed weasel, p. 135
- 82 **Putorius noveboracensis** Emmons: New York weasel, p. 135
Represented by:
Putorius noveboracensis noveboracensis Em-
mons: white-bellied New York weasel, p. 136
Putorius noveboracensis notius Bangs: yellow-
bellied New York weasel, p. 136
Genus **Mephitis** Cuvier: p. 136
- 83 **Mephitis mephitica** (Shaw): skunk, p. 136
Represented by:
Mephitis mephitica mephitica (Shaw): northeastern
skunk, p. 137
Mephitis mephitica scrutator Bangs: southeastern
skunk, p. 137
Family **PROCYONIDAE**: racoons, p. 137
Genus **Procyon** Storr: p. 137

- 84 **Procyon lotor** (Linnaeus): racoon, p. 137
 Represented by:
Procyon lotor lotor (Linnaeus): northeastern racoon, p. 138
 Family **URSIDAE**: bears, p. 138
 Genus **Thalarctos** Gray: p. 138
- 85 **Thalarctos maritimus** (Phipps): polar bear, p. 139
 Genus **Ursus** Linnaeus: p. 139
 Subgenus **Euarctos** Gray: p. 139
- 86 **Ursus americanus** Pallas: black bear, p. 139
 Represented by: *
Ursus americanus americanus Pallas: eastern black bear, p. 139
Ursus americanus sornborgeri Bangs: Labrador black bear, p. 139
 Order **INSECTIVORA**: insect-eaters, p. 140
 Family **TALPIDAE**: moles, p. 140
 Subfamily **TALPINAE**: true moles, p. 140
 Genus **Scalops** Cuvier: p. 141
- 87 **Scalops aquaticus** (Linnaeus): naked-tailed mole, p. 141
 Represented by:
Scalops aquaticus aquaticus (Linnaeus): northern naked-tailed mole, p. 141
 Genus **Parascalops** True: p. 141
- 88 **Parascalops breweri** (Bachman): eastern hairy-tailed mole, p. 142
 Genus **Condylura** Illiger: p. 140
- 89 **Condylura cristata** (Linnaeus): star-nosed mole, p. 141
 Family **SORICIDAE**: shrews, p. 142
 Genus **Blarina** Gray: p. 142
 Subgenus **Blarina** Gray: p. 142
- 90 **Blarina brevicauda** (Gray): large blarina, p. 142
 Represented by:
Blarina brevicauda brevicauda (Gray): northern large blarina, p. 143
 Subgenus **Cryptotis** Pomel: p. 142
- 91 **Blarina parva** (Say): small blarina, p. 143
 Represented by:
Blarina parva parva (Say): northern small blarina, p. 143
 Genus **Sorex** Linnaeus: p. 143
 Subgenus **Neosorex** Baird: p. 143

- 92 **Sorex albibarbis** (Cope): eastern marsh shrew, p. 144
 Subgenus **Microsorex** Baird: p. 143
- 93 **Sorex hoyi** Baird: Hoy's shrew, p. 144
 Subgenus **Sorex** Linnaeus: p. 143
- 94 **Sorex macrurus** Batchelder: big-tailed shrew, p. 144
- 95 **Sorex richardsoni** Bachman: Richardson's shrew, p. 144
- 96 **Sorex fumeus** Miller: smoky shrew, p. 145
- 97 **Sorex personatus** I. Geoffroy: masked shrew: p. 145
 Represented by:
Sorex personatus lesueuri (Duvernoy): southern masked shrew, p. 146
Sorex personatus personatus I. Geoffroy: northern masked shrew, p. 145
Sorex personatus miscix Bangs: Labrador masked shrew p. 146
- Order **CHIROPTERA**: bats, p. 146
 Suborder **MICROCHIROPTERA** true bats, p. 146
 Family **VESPERTILIONIDAE**: typical bats, p. 146
 Subfamily **VESPERTILIONINAE**: simple-nosed typical bats, p. 146
 Genus **Lasiurus** Gray: p. 147
- 98 **Lasiurus cinereus** (Beauvois): hoary bat, p. 147
- 99 **Lasiurus borealis** (Müller): red bat, p. 147
 Represented by:
Lasiurus borealis borealis (Müller): northern red bat, p. 148
 Genus **Nycticeius** Rafinesque: p. 148
- 100 **Nycticeius humeralis** Rafinesque: Rafinesque's bat, p. 148
 Genus **Myotis** Kaup: p. 148
- 101 **Myotis subulatus** (Say): Say's bat, p. 149
 Represented by:
Myotis subulatus subulatus (Say): eastern Say's bat, p. 149
- 102 **Myotis lucifugus** (Le Conte): little brown bat, p. 149
 Represented by:
Myotis lucifugus lucifugus (Le Conte): eastern little brown bat, p. 149
 Genus **Lasionycteris** Peters: p. 149
- 103 **Lasionycteris noctivagans** (Le Conte): silvery bat, p. 149
 Genus **Pipistrellus** Kaup: p. 150

104 **Pipistrellus subflavus** (F. Cuvier): American pipistrelle, p. 150

Represented by:

Pipistrellus subflavus subflavus (F. Cuvier): southeastern pipistrelle, p. 150

Pipistrellus subflavus obscurus Miller: northeastern pipistrelle, p. 150

Genus **Vespertilio** Linnaeus: p. 151

105 **Vespertilio fuscus** Beauvois: big brown bat, p. 151

Represented by:

Vespertilio fuscus fuscus Beauvois: eastern big brown bat, p. 151

KEY

Class **Mammalia** M a m m a l s

Vertebrate (backboned) animals with four chambered heart, complete double circulation, body partly or wholly covered with hair (rarely almost naked); young nourished for a period after birth by milk; breathing accomplished by means of lungs (**Mammalia**; Lat., a nipple).

The **Mammalia** are distributed over practically the whole surface of the earth and throughout the oceans. They are absent however from the most extreme arctic and antarctic regions. The class is divided into three subclasses: 1) the **Prototheria**, in which the young are hatched from eggs as in birds, confined to New Guinea, Australia, and Tasmania; 2) the **Metatheria**, in which the young are born in a very rudimentary condition and after birth carried for some time attached to the nipples of the parent (usually in a special pouch of skin); and 3) the **Eutheria**, in which the young are born perfectly formed. While the **Metatheria** comprise the one order **Marsupialia**, a single representative of which occurs within our limits, the **Eutheria** are divided by Flower and Lydekker¹ into 9 orders. Of these 7 are terrestrial, and members of each are found in North America. Six come within the scope of the present paper.

ORDERS

Female generally (always in North American species) provided with an external pouch in which the young are carried for sometime after birth, **Metatheria** (in species found within our limits, tail prehensile, teeth 50, hind foot with 5 toes, the innermost of which is thumb-like and clawless) (opossums).... **Marsupialia**, p. 77

¹ An introduction to the study of mammals living and extinct. 1891.

- Female without external pouch for carrying the young,
 Eutheria (in species found within our limits,
 tail never prehensile, teeth less than 50, innermost
 toe of hind foot never thumb-like)
- Fore limbs modified to serve as wings (bats)..... Chiroptera, p. 146
- Fore limbs not modified to serve as wings
- Toes armed with hoofs (bison, deer etc.)..... Ungulata, p. 78
- Toes armed with claws
- Front teeth chisel-shaped and separated from
 grinding teeth by a wide space (gnawing
 animals)..... Glires, p. 83
- Front teeth not chisel-shaped, tooth row essen-
 tially continuous
- Brain large, well developed; in species found
 within our limits, size large, length 300
 (12) to 2400 (96), eyes well developed,
 muzzle not greatly elongated (flesh-eaters)..... Ferae, p. 119
- Brain small, not highly developed; in species
 found within our limits, size small, length
 under 250 (10), eyes small or rudiment-
 ary, muzzle greatly elongated (moles,
 shrews, etc.)..... Insectivora, p. 140

Order **Marsupialia** *Marsupials*

Two small separate bones projecting from front of pelvis; female repro-
 ductive organs double through greater part of their length; young not attached
 to parent before birth by a complicated special organ (placenta) but born in a
 very undeveloped condition and carried for some time in an external pouch
 of skin in which are situated the nipples; brain very small and simple; in
 North American species tail prehensile, teeth 50, hind foot with five toes, the
 innermost of which is clawless and thumb-like. (*Marsupialia*; Lat., a pouch)

The order *Marsupialia* reaches its greatest development in Aus-
 tralia and the neighboring islands. Elsewhere it is confined to South
 America and the warmer parts of North America. Eight families are
 recognized, six of which are peculiar to the Australian region. The
 other two are confined to America. One of them reaches our limits.

Family **Didelphididae** *Opossums*

Teeth 50; toes five, distinct, each provided with a well developed claw except
 the first on hind foot, which is thumb-like and clawless. Tail long, prehensile,
 mostly naked and scaly. (*Didelphididae*; genus *Didelphis*)

The family Didelphididae is peculiar to the warmer parts of America. It contains about 10 genera, all strictly tropical with the exception of the following:

Genus *Didelphis* Linnaeus

1758 *Didelphis* Linnaeus, *Systema naturae*. ed. 10. 1:21. Type *Didelphis marsupialis* Linnaeus.

Size of a house cat; fur a mixture of short, fine, soft hairs and long coarse bristles; pouch always well developed; fifth toe on hind foot markedly shorter than second, third and fourth, which are subequal. (*Didelphis*; Gk., two womb)

The genus *Didelphis* is peculiar to the warmer parts of America, it contains three or four species, one of which reaches our limits.

Didelphis virginiana Kerr *Common opossum*

1792 *Didelphis virginiana* Kerr, *Animal kingdom*. 1:193 (Virginia).

Blackish varied with grayish white; ears naked, leathery; tail dark at base, light at tip; total length 700 (27½), tail vertebrae 28 (11), hind foot 57 (2½). (*virginiana*; N. Lat. Virginian)

The common opossum is abundant in woods and old fields throughout the austral zones of the eastern United States. At the northern limit of its range it is irregular in distribution. Notwithstanding the popular misconceptions on the subject the process of reproduction in the opossum is, with the exception of the one peculiarity common to the members of the subclass *Metatheria*, precisely as in our other mammals.

Order *Ungulata* *Hoofed animals*

Terrestrial, herbivorous or omnivorous animals with hoofed toes; front teeth variable in form (sometimes wanting in upper jaw) but never long and with chisel-like edges; cheek teeth with broad flat crowns for grinding vegetable matter. (*Ungulata*; Lat., a hoof)

The order *Ungulata* contains about a dozen families distributed practically throughout the world outside of Australia and the neighboring islands. Four of these occur in America north of Panama, and two have been found within our limits during historic times. The domestic horse, cow, sheep, and pig are well known representatives of the order. The North American members of the group belong to the suborder *Artiodactyla*, in which an even number of toes (usually two) are well developed in each foot.

FAMILIES OF UNGULATA

Horns simple, hollow, permanent..... B o v i d a e
 Horns branched, solid, periodically shed..... C e r v i d a e

Family **Bovidae** *Cattle, bison, sheep, etc.*

Horns permanent, consisting of a hollow sheath and solid bony core, canine teeth never present. (B ó v i d a e; Genus B o s)

The family B o v i d a e, containing the cattle, bison, sheep, true antelopes, and their allies, is represented by about 30 genera, chiefly African and Asiatic. Only one of the three genera occurring in America is confined to the western hemisphere. A single genus has inhabited north-eastern North America within historic times.

Genus **Bison** Hamilton Smith

1827 B i s o n Hamilton Smith, Griffith's Cuvier, Animal kingdom. 5:373. Type B o s b i s o n Linnaeus.

Forehead convex, much broader than long; horns placed in front of highest part of skull; head heavily clothed with long bushy hair. (B í s o n; Lat., a bison)

Two living members of this genus are known, one peculiar to eastern Europe, the other to North America. The remains of several extinct species have been found in various parts of North America.

Bison bison (Linnaeus) *American bison*

1758 [B o s], b i s o n Linnaeus, Systema naturae. ed. 10. 1:72 (Texas).

1891 B [i s o n] b i s o n Jordan, Manual of the vertebrate animals of the northern United States. ed. 5, p. 337.

Horn core short (under 10 in. or 250 mm) very strongly curved, circumference at base much greater than length along upper curvature. (b í s o n; Lat. a bison)

The American bison, which formerly ranged throughout central North America, east to Pennsylvania and central New York, is now practically extinct, but the skulls and horn cores may be occasionally found in salt licks and other places once frequented by the animals. Our animal was the plains bison, B. b i s o n b i s o n, smaller and shorter horned than the woodland bison, B. b i s o n a t h a b a s c a e Rhoads.

Family **Cervidae** Deer and their allies

Horns solid, shed and renewed each year, usually much branched, though occasionally (always in young) simple; canine teeth usually present in upper jaw. (C é r v i d a e; genus C e r v u s)

The family Cervidae contains 10 or more genera mostly of very wide distribution or peculiar to the old world. At least three are con-

fined to America. Four of the five that occur in America north of Panama have been found within our limits during historic times, and three of these are still represented.

GENERA OF CERVIDAE

Horns present in both sexes; nose entirely hairy (caribou)	<i>Rangifer</i> , p. 80
Horns normally present in males only; nose partly or entirely naked	
Horns broadly flattened; a small naked space between nostrils (moose).....	<i>Alces</i> , p. 81
Horns not conspicuously flattened; muzzle entirely naked	
Horns about 1530 (60) in length, their circumference at base about 200 (8) (wapiti)	<i>Cervus</i> , p. 82
Horns about 610 (24) in length, their circumference at base about 115 (4½) (deer)	<i>Odocoileus</i> , p. 83

Genus *Rangifer* Hamilton Smith

1827 *Rangifer* Hamilton Smith, Griffith's Cuvier, Animal kingdom. 5:304.

Type *Cervus tarandus* Linnaeus.

Horns long, much branched, usually flattened at tip; muzzle entirely hairy. (*Rangifer*; Old French, branch-bearer)

This genus, which includes the reindeer of the old world and the caribou of America, is represented within our limits by three species.

SPECIES OF RANGIFER

Muzzle and region about eye dark	<i>R. caribou</i>
Muzzle and region about eye conspicuously whitish	
Size very large; antlers relatively short and heavy..	<i>R. terraenovae</i>
Size small; antlers relatively long and light.....	<i>R. arcticus</i>

Rangifer caribou (Gmelin) *Woodland caribou*

1788 [*Cervus tarandus*] *γ. caribou* Gmelin, Systema naturae. ed. 13. 1: 177. (Eastern Canada).

1853 *Rangifer caribou* Audubon and Bachman, Quadr. N. Am. 3: 111.

1898 *Rangifer tarandus caribou* Lydekker, The deer of all lands, p. 42.

General color tawny brown; head and neck paler; front half of lower surface of body dark; no white eye ring; a narrow white ring on leg above hoof; horns large and heavy, the prongs mostly pointing upward. (*caribou*; Indian name)

The woodland caribou is abundant in the forested region of the Hudsonian zone and uppermost part of the Canadian zone in eastern Canada. It reaches the eastern United States in northern Maine only.

Rangifer terraenovae Bangs *Newfoundland caribou*

1896 *Rangifer terraenovae* Bangs, Preliminary description of the Newfoundland caribou, Nov. 11, 1896. p. 2. (Codroy Newfoundland)

1898 *Rangifer tarandus terraenovae* Lydekker, The deer of all lands, p. 45.

General color drab; head and neck paler, *the muzzle and a large patch including eye conspicuously whitish*; legs whitish for some distance above hoofs; horns large and heavy, the prongs mostly pointing forward and inward. (*terraenovae*; N. Lat., of Newfoundland)

The Newfoundland caribou is confined to the island of Newfoundland, from which it never crosses to the mainland. It is the largest species of caribou of eastern North America.

Rangifer arcticus (Richardson) *Barren ground caribou*

1829 *Cervus tarandus* var. *arcticus* Richardson, Fauna Boreali-Americana. 1: 241. (Barren grounds of arctic America)

1896 *Rangifer arcticus* Allen, Bull. Am. mus. nat. hist. 20 Nov. 1896. 8: 234.

1898 *Rangifer tarandus arcticus* Lydekker, The deer of all lands, p. 47.

General color light brown; head and neck paler, the muzzle and a large patch about eye conspicuously whitish; legs whitish for some distance above hoofs, *horns very long and slender*, the prongs mostly pointing inward; *size small, the female scarcely larger than a sheep*. (*arcticus*; Lat., arctic)

The barren ground caribou occurs in the treeless arctic regions of extreme northern America. Within our limits it is confined to the barrens of Labrador.

Genus **Alces** Jardine

1835 *Alces* Jardine, The naturalists library, 21 (mammalia; deer, antelope, camels, etc.): 125. Type *Cervus alces* Linnaeus.

Horns very greatly flattened and expanded; muzzle broad and elongated; a small naked spot between nostrils. (*Alces*; Lat., an elk)

The genus *Alces*, which contains the old world elk and the American moose, the largest living members of the deer family, is represented by one species within our limits.

Alces americanus Jardine *Eastern moose*

1835 *Alces americanus* Jardine, The naturalists library, 21 (mammalia; deer, antelope, camels, etc.): 125. (Eastern Canada)

1898 *Alces machlis* Lydekker, The deer of all lands, p. 52. (part)

Dark brown, blackening on belly and paler on legs, shoulders and muzzle; height at shoulders about 2000 (6 ft); spread of antlers, 1700 (5 ft), circumference of antler above bur, 215 (8½). (*americanus*; N. Lat., American)

The moose is an inhabitant of forests in the Canadian zone and lowermost edge of the Hudsonian zone. It is now exterminated in the east-

ern United States except in northern Maine, but is still found in the adjoining British provinces.

Genus **Cervus** Linnaeus

1758 *Cervus* Linnaeus, *Systema naturae*. 1, ed. 10. 1: 66. Type *Cervus elaphus* Linnaeus.

Horns large, curved mostly backward, the tines all directed forward; first tine immediately above base; hoofs broad, tail short. (*Cervus*; Lat., a deer)

The genus *Cervus* is confined to the temperate parts of the northern hemisphere. About half a dozen species are known, mostly peculiar to the old world. Two are now recognized as occurring in America; one of these has only recently been exterminated within our limits.

Cervus canadensis (Erxleben) *East American wapiti*

1777 [*Cervus elaphus*] *canadensis* Erxleben, *Syst. regn. anim.* 1: 305. (Eastern Canada)

1822 *Cervus canadensis* Desmarest, *Mammalogie*. 2: 433.

1898 *Cervus canadensis* Lydekker, *The deer of all lands*, p. 94.

Reddish brown, paler in winter; height at shoulder, 1530 (5 ft); horns 1530 (5 ft) in length, 200 (8) in circumference above basal tine. (*canadensis*; N. Lat., Canadian)

The east American wapiti is now extinct in the eastern United States and eastern Canada,¹ where, however, its antlers are often found in bogs and stream beds.

Genus **Odocoileus** Rafinesque

1832 *Odocoileus* Rafinesque, *Atlantic journal*. 1: 109. Type *Odocoileus speleus* Rafinesque.

Horns small, curved forward, the tines all directed upward; first tine some distance above base; hoofs narrow; tail rather long. (*Odocoileus*; Gk., tooth cave, Rafinesque's specimen having come from a cavern deposit)

The genus *Odocoileus* (often known as *Cariacus* or *Dorcelaphus*) numerous members of which occur in the western United States as well as in Mexico and South America, is represented within our limits by one species only.

Odocoileus americanus (Erxleben) *Virginia deer*

General color in summer uniform reddish, in winter usually grayer and faintly speckled; belly, inner side of legs, and under side of tail white. (*americanus*; N. Lat., American)

The Virginia deer occurs in all sufficiently extensive tracts of forest throughout eastern North America from the south Atlantic states to the warmer parts of the Canadian zone. It is divisible into two well marked subspecies.

¹ It is possible that the animal still occurs in Quebec.

SUBSPECIES OF *ODOCOILEUS AMERICANUS*

Size medium; teeth relatively small (lower row of cheek teeth 75 (3) in length); gray winter coat not well developed. . . . *O. americanus americanus*

Size large; teeth relatively large (lower row of cheek teeth 85 (3½) in length); gray winter coat well developed. *O. americanus borealis*

Odocoileus americanus americanus (Erxleben) *Southern Virginia deer*

1777 [*Cervus dama*] *americanus* Erxleben, Syst. regn. anim. 1:312 (Virginia)

Size medium; teeth small, the row of lower cheek teeth 75 (3) in length; *winter pelage not conspicuously grayer or coarser than summer pelage*; horns slender, 540 (21½) in length, 90 (3½) in circumference at base. (*americanus*; N. Lat., American)

The southern Virginia deer is an inhabitant of the austral zones. Its range is not at present understood in detail; and it may eventually be found that the animal does not enter our limits.

Odocoileus americanus borealis, subsp. nov.¹ *Northern Virginia deer*

Cariacus virginianus Auct. (not *Cervus virginianus* Boddaert, which is *O. americanus americanus*)

1898. *Mazama americana* Lydekker, The deer of all lands, p. 249. (part)

Size, large; teeth large, the row of lower cheek teeth 85 (3¾) in length; *winter pelage coarse, usually much tinged with gray, very different from summer pelage*; horns robust, 540 (21½) in length, 120 (4¾) in circumference at base. (*borealis*; Lat., northern)

The northern Virginia deer is an inhabitant of the Canadian zone. It is abundant throughout northern New York, northern New England and southeastern Canada. The limits of its range are not known.

Order Glires *Rodents*

Front teeth long, chisel shaped; cheek teeth broad, short, flat-crowned; a wide toothless space between front teeth and cheek teeth. (Gli-res; Lat., a dormouse)

¹ Type, adult male (skin and skull) No. 4999, collection of E. A. and O. Bangs, Bucksport, Maine, 12 Dec. 1895. Collected by Alvah G. Dorr.

Some of the measurements of this specimen are as follows: total length, 1830 (6 ft); tail 280 (11 in.) (from fresh specimen by collector). Skull, greatest length 340 (13¾), basal length, 310 (12¼), zygomatic breadth, 130 (5); length of upper tooth row, 83 (3¼); greatest width between outer sides of upper tooth row, 83 (3¼), lower tooth row, 63 (3¼).

The order *Glir es* is essentially cosmopolitan. Its members may be recognized at a glance by their peculiar teeth. The group is usually divided into 21 families,¹ nine of which occur in North America. Six of these are found within our limits.

FAMILIES OF GLIRES

Upper front teeth four, the second pair minute and placed directly behind the first (hares, <i>Duplicidentata</i>)	Leporidae, p. 115
Upper front teeth two. (<i>Simplicidentata</i>)	
Tail very broad, flattened from above downward (beaver).....	Castoridae, p. 91
Tail rounded or flattened from side to side	
Fur thickly sprinkled with stiff quills (porcupines)	Erethizontidae, p. 115
Fur without quills	
At least four well developed grinding teeth in each jaw; tail bushy (squirrels, etc.)....	Sciuridae, p. 84
Never more than three well developed grinding teeth in each jaw; tail closely haired	
Hind feet not greatly elongated (rats, mice etc.)	Muridae, p. 92
Hind feet greatly elongated (jumping mice)	Dipodidae, p. 111

Family *Sciuridae* *Squirrels*

Upper front teeth two; upper cheek teeth four or five, lower cheek teeth four; a well developed bony projection on skull above and behind eye socket (postorbital process); tail round, covered with long hairs which are usually so arranged as to form a broad, flat brush. (*Sciuridae*; genus *Sciurus*)

The family *Sciuridae* is almost cosmopolitan in distribution. It is a large group, containing 15 or 20 genera. In North America it is represented by seven genera, four of which occur within our limits.

GENERA OF SCIURIDAE

Sides with a densely furred membrane joining front and hind legs (flying squirrels).....	Sciuropterus, p. 90
Sides without membrane	
Form stout and clumsy; tail less than half as long as body; top of skull nearly flat (woodchucks)	Arctomys, p. 89
Form slender and graceful; tail much more than half as long as body; top of skull distinctly rounded	
Cheek pouches present; back striped (chipmunks)	Tamias, p. 88
Cheek pouches absent; back (in our species) without stripes (squirrels).....	Sciurus, p. 85

¹ Tullberg recognizes 27 families, but even this number is probably too small.

Genus **Sciurus** Linnaeus

1758 *Sciurus* Linnaeus, *Systema naturae*. ed. 10, 1: 63. Type *Sciurus vulgaris* Linnaeus.

Tail very long and bushy, the hairs longest on the sides; ears well developed, pointed, hairy; thumb with a rudimentary nail. (*Sciurus*; Gk. shade tail)

The genus *Sciurus*, which is found in nearly all parts of the world except Australia and the neighboring islands, is well represented in North America, about 80 forms occurring north of Panama. Three species are found within our limits.

SPECIES OF **SCIURUS**

Size small, hind foot less than 50 (2); back red (red squirrels, subgenus *Tamiasciurus*)..... *S. hudsonicus*

Size medium or large, hind foot over 60 (2 $\frac{3}{4}$); back not red

Ears whitish (gray squirrels, subgenus *Neosciurus*). *S. carolinensis*

Ears rusty brown (fox squirrels, subgenus *Parasciurus*) *S. ludovicianus*

Sciurus hudsonicus (Erxleben) *Red squirrel*

Size small; *back red, varying* much in exact shade; belly white or gray, never tawny in forms found within our limits. (*hudsonicus*; N. Lat., Hudsonian)

The well known red squirrel occurs throughout the wooded parts of northern North America. In different regions it has developed numerous well marked local races, three of which occur in eastern North America.

SUBSPECIES OF **SCIURUS HUDSONICUS**

Hind foot about 44 (1 $\frac{3}{4}$); edge of tail reddish. *S. hudsonicus gymnicus*

Hind foot about 47 (1 $\frac{7}{8}$); edge of tail yellowish or grayish

Belly in winter pelage gray..... *S. hudsonicus hudsonicus*

Belly always pure white. *S. hudsonicus loquax*

Sciurus hudsonicus gymnicus Bangs *Canadian red squirrel*

1899 *Sciurus hudsonicus gymnicus* Bangs, Proc. New England zool. club. 31 Mar. 1899. 1: 28. (Greenville (near Moosehead lake) Maine)

Colors dark and rich; outer fringe of tail distinctly *red*; belly white in summer, *dark gray* in winter. Total length, 290 (11 $\frac{1}{2}$); tail vertebrae, 120 (4 $\frac{3}{4}$); hind foot, 44 (1 $\frac{3}{4}$). (*gymnicus*; Lat., gymnastic)

The Canadian red squirrel inhabits the Canadian forests of eastern North America, south to northern New York.

Sciurus hudsonicus hudsonicus (Erxleben) *Hudsonian red squirrel*

1777 [*Sciurus vulgaris*] *ε hudsonicus* Erxleben, Syst. regn. anim. 1: 416. (Hudson bay)

1894 *Sciurus hudsonicus* Allen, Bull. Am. mus. nat. hist. 7 Nov. 1894. 6: 325.

1898 *Sciurus hudsonicus* Allen, Bull. Am. mus. nat. hist. 22 July 1898. 10: 255.

Colors pale, outer fringe of tail *yellowish or grayish*, belly white in summer, dark gray in winter. Total length, 310 (21 $\frac{1}{2}$); tail vertebrae, 118 (4 $\frac{3}{4}$); hind foot, 47 (1 $\frac{3}{4}$). (*hudsónicus*; N. Lat., Hudsonian)

The Hudsonian red squirrel is probably confined to the wooded portions of the Labrador peninsula.

Sciurus hudsonicus loquax Bangs *Southeastern red squirrel*

1896 *Sciurus hudsonicus loquax* Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 161. (Liberty Hill Ct.)

1898 *Sciurus hudsonicus loquax* Allen, Bull. Am. mus. nat. hist. 28 July 1898. 10: 257.

Colors pale; outer fringe of tail *yellowish*; *belly pure white at all seasons*. Total length, 315 (12 $\frac{1}{2}$); tail vertebrae, 130 (5 $\frac{1}{2}$); hind foot, 47 (1 $\frac{3}{4}$). (*lóquax*; Lat., talkative)

The southeastern red squirrel occurs in the deciduous forests of the transition and upper austral zones of the eastern United States.

Sciurus carolinensis Gmelin *Gray squirrel*

Size *medium*; *back gray*, more or less tinged with *yellowish*; belly white, occasionally blotched with *rusty*; ears *whitish*. (*carolinénsis*; N. Lat., Carolinian)

The gray squirrel is a wide ranging species, divisible into numerous geographic races, two of which occur within our limits.

SUBSPECIES OF SCIURUS CAROLINENSIS

Hind foot about 60 (2 $\frac{3}{8}$); back always strongly tinged with rusty yellowish.....	<i>S. carolinensis carolinensis</i>
Hind foot about 70 (2 $\frac{1}{4}$); back in winter pelage clear gray....	<i>S. carolinensis leucotis</i>

Sciurus carolinensis carolinensis Gmelin *Southeastern gray squirrel*

1788 [*Sciurus*] *carolinensis* Gmelin, Systema naturae. ed. 13, 1: 148.

1896 *Sciurus carolinensis carolinensis* Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 153.

Back dark yellowish rusty gray, *never clear gray* in any pelage. Total length, 455 (18); tail vertebrae, 205 (8); hind foot, 60 ($2\frac{3}{8}$). (*carolinensis*; N. Lat., Carolinian)

The southeastern gray squirrel inhabits the austral zones of the eastern United States from New Jersey to northern Florida.

Sciurus carolinensis leucotis (Gapper) *Northeastern gray squirrel*

1830 *Sciurus leucotis* Gapper, Zoological journal. 5: 206. (Region between York and Lake Simcoe, Ontario)

1877 *Sciurus carolinensis* var. *leucotis* Allen, Monogr. N. Am. rodentia, p. 706.

1896 *Sciurus carolinensis leucotis* Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 155.

Back *clear silvery gray in winter pelage*, often tinged with yellowish brown in summer, belly occasionally with rusty blotches. Total length, 500 ($19\frac{1}{2}$); tail vertebrae, 220 ($8\frac{1}{2}$); hind foot, 70 ($2\frac{3}{8}$). (*leucotis*; Gk., white ear)

The northeastern gray squirrel occurs in the deciduous forests of the transition zone and lowermost part of the Canadian zone in Pennsylvania, New York, New England and southeastern Canada. Wholly or partly black individuals are often met with.

Sciurus ludovicianus Custis *Fox squirrel*

Size medium; back always strongly tinged with rusty; *belly never pure white* (varying from bright rust color to rusty white; *ears rusty*). (*ludovicianus*; N. Lat., Louisianian)

The fox squirrel is confined to the forests of the austral zones and lower edge of the transition zone of eastern North America. Its western limit is not definitely known. Of the three or more races into which the species is divisible, only the following occurs within our limits. Partly or wholly black individuals are not uncommon.

Sciurus ludovicianus vicinus Bangs *Northern fox squirrel*

1896 *Sciurus ludovicianus vicinus*. Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 150. (White Sulphur Springs, West Virginia)

Back mixed black and rusty; belly varying from pale rust color to rusty white; ears rusty. Total length, 590 ($23\frac{1}{2}$); tail vertebrae, 270 ($10\frac{1}{2}$); hind foot, 73 ($2\frac{7}{8}$). (*vicinus*; Lat., neighboring)

The northern fox squirrel is an inhabitant of the forests of the transition zone and upper austral zone east of the Alleghanies. It formerly occurred with considerable regularity as far north as central New York and southern New England, but it is now fast approaching extinction, specially in the northern part of its range. The western fox squirrel, *S. ludovicianus ludovicianus*, occupies the same zones in the region immediately west of the Alleghanies.

Genus **Tamias** Illiger

1811 *Tamias* Illiger, Prodr. syst. mamm. et. avium, p. 83. Type *Sciurus striatus* Linnaeus.

Like *Sciurus*, but with less bushy tail, and with well developed cheek pouches in which large quantities of food can be carried. *The only known species is conspicuously striped on the back*, while none of our squirrels are so marked. *Upper cheek teeth four* on each side, all well developed. (*Tamias*; Gk., a steward)

The genus *Tamias* is represented by one species only, the well known chipmunk of the eastern United States and southern Canada.

Tamias striatus (Linnaeus) *Eastern chipmunk*

Reddish brown or yellowish brown; *back with five black stripes and two whitish ones.* (*striatus*; Lat., striped)

The eastern chipmunk occurs throughout eastern North America from the lower edge of the upper austral zone to the lower edge of the Hudsonian zone. It is divisible into four geographic races, two of which occur within our limits.

SUBSPECIES OF **TAMIAS STRIATUS**

Rump rich rufous brown.....*T. striatus striatus*
Rump pale, dull, yellowish brown..... *T. striatus lysteri*

Tamias striatus striatus (Linnaeus) *Southeastern chipmunk*

1758 [*Sciurus*] *striatus* Linnaeus, *Systema naturae*. ed. 10. 1: 64. (South-eastern United States)

1857 *Tamias striatus* Baird, 11th Smithsonian report, p. 35.

1886 *Tamias striatus* Merriam, *American naturalist*. Mar. 1886, 20: 242.

Colors dark and rich; rump warm rufous brown, or chestnut. Total length, 250 (9 $\frac{3}{8}$); tail vertebrae, 90 (3 $\frac{3}{8}$); hind foot, 33 (1 $\frac{3}{8}$). (*striatus*; Lat., striped)

The southeastern chipmunk inhabits the old fields and open woods of the upper austral zone. It is abundant from the lower Hudson valley south to North Carolina.

Tamias striatus lysteri (Richardson) *Northeastern chipmunk*

1829 *Sciurus* (*Tamias*) *lysteri* Richardson, *Fauna Boreali-Americana*. 1: 182. (Penetanguishene, Ontario, Canada)

1886 *Tamias striatus lysteri* Merriam, *American naturalist*. Mar. 1886. 20: 242.

Color pale and dull, rump yellowish brown. Total length, 250 (9 $\frac{3}{8}$); tail vertebrae, 95 (3 $\frac{3}{8}$); hind foot 36 (1 $\frac{3}{8}$).

The northeastern chipmunk inhabits clearings, old fields and open woods in the transition zone and lower part of the Canadian zone in the region east of Lake Huron and the upper Mississippi valley. It is abundant throughout the greater part of New York and New England.

Genus **Arctomys** Schreber1780 *Arctomys* Schreber, Säugethiere. pl. 207.

Form stout and heavy; tail short, much less than half as long as body, densely covered with long, rather stiff hairs; upper cheek teeth five in each jaw, each, except first, with two transverse grooves on crown. (*Arctomys*; Gk., bear mouse)

The genus *Arctomys* occurs throughout the greater part of northern North America, Asia and alpine Europe. It is represented in North America by six or more species, two of which, the well known woodchuck or ground-hog, and a little known animal from Labrador, occur within our limits.

SPECIES OF ARCTOMYS

- Fur much suffused with reddish and yellowish; skull long and narrow, smooth above..... *A. monax*
 Fur slightly suffused with reddish and yellowish; skull short and broad, with a well developed median ridge over brain case *A. ignavus*

Arctomys monax (Linnaeus) *Common woodchuck*

1758 [*Mus*] *monax* Linnaeus, *Systema naturae*. ed. 10.1:60. (Maryland)
 1780 *Arctomys monax* Schreber, Säugethiere. 4:737.

Grizzly gray, varied with chestnut, yellowish and blackish; under parts reddish; skull long and narrow, the top smooth. Total length, 460 (18); tail vertebrae, 115 (4½); hind foot, 75 (3). (*Mónax*; Lat., a hermit)

The common woodchuck is an abundant animal throughout the Hudsonian, Canadian, transition and upper austral zones in eastern North America from Labrador and Hudson bay south at least to Virginia. Two races probably occur in this region, but their characters are not well understood. The southern form is *A. monax monax*, the northern *A. monax canadensis* (Erxleben) (See Allen, *Bull. Am. mus. nat. hist.* 10 Nov. 1898. 10:456.) Partly or wholly black individuals are often met with.

Arctomys ignavus Bangs *Labrador woodchuck*

1899 *Arctomys ignavus* Bangs, *Proc. New England zool. club.* 28 Feb. 1899. 1:13. (Black bay, Labrador)

Dark grizzly gray, little varied with yellowish and reddish; *skull short and broad, the braincase developing a well marked median ridge* in adult individuals. Total length, 500 (19½); tail vertebrae, 140 (5½); hind foot, 80(3½). (*ignavus*; Lat., inactive)

The Labrador woodchuck is at present known from Black bay, Labrador only.

Genus **Sciuropterus** F. Cuvier

1858 *Sciuropterus* F. Cuvier, *Dents des mammifères*, p. 255. Type *Sciurus volans* Linnaeus.

Squirrels with a broad furry membrane connecting front and hind leg of each side, but none between hind legs. (*Sciuropterus*; Gk., squirrel wing)

The genus *Sciuropterus* is distributed throughout the greater part of northern Europe, northern Asia and northern North America. It contains a dozen or more species, several of which are American. Two occur within our limits.

SPECIES OF **SCIUROPTERUS**

Total length about 280 (11); fur of belly dark at base..... *S. sabrinus*
 Total length about 230 (9); fur of belly white to base..... *S. volans*

Sciuropterus volans (Linnaeus) *Southern flying squirrel*

1758 [*Mus*] *volans* Linnaeus, *Systema naturae*. ed. 10. 1:63. (Virginia)

1890 *S[ciuropterus] volans* Jordan, *Manual of the vertebrate animals of the northern United States*. ed. 5. p. 324.

1896 *Sciuropterus volans volans* Bangs, *Proc. biol. soc. Washington*. 28 Dec. 1896. 10:164.

Back drab, somewhat shaded with russet, not distinctly different in winter and summer; *belly pure white to extreme base of hairs*. Total length 230 (9); tail vertebrae, 100 (4); hind foot, 30 (1½). (*volans*; Lat., flying)

The southern flying squirrel occurs in woods, orchards, buildings, etc., in the transition zone and upper austral zone from New Hampshire and southern Ontario to Georgia. It is divisible into two races; of which the typical form alone, *S. volans volans*, occurs within our limits.

Sciuropterus sabrinus (Shaw) *Northern flying squirrel*

Back in winter glossy wood brown mixed with cinnamon, in summer sooty drab; *belly dirty white, the hairs darker at base*. (*sabrinus*; N. Lat., Severn)

The northern flying squirrel occurs throughout the wooded portions of eastern North America from the southern border of the Canadian zone northward. It is abundant in the evergreen forests of central and northern New York and New England, and in the Alleghanies. Two subspecies occur within our limits.

SUBSPECIES OF SCIUROPTERUS SABRINUS

- Size large, hind foot over 40 ($1\frac{1}{8}$); ear short and broad S. *sabrinus sabrinus*
 Size medium, hind foot under 40 ($1\frac{1}{8}$); ear long and narrow S. *sabrinus macrotis*

Sciuropterus sabrinus sabrinus (Shaw) *Hudsonian flying squirrel*

1801 *Sciurus sabrinus* Shaw, Gen. zool. 1: 157. (Severn river, James bay)

1898 *Sciuropterus sabrinus* Mearns, Proc. U. S. nat. mus. 4 Nov. 1889. 21: 353.

Total length, 350 ($13\frac{1}{2}$); tail vertebrae, 140 ($5\frac{1}{2}$); hind foot, 42 ($1\frac{1}{8}$); ear from crown, 15 ($\frac{3}{8}$). (*sabrinus*; N. Lat., Severn)

The Hudsonian flying squirrel is confined to the Hudsonian forests of eastern and central Canada.

Sciuropterus sabrinus macrotis Mearns *Canadian flying squirrel*

1896 *Sciuropterus sabrinus* Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 162.

1898 *Sciuropterus sabrinus macrotis* Mearns, Proc. U. S. nat. mus. 4 Nov. 1898. 21: 353. (Catskill mts, N. Y.)

Total length, 280 (11); tail vertebrae, 125 (5); hind foot, 38 ($1\frac{1}{2}$); ear from crown, 20 ($\frac{3}{4}$). (*macrotis*; Gk., long eared)

The Canadian flying squirrel is abundant in the Canadian forests of the northeastern United States and southeastern Canada.

Family **Castoridae** *Beavers*

Four broad, rootless cheek teeth in each jaw; angle of lower jaw rounded; tail very broad, flattened from above downward, scaly; size large. (Castoridae; genus *Castor*)

The family Castoridae is represented by a single living genus common to the northern parts of both old and new worlds.

Genus **Castor** Linnaeus

1758 *Castor* Linnaeus, Systema naturae. ed. 10. 1: 58. Type *Castor fiber* Linnaeus.

Feet four-toed; hind feet webbed; second toe of hind foot double-clawed. (*Cástor*; Lat., a beaver)

One species of beaver occurs in North America. It is closely related to that of the old world.

Castor canadensis Kuhl *American beaver*

Flat space on top of skull between eye sockets distinctly longer than broad. (canadensis; N. Lat., Canadian)

The American beaver, which occurs throughout the wooded parts of North America, is divisible into four or more races, two of which are found within our limits.

SUBSPECIES OF CASTOR CANADENSIS

Scaly portion of tail more than twice as long as wide.....	C. canadensis canadensis
Scaly portion of tail less than twice as long as wide.....	C. canadensis carolinensis

Castor canadensis canadensis Kuhl *Northeastern beaver*

1820 *Castor canadensis* Kuhl, Beiträge zur zool. u. vergl. anat. p. 64. (Eastern Canada)

1898 *Castor canadensis* Rhoads, Trans. Am. philos. soc. n. s. Oct. 1898. 19:418.

Scaly portion of tail more than twice as long as wide; pelage long, full and soft. Total length, 1100 (35); tail vertebrae, 410 (16½); hind foot, 175 (6½). (canadensis; N. Lat., Canadian)

The northeastern beaver was formerly an inhabitant of the wooded banks of lakes and watercourses in the Hudsonian and Canadian zones of eastern Canada and the northeastern United States. It has been exterminated south of the Canadian border.

Castor canadensis carolinensis Rhoads *Southeastern beaver*

1898 *Castor canadensis carolinensis* Rhoads, Trans. Am. philos. soc. n. s. Oct. 1898. 19:420.

Scaly portion of tail less than twice as long as wide; pelage relatively short and harsh. Total length, 1100 (35); hind foot, 180 (7). (carolinensis; N. Lat., Carolinian)

The southern beaver inhabits the austral zones of the eastern United States. Its range is now restricted to the wilder foothills of the southern Alleghanies.

Family Muridae *Rats, mice, etc.*

Front teeth two; cheek teeth never more than three in each jaw. *In the species that occur within our limits the fur is without spines or bristles*, and the hind feet and legs are never greatly elongated for jumping. (Muridae; genus Mus)

The family Muridae, which includes more than one third of the existing rodents and a greater number of species than any other family of mammals, is cosmopolitan in distribution. It probably contains more than 100 genera, many of which are American, 11 occurring within our limits.

GENERA OF MURIDAE

- Grinding teeth with tubercles arranged in three transverse rows very distinct in teeth of upper jaw (subfamily Murinae, old world rats and mice) Mus, p. 94
- Grinding teeth with tubercles arranged in two rows, or without distinct tubercles of any kind
 - Crowns of grinding teeth with tubercles arranged in two rows (subfamily Cricetinae, American rats and mice)
 - Upper front teeth grooved (harvest mice) Reithrodontomys, p. 95
 - Upper front teeth not grooved
 - Skull with a distinct ridge over eye-socket; fur coarse; belly not pure white; total length over 230 (9) (rice field mice) Oryzomys, p. 96
 - Skull without ridge over eye-socket; fur fine; belly pure white; total length under 215 (8½) (white-footed mice) .. Peromyscus, p. 96
 - Crowns of grinding teeth divided into loops, or triangles formed by plates of hard enamel inclosing a softer substance (dentine)
 - Upper front teeth narrow, compressed, the antero-posterior diameter of each much greater than the transverse diameter; body slender, tail always long; eyes and ears large; belly white (subfamily Neotominae, wood rats and cave rats). Neotoma, p. 98
 - Upper front teeth broad, the antero-posterior diameter of each less than transverse diameter; body clumsy; tail usually short; eyes and ears small; belly generally not white (subfamily Microtinae, voles, lemmings, muskrats etc.)
 - Lower front teeth short, the roots terminating on inner side of grinding teeth (lemmings)
 - Upper front teeth grooved; ears small but well formed; color not changing to white in winter; tail covered with short hairs Synaptomys, p. 99
 - Upper front teeth not grooved, ears rudimentary; color white in winter, tail with a brush of stiff hairs nearly as long as itself Dicrostonyx, p. 101

Lower front teeth long, their roots extending under posterior grinding tooth into outer side of jaw (voles)	
Tail flattened laterally (musk-rat)	Fiber, p. 101
Tail round	.
Grinding teeth without roots (prongs)	Microtus, p. 102
Grinding teeth with roots (prongs) in adults	
Grinding teeth heavy, with sharp-pointed angles; color never red..	Phenacomys, p. 108
Grinding teeth light, with blunt angles; color usually red	Evotomys, p. 109

Genus *Mus* Linnaeus

1758 *Mus* Linnaeus, *Systema naturae*. ed. 10. 1: 59. Type *Mus rattus* Linnaeus.

Front teeth without grooves; cheek teeth in upper jaw with *tubercles of crown arranged in three* longitudinal rows; form slender; tail long, scaly, scant haired; fur coarse. (Lat., a mouse)

The genus *Mus* contains many old world species, but none native to America. Four have been naturalized in the United States. One of these, the roof rat, *Mus alexandrinus* (like the black rat but brown with a yellowish white belly) is normally confined to the lower austral zone. Two of the three others are well known within our limits.

SPECIES OF *MUS*

Total length under 200 (8) (mice)	<i>M. musculus</i>
Total length over 300 (12) (rats)	
Color bluish black; tail more than half of total length	<i>M. rattus</i>
Color brownish; tail less than half of total length....	<i>M. decumanus</i>

Mus musculus Linnaeus *House mouse*

1758 [*Mus*] *musculus* Linnaeus, *Systema naturae*. ed. 10. 1: 62. (Sweden) Brownish gray, slightly paler below. Total length, 170 (6 $\frac{1}{2}$); tail vertebrae, 85 (3 $\frac{3}{4}$); hind foot, 17 ($\frac{11}{16}$). (*musculus*; Lat., a little mouse)

The house mouse is thoroughly established throughout the settled parts of America. It is abundant in buildings and cultivated fields within our limits, and is sometimes found in woods.

Mus rattus Linnaeus *Black rat*

1758 [Mus] rattus Linnaeus, Systema naturae. ed. 10. 1: 61. (Sweden)
 Blue black, darker on the back, more slaty on the belly. Total length, 400 (15½); tail vertebrae, 215 (8½); hind foot, 37 (1⅞). (rát tus; Lat., a rat)

The black rat was formerly widely spread in the eastern United States. It is now rapidly disappearing before the larger and stronger brown rat. This animal occurs still in central Massachusetts, but with this exception I know of no localities where it is now found abundantly in the northeastern United States.

Mus decumanus Pallas *House rat*

1778 Mus decumanus Pallas, Nov. sp. quadr. glir. ord. p. 91. (Russia)

Brownish above; grayish beneath; tail scaly, clothed with short stiff hairs, not distinctly bicolor. Total length, 400 (15½); tail vertebrae, 180 (7½); hind foot, 45 (1¾). (decumán us; Lat., a tithe gatherer)

The house rat is abundant and well known throughout North America.

Genus **Reithrodontomys** Giglioli

1873 Reithrodontomys Giglioli, Richer. intern. alla distrib. geogr. gener. p. 60. Type Mus lecontii Aud. and Bach.

Like Peromyscus except that the face of each upper front tooth is marked by a conspicuous longitudinal groove. (Reithrodóntomys; Gk., channel tooth mouse)

The genus Reithrodontomys is confined to North America. It reaches its greatest development in Mexico and the southwestern United States, where it is represented by 15 or more forms. Only one species occurs within our limits.

Reithrodontomys lecontii (Audobon and Bachman) *Harvest mouse*

1842 Mus lecontii Audobon and Bachman, Journ. Acad. nat. sci. Philadelphia. 8: 307. (Georgia)

1895 Reithrodontomys lecontii Allen, Bull. Am. mus. nat. hist. May 21, 1895. 7: 116.

Light brown above, varying much in exact shade; whitish beneath. (lecontii; name from that of John LeConte)

The harvest mouse is common throughout the southeastern United States. Three races are now recognized: R. lecontii dickinsoni Rhoads from Florida; R. lecontii lecontii from the lower austral zone, and the following:

Reithrodontomys lecontii impiger Bangs *Virginia harvest mouse*

1898 *Reithrodontomys lecontii impiger* Bangs, Proc. biolog. soc. Washington. 10 Aug. 1898. 12: 167. (White Sulphur Springs, W. Va.)

Russet brown above, dull white beneath. Total length, 115 (4½); tail vertebrae, 51 (2); hind foot 9 (¾). (*impiger*; Lat., quick)

The little known Virginia harvest mouse has been taken at White Sulphur Springs W. Va. only. It probably occurs throughout the southern part of the upper austral zone, east of the high Alleghanies.

Genus **Oryzomys** Baird

1857 *Oryzomys* Baird, Mamm. N. Am. p. 458. Type *Mus palustris* Harlan.

Front teeth without grooves; cheek teeth with tubercles arranged in two rows; *skull distinctly ridged over eye sockets*; form slender; total length more than 230 (9); tail long, scant haired; belly not white. (*Oryzomys*; Gk., rice mouse)

The genus *Oryzomys* is widely distributed in the warmer parts of America. Many species are known, only one of which reaches the upper austral zone of the eastern United States.

Oryzomys palustris (Harlan) *Rice field mouse*

1837 *Mus palustris* Harlan, American jour. sci. 31: 386. (Fast island, near Salem N. J.)

1857 *Oryzomys palustris* Baird, Mamm. N. Am. p. 459.

Dark brown above, paler below. Total length, 240 (9½); tail vertebrae, 115 (4½); hind foot, 30 (1¾). (*palustris*; Lat., pertaining to a marsh)

The ricefield mouse is locally common in marshes throughout the austral zones of the eastern United States, north to New Jersey. The form which occurs within our limits is the typical subspecies, *O. palustris palustris*. Two others are found in Florida and a fourth in Texas.

Genus **Peromyscus** Gloger

1842 *Peromyscus* Gloger, Gemeinn. Hand-u. hilfsbuch der naturgesch. p. 95. Type *Peromyscus arboreus* Gloger-*Cricetus myoides* Gapper-*Mus sylvaticus noveboracensis* Fischer.

Front teeth without grooves, cheek teeth in upper jaw with tubercles arranged in two longitudinal rows; *skull smoothly rounded between eye sockets*; form slender. Total length, (in our species) under 220 (8¾); tail long, well furred, belly white. (*Peromyscus*; Gk., little pocket mouse)

The genus *Peromyscus*, which contains nearly 100 species, is confined to America. It reaches its greatest development in Mexico and the western United States. Three species occur within our limits, all members of the subgenus *Peromyscus*.

SPECIES OF PEROMYSCUS

- Tail about half of total length, ears large, colors
 dull or light..... *P. canadensis*
- Tail less than half of total length, ears moderate, colors
 bright or dark
- Tail slightly less than half of total length, color strongly
 russet *P. leucopus*
- Tail considerably less than half of total length, color
 dull, not strongly russet..... *P. maniculatus*

Peromyscus canadensis (Miller) *Canadian white-footed mouse*

Tail 45% to 60% of total length, with a conspicuous tuft of hair at tip; ears and eyes large. Adults never reddish brown above (young bluish gray); belly hairs always snowy white at tips. (*canadensis*; N. Lat., Canadian)

This mouse is an inhabitant of the forests of the Canadian and Hudsonian zones of eastern America. It is divisible into four subspecies, three of which occur within our limits.

SUBSPECIES OF PEROMYSCUS CANADENSIS

- Adults very pale, grayish brown..... *P. canadensis abietorum*
- Adults not pale, grayish brown
- Adults yellowish brown..... *P. canadensis canadensis*
- Adults dull brownish..... *P. canadensis nubiterrae*

Peromyscus canadensis abietorum Bangs *Hudsonian white-footed mouse*

1896 *Peromyscus canadensis abietorum* Bangs, Proc. biolog. soc. Washington. 9 Mar. 1896. 10: 49. (Lake Edward, Quebec)

Adults pale grayish brown above, never fuscous or yellowish. Total length, 190 (7½); tail vertebrae, 100 (4); hind foot, 21.5 (½). (*abietorum*; Lat., of the firs)

The Hudsonian white-footed mouse inhabits the spruce forests of Quebec, New Brunswick and Nova Scotia. It probably occurs in northern Maine.

Peromyscus canadensis canadensis Miller *Canadian white-footed mouse*

1893 *Sitomys americanus canadensis* Miller, Proc. biolog. soc. Washington. 20 June 1893. 8: 55. (Peterboro, Madison co. N. Y.)

1896 *Peromyscus canadensis* Bangs, Proc. biolog. soc. Washington. 9 Mar. 1896. 10: 49.

Adults dull yellowish brown above. Total length, 190 (7½); tail vertebrae, 100 (4); hind foot, 21.5 (½). (*canadensis*; N. Lat., Canadian)

The Canadian white-footed mouse inhabits the Canadian zone and locally the cooler parts of the transition zone in the eastern United States and Canada. It is a characteristic forest animal.

Peromyscus canadensis nubiterrae Rhoads *Cloudland white-footed mouse*

- 1896 *Peromyscus leucopus nubiterrae* Rhoads, Proc. acad. nat. sci. Philadelphia. p. 187. (Summit of Roan mountain, N. C.)
 1897 *Peromyscus canadensis nubiterrae* Rhoads, Proc. acad. nat. sci. Philadelphia. p. 213.

Adults dull brownish above. Total length, 170 ($6\frac{1}{2}$); tail vertebrae, 86 ($3\frac{1}{2}$); hind foot 21.5 ($\frac{11}{8}$). (*nubiterrae*; N. Lat., of Cloudland)

This form of the Canadian white-footed mouse is confined to the spruce forests of the high southern Alleghanies.

Peromyscus leucopus (Rafinesque) *Deer mouse*

- 1818 *Musculus leucopus* Rafinesque, Am. monthly magazine. 3: 446. (Kentucky)
 1895 *Peromyscus leucopus* Thomas, Ann. and mag. nat. hist. Feb. 1895. ser. 6. 15:192.

Tail 40% to 45 % of total length, with an inconspicuous tuft of hair at tip; ears and eyes moderate; *adults chestnut brown* above (young bluish gray); belly hairs always snowy white at tips. Total length, 170 ($6\frac{1}{2}$); tail vertebrae, 75 (3); hind foot, 20 ($\frac{11}{8}$). (*Leucopus*; Gk., white foot)

The deer mouse is abundant throughout the upper austral and transition zones. The race occurring in the former is true *leucopus*, that of the transition zone has been separated as *P. l. noveboracensis*. (See Miller, Proc. Boston soc. nat. hist. 28: 22) The status of these forms is not well understood.

Peromyscus maniculatus (Wagner) *Labrador deer mouse*

- 1845 *Hesperomys maniculatus* Wagner, Wiegmann's Archiv für naturgesch. 11, 1:148. (Moravian settlements of Labrador)
 1898 *Peromyscus maniculatus* Bangs, American naturalist. July 1898. 32:496.

Color about as in *P. canadensis canadensis*. Total length, 165 ($6\frac{1}{2}$); tail vertebrae, 74 (3); hind foot, 20 ($\frac{11}{8}$). (*maniculatus*; Lat., gloved)

The Labrador white-footed mouse is probably confined to the wooded parts of the Hudsonian zone in Labrador. The species is very imperfectly known.

Genus **Neotoma** Say & Ord

- 1825 *Neotoma* Say & Ord. Jour. acad. nat. sci. Philadelphia. v. 9, pt 2, p. 346. Type *Neotoma floridana* Say & Ord.

Front teeth without grooves, narrow, compressed, much deeper than broad; grinding teeth rooted, the flat crown divided by enamel folds into loops and

triangles; form slender; tail long and hairy; eyes and ears large; fur soft. (Neotoma; Gk., new cutter)

The genus *Neotoma* is peculiar to America. It reaches its greatest development in Mexico and the southwestern United States, where 70 or more forms occur. One species only is found in the eastern United States north of the lower austral zone. This is a member of the restricted subgenus *Neotoma*, in which the tail is round.

Neotoma pennsylvanica Stone *Alleghany cave rat*

1894 *Neotoma pennsylvanica* Stone, Proc. acad. nat. sci. Philadelphia. p. 16. (South mountain, Cumberland co. Pa.)

Grayish above, white beneath, *tail furry, sharply bicolor*. Total length, 410 (16½); tail vertebrae, 85 (7½); hind foot, 42 (1½). (*pennsylvanica*; N. Lat., Pennsylvanian)

The Alleghany cave rat is common in caves and rocky woods throughout the Alleghanies. Its northern range extends to the lower Hudson valley. This is the common rat in Mammoth cave. Aside from the character of its teeth, the cave rat differs from the house rat in its larger eyes and ears, long soft fur and more hairy tail, *which is dark above and white below, the two colors sharply defined*.

Genus **Synaptomys** Baird

1857 *Synaptomys* Baird, Mamm. N. Am. p. 558. Type *Synaptomys cooperi* Baird

Face of each upper front tooth with a distinct longitudinal groove, grinding teeth without roots (prongs); skull small, not strongly angular; claws small, simple; tail moderate (about as long as hind foot) covered with short hairs; color always dark. (*Synaptomys*; Gk., connecting mouse)

The genus *Synaptomys*, containing the smallest and least specialized of the lemmings, has not been detected in the old world. It is generally distributed throughout boreal North America. Eight species are now recognized, four of which occur within our limits.

SPECIES OF SYNAPTOMYS

Mammæ 6; crown of each lower cheek teeth with a small closed triangle of enamel on outer side (subgenus *Synaptomys*)

Upper front teeth relatively broad and heavy *S. cooperi*

Upper front teeth relatively narrow and light *S. fatuus*

Mammæ 8; crown of lower cheek teeth without closed triangles of enamel on outer side (subgenus *Mictomys*)

Total length, 115 (4½) *S. inuitus*

Total length, 132 (5½)..... *S. sphagnicola*

Synaptomys cooperi Baird *Cooper's lemming*

1857 *Synaptomys cooperi* Baird, Mamm. N. Am. p. 55*. (Probably northern New Jersey or southern New York)

1896 *Synaptomys cooperi* Merriam, Proc. biolog. soc. Washington. 19 Mar. 1896. 10:58.

General appearance of a common meadow mouse, but tail very much shorter; color grizzled gray and yellowish brown thickly sprinkled with black; belly soiled whitish. Total length, 120 ($4\frac{3}{4}$); tail vertebrae, 18 ($1\frac{1}{2}$); hind foot, 18 ($1\frac{1}{2}$). (*cooperi*; name from that of William Cooper)

Cooper's lemming is locally common in cool bogs and marshy places from Massachusetts to Virginia, west to Michigan and Indiana.

Synaptomys fatuus Bangs *Bangs's lemming*

1896 *Synaptomys fatuus* Bangs, Proc. biolog. soc. Washington. 9 Mar. 1896. 10:47. (Lake Edward, Quebec)

1896 *Synaptomys fatuus* Merriam, Proc. biolog. soc. Washington. 19 Mar. 1896. 10:58

Like *S. cooperi* but with smaller front teeth and less heavily built anterior part of skull. Total length, 120 ($4\frac{3}{4}$); tail vertebrae, 21 ($\frac{4}{5}$); hind foot, 18 ($1\frac{1}{2}$). (*fatuus*; Lat., clumsy)

Bangs's lemming is common in bogs and wet woods of the Hudsonian zone and upper part of the Canadian zone from New Brunswick to the north shore of Lake Superior, south to New Hampshire. A single specimen has been recorded from the Catskills.

Synaptomys innuitus True *True's lemming*

1894 *Mictomys innuitus* True, Diagnoses of new North American mammals. 26 Ap. 1894. p. 3. Reprinted in Proc. U. S. nat. mus. 15 Nov. 1894. 17:243. (Fort Chimo, Ungava, Labrador)

1896 *Synaptomys innuitus* Merriam, Proc. biolog. soc. Washington. 19 Mar. 1896. 10:61.

Like *S. cooperi* but smaller. Total length 115 ($4\frac{3}{4}$); tail vertebrae, 17 ($1\frac{1}{2}$); hind foot, 17 ($1\frac{1}{2}$); greatest length of skull, 19 ($\frac{3}{4}$). (*innuitus*; N. Lat., Eskimo)

True's lemming is at present known from northern Labrador only (Fort Chimo and Hamilton inlet)

Synaptomys sphagnicola Preble *Preble's lemming*

1899 *Synaptomys sphagnicola* Preble, Proc. biolog. soc. Washington. 29 May 1899. 13:43. (Fabyans, Coos co., New Hampshire)

Like *S. cooperi* but larger. Total length, 132 ($5\frac{3}{4}$); tail vertebrae, 24 ($1\frac{1}{2}$); hind foot, 20 ($\frac{4}{5}$); greatest length of skull, 27 ($1\frac{1}{2}$). (*sphagnicola*; N. Lat., an inhabitant of sphagnum)

Preble's lemming is at present known from the type specimen only, taken in the Canadian forests near the foot of Mt Washington, New Hampshire.

Genus **Dicrostonyx** Gloger

1844 *Dicrostonyx* Gloger, *Gemeinn. hand. u. hilfsbuch d. naturgesch.* 1: xxxi, 97. Type *Mus hudsonius*, Pallas.

Face of each upper front tooth smooth, grinding teeth without roots (prongs), *skull large, heavily angular; ears reduced to mere naked rims; claws very large; in winter apparently double; tail very short with a long brush of stiff hairs; fur turning white in winter.* (*Dicrostonyx*; Gk., fork claw)

The genus *Dicrostonyx*, containing the lemmings which turn white in winter, is circumpolar in distribution. One or more forms occur in northern Europe and Asia. The following species is found in Labrador.

Dicrostonyx hudsonius Pallas *Labrador lemming*

1778 *Mus hudsonius* Pallas, *Nov. spec. quadr. glir. ord.* p. 203.

1897 *Dicrostonyx hudsonius* Bangs, *Proc. biolog. soc. Washington.* 11: 237.

In summer about the color of a Maltese cat, slightly varied with rusty; a narrow black line down middle of back; in winter pure white. Total length, 150 (6); tail vertebrae, 21 ($\frac{1}{3}$); hind foot, 21 ($\frac{1}{3}$). (*hudsonius*; N. Lat., Hudsonian)

The range of the Labrador lemming is imperfectly known. The animal occurs on the barrens of northern Labrador, south at least to Hamilton inlet.

Genus **Fiber** Cuvier

1800 *Fiber* Cuvier, *Leçons d'anat. comp.* 1, tab. 1. (Described in *Tab. élém. de l'hist. nat. des anim.* 1798, p. 141) Type *Castor zibethicus* Linnaeus.

Front teeth without grooves, broader than deep; *grinding teeth with roots (prongs)*, body short and thick; tail long, *flattened laterally.* (*Fiber*; Lat., a beaver)

The genus *Fiber* containing the well known muskrat, is peculiar to America. Seven forms have been described, but their interrelationships are very imperfectly understood. Two species occur within our limits.

SPECIES OF FIBER

Upper lip yellowish brown, total length over 500 (19 $\frac{1}{2}$)..... *F. zibethicus*
Upper lip white, total length under 500 (19 $\frac{1}{2}$)..... *F. obscurus*

Fiber zibethicus Linnaeus *Muskrat*

Size usually large; hind foot generally about 80 ($3\frac{1}{2}$) color very variable; upper lip yellowish brown. (*zibethicus*; Lat., a civet, in allusion to the musky odor)

The muskrat occurs throughout North America south into the lower austral zone. It is divisible into four or five races, two of which occur within our limits.

SUBSPECIES OF FIBER ZIBETHICUS

- Hind foot about 80 ($3\frac{2}{3}$); color brown much suffused with yellowish and reddish..... F. zibethicus zibethicus
 Hind foot about 73 ($2\frac{2}{3}$); color blackish brown, little suffused with yellowish and reddish..... F. zibethicus aquilonius

Fiber zibethicus zibethicus (Linnaeus) *Northern muskrat*

1766 [Castor] zibethicus Linnaeus, Systema naturae, ed. 12. 1: 79.
 (Eastern Canada)

1817 Fiber zibethicus Cuvier, Règne animal, 1: 192.

Rich dark brown above; sides and belly strongly tinged with rusty. Total length, 600 ($23\frac{1}{2}$); tail vertebrae, 267 ($10\frac{1}{2}$); hind foot, 80 ($3\frac{1}{8}$). (zibéthicus; Lat., a civet, in allusion to the musky odor)

The northern muskrat is abundant in marshes and on the borders of ponds and water courses throughout eastern North America, south at least into the upper austral zone. In Louisiana it is replaced by another race, F. z. rivalicicus Bangs. In Labrador it gives way to the following form.

Fiber zibethicus aquilonius Bangs *Labrador muskrat*

1899 Fiber zibethicus aquilonius Bangs, Proc. New England zool. club. 28 Feb. 1899. 1: 11.

Blackish brown above; sides and belly tinged with umber. Total length, 540 ($2\frac{1}{2}$); tail vertebrae, 240 ($9\frac{1}{2}$); hind foot, 73 ($2\frac{1}{2}$). (aquilónius; Lat., northern)

The Labrador muskrat is thus far known from Black bay, Labrador only. It probably ranges throughout the Hudsonian zone of Labrador.

Fiber obscurus Bangs *Newfoundland muskrat*

1894 Fiber obscurus Bangs, Proc. biolog. soc. Washington. 15 Sep. 1894. 9: 133. (Codroy, Newfoundland)

Blackish brown above; sides and belly light grayish brown tinged with fawn color; upper lip white. Total length, 180 (19); tail vertebrae, 210 ($8\frac{1}{2}$); hind foot, 70 ($2\frac{3}{4}$). (obscurus; Lat., dark)

The Newfoundland muskrat is confined to the island of Newfoundland.

Genus **Microtus** Schrank

1798 Microtus Schrank, Fauna boica. 1: 72. Type Mus arvalis Pallas.

Front teeth without grooves, not compressed, broader than deep: grinding teeth without roots, (prongs); bony palate not ending in a thin-edged shelf behind; body stout and thick; tail short; ears just appearing above fur (color seldom distinctly red). (Microtus; Gk., small ear)

The genus Microtus is distributed throughout the boreal and austral regions of the northern hemisphere. It probably contains one hundred or more species, seven of which occur within our limits.

SPECIES OF MICROTUS

- Fur dense and mole-like; claws on front feet longest (subgenus *Pitymys*)**..... *M. pinetorum*, p. 103
- Fur not dense and mole-like; claws on hind feet longest (subgenus *Microtus*)**
- Face or muzzle distinctly yellowish
- Total length about 180 (6 $\frac{1}{2}$); muzzle patches pale..... *M. terraenovae*, p. 104
- Total length about 165 (6 $\frac{1}{4}$); muzzle patches dark..... *M. chrotorrhinus*, p. 104
- Face or muzzle not distinctly yellowish
- Total length often over 200 (8); color very pale..... *M. breweri*, p. 105
- Total length seldom if ever reaching 200 (8); color dark
- Teeth weak; front teeth protruding forward; the row of cheek teeth less than $\frac{1}{4}$ basal length of skull... *M. enixus*, p. 105
- Teeth strong; front teeth not protruding forward; the row of cheek teeth more than $\frac{1}{4}$ basal length of skull
- Skull not very broad (the common field mouse of the eastern United States) *M. pennsylvanicus*, p. 105
- Skull very broad (confined to Great Gull island off the eastern end of Long Island, New York) *M. nesophilus*, p. 107

***Microtus pinetorum* (Le Conte) Pine mouse**

Fur dense velvety and mole-like, eyes and ears very small, claws on front feet longest; color of adults dull reddish brown; young slaty. (pinetorum; Lat., of the pines)

The pine mouse inhabits dry sandy soil (usually in thickets and open woods) in the austral zones and lower part of the transition zone of the United States from the Atlantic coast west to Missouri and Indian territory. It is divisible into four or more subspecies, one of which occurs within our limits.

***Microtus pinetorum scalopsoides* (Audubon & Bachman)**

Northern pine mouse

- 1841 *Arvicola scalopsoides* Audubon & Bachman, Proc. acad. nat. sci. Philadelphia, Oct. 1841. 1:97. (Long Island, New York)
- 1896 *Microtus pinetorum scalopsoides* Batchelder, Proc. Boston soc. nat. hist. Oct. 1896. 27: 187.
- 1900 *Microtus pinetorum scalopsoides* Bailey North American fauna. 6 June 1900. no. 17, p. 64.

Adults reddish brown, lighter than in the southeastern pine mouse (*M. pinetorum pinetorum*) of the lower austral zone. Total length, 125 (5); tail vertebrae, 22 ($\frac{1}{2}$); hind foot, 16 ($\frac{1}{2}$). (*scalopsoides*; Gk., mole-like)

The northern pine mouse inhabits the upper austral zone and lower part of the transition zone east of the Alleghanies. It generally occurs in colonies, which may be detected by the mole-like ridges thrown up by the animals.

Microtus terraenovae Bangs *Newfoundland vole*

- 1894 *Arvicola terraenovae* Bangs, Proc. biolog. soc. Washington. 27 July 1894. 9:129. (Codroy, Newfoundland)
 1896 [*Microtus*] *terraenovae* Miller, North American fauna. 23 July 1896. no. 12, 66.
 1900 *Microtus terraenovae* Bailey, North American fauna. 6 June 1900. no. 17, p. 25.

Above umber brown, slightly sprinkled with blackish hairs; below light gray; tail well haired, blackish above, light gray below; a pale dull tawny patch on each side of muzzle at roots of whiskers. Total length, 180 (6 $\frac{1}{2}$); tail vertebrae, 50 (2); hind foot, 24 (1). (*terraenovae*; N. Lat., of Newfoundland)

The Newfoundland vole is confined to the island of Newfoundland.

Microtus chrotorrhinus (Miller) *Rock vole*

Light brown above, thickly sprinkled with blackish hairs beneath; a conspicuous ochraceous patch on each side of muzzle; *hind foot about 21* ($1\frac{1}{3}$). (*chrotorrhinus*; Gk., color nose)

The rock vole inhabits heavy spruce woods and rock cavities in the Hudsonian zone of eastern North America. Two well marked subspecies are known, both of which occur within our limits.

SUBSPECIES OF MICROTUS CHROTORRHINUS

- Muzzle patch dark tawny ochraceous, confined to extremity of muzzle *M. chrotorrhinus chrotorrhinus*
 Muzzle patch pale tawny ochraceous, suffusing whole face.... *M. chrotorrhinus ravus*

Microtus chrotorrhinus chrotorrhinus (Miller) *Southern rock vole*

- 1894 *Arvicola chrotorrhinus* Miller, Proc. Boston soc. nat. hist. 24 Mar. 1894. 26:190. (Mt Washington, New Hampshire)
 1896 *Microtus chrotorrhinus* Bangs, Proc. biolog. soc. Washington. 9 Mar. 1896. 10:49.
 1900 *Microtus chrotorrhinus* Bailey, North American fauna. 6 June 1900. no. 17, p. 58.

General color of upper parts umber brown; muzzle patches deep tawny ochraceous *strictly confined to sides of muzzle*. Total length, 165 (6 $\frac{1}{2}$); tail vertebrae, 50 (2); hind foot, 20 ($1\frac{1}{3}$). (*chrotorrhinus*; Gk., color nose)

The southern rock vole is locally distributed in the Hudsonian zone and in cold situations in the Canadian zone of Quebec, New Brunswick, the White mountains, Adirondacks and Catskills.

Microtus chrotorrhinus ravus Bangs *Labrador rock vole*

1898 *Microtus chrotorrhinus ravus* Bangs, Proc. biol. soc. Washington. 16 Nov. 1898. 12:188. (Black bay, Labrador)

1900 *Microtus chrotorrhinus ravus* Bailey, North American fauna. June 1900. No. 17, p. 59.

General color of upper parts light umber brown; muzzle patches pale tawny ochraceous *spreading over whole face*. Total length, 160 (6 $\frac{1}{2}$); tail vertebrae, 45 (1 $\frac{3}{4}$); hind foot, 22 ($\frac{3}{4}$). (r á v u s; Lat., yellow gray)

The Labrador rock vole is thus far known from Black bay, Labrador only.

Microtus breweri (Baird) *Muskeget island vole*

1857 *Arvicola breweri* Baird, Mamm. N. Am. p. 525. (Muskeget island, Massachusetts)

1896 *Microtus breweri* Miller, Proc. Boston soc. nat. hist. June 1896. 27: 75.

1900 *Microtus breweri* Bailey, North American fauna. 6 June 1900. no. 17, p. 26.

Light gray, pure and whitish on belly, dull, tinged with wood brown and sprinkled with blackish hairs on back; *fur harsh and coarse*. Total length, 195 (7 $\frac{3}{4}$); tail vertebrae, 48 (1 $\frac{7}{8}$); hind foot, 24 (1 $\frac{3}{8}$). (b r é w e r i; name from that of Thomas Mayo Brewer)

The Muskeget island vole is peculiar to the island of Muskeget, off Nantucket, Massachusetts.

Microtus enixus Bangs *Hamilton inlet vole*

1896 *Microtus enixus* Bangs, American naturalist. Dec. 1896. 30: 1051. (Hamilton inlet Labrador)

1900 *Microtus enixus* Bailey, North American fauna. 6 June 1900. no. 17, p. 24.

Upper parts dark umber brown, much sprinkled with black hairs; under parts dark gray occasionally slightly washed with buffy, *teeth very lightly built, the front teeth slender and strongly projecting, the row of cheek teeth averaging less than $\frac{1}{2}$ basal length of skull*. Total length, 190 (7 $\frac{3}{4}$); tail vertebrae, 60 (2 $\frac{3}{8}$); hind foot, 22 ($\frac{3}{4}$). (e n i x u s; Lat., zealous)

The Hamilton inlet vole is abundant throughout northern Labrador.

Microtus pennsylvanicus (Ord) *Field mouse*

Upper parts dark brown, much sprinkled with black; under parts gray, usually washed with buffy; *teeth strong, the front teeth heavy, not directed noticeably forward, the row of cheek teeth averaging more than $\frac{1}{2}$ basal length of skull*; skull with long, narrow braincase. (p e n n s y l v á n i c u s; N. Lat., Pennsylvanian)

This is the common field mouse abundant and well known throughout eastern North America from Labrador to North Carolina, and ranging

far to the westward. It is often erroneously called "mole" or "meadow mole". In the extensive territory which it inhabits the animal is differentiated into several geographic races, four of which occur within our limits.

SUBSPECIES OF MICROTUS PENNSYLVANICUS

Size large, total length of adult males often over 185 (7½)....	<i>M. pennsylvanicus pennsylvanicus</i>
Size medium or small, total length of adult males seldom if ever reaching 175 (6½)	
Total length of adults mostly under 140 (5½)	<i>M. pennsylvanicus labradorius</i>
Total length of adults mostly over 140 (5½)	
General color clear light brown.....	<i>M. pennsylvanicus fontigenus</i>
General color brown tinged with russet.....	<i>M. pennsylvanicus acadicus</i>

***Microtus pennsylvanicus pennsylvanicus* (Ord) Common eastern field mouse**

- 1815 *Mus pennsylvanica* Ord, Guthrie's geography, Am. ed. 2: 2: 292. (Near Philadelphia Pa.)
 1895 [*Microtus*] *pennsylvanicus* Rhoads, American naturalist. Oct. 1895. 24: 940
 1900 *Microtus pennsylvanicus* Bailey, North American fauna. 6 June 1900. no. 17, p. 16.

General color above dark brown, usually tinged with tawny, under parts light gray often washed with buffy; *skull rather narrow*; fur not specially fine and soft. Total length, 180 (6½); tail vertebrae, 50 (2); hind foot, 21 (1½)

The common eastern meadow mouse is abundant in fields and marshes throughout the eastern United States and southern Canada from well within the Canadian zone to the lower edge of the upper austral zone.

***Microtus pennsylvanicus labradorius* Bailey Labrador field mouse**

- 1898 *Microtus pennsylvanicus labradorius* Bailey, Proc. biolog. soc. Washington. 30 Ap. 1898. 12: 88. (Fort Chimo, Ungava, Labrador)
 1900 *Microtus pennsylvanicus labradorius*, Bailey, North American fauna. 6 June 1900. no. 17, p. 22.

Dark brown above, whitish below; *skull not very narrow*. Total length, 138 (5½); tail vertebrae, 38 (1½); hind foot, 19 (¾). (*labradórius*; N. Lat., Labradorean)

The Labrador field mouse inhabits the barrens of northern Labrador.

Microtus pennsylvanicus fontigenus (Bangs) *Northern field mouse*

1896 *Microtus fontigenus* Bangs, Proc. biolog. soc. Washington. 9 Mar. 1896, p. 48. (Lake Edward, Quebec)

1897 *Microtus pennsylvanicus fontigenus* Miller, Proc. Boston soc. nat. hist. 30 Ap. 1897. 28:14.

1900 *Microtus pennsylvanicus fontigenus* Bailey, North American fauna. 6 June 1900. no. 17, p. 21.

Upper parts clear sepia brown without tawny tinge; under parts light gray; skull narrow. Total length, 140 ($5\frac{1}{2}$); tail vertebrae, 40 ($\frac{1}{8}$); hind foot, 20 ($\frac{3}{4}$). (*fontigenus*; Lat., spring-born)

The northern field mouse inhabits fields, barrens and dry woods in the Hudsonian zone of eastern North America from Quebec to the north shore of Lake Superior.

Microtus pennsylvanicus acadicus Bangs *Acadian field mouse*

1897 *Microtus pennsylvanicus acadicus* Bangs, American naturalist. Mar. 1897. 30:239. (Digby, Nova Scotia)

1900 *Microtus pennsylvanicus acadicus* Bailey, North American fauna. 6 June 1900. no. 17, p. 19.

Upper parts varying from bister shaded with russet to almost clear russet; under parts dark gray; skull slender. Total length, 167 ($6\frac{3}{8}$); tail vertebrae, 45 ($1\frac{3}{4}$); hind foot, 20 ($\frac{3}{4}$). (*acadicus*; N. Lat., Acadian)

The Acadian meadow mouse is confined to the fields, fresh water marshes and forest glades of Nova Scotia.

Microtus nesophilus Bailey *Gull island mouse*

1898 *Microtus insularis* Bailey, Proc. biolog. soc. Washington. 12: 86. (Great Gull island, Long Island, N. Y.) not *Lemmus insularis* Nilsson.

1899 *Microtus nesophilus* Bailey, Science. n. s. 2 Dec. 1898, 8: 782.

1900 *Microtus nesophilus* Bailey, North American fauna. 6 June 1900. no. 17, p. 26.

Upper parts dark brown, slightly darker than in average specimens of *M. pennsylvanicus*; under parts dusky, washed with cinnamon; teeth as in *M. pennsylvanicus*; skull with short broad braincase. Tail vertebrae, 29 ($1\frac{1}{2}$); hind foot, 20 ($\frac{3}{4}$). (*nesophilus*; Gk., island lover)

The Gull island mouse is confined to Great Gull island and Little Gull island, off the eastern extremity of Long Island, New York. The species is probably extinct.

Genus **Phenacomys** Merriam

1889 *Phenacomys* Merriam, North American fauna. 30 Oct. 1889. no. 2, p. 28. Type *Phenacomys intermedius* Merriam.

Front teeth without grooves, broader than deep; *grinding teeth rooted* (pronged) in adults, large and heavy; bony palate not ending in a thin-edged shelf behind; body short and thick; tail short; ears just appearing above fur; color never distinctly red. (*Phenacomys*; Gk., impostor mouse)

So far as at present known the genus *Phenacomys* is peculiar to North America. Six species are recognized, two of which occur within our limits.

SPECIES OF PHENACOMYS

Total length about 150 ($5\frac{7}{8}$); skull with a deep groove between eye sockets.....	<i>P. celatus</i>
Total length about 130 ($5\frac{1}{2}$); skull without distinct groove between eye sockets.....	<i>P. latimanus</i>

Phenacomys celatus Merriam *Large yellow-faced phenacomys*

1889 *Phenacomys celatus* Merriam, North American fauna. 30 Oct. 1889. no. 2, p. 33. (Godbout, Quebec, Canada)

1897 *Phenacomys angava* Miller, Proc. biolog. soc. Washington. 21 Ap. 1897. 11: 84.

Yellowish brown above; whitish below; *face suffused with reddish*. Total length, 150 ($5\frac{7}{8}$); tail vertebrae, 35 ($1\frac{3}{8}$); hind foot, 20 ($1\frac{1}{8}$). (*celatus*; Lat., secret)

The large yellow-faced phenacomys ranges throughout the Hudsonian zone in Labrador and eastern Canada, south to southeastern Quebec. It has not yet been taken in Nova Scotia or the United States.

Phenacomys latimanus Merriam *Small yellow-faced phenacomys*

1889 *Phenacomys latimanus* Merriam, North American fauna. 30 Oct. 1889. no. 2, p. 34. (Fort Chimo, Ungava, Labrador)

1897 *Phenacomys latimanus* Miller, Proc. biolog. soc. Washington. 21 Ap. 1897. 11: 83.

Color as in *P. celatus*. Total length, 130 ($5\frac{1}{2}$); tail vertebrae, 30 ($1\frac{1}{2}$); hind foot, 18 ($1\frac{1}{8}$). (*latimanus*; Lat., broad hand)

The small yellow-faced phenacomys ranges from western Labrador to the north shore of Lake Superior. It is apparently confined to barrens and open places, seldom if ever entering the dense forests inhabited by the red-backed mice.

Genus **Evotomys** Coues

1874 *Evotomys* Coues, Proc. acad. nat. sci. Philadelphia. p. 186. Type *Mus-rutilus* Pallas.

Front teeth without grooves, broader than deep; *grinding teeth rooted* (pronged) *in adults, small and weak; bony palate ending in thin-edged shelf behind*; body short and thick; tail short, ears usually just appearing above fur; *color of back usually distinctly red.* (*Evotomys*; Gk., well-eared mouse)

The genus *Evotomys* which occurs throughout the cooler part of the northern hemisphere is represented in America by about 25 forms. Five species occur within our limits.

SPECIES OF EVOTOMYS

- Red area on back fading insensibly into color of sides
 Ears small, completely covered by the surrounding fur;
 teeth small *E. ungava*
 Ears large, appearing conspicuously above surrounding
 fur; teeth very heavy *E. carolinensis*
 Red area on back sharply defined from color of sides
 Tail considerably more than twice length of hind foot... *E. proteus*
 Tail scarcely more than twice length of hind foot, or less
 Hind foot about 19 ($\frac{3}{4}$); skull small; teeth light *E. gapperi*
 Hind foot about 21 ($1\frac{1}{8}$); skull large; teeth heavy..... *E. rhoadsi*

Evotomys ungava Bailey *Ungava red-backed mouse*

1897 *Evotomys ungava* Bailey, Proc. biolog. soc. Washington. 13 May 1897. 11: 130. (Fort Chimo, Ungava, Labrador)

Ears very small, not projecting above fur; back dull brownish chestnut, fading insensibly into buffy gray of sides; tail about twice as long as hind foot. Total length, 135 ($5\frac{1}{2}$); tail vertebrae, 40 ($1\frac{5}{8}$); hind foot, 19 ($\frac{3}{4}$). (*ungava*; N. Lat., Ungava)

The Ungava red-backed mouse is known from Ungava, Labrador only.

Evotomys carolinensis Merriam *Carolina red-backed mouse*

1888 *Evotomys carolinensis* Merriam, Amer. jour. sci. and arts. Dec. 1888. 36: 460. (Roan mountain, North Carolina)

1897 *Evotomys carolinensis* Bailey, Proc. biolog. soc. Washington. 13 May 1897. 11: 130.

Ears large, projecting conspicuously above fur; *back dark chestnut fading insensibly into bister of sides*; tail about twice as long as hind foot. Total length, 150 ($5\frac{3}{4}$); tail vertebrae, 45 ($1\frac{3}{4}$); hind foot, 21 ($1\frac{1}{8}$). (*Carolinensis*; N. Lat., Carolinian)

The Carolina red-backed mouse is confined to the boreal mountain forests of the southern Alleghanies (Tennessee, North Carolina, West Virginia and Virginia).

Evotomys proteus Bangs *Variable red-backed mouse*

1897 *Evotomys proteus* Bangs, Proc. biolog. soc. Washington. 13 May 1897. 11:137. (Hamilton inlet, Labrador)

Ears large, projecting conspicuously above fur, *back varying from slate color and dark sepia to dull yellowish and bright chestnut*, usually sharply marked off from gray of sides; *tail much more than twice as long as hind foot*. Total length, 160 (6½); tail vertebrae, 50 (2); hind foot, 21 (¾). (*próteus*; Lat., a many formed sea god)

The variable red-backed mouse has been taken in the stunted spruce forest at Hamilton inlet, Labrador, only.

Evotomys gapperi (Vigors) *Common red-backed mouse*

Ears large, projecting conspicuously above fur; *color of back sharply defined* from that of sides, tail about twice as long as hind foot. (*gápperi*; name from that of Dr Gapper)

The common red-backed mouse occurs in the forests of the boreal zone and cooler parts of the transition zone throughout the greater part of the northern United States and southern Canada. It is divisible into six or more well marked geographic races, two of which are found within our limits. In the northern part of its range brown individuals (*E. fuscodorsalis* Allen) are of frequent occurrence.

SUBSPECIES OF EVOTOMYS GAPPERI

Back bright chestnut sprinkled with black hairs. *E. gapperi gapperi*
Back dull rusty rufous without sprinkling of black

hairs.....*E. gapperi ochraceus*

Evotomys gapperi gapperi (Vigors) *Eastern red-backed mouse*

1830 *Arvicola gapperi* Vigors, Zool. jour. 5:204. (Region between York and Lake Simcoe, Ontario, Canada)

1891 *Evotomys gapperi* Merriam, North American fauna. 30 July 1891. no. 5, p. 119.

1897 *Evotomys gapperi* Bailey, Proc. biolog. soc. Washington. 13 May 1897. 11: 122.

Back bright chestnut, sprinkled with blackish hairs; sides bright buffy ochraceous; belly gray washed with pale buff. Total length, 140 (5½); tail vertebrae, 40 (1¾); hind foot, 18 (¾). (*gápperi*; name from that of Dr Gapper)

The eastern red-backed mouse is abundant in the forests of the boreal zone and cooler parts of the transition zone from Quebec to Pennsylvania and from the Atlantic coast to Dakota.

Evotomys gapperi ochraceus Miller, *Mount Washington red-backed mouse*

- 1894 *Evotomys gapperi ochraceus* Miller, Proc. Boston soc. nat. hist. 24 Mar. 1894. 26: 193. (Mt Washington, New Hampshire)
 1897 *Evotomys gapperi ochraceus* Bailey, Proc. biol. soc. Washington. 13 May 1897. 11: 124.

Back pale, dull, rusty rufous, without sprinkling of blackish hairs, sides buffy clay color; belly dirty whitish. Total length, 150 ($5\frac{7}{8}$); tail vertebrae, 40 ($1\frac{7}{8}$); hind foot, 19 ($\frac{3}{4}$). (*ochraceus*; Lat., ochraceous)

The Mt Washington red-backed mouse is so far as known confined to the upper boreal zone of Mt Washington, New Hampshire.

Evotomys rhoadsi (Stone) *New Jersey red-backed mouse*

- 1893 *Evotomys gapperi rhoadsi* Stone, American naturalist. Jan. 1893. 27: 54. (Mays Landing N. J.)
 1897 *Evotomys gapperi rhoadsi* Bailey, Proc. biol. soc. Washington. 13 May 1897. 11: 125.

Ears large, projecting conspicuously above fur; back dark chestnut, *sharply marked off* from buffy gray of sides; *skull and teeth much heavier than in E. gapperi*, in this respect resembling *E. carolinensis*. Total length, 140 ($5\frac{1}{2}$); tail vertebrae, 40 ($1\frac{5}{8}$); hind foot, 21 ($\frac{3}{8}$). (*rhoadsi*; name from that of Samuel N. Rhoads)

The New Jersey red-backed mouse has thus far been found in the cool bogs of southern New Jersey and southern New York only.

Family Dipodidae *Jerboas and jumping mice*

Front teeth two, compressed (in our genera each with a deep longitudinal groove on front face); cheek teeth in upper jaw usually four on each side (three in *Napaeozapus*); skull with a conspicuous aperture opening forward in front of the eye socket; tail and hind legs elongated for jumping. (*Dipodidae*; genus, *Dipus*)

The family *Dipodidae* is widely distributed through North America, Asia, Africa and eastern and northern Europe. Half a dozen or more old world genera are now recognized, while only two are found in America. The latter form the subfamily *Zapodinae*.

GENERA OF DIPODIDAE

A small, probably useless tooth in front of first well developed grinder in upper jaw.....	<i>Zapus</i>
No small tooth in front of first well developed grinder in upper jaw.....	<i>Napaeozapus</i>

Genus *Zapus* Coues

1873 *Zapus* Coues, Bull. U. S. geolog. surv. terr. ser. 2, no. 5, p. 253. Type
Dipus hudsonius Zimmermann.

Teeth 18; tail considerably longer than head and body; hind foot greatly elongated, between one half and one third as long as head and body. (*Zapus*; Gk., much foot)

The genus *Zapus* reaches its greatest development in boreal North America. Several species are known, all North American but one, which occurs in western China. Only one is found within our limits.

Zapus hudsonius (Zimmermann) *Meadow jumping mouse*

Back and sides yellowish brown, the former heavily, the latter lightly sprinkled with darker hairs; belly white, usually *strongly tinged with yellowish*; tail brown to extreme tip. (*hudsonius*; N. Lat., Hudsonian)

The meadow jumping mouse is common in meadows, old fields and open woods throughout eastern North America south to the northern edge of the upper austral zone. It is divisible into several races, three of which occur within our limits.

SUBSPECIES OF *ZAPUS HUDSONIUS*

Total length under 200 (8); hind foot less than

30 ($1\frac{1}{2}$).....*Z. hudsonius americanus*

Total length over 215 ($8\frac{1}{2}$); hind foot more than 30 (1)

Total length about 220 ($8\frac{1}{2}$)..... *Z. hudsonius hudsonius*

Total length about 230 ($9\frac{1}{2}$)..... *Z. hudsonius ladasi*

Zapus hudsonius americanus (Barton) *Southern meadow jumping mouse*

1799 *Meriones americanus* Barton, Trans. Am. philos. soc. 4:115. (Philadelphia Pa.)

1899 *Zapus hudsonius americanus* Batchelder, Bull. New England zool. club. 8 Feb. 1899. 1: 6.

1899 *Zapus hudsonius americanus* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 19.

Back dusky brown faintly tinged with reddish buff, sides reddish buff, very slightly grizzled. Total length, 190 ($7\frac{1}{2}$); tail vertebrae, 115 ($4\frac{1}{2}$); hind foot, 18 ($1\frac{1}{2}$). (*americanus*; N. Lat., American)

The southern meadow jumping mouse occurs throughout the upper austral zone of the eastern United States from North Carolina northward. In the transition zone it intergrades with the next race.

Zapus hudsonius hudsonius (Zimmermann) *Northern meadow jumping mouse*

- 1780 *Dipus hudsonius* Zimmermann, Geogr. Gesch. 2:358. (Hudson bay)
 1873 *Zapus hudsonius* Coues, Bull. U. S. geolog. surv. terr. ser. 2. no. 5, p. 254.
 1899 *Zapus hudsonius* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 15.

Back yellowish brown; sides light grayish buff, slightly sprinkled with black. Total length, 220 (8½); tail vertebrae, 130 (5½); hind foot, 31 (1¼). (*hudsonius*; N. Lat., Hudsonian)

The northern meadow jumping mouse occurs throughout the Canadian zone and lower part of the Hudsonian zone of eastern North America except in the area occupied by the following form.

Zapus hudsonius ladas Bangs *Labrador meadow jumping mouse*

- 1899 *Zapus hudsonius ladas* Bangs, Proc. New England zool. club. 28 Feb. 1899. 1: 10. (Hamilton inlet, Labrador)
 1899 *Zapus hudsonius ladas* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 17.

Back blackish; sides tawny ochraceous, conspicuously sprinkled with black. Total length, 230 (9½); tail vertebrae, 145 (5¾); hind foot, 32 (1¼). (*ladas*; from name of a famous runner of Alexander the Great)

The Labrador meadow jumping mouse is at present known from eastern Labrador only.

Genus **Napaeozapus** Preble

- 1899 *Napaeozapus* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 33.
 Type *Zapus insignis* Miller.
Teeth 16; otherwise as in *Zapus*. (*Napaeozapus*; Gk., woodland *Zapus*)

The genus *Napaeozapus* is peculiar to eastern North America, where it is represented by one species only.

Napaeozapus insignis Miller *Woodland jumping mouse*

Back and sides yellowish brown, the former heavily, the latter scarcely, sprinkled with black; belly always pure white; tail tipped with white. (*insignis*; Lat., distinguished)

The woodland jumping mouse is abundant in heavy woods (chiefly near watercourses) throughout the Hudsonian and Canadian zones of eastern North America. It also occurs sparingly in isolated cool localities in the upper edge of the transition zone. It is divisible into three races.

SUBSPECIES OF NAPAEZOZAPUS INSIGNIS

Total length about 250 (9 $\frac{1}{2}$); hind foot about 33

(1 $\frac{1}{2}$) *N. insignis abietorum*

Total length about 225 (8 $\frac{3}{4}$); hind foot about 30

(1 $\frac{3}{8}$)

Colors bright; hind foot usually more than 30

(1 $\frac{1}{2}$) *N. insignis insignis*

Colors dull; hind foot usually less than 30 (1 $\frac{3}{8}$).. *N. insignis roanensis*

Napaeozapus insignis abietorum (Preble) *Hudsonian woodland jumping mouse*

1899 *Zapus* (*Napaeozapus*) *insignis abietorum* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 36. (North shore of Lake Superior)

Size very large; skull broad between eye sockets. Total length, 250 (9 $\frac{1}{2}$); tail vertebrae, 160 (6 $\frac{1}{8}$). (*abietorum*; Lat., of the firs)

The northern woodland jumping mouse is confined to the Hudsonian zone of eastern Canada.

Napaeozapus insignis insignis Miller *Northern woodland jumping mouse*

1891 *Zapus insignis* Miller, American naturalist. Aug. 1891. 25:472. (Restigouche river, New Brunswick)

1899 *Zapus* (*Napaeozapus*) *insignis* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 33.

Size medium; skull narrow between eye sockets; color bright. Total length, 235 (9 $\frac{1}{4}$); tail vertebrae, 145 (5 $\frac{1}{4}$); hind foot, 31 (1 $\frac{1}{2}$). (*insignis*; Lat., distinguished)

The northern woodland jumping mouse is abundant throughout the Canadian forests of the eastern United States and Canada.

Napaeozapus insignis roanensis (Preble) *Mountain woodland jumping mouse*

1899 *Zapus* (*Napaeozapus*) *insignis roanensis* Preble, North American fauna. 8 Aug. 1899. no. 15, p. 35. (Roan mountain, N. C.)

Size small; skull narrow between eye sockets; colors dull. Total length, 220 (8 $\frac{3}{4}$); tail vertebrae, 130 (5 $\frac{1}{4}$); hind foot, 30 (1 $\frac{3}{8}$). (*roanensis*; N. Lat., inhabiting Roan mountain)

The mountain woodland jumping mouse is at present known from the evergreen forests of Roan mountain only. It probably occurs in the Canadian zone throughout the southern Alleghanies.

Family **Erethizontidae** *New world porcupines*

Cheek teeth rooted; no thumb; *fur mixed with long stiff quills*. (Erethizontidae; genus Erethizon)

The new world porcupines are represented by three genera, two of which are tropical. The third occurs throughout the wooded portion of boreal North America.

Genus **Erethizon** F. Cuvier

1825 *Erethizon* F. Cuvier, *Dents des mammifères*, p. 256. Type *Hystrix dorsatus* Linnaeus

Tail short, not prehensile; toes four in front, five behind. (Erethizon; Gk., to irritate)

The genus *Erethizon* is confined to the northern parts of North America. Two species are known, one of which occurs within our limits.

Erethizon dorsatus (Linnaeus) *Canada porcupine*, "hedgehog"

1758 *Hystrix dorsatus* Linnaeus, *Systema naturae*. ed. 10. 1:57. (Canada)

1822 *Erethizon dorsatus* F. Cuvier, *Mém. du muséum d'hist. nat.* Paris. 9:432.

Blackish; quills whitish tipped. Total length, 700 (28); tail vertebrae, 200 (8) hind foot, 90 (3½). (*dorsatus*; Lat., large-backed)

The Canada porcupine occurs throughout the Canadian zone of northeastern North America wherever are still found sufficiently extensive tracts of unbroken forest. It is chiefly arboreal in habits. The true hedgehogs are very different animals (insectivores) confined to the old world.

Family **Leporidae** *Hares*

Upper front teeth four, *a large pair in front and a small pair immediately behind*; front legs short; hind legs elongated for jumping; tail very short or rudimentary. (Leporidae; genus *Lepus*)

The family Leporidae, though nearly universally distributed outside of Australia and the neighboring islands, contains only two genera, one of which is peculiar to the high mountains of southern Mexico.

Genus **Lepus** Linnaeus

1758 *Lepus* Linnaeus, *Systema naturae*. ed. 10. 1:57. Type *Lepus timidus*, Linnaeus.

Tail well developed; ears long and narrow; hind legs very long. (*Lepus*; Lat., a hare)

The genus *Lepus*, the range of which is coincident with that of the family, probably contains more than one hundred species. Four of these occur in northeastern North America.

SPECIES OF LEPUS

- Size small; hind foot under 115 ($4\frac{1}{2}$); fur never turning white in winter (cottontails, subgenus *Sylvilagus*) *L. floridanus*
- Size medium or large; hind foot 125 (5) to 165 ($6\frac{1}{2}$); fur in American species generally turning white in winter (hares, subgenus *Lepus*)
- Total length usually less than 500 ($19\frac{3}{4}$); fur usually but not always turning white in winter (varying hares).. *L. americanus*
- Total length about 600 ($23\frac{1}{2}$) or more; fur always turning white in winter (arctic hares)
- Hind foot, 145 ($5\frac{3}{4}$); ear from crown, 100 (4)..... *L. labradorius*
- Hind foot, 165 ($6\frac{1}{2}$); ear from crown, 85 ($3\frac{3}{8}$)..... *L. bangsi*

Lepus labradorius Miller *Labrador arctic hare*

- 1896 *Lepus arcticus bangsi* Rhoads, Proc. acad. nat. sci. Philadelphia, p. 365. (part)
- 1899 *Lepus labradorius* Miller, Proc. biolog. soc. Washington. (Fort Chimo, Ungava, Labrador)

General color in summer light brown, turning to dusky bluish gray on sides and to white on under parts; in winter pure white; ears always tipped with black; tail snowy white. Total length, 600 ($23\frac{1}{2}$); tail vertebrae, 55 ($2\frac{1}{2}$); *hind foot, 145* ($5\frac{3}{4}$); *ear from crown, 100* (4). (*labradorius*; N. Lat., Labradorian)

The Labrador arctic hare is confined to the barren region of northern Labrador, where it is abundant. Its range extends as far south as Hamilton inlet.

Lepus bangsi (Rhoads) *Newfoundland arctic hare*

- 1896 *Lepus arcticus bangsi* Rhoads, American naturalist. Mar. 1896. 30: 253. (part) (Codroy Newfoundland)
- 1896 *Lepus arcticus bangsi* Rhoads, Proc. acad. nat. sci. Philadelphia. p. 365. (part)

General color in summer light brown, turning to dusky bluish gray on sides and to white on under parts, in winter pure white; ears always tipped with black; tail snowy white. Total length, 600 ($23\frac{1}{2}$); tail vertebrae, 65 ($2\frac{3}{8}$) *hind foot, 165* ($6\frac{1}{2}$); *ear from crown, 85* ($3\frac{3}{8}$). (*bangsi*; name from that of Outram Bangs)

The Newfoundland arctic hare is confined to the island of Newfoundland.

Lepus americanus Erxleben *American varying hare*

Size medium (much less than that of the western jack rabbits, and northern arctic hares); fur usually undergoing marked periodic changes, from brown to white in autumn and from white to brown in spring; *tail* (in dark pelage), *dull yellowish or whitish beneath*. (*americanus*; N. Lat., American)

The American varying hare is a wide ranging species divisible into numerous geographic races. Three of these occur in northeastern North America.

SUBSPECIES OF *LEPUS AMERICANUS*

Hind foot small, about 127 (5) in length... *L. americanus struthopus*

Hind foot large, about 140 (5½) in length

General color (in summer coat) light yellowish brown or drab; ears conspicuously rimmed with white.....

L. americanus americanus

General color (in summer coat) russet or rusty; ears inconspicuously rimmed with white.....

L. americanus virginianus.

Lepus americanus struthopus Bangs *Nova Scotian hare*

1898 *Lepus americanus struthopus* Bangs, Proc. biolog. soc. Washington. 24 Mar. 1898. 12:81. (Digby N. S.)

Hind foot small; color in summer dull tawny brown, (varying from raw umber to bister); black-tipped hairs on back not numerous; ears dusky or black at tip; borders of ears yellowish brown. Length, 470 (18½); tail, 50 (2); hind foot, 127 (5). (struthopus; Lat., small-footed)

The Nova Scotian hare, as its name implies, is confined to the province of Nova Scotia, where it is exceedingly abundant.

Lepus americanus americanus Erxleben *Northern varying hare*

1777 *Lepus americanus* Erxleben, Syst. regn. anim. 1:330.

1898 *Lepus americanus americanus* Bangs, Proc. biolog. soc. Washington. 12:78.

Hind foot large; color in summer pale tawny brown, (varying from hair brown and drab to tawny clay color); black-tipped hairs on back numerous; ears dusky at tips; borders of ears conspicuously white. Length, 470 (18½); tail, 38 (1½); hind foot, 150 (6). (americanus; N. Lat., American)

The northern varying hare occupies the wooded portions of Labrador. Its southern limit is not definitely known; but the animal does not reach the northern border of the United States.

Lepus americanus virginianus (Harlan) *Southern varying hare*

1825 *Lepus virginianus* Harlan, Fauna Americana, p. 196. (Blue mountains of Pennsylvania)

1877 [*Lepus americanus*] var. *virginianus* Allen, Monogr. N. Am. rodentia, p. 307.

1898 *Lepus americanus virginianus* Bangs, Proc. biolog. soc. Washington. 12:79.

Hind foot large; color in summer bright rusty brown, (varying from russet to deep rust color); black-tipped hairs on back numerous; ears dusky at tip; borders of ears very inconspicuously whitish. Length, 485 (19); tail, 50 (2); hind foot, 140 (5½). (virginianus; N. Lat., Virginian)

The southern varying hare inhabits the Canadian zone and cool, damp situations in the transition zone of the eastern United States and southeastern Canada. At the southern extremity of its range the animal does not assume the white coat in winter.

Lepus floridanus Allen *Cottontail*

Size small; fur always dark; feet stout, well furred; tail conspicuously snowy white beneath. (floridanus; N. Lat., Floridian)

The cottontail like the varying hare is a wide ranging species. It is divisible into even more local races than its larger relative. Only three of these subspecies occur within our limits. The typical form, *Lepus floridanus floridanus*, is confined to the peninsula of Florida.

SUBSPECIES OF LEPUS FLORIDANUS

General color bright yellowish brown with a strong admixture of black; a distinct black spot between ears.....	<i>L. floridanus transitionalis</i>
General color pale yellowish brown with very faint admixture of black; no black spot between ears	
Rump noticeably paler than back; hind foot often over 100 (4)	<i>L. floridanus mearnsi</i>
Rump not noticeably paler than back; hind foot generally under 100 (4)....	<i>L. floridanus mallurus</i>

Lepus floridanus transitionalis (Bangs) *Northeastern cottontail*

1895 *Lepus sylvaticus transitionalis* Bangs, Proc. Boston soc. nat. hist. 1894. 26: 405. 31 Jan. 1895 (Liberty Hill Ct.)

1899 *Lepus floridanus transitionalis* Allen, Bull. Am. mus. nat. hist. 4 Mar. 1899. 12: 13.

Hair long, full and silky; *color bright*, chiefly russet, wood brown and hazel; back heavily sprinkled with black-tipped hairs; *rump not noticeably paler than back, a black spot between ears*; ears thickly furred and with decided black margin on outer edge. Length, 430 (17); tail, 55 (2½); hind foot, 95 (3¾). (*transitionalis*; N. Lat., pertaining to the transition zone)

The northeastern cottontail inhabits the transition zone of southern New England and eastern New York.

Lepus floridanus mearnsi Allen *Eastern prairie cottontail*

1894 *Lepus sylvaticus mearnsi* Allen, Bull. Am. mus. nat. hist. 6: 171. (Fort Snelling Minn.)

1895 *Lepus sylvaticus mearnsi* Bangs, Proc. Boston soc. nat. hist. 26: 406.

1899 *Lepus floridanus mearnsi* Allen, Bull. Am. mus. nat. hist. 4 Mar. 1899. 12:13.

Hair long, full and soft; *color pale*, chiefly wood brown and gray; back not heavily sprinkled with black-tipped hairs; *rump very noticeably paler than back*; *no black spots between ears*; ears thinly furred and without distinct black margins. Length, 475 (18 $\frac{3}{4}$); tail, 65 (2 $\frac{1}{2}$); hind foot, 100 (4). (*mearnsi*; name from that of Edgar A. Mearns)

The eastern prairie cottontail is a member of the eastern prairie fauna of the transition and upper austral zones. It would therefore not come within the scope of the present paper had it not recently extended its range as far as Toronto, Ontario and central New York.

Lepus floridanus mallurus (Thomas) *Southeastern cottontail*

1837 *Lepus sylvaticus* Bachman, Jour. acad. nat. sci. Philadelphia. 7: 403. Eastern United States. (Not *Lepus borealis sylvaticus* Nilsson, 1832)

1895 *Lepus sylvaticus* Bangs, Proc. Boston soc. nat. hist. 26: 405.

1898 *Lepus nuttalli mallurus* Thomas, Ann. and mag. nat. hist. ser. 7, 2: 320. (Raleigh N. C.)

1899 *Lepus floridanus mallurus* Allen, Bull. Am. mus. nat. hist. 4 Mar. 1899. 12: 13.

Hair short and coarse; *color dull*, chiefly wood brown and cinnamon; back not heavily sprinkled with black-tipped hairs; rump not noticeably paler than back; *no black spot between ears*; ears rather thinly furred, and without distinct dark margins. Length, 430 (17); tail, 55 (2 $\frac{1}{4}$); hind foot, 95 (3 $\frac{3}{4}$). (*mallurus*; Gk., wool tail)

The southeastern cottontail is abundant through the austral zones of the eastern United States. Its northern limit reaches the lower Hudson valley.

Order **Ferae** *Flesh-eaters or carnivores*

Canine teeth well developed; cheek teeth formed for cutting; front teeth small, in a row between the canines; toes provided with claws; brain large, well developed; species occurring within our limits large or medium sized, the smallest (weasels) about 300 (1 ft) in length; eyes well developed; fur not modified for an underground life. (*Fé rae*; Lat., wild beasts)

The order *Ferae*, containing the cats, dogs, bears, weasels, racoons, etc., is distinguished among the groups of mammals occurring in North America by the high development of the teeth for flesh-cutting. The order is very generally distributed in the new world and in the old world outside of Australia. It contains about a dozen families, six of which are found in northeastern North America.

FAMILIES OF FERAE

- Limbs so highly modified for swimming as to be practically useless for walking (Pinnipedia; seals and their allies)
- Hind feet capable of turning forward under the body; a large tusk on each side of upper jaw (walruses).. Rosmaridae, p. 120
- Hind feet permanently directed backward; no tusks (seals)..... Phocidae, p. 121
- Limbs normal (Fissipedia; the true carnivores)
- Hind foot with four toes
- Claws retractile into a sheath; muzzle broad and short; teeth not more than 30 (cats)..... Felidae, p. 123
- Claws not retractile; muzzle narrow and long; teeth 42 (dogs)..... Canidae, p. 126
- Hind foot with five toes
- Entire sole not applied to ground in walking (weasels, otters, martins etc.)..... Mustelidae, p. 129
- Entire sole applied to ground in walking
- Size small or medium; tail well developed; teeth 36 to 40 (racoons, etc.)..... Procyonidae, p. 137
- Size very large, tail rudimentary; teeth 42 (bears) Ursidae, p. 138

Family Rosmaridae *Walruses*

Hind feet capable of turning forward under body; no external ears; a large tusk growing downward from each side of upper jaw. (Rosmaridae; genus Rosmarus)

The family Rosmaridae contains the one genus Rosmarus.

Genus Rosmarus Scopoli

1777 Rosmarus Scopoli, Introd. hist. nat. p. 490. Type Trichechus rosmarus Linnaeus.

Characters of the family. (Rosmarus; an old name for the walrus first used by Olaus Magnus in the 16th century)

The genus Rosmarus is represented by two species, one each in the north Atlantic and north Pacific.

Rosmarus rosmarus (Linnaeus) *Atlantic walrus*

1766 Trichechus rosmarus Linnaeus, Systema naturae. ed. 12. 1:49. (North Atlantic ocean)

1880 Odobaeus rosmarus Allen, History of North American pinnipeds, p. 23.

1894 Rosmarus rosmarus Rhoads, American naturalist, 28: 523.

Characters as above; bristly nose pad narrow. (rosmarus; an old name)

The Atlantic walrus, within our limits is now restricted to northern Labrador; its range formerly extended much farther south.

Family **Phocidae** *Earless seals*

Hind feet directed *permanently backward*; no external ears; no tusks.
(Phocidae; genus *Phoca*)

The family Phocidae contains a dozen or more genera distributed on practically all sea coasts. Four occur in North America, all of which are represented within our limits.

GENERA OF PHOCIDAE

Teeth 30; snout of male developed into a conspicuous "hood"

(subfamily Cystophorinae)..... *Cystophora*

Teeth 34; snout not specially developed (subfamily Phocinae)

Braincase forming less than one third of length of skull.... *Halichoerus*

Braincase forming nearly one half of length of skull

Cheek teeth large and strong; forehead high, arched..... *Phoca*

Cheek teeth small and weak; forehead low, flat..... *Erignathus*

Genus **Cystophora** Nilsson

1820 *Cystophora* Nilsson, Skand. fauna. 1:382. Type *Cystophora borealis* Nilsson=*Phoca cristata* Erxleben.

Teeth 30 (*only two front teeth in lower jaw*); muzzle elongated, that of male capable of inflation. (*Cystophora*; Gk., bladder-bearer)

The genus *Cystophora* is peculiar to the coasts and islands of the North Atlantic. Only one species is known.

Cystophora cristata (Erxleben) *Hooded seal*

1777 [*Phoca*] *cristata* Erxleben, Syst. regn. anim. 1:590. (Greenland)

1837 *Cystophora cristata* Nilsson, Kongl. Vet. akad. Handl. Stockholm.

1880 *Cystophora cristata* Allen, History of North American pinnipeds, p. 724.

1884 *Cystophora cristata* Merriam, Science. 5 Dec. 1884. 4:514.

Bluish black, lighter on sides and belly; back thickly sprinkled with irregular whitish spots. Total length 2450 (7 ft) to 2800 (8 ft). (*cristata*; Lat., crested)

The hooded seal occurs on the northern coasts of western Europe and eastern North America. In the latter country its southward range extends about to Nova Scotia, though stragglers have been taken as far south as Long Island.

Genus **Halichoerus** Nilsson

1820 *Halichoerus* Nilsson, Faun. Skand. 1:377. Type *Halichoerus griseus* Nilsson=*Phoca grypus* Fabricius.

Teeth 34 (*four front teeth in lower jaw*); braincase very small, forming less than one third length of skull. (*Halichoerus*; Gk., sea pig)

The genus *Halichoerus* is peculiar to the coasts and islands of the North Atlantic. Only one species is known.

Halichoerus grypus (Fabricius) *Gray seal*

1791 *Phoca grypus* Fabricius, *Skriv. af Naturl. Selsk.* 1:167.

1837 *Halichoerus grypus* Nilsson, *Kongl. Vet. akad. Handl.* Stockholm.

1880 *Halichoerus grypus* Allen, *History of North American pinnipeds.* p. 689.

Gray (silvery, ashy or dusky) with ill-defined dark spots. Total length 2450 (7 ft) to 3150 (9 ft). (*grypus*; Lat., hook-nosed)

The gray seal occurs on the northern coasts of western Europe and eastern North America. Its southward range in America extends about to Nova Scotia.

Genus **Phoca** Linnaeus

1758 *Phoca* Linnaeus, *Systema naturae.* ed. 10. 1:37. Type *Phoca vitulina* Linnaeus.

Teeth 34 (*four front teeth in lower jaw*); the cheek teeth large and strong, *not falling out with age*; braincase forming nearly one half of length of skull; forehead high, arched. (*Phoca*; Lat., a seal)

The genus *Phoca* is widely distributed on the coasts of the northern hemisphere. About a half dozen species are known, three of which occur within our limits.

SPECIES OF PHOCA

Male whitish with a black stripe crossing shoulder and running back along sides (subgenus <i>Pagophilus</i> Gray).....	<i>P. groenlandica</i>
Male not white with black markings	
First finger slightly longer than others; back generally blackish with whitish spots (subgenus <i>Pusa</i> Scopoli).....	<i>P. hispida</i>
First finger not longer than others; back generally light brown or gray with dark spots (subgenus <i>Phoca</i>).....	<i>P. vitulina</i>

Phoca groenlandica Fabricius *Harp seal*

1776 *Phoca groenlandica* Fabricius, *Müller's Zool. Dan. prodr.*, 8. (Coast of Greenland)

1880 *Phoca groenlandica* Allen, *History of North American pinnipeds.* p. 630.

Male whitish, with black face, and a black stripe crossing shoulders and extending backward along sides. Female less distinctly marked. Total length (male) about 1750 (5 ft), female smaller. (*groenlandica*; N. Lat., pertaining to Greenland)

The harp seal is a circumpolar species, confined to the icy northern seas. In America its southward range extends to Newfoundland and the Magdalen islands.

Phoca hispida Schreber *Ringed seal*

1775 *Phoca hispida* Schreber, Säugethiere. 3:312.

1880 *Phoca foetida* Allen, History of North American pinnipeds, p. 597.

First finger longest, the others successively decreasing in length. General color blackish brown above, yellowish white below, the back with large oval whitish spots; muzzle and eye ring usually black. Total length (male) about 1750 (5 ft), female smaller. (*hispida*; Lat., harsh)

The ringed seal occurs on the Arctic coasts of both hemispheres. In eastern North America its range extends to Labrador and Newfoundland.

Phoca vitulina Linnaeus *Harbor seal*

1758 [*Phoca*] *vitulina* Linnaeus, Systema naturae. ed. 10. 1:38. (Coast of Europe)

1880 *Phoca vitulina* Allen, History of North American pinnipeds, p. 559.

Fingers not distinctly graduated; general color grayish or brownish; paler below; the back with dark spots, muzzle and eye ring usually yellowish. Total length about 1750 (5 ft); female smaller. (*vitulina*; Lat., calf-like)

The harbor seal is peculiar to the north Atlantic. Its normal range in North America extends about to Long Island, though individuals straggle much farther south. It is frequently taken in rivers and lakes at some distance from the sea.

Family **Felidae** *Cats*

Heel never applied to ground in walking; claws sharp, compressed, retractile, hind toes 4; teeth 28 or 30; head short, round. (*Félida*, genus *Felis*)

The well known cat family, though distributed throughout the warmer parts of the world (Australia and neighboring islands excepted) contains only a small number of genera. Two are all that are commonly recognized, but this number should probably be doubled. Two only occur in America, both of which are found in the northeastern United States.

GENERA OF FELIDAE

Tail long; teeth 30..... *Felis*
 Tail short; teeth 28..... *Lynx*

Genus **Felis** Linnaeus

1758 *Felis* Linnaeus, Systema naturae. ed. 10. 1:41. Type *Felis catus* Linnaeus.

Form slender; tail long; teeth 30; no mane; ears not tufted; pupil of eye when contracted a vertical slit. (*Félis*; Lat., a cat)

The range of the genus *Felis* is the same as that of the family. Some 50 species are known, about a dozen of which occur in America

north of Panama. The following is the only wild¹ species found in northeastern North America.

Felis oregonensis Rafinesque *Puma*

Yellowish brown above, middle line of back darker; under parts whitish; feet large and heavy. (*oregonensis*; N. Lat., Oregonian)

While its typical subspecies *F. oregonensis oregonensis* is confined to the northwest coast region, the puma occurs throughout the wilder parts of North America south of the upper part of the Canadian zone. It is divisible into several geographic races, one of which is found within our limits.

Felis oregonensis hippolestes (Merriam) *Northern puma*

1897 *Felis hippolestes* Merriam, Proc. biolog. soc. Washington. 15 July 1897. 11:219. (Wind river mountains, Wy.)

1898 *Felis oregonensis hippolestes* Stone, Science. n. s., 6 Jan. 1899. 9:35.

Total length, 2600 (8½ ft); tail vertebrae, 930 (36½); hind foot, 270 (10½). (*hippolestes*; Gk., horse thief)

The northern puma formerly occurred throughout the wooded portions of the northeastern United States and southern Canada. It is now exterminated except in the remotest districts. This is the *Felis concolor* of writers on the mammals of eastern North America. True *Felis concolor* is, however, confined to South America. The proper subspecific name for the puma of the northeastern United States is still a matter of doubt. I use *hippolestes* provisionally only.

Genus **Lynx** Kerr

1792 *Lynx* Kerr, Animal kingdom, 1, Systematic catalogue (inserted between p. 32 and 33). Type *Lynx vulgaris* Kerr = *Felis lynx* Linnaeus.

Form robust; tail short; *teeth* 28; ears tufted; otherwise as in *Felis*.

The genus *Lynx* contains a dozen or more species, confined for the most part to the middle and lower boreal regions of the northern hemisphere. About a dozen species or races, the status of which is not yet well understood, occur in North America. Four of these are found within our limits.

¹The house cat is often found in a half wild state.

SPECIES OF LYNX

- Feet very large; tail very short; fur long and loose; ear tufts long; skull broad (subgenus *Lynx*)
 Upper parts light (a mixture of dark brown and gray).... *L. canadensis*
 Upper parts dark (a mixture of black and hazel)..... *L. subsolanus*
- Feet moderate; tail moderate; fur short and dense; ear tufts short; skull narrow (subgenus *Cervaria*)
 Color rich, with much black on upper parts; greatest length of skull about 132 (5½)..... *L. gigas*
 Color dull, little black on upper parts; greatest length of skull about 120 (4¾)..... *L. ruffus*

Lynx canadensis Kerr *Canada lynx*

1792 *Lynx canadensis* Kerr, Animal kingdom, 1, Systematic catalogue (inserted between p. 32 and 33), no. 298. (Canada)

Back a grizzle of dark brown and light gray; belly dirty white; ear tufts about 50 (2). Total length, 1000 (39½); tail vertebrae, 100 (4); hind foot, 225 (8¾); breadth of front foot about 80 (3¼). (*canadensis*; N. Lat., Canadian)

The Canada lynx occurs in the forested region of "the whole of boreal North America from Maine and northern New York to Alaska, but now very rare and apparently becoming extirpated in the east."—*Bangs*

Lynx subsolanus Bangs *Newfoundland lynx*

1897 *Lynx subsolanus* Bangs, Proc. biolog. soc. Washington. 16 Mar. 1897. 11: 49. (Codroy, Newfoundland)

Back a grizzle of black and hazel; belly pale yellowish brown with irregular spots of black. Total length, 920 (36); tail vertebrae, 110 (4¼); hind foot, 220 (8¾); breadth of front foot about 75 (3) (*subsolanus*; Lat., under the east wind, i. e. eastern)

The Newfoundland lynx is confined to the island of Newfoundland.

Lynx ruffus (Gueldenstaedt) *Bay lynx; wildcat*

1776 *Felis ruffus* Gueldenstaedt, Novi. comment. acad. scient. Imp. Petropolitanae. (1775), 20: 484. 1776.

1897 *Lynx ruffus* Rhoads, Proc. acad. nat. sci. Philadelphia. p. 32.

Back yellowish gray tinged with rufous, much spotted and streaked with black; belly whitish spotted with black; a brownish collar on throat. Total length 900 (35½); tail vertebrae, 170 (6¾); hind foot, 180 (7¼); breadth of front foot about 50 (2). (*ruffus*; Lat., reddish)

The wildcat ranges from northern Georgia to the coast of Maine. It is often common in comparatively thickly settled districts. The species is divisible into numerous subspecies, of which the typical form only (*L. ruffus ruffus*) occurs within our limits.

Lynx gigas Bangs *Nova Scotia lynx*

1897 *Lynx gigas* Bangs, Proc. biolog. soc. Washington. 16 Mar. 1897. 11: 50. (15 miles back of Bear river, Nova Scotia)

Back cinnamon rufus, much spotted and streaked with black; belly dull white, spotted with black; a collar of cinnamon on throat. Total length, 1000 (39); tail vertebrae, 180 (7); hind foot, 200 (8); breadth of front foot about 50 (2). (*gigas*; Lat., a giant)

The Nova Scotia lynx is confined to the forested regions of the peninsula of Nova Scotia.

Family **Canidae** *Dogs*

Heel never applied to the ground in walking, claws blunt, not compressed or retractile; hind toes 4; teeth 42 or more; head generally long and narrow. (Cánidae; genus *Canis*)

The dog family is even more widely distributed than are the cats, since some of its members reach the highest northern limits of mammalian life. Like the cat family it contains a few genera only. Three of these occur in North America, and all are found within our limits.

GENERA OF CANIDAE

Upper front teeth distinctly lobed; pupil of eye circular..... *Canis*
 Upper front teeth without lobes; pupil of eye elliptic
 Tail without concealed mane and with abundant soft under-fur..... *Vulpes*
 Tail with a concealed mane of stiff hairs and without soft fur..... *Urocyon*

Genus **Canis** Linnaeus

1758 *Canis* Linnaeus, Systema naturae. ed. 10, 1:38. Type *Canis familiaris* Linnaeus.

Teeth 42, upper front teeth distinctly lobed; pupil of eye circular. (Cánis Lat., a dog)

This extensive genus may be considered as truly cosmopolitan. One or more species occur in every part of the American continent from Greenland to Patagonia and the Falkland isles; and similarly in the old world, Europe, Africa and Asia, with most of the large islands adjacent, and even Australia, have their wild dogs, though in the last case they may belong to a feral race, introduced originally by man.—*Flower & Lydekker*. A dozen or more species occur in North America, only two of which are found within our limits.

SPECIES OF CANIS

- Fur white in winter..... *C. albus*
 Fur always dark..... *C. occidentalis*

Canis albus (J. Sabine) *Arctic wolf*

1823 *Canis lupus albus* J. Sabine, Franklin's journal, appendix, p. 655.
 (Fort Enterprise)

1898 *Canis albus* Bangs, American naturalist. July 1898. 32:505.

Fur white in winter. (This animal is very slightly known. I have seen no specimens, nor can I find reliable published measurements.) (*albus*; Lat., white)

The arctic wolf inhabits the barren arctic regions of America. Within our limits it is confined to northern Labrador.

Canis occidentalis (Richardson) *American wolf*

1829 *Canis lupus, occidentalis* Richardson, Fauna Boreali-Americana. 1:60. (Northern North America)

1898 *Canis occidentalis* Bangs, American naturalist. July 1898. 32:505.

Back brownish or blackish mixed with tawny; belly light tawny or dirty whitish. Total length, 1465 (57); tail vertebrae, 405 (16); hind foot, 225 (9). (*occidentalis*; Lat., western, i. e. inhabiting the western hemisphere)

The American wolf is now exterminated within our limits in all but the wildest and most sparsely settled regions. The exact boundaries of the animal's range are unknown.

Genus Vulpes Richardson

1829 *Vulpes* Richardson, Fauna Boreali-Americana. 1:83-91. Based on the American foxes.

Teeth 42; upper front teeth not lobed; pupil of eye elliptic; *tail with a uniform coat of long hair and an abundant soft under-fur.* (*Vulpes*; Lat., a fox)

The genus *Vulpes* contains a half dozen or more species, all of which are peculiar to the northern hemisphere. Four or more occur in North America. Three of these are found within our limits.

SPECIES OF VULPES

- Ear rounded, scarcely overtopping fur, color bluish gray in summer, white in winter..... *V. lagopus*
 Ear pointed, long and conspicuous; fur normally fulvous or reddish at all seasons (occasionally black or gray)
 Claws short, mostly hidden by the fur; color dark..... *V. fulvus*
 Claws very long and conspicuous; color pale..... *V. detritus*

Vulpes lagopus (Linnaeus) *Arctic fox*

1758 [*Canis*] *lagopus* Linnaeus, *Systema naturae*. ed. 10. 1: 40 (Lapland)
 1854 *Vulpes lagopus* Audubon and Bachman, *Quadr. N. Am.* 3: 89.

Fur dark bluish gray in summer, turning to pure white in winter; sooty black individuals occasionally found. Total length, 1100 (43½); tail vertebrae, 350 (13½); hind foot, 145 (5½); ear, 45 (1½). (*lagopus*; Gk., hare foot)

The arctic fox occurs in the arctic regions of both hemispheres. It ranges throughout northern Labrador and on the coast occasionally reaches James bay and the strait of Belle Isle.

Vulpes fulvus (Desmarest) *Red fox*

Reddish; feet and ears blackish; tip of tail white; ear pointed, about 80 (3½) in length. The following color variations occur more commonly in the northern part of the animal's range than elsewhere. *The cross fox*, like the last but with a dark half ring on back of neck crossed by a dark line along middle of back. *The silver fox* entirely silver gray. *The black fox* entirely blackish. All of these phases intergrade with each other and with the red phase. (*fulvus*; Lat., yellowish)

The well known red fox ranges throughout the greater part of North America south to the lower edge of the upper austral zone. Two subspecies are known within our limits.

SUBSPECIES OF VULPES FULVUS

Upper parts tawny yellowish; total length, 1000

(39½) *V. fulvus fulvus*

Upper parts bright rust color; total length, 1080

(42½) *V. fulvus rubricatus*

Vulpes fulvus fulvus (Desmarest) *Southeastern red fox*

1820 *Canis fulvus* Desmarest, *Mammalogie*. 1: 203. (Virginia)

1842 *Vulpes fulvus* DeKay, *Zoology of New York, Mammalia*, p. 44.

Back tawny yellowish, never strongly rust color. Total length, 1000 (39½); tail vertebrae, 360 (14); hind foot, 150 (5½). (*fulvus*; Lat., yellowish)

The southeastern red fox is common throughout the eastern United States south to the lower edge of the upper austral zone. The northern limits of range is not yet known.

Vulpes fulvus rubricatus Bangs *Nova Scotia red fox*

1897 *Vulpes pennsylvanica vafra* Bangs, *Proc. biol. soc. Washington*, p. 53. (not *Canis vafra* Leidy)

1898 *Vulpes pennsylvanica rubricata* Bangs, *Science*. n. s. 25 Feb. 1898. 7: 272. (Digby N. S.)

Back bright rust color. Total length, 1080 (42½); tail vertebrae, 400 (15½); hind foot, 160 (6½). (*rubricatus*; Lat., reddened)

The Nova Scotia red fox is not at present known to occur outside of

the peninsula of Nova Scotia. The relationships of this race, the typical form and the large form occurring in the Hudsonian zone of Ontario and Quebec are not well understood.

Vulpes deletrix Bangs *Newfoundland red fox*

1898 *Vulpes deletrix* Bangs, Proc. biolog. soc. Washington. 24 Mar. 1898, 12: 36. (Bay St George, Newfoundland)

Like *Vulpes fulvus*, but hind foot *proportionally very large*; claws long and stout; color in red phase pale ochre yellow; black and silver gray phases very common. Total length, 960 (37½); tail vertebrae, 336 (13); hind foot, 160 (6¼). (*deletrix* Lat., a destroyer)

The Newfoundland fox is confined to the island of Newfoundland.

Genus **Urocyon** Baird

1857 *Urocyon*, Baird, Mamm. N. Am. p. 121. Type *Canis virginianus* Erxleben=*C. cinereoargenteus* Müller.

Teeth 42, upper front teeth not lobed; pupil of eye elliptic; *tail with a concealed mane of stiff hairs and no soft under-fur*. (*Urocyon*; Gk., tail dog)

Peculiar to the new world. Ranges from South America north to the lower edge of the transition zone in the eastern United States. Several species are known, two of which occur in North America. Only one of these is found within our limits.

Urocyon cinereoargenteus (Müller) *Gray fox*

1776 *Canis cinereoargenteus* Müller, Natursyst. Suppl. p. 29. (Eastern United States)

1894 *Urocyon cinereoargenteus* Rhoads. American naturalist. June 1894. 28: 524.

Back a coarse grizzle of blackish and white, belly tawny; region about ears tawny; a black line along back of tail. Total length, 900 (35½); tail vertebrae, 260 (10¼); hind foot, 125 (5). (*cinereoargenteus*; Lat., gray-silvered)

The gray fox ranges throughout the southern United States from Atlantic to Pacific. It is divisible into six or more geographic races. The typical subspecies alone, *Urocyon cinereoargenteus cinereoargenteus*, occurs within our limits. It is common in the region east of the Alleghanies from Long Island and the lower Hudson valley southward.

Family **Mustelidae** *Weasels*

Entire sole to heel not habitually applied to ground in walking; claws never fully retractile; hind toes five; teeth 32 to 38; head variable in form. (*Mustelidae*; genus *Mustela*)

The family *Mustelidae* is distributed throughout both hemispheres with the exception of the Australian region. It contains about twenty genera, nine of which occur in North America. Five of these are found within our limits.

GENERA OF MUSTELIDAE

- Toes conspicuously webbed; the whole animal highly modified
for an aquatic life (otters)..... *Lutra*, p. 130
- Toes not conspicuously webbed; animal not specially modified
for an aquatic life
- Teeth 38
- Body stout; part of sole applied to ground in walking
(wolverine)..... *Gulo*, p. 131
- Body slender; only the toes applied to ground in
walking (martius and fishers)..... *Mustela*, p. 132
- Teeth 34
- Tail closely furred; claws short (weasels)..... *Putorius*, p. 133
- Tail bushy; claws long (skunk)..... *Mephitis*, p. 136

Genus *Lutra* Brisson

1756 *Lutra* Brisson, *Regnum animale* in classes 9 distributum. Type
Mustela lutra Linnaeus.

Teeth 36; feet short and rounded; toes webbed; claws small, curved, blunt;
head broad, flat; tail thick at base, tapering; fur short and dense. (*Lutra*;
Lat., an otter)

The genus *Lutra* is distributed throughout the greater part of the
world, north to the limit of tree growth. It is not found in the Austral-
ian region. A dozen or more species are known, two of which occur
in eastern North America.

SPECIES OF LUTRA

- Total length about 1100 (43 $\frac{3}{8}$); skull about 105 (4 $\frac{1}{4}$)..... *L. hudsonica*
Total length about 995 (39 $\frac{1}{4}$); skull about 95 (3 $\frac{3}{4}$)..... *L. degener*

Lutra hudsonica (Desmarest) *North American otter*

Size large; total length about 1100 (43 $\frac{3}{8}$); greatest length of skull about
105 (4 $\frac{1}{4}$). (*hudsonica*; N. Lat., Hudsonian)

The North American otter inhabits marshes, lakes and watercourses
throughout the continent of North America from the extreme north at
least to the southern boundary of the United States. It is divisible into
four or more subspecies, two of which occur within our limits.

SUBSPECIES OF LUTRA HUDSONICA

- General color dark; webs between toes densely
haired below..... *L. hudsonica hudsonica*
- General color light; webs between toes sparsely
haired below..... *L. hudsonica lataxina*

Lutra hudsonica hudsonica (Desmarest) *Northeastern otter*

1803 *Mustela hudsonica* Desmarest, *Nouv. diet. d'hist. nat.* 13:384.
(Eastern Canada)

1831 *Lutra hudsonica* F. Cuvier, *Suppl. Oeuvres de Buffon.* 1:194.

1898 *Lutra hudsonica* Rhoads, *Trans. Am. philos. soc. n. s.* Oct. 1898.
20:424.

Upper parts seal brown; under parts grayish brown; under surface of webs between toes densely hairy. Total length, 1100 (43 $\frac{1}{2}$); tail vertebrae, 420 (16 $\frac{1}{2}$); hind foot, 120 (4 $\frac{1}{2}$). (*hudsonica*; N. Lat., Hudsonian)

The northeastern otter occurs throughout the less densely inhabited portions of eastern North America from the lower edge of the transition zone northward.

Lutra hudsonica lataxina (F. Cuvier) *Southeastern otter*

1823 *Lutra lataxina* F. Cuvier, *Diet. des sci. nat.* 27:242. (South Carolina)

1898 *Lutra hudsonica lataxina* Rhoads, *Trans. Am. philos. soc. u. s.* Oct. 1898. 20:427.

Upper parts yellowish brown; under parts light grayish brown; under surface of webs between toes sparsely hairy. Total length, 1100 (43 $\frac{1}{2}$); tail vertebrae, 420 (16 $\frac{1}{2}$); hind foot, 125 (4 $\frac{3}{8}$). (*lataxina*; N. Lat., like the genus *Latax*)

The southeastern otter occupies the austral zones of the eastern United States north of the peninsula of Florida, where it gives way to the Florida otter, *L. hudsonica vaga* Bangs.

Lutra degener Bangs *Newfoundland Otter*

1898 *Lutra degener* Bangs, *Proc. biolog. soc. Washington.* 24 Mar. 1898. 12:35. (Bay St George, Newfoundland)

1898 *Lutra degener* Rhoads, *Trans. Am. philos. soc. u. s.* Oct. 1898 20:433.

Size small, total length about 995 (39 $\frac{1}{2}$); greatest length of skull about 95 (3 $\frac{1}{2}$); hind foot about 112 (4 $\frac{3}{8}$); color blackish. (*dégener*; Lat., degenerate)

The Newfoundland otter is confined to the island of Newfoundland.

Genus ***Gulo*** Storr

1780 *Gulo* Storr, *Prodr. meth. mamm.* p. 34. Type *Ursus gulo* Linnaeus.

Part of sole applied to ground in walking, body stout; claws large, compressed, curved; ears very short; tail short, bushy; teeth 38. (*Gúlo*; Lat., a glutton)

The genus *Gulo* contains two species only, both inhabitants of the northern hemisphere, *G. gulo* of the old world, and the following:

Gulo luscus (Linnaeus) *Wolverine*

1758 *Ursus luscus*, Linnaeus, *Systema naturae.* ed. 10. 1:47. (Hudson bay)

1823 *Gulo luscus* J. Sabine, *Franklin's journal*, p. 650.

Dark brown or blackish; a pale area on sides. Total length, 760 (30); tail vertebrae, 200 (8); hind foot, 170 (6 $\frac{1}{2}$). (*lúscus*; Lat., one-eyed)

The wolverine inhabits the boreal forests of North America. Within our limits it is now chiefly, if not wholly confined to Canada.

Genus **Mustela** Linnaeus

1758 **Mustela** Linnaeus, *Systema naturae*. ed. 10. 1: 45. Type by elimination *Mustela martes* Linnaeus.

Only the toes applied to ground in walking; body slender; claws small, sharp, partly retractile; ears short; tail long, not conspicuously bushy; teeth 38. (*Mustéla*; Lat., a martin)

The genus *Mustela* occurs throughout the forested boreal regions of the northern hemisphere. About a dozen species are known. Four of the five American forms occur within our limits.

SPECIES OF **MUSTELA**

Length over 760 (30); ear low, rounded (Fisher)	<i>M. pennanti</i>
Length under 760 (30); ear high, pointed (Martin)	
Greatest length of skull about 85 ($3\frac{3}{8}$)	<i>M. brumalis</i>
Greatest length of skull about 80 ($3\frac{1}{8}$)	
General color light rich brown	<i>M. americana</i>
General color deep chocolate brown	<i>M. atrata</i>

Mustela pennanti Erxleben *Fisher*

1777 **Mustela pennanti** Erxleben, *Syst. regu. anim.* 1: 470. (Eastern Canada)

Dark brown or blackish, darker on under parts; no pale throat patch; ears low and rounded. Total length, 890 (35); tail vertebrae, 355 (14); hind foot, 120 ($4\frac{1}{2}$). (*pennanti*; name from that of Thomas Pennant)

The fisher occurs in the boreal forests of North America from Maine and southern Labrador west to the Pacific coast. The typical subspecies *M. pennanti pennanti* is the only geographic race found within our limits.

Mustela brumalis Bangs *North Labrador martin*

1898 **Mustela brumalis** Bangs. *American naturalist*. July 1898. 32: 502. (Okak Labrador)

Dimensions of skull (the only part of the animal now known); greatest length, 85 ($3\frac{3}{8}$); width of muzzle across canines, 17.2 ($1\frac{1}{2}$). (*brumalis*; Lat., wintery northern)

The north Labrador martin is known from three skulls collected at Okak Labrador.

Mustela americana Turton *Eastern martin*

1800 **Mustela americana** Turton, *System of nature*. 1: 60. (Eastern North America)

General color light rich brown, slightly paler on under parts; throat usually with a light (tawny or whitish) patch; ears high pointed. Total length, 610 (24);

tail vertebrae, 205 (8); hind foot 90 (3½). Skull: greatest length, 80 (3½); width of muzzle across canines, 14 (½). (*Americána*; N. Lat., American)

The eastern pine martin inhabits the boreal forests of North America from the Atlantic coast west at least to the Rocky mountains. On the Pacific coast it is replaced by the closely related *M. caurina* Merriam. It is still common in northern New England and northern New York.

Mustela atrata Bangs *Newfoundland martin*

1897 *Mustela atrata* Bangs, American naturalist. Feb. 1897. 31:162. (Bay St George, Newfoundland).

General color *deep chocolate* and black; throat patch orange. Total length, 550 (17¾); tail vertebrae, 185 (7¼); hind foot, 88 (2½). (*atrata*; Lat., wearing mourning)

The Newfoundland martin is confined to the island of Newfoundland.

Genus **Putorius** Cuvier

1817 *Putorius* Cuvier, R gne animal. 1:147. Type *Mustela putorius* Linnaeus.

Like *Mustela*, but *teeth only* 34. (*Putorius*; Lat., a bad odor)

The genus *Putorius* is widely distributed in Europe, Asia, Africa, North America and South America. 50 or more forms will doubtless eventually be recognized. In America north of Panama, 22 are now known to occur, and four of these are found within our limits.

SPECIES OF PUTORIUS

- Total length over 500 (20); (subgenus *Lutreola* Wagner)..... *P. vison*
- Total length under 500 (20); toes without webs (subgenus *Arctogale* Kaup)
- Tail forming about one fourth of total length..... *P. cicognanii*
- Tail forming about one third of total length
- Tail slender and closely haired, its black tip short (about 60 (2¾) in male, 28 (1½) in female)..... *P. occisor*
- Tail somewhat bushy, its black tip long (about 80 (3¼) in male, 50 (2) in female)..... *P. noveboracensis*

Putorius vison (Schreber) *Mink*

Total length over 500 (20); color brown throughout varying much in exact shade; chin usually spotted with white. (*vison*; derivation not known)

The mink ranges throughout the greater part of North America north of Mexico. It is divisible into half a dozen or more geographic races, two of which occur within our limits.

SUBSPECIES OF *PUTORIUS VISON*

Total length under 600 (23½); color blackish brown.....	<i>P. vison vison</i>
Total length over 600 (23½); color chestnut brown.....	<i>P. vison lutrecephalus</i>

Putorius vison vison (Schreber) *Northeastern mink*

1778 *Mustela vison* Schreber, Säugethiere, 3: 463 (eastern Canada)

1896 *Putorius vison* Bangs, Proc. Boston soc. nat. hist. 1896. 27: 3.

Color rich dark brown, *often nearly black*. Total length, 520 (20½); tail vertebrae, 185 (7½); hind foot, 55 (2½).

The northeastern mink inhabits the border of watercourses in the boreal forests of northern North America, south into the northern tier of states. West of the Rocky mountains it is replaced by the larger *P. vison energumenos* Bangs.

Putorius vison lutrecephalus (Harlan) *Southeastern mink*

1825 *Mustela lutrecephala* Harlan, Fauna americana, p. 63.

1896 *Putorius vison lutrecephalus* Bangs, Proc. Boston soc. nat. hist. Ap. 1896. 27: 4.

Color dark chestnut brown, the tail darker. Total length, 635 (27); tail vertebrae, 210 (8½); hind foot, 70 (2¾). (*lutrecephalus*; Lat. and Gk., otter head)

The southeastern mink inhabits the borders of watercourses in the transition zone and upper austral zone of the eastern United States, from central New York and the coast of Maine southward. In the lower austral zone it is replaced by two nearly related forms, *P. vison vulgivagus* Bangs, of the gulf coast, and *P. vison lutensis* Bangs, of the south Atlantic coast.

Putorius cicognanii (Bonaparte) *Small brown weasel*

1838 *Mustela cicognanii* Bonaparte, Charlesworths magazine. Jan. 1838. 2:37. (Eastern United States)

1839 *Putorius cicognanii* Richardson, Zoölogy of Beechey's voyage of the blossom, p. 10*.

1896 *Putorius cicognanii* Merriam, North American fauna. 30 June 1896. no. 11, p. 10.

Color in summer dark brown above, pure white below, *tail forming about one fourth of total length*, the terminal third black, winter coat pure white except tip of tail, which remains black. Total length, male, 285 (11½),

female, 225 (10); tail vertebrae, male, 77 ($3\frac{1}{2}$), female, 69 ($2\frac{3}{4}$); hind foot, male, 37 ($1\frac{1}{2}$), female, 30 ($1\frac{1}{8}$). (*cicognanii*; name from that of Felice Cicognani)

The small brown weasel inhabits woods and fields in the boreal and transition zones throughout eastern North America from the limit of tree growth south to Long Island and in the mountains probably much farther. The change to the white winter coat always takes place. The form occurring within our limits is the typical subspecies *P. cicognanii cicognanii*. In northwestern British America and in Alaska this is replaced respectively by *P. cicognanii richardsoni* (Bonaparte) and *P. cicognanii alascensis* (Merriam).

Putorius occisor* Bangs *Slender-tailed weasel

1899 *Putorius occisor* Bangs, Proc. New England zoölogical club. 9 June 1899. 1:54. (Bucksport Me.)

Tail closely haired, forming nearly one third of total length, *its black tip short* (about 60 ($2\frac{3}{4}$) in male, 30 ($1\frac{1}{2}$) in female) and *mostly confined to the terminal tuft of hair*; winter coat pure white except the black tip of tail and a slight wash of pale yellow on belly; summer coat not known. Total length, male, 460 (18), female, 350 ($13\frac{3}{4}$); tail vertebrae, male, 170 ($6\frac{3}{4}$), female, 115 ($4\frac{1}{2}$); hind foot, male, 50 (2), female, 36 ($1\frac{1}{8}$). (*occisor*; Lat., a slayer)

The slender-tailed weasel is at present very slightly known. It probably occurs in the forests of the Canadian zone from Maine to Manitoba. Like the New York weasel, it is remarkable for the great difference in size between the sexes.

Putorius noveboracensis* Emmons *New York weasel

Tail somewhat bushy, forming about one third of total length, *its black tip long* (about 80 ($3\frac{1}{2}$) in male, 50 (2) in female) and *extending considerably beyond the terminal tuft of hairs* (often occupying nearly one half of tail); summer coat brown above, white or yellow below; winter coat white (northern) or drab (southern). Total length, male, 405 (16), female, 325 ($12\frac{3}{4}$); tail vertebrae, male, 140 ($5\frac{1}{2}$), female, 108 ($4\frac{1}{2}$); hind foot, male, 47 ($1\frac{1}{2}$), female, 34 ($1\frac{1}{4}$). (*noveboracensis*; N. Lat., pertaining to New York)

The New York weasel inhabits woods and fields in the transition and upper austral zones throughout the eastern United States from Maine and New York to North Carolina. The change to the white winter coat always takes place in the northern part of the animal's range; at the south the change is to a drab coat. The latter is not well understood. This species is divisible into two geographic races.

SUBSPECIES OF PUTORIUS NOVEBORACENSIS

Under parts white *P. noveboracensis noveboracensis*
 Under parts yellow..... *P. noveboracensis notius*

Putorius noveboracensis noveboracensis Emmons *White-bellied New York weasel*

1840 *Putorius noveboracensis* Emmons, Report on the quadrupeds of Massachusetts, p. 45. (Southern New York)

1896 *Putorius noveboracensis* Merriam, North American fauna. 30 June 1896. no. 11, p. 16. (part)

Under parts always pure white; winter coat white. (*noveboracensis*; N. Lat., pertaining to New York)

The white-bellied New York weasel occupies the range of the species north of the upper austral zone.

Putorius noveboracensis notius Bangs *Yellow-bellied New York weasel*

1896 *Putorius noveboracensis* Merriam, North American fauna. 30 June 1896. no. 11, p. 16. (part)

1899 *Putorius noveboracensis notius* Bangs, Proc. New England zoological club. 9 June 1899. 1: 53. (Weaverville, Buncombe co. N. C.)

Under parts always pale yellow; winter coat drab. (*notius*; Lat., southern)

The yellow-bellied New York weasel is confined to the austral zones of the eastern United States. The exact limits of its range are not known.

Genus **Mephitis** Cuvier

1800 *Mephitis* Cuvier, Leçons d'anat. comp., 1, Tab. gen. des classes des anim. (facing p. 522). Based on "les Mouffettes". Described in Tab. elem. d' hist. nat. des anim. 1798. p. 116.

Part of sole applied to ground in walking; body stout; claws large, curved and strong; ears short; *tail very long and bushy*; *teeth 34*; *secretion of anal glands* (not urine as commonly supposed) *so copious and offensive as to be the animal's chief weapon of defense*. (*Mephitis*; Lat., a bad odor)

The genus *Mephitis* is peculiar to America, where it is very generally distributed. It probably contains a dozen or more species, half of which occur in North America. Only one is found within our limits.

Mephitis mephitis (Shaw) *Common skunk*

Black, with a white stripe on forehead; a white patch on nape; a white stripe extending backward from nape patch for a varying distance on each side of body; and a white tip to tail; *tail slightly more than one third of total length, the terminal brush tapering*. (*mephitis*; Lat., having a bad odor)

The common skunk inhabits both forests and cleared lands throughout the greater part of eastern North America. It is divisible into two subspecies.

SUBSPECIES OF MEPHITIS MEPHITICA

- Hind foot 83 ($3\frac{1}{2}$)..... *M. mephitica mephitica*
 Hind foot 65 ($2\frac{3}{4}$)..... *M. mephitica scrutator*

Mephitis mephitica mephitica (Shaw) *Northeastern skunk*

- 1792 *Viverra mephitica* Shaw, Museum Leverianum, p. 172. (North America; name afterward restricted to the northern form)
 1895 *Mephitis mephitica* Bangs, Proc. Boston soc. nat. hist. 31 July 1895. 26: 533.
 1896 *Mephitis mephitica mephitica* Bangs, Proc. biolog. soc. Washington. 28 Dec. 1896. 10: 140.

Total length, 650 ($25\frac{1}{2}$); tail vertebrae, 165 ($6\frac{1}{2}$); hind foot 83 ($3\frac{1}{2}$). (*mephitica*; Lat., having a bad odor)

The northeastern skunk inhabits the boreal zone of eastern North America.

Mephitis mephitica scrutator Bangs *Southeastern skunk*

- 1896 *Mephitis mephitica scrutator* Bangs, Proc. biolog. soc. Washington. Dec. 1896. 10: 141. (Cartersville, Acadia parish, La.)

Total length 590 ($23\frac{1}{2}$); tail vertebrae, 210 ($8\frac{1}{4}$); hind foot, 65 ($2\frac{3}{4}$). (*scrutator*; Lat., an examiner)

The southeastern skunk inhabits the austral zones of the eastern United States. In the transition zone it gradually merges into *M. mephitica mephitica*.

Family **Procyonidae** *Racoons*

Whole sole to heel applied to ground in walking; claws not retractile; hind toes 5; *teeth* 36 to 40; *size medium*; *tail well developed*. (*Procyonidae*; genus *Procyon*)

The *Procyonidae* are typically tropical American, though one genus is oriental. Seven or eight genera are now usually placed in this family, though the number is probably too great. Two of these occur in the United States, and one is found within our limits.

Genus **Procyon** Storr

- 1780 *Procyon* Storr, Prodr. meth. mamm. p. 35. Type *Ursus lotor* Linnaeus.

Form stout; tail short, cylindrical; head round; muzzle pointed; *teeth* 40. (*Procyon*; Gk., false dog)

The genus *Procyon* ranges from tropical South America north through Mexico about to the northern limit of the United States. It contains several species, only one of which occurs in North America.

Procyon lotor (Linnaeus) *Raccoon*

1758 [Ursus] *lotor* Linnaeus, *Systema naturae*. ed. 10. 1:48. (Eastern United States)

1780 *Procyon lotor* Storr, "Prodr. meth. mamm."

Yellowish brown, the hairs tipped with black; tail ringed with black; a black area about eye. Total length, 830 (32 $\frac{1}{4}$); tail vertebrae, 250 (9 $\frac{1}{4}$); hind foot, 120 (4 $\frac{3}{4}$). (16 tor; Lat., one who washes)

The racoon occurs throughout the forested regions of North America south of the lower edge of the boreal zone. The form found within our limits is typical *Procyon lotor lotor*. In Florida this is replaced by *P. lotor elucus* Bangs.

Family **Ursidae** *Bears*

Whole sole to heel applied to ground in walking; claws not retractile; hind toes 5; teeth 40 to 42; size very large; tail rudimentary. (Ursidae; genus *Ursus*)

The family *Ursidae* is widely distributed throughout both hemispheres outside of Africa and Australia. Four genera are usually recognized, but this number will doubtless be increased. Two occur in North America and both of these are found within our limits.

GENERA OF **URSIDAE**

Head long and narrow; cheek teeth relatively small and weak;
color always white *Thalarcctos*
Head short and broad; cheek teeth relatively large and strong;
color never white *Ursus*

Genus **Thalarcctos** Gray

1825 *Thalarcctos* Gray, *Annals of philosophy*. n. s. July 1825. 10:62. Type *Ursus maritimus* Linnaeus. (*Thalarcctos polaris* Gray)

Head long and narrow; cheek teeth small and weak relatively to size of skull; *color always white.* (*Thalárcctos*; Gk., sea bear)

The genus *Thalarcctos* occurs in the polar regions of both eastern and western hemispheres. Only one species is at present recognized.

Thalarcctos maritimus (Phipps) *Polar bear*

1774 *Ursus maritimus* Phipps. *A voyage toward the north pole*, p. 185. (Spitzbergen)

1899 *Thalarcctos maritimus* Stejneger, *Science*. 15 Sep. 1899. 10:378.

White at all seasons. Total length, 2135 (7 ft). (*marítimus* Lat., maritime)

The range of the polar bear in eastern North America extends as far south on the Atlantic coast of Labrador as the strait of Belle Isle. The animal is nowhere found far away from salt water.

Genus **Ursus** Linnaeus

1758 *Ursus* Linnaeus, *Systema naturae*. ed. 10. 1: 47. Type *Ursus arctos* Linnaeus.

Head short and broad; cheek teeth large and strong relatively to size of skull; *color never white*. (*Ursus*; Lat., a bear)

The distribution of the genus *Ursus* is essentially the same as that of the family to which it belongs. The species are at present little known; probably 30 or more forms will eventually be recognized. About a dozen occur in North America, only one of which is certainly known within our limits. It is a member of the subgenus *Euarctos*.

Ursus americanus Pallas *Black bear*

Front claws slightly if at all longer than the hind ones; color black or dark brown, the exact shade variable; length of skull under 350 (13 $\frac{1}{2}$). (*americanus*; N. Lat., American)

The black bear is widely distributed in North America from Mexico and the gulf states northward. It is divisible into numerous geographic races, at least two of which occur within our limits.

SUBSPECIES OF **URSUS AMERICANUS**

Length of adult skull about 250 (9 $\frac{1}{4}$)..... *U. americanus americanus*
Length of adult skull about 200 (8)..... *U. americanus sornborgeri*

Ursus americanus americanus Pallas *Northern black bear*

1780 *Ursus americanus* Pallas, *Spicilegia zoologica*. fasc. 14, p. 5. (North America)

1896 *Ursus americanus* Merriam, *Proc. biol. soc. Washington*. 13 Ap. 1896. 10: 79.

Skull long and narrow, its greatest length about 250 (9 $\frac{1}{4}$). (*americanus*; N. Lat., American)

The northern black bear is abundant throughout the wilder forested parts of the boreal and transition zones of eastern North America. The characters of the bear inhabiting the austral zones are not at present understood.

Ursus americanus sornborgeri Bangs *Labrador black bear*

1898 *Ursus (Euarctos) americanus sornborgeri* Bangs, *American naturalist*. July 1898. 32: 500. (Okak, Labrador)

Skull broad and short, its greatest length about 200 (8). (*sornborgeri*; name from that of J. D. Sornborger)

The Labrador black bear, known only from the skull, is common throughout Labrador north of the tree limit.

A large bear related to the grizzlies (perhaps *Ursus richardsoni*) probably occurs on the barrens of interior Labrador. The species has not yet been determined.

Order **Insectivora** *Insect-eaters*

Canine teeth present but usually not conspicuously developed; cheek teeth formed for chopping; toes provided with claws; *brain small*. (*Species occurring within our limits mostly very small, the largest seldom reaching 200 (8) in length; eyes small or rudimentary; fur distinctly modified for an underground life.*) (Insectivora; N. Lat., insect eaters)

The American insectivores are readily distinguished among the orders of mammals occurring in North America by their small size, small or rudimentary eyes, soft dense fur, many-pointed cheek teeth, and general modification for an underground life. The order is widely distributed in both hemispheres, but is absent in Australia; and in South America is at present known from the extreme northwest only. Two of the nine families into which the order is usually divided occur in North America, and both of these are found within our limits.

FAMILIES OF INSECTIVORA

Fore feet highly modified for digging; external ear absent (moles).. Talpidae

Fore feet not modified for digging; external ear present (shrews).. Soricidae

Family **Talpidae** *Moles*

Body thick, stout and clumsy, without distinct neck; eyes rudimentary or concealed; *no external ear; front feet very large, the nearly circular palm held edgewise*; fur very soft and velvety. (Talpidae; from genus Talpa)

Moles are found throughout the northern hemisphere except in the extreme north. Eight or more genera are known, five of which occur in North America. Three of these are found within our limits. They are all members of the subfamily Talpinae.

GENERA OF TALPIDAE

Tip of muzzle with a fringe of fleshy projections; tail long..... Condylura

Tip of muzzle without fleshy projections; tail short.

Teeth 36; tail slender, nearly naked..... Scalops

Teeth 44; tail thick, very hairy..... Parascalops

Genus **Condylura** Illiger

1811 Condylura Illiger, Prodr. syst. mamm. et avium, p. 125. (Type *Sorex cristatus* Linnaeus)

Teeth 44; nostrils at tip of *conspicuously fringed muzzle; tail nearly as long as body*, densely haired. (Condylura; Gk., knotted tail)

The genus Condylura is confined to eastern North America. Only one species is known.

Condylura cristata (Linnaeus) *Star-nosed mole*

1758 *Sorex cristatus* Linnaeus, *Systema naturae*. ed. 10. 1:53. (Pennsylvania)

1819 *Condylura cristata* Desmarest, *Journal de physique*. 89:230.

1896 *Condylura cristata* True, *Proc. U. S. national museum*. 19:78.

Dusky brown, paler and grayer below. Total length, 170 (6 $\frac{1}{2}$); tail vertebrae, 72 (2 $\frac{1}{2}$); hind foot, 27 (1 $\frac{1}{2}$). (*cristata*; Lat., crested)

The star-nosed mole inhabits wet places in the boreal and transition zones of eastern North America. Its northward range is more extensive than that of any other American species.

Genus **Scalops** Illiger

1811 *Scalops* Illiger, *Prodr. syst. mamm. et avium*, p. 126. Type *Sorex aquaticus* Linnaeus.

Teeth 36; nostrils on upper side of simple muzzle; tail short, not thickened, nearly naked. (*Scalops*; Gk., a mole)

The genus *Scalops* is confined to eastern North America. It contains five or six forms whose interrelationships are not fully understood. Only one of these occurs within our limits.

Scalops aquaticus (Linnaeus) *Naked-tailed mole*

1758 *Sorex aquaticus* Linnaeus, *Systema naturae*. ed. 10. 1:53. (Eastern United States)

1825 *Scalops aquaticus* F. Cuvier, *Dents des mammifères*, p. 251.

1896 *Scalops aquaticus* True, *Proc. U. S. national museum*. 19:19.

Light, glossy slate-brown, often tinged with rusty; tail whitish. Total length, 162 (6 $\frac{3}{8}$); tail vertebrae, 27 (1 $\frac{1}{2}$); hind foot, 16.5 ($\frac{3}{8}$). (*aquaticus*; from Lat., aquatic)

The naked-tailed mole inhabits dry sandy soil in the eastern United States and southern Canada from the northern limits of the transition zone southward. The form found within our limits is the typical subspecies, *S. aquaticus aquaticus*.

Genus **Parascalops** True

1894 *Parascalops* True, *Diagnoses of new North American mammals*. 26 Ap. 1894. p. 2. (Reprinted: *Proc. U. S. national museum*. 15 Nov. 1894. 17:242) Type *Scalops breweri* Bachman.

Teeth 44; nostrils on outer side of simple muzzle; tail short, thick, densely haired. (*Parascalops*; Gk., near to the genus *Scalops*)

The genus *Parascalops* is confined to eastern North America. Only one species is known.

Parascalops breweri (Bachman) *Eastern hairy-tailed mole*

1844 *Scalops breweri* Bachman, Boston jour. nat. hist. 4: 32. ("Island of Marthas Vineyard, Mass." This doubtless an error.)

1895 *Parascalops breweri* True, Science. n. s. 25 Jan. 1895. 1: 101.

1896 *Parascalops breweri* True, Proc. U. S. national museum. 19: 68.

Dark lead-gray, seldom if ever tinged with rusty; tail dark. Total length, 147 ($5\frac{1}{2}$); tail vertebrae, 30 ($1\frac{1}{2}$); hind foot, 19 ($\frac{3}{4}$). (*breweri*; name from that of Thomas Mayo Brewer)

The eastern hairy-tailed mole inhabits dry soil in the boreal and transition zones of the eastern United States and southern Canada.

Family **Soricidae** *Shrews*

Body usually slender and mouse-like, with a distinct neck; eyes well developed but very small; a distinct external ear; front feet small, not specially modified; fur only moderately soft and dense. (Soricidae; from genus *Sorex*)

The range of the family Soricidae is essentially the same as that of the order Insectivora. 10 or more genera are known, three of which occur in North America. Two of these are found within our limits. Shrews are small animals much like mice in general appearance but readily distinguishable by their pointed snouts and small eyes.

GENERA OF SORICIDAE

Ears completely hidden by the fur; tail scarcely longer than head.. *Blarina*
Ears distinctly visible; tail much longer than head..... *Sorex*

Genus **Blarina** Gray

1838 *Blarina* Gray, Proc. zool. soc. London. (1837) p. 124. Type *Sorex talpoides* Gapper=*S. brevicaudus* Say.

Ears very small, completely hidden by the fur; body stout, somewhat mole-like; tail scarcely longer than head. (*Blarina*; a coined word)

The genus *Blarina* is peculiar to America. All but one of the 23 known forms are North American or Central American. The exception, *B. thomasi* Merriam, is the only known South American member of the order Insectivora. Two species only are found within our limits.

SPECIES OF BLARINA

Teeth 32; total length about 120 ($4\frac{3}{4}$) (subgenus *Blarina*).. *B. brevicauda*
Teeth 30; total length about 75 (3) (subgenus *Cryptotis*)..... *B. parva*

Blarina brevicauda (Say) *Large blarina*

1823 *Sorex brevicaudus* Say, Long's exped. to the Rocky mts. 1: 164.
(Near Blair Neb.)

1857 *Blarina brevicauda* Baird, Mamm. N. Am. p. 42.

1895 *Blarina brevicauda* Merriam, North American fauna. 31 Dec. 1895 no. 10, p. 10.

Teeth 32; color sooty slate-brown above, more ashy below. *Total length*, 120, (4 $\frac{1}{2}$); tail vertebrae, 25 (1); hind foot, 15 ($\frac{1}{2}$). (*brevicauda*; Lat., short tail)

The typical form of the large blarina, *Blarina brevicauda*, is one of the most abundant mammals in dry woods and old fields throughout eastern North America, from the lower edge of the upper austral zone north into the boreal zone. In the lower austral zone of the southeastern United States it gives way to a smaller form, *B. brevicauda carolinensis* (Bachman).

Blarina parva* (Say) *Small blarina

1823 *Sorex parvus* Say, Long's exped. to the Rocky mts. 1:164. (Near Blair Neb.)

1895 *Blarina parva* Merriam, North American fauna. 31 Dec. 1895. no. 10, p. 17.

Teeth 30; color brownish above, ashy below. *Total length*, 75 (3); tail vertebrae, 15 ($\frac{1}{2}$); hind foot, 10 ($\frac{3}{8}$). (*parva*; Lat., small)

The small blarina is common in meadows and old fields throughout the upper austral and lower austral zones in the eastern United States. Its range therefore extends north about to the southern border of New York.

Genus *Sorex* Linnaeus

1758 *Sorex* Linnaeus, *Systema naturae*. ed. 10. 1:53. Type *Sorex araneus* Linnaeus.

Ears well developed, generally appearing distinctly above the fur; body slender, mouse-like; *tail much longer than head*. (*Sorex*; Lat., a field mouse)

The genus *Sorex* is very generally distributed throughout the boreal portion of the northern hemisphere. It probably contains 75 or more species. In America 42 forms are known; of these six occur within our limits.

SPECIES OF SOREX

Total length over 140 (5 $\frac{1}{2}$); hind feet conspicuously fringed
(subgenus *Neosorex*)..... *S. albibarbis*

Total length under 130 (5 $\frac{1}{4}$); hind feet not fringed
Fourth tooth in upper jaw exceedingly minute (almost invisible without aid of lens), closely wedged between well developed third and fifth (subgenus *Microsorex*)..... *S. hoyi*

Fourth tooth in upper jaw well developed (subgenus *Sorex*)
Tail vertebrae about 55 (2 $\frac{1}{2}$) *S. macrurus*

Tail vertebrae less than 50 (2)
Back conspicuously blackish..... *S. richardsoni*

Back not conspicuously blackish

Hind foot about 14 ($\frac{7}{8}$); general color smoky slate-color throughout *S. fumeus*

Hind foot about 12 ($\frac{1}{2}$); back clear brown, belly whitish gray..... *S. personatus*

Sorex albibarbis (Cope) *Eastern marsh shrew*

1862 *Neosorex albibarbis* Cope, Proc. acad. nat. sci. Philadelphia, p. 188. (Profile lake, N. H.)

1892 *Sorex albibarbis* Merriam, Proc. biolog. soc. Washington. 7:25.

1895 *Sorex albibarbis* Miller, North American fauna. 31 Dec. 1895. no. 10, p. 46.

Upper parts blackish slate with a slight hoary cast; chin and throat grayish white; rest of lower parts dusky. Total length, 155 ($6\frac{1}{2}$); tail vertebrae, 70 ($2\frac{1}{2}$); hind foot, 19 ($\frac{3}{4}$). (*albibarbis*; Lat., white beard)

The marsh shrew inhabits marshes and the banks of watercourses in the boreal zone of eastern North America south in the mountains at least to Pennsylvania and probably farther.

Sorex hoyi Baird *Hoy's shrew*

1857 *Sorex hoyi* Baird, Mamm. N. Am. p. 32 (Racine Wis.)

1895 *Sorex hoyi* Miller, North American fauna. 31 Dec. 1895. no. 10, p. 43.

Upper parts sepia-brown; lower parts whitish gray usually washed with yellowish on chest. Total length, 90 ($3\frac{3}{8}$); tail vertebrae, 32 ($1\frac{1}{4}$); hind foot, 10 ($\frac{3}{8}$). (*hoyi*; name from that of P. R. Hoy)

Hoy's shrew, a little known animal, inhabits open fields, plains and clearings in the boreal zone and upper part of the transition zone from British Columbia to Nova Scotia, south to Wisconsin and northern New York.

Sorex macrurus Batchelder *Big-tailed shrew*

1896 *Sorex macrurus* Batchelder, Proc. biolog. soc. Washington. 8 Dec. 1896, 10:133. (Beedes, Essex co. N. Y.)

Upper parts blackish slaty, lower parts dark smoke gray. Total length, 125 (5); tail vertebrae, 57 ($2\frac{1}{4}$); hind foot, 15 ($\frac{3}{8}$). (*macrurus*; Gk., big tail)

The big-tailed shrew is known from the eastern Adirondacks and the Catskills only. Thus far only 10 specimens have been recorded.

Sorex richardsoni Bachman *Richardson's shrew*

1857 *Sorex richardsoni* Bachman, Jour. acad. nat. sci. Philadelphia. 7: 383. (Probably from plains of Saskatchewan)

1895 *Sorex richardsoni* Miller, North American fauna. 31 Dec. 1895. no. 10, p. 48.

Back very dark (almost blackish) brown, without slaty tinge; sides dull yellowish brown; under parts grayish, washed with chestnut. Total length,

112 ($4\frac{3}{8}$); tail vertebrae, 40 ($1\frac{5}{8}$); hind foot, 14 ($\frac{7}{8}$). (*richardsoni*; name from that of John Richardson)

Richardson's shrew, an imperfectly known species, occurs in the boreal zone of Saskatchewan, northern Minnesota, the north shore of Lake Superior and in New Brunswick¹.

Sorex fumeus Miller *Smoky shrew*

1895 *Sorex fumeus* Miller, North American fauna. no. 10, p. 50. (Peterboro, Madison co. N. Y.)

Smoky slate color, slightly paler below. Total length, 115 ($4\frac{1}{2}$); tail vertebrae, 45 ($1\frac{3}{4}$); hind foot, 14 ($\frac{7}{8}$). (*fumeus*; Lat., smoky)

The smoky shrew inhabits the forests of the boreal zone and upper part of the transition zone in eastern North America, south into the southern Alleghanies.

Sorex personatus Geoffroy St Hilaire *Maskea shrew*

Clear brown (sepia or drab) above, whitish gray below. Total length, 90 ($3\frac{1}{2}$) to 110 ($4\frac{5}{8}$); hind foot, 13 ($\frac{3}{4}$) or less. (*personatus*; Lat., masked)

The masked shrew occurs throughout the greater part of boreal North America, and in cold situations even in the upper austral zone. It is divisible into several races, three of which occur within our limits.

SUBSPECIES OF SOREX PERSONATUS

Total length about 95 ($3\frac{3}{4}$) *S. personatus lesueurii*

Total length about 105 ($4\frac{1}{8}$)

Back sepia brown at all seasons..... *S. personatus personatus*

Back light (broccoli) brown in summer, drab

gray in winter *S. personatus miscix*

Sorex personatus personatus I. Geoffroy St Hilaire *Northern masked shrew*

1827 *Sorex personatus* E. Geoffroy St Hilaire, Mem. du muséum, d' hist. nat. Paris. 15:122. (Eastern United States, probably New York)

1895 *Sorex personatus* Miller, North American fauna. 31 Dec. 1895. no. 10, p. 53.

Upper parts sepia brown; under parts whitish gray. Total length, 105 ($4\frac{1}{8}$); tail vertebrae, 40 ($1\frac{5}{8}$); hind foot, 12 ($\frac{1}{2}$). (*personatus*; Lat., masked)

The northern masked shrew is abundant in a great variety of situations throughout the transition zone and Canadian zone of the eastern United States and eastern Canada.

¹ For occurrence of *Sorex richardsoni* in New Brunswick see Cox, Canadian record of science. Ap. 1896. 7: 117-18.

Sorex personatus lesueuri (Duvernoy) *Southern masked shrew*

1842 *Amphisorex lesueuri* Duvernoy, Magasin de zoologie, mamm. Nov. 1848. p. 33. (Wabash river, Indiana)

1895 [*Sorex personatus*] *lesueuri* Merriam, North American fauna. 31 Dec. 1895. no. 10, p. 61.

Color as in *S. personatus personatus*; size smaller. Total length, 90 ($3\frac{1}{2}$); tail vertebrae, 33 ($\frac{5}{8}$); hind foot, 10.5 ($\frac{6\frac{1}{2}}{16}$). (*lesueuri*; name from that of Lesueur)

The southern masked shrew is confined to the cool, boreal sphagnum bogs of the upper austral zone. It is the smallest of our mammals, and at present very rare in collections.

Sorex personatus miscix Bangs *Labrador masked shrew*

1899 *Sorex personatus miscix* Bangs, Proc. New England zool. club. 28 Feb. 1899. 1: 15. (Black bay, Labrador)

Upper parts in winter drab gray, in summer very light (broccoli) brown; under parts pale gray. Total length, 102 ($4\frac{1}{8}$); tail vertebrae, 43 ($1\frac{1}{4}$); hind foot, 13 ($1\frac{1}{2}$) (*miscix*; Lat., changeable)

The Labrador masked shrew is at present known from Black bay, Labrador only.

Order **Chiroptera** *Bats*

Fore limbs greatly developed, the elongated fingers *supporting a membrane by means of which true flight is performed*. (*Chiroptera*; Gk., hand-wings)

The bats, though most numerous in the tropics, are almost universally distributed. The order contains two suborders, one the *Megachiroptera* (flying foxes) peculiar to the old world, the other, the *Microchiroptera*, (true bats) with the same range as the order. The *Microchiroptera* are usually divided into five families, but this number will probably be greatly increased. Only one family, the *Vespertilionidae*, occurs in northeastern North America.

Family **Vespertilionidae** *Typical bats*

Tail included in membrane nearly or quite to tip; nose without leaf-like fleshy outgrowths. (*Vespertilionidae*; from genus *Vespertilio*)

The family *Vespertilionidae* has essentially the same range as the order *Chiroptera*. It contains many genera, 12 of which occur in North America. Six are found within our limits; all of these are members of the subfamily *Vespertilioninae*, or typical bats with simple nostrils and separate ears.

GENERA OF VESPERTILIONIDAE

- Membrane between legs completely furred above..... *Lasiurus*, p. 147
 Membrane between legs not completely furred above
 Fur blackish, frosted with white..... *Lasionycteris*, p. 149
 Fur not blackish, frosted with white
 Total length over 100 (4)..... *Vespertilio*, p. 151
 Total length under 100 (4)
 Individual hairs on back with three
 distinct color bands..... *Pipistrellus*, p. 150
 Individual hairs on back with less than
 three distinct color bands
 Upper front teeth 2..... *Nycticeius*, p. 148
 Upper front teeth 4..... *Myotis*, p. 148

Genus *Lasiurus* Gray

1831 *Lasiurus* Gray, Zoological miscellany. no. 1, p. 38 (based on the American hairy-tailed bats).

Teeth 32; only two front teeth in upper jaw between canines; *back of membrane between legs densely furred*; ears short and round. (*Lasiurus*; Gk., silk tail)

The genus *Lasiurus* is peculiar to America, where it is represented by half a dozen or more species. Two of these occur within our limits.

SPECIES OF LASIURUS

Total length 135 (5½); general color hoary; rim of ear dark... *L. cinereus*
 Total length 110 (4½); general color reddish; rim of ear light... *L. borealis*

Lasiurus cinereus (Beauvois) *Hoary bat*

1796 *Vespertilio lineatus* (Obvious misprint for *cinereus*) Beauvois, Catalogue Peale's museum. Philadelphia. p. 14. (Philadelphia Pa.)

1864 *Lasiurus cinereus* H. Allen, Monogr., bats N. Am. p. 21.

1897 *Lasiurus cinereus* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 112.

General color a mixture of light yellowish brown, deep umber brown, and white. Total length, 135 (5½); tail vertebrae, 50 (2); forearm, 40 (2½). (*cinereus*; Lat., gray)

The hoary bat breeds throughout the forests of the boreal zone of North America. In autumn and winter it migrates far to the southward of its breeding range.

Lasiurus borealis (Müller) *Red bat*

1776 *Vespertilio borealis* Müller, Natursyst. suppl.-u. regist.-band. p. 21. (New York)

1897 *Lasiurus borealis* Miller, North American fauna. 13 Oct. 1897. no. 13, p. 105.

General color varying from rufous red to yellowish gray; a white spot at shoulder, sometimes connected with its fellow by a white chest band. Total length, 110 (4 $\frac{1}{2}$); tail vertebrae, 50 (2); forearm, 40 (1 $\frac{3}{8}$). (*borealis*; Lat., northern)

The red bat occurs in a great variety of situations throughout most of North America. It is divisible into several geographic races. The typical form, *L. borealis borealis* is the only one that occurs within our limits.

Genus *Nycticeius* Rafinesque .

1819 *Nycticeius* Rafinesque, Journal de physique. 88 : 417. Type *N. humeralis* Rafinesque.

Teeth 30; only two front teeth in upper jaw between canines; back of membrane between legs furred at extreme base only; ears short, obtusely pointed. (*Nycticeius*; Gk., night being).

Nycticeius is peculiar to North America, though closely related to an old world genus (*Scotophilus*). It is represented by one species only, a small but thickset bat with broad muzzle and blunt ears.

Nycticeius humeralis Rafinesque *Rafinesque's bat*

1818 *Vespertilio humeralis* Rafinesque, American monthly magazine. 3 : 445. (Kentucky)

1819 *Nycticeius humeralis* Rafinesque, Journal de physique. 88 : 417.

1897 *Nycticeius humeralis* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 118.

Dull umber brown above, paler below. Total length 90 (3 $\frac{1}{2}$); tail vertebrae, 36 (1 $\frac{1}{8}$); forearm, 36 (1 $\frac{1}{8}$). (*humeralis*; Lat., humeral)

Rafinesque's bat inhabits the austral zones of the eastern United States. At present it has not been found north of Carlisle Pa.

Genus *Myotis* Kaup

1829 *Myotis* Kaup, Skizzirte Entw.-gesch. u. natürl. syst. d. Europ. Thierw. 1:106. Type *Vespertilio murinus* Schreber = *V. myotis* Bechstein.

Teeth 38; two pairs of front teeth in upper jaw between canines; back of membrane between legs naked except at extreme base. (*Myotis*; Gk., mouse ear)

The genus *Myotis* is very widely distributed in both eastern and western hemispheres. The species are still imperfectly known. In North America 16 forms are known, but only two of these occur within our limits. These are small delicately formed bats with slender muzzles and narrow ears.

SPECIES OF MYOTIS

- Ear, when laid forward, reaching considerably beyond tip of muzzle..... M. subulatus
 Ear, when laid forward, reaching about to tip of muzzle..... M. lucifugus

Myotis subulatus (Say) *Say's bat*

- 1823 ? *Vespertilio subulatus* Say, Long's exped. to Rocky mts. 2:65.
 (Arkansas river, near La Junta Col.)
 1864 *Vespertilio subulatus* H. Allen, Monogr, bats. N. Am. p. 51.
 (Eastern United States)
 1897 *Myotis subulatus* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 75.

Dull brown, slightly paler and more yellowish below; *ear reaching considerably beyond* tip of nose when laid forward. Total length, 85 (3 $\frac{3}{8}$); tail vertebrae, 38 (1 $\frac{1}{2}$); forearm, 35 (1 $\frac{3}{8}$). (*subulatus*; Lat., awl-shaped)

Say's bat is locally common throughout eastern North America, south into the upper austral zone. The details of its distribution are imperfectly known. The form found within our limits is *M. subulatus subulatus*.

Myotis lucifugus (Le Conte) *Little brown bat*

- 1831 *Vespertilio lucifugus* Le Conte, McMurtries's Cuvier, Animal kingdom, 1, append. p. 431. (Southern Georgia)
 1897 *Myotis lucifugus* Miller, North America fauna. 16 Oct. 1897. no. 13, p. 59.

Dull brown, slightly paler and more yellowish below; *ear reaching barely to nostril* when laid forward. Total length, 85 (3 $\frac{3}{8}$); tail vertebrae, 38 (1 $\frac{1}{2}$); forearm, 38 (1 $\frac{1}{2}$). (*lucifugus*; Lat., light-fleeing)

The little brown bat is abundant throughout eastern North America, south to the gulf coast. Within our limits it is represented by the typical race, *M. lucifugus lucifugus*.

Genus **Lasionycteris** Peters

- 1865 *Lasionycteris* Peters, Monatsber. K. Preuss. akad. wissenschaft. Berlin. p. 648. Type *Vespertilio noctivagans* Le Conte.

Teeth 36; two pairs of front teeth in upper jaw between canines; *back of membrane between legs furred to about middle*. (*Lasionycteris*; Gk., silk bat)

The genus *Lasionycteris* is peculiar to North America. It contains one species only.

Lasionycteris noctivagans (Le Conte) *Silvery bat*

- 1831 *Vespertilio noctivagans* Le Conte, McMurtries' Cuvier, Animal kingdom. June 1831. Append. p. 431. (Eastern United States)
 1865 *Lasionycteris noctivagans* Peters, Monatsber. K. Preuss. akad. wissenschaft., Berlin. p. 648.

1897 *Lasionycteris noctivagans* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 86.

Blackish, frosted with white. Total length, 100 (4); tail vertebrae, 40 ($1\frac{2}{3}$); forearm, 40 ($1\frac{1}{2}$). (*noctivagans*; Lat., night wandering)

The silvery bat is a common species in eastern North America. It is apparently most numerous in the boreal and transition zones.

Genus *Pipistrellus* Kaup

1829 *Pipistrellus* Kaup, Skizzirte Eutwick.-gesch. u. natürl. syst. d. Europ. Thierw. Th. 1, p. 98. Type *Vespertilio pipistrellus*. Schreber.

Teeth 34; two pairs of front teeth in upper jaw between canines; back of membrane between legs thinly haired on basal third. (*Pipistréllus*; N. Lat., a *pipistrelle*)

The genus *Pipistrellus* is widely distributed in both old and new worlds. It contains numerous species, only three of which are American. One of these occurs within our limits.

Pipistrellus subflavus (F. Cuvier) *American pipistrelle*

Hairs on back with three distinct color bands. Total length, 85 ($3\frac{3}{8}$); tail vertebrae, 40 ($1\frac{1}{2}$); forearm, 35 ($1\frac{1}{2}$). (*subflávus*; Lat., yellowish.)

The pipistrelle inhabits the eastern United States north to Lake George, New York. It is one of the most abundant bats throughout the austral zones. It is divisible into two subspecies.

SUBSPECIES OF *PIPISTRELLUS SUBFLAVUS*

General color light yellowish brown *P. subflavus subflavus*
 General color drab brown..... *P. subflavus obscurus*

Pipistrellus subflavus subflavus (F. Cuvier) *Southeastern pipistrelle*

1832 *Vespertilio subflavus* F. Cuvier, *Nouv. Ann. mus. d'hist. nat.* Paris. p. 17. (Eastern United States, probably Georgia)

1897 *Pipistrellus subflavus* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 90.

General color light yellowish brown, the individual hairs on back deep plumbeous at base, yellowish brown at middle and dark brown at tip. (*subflávus*; Lat., yellowish)

The southeastern pipistrelle is very abundant throughout the austral zones of the eastern United States, north to the lower Hudson valley.

Pipistrellus subflavus obscurus Miller *Northeastern pipistrelle*

1897 *Pipistrellus subflavus obscurus* Miller, North American fauna. 16 Oct. 1897. no. 13, p. 93. (Lake George, New York)

General color dull, pale, drab brown. (*obscurus*; Lat., dusky)

The northeastern pipistrelle is at present known from one locality only, Lake George, Warren co. N. Y.

Genus *Vespertilio* Linnaeus

1758 *Vespertilio* Linnaeus, *Systema naturae*. ed. 10. 1:31. Type *V. murinus*, Linnaeus.

Teeth 32; two pairs of front teeth in upper jaw between canines; back of membrane between legs naked except for a sprinkling of fine hairs on basal fourth. (*Vespertilio*; Lat., a bat)

The genus *Vespertilio* is widely distributed in both hemispheres, but the species are very imperfectly known. Only one occurs in North America.

Vespertilio fuscus Beauvois *Big brown bat*

1796 *Vespertilio fuscus* Beauvois, *Catalogue Peale's museum*. Philadelphia. p. 18. (Philadelphia Pa.)

1897 *Vespertilio fuscus* Miller, *North American fauna*. 16 Oct. 1897. no. 13, p. 96.

Sepia brown, paler below. Total length, 110 (4 $\frac{3}{8}$); tail vertebrae, 45 (1 $\frac{1}{2}$); forearm, 45 (1 $\frac{1}{2}$). (*fuscus*; Lat., dark)

The big brown bat occurs throughout Mexico, the United States and southern Canada north to the lower edge of the boreal zone. It is divisible into several races, of which the typical, *V. fuscus fuscus*, is abundant in eastern North America.

CORRECTIONS

Corrections of the names of two of the mammals occurring in eastern North America have been published¹ too late to be inserted in the body of this paper. They are as follows:

The house rat (p. 95) should be *Mus norvegicus* Erxleben, *Syst. regn. anim.* p. 381. 1777.

The northeastern fox squirrel (p. 87) should be *Sciurus ludovicianus neglectus* (Gray) (*Macroxus neglectus* Gray, *Ann. and Mag. nat. hist.* 1867, 3d ser. 20: 425. *Sciurus ludovicianus neglectus* Nelson, *Proc. biolog. soc. Washington* 31 Oct. 1900. 13: 170).

INDEX

The superior figures tell the exact place on the page in ninths; e. g. 62⁸ means page 62, beginning in the third ninth of the page, i. e. about one third of the way down. Synonyms are printed in italics.

- Alces**, 81⁶-82¹
 Americanus, 81⁴-82¹
 machlis, 81⁸-82¹
Amphisorex lesueuri, 146⁷
Arctic zone, 62⁸
Arctomys, 89²
 ignavus, 89⁶
 monax, 89⁵
 canadensis, 89⁷
 monax, 89⁷
Artiodactyla, 78⁹
Arvicola breweri, 105⁸
 chrotorrhinus, 104⁷
 gapperi, 110⁷
 scalopsoides, 103⁸-4¹
 terraenovae, 104²
Austral zone, 32⁸

Bat, 146⁸-51⁵
 big brown, 151⁸
 hoary, 147⁹
 little brown, 149⁵
 Rafinesque's, 148⁸
 red, 147⁹-48²
 Say's, 149²
 silvery, 149⁹-50²
 true, 146⁹
 typical, 146⁸-51⁵
Beaver, 91⁶-92⁷
 American, 92¹
 northeastern, 92⁸
 southeastern, 92⁸
Bison, 79²
 American, 79⁶
 plains, 79⁶
Bison, 79⁴
 bison, 79⁶
 athabascaae, 79⁸
 bison, 79⁸
Blarina, large, 142⁸-43⁸
 small, 143⁸
Blarina, 142⁸-43⁵
 brevicauda, 142⁸-43⁸
 brevicauda, 143²
 carolinensis, 143⁸
 parva, 143⁸
 thomasi, 142⁷
Bos bison, 79⁶
Bovidae, 79²

Canadian zone, 62⁹
Canidae, 126⁸-29⁷
Canis, 126⁷-27⁵
 albus, 127²
 cinereoargenteus, 129⁸
 fulvus, 128⁷
 lagopus, 128¹
 lupus albus, 127²
 occidentalis, 127⁴
 occidentalis, 127⁴
Cariacus, *see* *Odocoileus*

- Caribou, barren ground, 81^a**
 Newfoundland, 81¹
 woodland, 80⁷
Carnivores, 119⁷-39^o
Castor, 91⁸-92⁷
 canadensis, 92¹
 canadensis, 92³
 canadensis, 92³
 carolinensis, 92⁵
 zibethicus, 102²
Castoridae, 91⁸-92⁷
Cats, 123⁵-26³
Cattle, 79²
Cervidae, 79⁸-83⁷
Cervus, 82²
 canadensis, 82³
 [*dama*] *Americanus*, 83³
 [*elaphus*] *canadensis*, 82⁴
 tarandus var. *arcticus*, 81⁴
 caribou, 80⁷
 virginianus, 83⁵
Chipmunk, eastern, 88³
 northeastern, 88⁷
 southeastern, 88⁵
Chiroptera, 146⁵-51⁵
Condylura, 140⁸-41⁸
 crinata, 141¹
Cottontail, 118⁵-19³
 eastern prairie, 118⁵-19³
 northeastern, 118⁶
 southeastern, 119⁴
Cystophora, 121⁴
 crinata, 121³

Deer, 79⁸-83⁷
 northern Virginia, 83⁵
 southern Virginia, 83³
 Virginia, 82³-83⁷
Dicrostonyx, 101¹
 hudsonius, 101³
Didelphididae, 77⁹-78³
Didelphis, 78²
 virginiana, 78⁴
Dipodidae, 111⁶-14⁹
 Dipus hudsonius, 113³

Dogs, 126³-29⁷
Dorcelaphus, see Odocoileus

Erethizon, 115³
 dorsatus, 115⁴
Erethizontidae, 115¹
Euarctos, 139³
Eutheria, 76⁶
Evotomys, 109¹-11⁶
 carolinensis, 109⁷
 fuscodorsalis, 110⁵
 gapperi, 110²-11³
 gapperi, 110⁷
 gapperi, 110⁷
 ochraceus, 111¹
 rhoadsi, 111⁴
 proteus, 110⁴
 rhoadsi, 111⁴
 ungava, 109⁶

Felidae, 123⁵-26³
Felis, 123⁵-24³
 concolor, 124⁴
 hippolestes, 124⁴
 oregonensis, 124²
 hippolestes, 124⁴
 oregonensis, 124²
 ruffus, 125⁷
Ferae, 119⁷-39⁹
Fiber, 101⁵-2³
 obscurus, 102⁹
 zibethicus, 101⁶-2³
 zibethicus, 102²
 aquilonius, 102³
 rivalicius, 102⁴
 zibethicus, 102³

Fisher, 132¹
Flesh-eaters, 119⁷-39⁹
Fox, arctic, 128³
 lying, 146⁵
 gray, 129⁵
 Newfoundland red, 129³
 Nova Scotia red, 128³-29¹
 red, 128³-29¹
 southeastern red, 128⁶

Glires, 83³-119³
Ground-hog, 89³

- Gulo**, 131⁶
 gulo, 131⁷
 luscus, 131⁸
- Halichoerus**, 121⁸-22⁸
 grypus, 122¹
- Hare**, 115¹-19⁶
 American varying, 116⁴-18¹
 Labrador arctic, 116³
 Newfoundland arctic, 116⁶
 northern varying, 117⁶
 Nova Scotian, 117³
 southern varying, 117¹-18¹
- Hedgehog**, 115⁴
Hesperomys maniculatus, 98⁷
- Hoofed animals**, 78⁷-83⁷
- Hudsonian zone**, 62⁴
- Hystrix dorsatus*, 115¹
- Insect-eaters**, 140¹-46⁴
- Insectivora**, 140¹-46⁴
- Jerboas**, 111⁶-14⁶
- Lasionycteris**, 149⁷-50³
 noctivagans, 149⁶-50²
- Lasiurus**, 147⁴-48⁶
 borealis, 147²-48²
 borealis, 148⁸
 cinereus, 147³
- Lemming**, Bangs's, 100⁸
 Cooper's, 100¹
 Labrador, 101⁸
 Preble's, 100⁸
 True's, 100⁶
- Leporidae**, 115⁷-19⁶
- Lepus**, 115⁸-19⁶
 americanus, 116³-18¹
americanus, 117⁶
 americanus, 117⁵
 struthopus, 117⁸
 virginianus, 117¹-18¹
arcticus bangsi, 116⁸, 116⁸
 bangsi, 116⁵
- Lepus** (*continued*)
 floridanus, 118²-19⁶
 floridanus, 118³
 mallurus, 119⁴
 mearnsi, 118⁸-19⁶
 transitionalis, 118⁶
 labradorius, 116⁸
nuttalli mallurus, 119⁴
sylvaticus, 119⁴
mearnsi, 118⁸-19⁶
transitionalis, 118⁶
virginianus, 117⁷
- Life zones**, 61¹-62⁹
- Lutra**, 130⁸-31⁶
 degener, 131⁵
 hudsonica, 130⁸-31⁴
hudsonica, 130⁸-31²
 hudsonica, 130⁸-31²
 lataxina, 131²
 vaga, 131⁴
lataxina, 131²
- Lynx**, bay, 125⁷
 Canada, 125⁸
 Newfoundland, 125⁵
 Nova Scotia, 126¹
- Lynx**, 124⁷-26³
 canadensis, 125⁸
 gigas, 126¹
 ruffus, 125⁷
 ruffus, 125⁹
 subsolanus, 125⁸
- Marsupialia**, 77⁵-78⁶
- Marsupials**, 77⁵-78⁶
- Martin**, eastern, 132⁹-33³
 Newfoundland, 133⁸
 north Labrador, 132⁷
- Mazama americana*, 83⁶
- Megachiroptera**, 146⁹
- Mephitis**, 136⁸-37⁷
 mephitica, 136⁸-37⁵
mephitica, 137²
 mephitica, 137²
mephitica, 137⁶
 scrutator, 137⁴
- Meriones americanus*, 112⁷

Metatheria, 76^o
 Microchiroptera, 146^o
 Microtus, 102^s-7^o
 breweri, 105^o
 chrotorrhinus, 104¹-5^o
 chrotorrhinus, 104⁷
 chrotorrhinus, 104⁷
 ravus, 105¹
 enixus, 105^o
 fontigenus, 107¹
 insularis, 107^o
 nesophilus, 107^o
 pennsylvanicus, 105^s-7^o
 pennsylvanicus, 106^s
 academicus, 107⁴
 fontigenus, 107¹
 labradorius, 106^s
 pennsylvanicus, 106^s
 pinetorum, 103^s-4¹
 scalopsoides, 103^s-4¹
 terraenovae, 104²
Micromys inuitus, 100^o
 Mink, 133^s-34⁷
 northeastern, 134²
 southeastern, 134³
 Mole, 140^s-42^o
 eastern hairy-tailed, 142¹
 naked-tailed, 141^s
 star-nosed, 141¹
 Moose, eastern, 81^s-82¹
 Mouse, 92^s-111^o
 acadian field, 107⁴
 Canadian white-footed, 97^o 98^o
 Carolina redbacked, 109⁷
 cloudland white-footed, 98¹
 common eastern field, 100^s
 common redbacked, 110^s-11^s
 deer, 98³
 eastern redbacked, 110⁷
 field, 105^s-7^o
 Gull island, 107^o
 harvest, 95^s
 house, 94^o-95¹
 Hudsonian white-footed, 97¹
 Hudsonian woodland jumping,
 114^s

Mouse (*continued*)
 jumping, 111^s-14^o
 Labrador deer, 98^s
 Labrador field, 106^s
 Labrador meadow jumping, 113¹
 meadow, 107^o
 meadow jumping, 112^s-13^s
 Mount Washington redbacked,
 111¹
 mountain woodland jumping,
 114⁷
 New Jersey redbacked, 111⁴
 northern field, 107¹
 northern meadow jumping, 113¹
 northern pine, 103^s-4¹
 northern woodland jumping,
 114^s
 pine, 103^s-4¹
 rice field, 96^s
 southern meadow jumping, 112⁷
 ungava redbacked, 109^o
 variable redbacked, 110¹
 Virginia harvest, 96¹
 woodland jumping, 113¹-14^o
 Muridae, 92^s-111^o
 Mus, 94^o-95^o
 alexandrinus, 94⁷
 decumanus, 95⁴
 hudsonius, 101^s
 lecontei, 95^s
 montez, 89^s
 musculus, 94^o-95¹
 palustris, 96^s
 pennsylvanica, 106^s
 rattus, 95²
 volans, 90¹
Musculus leucopus, 98⁴
 Muskrat, 101^s-2³
 Labrador, 102^s
 Newfoundland, 102^o
 northern, 102²
 Mustela, 132¹-33⁴
 americana, 132^s-33²
 atrata, 133^o
 brumalis, 132⁷
 caurina, 133²

- Mustela* (*continued*)
cicognanii, 134^s-35^s
hudsonica, 130^o-31²
lutrocephala, 134^s
pennanti, 132⁴
pennanti, 132^o
vison, 134^s
- Mustelidae, 129^s-37^s
 Myotis, 148⁷-49⁷
 lucifugus, 149^s
 lucifugus, 149⁷
 subulatus, 149²
 subulatus, 149⁴
- Napaeozapus*, 113^o-14^o
 insignis, 113^s-14^o
 abietorum, 114^s
 insignis, 114^s
 roanensis, 114⁷
- Neosciurus*, 63^s
Neosorex albibarbis, 144^s
Neotoma, 98^o-99^s
 pennsylvanica, 99^s
- Nycticeius*, 148^s
 humeralis, 148^s
- Odobeaenus rosmarus*, 120^s
Odocoileus, 82^s-83⁷
 americanus, 82^s-83⁷
 americanus, 83^s
 borealis, 83^s
- Opossum*, 77^o-78^s
 common, 78⁴
- Oryzomys*, 96^s
 palustris, 96^s
 palustris, 96⁷
- Otter*, Newfoundland, 131^s
 North American, 130^o-31⁴
 northeastern, 130^o-31²
 southeastern, 131²
- Parascalops*, 141^s-42^s
 breweri, 142¹
- Parasciurus*, 63^s
- Peromyscus*, 96⁷-98^s
 canadensis, 97^s-98^s
 canadensis, 97^s
 abietorum, 97^s
- Peromyscus canadensis* (*continued*)
 canadensis, 97⁷
 nubiterrae, 98¹
 leucopus, 98^s
 novaboracensis, 98^o
 nubiterrae, 98²
 maniculatus, 98^o
- Phenacomys*, large yellow-faced,
 108^s
 small yellow-faced, 108⁷
- Phenacomys*, 108¹
 celatus, 108^s
 latimanus, 108⁷
 ungava, 108^s
- Phoca*, 122^s-23^s
 cristata, 121^o
 foetida, 123¹
 groenlandica, 122⁷
 grypus, 122¹
 hispidata, 123¹
 vitulina, 123^s
- Phocidae, 121¹-23^s
- Pipistrelle*, American, 150⁴
 northeastern, 150^o
 southeastern, 150⁷
- Pipistrellus*, 150^s
 subflavus, 150⁴
 subflavus, 150⁷
 obscurus, 150^o
 subflavus, 150⁷
- Porcupine*, Canada, 115⁴
 new world, 115¹
- Procyon*, 137^s-38^s
 lotor, 138¹
 elucus, 138^s
 lotor, 138^s
- Procyonidae, 137^o-38^s
- Prototheria*, 76^s
- Puma*, 124²
 northern, 124⁴
- Putorius*, 133⁴-36^s
 cicognanii, 134^s
 cicognanii, 134⁷-35^s
 alascensis, 135^s
 cicognanii, 135^s
 richardsoni, 135^s

Putorius (*continued*)

- noveboracensis, 135^o-36^o
- noveboracensis*, 136^o, 136^o
- notius, 136^o
- noveboracensis, 136^o
- occisor, 135^o
- vison, 133^o-34^o
- vison*, 134^o
- energumenos, 134^o
- lutensis, 134^o
- lutrocephalus, 134^o
- vison, 134^o
- vulgivagus, 134^o

Raccoon, 137^o-38^o**Rangifer**, 80^o-81^o

- arcticus, 81^o
- caribou, 80^o
- tarandus arcticus*, 81^o
- caribou*, 80^o
- terraenovae*, 81^o
- terraenovae, 81^o

Rat, 92^o-111^o

- Alleghany cave, 99^o
- black, 95^o
- house, 95^o
- roof, 94^o

Reindeer, 80^o-81^o**Reithrodontomys**, 95^o-96^o

- lecontei, 95^o-96^o
- dickinsoni, 95^o
- impiger, 96^o
- lecontei, 95^o

Rodents, 83^o-119^o**Rosmaridae**, 120^o**Rosmarus**, 120^o

- rosmarus, 120^o

Scalops, 141^o

- aquaticus, 141^o
- breweri*, 142^o

Sciuridae, 84^o-91^o**Sciuropterus**, 90^o-91^o

- sabrinus, 90^o-91^o
- sabrinus*, 91^o, 91^o
- macroctis, 91^o
- sabrinus, 91^o

Sciuropterus (*continued*)volans, 90^o*volans*, 90^o**Sciurus**, 63^o, 85^o-87^o

- carolinensis, 86^o-87^o
- carolinensis*, 86^o-87^o, 87^o
- carolinensis, 86^o-87^o
- leucotis, 87^o
- hudsonicus, 85^o-86^o
- hudsonicus*, 86^o
- gymnicus, 85^o
- hudsonicus, 86^o
- loquax, 86^o
- leucotis*, 87^o
- lysteri*, 85^o
- ludovicianus, 63^o, 87^o
- ludovicianus*, 87^o
- vicinus, 63^o, 87^o
- sabrinus, 91^o
- striatus, 88^o
- [*vulgaris*] *hudsonicus*, 86^o

Scotophilus, 148^o**Seal**, earless, 121^o-23^o

- gray, 122^o
- harbor, 123^o
- harp, 122^o
- hooded, 121^o
- ringed, 123^o

Sheep, 79^o**Shrew**, 142^o-46^o

- big-tailed, 144^o
- eastern marsh, 144^o
- Hoy's, 144^o
- Labrador masked, 146^o
- masked, 145^o-46^o
- northern masked, 145^o
- Richardson's, 144^o-45^o
- smoky, 145^o
- southern masked, 146^o

Sitomys americanus canadensis, 97^o**Skunk**, common, 136^o-37^o

- northeastern, 137^o
- southeastern, 137^o

Sorex, 143^o-46^o

- albibarbis, 144^o
- aquaticus*, 141^o

- Sorex** (*continued*)
breviceaudus, 142^o-43^s
cristatus, 141¹
fumeus, 145²
hoyi, 144¹
macrurus, 144⁷
parvus, 143⁴
personatus, 145¹-46^s
personatus, 145⁷
 leseuri, 146¹
 miscix, 146³
 personatus, 145⁷
 richardsoni, 141¹-45²
- Soricidae**, 142^s-46⁴
- Squirrel**, 84^o-91^o
 Canadian flying, 91⁴
 Canadian red, 85^s
 fox, 87^s
 gray, 86^s-87^s
 Hudsonian flying, 91²
 Hudsonian red, 86¹
 northeastern gray, 87²
 northern flying, 90²-91^o
 northern fox, 87¹
 red, 85^s-86^s
 southeastern gray, 86^s-87²
 southeastern red, 86⁴
 southern flying, 90⁴
 western fox, 87²
- Synaptomys**, 99^s-100^o
 cooperi, 100¹
 fatuus, 100^s
 innuitus, 100^s
 sphagnicola, 100^s
- Synopsis**, 65-76
- Talpidae**, 140^s-42^s
- Talpinae**, 140^s
- Tamias**, 88¹
 striatus, 88^s /
 striatus, 88^s
 lysteri, 88⁷
 striatus, 88^s
- Tamiasciurus**, 63^s
- Thalarectos**, 138^s
 maritimus, 138^s
 maritimus, 138^s
 polaris, 138^o
- Transition zone**, 62^o
- Trichechus rosmarus***, 120^s
- Ungulata**, 78²-83⁷
- Upper austral zone**, 62^o
- Urocyon**, 129⁴
 cinereoargenteus, 129^o
 cinereoargenteus, 129⁷
- Ursidae**, 138⁴-39^o
- Ursus**, 139¹
 americanus, 139^s
 americanus, 139^o
 americanus, 139^s
 sornborgeri, 139⁷
 lotor, 138¹
 luscus, 131^s
 maritimus, 138^s
 richardsoni, 139^o
- Vespertilio**, 151¹
 borealis, 147^o-48²
 fuscus, 151^s
 fuscus, 151^s
 humeralis, 148^s
 linereus, 147^o
 lucifugus, 149^s
 noctivagans, 149^o-50²
 subflavus, 150⁷
 subulatus, 149²
- Vespertilionidae**, 146^s-51^s
- Vespertilioninae**, 146^o
- Viverra mephitica***, 137²
- Vole**, Hamilton inlet, 105^o
 Labrador rock, 105¹
 Muskeget island, 105^s
 Newfoundland, 104²
 rock, 104⁴-5^s
 southern rock, 104⁷
- Vulpes**, 127^o-29^o
 deletrix, 129²
 fulvus, 128^s-29¹

Vulpes (*continued*)

- fulvus*, 128⁷
- fulvus*, 128⁸
- rubricatus*, 128⁸-29¹
- lagopus*, 128¹
- pennsylvanica rubricata*, 128⁸-29¹
- vafra*, 128⁸-29¹

Walrus, 120⁵

- Atlantic, 120⁸

Wapiti, east American, 82¹Weasel, 129⁸-37⁸

- New York, 135⁸-36⁵
- slender-tailed, 135⁴
- small brown, 134⁷-35⁸
- white-bellied New York, 136²
- yellow-bellied New York, 136⁴

Wildcat, 125⁷Wolf, American, 127⁴

- arctic, 127²

Wolverine, 131⁸Woodchuck, common, 89⁵

- Labrador, 89⁸

Zapodinae, 111⁸Zapus, 112¹-13⁵

- hudsonius*, 112⁸-13³

hudsonius, 113²

- americanus*, 112⁷

hudsonius, 113¹

- ladas*, 113⁴

insignis, 114⁵

- abietorum*, 114⁸

roanensis, 114⁸

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