

PROCEEDINGS OF THE UNITED STATES NATIONAL MUSEUM



SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 84

Washington: 1937

No. 3022

ANNOTATED LIST OF WEST VIRGINIA MAMMALS

By REMINGTON KELLOGG

Assistant Curator, Division of Mammals, United States National Museum

IN THE spring of 1936 the Smithsonian Institution completed arrangements for a party from the United States National Museum to make a collection of birds and mammals in West Virginia. In accordance with instructions I accompanied the party across the State to Cabell County, where a camp was established about 4 miles east of Huntington on April 19, 1936. After making a number of short trips along the stream valleys of adjoining counties to appraise collecting prospects, I returned to Washington, D. C., on April 25. Watson M. Perrygo and Carleton Lingeback continued with the work until July 9 and then returned to Washington. On September 16 they went again to West Virginia and remained there until November 7.

Included in this report are all the West Virginia specimens in the National Museum and the Biological Survey collections. Seventy-three forms of Recent mammals are recorded as present either now or formerly within the boundaries of the State.

Measurements herein are given in millimeters.

The collectors of the specimens herein discussed are listed as follows chronologically according to the year in which the material was obtained:

U. S. NATIONAL MUSEUM

Spencer F. Baird, 1850.
 C. B. R. Kennerly, 1850.
 A. Brakeley, 1856, 1857.
 Gustave Kohn, 1886.
 Mrs. C. Hart Merriam, 1888.
 Wirt Robinson, 1896, 1897.
 Thaddeus Surber, 1896, 1897.
 J. H. Riley, 1899.
 W. P. Hay, 1900.
 Lee Hiatt, 1900.
 Isaac Helmick, 1905.
 J. R. Godlove, 1911.
 C. Worthington, 1916.
 B. L. Chambers, 1924.
 A. B. Brooks, 1928.
 W. J. Hamilton, Jr., 1931.
 A. M. Reese, 1933, 1936.
 Andrew W. Alt, 1935.
 Remington Kellogg, 1936.
 Carleton Lingebach, 1936.
 W. M. Perrygo, 1936.

U. S. BIOLOGICAL SURVEY

J. D. Figgins, 1890.
 Richard Elkins, 1892.
 E. B. Vaughan, 1892.
 R. S. Matthews, 1895.
 E. A. Preble, 1895, 1909.
 Vernon Bailey, 1897, 1924, 1928.
 C. G. Rorebeck, 1897.
 W. J. Yeager, 1897, 1902.
 T. B. Wilson, 1903.
 J. L. Yost, 1907, 1908.
 Fred E. Brooks, 1909.
 Arthur H. Howell, 1909, 1910.
 Frank Houchin, 1910.
 B. L. Yost, 1910.
 Mrs. T. H. Ward, 1915.
 A. B. Brooks, 1916.
 James Silver, 1921.

Family DIDELPHIIDAE

DIDELPHIS VIRGINIANA VIRGINIANA Kerr

OPOSSUM

Opossums are seldom found very far away from timbered bottom lands, ravines, or rock ledges on bluffs and hillsides. They occur less frequently in dry upland woods. They are chiefly nocturnal. During the day they hide in abandoned woodchuck burrows, under roots of trees, in hollow logs, in crevices in rock ledges, or in old nests made of leaves by gray squirrels. Two opossums were trapped in Cabell County during the latter part of April 1936. One of these was a large female that had 11 young in the pouch, ranging from 26 to 28 mm in length. During the winter of 1908-09, two were killed by Frank Houchin at Cranberry Glades, Pocahontas County (F. E. Brooks, 1911, p. 11), indicating that their vertical range goes at least to 3,300 feet. They are occasionally killed by automobiles on the highways. One thus killed was seen near Summersville during October 1936.

Cabell County: 3 miles east of Huntington, 2.

Family TALPIDAE

PARASCALOPS BREWERI (Bachman)

HAIRY-TAILED MOLE

Available records indicate that the hairy-tailed mole occurs throughout the eastern mountainous portion of the State as well as along the Ohio drainage in the western part. It has not as yet been reported

from the central and southern portions of West Virginia. The tunnels made by this mole are frequently injurious to lawns and flower beds.

Cabell County: 4 miles east of Huntington, 2.

Greenbrier County: White Sulphur Springs, 3.

Lincoln County: Mountains between Fourteen and Guyandotte River, 1.

Ohio County: Oglebay Park near Wheeling, 1.

Pendleton County: Franklin, 1.

Pocahontas County: Cranberry Glades, 1; Travellers Repose, 1.

Randolph County: Cheat Bridge, altitude 3,558 feet, 1.

Wetzel County: 1.

SCALOPUS AQUATICUS AQUATICUS (Linnaeus)

EASTERN MOLE

On July 4, 1895, a male of this animal was found dead by R. S. Matthews in a road on the side of a mountain in one of the northeastern counties. Subsequent collecting has not revealed any further information on its distribution within the State.

Morgan County: Berkeley Springs, 1.

CONDYLURA CRISTATA (Linnaeus)

STAR-NOSED MOLE

The star-nosed mole is an inhabitant of wet meadows, marshes, and bogs in eastern and northern West Virginia. In June 1908, F. E. Brooks (1911, p. 29) collected one on the bank of Big Run, Pendleton County, and another near Osecola, Randolph County. A. B. Brooks (1929, p. 539) recorded one from Deckers Creek, Monongalia County. The National Museum party trapped one on June 18, 1936, in a runway in moss covering the wet soil of Cranberry Glades.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 1.

Family SORICIDAE

SOREX CINEREUS CINEREUS Kerr

CINEREOUS SHREW

This small shrew seems to be commonest in the bogs and forests in the eastern mountainous portion of the State. It has been recorded (A. B. Brooks, 1929, p. 540) from Oglebay Park, Ohio County, as well as from French Creek, Upshur County, and Pickens, Randolph County (Fred E. Brooks, 1911, p. 27). It was most frequently trapped by Perrygo and Lingeback under the matted leaves on the hillsides about 30 to 40 yards from streams. The traps were set in the runways that were exposed when the leaves were pushed aside. In the vicinity of Cheat Bridge it was most plentiful in open tracts of deciduous and coniferous woods. On several occasions while stalking birds, Perrygo heard the rustling of dead leaves near his feet, and for an instant the head or body of one of these shrews would appear.

Greenbrier County: Jobs Knob, 13 miles north-northwest of Renicks Valley, altitude 4,338 feet, 2.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 7.

Randolph County: Cheat Bridge, altitude 3,900 feet, 6.

SOREX DISPAR Batchelder

GRAY LONG-TAILED SHREW

A male of this species was taken by A. H. Howell in July 1909 in the southern part of the State on the cool north slope of a canyon forested with hemlock and deciduous trees. Further collecting may show that this shrew occurs in the eastern part of the State.

Raleigh County: Winding Gulf, 4 miles southwest of Pemberton, altitude 2,000 feet, 1.

SOREX FUMEUS FUMEUS Miller

SMOKY SHREW

Smoky shrews are most plentiful in the colder parts of the Transition and Canadian Zones in West Virginia. In the eastern part of the State they were found to be fairly common in the higher altitudes where the forest had not been burned over recently. These shrews were trapped by Perrygo and Lingebach only in wet boggy places and along the banks of streams. They were frequently taken in *Microtus* runways. Jackson (1928, p. 64) has commented on the shallow brain cases of some of the five specimens taken at Travellers Repose. He found, however, that other individuals from the same and nearby localities have high brain cases. The color shows no peculiarities.

Average measurements of seven males: Total length, 114 (110-120); tail, 46 (41-51); hind foot, 14.1 (13-15). Average measurements of nine females: Total length, 117 (110-132); tail, 46.5 (42-48); hind foot, 13.6 (12-15).

Greenbrier County: White Sulphur Springs, 1.

Pendleton County: Franklin, 1; Spruce Knob, altitude 4,860 feet, 1.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 9; Travellers Repose, 5.

Raleigh County: Winding Gulf, 4 miles southwest of Pemberton, 2.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, altitude 3,900 feet, 1.

It has been reported (F. E. Brooks, 1911, p. 28) also from French Creek, Upshur County; Terra Alta, Preston County; and Pickens and Osceola, Randolph County.

[**SOREX PALUSTRIS** subsp. ?]

WATER SHREW

Small mammals, locally known as water ground moles, were reported by Fred T. Galford, an employee of the E.C.W. at Camp Black Mountain, to occur along the head waters of Williams River at an altitude of 3,300 feet. They were described by Galford as diving into streams

like little muskrats and then hiding under the banks. When swimming submerged in the water they resembled little silver streaks. Galford reported that he had seen them most frequently on the head waters of Williams River, 5 miles east of Black Mountain.

CRYPTOTIS PARVA (Say)

SMALL SHORT-TAILED SHREW

This little short-tailed shrew seems to prefer dry fields overgrown with grass and weeds, though there are records of its occurrence in damp meadows and woods. A pair of these small shrews was collected in Greenbrier County by Thaddeus Surber during October 1897. Although thus far taken only in the southeastern corner of the State, it is quite likely that the animal will be found in some of the western counties drained by the Ohio River.

Greenbrier County: White Sulphur Springs, 2.

BLARINA BREVICAUDA TALPOIDES (Gapper)

SHORT-TAILED SHREW

Short-tailed shrews seem to be the most abundant insectivores in West Virginia. During April, in the western part of the State, they were readily trapped in underground runways. In some locations it frequently happened that it was necessary to kill off these shrews before undamaged specimens of other small mammals could be trapped. In the mountainous section of eastern West Virginia they were rather plentiful during 1936 and were trapped in wet bogs, along streams, near rotten logs and stumps, in meadows, and even in slide rock on steep hill slopes. Curiously enough Blarinas were caught at Odd in large Schuyler traps that had been nailed to the trunks of oak trees about 5 to 6 feet above the ground. These traps were set for flying squirrels and were baited with bird bodies. In the Cranberry Glades, Blarinas were caught likewise in traps nailed to the trunks of beech trees.

Pending a new revision of the genus, not much can be done in the way of distinguishing geographic races of *Blarina* in the Eastern United States. Those taken in eastern West Virginia average larger than the western series. From the eastern and southern parts of the State, the average measurements of 25 males are as follows: Total length, 121 (110–133); tail, 26.1 (22–33); hind foot, 14.9 (13.5–16). For 57 females from the same area the average measurements are: Total length, 115.6 (101–130); tail, 24.2 (16–34); hind foot, 14.9 (13–16). For a series of six males from the western part of the State the average measurements are: Total length, 111.3 (103–119); tail, 22 (18–24); hind foot, 14.1 (13.5–15). The average measurements of 10 females from the same area are as follows: Total length, 109.3 (94–118); tail, 22.8 (20–27); hind foot, 13.6 (13–14).

Cabell County: 5 miles east of Huntington, 8.

Greenbrier County: White Sulphur Springs, 9; 2 miles east of White Sulphur Springs, 2.

Lincoln County: Fourteen (27 miles southeast of Huntington), 2.

Mason County: Mercers Bottom, 7.

Mercer County: Flat Top, altitude 3,500 feet, 3.

Pendleton County: Franklin, 1; Spruce Knob, altitude 4,860 feet, 1.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 25; Williams River, altitude 3,300 feet, 9; Travellers Repose, 6.

Raleigh County: Ghent, altitude 2,900 feet, 4; Odd, altitude 2,900 feet, 8; Winding Gulf, 4 miles southwest of Pemberton, altitude 2,200 feet, 4.

Randolph County: Middle Mountain, 11 miles northeast of Durbin, 8; Cheat Mountain, 3 miles west of Cheat Bridge, altitude 3,900 feet, 9.

Family VESPERTILIONIDAE

MYOTIS LUCIFUGUS LUCIFUGUS (LeConte)

LITTLE BROWN BAT

Bats, presumably this species, were occasionally observed at Summersville, Nicholas County. On Middle Mountain, Randolph County, bats were fairly common, but none were collected. W. M. Perrygo was told that hundreds of bats wintered in the caves in "The Sinks" on Gandy Creek, 4½ miles west of Spruce Knob, Randolph County. It is likely that several species of bats hibernate in these caves. Fred E. Brooks (1911, p. 29) reported that this bat was abundant at French Creek, Upshur County, and at Morgantown, Monongalia County. A. M. Reese (1934, pp. 45, 50, 51) records the little brown bat from Cornwall's Cave in Preston County, as well as from Arbuckle's, Rapp's, and Bunger's Caves in Greenbrier County.

Greenbrier County: White Sulphur Springs, 4.

Pendleton County: Franklin, 2.

MYOTIS SUBULATUS LEIBII (Audubon and Bachman)

LEIB BAT

There are no specimens of this bat from West Virginia in the National Museum collection. Miller and Allen (1928, p. 172), however, recorded one from White Sulphur Springs in Greenbrier County. Brooks writes that "many of these bats hibernate in the caves, hanging in dense masses from their roofs."

MYOTIS KEENII SEPTENTRIONALIS (Trouessart)

TROU ESSART BAT

This bat has been recorded in the central and northern parts of the State, one having been taken in Braxton County (Miller and Allen, 1928, p. 107) and two in Preston County during August 1888.

Preston County: Aurora, 2.

MYOTIS SODALIS Miller and Allen

INDIANA BAT

One individual weighing 7 grams was taken by A. B. Brooks on March 16, 1928.

Monongalia County: Cave near Morgantown, 1.

Preston County: Cheat River, 1.

LASIONYCTERIS NOCTIVAGANS (LeConte)

SILVER-HAIRED BAT

Surber (1909, p. 55) lists this bat from West Virginia but cites no definite records. He remarks that it is more partial to the forests than the other species.

PIPISTRELLUS SUBFLAVUS SUBFLAVUS (F. Cuvier)

GEORGIAN BAT

Further collecting in the caves of West Virginia will probably show that this small bat occurs throughout the State. A male taken by Vernon Bailey on November 1, 1924, at Charleston weighed 3.7 grams. A. M. Reese (1934, pp. 45, 47, 50, 51, 53) reports that he has collected Georgian bats in Cornwall's Cave in Preston County; The Sinks Cave no. 1 in Randolph County; Smoke Hole Cave in Pendleton County; Rapp's, Bungler's, and Saltpeter Cave no. 1 in Greenbrier County; and in Green Saltpeter, Argobrite's, and Union Caves in Monroe County.

Kanawha County: Charleston, 1.

Pendleton County: Franklin, 6.

NYCTERIS CINEREA (Beauvois)

HOARY BAT

A. B. Brooks (1929, p. 541) writes that this bat "is reported as occurring in West Virginia", but he cites no definite records. Surber (1909, p. 55) likewise lists it as a rare migrant.

NYCTERIS BOREALIS BOREALIS (Müller)

RED BAT

Although the available records for the red bat are all from the eastern and southern counties, this animal should occur throughout the State. During the summer months at least this bat is not gregarious, and during the daylight hours it is often found suspended from a lower branch of some small tree or shrub.

Pendleton County: Franklin, 1.

Raleigh County: Near head of Sand Lick Creek, 1.

Wyoming County: Near Baileysville, 1.

EPTESICUS FUSCUS FUSCUS (Beauvois)

BIG BROWN BAT

Four specimens were collected by Thaddeus Surber and Wirt Robinson during April and May 1897 in the southeastern corner of the State. A male taken in Preston County during March 1928 by A. B. Brooks weighed 12 grams. This bat frequently gets into houses and outbuildings during the fall and winter months. It also hibernates in hollow trees and crevices in rocks, as well as in caves. The brown bat has been taken by A. M. Reese (1934, pp. 45, 47) in Cornwall's Cave in Preston County and in Smoke Hole Cave in Pendleton County.

Greenbrier County: White Sulphur Springs, 4.

Preston County: Cheat River, 1; Cronwell Cave (recorded by A. B. Brooks, 1929, p. 541).

CORYNORHINUS RAFINESQUII RAFINESQUII (Lesson)

BIG-EARED BAT

Though actual records are restricted to Pendleton, Randolph, and Preston Counties, this bat should occur in caves throughout the State. The big-eared bat, as the name implies, is readily recognized by its unusually long ears, equaling about one-third of the total length of the animal. The ears are connected at the base across the forehead. On June 13, 1933, A. M. Reese collected four females, each nursing one young, in Pendleton County. Most of the individuals listed below were found hanging head downward either in a cave or in dark crevices in rocks. This bat, according to A. M. Reese (1934, p. 47) has been taken also in The Sinks Cave no. 1 in Randolph County and in Seneca Caverns in Pendleton County.

Pendleton County: Brushy Run, 1; Cave Mountain Cave, 1; Upper Tract, 8.

Family *URSIDAE**EUARCTOS AMERICANUS AMERICANUS* (Pallas)

BLACK BEAR

Black bears appear to have ranged over the whole State at the time of settlement. Bear meat formed a substantial part of the staple diet of hunters and settlers. Of the many records, a few have been selected to indicate the extent of the former range of the species. On May 9, 1751, Christopher Gist (Darlington, 1893, pp. 65, 135) killed a bear on Indian Creek in Monroe County. Gist also killed bears during January 1752 at the head of Fish Creek in Marshall County (Darlington, 1893, pp. 72, 142) and on March 5, 1752, on Fishing Creek in Wetzel County (pp. 76, 145). In May 1765 Colonel Croghan (1831, p. 260) reported that bears were abundant along the Ohio River between the mouth of the Little Kanawha River and the Big Bend. According to McWhorter (1915, p. 80) the early settlers killed many bears along Hackers Creek in Harrison County.

While collecting along the Guyandotte River in Logan County, we received reports that black bears are occasionally killed in the surrounding mountains. Reports indicate that bears are still fairly abundant in the eastern counties, especially in timbered lands overgrown with thickets. During 1936 they were rather common around Cranberry Glades, in the mountains along Williams River, in the vicinity of Cheat Mountain. Numerous tracks were seen on Middle Mountain during July 1936. On July 4, 1936, a black bear killed six sheep belonging to a resident of Middle Mountain. Another resident of Middle Mountain is reported to have killed 14 bears during the winter of 1934-35. On September 21, 1936, while collecting on Spruce Knob, W. M. Perrygo was told that a bear had killed several sheep during the preceding night.

Periodical "game drives" on the Monongahela National Forest supervised by forest rangers have furnished some interesting data on the relative abundance of some of the larger mammals. According to Arthur A. Wood, forest supervisor, the method of obtaining these tallies is as follows: 12 sample plots of 160 acres each have been established at various points within the Monongahela Forest boundaries, and each area is systematically "driven" by 120 men, four times each year. Of these 120 men, at least half form the "drivers' " line and the rest are stationed at equal distances around the drive boundaries of the area to count the game. At a prearranged signal the drivers' lines advance from one end of the area to the other, driving through the stationary lines all the larger mammals found on the area. On the basis of the data thus obtained the mean abundance of the species is calculated. By this method it has been found that black bears are most abundant in the drive areas located in the northern hardwood timber on the Little River drainage in northern Pocahontas County. The forest records show a yearly mean population of 1 bear to each 993 acres in this section. For the entire forest, the calculation is 1 bear to each 2,518 acres.

Randolph County: Cheat Mountain, 1.

Family PROCYONIDAE
PROCYON LOTOR LOTOR (Linnaeus)
RACCOON

No specimens of this fairly common fur bearer have been received from West Virginia by the National Museum. I have examined, however, the skin of a raccoon killed during 1936 near Williams River, 5 miles east of Black Mountain, Pocahontas County. Raccoon tracks were found along the Guyandotte River near Barboursville in Cabell County and along the Ohio River near Point Pleasant in Mason County during April 1936. Trappers working along the Cranberry River near the glades say that the raccoons live in dens in the rocks and rarely are found in hollow trees.

Family MUSTELIDAE

MARTES PENNANTI PENNANTI (Erzleben)

EASTERN FISHER, OR PEKAN

Although the range of the fisher formerly extended southward in the Allegheny Mountains to North Carolina, there are very few authenticated records for West Virginia. Fred E. Brooks (1911, p. 26) writes that E. C. Barrett, of Beckley [Raleigh County] bought three fisher skins from Moses Stover, in 1871, 1872, and 1873, paying for them \$3, \$3.50, and \$5, respectively. The animals were trapped on the Clear Fork of Big Coal River. Brooks believed that the records of the carnivore called "black fox" by the early settlers should be accredited to the fisher. Christopher Gist (Darlington, 1893, pp. 76, 145) states that he killed a "black fox" on March 5, 1752, on Neemokeesy Creek [=Fishing Creek] in Wetzel County. These animals were occasionally caught by Edwin Phillips (A. B. Brooks, 1929, p. 538), a pioneer in Upshur County, in log bear traps. Surber (1909, p. 55) says that the fisher "formerly occurred in some numbers in the black spruce region."

MUSTELA RIXOSA ALLEGHENIENSIS (Rhoads)

LEAST WEASEL

This weasel is the smallest of all the North American carnivores and is rarely taken by trappers.

Pocahontas County: Travellers Repose, 1.

Randolph County: Huttonsville, 1.

Ohio County: Oglebay Park, recorded by A. B. Brooks (1929, p. 541).

MUSTELA FRENATA NOVEBORACENSIS (Emmons)

NEW YORK WEASEL

Specimens of the New York weasel have been collected in the northern and eastern parts of West Virginia. The animal should occur throughout the State. This weasel often lives in stone fences, in the vicinity of cabins, and in farm buildings. Near Philippi it was reported as being most plentiful in the vicinity of rock ledges on the hillsides. One was caught in a trap set in a rock crevice for wood rats. Another was taken on Spruce Knob and still another at Cranberry Glades in large Schuyler traps that had been nailed to the trunks of spruce trees. These traps were set about 5 to 6 feet above the ground and baited with bacon.

Barbour County: 7 miles east of Philippi, 1.

Hardy County: 1.

Pendleton County: Spruce Knob, altitude 4,860 feet, 1.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 1.

MUSTELA VISON VISON Schreber

MOUNTAIN, OR BLACK, MINK

Surber (1909, p. 55) says that this mink occurs only in the black-spruce belt. Black minks have been trapped by Frank Houchin in the spruce belt in the vicinity of Cranberry Glades (Brooks, 1911, p. 25). Trappers along the Williams River reported that pelts of this mink brought a much higher price than those of the lowland mink. Minks were reported to be plentiful along Williams River, Cranberry River, Cheat River, and Shavers River in the eastern part of the State during 1936, but no specimens were procured by the Museum party.

MUSTELA VISON MINK Peale and Beauvois

COMMON, OR BROWN, MINK

This mink occurs in hilly regions and lowlands in all parts of the State. Trappers reported that they were fairly plentiful on Peters Creek in Nicholas County in the summer of 1936. No specimens of this common fur bearer have been received from West Virginia by the National Museum.

LUTRA CANADENSIS CANADENSIS (Schreber)

OTTER

A. B. Brooks (1929, p. 541) says that the otter "is still found along certain streams in the less populous counties." Arthur A. Wood, forest supervisor, thinks, however, that there is no evidence that otters now occur in the Monongahela National Forest. Nevertheless, otters were trapped along most of the major streams of the State before the Civil War. An otter (U. S. N. M. no. $\frac{2255}{3118}$), collected by A. Brakeley at Rowlesburg in Preston County, was received in the flesh at the Smithsonian Institution during January 1857. This specimen probably was mounted by C. Drexler for the exhibition series. No record of its subsequent disposition has been found.

SPILOGALE PUTORIUS (Linnaeus)

SPOTTED SKUNK

A. B. Brooks (1929, p. 541) writes that the spotted skunk occurs "at low elevations in southern and eastern counties." Fred E. Brooks (1911, p. 25) reports that a few skins are received each year by a fur dealer in Huntington from the valley of Big Sandy River and that skins have been seen in stores at Franklin in Pendleton County. Trappers say that this skunk is found along the valley of the south branch of the Potomac River. Howell (1906, p. 17) records one from White Sulphur Springs in Greenbrier County. There are no specimens collected in West Virginia in the National Museum.

MEPHITIS MEPHITIS ELONGATA Bangs

FLORIDA SKUNK

To this species Howell (1901, p. 28) has referred skunks taken in the eastern part of the State. He considers that they are fairly typical with the exception of slightly shorter tails. In October 1896 Fred E. Brooks (1911, p. 24) found one lying dead on a path through the dense spruce woods on the summit of Black Mountain. Brooks also says that skunks were abundant in the vicinity of Cranberry Glades during the winter of 1908-1909.

Pocahontas County: Green Bank, 1; Travellers Repose, 2.

MEPHITIS MEPHITIS NIGRA (Peale and Beauvois)

EASTERN SKUNK

A female from Cabell County in the Ohio River drainage and a male from Raleigh County seem to agree more closely with the common eastern skunk. This species has been recorded (A. B. Brooks, 1929, p. 542) also at Oglebay Park, Ohio County. Skunks were fairly common in Nicholas County during 1936. On May 7, 1936, a skunk that had been run over by an automobile was found in the road near Middleton. Numerous skunks are reported to be trapped each year on the rock ledges in the vicinity of Philippi, Barbour County.

Cabell County: Barboursville, 1.

Raleigh County: Odd, altitude 2,900 feet, 1.

Family CANIDAE

VULPES FULVA FULVA (Desmarest)

RED FOX

According to early hunters and settlers, red foxes first made their appearance in West Virginia more than a century ago and invaded the State from the north (Brooks, 1911, p. 23). Pioneer settlers have repeatedly stated that they found only gray foxes. The red fox, according to information obtained in 1936, is quite rare in many sections. On the other hand, A. B. Brooks (1929, p. 542) reported that the range of this species covers all of West Virginia. William Bolton told W. M. Perrygo that he had trapped red foxes near Philippi in Barbour County. Local trappers in the vicinity of Black Mountain say that red foxes are occasionally trapped in Pocahontas County. According to Arthur H. Wood, forest supervisor, red foxes are fairly well distributed over the entire Monongahela National Forest and are somewhat more numerous in the northern hardwood tracts. Calculations based on tally counts made during periodical drives on twelve 160-acre plots within the forest indicate a mean abundance of

1 red fox to each 1,886 acres. No specimens of this fox taken in West Virginia are in the National Museum collection.

UROCYON CINEREOARGENTEUS CINEREOARGENTEUS (Schreber)

GRAY FOX

In 1936 gray foxes seemed to be fairly common in Nicholas County, where low rolling hills and rock cliffs abound. I have examined the skin of one killed near Summersville during December 1935. At Philippi, in Barbour County, William Bolton told us that he had trapped a number of gray foxes in previous years. About 2 miles east of Fourteen, Lincoln County, Perrygo and Lingebach located a den during April 1936, but circumstances were such that they did not have opportunity to trap a specimen. Within the Monongahela National Forest, according to Arthur A. Wood, forest supervisor, gray foxes occur chiefly in the northern hardwood tracts of the forest. Tally counts made during the periodical drives in this forest indicate a mean abundance of 1 gray fox to each 1,511 acres.

After a conference with Secretary Joseph Henry during July 1848, Spencer F. Baird agreed to make a collection of natural-history specimens for the Smithsonian Institution. Most of this collection, including the skull of an old gray fox (no. 671) from Greenbrier County, was cataloged shortly after Baird's arrival in Washington. In January 1856 another specimen (no. $\frac{1556}{2384}$), collected at Rowlesburg in Preston County, was received from A. Brakeley. This specimen cannot now be found.

Greenbrier County: White Sulphur Springs, 1.

CANIS LUPUS LYCAON Schreber

GRAY WOLF

Although no longer found in West Virginia, wolves were once fairly common in many parts of the State. Nevertheless, there are relatively few published records. In 1787, Levi Morgan narrowly escaped capture by the Indians while skinning a wolf that he had trapped on Buffalo Creek, Monongalia County (Withers, 1831, p. 278). Bounties were paid for wolves as early as 1788 and as late as the Civil War (Maxwell, 1898, p. 216). In 1801, a bounty of £1 (\$3.33) was paid for a full-grown wolf. This bounty was raised to \$35 in 1889 (Morton, 1910, p. 357). Wolves were said to have been fairly numerous as late as 1815 along Finks Creek, but the last wolf was killed in Gilmer County before 1852 (McWhorter, 1915, pp. 149, 329-330). A wolf was seen in 1854 on Buckhannon Run, Hackers Creek, Harrison County (Lewis, 1912, p. 135). Maxwell (1898, p. 216) records the number of wolves killed in Randolph County from 1787 to 1861. The number killed fluctuated from year to year—44

in 1810, 51 in 1816, 56 in 1822, and 51 in 1824, but only 2 in 1861. Maxwell (1898, pp. 215, 216), says that a wolf was killed near St. George, Tucker County, as late as 1894 and one in Randolph County in 1897. Regarding Pendleton County, Morton (1910, pp. 357-358) writes that A. W. Roby killed two wolves in 1889, Thomas A. Payne two wolves in 1892, and S. P. Dolly and Jacob Arbogast two wolves in 1896. According to Brooks (1911, p. 24) the last record for the State is a wolf killed by Stofer Hamrick during January 1900 in Randolph County.

Family FELIDAE

FELIS CONCOLOR COUGUAR Kerr

COUGAR, PANTHER, OR EASTERN MOUNTAIN LION

When the first settlers arrived, panthers were reported to have been commoner in the Allegheny Mountains than elsewhere in the State. Nevertheless, they were at one time numerous enough in most sections to disturb the settlers. McWhorter (1915, pp. 346, 488) has published records of panthers in Taylor County and along Blood Run and Horn Creek, tributaries of the Little Kanawha River. Panthers were reported to have been fairly common up to and even later than 1815 along Finks Creek in Gilmer County (McWhorter, 1915, p. 326). A panther killed by John Riffle in 1855 on Oil Creek appears to be the last record for Lewis County (McWhorter, 1915, p. 353). McWhorter (1915, p. 347) likewise records panthers on White Oak Run, Middle Fork River, and on Cheat Mountain in Randolph County. In 1850, C. B. R. Kennerly presented to the Smithsonian Institution the skeleton of one (no. 848) killed at Capon Springs in Hampshire County.

According to the statistical tabulations published by Maxwell (1898, p. 216), 11 panthers were killed in Randolph County in 1853, 14 in 1856, 11 in 1858, and 6 in 1859. Fred T. Galford, a skilled worker employed by the E.C.W. at Camp Black Mountain, Monongahela National Forest, reports finding tracks of a panther in the snow on Black Mountain during the winter of 1935 and also in 1936. He and members of a C.C.C. camp saw one at the same locality walking along a footpath during the summer of 1936. Forest employees were convinced that one or more go over Black Mountain in Pocahontas County about twice every 10 days. W. M. Perrygo and C. Lingeback saw panther tracks on Kennison Mountain, Pocahontas County, during the latter part of June 1936. They also noticed tracks on Middle Mountain in Randolph County. Arthur A. Wood, forest supervisor, Monongahela National Forest, writes that there is some evidence of a very few panthers in the Middle Mountain section of Randolph and Pocahontas Counties.

LYNX RUFUS RUFUS (Schreber)

BOBCAT, OR WILD CAT

Maxwell's tabulation (1898, p. 216) of bounty payments shows that bobcats were abundant in Randolph County before the Civil War, 66 being killed in 1855, 106 in 1857, and 80 in 1859. An adult and a young collected at Rowlesburg were shipped to the Smithsonian Institution in January 1856 by A. Brakeley. In the interval between March 1897 and February 1902, W. J. Yeager collected 25 bobcats in Pocahontas County for the U. S. Biological Survey. The West Virginia Conservation Commission reported that bounty payments had been made on 153 bobcats during the year 1936. Of these, 30 were killed in Pocahontas County and 21 in Randolph County. The bobcat seems to have adapted itself to changing conditions and now survives in the partially cleared land and also in the forested areas of eastern West Virginia.

There is some seasonal as well as considerable individual variation in the coloration and the extent of spotting, but apparently no sexual correlation. No seasonal uniformity in the degree of intensity of the color tones in the spots was observable in a series of 29 skins. The spots were, however, much more sharply demarcated on the limbs and the sides of the body than elsewhere.

The two males taken during October and November are more rufous and much lighter in coloration than the other specimens, and the long black overhairs do not materially darken the upperparts. In the case of eight males and six females taken during January, the tawny mid-dorsal stripe is accentuated by the long black overhairs. The spotting on the sides of the body is rather conspicuous on two of the males. Of the four males taken during February, two are somewhat grayish and the others more cinnamon colored. The wearing off of the long black overhairs and the light tips of the other hairs on skins of animals taken during March, April, and May likewise alters the color tones.

The coloration of the underparts seems to be more uniform than that of the upperparts. During the winter months the males seem to have more white hair. In the case of the females, however, the long white hairs are largely restricted to the throat and chest, while the cinnamon-buff to pinkish-cinnamon hairs of the sides encroach on the median line of the belly.

Average measurements of 11 adult males: Total length, 870 (787-935); tail, 146 (133-165); hind foot, 171 (162-195). Skull: Greatest length, 126 (120-131); condylobasal length, 114.3 (109.4-118.6); depth of braincase at basisphenoid, 43.8 (42.8-45.5); zygomatic breadth, 88.3 (82.2-93); mastoid breadth, 54.2 (50.3-58.6); interorbital constriction, 23.3 (22.5-26.6); distance between ends of postorbital processes, 59 (55.5-66); least distance anteriorly between

outer walls of hamular processes of pterygoids, 15 (14-17); alveolar length of upper canine-premolar-molar series, 38.2 (36.8-39.9); crown length of upper carnassial, 14.6 (13.9-15.4).

Average measurements of 8 adult females: Total length, 772 (737-813); tail, 144 (136.5-156); hind foot, 158 (152-165). Skull: Greatest length, 113.1 (110-116.5); condylobasal length, 103.7 (101.2-106.7); depth of braincase at basisphenoid, 42.5 (40.1-44.5); zygomatic breadth, 78.7 (75.2-81.8); mastoid breadth, 48.2 (46.5-49.8); interorbital constriction, 20.6 (19-22); distance between ends of postorbital processes, 54.6 (50.6-58.8); least distance anteriorly between outer walls of hamular processes of pterygoids, 14 (13-14.8); alveolar length of upper canine-premolar-molar series, 34.8 (33.7-35.6); crown length of upper carnassial, 13.7 (13-14.3).

Greenbrier County: White Sulphur Springs, 2; Renicks Valley, 1.

Hardy County: Capon Iron Works, 1.

Pocahontas County: Green Bank, 9; Travellers Repose, 16.

Preston County: Rowlesburg, 1.

Family SCIURIDAE

MARMOTA MONAX MONAX (Linnaeus)

SOUTHERN WOODCHUCK, OR GROUNDHOG

The woodchuck is fairly common throughout the State except in the coniferous forests. The burrows of this rodent are found especially along the sparsely forested banks of streams bordering on cultivated fields, in clearings in deciduous woods, and also under large rocks on hillsides. On April 22, 1936, we were surprised to find freshly opened burrows in the bottomlands along the Guyandotte River from which the flood waters had receded only a short time previously. On two occasions that week we came upon woodchucks that were sunning themselves near their burrows, although the weather at the time was decidedly cold and raw.

Cabell County: 4 miles east of Huntington, 2.

Greenbrier County: Jobs Knob, 13 miles north-northwest of Renicks Valley, 1.

Hampshire County: Springfield, 1.

Hardy County: North Mountain, 1.

Nicholas County: Drennen, 2.

Pendleton County: Franklin, 3; Spruce Knob, altitude 4,860 feet, 2.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 2; Williams River, 1.

Preston County: Rowlesburg, 1.

Randolph County: Middle Mountain, 11 miles northeast of Durbin, 3.

TAMIAS STRIATUS FISHERI Howell

FISHER CHIPMUNK

The chipmunk seems to be distributed over the whole State. Its burrows are commonly found under or near stumps of dead trees and piles of tangled driftwood along the banks of streams. On rocky

hillsides the animals appear to prefer crevices in exposed rocky ledges. In coniferous forests on the mountain slopes they are most plentiful around rotten trunks of fallen trees. During 1936 the first specimen was taken in Cabell County on April 23 and the last on October 17 on Great Flat Top Mountain in Raleigh County.

Barbour County: 7 miles east of Philippi, 2.

Cabell County: 5 miles east of Huntington, 2.

Calhoun County: 5 miles west of Grantsville, 2; Freed, 1.

Greenbrier County: White Sulphur Springs, 3.

Logan County: 1½ miles south of Big Creek, 1.

Mercer County: Flat Top, altitude 3,200 feet, 1.

Morgan County: Berkeley Springs, 2.

Nicholas County: Gilboa, 3; Pine Creek, 1½ miles north of Zela, 1.

Pendleton County: Franklin, 9; Spruce Knob, altitude 4,700 feet, 2.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 4.

Raleigh County: Odd, altitude 2,900 feet, 1; Redbird, 2.

Randolph County: Elkins, 1; Middle Mountain, 12 miles northeast of Durbin, 3.

TAMIASCIURUS HUDSONICUS ABIETICOLA Howell

CLOUDLAND RED SQUIRREL, OR PINE SQUIRREL

During 1936 the National Museum party did not obtain any authentic records of the occurrence of the Cloudland red squirrel outside of the Allegheny Mountain region. Red squirrels were found mostly in the spruce woods. Occasionally they were observed in mixed woods of deciduous and coniferous trees. In 1936 red squirrels seemed to be more abundant on Cheat Mountain and along both forks of the Cranberry than elsewhere in the areas visited by the Museum party. In Pocahontas County the red squirrel is called "fairy-diddle." In 1896 Fred E. Brooks (1911, p. 14) found red squirrels feeding on buckeyes on the slopes of Black Mountain. The "vermin" campaigns now being conducted in West Virginia are depleting the numbers of these squirrels. Unfortunately, in campaigns of this sort, where a premium is placed on the number of red squirrels taken, no concerted effort is made to restrict the killing to areas where control may appear advisable.

The seasonal changes of pelage are marked, the most noticeable characteristics of the winter pelage being the longer hairs, the less noticeable grizzling of the upperparts, and the presence of a broad dorsal reddish band extending from top of head to base of tail. In summer the pelage is darker and distinctly grizzled, and the reddish dorsal band is absent.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 12; Williams River, 12 miles west of Marlinton, altitude 3,300 feet, 2; Travellers Repose, 13.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, altitude 3,900 feet, 5; Middle Mountain, 11 miles northeast of Durbin, 5.

TAMIASCIURUS HUDSONICUS LOQUAX (Bangs)

EASTERN RED SQUIRREL, CHICKAREE, OR PINEY

The southern limit of the range of the eastern red squirrel is found along the border of northern West Virginia. A summer specimen from Berkeley Springs in the Potomac River drainage is referred to this race. A. B. Brooks (1929, p. 542) writes that red squirrels taken at Oglebay Park, Ohio County, in the Ohio River drainage have been identified as *T. h. loquax*.

Morgan County: Berkeley Springs, 1.

SCIURUS CAROLINENSIS LEUCOTIS Gapper

NORTHERN GRAY SQUIRREL

Gray squirrels seemingly prefer the lower levels of the mountainous portions of West Virginia. They are found in both deciduous and mixed woods. In the eastern part of the State, during the summer months especially, they occur on the lower mountain slopes. When hickorynuts and other mast are plentiful in fall, they do not come down to the lowlands in search of food. When food is scarce, however, they migrate to the lowlands where they feed on buckeyes and whatever else is available. In the western part of the State they are found most commonly in the deciduous woods on the ridges that border the stream valleys.

All the West Virginia specimens are referred to the northern race of gray squirrel. Winter specimens from the eastern part of the State have the light-gray coloration of *leucotis*, including the light clay-colored dorsal band and the predominance of whitish- or whitish-gray-tipped hairs in the tail, as well as large hind feet and long tail. Summer specimens likewise have a coloration similar to the northern race. The average measurements of nine females are: Total length, 473 (430-496); tail, 212 (196-226); hind foot, 67.6 (65-69). For eight males the average measurements are: Total length, 471.7 (459-490); tail, 210.7 (195-220); hind foot, 66.7 (63-71).

Specimens from the western part of the State are not typical, but in coloration they are nearest to the northern race. Winter specimens from Cabell County have the upperparts light grayish as in *leucotis*, but they approximate true *carolinensis* from the Carolinas by having smaller hind feet and shorter tail. Summer specimens from Barbour County likewise agree more closely in coloration with the northern race but approach the southern race more closely in the lengths of the hind feet and tail.

Melanism is common at some localities. The melanistic phase appears to have been particularly prevalent in 1895 at Frankford. Six melanistic specimens are grizzled on the side, the clay-colored subapical band persisting on the long black hairs.

By an act of the Virginia Assembly in 1769, each head of family was required to produce "per tithe the heads of five squirrels or crowns" (Morton, 1910, p. 357).

Barbour County: Sugar Creek, 5 miles east of Philippi, 1; Bills Creek, 7 miles east of Philippi, 1.

Cabell County: 4 miles east of Huntington, 2; 13 miles east of Huntington, 1.

Greenbrier County: Frankford, 4; Ronceverte, 1; White Sulphur Springs, 1.

Pendleton County: Franklin, 1.

Pocahontas County: Travellers Repose, 3; Williams River, 12 miles west of Marlinton, altitude 3,200 feet, 8.

SCIURUS NIGER NEGLECTUS (Gray)

NORTHERN FOX SQUIRREL

This large, long-tailed squirrel seems to be less adaptable than the gray squirrel to the changing conditions brought on by the settlement of the wooded areas of the East. In West Virginia it now survives in the heavily wooded and sparsely settled higher altitudes of the Allegheny Mountains. On Spruce Knob, in Pendleton County, the fox squirrel is called the highland squirrel. A fox squirrel was seen by W. M. Perrygo at an elevation of 4,600 feet on Albemarle Ridge, east of Travellers Repose. On this area it is reported that these squirrels feed largely on chestnuts during the fall and winter months.

For many years numbers of fox squirrels were shipped to Center Market in Washington, D. C., from points in western Virginia and from eastern West Virginia. There are two specimens in the National Museum collection labeled merely West Virginia that were purchased at this market, one (no. 16315) bought by William Palmer on October 10, 1888, and the other (no. 22752) by Morris M. Green on December 12, 1888. Another specimen (no. 107620), purchased at the same market during January 1895, is labeled Hightown, Va., a locality in Highland County close to the West Virginia boundary.

In 1896 Thaddeus Surber collected for Outram Bangs three adult fox squirrels at White Sulphur Springs in Greenbrier County. One of them became the type of a new race, *Sciurus ludovicianus vicinus* Bangs. Gray's name (applied to a Delaware specimen) is older and therefore has precedence.

A series of 15 fox squirrels collected by Thaddeus Surber during October 1897 at Lewisburg illustrates the color variation in the pelage. The upperparts of some of these specimens are rather light in color. A specimen (no. 114012) taken in Hampshire County, however, has lighter gray upperparts than any of the Lewisburg specimens, the subapical band on the black-tipped hairs being faded to a light clay color and the other hairs broadly tipped with light gray. The feet of this specimen are whitish. The feet of the Lewisburg specimens vary from light ferruginous to a pale yellowish gray or dingy white. On one squirrel (no. 91499) the thighs, hindfeet,

forearm, forefeet, entire head, chin, throat, and underparts are black, but the remainder of the pelage is normal. Nine of these specimens have more black hairs on the head than the others. The throat and chest are washed with pinkish buff on all but two of this series. Two have whitish underparts. Three have the entire underparts suffused with pinkish buff. On all the others this pinkish-buff suffusion extends backward along the median line. The under surface of the tail is normally ferruginous.

Fred E. Brooks (1911, p. 14) reports that he has seen this squirrel at French Creek, Upshur County, and in beech woods near Edray, Pocahontas County. Specimens taken at Oglebay Park, Ohio County, according to A. B. Brooks (1929, p. 543), have been identified as *Sciurus niger rufiventris*.

Greenbrier County: Lewisburg, 15; White Sulphur Springs, 9.

Hampshire County: 1.

Pocahontas County: Academy, 1.

GLAUCOMYS VOLANS VOLANS (Linnaeus)

SMALL EASTERN FLYING SQUIRREL

These small flying squirrels seem to be fairly common in all the wooded parts of the State. Because of their crepuscular and nocturnal habits, they are rarely seen. In Mason County these squirrels were found in the deciduous woods on the bluffs along the Ohio River. They seem to be fairly numerous in the open oak woods on the flat-topped hills of Barbour County. On warm nights, during the first week of June 1936, Perrygo and Lingeback repeatedly heard thuds and the familiar scratching of claws on the bark of trees around their camp 6 miles south of Philippi. In the lowlands along Nicholas Creek near Gilboa on May 6, 1936, one was found curled up at the bottom of an abandoned woodpecker hole in a dead tree. One was trapped on November 1, 1936, on the trunk of a white oak in a mixed deciduous and coniferous forest near the top of Katis Mountain south of White Sulphur Springs. On September 2, 1895, Thaddeus Surber collected a male at an altitude of 3,200 feet on Katis Mountain; this specimen subsequently became the type of *Sciuropterus silus* Bangs. Howell (1918, p. 22) has concluded that *silus* is "an immature individual of *volans*, evidently a runt." Other specimens from the same mountain, including one examined by Bangs, are clearly referable to *volans*. At an altitude of 3,700 feet, on the top of Cranberry Mountain, they seemed to prefer the big white oaks. Along Williams River they were found in a thick forest of sugar maple, oak, and beech. On the colder nights of late spring and early fall very little activity was noted. Nevertheless, flying squirrels leave their nests from time to time during winter months, for C. G. Rorebeck collected two males at Travellers Repose during the last week of February 1897.

Barbour County: Bills Creek, 7 miles east of Philippi, 7; Sugar Creek, 5 miles east of Philippi, 3.

Greenbrier County: Katis Mountain, White Sulphur Springs, altitude 3,000 feet, 2.

Mason County: Mercers Bottom, 1.

Nicholas County: Gilboa, 1.

Pocahontas County: Cranberry Mountain, Cranberry Glades, 1; Travellers Repose, 2; Williams River, 12 miles east of Marlinton, 1.

Raleigh County: Odd, altitude 2,900 feet, 1.

GLAUCOMYS SABRINUS FUSCUS Miller

WEST VIRGINIA FLYING SQUIRREL

The range of this gray-faced flying squirrel within the State is imperfectly known. The type specimen was taken at an altitude of 3,300 feet in a fairly thick forest of spruce, sugar maple, beech, and yellow birch. It was caught in a Schuyler trap nailed to the trunk of a large spruce growing about 10 yards from the bank of the north fork of the Cranberry River. Two individuals were trapped at an altitude of 3,900 feet on Cheat Mountain in a tract of sugar maple, beech, yellow birch, and spruce. Both of these specimens were taken in traps nailed to the trunks of very large shaggy-barked sugar maples. On the basis of these occurrences it appears that this flying squirrel lives in the Canadian life zone in eastern West Virginia. Doult (1930, p. 239) collected a northern flying squirrel in an isolated tract of similar Canadian trees in Potter County, Pa. This indicates that the animal may also occur in the Allegheny Mountains in the north-eastern part of the State.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, 2.

Pocahontas County: Cranberry Glades, 1.

Family CASTORIDAE

CASTOR CANADENSIS CANADENSIS Kuhl

NORTHERN BEAVER

There are surprisingly few references to beavers in West Virginia in the accounts left by early travelers. English and French traders had established posts along the Ohio River prior to the arrival of the settlers. Before 1740 the Pennsylvania trader James Le Tort had a post at Letart, Mason County. Beaver skins were valued at 6 shillings a pound in 1763 (Hanna, 1911, p. 374). According to Hale (1886, p. 170), Paddy Huddlestone and Daniel Boone trapped about a dozen beavers at the upper end of Long Shoal, a few miles below Kanawha Falls, Fayette County. Boone was a surveyor in this region from 1789 to 1798. The beaver reported killed in Pocahontas County about 1907 is thought to have escaped from captivity (Brooks, 1911, p. 15). Some years ago remnants of old beaver dams were

found on the Williams and Greenbrier Rivers. According to Brooks (1929, pp. 536-537) freshly cut trees and a dam were found in 1925 in Hampshire County on Tarcoat Creek, an indirect tributary of the Great Cacapon River. It was thought that these beavers had entered the State by way of the Potomac and Great Cacapon Rivers. Shortly afterward this colony moved to North River where suitable food was more plentiful. This colony disappeared within three years.

Family CRICETIDAE

REITHRODONTOMYS HUMULIS IMPIGER Bangs

SHORT-EARED HARVEST MOUSE

Thaddeus Surber found that this harvest mouse was comparatively common in fields overgrown with weeds near White Sulphur Springs. Five specimens were sent to Outram Bangs and one of them became the type of this race. Others were subsequently acquired by the Biological Survey from the same collector. The Museum party did not collect any specimens at this locality. Howell (1914, p. 21) has concluded that this is "a rather poorly marked race of *humulis* occupying the northern end of the range of the species."

Greenbrier County: White Sulphur Springs, 9.

REITHRODONTOMYS HUMULIS MERRIAMI Allen

MERRIAM HARVEST MOUSE

One specimen was trapped at Ceredo by A. H. Howell on July 29, 1910, in a low uncultivated field overgrown with grass and weeds and situated between the railroad tracks and the Ohio River. At the time of our visit in April 1936, all these lowlands including this field had been flooded recently by the Ohio River. Our trapping there indicated that all the smaller mammals had either been destroyed or driven away by this flood. Elsewhere it has been reported that this mouse generally selects a matted tangle of grass, weeds, or briers, often in wet bottomland or at edge of a marsh. Hence it is quite likely that the floods periodically reduce its numbers.

Wayne County: Ceredo, 1.

PEROMYSCUS LEUCOPUS NOVEBORACENSIS (Fischer)

NORTHERN WHITE-FOOTED MOUSE, OR DEER MOUSE

This nocturnal mouse is rarely found at any great distance from timber or brush of some sort. Available records indicate that its vertical range stops at about 3,000 feet. It ranges over most of the western half of the State and is found also in the southeastern and northeastern counties.

On the wooded bluffs along the Ohio River the northern white-footed mice were most abundant near rock ledges. In the Guyandotte River Valley they were usually trapped under the exposed roots of elms and oaks growing on the banks of small streams. Along Sugar Creek near Philippi they were caught in traps set in crevices in the rock ledges on hillsides forested with birch, oak, and poplar. They were caught also in traps set in crevices between rocks loosened by the roots of hemlocks growing on the banks of Peters Creek near Gilboa. On Great Flat Top Mountain near Odd one was caught in a large Schuyler trap that had been nailed to the trunk of a beech tree, 5 or 6 feet above the base. Others were trapped under a dilapidated rail fence.

Barbour County: 7 miles east of Philippi, 2.

Cabell County: 5 miles east of Huntington, 3.

Greenbrier County: White Sulphur Springs, 19; Jobs Knob, 13 miles north-northwest of Renicks Valley, 1.

Lincoln County: Fourteen, 1.

Mason County: Mercers Bottom, 3.

Mineral County: Ridgeley, 5.

Nicholas County: Gilboa, 6.

Pendleton County: Franklin, 4.

Raleigh County: Redbird, 1; Marshes, 3; Odd, altitude 2,900 feet, 2.

PEROMYSCUS MANICULATUS BAIRDII (Hoy and Kennicott)

PRAIRIE WHITE-FOOTED MOUSE

The known range of this short-tailed mouse has now been extended eastward from central Ohio to the Panhandle of West Virginia. Two specimens collected by Karl W. Haller on March 24, 1937, along the Avalon-Bethany pike in Ohio County were submitted to the U. S. Biological Survey for identification by A. B. Brooks.

PEROMYSCUS MANICULATUS NUBITERRAE Rhoads

CLOUDLAND WHITE-FOOTED MOUSE

These long-tailed white-footed mice are most plentiful in the higher altitudes of the Allegheny Mountains. They are found generally on the drier hill slopes around rock crevices, stumps, rotten logs, brush piles, and the like. In the Cranberry Glades most of the specimens taken were trapped around rock slides on the mountain slopes. Some were caught in large Schuyler traps that had been nailed to the trunks of spruce and beech trees. In the vicinity of Cheat Bridge they were trapped at the entrances to holes in the moss covering the roots and base of trunks of spruce trees. Along Williams River they were most plentiful on the wooded hillsides. On Spruce Knob some were caught in the loose shale on the top of the Knob, others along rotten logs on the slopes, in runways in the moss at the bases of trees, and in traps

set for flying squirrels on the trunks of birch trees. On Flat Top Mountain, in the southern part of the State, they were trapped along fallen trunks of chestnut trees and also at the bases of living oak trees. Near Odd they were trapped only on the gravelly banks of a small stream flowing down the side of Flat Top Mountain. There was a rather thick growth of rhododendron on both banks of this stream.

Greenbrier County: White Sulphur Springs, 1.

Pendleton County: Spruce Knob, altitude 4,860 feet, 5.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 27; Travellers Repose, 10; Williams River, 12 miles west of Marlinton, 1.

Raleigh County: Odd, altitude 2,900 feet, 2; Flat Top, altitude 3,500 feet, 2; Winding Gulf, 4 miles southwest of Pemberton, 1.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, 4; Middle Mountain, 11 miles northeast of Durbin, 2.

NEOTOMA PENNSYLVANICA Stone

ALLEGHENY WOOD RAT

This wood rat occurs generally in the more remote parts of the mountains in eastern West Virginia, as well as in some of the northern and southern counties. It prefers rock ledges, caves, and rock slides, but so far as known it has never been taken in lowland swamps. The nests are generally made in a mass of vegetable rubbish consisting of sticks, leaves, nutshells, and the like on ledges or shelving rocks. At Philippi one was caught near a nest on a rock ledge exposed on a steep hill. There was also evidence that wood rats had been living in the rock crevices. Local residents believed that most of the wood rats in this area had died either of starvation or from the effects of the prolonged low temperatures during the winter of 1935-36. During June 1936 wood rats were trapped on a rock ledge at Cranberry Glades, but no nests were found. Two others were subsequently seen one night on these rocks. Newcombe (1930, p. 204) has made an ecological study of this wood rat in West Virginia, chiefly at Prices Rock near Madison in Boone County, at Mitchells Knob near Morgantown in Monongalia County, and at Cornwall's Cave near Masontown in Preston County. Robert C. Patterson (1933, 1934) also has published some observations on the habits of this wood rat. A. M. Reese (1934, pp. 44, 45, 47) records this wood rat from Lower Beaver Hole Cave in Monongalia County, Cornwall's Cave in Preston County, and Smoke Hill Cave in Pendleton County.

Barbour County: 4 miles east of Philippi, 1.

Greenbrier County: White Sulphur Springs, 16.

Pendleton County: Franklin, 11.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 2.

SYNAPTOMYS COOPERI STONEI Rhoads

STONE MOUSE LEMMING

This lemming is found in a variety of ecological situations, such as blue-grass pastures, old fields and hillsides, and sphagnum bogs. Near Gilboa one was trapped along an old rail fence bounding a dry field overgrown with broomsedge and grass about 50 yards from Peters Creek and at least 100 yards from a hemlock thicket. In an open forest of sugar maple, yellow birch, and spruce on a hillside about 30 yards from Cranberry Glades specimens were taken in runways under the matted leaves. On the side of Cheat Mountain one was caught at the entrance to a burrow in the moss growing around the base of a spruce tree. Another was found drowned in the C. C. C. camp reservoir on Black Mountain. Open woods and laurel thickets surrounded this reservoir.

The animal has been taken at White Sulphur Springs (Surber, 1909, p. 53) and also near a little woodland stream at French Creek, Upshur County (F. E. Brooks, 1911, p. 19).

Nicholas County: Gilboa, 1.

Pocahontas County: Black Mountain, Williams River, altitude 3,300 feet, 1; Cranberry Glades, altitude 3,300 feet, 2; near head of Cranberry River, 2; Travellers Repose, 4.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, altitude 3,900 feet, 1.

CLETHRIONOMYS CAROLINENSIS (Merriam)

CAROLINA RED-BACKED MOUSE

The records for this mouse are all in the eastern and southern mountainous portions of the State. At Odd, red-backed mice were trapped on a fairly dry hillside in runways under matted leaves near an old rail fence in a thicket of hemlock and laurel. One was caught in a trap set in a runway in a wet meadow at Cranberry Glades, where numerous moss mounds on the roots of trees were growing. This mouse may have come from one of these mounds, for on Cheat Mountain, Middle Mountain, and Spruce Knob red-backed mice were trapped only at the entrances to burrows in the moss mounds on the roots of spruce and yellow birch.

Greenbrier County: Jobs Knob, 13 miles north-northwest of Renicks Valley, 1.

Pendleton County: Franklin, 8; Spruce Knob, 3.

Pocahontas County: Cranberry Glades, 24; near head of Cranberry River, 1; Travellers Repose, 45.

Raleigh County: Odd, 1.

Randolph County: Cheat Mountain, 3 miles east of Cheat Bridge, 7.

MICROTUS PENNSYLVANICUS PENNSYLVANICUS (Ord)

PENNSYLVANIA MEADOW MOUSE, OR VOLE

Meadow mice make long intricate runways in matted grass on uncultivated borders of fields, in wet meadows, or near streams in lowland pastures. In such locations these mice may be found in most parts of the State. On a high knob at Mercers Bottom that had not been inundated by the flood waters of the Ohio River, runways of these mice were found in grass and weeds along a fence at the edge of a cultivated field. Near Huntington the runways of a colony were found in a tangle of matted grass and briars on both sides of a small spring stream. Although the runways in the wet pasture divided by Muddlety Creek were flooded, the meadow mice were not driven away. At Philippi meadow mice were trapped in runways on the gentle slope of a hill overgrown with broomsedge. Near Fourteen, a nest containing several young was thrown out by the plow on a hillside field below a hemlock grove. In Cranberry Glades most of these mice were caught in runways in the grass and moss growing between moss mounds in a wet meadow. Fred E. Brooks (1911, p. 18) reports that he had trapped one within a few yards of the summit of Spruce Knob, Pendleton County, or approximately 4,650 feet altitude.

Barbour County: 7 miles east of Philippi, 1.

Cabell County: 5 miles east of Huntington, 6.

Greenbrier County: White Sulphur Springs, 4.

Lincoln County: Fourteen, 1.

Mason County: Mercers Bottom, 2.

Nicholas County: Muddlety, 1; Gilboa, 1.

Pendleton County: Franklin, 3.

Pocahontas County: Cranberry Glades, 21; Travellers Repose, 2.

Wayne County: Ceredo, 1.

MICROTUS CHROTORRHINUS CAROLINENSIS Komarek

SMOKY MOUNTAIN ROCK VOLE

Although at present known to occur only at Cranberry Glades, this vole may be found to inhabit similar isolated areas throughout the Allegheny Mountain region of West Virginia. Cranberry Glades is a natural basin about half a mile in length and a quarter of a mile in width. Blueberry, cranberry, and sphagnum are among the conspicuous plants growing here. E. A. Preble, in November 1909, obtained a number of rock voles about an eighth of a mile south of this basin in a mixed, fairly open forest of beech, maple, and oak on a gentle slope at the base of Kennison Mountain. They were trapped at the entrances to little burrows in the moss that filled the intervals between rocks embedded in the ground. No runways were found.

Average of nine males: Total length, 156.1 (150-162); tail vertebrae, 51.6 (46-60); hind foot, 20.3 (20-21); condylobasal length of skull,

26.4 (24.8–27.5); occipitonasal length, 26.3 (24.9–27.5); basilar length Hensel, 23.6 (22–25); nasal length, 7.4 (7.1–7.7); zygomatic breadth, 15.1 (14.5–15.8); interorbital constriction, 3.7 (3.7–3.9); shelf of bony palate, 13.6 (12.8–13.7); height of cranium at bullae, 9.5 (9–10.5); mastoid width, 12.6 (12–12.9); length of upper molar series, 6.5 (6.3–6.8); and length of mandible, 16.1 (15.7–16.6).

Average of six females: Total length, 152.8 (150–169); tail vertebrae, 45.6 (43–50); hind foot, 20.1 (20–21); condylobasal length of skull, 26.7 (26–27.2); occipitonasal length, 26.6 (21.1–27.2); basilar length Hensel, 24 (23.6–24.4); nasal length, 7.3 (7–8); zygomatic breadth, 15 (14.8–15.2); interorbital constriction, 3.7 (3.6–3.9); shelf of bony palate, 13.3 (12.8–13.8); height of cranium at bullae, 9.4 (9.1–9.7); mastoid width, 12.6 (12.3–12.9); length of upper molar series, 6.4 (6.2–6.6); and length of mandible, 16.2 (15.9–16.5).

Pocahontas County: Cranberry Glades, 23; Millpoint, 1.

PITYMYS PINETORUM SCALOPSOIDES (Audubon and Bachman)

NORTHERN PINE MOUSE

The pine mouse is a burrower, spending most of its life in underground runways. As the name implies, it seems to show some preference for woodlands, especially pine woods. It is frequently found, however, along the borders of cultivated fields, meadows, and pastures adjoining woods, and occasionally in wet bottomland timber. Along Peters Creek, near Gilboa, pine mice were trapped in runways under dry matted leaves near an old rail fence in a growth of hemlocks.

F. E. Brooks (1911, p. 18) records this mouse from Morgantown, Monongalia County; Terra Alta, Preston County; French Creek and Buckhannon in Upshur County; and Peterstown, Monroe County.

Greenbrier County: White Sulphur Springs, 11.

Nicholas County: Gilboa, 2.

Putnam County: Raymond City, 1.

ONDATRA ZIBETHICA ZIBETHICA (Linnaeus)

COMMON MUSKRAT

According to A. B. Brooks (1929, p. 544) the muskrat inhabits streams and marshes throughout the State. The National Museum party did not collect any specimens. Tracks were seen along the Ohio River above Point Pleasant, Mason County. Those living along Muddlety Creek on the Tinnel farm were driven away apparently by spring floods in 1936. Similar conditions seemed to prevail along Sugar Creek south of Philippi in Barbour County. Hollister (1911, p. 18) records four specimens from White Sulphur Springs, Greenbrier County.

Family MURIDAE

RATTUS RATTUS RATTUS (Linnaeus)

BLACK RAT

Though the black rat was probably the first introduced rat to reach West Virginia, in most localities where it formerly occurred it has been driven away by the Norway rat. Writing from the vicinity of Wellsburg, Brooke County, W. Va., Doddridge (1824, p. 71) makes the following statement: "Rats which were not known here for several years after the settlement of the county, took possession of it, in its whole extent, in one winter season." Specimens were collected by Thaddeus Surber at White Sulphur Springs in 1897.

Greenbrier County: White Sulphur Springs, 1.

RATTUS NORVEGICUS (Erxleben)

NORWAY OR HOUSE RAT

This introduced rodent is the common destructive rat of warehouses and alleys and is likewise a nuisance around barns and grain cribs on farms.

MUS MUSCULUS MUSCULUS (Linnaeus)

HOUSE MOUSE

The familiar house mouse apparently came to West Virginia in boxes containing supplies for the early settlers.

Mason County: Mercers Bottom, 1.

Pendleton County: Franklin, 1.

Family ZAPODIDAE

NAPAEZAPUS INSIGNIS INSIGNIS (Miller)

WOODLAND JUMPING MOUSE

The woodland jumping mouse has been recorded (F. E. Brooks, 1911, p. 19) from French Creek, Upshur County. There are no specimens collected in West Virginia in the National Museum.

NAPAEZAPUS INSIGNIS ROANENSIS (Preble)

ROAN MOUNTAIN WOODLAND JUMPING MOUSE

This jumping mouse is partial to deep woods, especially near running streams. On the south fork of Cranberry River, Cranberry Glades, one was trapped on a stump in a forest of spruce, sugar maple, and yellow birch. Another one was caught on Cheat Mountain in a trap set at the entrance to a small burrow in a moss mound growing on the roots of a spruce tree. On Spruce Knob in a dense forest of spruce, sugar maple, and yellow birch, two jumping mice were trapped at entrances to burrows in the moss growing in the inter-

vals between rocks. This form is smaller and darker than the typical *insignis*.

Greenbrier County: ? White Sulphur Springs, 1.

Pendleton County: Spruce Knob, 2.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 1.

Randolph County: Cheat Mountain, 3 miles west of Cheat Bridge, altitude 3,900 feet, 1.

It has been recorded (F. E. Brooks, 1911, p. 19) also from Turkey-bone Mountain, 2 miles south-southeast of Pickens, Randolph County.

ZAPUS HUDSONIUS HUDSONIUS (Zimmermann)

NORTHERN JUMPING MOUSE

This jumping mouse occurs in meadows and wet fields overgrown with shrubs in the area drained by the Ohio River and its tributaries. The specimen (U. S. N. M. no. 18442) listed by Preble (1899, p. 17) as coming from Wheeling, W. Va., was actually collected by E. Walton Hennig at Portland Station, Meigs County, Ohio. The animal has been recorded, however, by F. E. Brooks (1911, p. 19) from French Creek in Upshur County and Sherrard in Marshall County.

Family ERETHIZONTIDAE

ERETHIZON DORSATUM DORSATUM (Linnaeus)

AMERICAN PORCUPINE

From time to time porcupines have been killed in the pine forests on the lower ridges of Spruce Knob, Pendleton County. They have never been very plentiful in the memory of present residents of that area. Fred E. Brooks (1911, p. 20) reports that one was killed near Morgantown, Monongalia County.

Family LEPORIDAE

LEPUS AMERICANUS VIRGINIANUS Harlan

VIRGINIA VARYING HARE

This hare seems to prefer dense forests where thickets and brush abound, and especially tracts of woods broken by open glades. It is seldom found in woodland devoid of underbrush. During the summer months it frequents the dense "dark pine patches" on the higher points of the Allegheny Mountains where the rays of the sun do not penetrate. According to Fred E. Brooks (1911, p. 21), hunters reported that the varying hare was abundant in places on Shavers Mountain and also on Black Mountain, Pocahontas County, and that a number had been seen in Canaan Valley, Tucker County. During the summer of 1936, however, residents in Pocahontas and Randolph Counties reported

that the animals had been rather scarce during the past two seasons. It was assumed that they had been depleted in numbers by a periodical epizootic. One was caught on June 13, 1936, in Cranberry Glades in a large Schuyler trap baited with bacon.

Pocahontas County: Cranberry Glades, altitude 3,300 feet, 1; no definite locality, 1; Travellers Repose, 1.

SYLVILAGUS FLORIDANUS MALLURUS (Thomas)

EASTERN COTTONTAIL

Cottontails occur in the northern, eastern, and some of the southern counties. During the summer of 1936 they were fairly common in the laurel thickets along the north and south forks of the Cranberry River as far east as The Glades. The vertical range of the species extends to at least 3,300 feet in the region around The Glades. Farther north, in Randolph County, cottontails appeared to be rather scarce.

Greenbrier County: Ronceverte, 2.

Pendelton County: Franklin, 2.

Pocahontas County: Cranberry Glades, 2.

Raleigh County: Beckley, 1; Marshes, 1; Masseysville, 1.

Wetzel County: Earnshaw, 8; no definite locality, 1.

SYLVILAGUS FLORIDANUS MEARNsii (Allen)

MEARNS COTTONTAIL

Cottontail rabbits from the western and central portions of West Virginia were referred to this race by Nelson (1909, p. 160), although no specimens were then available for comparison. During the summer of 1936 cottontails were collected by the Museum party in four of these counties. These specimens are paler and the upperparts are more grayish and less noticeably pinkish buff than is the case with specimens of *S. f. mallurus*. The tympanic bullae, also, are slightly smaller. The ears, however, do not average shorter nor do the hind feet average longer. This cottontail is most abundant in abandoned farm fields overgrown with weeds and brush. It is a woodland species but is not found in dense forests or open fields.

In the vicinity of Mercers Bottom cottontails were found in brier thickets bordering cultivated fields in the bottomland along the Ohio River. Near Huntington they were rather common in brier patches in fields overgrown with broomsedge and weeds, as well as in open deciduous woods in the bottomlands along the Guyandotte River. At Gilboa cottontail rabbits were found in the rhododendron and laurel thickets bordering uncultivated fields along Peters Creek. Near Philippi they seemed to prefer the brier patches in open deciduous woods.

Three full-term fetuses were taken from a female killed on April 20, 1936, near Huntington.

Barbour County: 7 miles east of Philippi, 2.

Cabell County: 5 miles east of Huntington, 2.

Mason County: Mercers Bottom, 1.

Nicholas County: Gilboa, 2.

SYLVILAGUS TRANSITIONALIS (Bangs)

NEW ENGLAND COTTONTAIL

The range of this cottontail extends southward through West Virginia in the Allegheny Mountains. It is a forest-inhabiting species, preferring tracts with dense underbrush. Specimens collected by A. B. Brooks (1929, p. 544) in Morgan County in 1915 were identified as this species.

Greenbrier County: Ronceverte, 1; White Sulphur Springs, 2.

Morgan County: Great Cacapon Mountain, 2.

Pocahontas County: Travellers Repose, 2.

Family CERVIDAE

ODOCOILEUS VIRGINIANUS VIRGINIANUS (Boddaert) and *ODOCOILEUS VIRGINIANUS BOREALIS* Miller

WHITE-TAILED DEER

Deer seem to have been plentiful for many years after the arrival of the early settlers. Their skins were used by hunters and settlers for clothing and moccasins, and thousands were sold to traders. Deer skins "in the hair" were valued by the traders in 1763 at 18 pence a pound. The first attempts to restrict the killing of deer seem to have been made as early as 1801. During that year in Pendleton County killing between January 1 and August 1 was prohibited, the fine for such an offense being \$5 (Morton, 1910, p. 356).

Fred E. Brooks (1911, p. 11) concludes that the native deer belong mostly to the northern subspecies, and it is likely that this race did occur in the mountains of eastern West Virginia. The ranges of northern races of other mammals do extend southward in the Allegheny Mountains. The Virginia race, however, may have ranged over the lowlands of Greenbrier County, the lower Kanawha Valley, and the Ohio and its smaller tributaries.

Numerous references to deer appear in the journals of early traders and hunters. The earliest record for deer in West Virginia appears to be one mentioned in Fallam's journal (Bushnell, 1907, p. 51). This deer was killed during September 1671 near the falls of Great Kanawha River. Gist (Darlington, 1893, pp. 72, 142) records that he killed deer during January 1752 in Marshall County. Colonel Croghan (1831, p. 260) states that many deer were seen in May 1765 along the Ohio River between the mouth of the Little Kanawha

River and the Big Bend. In 1768 and for some years afterward deer were quite common along Hackers Creek in Harrison County (McWhorter, 1915, p. 80). George Washington refers in his journal (Sparks, 1839, p. 112) to the abundance of deer near the mouth of the Great Kanawha River on October 5, 1770. The Rev. David Jones writes in his journal (1865, p. 27) under date of December 16, 1772, that Mr. Owens killed several deer near the mouth of the Little Kanawha River. Historical accounts of West Virginia counties contain other references to the former abundance of deer. Brooks (1911, p. 12) mentions one hunter who had killed 600 deer.

It is believed that native white-tailed deer still exist in Pendleton, Randolph, and Pocahontas Counties. Nevertheless, West Virginia has introduced deer from other States into many of its forests. During the summer of 1936, deer were fairly common on Cheat Mountain, but only a few were reported to occur on Middle Mountain. Calculations based on tally counts made during periodical drives on twelve 160-acre plots within the Monongahela National Forest indicate, according to Arthur A. Wood, forest supervisor, a mean abundance of 1 deer to each 108 acres in middle and southern Pocahontas County, but only 1 deer to each 420 acres for the entire forest.

Greenbrier County: Meadow Creek Mountains, 5 miles northeast of Shryock, 1.
Preston County: Rowlesburg, 1.

CERVUS CANADENSIS CANADENSIS *Erzleben*

EASTERN ELK, OR WAPITI

So far as can be ascertained from printed records, native elk disappeared from West Virginia at least 65 years ago. Elk were present throughout the State at the time when the first settlers arrived. In 1671 Sir William Berkeley sent a small exploring party (Brodhead, 1853, p. 193; Bushnell, 1907, p. 46) under the command of Thomas Batts and Robert Fallam to explore the country west of the settlements in Virginia. According to Beverley (1705, book 1, p. 64) "they set out together from Appomattox [near Petersburg], and in seven days' march reach'd the foot of the mountains. The mountains [Blue Ridge] they first arriv'd at, were not extraordinary high or steep; but, after they had pass'd the first ridge, they encounter'd others, that seem'd to reach the clouds, and were so perpendicular and full of precipices, that sometimes in a whole day's march they could not travel three miles in a direct line. In other places they found large level plains and fine savanna's three or four miles wide, in which were an infinite quantity of turkies, deer, elks, and buffaloes, so gentle and undisturbed, that they had no fear at the appearance of the men; but would suffer them to come almost within reach of their hands."

The next mention of elk in West Virginia is found in the journal of Christopher Gist (Darlington, 1893, p. 77). Gist writes under date

of March 6, 1752, that a herd of 30 elk were seen near a cave on Neemokeesy [=Fishing] Creek in Wood County and that one was shot. According to Kercheval (1833, p. 265) elk were plentiful in 1763 in the vicinity of Muddy Creek and Big Levels settlements in Greenbrier County. Three elk were killed that year by Archibald Glendennin for an Indian feast, following which the settlers were massacred. Withers (1831, p. 168) writes that elk were killed in 1777 on the Little Kanawha River. Early settlers shot elk in Harrison County along Hackers Creek near West Milford on West Fork River and also in the mountains of Randolph County (McWhorter, 1915, pp. 80, 81). According to Hale (1886, p. 62), the last elk was killed in Kanawha Valley in 1820 on Two Mile Creek, Elk River, about 5½ miles northeast of Charleston.

Between 1830 and 1835, elk were killed at a deer lick near "The Sinks" on Gandy Creek, a branch of the Dry Fork of Cheat River, Randolph County (Maxwell, 1898, p. 299). Three elk were killed on the Black Fork of Cheat River near Davis, Tucker County, in 1843 (Maxwell, 1898, p. 299). During 1845, seven elk were seen near Durbin, Pocahontas County (Brooks, 1911, p. 12). According to McWhorter (1915, p. 382) elk were last seen in Canaan Valley, Tucker County, about the time of the Civil War. McWhorter (1915, p. 382) states that an elk was killed in 1867 at Elk Lick on Middle River, Pocahontas County, and that tracks of elk were seen near the headwaters of Cheat River not later than 1873.

The few elk now at large on the ridges in the eastern part of the State escaped 10 or 15 years ago from an enclosure near Marlinton, Pocahontas County, belonging to the Allegheny Sportsmen's Association (Brooks, 1929, p. 538).

Family BOVIDAE

BISON BISON PENNSYLVANICUS Shoemaker

EASTERN WOODLAND BISON

Although bison were abundant in West Virginia as late as 1780, it is rather surprising that only incidental reference is made to their presence in the journals and accounts left by explorers, hunters, and early settlers. The earliest record of bison within the present limits of West Virginia appears to be found in the account of an exploring expedition (Bushnell, 1907, p. 46; Alvord and Bidgood, 1912, pp. 183-205) that left the Virginia settlements near where Petersburg now stands on September 1, 1671. Thomas Batts, Thomas Wood, and Robert Fallam, who had been commissioned by Maj. Gen. Abraham Wood under authority of Governor Sir William Berkeley to explore the country to the west of the Virginia settlements, were accompanied by a servant, Jack Weason, and eight Appomattox

Indians. After crossing Craig, Potts, and Peters Mountains, the party traveled northwest across Monroe and Greenbrier Counties to the main branch of Gauley River and thence westward to the Great Falls of the Kanawha River in Fayette County. Reference (Beverley, 1705, p. 64) is made to the "infinite quantity" of bison and other game encountered by this party while crossing flat plains and savannas. There is traditional evidence according to Allen (1876, p. 86) "that buffaloes formerly passed eastward from the headwaters of the Great Kanawha River in West Virginia to the headwaters of the James River in Virginia."

In 1740, John Peter Salley was commissioned by the governor of Virginia to travel as far westward as the Mississippi River. Accompanied by two white assistants, Salley (Darlington, 1893, pp. 251-254) on March 16, 1742, set off from his home near Natural Bridge in Rockbridge County, Va., and traveled westward to the Greenbrier River, where five bison were killed. The hides were used to cover the frame of a boat, and the party continued on their journey.

The next mention of bison is found in the journal of Christopher Gist, who under instructions from the Ohio Company made an examination of lands in West Virginia bordering the Ohio River between the landing on the Monongahela River and the mouth of the Great Kanawha River. Gist (Darlington, 1893, p. 73) killed two bison on February 12, 1752, in Wirt County. On the return trip Gist (Darlington, 1893, p. 76) killed four bison on February 27, 1752, on the Lawwellaconin [=Pond Creek] in Wood County, W. Va.

In 1765 an English expedition commanded by Col. George Croghan was sent out to explore the Ohio River Valley and to conciliate the Indians. Leaving Fort Pitt on May 15, 1765, this party descended the Ohio River in two batteaux. Between the mouth of the Little Kanawha River and Buffalo Bottoms on the Big Bend of the Ohio River, Croghan writes in his journal (1831, p. 260) under the date of May 21, 1765, that buffalo, bears, deer, and all sorts of wild game were so plentiful that his party shot all they needed from the boats. Although no mention is made of the incident in the journal, Hale (1886, p. 62) states that Croghan encountered a vast migrating herd of buffalo crossing the Ohio River at Letart, Mason County, W. Va. In 1769, buffalo destroyed the crops of settlers on South Branch [=Hackers Creek] in Harrison County (Withers, 1831, p. 93).

During the years 1767 to 1769, settlers along the Buckhannon River killed bison in Barbour County (Withers, 1831, pp. 91-93). On October 5, 1770, George Washington found these animals in great abundance 14 miles above the mouth of the Great Kanawha River (Sparks, 1839, p. 112). The settlers killed seven bison on Elk Creek in Harrison County on January 1, 1772 (McWhorter, 1915, p. 381). Reference is made in the journal of the Rev. David Jones (1865, pp.

42-43) to the abundance of buffalo near the mouth of the Guyan-dotte River during January 1873. A few were still present in Greenbrier County as late as 1774 (McWhorter, 1915, p. 380). Again, in 1780, bison were so plentiful along the Little Kanawha River that Col. Daniel Brodhead sent hunters there to obtain a supply of meat for the garrison at Fort Pitt (Ellis, 1882, p. 86). Bison are reported to have been killed by settlers on Fishing Creek in Wetzel County in 1796 (McWhorter, 1915, p. 381). Although it has been stated (McWhorter, 1915, p. 381) that buffalo were not seen in the vicinity of Huntington, Cabell County, after 1805, Hale (1886, p. 62) writes that a buffalo was killed in 1815 on Little Sandy Creek, Elk River, about 12 miles northeast of Charleston, Kanawha County. According to Maxwell (1898, p. 300) a cow buffalo and her calf were discovered at a deer lick in Webster County about 1825. The settlers chased them with dogs. The calf was killed on Valley Fork of Elk River, and the cow was followed to Valley Head, Randolph County, where she was shot. This appears to be the last record for the State.

LITERATURE CITED

ALLEN, JOEL ASAPH.

1876. The American bisons, living and extinct. Mem. Kentucky Geol. Surv., vol. 1, pt. 2, ix+246 pp., 12 pls.

ALVORD, CLARENCE WALWORTH, and BIDGOOD, LEE.

1912. The first explorations of the trans-Allegheny region by the Virginians 1650-1674, 275 pp. Cleveland.

BEVERLEY, ROBERT.

1705. The history and present state of Virginia. Book 1, 10+104 pp.; book 2, 40 pp.; book 3, 64 pp.; book 4, 83 pp.; illus.

BRODHEAD, JOHN ROMEYN.

1853. The journal and relation of a new discovery made behind the Apuleian Mountains to the west of Virginia. Documents relative to the colonial history of the State of New York; procured in Holland, England, and France, vol. 3, pp. 193-197. Albany.

BROOKS, ALONZO BEECHER.

1929. Mammals of West Virginia. The West Virginia Encyclopedia, ed. 1, xxiv+1,052 pp. Charleston, W. Va.

BROOKS, FRED ERNEST.

1911. The mammals of West Virginia. Rpt. West Virginia State Board Agr., no. 20 (for quarter ended Dec. 30, 1910), pp. 9-30.

BUSHNELL, DAVID IVES, JR.

1907. Discoveries beyond the Appalachian Mountains in September, 1671. Amer. Anthropol., vol. 9, no. 1, pp. 45-56.

CROGHAN, GEORGE.

1831. The journal of Col. Croghan. Monthly Amer. Journ. Geol. and Nat. Sci., vol. 1, no. 6, pp. 257-272.

DARLINGTON, WILLIAM McCULLOUGH.

1893. Christopher Gist's journals with historical, geographical and ethnological notes and biographies of his contemporaries, 296 pp., illus. Pittsburgh.

DODDRIDGE, REV. JOSEPH.

1824. Notes, on the settlement and Indian wars, of the western parts of Virginia and Pennsylvania, from the year 1763 until the year 1783 inclusive. Together with a view of the state of society and manners of the first settlers of the western country, xiii+15-316 pp. Wells-burgh, Va.

DOUTT, J. KENNETH.

1930. *Glaucomys sabrinus* in Pennsylvania. Journ. Mamm., vol. 11, pp. 239-240.

ELLIS, FRANKLIN.

1882. History of Fayette County, Pennsylvania, with biographical sketches of many of its pioneers and prominent men, 840 pp. Philadelphia.

HALE, JOHN PETER.

1886. Trans-Allegheny pioneers, historical sketches of the first white settlements west of the Alleghenies, 1748 and after, 330 pp., illus. Cincinnati.

HANNA, CHARLES AUGUSTUS.

1911. The wilderness trail, or the ventures and adventures of the Pennsylvania traders on the Allegheny Path with some new annals of the old west, and the records of some strong men and some bad ones, vol. 2, vi+457 pp., illus. New York and London.

HOLLISTER, NED.

1911. A systematic synopsis of the muskrats. North Amer. Fauna 32, 47 pp., 6 pls.

HOWELL, ARTHUR HOLMES.

1901. Revision of the skunks of the genus *Chincha*. North Amer. Fauna 20, 62 pp., 8 pls.

1906. Revision of the skunks of the genus *Spilogale*. North Amer. Fauna 26, 55 pp., 10 pls.

1914. Revision of the American harvest mice (genus *Reithrodontomys*). North Amer. Fauna 36, 97 pp., 6 maps, 7 pls.

1918. Revision of the American flying squirrels. North Amer. Fauna 44, 64 pp., 4 maps, 7 pls.

JACKSON, HARTLEY HARRAD THOMPSON.

1928. A taxonomic review of the American long-tailed shrews (genera *Sorex* and *Microsorex*). North Amer. Fauna 51, vi+238 pp., 24 figs., 13 pls.

JONES, REV. DAVID.

1865. A journal of two visits made to some nations of Indians on the west side of the river Ohio, in the years 1772 and 1773, xi+5+127 pp. New York (reprinted for Joseph Sabin).

KERCHEVAL, SAMUEL.

1833. A history of the valley of Virginia, xlvi+47-486 pp. Winchester.

LEWIS, VIRGIL ANSON.

1912. History and government of West Virginia, 416 pp., illus. New York.

MAXWELL, HU.

1898. The history of Randolph County, West Virginia, 531 pp., illus. Morgantown.

MCWHORTER, LUCULLUS VIRGIL.

1915. The border settlers of northwestern Virginia from 1768 to 1795 embracing the life of Jesse Hughes and other noted scouts of the great woods of the trans-Allegheny with notes and illustrative anecdotes, 509 pp., illus. Hamilton, Ohio.

- MILLER, GERRIT SMITH, JR., and ALLEN, GLOVER MORRILL.
1928. The American bats of the genera *Myotis* and *Pizonyx*. U. S. Nat. Mus. Bull. 144, viii+218 pp., 13 maps.
- MORTON, OREN FREDRIC.
1910. A history of Pendleton County, West Virginia, viii+493 pp. Franklin, W. Va.
- NELSON, EDWARD WILLIAM.
1909. The rabbits of North America. North Amer. Fauna 29, 314 pp., 19 maps, 13 pls.
- NEWCOMBE, C. L.
1930. An ecological study of the Allegheny cliff rat (*Neotoma pennsylvanica* Stone). Journ. Mamm., vol. 11, pp. 204-211, 1 map, 2 pls.
- PATTERSON, ROBERT COMPTON.
1933. Notes on *Neotoma pennsylvanica* with special reference to the genital organization. West Virginia Univ. Bull., ser. 33, no. 15 (Proc. West Virginia Acad. Sci., vol. 6), pp. 38-42.
1934. Habits of *Neotoma pennsylvanica*. West Virginia Univ. Bull., ser. 34, no. 15 (Proc. West Virginia Acad. Sci., vol. 7), pp. 32-35.
- PREBLE, EDWARD ALEXANDER.
1899. Revision of the jumping mice of the genus *Zapus*. North Amer. Fauna 15, 42 pp., 4 figs., 1 pl.
- REESE, ALBERT MOORE.
1934. The fauna of West Virginia caves. West Virginia Univ. Bull., ser. 34, no. 15 (Proc. West Virginia Acad. Sci., vol. 7), pp. 39-53.
- SPARKS, JARED.
1839. The life of George Washington, xx+562 pp., illus. Boston.
- SURBER, THADDEUS.
1909. Some remarks on the game mammals of West Virginia. With an annotated list of all species found in the State. Proc. 3d Annual Meeting West Virginia Fish and Game Prot. Assoc., pp. 49-56. Charleston, W. Va.
- WITHERS, ALEXANDER SCOTT.
1831. Chronicles of border warfare, or a history of the settlement by the whites, of north-western Virginia: and of the Indian wars and massacres, in that section of the State; with reflections, anecdotes, etc., 319 pp. Clarksburg, Va.