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ANNOTATED LIST OF TENNESSEE MAMMALS

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DURING 1937 the United States National Museum conducted natural-history field work in Tennessee, for the purpose of making a collection of birds and mammals of the State. Watson M. Perrygo was in charge of the field party, with Carleton Lingebach and Henry R. Schaefer acting as field assistants. Leaving Washington on April 3, Perrygo and Lingebach traveled across Virginia and Tennessee to Ellendale, Shelby County, where they established their first camp on April 7. From this camp they collected at several localities in Shelby and Fayette Counties until April 22. They worked in the vicinity of Reelfoot Lake, Obion County, from April 23 to May 9; in Wayne County from May 9 to 20; and in Cumberland County from May 20 to June 1. The party then commenced field work in the eastern mountainous section, where with Shady Valley as a base camp they made collections in this valley and in the Holston Mountains from June 2 to 16. Moving camp to Cosby, in Cocke County, they worked in the Great Smoky Mountains from June 18 to July 5. After working in the vicinity of Big Frog Mountain, Cherokee National Forest, from July 8 to 15, they discontinued field operations for a few weeks and returned to Washington on July 17.

On September 9 Perrygo and Schaefer left Washington and drove to Roan Mountain, where they worked from September 11 to 25. They collected in the Clinch Mountains and elsewhere in Grainger County from September 27 to October 2, and around Reelfoot Lake from October 4 to 24. They worked in Stewart County from October 25 to 30 and in Giles and Lincoln Counties from November 1 to 10, when the season's work was concluded.

The present paper reports not only on the mammals collected during the course of the field work in Tennessee conducted in 1937 but also on all the Tennessee specimens in the National Museum and the Biological Survey collections. 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

Richard Owen, 1854.
J. B. Mitchell, 1856.
John Constable, 1877.
James W. Rogan, 1884.
C. S. Brimley, 1891.
H. H. Brimley, 1891.
William Palmer, 1897.
W. P. Hay, 1902.
Paul Bartsch, 1907.
Porter Dunlap, 1911.
Robert Gorham, 1911.
Clarence B. Moore, 1914, 1915, 1916.
Lloyd Branson, 1915.
J. D. Ives, 1925, 1926.
J. G. Gillespie, 1927.
R. J. Fleetwood, 1934.
Carleton Lingebach, 1937.
Watson M. Perrygo, 1937.
Henry R. Schaefer, 1937.
A. R. Cahn, 1938.

U. S. Biological Survey

T. J. Park, 1891.
G. A. Coleman, 1892.
Russell J. Thompson, 1892.
H. C. Oberholser, 1895.
Charles R. Ellis, 1904.
Stanley E. Piper, 1904.
Arthur H. Howell, 1908, 1910, 1930.
W. H. Provins, 1908.
W. J. Millsaps, 1909, 1910.
Adam G. Millsaps, 1912.
Morton L. Church, 1912.
Earl May, 1931.
James Silver, 1933.
R. J. Fleetwood, 1934.

Measurements herein are given in millimeters.

The birds collected in the Tennessee field work have been reported on by Dr. Alexander Wetmore.¹

Family DIDELPHIIDAE

DIDELPHIS VIRGINIANA VIRGINIANA Kerr: Opossum

The opossum seems to be distributed over the whole State, occurring most frequently in the timbered bottomlands and in the rock ledges on the bluffs bordering the stream valleys. In the mountainous sections of eastern Tennessee, the vertical range of the opossum goes at least to 3,700 feet. Perrygo and Schaefer were told in September 1937 that opossums were common in valleys northwest of Roan Mountain.

S. C. Williams relates (1924, p. 217) that Senator Hugh Lawson White of Tennessee, in replying to a speech by Senator Webster, referred to the abundance of opossums in the short-lived State of Franklin. He stated that about 1785 the subtreasurers or collectors took in peltries for taxes, as provided by law. Although raccoon

¹ Proc. U. S. Nat. Mus., vol. 86, no. 3050.

skins were readily procured, opossum skins that had little or no value were even more plentiful. The collectors obtained the requisite number of opossum skins, cut the tails off the raccoon skins and sewed them to the opossum skins, and then deposited them in the general treasury. The raccoon skins were sold by the collectors to the hatters.

During the spring of 1937 it was reported that opossums were not so abundant as formerly in Shelby and Fayette Counties. One that had been run over by an automobile was seen on April 13, 1937, on the road near Memphis. On April 23, 1937, in Obion County, one was seen crushed on the road near Hornbeak, and the following day on the road between Troy and Reelfoot Lake three crushed opossums were noted. Rhoads (1896, p. 176) did not collect opossums in Tennessee, but he was told by B. C. Miles that the Negroes of Haywood and Lauderdale Counties claimed there were two kinds, one with black and the other with white feet.

On May 11, 1937, another crushed opossum was seen on the road 11 miles north of Waynesboro, Wayne County. On November 8, 1937, a female opossum was taken near Frankewing in a Schuyler trap set for flying squirrels. Fourteen embryos, the largest of which have a head and body length of 60 mm, were removed by Russell J. Thompson from the pouch of a female collected on June 23, 1892, at Big Sandy. The measurements of the largest male (U.S.N.M. no. 46895, Danville) in this series of 11 Tennessee specimens are as follows: Total length, 785; tail, 320; hind foot, 52.

Specimens taken at Greenbrier, Sevier County, are listed by Komarek and Komarek (1938, p. 145).

Benton County: Big Sandy, 1.

Carter County: Carvers Gap, Roan Mountain, altitude 3,700 feet, 1.

Grainger County: Thorn Hill, Clinch Mountains, altitude 1,800 feet, 2.

Houston County: Danville, 1.

Humphreys County: South of Johnsonville, 1.

Lincoln County: 6 miles east Frankewing, 1.

Montgomery County: Clarksville, 3.

Sumner County: Rockland [Hendersonville P. O.], 1.

Family TALPIDAE

PARASCALOPS BREWERI (Bachman): Hairy-tailed Mole

Hairy-tailed moles were reported to be common in cultivated fields in the vicinity of Shady Valley. A female was trapped by W. M. Perrygo and Carleton Lingebach on June 13, 1937, in a cornfield near a bog. Komarek and Komarek (1938, p. 145) report that hairy-tailed moles were trapped in damp rhododendron thickets in Sevier County along Chapman Prong (altitude 3,200 feet) and Buck Fork of Little Pigeon River.

Johnson County: Shady Valley, altitude 2,900 feet, 1.

SCALOPUS AQUATICUS AQUATICUS (Linnaeus): Eastern Mole

The range of this race seems to be restricted to the drainage basins of the upper Tennessee—Clinch, Holston, and French Broad Rivers in the eastern part of the State. Howell (1909, p. 67) states that this mole was reported to occur in the vicinity of Briceville, Anderson County, and that it was scarce on Walden Ridge near Soddy, Hamilton County. On the western slope of Low Gap, two moles were trapped in an old cornfield. The male (U.S.N.M. no. 267145) from Low Gap has a somewhat shorter skull than average individuals of the race from Virginia and Maryland, although the well-worn teeth show that it is fully adult. It is, however, approximately the same size as a skull (U.S.N.M. no. 99639) from Falls Church, Va., which has similarly worn teeth. This mole has been recorded from Dry Valley, Blount County (Komarek and Komarek, 1938, p. 145).

Blount County: 1.

Cocke County: Low Gap, 4½ miles southeast of Cosby, altitude 2,700 feet, 2.

Hamilton County: Walden Ridge near Rathburn [Soddy P. O.], 1.

SCALOPUS AQUATICUS MACHRINUS (Rafinesque): Prairie Mole

This mole occurs in the bluegrass region of middle Tennessee, chiefly in the lower drainage areas of the Big Sandy, Tennessee, and Cumberland Rivers, as well as in the bottomlands bordering the small tributaries of the Mississippi River. Jackson (1915, p. 44) lists three specimens from Nashville, Davidson County.

From Benjamin C. Miles, Rhoads (1896, p. 201) received information that the mole is common in Haywood County "wherever land is rich, and is troublesome in that he burrows in the rows and destroys growing plants, and runs tunnels up and down hill which I have seen in one season wash into gullies 18 inches deep."

Four moles taken by W. M. Perrygo and Carleton Lingebach during April 1937 extend the range of this race to the southwestern corner of the State. These moles were trapped in a cottonfield and, judged from the number of runways, moles were apparently common in northwestern Shelby County. The four specimens from Shelby County resemble *machrinus* in general coloration, but they have shorter skulls and slightly lighter dentition, as well as a shorter total length. These specimens approach individuals of *howelli* from Ardell (U.S.N.M. no. 207227) and Greensboro (U.S.N.M. no. 57050), Ala., in the length of the skull and size of the teeth, but differ in coloration. The above-mentioned specimens of *howelli* are considerably larger than topotypes. Burrows made by moles were seen along the edge of the cypress swamp near Hickory Withe, but the museum party did not succeed in trapping any.

Benton County: Big Sandy, 1.
Humphreys County: South of Johnsonville, 1.
Montgomery County: Clarksville, 1.
Shelby County: Ellendale, 4.
Sumner County: Bethpage, 1.

CONDYLURA CRISTATA (Linnaeus): Star-nosed Mole

On June 13, 1937, a desiccated mole was picked up by W. M. Perrygo and Carleton Lingebach at their camp on the edge of the rhododendron bog at Shady Valley. Audubon and Bachman (1851, vol. 2, p. 142) refer to this mole's occurrence in the State as follows: "To the west we have traced it in Ohio and the northern parts of Tennessee."

Johnson County: Shady Valley, altitude 2,900 feet, 1.

Family SORICIDAE

SOREX CINEREUS CINEREUS Kerr: Cinereous, or Masked, Shrew

The range of this masked shrew in Tennessee seems to be restricted to the eastern mountainous portion of the State. Rhoads (1896, p. 202) writes that the burrows of this shrew "were found under decaying logs and large stones in moist places along the bridge path leading directly from Cloudland to the Doe River Valley," Carter County. Two were taken in September 1937, at an altitude of 6,200 feet in moss at the base of fir trees in the forest on the summit of Roan Mountain. Masked shrews were trapped by A. H. Howell in a spruce and fir forest near the summit of the ridge at Indian Gap. On the summit of Old Black Mountain, these shrews were caught in runways in damp moss at the base of fir trees. Masked shrews appear to be generally distributed throughout the wooded ridges of the Great Smoky Mountains National Park. They have been recorded from the Buck Fork of Little Pigeon River, Dry Sluice, and Mount Guyot in Sevier County by Komarek and Komarek (1938, p. 146).

In tabulating a series of 17 skulls from Roan Mountain, N. C., it was found that 14 have the third and fourth unicuspid subequal, 3 have the third unicuspid smaller than the fourth, and 1 has the fourth unicuspid larger than the third. In the case of 11 skulls from New York (8 from Montauk Point, Suffolk County, and 3 from Mountain View, Franklin County), 5 have the third and fourth unicuspid subequal and 6 have the fourth unicuspid larger than the third.

Carter County: Roan Mountain, altitude 6,200 feet, 1.
Cocke County: Old Black Mountain, Great Smoky Mountains, altitude 6,300 feet, 2.
Sevier County: Indian Gap, altitude 5,200 feet, 2.

SOREX LONGIROSTRIS LONGIROSTRIS Bachman: Bachman's Shrew

These minute shrews are rarely taken by collectors. One was found by Raymond J. Fleetwood in a posthole in a field overgrown with sedgegrass at Greenbrier, Sevier County. Komarek and Komarek (1938, p. 146) mention another that had been trapped in one of the buildings of a C. C. C. camp in the Great Smoky Mountains National Park. The Sevier County occurrence indicates that this species may range northward in the valleys of eastern Tennessee. The taking of one of these small shrews by Perrygo and Schaefer near Reelfoot Lake on October 1, 1937, extends the range across the State to the Mississippi bottomlands. This male was trapped barely above the water line in matted decayed leaves beside a rotten log in the swamp bordering Reelfoot Lake.

The identification of these two specimens from Tennessee has led to a restudy of specimens previously referred to *Sorex fontinalis* and *Sorex longirostris longirostris*. It so happened that the specimens from southern localities available to Hollister (1911, pp. 378-380) had the third upper unicuspid smaller than the fourth. The larger series of specimens now available exhibits so many exceptions that I am unable to accept the conclusions of Jackson in regard to the distinctness of these two shrews. The characters listed by Jackson (1928, pp. 37, 83) as distinguishing *S. longirostris* from *S. fontinalis*, including (1) relatively shorter, broader rostrum, (2) shorter and more crowded unicuspid row, (3) third upper unicuspid smaller than fourth, (4) anteroposterior diameter less than transverse diameter of unicuspid teeth, (5) anteroposterior diameter of molariform teeth relatively greater, and (6) first incisors, upper and lower, relatively smaller, do not appear to me so to differentiate a series of 20 specimens. This series comprises 10 Maryland specimens previously referred to *S. fontinalis*, collected at Bowie, Cabin John, Cold Spring Swamp, Glen Echo Heights, Hollywood, Hyattsville, Laurel (2), and Sandy Spring (2), and a like number of *S. longirostris* from Chesapeake Beach, Md., Falls Church, Va., Pisgah National Forest and Raleigh (2), N. C., Young Harris, Ga., Phillippy and Greenbrier (Sevier County), Tenn., and Bicknell, Ind. (2). After tabulating this series according to the relative sizes of the third and fourth unicuspid, it was found that this character cannot be relied on. The dimensions of the molariform teeth, the unicuspid, and the first incisors can be matched in several specimens in both groups. In one of the Tennessee specimens the anteroposterior diameter of the third molariform teeth is less than the transverse, and in the other these measurements are reversed. Micrometer measurements of the rostrum and of the teeth made with a binocular failed to differentiate readily specimens from the supposed range of *S. longirostris* from

those of *S. fontinalis*. A similar crowding of unicuspid teeth was observed in individuals in both series. Tabulations based on the above-mentioned characters indicate that they are so highly variable that not even a limited correlation with geographic distribution can be discerned. In the light of the present series of specimens it seems clear that the supposed distinctions between *Sorex longirostris* and *S. fontinalis* are nothing more than individual variations.

Lake County: Reelfoot Lake, 2 miles east of Phillippy, 1.

Sevier County: Greenbrier, 1.

SOREX FUMEUS FUMEUS Miller: Smoky Shrew

Smoky shrews in Tennessee are most frequently found in moist heavy spruce forests in the colder parts of the Transition and Canadian Zones. They were trapped in runways in the damp moss at base of balsam fir trees on the west slopes of Mount Guyot and Old Black Mountain. On the west slope of Inadu Knob, smoky shrews were caught in the moss on banks of a spring in a balsam-fir forest. They were likewise taken in moss on the west slope of Low Gap, 4½ miles southeast of Cosby. According to Komarek and Komarek (1938, p. 146), this shrew has been taken at the following localities in Sevier County: Chapman Prong and Eagle Rocks Prong of Little Pigeon River, Dry Sluice (near Mount Collins), and Little River (altitude 2,900 feet). A. H. Howell took one on August 21, 1908, near Highcliff in a damp heavily timbered ravine near the base of the north escarpment of Pine Mountain.

Campbell County: Highcliff, altitude 1,000 feet, 1.

Cocke County: Mount Guyot, Great Smoky Mountains, altitude 6,300 feet, 1; Old Black Mountain, Great Smoky Mountains, altitude 6,300 feet, 4; Inadu Knob, Great Smoky Mountains, altitude 5,700 feet, 2; Low Gap, 4½ miles southeast of Cosby, altitude 3,400 feet, 2.

Sevier County: Indian Gap, altitude 5,200 feet, 3.

CRYPTOTIS PARVA (Say): Small Short-tailed Shrew

Five of these little short-tailed shrews were taken during November 1937 by Perrygo and Schaefer in traps set in cotton-rat runways in thickly matted grass and broomsedge growing between the road and a small creek east of Pulaski. Four were trapped in *Microtus ochrogaster* runways during April and May 1937 in an abandoned alfalfa field on the edge of Reelfoot Lake. Three were trapped by A. H. Howell on one night, all within a few yards of one another, in prairie meadow mouse runways in a patch of dry grass and briers in an old field near Clarksville. Dr. A. R. Cahn submitted for identification a short-tailed shrew collected on October 18, 1937, at Norris, Anderson County.

These shrews were reported by Komarek and Komarek (1938, p. 147) as having been trapped in Sevier County in fallow fields overgrown with broomsedge at Greenbrier, along Fighting Creek near Gatlinburg, and in the runways of Stone's lemming mouse along Fish Camp Prong of Little River (altitude 2,730 feet).

Giles County: 6 miles east of Pulaski, 5.

Lake County: Reelfoot Lake, 3 miles north of Tiptonville, 4.

Montgomery County: Clarksville, 3.

BLARINA BREVICAUDA TALPOIDES (Gapper): Short-tailed Shrew

The short-tailed shrew is the largest of the five shrews recorded for the State. It lives in underground burrows and also makes surface runways under matted leaves and decaying vegetation. When hunting for food it frequently uses the runways of other small mammals. Blarinas were caught in the Great Smoky Mountains in large Schuyler traps that had been nailed to the trunks of trees 5 or 6 feet above ground.

At Shady Valley short-tailed shrews were trapped in a bog in which rhododendron and hemlock were growing. On the southeastern slope of Holston Mountain they were trapped along a small mountain stream in runways under moss in a growth of rhododendron and hemlock. On the west slope of Mount Guyot they were taken in a balsam-fir forest and at Low Gap in runways under moss in hemlock. On Snake Den Mountain, blarinas were trapped in runways under moss under mixed deciduous and hemlock trees growing on the banks of a swift-flowing mountain stream. The vertical range of this shrew extends to at least 6,300 feet. Komarek and Komarek (1938, p. 147) list specimens from the following localities in Sevier County: Fish Camp Prong of Little River, Grassy Patch (on Alum Cave Creek, 2 miles east of The Chimneys, altitude 4,000 feet), Greenbrier, Horsehoe Mountain (about 3 miles east of Mount LeConte and 1½ miles north of Mount Kephart), Silers Bald, and Walker Prong of Little River.

Specimens from eastern Tennessee average somewhat smaller than those taken in eastern and southern West Virginia, but they have a larger hind foot than those referred to *carolinensis*. Until this genus is revised, this series may be tentatively allocated to *talpoides*. From the eastern mountainous section the average measurements of 11 males are as follows: Total length, 115.6 (110–125); tail, 23.2 (19–27); hind foot, 14.7 (13–16). For 9 females from the same area the average measurements are: Total length, 117.2 (108–126); tail, 23.5 (16.5–27); hind foot, 15.1 (14–16.5).

Johnson County: Shady Valley, altitude 2,900 feet, 1; Holston Mountain, 4 miles northeast of Shady Valley, altitude 3,800 feet, 5; Holston Mountain, 3 miles northeast of Shady Valley, altitude 3,000 feet, 1.

Carter County: Roan Mountain, altitude 4,100–5,000 feet, 6.

Cocke County: Mount Guyot, altitude 6,300 feet, 1; Low Gap, 4½ miles southeast of Cosby, altitude 3,300–3,400 feet, 3; Snake Den Mountain, altitude 3,800 feet, 1.

BLARINA BREVICAUDA CAROLINENSIS (Bachman): Carolina Short-tailed Shrew, or Mole-shrew

Rhoads (1896, p. 202) found that the southern mole-shrew was present "in the bottom lands of west Tennessee both in the open and in deep swampy woods." He collected specimens at Samburg on the shore of Reelfoot Lake and in the bottom lands of Wolf River near Raleigh, Shelby County. Rhoads also lists specimens from Bellevue in Davidson County, Sawyers Springs on Walden Ridge in Hamilton County, and Harriman in Roane County.

At Hickory Withe the National Museum party trapped these blarinas in runways under matted leaves on tussocks on cypress knees in the swamp as well as in the canebrake, at Frankewing under matted leaves alongside rotten logs in deciduous woods, and also on a dry hillside in deciduous woods 8 miles north of Waynesboro.

The short-tailed shrews collected in southern and western Tennessee average somewhat smaller than the eastern series. The average measurements of three males are as follows: Total length, 98.3 (85–112); tail, 19 (17–22); hind foot, 12.6 (11–14). For three females the average measurements are: Total length, 96.3 (85–109); tail, 19.6 (18–22); hind foot, 11.5 (11–12.5). These measurements correspond rather closely with those that are considered typical of the subspecies *carolinensis*. The average measurements of 15 males from localities in South Carolina, Georgia, and Alabama are as follows: Total length, 97.7 (94–110); tail, 18.8 (15–21); hind foot, 12 (11–13). For 10 females from the same States the average measurements are: Total length, 95 (86–103); tail, 19.9 (17–25); hind foot, 12 (11–13).

Benton County: Big Sandy, 1.

Davidson County: Nashville, 1.

Fayette County: Hickory Withe, 3.

Lincoln County: 6 miles east of Frankewing, 1.

Obion County: Samburg, 1.

Wayne County: 8 miles east of Waynesboro, 2.

Family VESPERTILIONIDAE

MYOTIS GRISESCENS Howell: Gray, or Howell's, Bat

Several thousand of these bats were found by Mohr (1933, pp. 50–51) during June 1932, hanging in compact masses from the roof

of a small chamber leading off from the main portion of Indian Cave. When the bats were disturbed, Mohr observed that hundreds flew around in the chamber and that probably only 5 percent carried their young, most of the females leaving their young hanging to the roof. The youngest of the bats were naked, and the oldest were about 3 weeks old. Mohr estimated that less than 10 percent of the bats were mature males. All the bats collected were in the russet phase. The Museum series from this cave was collected May 23, 1925, by Prof. J. D. Ives.

During June Mohr likewise found great numbers of these bats lining the roof of Nickajack Cave. When Mohr (1932, pp. 272-273) visited this cave on December 24, 1931, he found only a solitary female in the russet phase. On returning again to the cave on January 4, 1932, he located three males in the dusky phase. Arthur H. Howell collected a large series of these bats at Nickajack Cave on August 31, 1908. Under the name of *Myotis velifer*, Hahn (1908, p. 580) listed this bat as occurring in Nickajack Cave.

Grainger County: Indian Cave, on Holston River north of New Market, 15.

Marion County: Nickajack Cave, near Shell Mound, 76.

MYOTIS KEENII SEPTENTRIONALIS (Trouessart): Trouessart's Bat

On July 2, 1892, Russell J. Thompson found three of these bats hanging to rocks in Bellamys Cave, 4 miles from the Cumberland River. Miller and Allen (1928, p. 106) list two specimens from Hickman County.

Montgomery County: Bellamys Cave, 3.

MYOTIS LUCIFUGUS LUCIFUGUS (LeConte): Little Brown Bat

Rhoads (1896, p. 203) mentions four little brown bats collected by J. T. Park at Warner, Hickman County. Two specimens from Greenbrier, Sevier County, are listed by Komarek and Komarek (1938, p. 148).

MYOTIS SODALIS Miller and Allen: Indiana Bat

About 300 yards from the entrance of Nickajack Cave, Mohr (1932, pp. 272-273) on December 24, 1931, found a colony of about 300 Indiana bats hanging from the ceiling of a low chamber. On the far side of the stream in this cave Mohr found four additional clusters of these bats, each comprising several hundred individuals. On a second visit, January 4, 1932, Mohr estimated that there were 1,200 to 1,500 bats hibernating in this cave. The clusters contained individuals of both sexes. Not a single specimen of this bat was located when Mohr (1933, p. 51) revisited Nickajack Cave during June 1932.

Dr. A. R. Cahn submitted for identification two of these bats that were collected during April 1937 in Ward Cave, Bedford County. Arthur Stupka, park naturalist, Great Smoky Mountains National Park, submitted for identification a male taken on September 2, 1937, at Keener House, Sevier County (altitude 1,500 feet).

Marion County: Nickajack Cave, near Shell Mound, 1.

MYOTIS SUBULATUS LEIBII (Audubon and Bachman): Leib's Bat

This bat may occur in Tennessee, since it has been recorded on the north from White Sulphur Springs, W. Va., and Hickmans Cave, Ky.

LASIONYCTERIS NOCTIVAGANS (LeConte): Silver-haired Bat

Rhoads (1896, p. 205) tentatively identified as this species bats seen at Sawyers Springs on Walden Ridge, Hamilton County, and on Roan Mountain. It was Rhoads' belief that "the fluttering, moth-like flight of some of these mountain bats was characteristic of the peculiar movements of *noctivagans*." Two specimens from Cades Cove, Blount County, and one from Greenbrier, Sevier County, are listed by Komarek and Komarek (1938, p. 148).

PIPISTRELLUS SUBFLAVUS SUBFLAVUS (F. Cuvier): Southern
Pipistrelle, or Georgian Bat

The southern pipistrelle is one of the most widely distributed bats in the State. It is found hibernating in caves during winter, and in summer it spends the day in rock crevices and the like. Near dusk and later in the evening during the summer months it may be recognized by its erratic, butterflylike flight over fields, in clearings in the woods, and near ponds. The two collected at Low Gap were shot in the evening of July 5, 1937, while flying around abandoned buildings of a Civilian Conservation Corps camp. On December 24, 1931, Mohr (1932, p. 272) observed a few of these bats about 300 yards from the entrance of Nickajack Cave. Prof. J. D. Ives collected for the Museum a few individuals during December 1925 in Indian and Nickajack Caves. Dr. A. R. Cahn submitted for identification five pipistrelles collected during April 1937 in Ward Cave, Bedford County, and another lot of ten that were captured on February 10, 1938, in a cave near Dry Creek, Hardin County. Arthur Stupka, park naturalist, Great Smoky Mountains National Park, submitted for identification five males taken during July 1937 in Saltpeter Cave, Blount County (altitude 1,750 feet). Komarek and Komarek (1938, p. 148) record a specimen from Greenbrier, Sevier County.

Anderson County: Briceville, 6.

Benton County: Big Sandy, 9.

- Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, altitude 2,700 feet, 2.
Grainger County: Indian Cave, on Holston River near New Market, 2.
Hamilton County: Rathburn (Soddy P. O.), 2.
Hickman County: 1.
Houston County: Danville, 5.
Jefferson County: Jefferson City, 2.
Marion County: Nickajack Cave, near Shell Mound, 1.
Shelby County: Arlington, 3.

EPTESICUS FUSCUS FUSCUS (Beauvois): Big Brown Bat

Rhoads (1896, p. 204) reports that the brown bat is found on the Cumberland Plateau but that none were seen on Roan Mountain. He lists three specimens from Vaughans Cave, Belleview, Davidson County. H. Allen (1893, p. 152) lists a specimen collected in 1856 by Prof. J. B. Mitchell in Roane County. Dr. A. R. Cahn submitted for identification a brown bat collected on July 30, 1937, in Hatmaker Cave, Anderson County; another taken on October 2, 1937, at Norris; and a third captured on February 10, 1938, in a cave near Dry Creek, Hardin County. A specimen taken at Greenbrier, Sevier County, is listed by Komarek and Komarek (1938, p. 148).

Hamilton County: Rathburn (Soddy P. O.), 1.

LASIURUS BOREALIS (Müller): Red Bat

The red bat is occasionally found in caves during winter, but in summer it is usually found during daylight hours hanging from the smaller limbs of trees in wooded tracts. G. A. Coleman shot red bats in the open woods near the Loosahatchie River and in a clearing along the creek near Big Sandy. Rhoads (1896, p. 203) observed a few red bats in the mountains of eastern Tennessee. H. Allen (1893, p. 152) lists a specimen, which cannot now be located, collected in 1854 by Prof. Richard Owen at Tyree Springs, Sumner County. Miller (1897, p. 108) lists a specimen from Alexandria, De Kalb County. This bat has been taken also at Cades Cove, Blount County, and at Greenbrier, Sevier County (Komarek and Komarek, 1938, p. 148).

- Anderson County: Briceville, 2; Coal Creek, 1.
Benton County: Big Sandy, 11.
Cumberland County: 2 miles east of Crossville, altitude 2,000 feet, 1.
Houston County: Danville, 1.
Humphreys County: Waverly, 1.
Knox County: Knoxville, 1.
Marion County: Nickajack Cave, near Shell Mound, 1.
Montgomery County: Clarksville, 1.
Shelby County: Arlington, 2.

LASIURUS CINEREUS (Beauvois): Hoary Bat

Rhoads (1896, p. 203) concluded that the hoary bat "is likely to occur either as a migrant or resident anywhere east of the Cumberland Plateau."

NYCTICEIUS HUMERALIS (Rafinesque): Evening, or Rafinesque's, Bat

The recorded occurrences of this bat in the State are all west of the southern Allegheny Mountains. The evening bat begins to hunt considerably before dark and may be recognized by its rather slow and steady flight. G. A. Coleman collected a number of individuals during June 1892 in an open space near the creek and along the railroad tracks at Big Sandy, as well as in the open woods near Arlington. Rhoads (1896, p. 204) refers to specimens of this bat taken in Hickman County by J. T. Park during August and September.

Benton County: Big Sandy, 14.

Hickman County: Warner, 1; Hickman County: 1.

Houston County: Danville, 1.

Shelby County: Arlington, 4.

CORYNORHINUS MACROTIS (LeConte): LeConte's Lump-nosed, or Big-eared, Bat

Arthur Stupka, park naturalist, Great Smoky Mountains National Park, lent eight specimens from Cades Cove, 14½ miles southeast of Maryville, Blount County (altitude 1,750 feet). Of these one was a female collected at Cades Cove on September 12, 1936, and the remainder, four males and three females, were taken at the Cades Cove C. C. C. camp schoolhouse on July 12-15, 1937. This bat has been taken also in Sevier County at Gatlinburg and Greenbrier (Komarek and Komarek, 1938, p. 148).

The lump-nosed bat may occur in middle Tennessee, since it has been recorded by Howell (1921, p. 28) near the northern boundary line of Alabama at Huntsville, Madison County, and by Miller (1897, p. 52) at Bowling Green, Warren County, Ky.

Family URSIDAE**URSUS AMERICANUS AMERICANUS** Pallas: Black Bear

Black bears appear to have ranged over all Tennessee in early times, but they have since been exterminated in many sections. No skulls are available for examination, and this makes it impossible to say whether the Florida black bear (*Ursus floridanus*) formerly occurred in the southern parts of the State.

The Virginia trader Abraham Wood sent James Needham and Gabriell Arthur in 1673 to the Cherokee Indian town Cota, located

in what is now Monroe County, Tenn. While enroute to this place, Needham, as reported by Wood (Williams, 1928, p. 27), saw bears along the Holston River in the vicinity of Bays Mountains [? Hawkins County]. Dr. Thomas Walker (Williams, 1928, p. 172) relates that he had killed a male bear in Hawkins County on his trip in April 1750 to save his dog from further injury. In the valley of Boones Creek, a tributary of the Watauga River, near the old stage road between Jonesboro, Washington County, and Blountville, Sullivan County, there stood for many years a beech tree on which Daniel Boone in 1760 carved a notice that he had killed a bear there (Ramsey, 1853, p. 67). Lt. Henry Timberlake, on his trip down the Holston River during December 1761 from Kingsport, Sullivan County, to a large cave below the present site of Three Springs Ford, Hamblen County, commented on the amazing number of bears that he had seen (Williams, 1927, pp. 45, 47). The same traveler reported an abundance of bears in 1762 along the Little Tennessee River near the mouth of Tellico River (Williams, 1927, p. 71). Local residents reported that a bear was seen near Shady Valley, Johnson County, in 1936. Perrygo and Lingeback saw a black bear on June 25, 1937, and also on the following day at an altitude of 5,200 to 5,700 feet on Inadu Knob, Cocke County. Komarek and Komarek (1938, p. 148) report that a female and a large male black bear were taken above Greenbrier and another male along Ramsey Fort of Little Pigeon River in Sevier County. The visible bear "sign" noted by members of the field parties of the Chicago Academy of Sciences indicates that black bears are increasing in numbers since the establishment of the Great Smoky Mountains National Park.

Bears at one time were plentiful in the vicinity of the Cumberland settlements at Nashville, and many were killed for food by the early settlers. A hunter, Thomas Sharp Spencer, who was well known to the French and the Indians as the giant with "the big feet," hunted bears as early as 1775 a few miles southeast of Castalian Springs, Sumner County. Ramsey (1853, p. 450) states that a party of 20 hunters from Eatons Station [Nashville] traveled up the Cumberland River to the region between Caney Fork and Flynns Lick Creek [Smith, Putnam, and Jackson Counties], where they killed 105 bears during the winter of 1782. Putnam (1859, p. 296) writes that "bears and wolves were found in great numbers for a half-a-dozen years after the first settlements in the Harpeth Hills," 10 or 12 miles south of Nashville. During one winter Capt. John Rains "killed 32 bears within 7 miles of the Bluff, mostly in Harpeth Knobs, South of Nashville" (Putnam, 1859, p. 122). William Neelly, who had established a station for making salt at Neellys Bend of the Cumberland River, was killed by the Indians in 1788 on the night he

returned from a hunt for bear and buffalo meat for the workers (Putnam, 1859, p. 117). The records of Sumner County for 1787 show that "good fat bear meat" was accepted for taxes at 14 pence per pound, if delivered where troops were stationed (Putnam, 1859, p. 252).

Francis Baily (Williams, 1928, p. 407) mentions that while traveling the trail between Duck River and Nashville he heard bears and wolves howling on July 29, 1797. Andrew Michaux also records (Williams, 1928, p. 335) that bears were present in 1799 in the vicinity of Nashville. Abraham Steiner and Christian Frederic de Schweinitz wrote in their journal (Williams, 1928, pp. 504, 505, 519) that a bear was killed on November 24, 1799, near Drowning Creek and that John Binkley's party killed three bears the following day near Flat Rock [Cumberland County]. These two missionaries also mention that a Mr. Shaw, at whose cabin they stayed for one or two days, hunted bears in the vicinity of the Caney Fork road [Putnam County].

Black bears could be found without difficulty in 1881 in the mountains 15 or 20 miles from Chattanooga (Cee, 1881, p. 309). A few bears were reported in 1880 (Antler, p. 306) in the Caney Fork district, Van Buren County. Edward I. Mullins reported to me that a bear was seen about 1910 on his father's farm near Huntsville, Scott County, and that he had followed the tracks for a short distance. W. M. Perrygo was told by a local resident that a female and her cubs were killed in 1905 about 6 miles east of Waynesboro, Wayne County. This was the last bear seen in that vicinity. While collecting in Cumberland County, Perrygo was informed that a bear had been killed in 1921 near Crossville.

Black bears were plentiful for many years in the western part of the State. In his account of a voyage down the Mississippi River in 1700, Father James Gravier mentioned (Williams, 1928, p. 68) that "a quantity of bears" had been killed the preceding year at Fort Prud'homme [above Memphis]. While on his journey up the Mississippi River in 1723, Diron d'Artaguet camped a league above the second "Ecores à Prud'homme" [above Memphis, between the mouths of the Hatchie and Coal Creeks] where a "fat she bear of enormous size" was killed on March 23 (Williams, 1930, p. 10). Henry Rutherford and his guide, while surveying a large tract of land in 1785 on the south side of Forked Deer River, Lauderdale County, killed bears and other game for food (Williams, 1930, p. 44). David Crockett (1834, pp. 81, 92, 101), in relating his hunting experiences in the lowlands of Obion County, said that he killed bears in Obion County as early as 1822, and this county, longer than any other, remained a good hunting ground for bears and deer (Wil-

liams, 1930, p. 153). Crockett mentioned that in 1825 he killed four bears on one day and 105 in less than a year. During the year 1820, it is reported (Williams, 1930, p. 156) that Reuben Edmondson and John Bradshaw killed 85 bears in Weakley County. Benjamin Porter, Jr., born June 12, 1820, at Porters Gap, is said to have killed more than 100 bears in Lauderdale County during his lifetime (Williams, 1930, p. 161). From Benjamin C. Miles, Rhoads (1896, p. 199) learned that a bear killed in 1865 appeared to be the last record for Haywood County, though bears were occasionally killed in Lauderdale County as late as 1895.

Family PROCYONIDAE

PROCYON LOTOR VARIUS Nelson and Goldman: Alabama Raccoon

Although raccoons are still numerous in some districts in Tennessee, they were even more plentiful when the first settlers arrived. Lt. Henry Timberlake (Williams, 1927, p. 71) wrote in his journal under date of January 2, 1762, that raccoons were numerous in the vicinity of Tellico River, Monroe County. On March 31, 1785, an act was passed by the General Assembly of the State of Franklin that made lawful the payment of land taxes in pelts and other specified commodities. The value of a raccoon skin was fixed at 1 shilling 3 pence (Ramsey, 1853, p. 297). On account of the deranged currency and the scarcity of specie or notes of specie-paying banks, the General Assembly of the State of Franklin passed an act authorizing the payment of salaries to civil officers in pelts beginning January 1, 1788. The salary of the secretary to the Governor was fixed at 500 raccoon skins (Williams, 1924, p. 215).

Five specimens from Greenbrier, Sevier County, are listed by Komarek and Komarek (1938, p. 149). They report that raccoons occur in the Great Smoky Mountains at all elevations but are more numerous at lower altitudes.

About 40 years ago Rhoads (1896, p. 197) stated that raccoons were "excessively abundant in the bottoms of West Tennessee." Raccoons were reported in 1937 to be quite rare in Fayette County. They are said to be fairly numerous, however, in the swamps along the Loosahatchie River, Shelby County, and along the bottoms of Obion River in Dyer and Obion Counties. Tracks were seen by Perrygo and Lingeback during April 1937 along a creek in a hardwood swamp near Reelfoot Lake, Obion County. Raccoons were reported (Will, 1884, p. 106) as being abundant near Savannah, Hardin County, during the winter of 1883-84. Local residents near Waynesboro in 1937 stated that raccoons were becoming scarcer in Wayne County. A few are caught each year near Crossville.

Benton County: Big Sandy, 1.

Montgomery County: Clarksville, 1.

Shelby County: Arlington, 1.

Family MUSTELIDAE

MARTES PENNANTI PENNANTI (Erxleben): Eastern Fisher, or Peka

Although Dr. C. Hart Merriam (1888, p. 459), after having accompanied Henry Gannett, of the U. S. Geological Survey, several hundred miles through the Great Smoky Mountains of Tennessee and North Carolina, reported that the pekan was unknown in 1887 to local residents, reliable information exists that this animal formerly occurred in that area. Audubon and Bachman (1846, vol. 1, p. 314) refer to the former presence of the fisher as follows: "We have seen several skins procured in east Tennessee and we have heard of at least one individual that was captured near Flat Rock [? Cumberland County] in that State, latitude 35°." The Flat Rock was a well-known landmark when the wagon road from Clinch River to Nashville was opened for travel in 1795. Latitude 35°, however, is approximately the southern boundary of the State.

MUSTELA FRENATA NOVEBORACENSIS (Emmons): New York Weasel

The available specimens of this weasel were all taken in the eastern half of the State. Rhoads (1896, p. 196), however, states that it "is said to be common in west Tennessee." A weasel was taken at an altitude of 3,800 feet near Shady Valley on June 13, 1937, in a large-size Schuyler trap nailed to the trunk of an oak tree. Another weasel was trapped on Roan Mountain during September 1937 in a balsam-fir forest. Local residents in 1937 reported to Perrygo that weasels were fairly numerous at lower altitudes in the valleys of eastern Tennessee.

Curiously enough, the three weasels in the National Museum collection from the Allegheny Mountains of West Virginia, as well as the two collected in eastern Tennessee by the Museum party in 1937, are all somewhat darker than the Campbell and Hamilton County specimens. The coloration of the upper parts of these five specimens approaches Prout's brown or sepia. This coloration is of doubtful significance, since three specimens from 6,000 feet elevation on Roan Mountain, N. C., as well as five others from Magnetic City at the foot of Roan Mountain, have the usual cinnamon-brown coloration. Furthermore, in a series of 37 specimens from localities in Maryland, Virginia, and the District of Columbia, a young male and a young female have this dark-colored pelage.

Specimens from Lower Ramsey Branch of the Little Pigeon River, from Pinnacle in Sevier County, and from Knoxville in Knox County are referred tentatively to the southern weasel (*M. n. notia*) by Komarek and Komarek (1938, p. 150).

Campbell County: Highcliff, 1.

Carter County: Roan Mountain, altitude 6,100 feet, 1.

Hamilton County: Walden Ridge, near Soddy, 3.

Johnson County: Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,800 feet, 1.

MUSTELA VISON VISON Schreber: Mountain, or Black, Mink

The early records seem to indicate that the dark-colored mink was formerly common in the mountainous portion of eastern Tennessee. Under an act of the General Assembly of the State of Franklin, the remuneration of a constable serving a warrant was fixed at one mink skin beginning January 1, 1788 (Williams, 1924, p. 215). W. M. Perrygo was told in 1937 that a few minks are taken on Roan Mountain by local trappers, but that they are not so abundant as formerly. One mink was trapped and another seen in 1933 at Greenbrier, Sevier County (Komarek and Komarek, 1938, p. 150).

MUSTELA VISON MINK Peale and Beauvois: Common, or Brown, Mink

Minks were formerly generally distributed over most of Tennessee. In many localities they are now rather scarce, and high prices for pelts about 1920 almost resulted in their extermination in some counties. Minks were reported (Will, 1884, p. 106) very abundant near Savannah, Hardin County, during the winter of 1883-84. Local trappers reported in 1937 that minks were becoming rare in Shelby and Fayette Counties. Perrygo likewise learned from trappers that minks are caught occasionally in the vicinity of Reelfoot Lake, Obion County. Rhoads (1896, p. 198) lists a specimen from Open Lake, Lauderdale County.

LUTRA CANADENSIS INTERIOR Swenk: Mississippi Valley Otter

The otter doubtless occurred throughout Tennessee in early times, but persistent trapping by the early hunters and settlers soon reduced its numbers. No specimens have been received by the U. S. National Museum from the State, and it is therefore impossible to identify with certainty the race that may occur there now.

While residing with the Cherokee Indian chief Ostenaco at the mouth of Tellico River, Monroe County, Lt. Henry Timberlake on January 2, 1762, made a note in his journal (Williams, 1927, p. 69) concerning "brooks well stored with fish, otters, and beaver." Under an act of the General Assembly of the State of Franklin, passed and

signed on March 31, 1785, the value of a cased otter skin was fixed at 6 shillings and that of an uncased skin at 5 shillings (Ramsey, 1853, p. 297). The same Assembly in 1788 fixed the salary of the State treasurer at 450 otter skins (Williams, 1924, p. 215).

B. C. Miles reported to Rhoads (1896, p. 197) that he had seen an otter that was killed at Open Lake, Lauderdale County, during the winter of 1895. Rhoads also learned that otters were often seen by hunters at Reelfoot Lake.

SPILOGALE PUTORIUS (Linnaeus): Alleghenian Spotted Skunk

Howell (1909, p. 65) states that the spotted skunk was reported scarce in the vicinity of Briceville, Anderson County. Komarek and Komarek (1938, p. 150) list one specimen that was taken in the Great Smoky Mountains National Park but give no definite locality.

Campbell County: Highcliff, 1.

Sullivan County: Holston Mountains, head of Fishdam Creek, 1.

MEPHITIS MEPHITIS NIGRA (Peale and Beauvois): Eastern Skunk

The eastern skunk seems to be distributed in Tennessee west of the southern Allegheny Mountains. It occasionally takes up residence under a house or barn but generally is found in its own burrows or in abandoned burrows of some other animal. These are usually located in rocky terrain hidden by thickets or in clumps of brush at corners of rail fences. Rhoads (1896, p. 199) was told that skunks were "rare in the Mississippi lowlands" and reported that he "rarely detected the signs of this animal in Tennessee, though everyone seems to be acquainted with the animal in all localities visited except, perhaps, on the summits of the highest mountains." Perrygo reports that he saw no crushed skunks on the roads over which the Museum party drove their car during 1937 and that the familiar odor was not noted at any time except in the case of one taken in Lincoln County. This skunk was trapped in a rock ledge partially hidden in a hedgerow consisting of scrub cedar, briers, and cacti near farm buildings west of Fayetteville. Near Waynesboro one was killed in the deciduous woods on a rather dry hillside. Skunks were reported to be fairly common in Wayne County, but more skunks were said to be present in Lincoln County than in any other part of the State visited by the Museum party. The specimen from Campbell County, although not typical, is referred to *nigra* rather than to *elongata*, which occurs in eastern West Virginia.

Campbell County: Highcliff, 1.

Lincoln County: 2 miles west of Fayetteville, 1.

Wayne County: Waynesboro, 1.

MEPHITIS MEPHITIS ELONGATA Bangs: Florida Skunk

Five specimens taken in Sevier County at Greenbrier and Pinnacle are referred to the southern skunk by Komarek and Komarek (1938, p. 150).

Family CANIDAE

VULPES FULVA FULVA (Desmarest): Red Fox

The red fox seems not to have been one of the native mammals of Tennessee, but it has been introduced into various sections of the State at different times by those interested in hunting with hounds. Perrygo was told that red foxes have been liberated recently in a number of localities. Local residents informed him that red foxes were plentiful in the vicinity of Waynesboro, Wayne County, but that they were not common near Crossville, Cumberland County.

Contrary to general belief, Rhoads (1896, p. 200) states that the red fox was "always numerous in the mountains" but "has spread with increasing population into west Tennessee, where it was unknown to the early pioneers." Benjamin C. Miles is authority for the statement that this fox was introduced or migrated into Haywood and Lauderdale Counties about 1845.

Komarek and Komarek (1938, p. 150) mention a red fox that was found dead along Dudley Creek, Sevier County. From the Blount County Fox Hunters' Association they obtained information that in the years 1924 to 1926 approximately 150 red foxes were shipped from Waterloo, Minn., and liberated in the Chilhowee Mountains at several localities in the area between Sevierville and the Tennessee River.

UROCYON CINEREOARGENTEUS CINEREOARGENTEUS (Schreber):
Gray Fox

The gray fox in former times occurred in most sections of the State and is still common in many localities. Hunting with hounds has resulted in the reduction and in some cases the extermination of this fox in the vicinity of thickly settled regions.

Lt. Henry Timberlake (Williams, 1927, p. 71) mentions that foxes were very abundant in 1762 along the Little Tennessee River near the mouth of Tellico River. Ramsey (1853, p. 206) states that when the first settlers came to the Bluff [Nashville] in 1780 foxes were present in the vicinity.

Under the act of March 31, 1785, of the General Assembly of the State of Franklin, the value of a fox skin was fixed at 1 shilling 3 pence (Ramsey, 1853, p. 297).

Local residents reported to Perrygo that gray foxes are occasionally caught in Fayette and Shelby Counties. He was told that gray foxes were still plentiful in the vicinity of Waynesboro, Wayne County. Similarly, trappers residing near Crossville informed him that this fox was no longer caught very often in Cumberland County.

In eastern Tennessee, Rhoads (1896, p. 200) states that the gray fox "sometimes courses over the balsam belt of Roan Mountain, when pursued by dogs, but does not reside at so great an altitude." Arthur Stupka, park naturalist, has informed me that specimens from Cades Cove, Blount County, and Elkmont, Sevier County, have been acquired by the museum of the Great Smoky Mountains National Park and that he has sight records from Gatlinburg, Sevier County, and elsewhere in the park. His observations indicate that the gray fox outnumbers the red fox at elevations below 2,000 feet.

Benton County: Big Sandy, 1.

Hamilton County: Walden Ridge, near Soddy, 2.

CANIS LUPUS LYCAON Schreber: Gray Wolf

Wolves, although once numerous, were exterminated in many sections of Tennessee many years ago. Unfortunately there are few published records.

The first recorded mention of wolves in eastern Tennessee appears to be that of James Needham (Williams, 1928, p. 27), who in 1673 saw wolves while traveling from near the present site of Trade, Johnson County, to the Cherokee Indian town Chota in what is now Monroe County. While engaged in carrying out a peace treaty with the Cherokee Indians, Lt. Henry Timberlake wrote in his journal (Williams, 1927, p. 71) under date of January 2, 1762, near the mouth of Tellico River, Monroe County, that there were an incredible number of wolves. Dr. C. Hart Merriam (1888, p. 459) wrote, after his trip through the region in 1887, that wolves were present in the Smoky Mountains. Rhoads (1896, p. 200) states that a wolf was seen during the winter, about 1883, near the Cloudland hotel on Roan Mountain and that a few may persist in the southern Alleghenies. Early settlers in the vicinity of Shady Valley, Johnson County, resorted to the use of high pen traps baited with live sheep to rid the country of wolves. Perrygo was shown the location of some of these trapping sites in the Holston Mountains. These pens were constructed of logs and built so that one side abutted against some abrupt cut in a gradual hill slope. A pack of wolves, having scented the bait, generally came down the slope and jumped into the pen, from which they could not escape. The trapped wolves were then killed with a gun or club.

References to wolves are more numerous in the early records of middle Tennessee. Ramsey (1853, p. 206) mentions that wolves were present in 1780 in the vicinity of the Bluff [Nashville]. Other records show that wolves were so numerous at the time the Nashville settlements were established that the settlers were compelled to build pens as traps. During the winter of 1788, when many of the settlers had sought refuge from the Indians at Rains Station [on Browns Creek, 2½ miles south of Nashville], the hunters, men and boys, would "occasionally visit their wolf and turkey pens" (Putnam, 1859, p. 296). An entry in the journal of André Michaux (Williams, 1928, p. 335) written at Nashville on June 21, 1795, indicates that wolves were present in the vicinity. Francis Baily (Williams, 1928, p. 407), while traveling the trail from Duck River to Nashville, mentions hearing the howling of wolves on June 29, 1797. In John Lipscomb's journal (Williams, 1928, p. 276) under date of June 29, 1784, it is recorded that two big buffalo bulls followed by a wolf were seen at a lick near Little Barren River [Macon County, Tenn., or Allen County, Ky.]. Abraham Steiner and Christian Frederic de Schweinitz, while traveling eastward on the Caney Fork road, stopped for a day or so at the cabin of a Mr. Shaw. Under date of December 12, 1799, they wrote in their journal (Williams, 1928, p. 519) that "here [Smith or Putnam County], in proximity to the wilderness, there are deer, bear, and wolves in great numbers." Williams (1930, pp. 96, 180) writes that in 1819 wolves attacked pigs, young calves, and fawns and that bounties were paid to the trappers and hunters for scalps of wolves. Audubon and Bachman (1851, vol. 2, p. 129) describe a pit trap that was used in Kentucky, and it is quite likely that similar wolf pits were constructed in western and middle Tennessee. In 1880 (Antler, p. 306) it was reported that gray wolves were occasionally found in the Caney Fork district, Van Buren County. It was reported to W. M. Perrygo that a female and her pups had been killed about 1917 near Waynesboro, Wayne County. Another wolf was killed in 1919 on North Fork River, Cumberland County.

No specific mention of gray wolves has been found in the early accounts of western Tennessee. Benjamin C. Miles (1895, p. 182) supposed that the large gray wolf extended its range into the river bottoms of Lauderdale County about 1890 or 1891. Subsequently he learned from Major Shaw (Rhoads, 1896, p. 200), an old hunter of Haywood County, that the latter had "captured a litter of seven wolf pups, three of which were gray and four black." Major Shaw was inclined to believe that the "big gray wolf has always been here and some favorable circumstance must have developed his numbers."

Some time later Miles wrote Rhoads (1896, p. 200) that two wolves had been poisoned about December 10, 1895, within 7 miles of Brownsville, Haywood County.

CANIS RUFUS FLORIDANUS Miller: Florida Red Wolf

A right mandible (U.S.N.M. no. 200145), referred to this wolf, was found by Clarence B. Moore in 1914-15 a short distance above Chattanooga in debris from the Citico aboriginal mound near Citico Creek, Hamilton County. It is quite likely that this red wolf ranged over southeastern Tennessee at least until the time of the arrival of the first white traders, since iron-blades manufactured by the whites were found at this site (Moore, 1915, pp. 373-374).

CANIS RUFUS GREGORYI Goldman: Mississippi Valley Wolf

The specific identity of the gray and black wolves of Tennessee is quite puzzling in view of conflicting statements. According to Benjamin C. Miles (1895, p. 182) the small black wolf was exterminated about 1870 in Haywood and Lauderdale Counties. Major Shaw (Rhoads, 1896, p. 200) says that "our present wolf is larger and very much fiercer than those of my childhood, at least those specimens were which came under my observation." Audubon and Bachman (1851, vol. 2, p. 130) refer to having seen black wolves on trips through southern Kentucky and mention one hunter who had trained a black wolf to trail deer. No specimens are available for examination. It is known, however, that the black phase is quite common in this species of wolf. Goldman (1937, p. 44) states that "a specimen from Cherokee, Colbert County, northwestern Alabama, is somewhat intermediate, but in heavy dentition is nearer *floridanus*."

CANIS LATRANS Say: Coyote

Coyotes are reported to have been introduced in Tennessee in recent years, though no information is at present available as to the source where they were obtained. A female killed in Maury County was acquired by the Tennessee State Museum in 1930. According to an item that appeared in the Migrant,² "it is believed that it is from a stock of coyotes that were liberated in west Tennessee at Grand Junction [Hardeman County] for the purpose of training hounds." The Bureau of Biological Survey obtained from Earl May the skin and skull of a female killed on May 23, 1931, at McCains.

Maury County: McCains, 1.

² Quart. Publ. Tennessee Orn. Soc., vol. 1, nos. 3-4, p. 19, Dec. 1930.

FELIS CONCOLOR COUGUAR Kerr: Cougar, Panther, or Eastern Mountain Lion

An entry in the journal of Lt. Henry Timberlake (Williams, 1927, p. 71) under date of January 2, 1762, indicates that panthers were numerous at that date in the vicinity of Tellico River, Monroe County. Dr. C. Hart Merriam, however, reported in 1888 (p. 459) that the panther was unknown in the Great Smoky Mountains region of Tennessee and North Carolina. Perrygo was told that a panther had been killed in 1929 in the Holston Mountains near Shady Valley, Johnson County. Another panther was seen crossing the trail on Roan Mountain on September 18, 1937.

Ramsey (1853, p. 206) states that panthers were present in 1780 in the vicinity of the Bluff [Nashville]. While staying at the home of a Mr. Shaw on the Caney Fork road [? Smith County], Abraham Steiner and Christian Frederic de Schweinitz wrote on December 12, 1799, that panthers were present in that vicinity. A panther was seen on May 30, 1937, by local residents on North Fork River near Crossville, Cumberland County.

Williams (1930, p. 96) writes that panthers were present in western Tennessee in 1819. Some years later Benjamin Porter, Jr., is reported to have killed on one day four full-grown panthers, which averaged $9\frac{1}{2}$ feet in length, in Lauderdale County (Williams, 1930, p. 161). Hallock (1877, p. 153) stated that the canebrakes of Shelby County afforded fine grounds for hunting panthers. It is also reported that a panther measuring $7\frac{1}{2}$ feet from tip to tip was killed by Robert H. Weaver on Wheatley's plantation, 8 miles south of Memphis (Anon., 1880, p. 11). Benjamin C. Miles reported to Rhoads (1896, p. 201) that a few panthers were said to occur in the most impassable brakes and "harricanes" of the bottoms of Lauderdale County.

LYNX RUFUS RUFUS (Schreber): Bobcat, or Wild Cat

The first mention of wild cats occurring in the State of Tennessee appears to be that recorded by Abraham Steiner and Christian Frederic de Schweinitz. On December 12, 1799, they recorded in their journal (Williams, 1928, p. 519) that wild cats occur near the Caney Fork road [Smith or Putnam County]. Williams (1930, pp. 96, 180) records the occurrence in 1819 of wild cats and catamounts in western Tennessee.

Perrygo was informed by local residents that wild cats are occasionally trapped in cypress swamps in Fayette and Shelby Counties. In the vicinity of Waynesboro, Wayne County, it was reported that there were still a few wild cats on the ridges and that a female had been killed there during March 1937. Local residents in the vicinity of

Crossville reported that there were relatively few wild cats in Cumberland County. The specimens from Walden Ridge are indistinguishable from those taken in eastern West Virginia.

Tracks were seen by Perrygo and Schaefer during September 1937 on Roan Mountain, and they were told that wild cats were not abundant in the Great Smoky Mountains. Komarek and Komarek (1938, p. 151), however, report that wild-cat tracks were frequently seen in Sevier County near Mount Guyot and on Brushy Mountain. Three specimens were taken by their party at Greenbrier, Sevier County. Wild cats are frequently trapped in the Cherokee National Forest. The Florida wild cat (*Lynx rufus floridanus*) may occur in this forest.

Hamilton County: Walden Ridge, near Soddy, 3.

Family SCIURIDAE

MARMOTA MONAX MONAX (Linnaeus): Southern Woodchuck, or Groundhog

During April and May 1937 Perrygo and Lingeback learned that a few woodchucks were to be found in the bluffs bordering the Mississippi River lowlands but that they were not common in any of the western counties drained by the small tributaries of the river. One was seen April 29, 1937, crossing the road northeast of Hornbeak, Obion County. In 1895, Benjamin C. Miles informed Rhoads (1896, p. 193) that woodchucks were very rare in Haywood County. As far back as the oldest residents could recall, no woodchucks have been found in Fayette and Shelby Counties.

In middle Tennessee, two were seen during May 1937 near Waynesboro, Wayne County. Local residents near Crossville reported to Perrygo in May 1937 that woodchucks were rather scarce in Cumberland County. On the western slope of the Clinch Mountains, a few occur in the farming sections near the Clinch River, Grainger County. According to Howell (1909, p. 60) woodchucks were reported as being common in Anderson County on Cross Mountain and in Hamilton County on Walden Ridge near Soddy. They also occur on the ridge between Fayetteville, Lincoln County, and Pulaski, Giles County.

Woodchucks appear to be slightly more abundant in eastern Tennessee. Perrygo and Lingeback found that there were a few living in the hedgerows bordering farming land in Shady Valley, Johnson County. Woodchucks were reported as being not at all abundant in the Great Smoky Mountains. A few were seen in the rocky ground between hemlock woods (altitude 2,700 feet) and an old abandoned field at Low Gap, 4½ miles southeast of Cosby, but only

one was trapped. In eastern Tennessee, according to Rhoads (1896, p. 193), the vertical range of the woodchuck does not extend upward into the fir belt, which begins approximately at an elevation of 5,000 feet. Two woodchucks were taken by the Museum party, however, during September 1937 at Carvers Gap on a bald spot at an altitude of 5,500 feet. A specimen from Greenbrier, Sevier County, is listed by Komarek and Komarek (1938, p. 151).

A few woodchucks occur along the edges of mixed deciduous and pine woods on Big Frog Mountain, Polk County, where no farming has been carried on for a great many years. In this region the vertical range of this animal goes up to at least 2,500 feet.

Campbell County: Highcliff, 1.

Carter County: Carvers Gap, Roan Mountain, altitude 5,500 feet, 2.

Cocke County: Low Gap, 4½ miles southeast of Cosby, altitude 2,700 feet, 1.

Humphreys County: Duck River, 6 miles southwest of Waverly, 1.

Polk County: Big Frog Mountain, 12 miles west of Copperhill, altitude 1,800 feet, 1.

Stewart County: Dover, 1.

TAMIAS STRIATUS STRIATUS (Linnaeus): Southeastern Chipmunk

Very few chipmunks were seen in Tennessee by the Museum party. Several were observed during June 1937 at an altitude of 3,800 feet in oak and beech woods on the Holston Mountains, 4 miles northeast of Shady Valley, Johnson County. Chipmunks appear to be more numerous here than at any other locality visited in 1937. Two were seen September 18, 1937, at an altitude of 4,000 feet on Roan Mountain, Carter County. One was seen during June 1937 at an altitude of 2,700 feet on Low Gap southeast of Cosby, Cocke County. Komarek and Komarek (1938, p. 152) state that chipmunks are common in the deciduous woods of the Great Smoky Mountains and list specimens from Eagle Rocks Prong of Little Pigeon River, Greenbrier, Horseshoe Mountain (about 3 miles east of Mount LeConte and 1½ miles north of Mount Kephart), Mount Harrison, and Porters Flats in Sevier County, and also from Thunderhead in Blount County. Rhoads (1896, p. 194) observed chipmunks at Johnson City, Washington County, and at Greeneville, Greene County. Howell (1909, p. 59) states that chipmunks were reported to occur at Highcliff, Campbell County, and on Walden Ridge near Soddy, Hamilton County, and that one was seen on Coal Creek in Anderson County.

In middle Tennessee, Rhoads observed chipmunks at Nashville, Davidson County, and mentioned two specimens taken at Warner, Hickman County, during November and December. No chipmunks were seen by Rhoads "at Chattanooga or Knoxville, nor on the Cumberland plateau." Perrygo reports that a few chipmunks were noted

in a hardwood forest 8 miles northeast of Waynesboro, Wayne County. Two were seen near Dover, Stewart County, October 30, 1937.

According to Rhoads, observations (1896, p. 193), chipmunks were "very sparingly and irregularly distributed in the lowlands of Tennessee." He observed them near the springs at Raleigh and along the road from Raleigh to Bartlett, Shelby County. Benjamin C. Miles informed Rhoads that he saw five or six chipmunks every summer near Brownsville, Haywood County. Chipmunks were not found to be very numerous in the sections of Obion and Lake Counties visited in 1937.

Hickman County: 1.

Johnson County: Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,800 feet, 1.

Montgomery County: east of Clarksville, 1; Dunbars Cave, Clarksville, 4.

Obion County: Reelfoot Lake, Samburg, 1.

Stewart County: Cumberland River near Dover, 1.

Wayne County: 8 miles northeast of Waynesboro, 2.

TAMIASCIURUS HUDSONIUS ABIETICOLA Howell: Cloudland Red
Squirrel, Pine Squirrel, or Boomer

No red squirrels were seen by the Museum party outside of the hemlock, spruce, and fir forests of eastern Tennessee, except in the pine woods of the Cherokee National Forest. One was seen during June 1937 at an altitude of 2,900 feet in a hemlock bog near Shady Valley. Rhoads (1896, p. 196) reports that "owing to the severe winter of 1894-95, the 'Boomer' was very scarce in its usual haunts on the summit of Roan Mountain." Red squirrels were rather scarce in 1937 in the balsam-fir and beech forests on Roan Mountain, Carter County, but Perrygo and Schaefer succeeded in collecting a few specimens. In the Great Smoky Mountains district it required considerable effort on the part of Perrygo, Lingebach, and Schaefer to collect even a few red squirrels in the balsam-fir forests on Mount Guyot, Old Black Mountain, and Inadu Knob. They were nowhere numerous, and local residents were of the opinion that red squirrels would be exterminated within a few years. Komarek and Komarek (1938, p. 152), however, report that red squirrels were abundant in 1931 and 1932 in the deciduous and evergreen forests of the Great Smoky Mountains and list specimens from the following localities in Sevier County: Buck Fork and Ramsey Prong of Little Pigeon River, Dry Sluice [Gap] (intersection of Richland Mountain with Tennessee-North Carolina boundary line), Greenbrier, Horseshoe Mountain, Mount Guyot, and Porters Flats. One was seen during July 1937 in pine woods at an altitude of 4,100 feet on Big Frog Mountain, Polk County.

Carter County: Roan Mountain, altitudes 5,000 to 6,100 feet, 4.

Cocke County: Inadu Knob, altitudes 4,500 to 5,900 feet, 7; Mount Guyot, altitude 6,500 feet, 2; Snake Den Mountain, altitude 4,500 feet, 1.

Sevier County: Indian Gap, altitude 5,200 feet, 2.

SCIURUS CAROLINENSIS CAROLINENSIS Gmelin: Gray, or Cat, Squirrel

The gray squirrel was formerly one of the commonest and most widely distributed mammals in Tennessee. It frequents not only the moist bottomlands and swamps, where there is an abundance of nut-bearing deciduous trees, but is also found on wooded hills and the lower mountain slopes. Four gray squirrels were seen and two collected in deciduous woods on Poor Valley Ridge, Clinch Mountains, Grainger County. Although both of these are young individuals, they appear to resemble *carolinensis* more closely than *leucotis*.

The gray squirrel is no longer abundant in the more settled parts of middle Tennessee. André Michaux (Williams, 1928, p. 335) refers to the presence in 1795 of small gray squirrels in the vicinity of Nashville. Four years later, Abraham Steiner and Christian Frederic de Schweinitz (Williams, 1928, p. 516) comment on the "tremendous number of squirrels" in the Cumberland settlements in the vicinity of Nashville. The Museum party did not collect or see any gray squirrels in middle Tennessee, except in the vicinity of Fayetteville, Lincoln County, where six were seen and two collected, and in the deciduous woods 8 miles north of Indian Mound, Stewart County, where two were seen.

Gray squirrels were fairly common in some parts of southwestern Tennessee. Only a few were actually seen, however, near Hickory Withe, Fayette County, during April 1937. Benjamin C. Miles (Rhoads, 1896, p. 196) in describing the migrations of gray squirrels from Arkansas to Tennessee states that he has "seen them exhausted and wet on the east bank of the Mississippi River." This would indicate that gray squirrels can swim considerable distances when necessary.

The hind feet of the specimens from Big Sandy average larger than those taken in the southern part of the State. The average measurements of 10 males from this locality are as follows: Total length, 453.5 (428-480); tail, 215.9 (207-230); hind foot, 66.2 (63-68). For six females from the same locality the average measurements are: Total length, 475.5 (460-485); tail, 225.3 (220-230); hind foot, 66.3 (63-68).

Benton County: Big Sandy, 18.

Campbell County: Highcliff, 4.

Fayette County: Hickory Withe, 1.

- Grainger County:** Poor Valley Ridge, Clinch Mountains, 3 miles northeast of Rutledge, altitude 1,200 feet, 2.
Hamilton County: Walden Ridge near Soddy, 3.
Lincoln County: 3 miles south of Fayetteville, 1; 3 miles north of Fayetteville, 2.
Shelby County: Arlington, 7.

SCIURUS CAROLINENSIS LEUCOTIS Gapper: Northern Gray Squirrel

Although not typical, the specimens from the southern Alleghenies and the Great Smoky Mountains in eastern Tennessee are referred to *leucotis*, since they resemble those taken on the north in the mountainous sections of eastern West Virginia in the predominance of whitish-tipped or whitish-gray-tipped hairs in the tail as well as large hind feet. The measurements of two males are, respectively: Total length, 457, 452; tail, 220, 215; hind foot, 69, 68. For two females the measurements are, respectively: Total length, 451, 454; tail 203, 205; hind foot, 67, 67.

Gray squirrels appeared to be fairly numerous in eastern Tennessee during 1937, although it was reported to Perrygo that they were rapidly diminishing in numbers. One gray squirrel was seen and another one collected in oak and beech woods on the Holston Mountains. Rhoads (1896, p. 196) reports that he had seen the skin of one taken at an altitude of 4,000 feet on Roan Mountain. Gray squirrels have been taken along Fighting Creek, at Greenbrier, on Horseshoe Mountain (about 3 miles east of Mount LeConte and 1½ miles north of Mount Kephart), and along the Ramsey Prong of Little Pigeon River in Sevier County, and also on Russell Field, Blount County (Komarek and Komarek, 1938, p. 153). Six were seen and two collected in mixed hardwood and pine woods on Big Frog Mountain.

- Cocke County:** Snake Den Mountain, altitude 3,600 feet, 1; Inadu Knob, altitude 5,000 feet, 1.
Johnson County: Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,800 feet, 1.
Polk County: Sheeds Creek, Big Frog Mountain, 12 miles west of Copperhill, altitude 1,600 feet, 2.

SCIURUS NIGER NEGLECTUS (Gray): Northern Fox Squirrel

A few fox squirrels were reported to Perrygo to occur in the deciduous woods on the lower levels (altitude 1,500 to 2,000 feet) of Denny Mountains near Cosby, Cocke County. These are most likely referable to the northern race but can be only tentatively placed here until actual specimens are available for examination. These large, and generally white-bellied, long-tailed fox squirrels have been taken at two localities in Greenbrier County, W. Va., and should range southward in the southern Allegheny Mountains.

SCIURUS NIGER RUFIVENTER Geoffroy: Mississippi Valley Fox Squirrel

According to Benjamin C. Miles (Rhoads, 1896, p. 194) the fox squirrel is always found in big timber but prefers the gum and cypress trees in the swamps of Haywood and Lauderdale Counties. Fox squirrels appear to be most numerous in the northwestern corner of the State. During May 1937 one was seen near Union City, two were seen and one collected near Hornbeak, and one was collected on Green Island, Reelfoot Lake, Obion County. On returning to this county in October 1937, Perrygo saw two and collected one 3 miles south of Samburg. Perrygo learned from local residents that fox squirrels were no longer very numerous in Fayette and Shelby Counties. He was informed that none occur in the cypress swamp near Hickory Withe, Fayette County. Along the southern border of the State, a few fox squirrels were reported to occur in the woods south of Fayetteville, Lincoln County.

The upperparts of the skins from Obion and Lincoln Counties appear much darker than those from Campbell County. This condition appears attributable in part to wear, since the black subapical bands are more conspicuous than the grayish or buffy-gray hair tips. Howell (1909, p. 59) referred the small series from near the southern end of Pine Mountains in Campbell County to *Sciurus niger texianus*. The ground color of the upperparts of these specimens is more rufous than those from Obion County. As noted by Howell, five of these specimens have white noses and the underparts are rufous and not whitish like those referred to *neglectus*. Out of a series of 24 skins of *Sciurus niger neglectus* from eastern West Virginia, 14 have whitish underparts, 9 have the white underparts more or less suffused with yellowish or light rufous, and 1 has the underparts black. Three in this series have whitish noses. Howell also states that "fox squirrels are becoming scarce in many parts of the South, and specimens are often difficult to obtain."

Campbell County: Highcliff, 3 miles east of Jellico, 7.

Lincoln County: 3 miles south of Fayetteville, 1.

Obion County: Green Island, Reelfoot Lake, 1; Reelfoot Lake, 4 miles west of Hornbeak, 1; Reelfoot Lake, 3 miles south of Samburg, 1.

GLAUCOMYS VOLANS SATURATUS Howell: Southeastern Flying Squirrel

Flying squirrels are inhabitants of woods and generally reside in hollow trees, abandoned woodpecker holes, or cavities in stumps. Although rather active at night in good weather, they are seldom seen and frequently are common without their presence being generally known. In middle Tennessee, five were trapped in the deciduous woods along Birds Creek, 7 miles southwest of Crossville, Cumberland County. A dead young one was seen caught in a wire fence

at the same locality. Five were trapped in deciduous woods north of Waynesboro, Wayne County. Another one was trapped on an oak tree near Frankewing, Lincoln County. Howell (1918, p. 24) lists one specimen from Nashville, Davidson County.

In the southwestern corner of the State, four were trapped in the cypress swamp near Hickory Withe, Fayette County. Local residents did not know that flying squirrels were present in this area. In the lowlands of Haywood County flying squirrels were common according to B. C. Miles (Rhoads, 1896, p. 197), and in 1890 he routed 30 out of his martin box. Flying squirrels seemed to be less numerous in the northwestern corner of the State. Only two were trapped in Obion County, one on a beech tree south of Hornbeak and another one near Samburg.

This southern race resembles *volans* rather closely in external measurements, and typical specimens are darker than the latter. Most of the Tennessee specimens referred to this race have lighter upperparts than those from Alabama listed by Howell (1918, p. 25). The average measurements of eight males are as follows: Total length, 223.7 (211–237); tail vertebrae, 97.2 (93–101); hind foot, 30.1 (29–31). For 11 females the average measurements are: Total length, 221.7 (205–233); tail vertebrae, 94.5 (88–102); hind foot, 30.1 (28–32).

Cumberland County: 7 miles southwest of Crossville, 6.

Fayette County: Hickory Withe, 4.

Lincoln County: 6 miles southwest of Frankewing, 1.

Obion County: Reelfoot Lake, 3 miles south of Samburg, 1; Reelfoot Lake, 5 miles west of Hornbeak, 1.

GLAUCOMYS VOLANS VOLANS (Linnaeus): Small Eastern Flying Squirrel

These small flying squirrels appeared to be rather common in the Holston Mountains northeast of Shady Valley, for eight were taken in Schuyler traps nailed to the trunks of oak and beech trees at elevations of 3,000 to 3,800 feet. One was taken on the trunk of an oak tree at an altitude of 4,200 feet on Roan Mountain.

Specimens from Greenbrier, Sevier County, and Knoxville, Knox County, are listed by Komarek and Komarek (1938, p. 154).

Detailed comparisons of the series from the mountainous section of eastern Tennessee with a comparable series from eastern West Virginia failed to reveal any valid differences. It should be noted, however, that relatively few specimens from the southern Allegheny Mountains were available when Howell (1918) revised this genus. In the winter pelage, the toes and the fore parts of the feet are generally whitish in *volans* in contrast to the rather uniformly dark feet of *saturatus*, although the external measurements of this race do not differ appreciably from those of the latter. The

average measurements of five males are as follows: Total length, 217 (202-234); tail vertebrae, 91 (75-101); hind foot, 29.8 (28-31). For eight females the average measurements are: Total length, 230.7 (210-241); tail vertebrae, 102.6 (95-116); hind foot, 30.5 (29-32).

Carter County: Watauga Valley, 2; Roan Mountain, altitude 4,100 feet, 1.

Cocke County: Snake Den Mountain, altitude 4,700 feet, 1.

Johnson County: Holston Mountains, 3 miles northeast of Shady Valley, altitudes 3,000 to 3,800 feet, 6; Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,000 feet, 2.

Polk County: Big Frog Mountain, 12 miles west of Copperhill, altitude 2,000 feet, 1.

Wayne County: Waynesboro, 8 miles north, 6.

GLAUCOMYS SABRINUS FUSCUS Miller: West Virginia Flying Squirrel

The trapping of a male of this gray-faced flying squirrel on September 23, 1927, in a birch forest on the north slope of Roan Mountain, Carter County, extends the range of this race more than 200 miles south of Cranberry Glades, W. Va. This specimen was caught in a large-size Schuyler trap nailed to the trunk of a large birch tree. No additional information has been secured in regard to the habits of this flying squirrel.

Carter County: Roan Mountain, altitude 5,500 feet, 1.

Family CASTORIDAE

CASTOR CANADENSIS CAROLINENSIS Rhoads: Carolina Beaver

When the French, Virginia, and Carolina traders first visited the Indian settlements in what is now Tennessee, beavers were generally distributed in the watercourses over the whole State. Many traders were bartering for pelts long before 1700, but it is quite unlikely that any marked depletion of the beaver stock took place until after 1760.

Lt. Henry Timberlake, on his trip down the Holston River during December 1761 from Kingsport, Sullivan County, to a large cave below the present site of Three Springs Ford, Hamblen County, commented on the abundance of beavers along that watercourse (Williams, 1927, p. 47). The same traveler stated that beavers were plentiful along the Little Tennessee near the mouth of Tellico River (Williams, 1927, p. 69).

According to the verdict brought in by a jury and signed by Andrew Jackson, attorney for the State, the value of a beaver skin stolen in 1780 in Davidson County was given as 30 shillings (Lewis, 1903, pp. 294-295). This is rather interesting, for under the act of March 31, 1785, of the General Assembly of the State of Franklin,

the value of a "good, clean beaver skin" was fixed at 6 shillings (Ramsey, 1853, p. 297). The same Assembly fixed the salary of each county clerk at 300 beaver skins, the clerk of the House of Commons at 200 beaver skins, and members of the Assembly at 3 beaver skins, beginning January 1, 1788 (Williams, 1924, p. 215).

According to an entry in the journal of André Michaux (Williams, 1928, p. 335) under date of June 21, 1795, beavers were present in the vicinity of Nashville. Williams (1930, p. 96) states that in 1819 beavers were still present in western Tennessee, without giving any definite localities.

Rhoads (1896, pp. 192-193) examined a beaver house in the cypress swamp bordering Reelfoot Lake, about 3 miles west of Samburg, Obion County, and was told by his guide, H. B. Young, that there were 20 beavers in that district. B. C. Miles informed Rhoads that he knew of an inhabited beaver house within 9 miles of Brownsville, Haywood County.

Under the pen name "Will" (1884, p. 106), a resident of Savannah, Hardin County, wrote on February 11, 1884, as follows: "A few foxes and otters, several beavers, and multitudes of raccoons have been trapped here this winter. There are parties who make good wages trapping, as minks and 'coons are very abundant."

Family CRICETIDAE

REITHRODONTOMYS HUMULIS HUMULIS (Audubon and Bachman): Eastern Harvest Mouse

Although this harvest mouse is known at present from only one locality in the south-central part of the State, it is quite likely that it ranges over most of middle Tennessee. It seems to prefer old fields and tangled brier patches bordering cultivated fields, especially areas where there is an abundance of matted grass, broomsedge, or weeds. One was trapped at Giles in a cotton-rat runway in a pasture overgrown with broomsedge.

Six specimens are recorded by Komarek and Komarek (1938, p. 154) as having been taken in Sevier County in broomsedge areas around apple trees; another specimen was trapped in a similar field along Laurel Branch in Greenbrier.

Giles County: 6 miles east of Pulaski, 1.

PEROMYSCUS MANICULATUS BAIRDII (Hoy and Kennicott): Prairie White-footed Mouse

The discovery by Perrygo and Lingebach of this short-tailed white-footed mouse in Fayette County has extended its range in the Mississippi Valley at least 250 miles south of previously known Illinois records. Seven were trapped alongside of logs in a drained cypress

swamp near Hickory Withe. Inasmuch as the Campbell County specimens were taken near one of the smaller tributaries of the upper Cumberland River, this mouse may occur elsewhere along areas drained by that river.

For three males from Hickory Withe the measurements are, respectively: Total length, 153, 145, 141; tail, 60, 61, 59; hind foot, 18.5, 19, 18. The measurements of two females from Hickory Withe are, respectively: Total length, 166, 137; tail 67, 56; hind foot, 19, 19.

Campbell County: La Follette, 2.

Fayette County: Hickory Withe, 7.

PEROMYSCUS MANICULATUS NUBITERRAE Rhoads: Cloudland White-footed Mouse

The range of this mouse so far as known is restricted to the eastern part of the State, occurring chiefly at higher altitudes of the southern Alleghenies. Though most plentiful in forests of the Canadian Zone, they frequently occur at lower altitudes in rhododendron thickets bordering cold mountain streams. Contrary to the assumption of Rhoads (1896, p. 188) that the Cloudland deer mouse was "exclusively a dweller of the balsam or spruce belt," which crowns the summits of the southern Allegheny Mountains, it is now known to range downward into the hemlock timber as low as 2,700 feet.

Of the 14 taken during July 1937 by Perrygo and Lingeback near Shady Valley, 4 came from a hemlock and rhododendron bog behind camp (altitude 2,900 feet). The remainder were caught either among moss-covered boulders in a dense hemlock forest on the southeastern slope of Holston Mountains or in large-size Schuyler traps set for flying squirrels on the trunks of beech and oak trees (altitude 3,800 feet). These mice were found on the west slope of Roan Mountain in spruce and fir timber as low as 5,000 feet and up into the balsam fir forest at 6,300 feet, chiefly where there was a thick undergrowth of rhododendron. Near the foot of the west slope of Low Gap, these mice were trapped at an altitude of 2,700 feet around the moss-covered roots of hemlock trees. The sun never penetrates in this heavy hemlock timber, and the cool air may explain their presence at this low level. On Inadu Knob these mice were trapped at an altitude of 4,500 feet in a dense rhododendron undergrowth in hemlock and spruce woods and also at an elevation of 5,700 feet in birch and spruce. They are somewhat arboreal, for the majority of those collected on Inadu Knob were taken in large-size Schuyler traps nailed to trunks of spruce trees about 6 feet above the base. On the west slope of Mount Guyot and likewise on Old Black Mountain, these mice were caught in runways in the moss growing around the roots of balsam fir. On Snake Den Mountain, they were taken at an altitude of 3,700 feet along the banks of a swift mountain stream

in a dense growth of rhododendron in oak, birch, maple, and hemlock woods. At 4,500 feet they were trapped between the rocks around the roots of hemlock trees. Komarek and Komarek (1938, pp. 154-155) trapped this mouse in spruce forests along the divide of the Great Smoky Mountains and at lower elevations in shaded ravines and forested areas with dense crown. They list specimens from the following localities in Sevier County: Buck Fork, Chapman Prong, Eagle Rocks Prong, Ramsey Prong, and Walker Prong of Little Pigeon River, Brushy Mountain, Grassy Patch (on Alum Cave Creek, 2 miles east of The Chimneys), Greenbrier, Mount Guyot, and Silers Bald. Specimens were taken also at Russell Field and Thunderhead in Blount County.

This white-footed mouse may be recognized readily by its long penicillate tail. The average measurements of 10 males from Inadu Knob (2), Snake Den Mountain (2), Low Gap (1), and Roan Mountain (5) are as follows: Total length, 180.5 (174-185); tail, 92.5 (87-98); hind foot, 20.1 (20-21). For 12 females from Indian Knob (3), Low Gap (1), Snake Den Mountain (4), Roan Mountain (4) the average measurements are as follows: Total length, 182.9 (170-196); tail, 91 (76-98); hind foot, 20.45 (19.5-22).

Carter County: Roan Mountain, altitudes 5,000 to 6,300 feet, 11.

Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, altitudes 2,700 to 3,400 feet, 6; Inadu Knob, altitudes 4,500 to 5,700 feet, 13; Mount Guyot, altitude 6,300 feet, 1; Old Black Mountain, altitude 6,300 feet, 1; Snake Den Mountain, altitudes 3,700 to 4,500 feet, 11.

Johnson County: Holston Mountains, 3 miles northeast of Shady Valley, altitude 3,000 feet, 4; Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,800 feet, 5; Shady Valley, altitude 2,900 feet, 5.

Sevier County: Indian Gap, altitude 5,200 feet, 2.

Sullivan County: Holston Mountains, head of Fishdam Creek, 1.

PEROMYSCUS LEUCOPUS LEUCOPUS (Rafinesque): White-footed Deer Mouse

This white-footed mouse is generally found in upland woods but occurs also along the borders of poorly kept cultivated fields, especially where the hedgerows or fences are a tangled mass of bushes and briars. At higher elevations it has been found living in crevices in rock ledges. In the vicinity of Samburg, Rhoads (1896, p. 187) found that these mice "seemed to frequent the intermediate grounds between the overflowed bottoms and the bluff." Osgood (1909, p. 117) lists five specimens from Samburg, Obion County. Five were caught by Perrygo and Lingebach in wet boggy places in the deciduous woods near Reelfoot Lake, Obion County. Rhoads (1896, p. 187) trapped this mouse at Raleigh, Shelby County, and at Bellevue, Davidson County. They were rather numerous in sparse second-growth deciduous woods on the dry hillside north of Waynesboro,

Wayne County. Others were trapped in rock ledges in the woods along Birds Creek, south of Crossville, and in mixed pine and hardwoods on the Cumberland Plateau near Melvine. Near Pulaski and also at Frankewing, Perrygo trapped this mouse during November 1937 in patches of cacti growing on rocks in clumps of scrub cedar.

The average measurements of 12 males from Waynesboro (3), Frankewing (1), Crossville (2), Melvine (1), Big Sandy (1), and Reelfoot Lake (4) are as follows: Total length, 162.4 (152-171); tail, 71 (59-79); hind foot, 20 (19.5-21). For 7 females from Waynesboro (2), Pulaski (1), Big Sandy (2), Clarkesville (1), and Reelfoot Lake (1) the average measurements are: Total length, 170.5 (156-181); tail, 73.28 (67-83); hind foot, 20.2 (20-22).

Anderson County: Briceville, 1.

Benton County: Big Sandy, 9.

Cumberland County: Birds Creek, 7 miles southwest of Crossville, 2; Melvine, 1.

Davidson County: Nashville, 5.

Giles County: 10 miles east of Pulaski, 1.

Henderson County: Lexington, 2.

Houston County: Danville, 1.

Lincoln County: 6 miles east of Frankewing, 1.

Montgomery County: Clarksville, 4; Dunbars Cave, 1.

Obion County: Samburg, 1; Reelfoot Lake, 5 miles west of Hornbeak, 5.

Selby County: Arlington, 4.

Wayne County: 8 miles north of Waynesboro, 6.

PEROMYSCUS LEUCOPUS NOVEBORACENSIS (Fischer): Northern
White-footed Mouse, or Deer Mouse

The specimens from eastern Tennessee are not typical, although they do not differ appreciably from those taken in the mountainous section of eastern West Virginia. Two were taken on June 15, 1937, in a hemlock and rhododendron bog behind the camp at Shady Valley. At an altitude of 3,800 feet on the Holston Mountains, 4 miles northeast of Shady Valley, one was trapped in a large-size Schuyler trap nailed to an oak tree for flying squirrels.

For two males from Watauga Valley the measurements are, respectively: Total length, 161, 157; tail, 69, 66; hind foot, 20, 19.5. For two females from Johnson County and one female from Watauga Valley, the measurements are, respectively: Total length, 186, 172, 176; tail, 83, 83, 76; hind foot, 21.5, 22, 20. Komarek and Komarek (1938, p. 155) have commented on the difficulty of identifying subspecifically the white-footed mice of this area and refer specimens taken in Sevier County along Fish Camp Prong of Little River, at Greenbrier, and on Porters Flats provisionally to *Peromyscus leucopus leucopus*.

Carter County: Watauga Valley, 5.

Johnson County: Holston Mountains, 4 miles northeast of Shady Valley, altitude 3,800 feet, 1; Shady Valley, altitude 2,900 feet, 2.

PEROMYSCUS GOSSYPINUS MEGACEPHALUS (Rhoads): Rhoads's
Cotton Mouse, or Cane Mouse

The cotton mouse may occur in suitable localities throughout western and middle Tennessee. It seems to show some preference for cliffs and rocky bluffs, especially caves and crevices, and is found also in brushy thickets and timbered uplands, as well as in swampy areas. Rhoads (1896, p. 189) found this mouse abundant in deciduous woods with dense underbrush in the lowest and wettest parts of overflowed lands bordering Reelfoot Lake near Samburg, Obion County. In the vicinity of Big Sandy, G. A. Coleman trapped cotton mice in timbered bottomlands. The same collector caught others in traps set under rocks near the mouth of Dunbars Cave near Clarksville.

Cotton mice seem to prefer open woodlands and the growths of brush bordering old cultivated fields in the Great Smoky Mountains National Park, according to Komarek and Komarek (1938, p. 156). Specimens were collected by their field party at Greenbrier and along Fighting Creek near Gatlinburg in Sevier County.

This large-footed mouse resembles *leucopus* in general coloration but attains a somewhat larger size. For six males from Arlington (4) and Duck River (2) the average measurements are as follows: Total length, 189.4 (179–200); tail 84.5 (78–90); hind foot, 24.08 (23–25). The average measurements of nine females from Arlington (3), Big Sandy (1), Clarksville (4), and Duck River (1) are as follows: Total length, 190.7 (170–205); tail, 83.44 (78–92); hind foot, 23.55 (23–25).

Benton County: Big Sandy, 3.

Campbell County: Highcliff, 1.

Humphreys County: Duck River, 6 miles southwest of Waverly, 3.

Lawrence County: Lawrenceburg, 1.

Montgomery County: Clarksville, 7.

Shelby County: Arlington, 9.

PEROMYSCUS NUTTALLI NUTTALLI (Harlan): Northern Golden Mouse

The golden mouse may be recognized by its soft, thick pelage and heavily furred underparts, the white of the latter being suffused with ochraceous. At an altitude of 3,000 feet in a dense hemlock forest on the southeast slope of the Holston Mountains, golden mice were caught by Perrygo and Lingebach in traps set among moss-covered boulders. They have been taken along the borders of broomsedge fields, brier patches, and old fences near Fighting Creek, Greenbrier, and Porters Flats in Sevier County (Komarek and Komarek, 1938, p. 156). In middle Tennessee they may occur in swampy woodland, as well as on brushy hillsides and in dry thickets bordering timber.

Campbell County: Highcliff, 1.

Carter County: Roan Mountain Station, altitude 2,500 feet, 1.

Johnson County: Holston Mountains, 3 miles northeast of Shady Valley, altitude 3,000 feet, 4.

Knox County: Knoxville, 1.

ORYZOMYS PALUSTRIS PALUSTRIS (Harlan): Rice Rat

The rice rat frequents wet marshy areas in fields, wooded swamps, grassy bottomlands, and occasionally the edges of cultivated fields. A female trapped by A. H. Howell on September 13, 1908, near Lawrenceburg contained four embryos.

Komarek and Komarek (1938, p. 156) record the finding of a dead rice rat on the sill of an old barn near a marshy creek in Greenbrier (altitude 2,200 feet), Sevier County. Specimens from three widely separated localities indicate that rice rats may occur in suitable localities over most of the State west of the mountains of eastern Tennessee.

Campbell County: Highcliff, 1.

Lawrence County: Lawrenceburg, 2.

Shelby County: Arlington, 1.

SIGMODON HISPIDUS HISPIDUS Say and Ord: Eastern Cotton Rat

The cotton rat makes runways in old fields overgrown with grass and weeds, under brush and weeds growing along borders of cultivated fields, as well as in marshes. Near Hickory Withe, Perrygo trapped cotton rats in runways under a scraggly hedgerow bordering a cottonfield. Cotton rats were apparently abundant in the vicinity of Pulaski during November 1937. Numerous runways were noted in an abandoned field covered with matted grass and broomsedge and likewise on a nearby dry hillside. Cotton rats were taken in 1931 and 1932 by Komarek and Komarek (1938, pp. 156-157) in a field overgrown with broomsedge near Greenbrier (altitude 1,700 feet), Sevier County. They state that these rats occur also near Knoxville, Knox County.

Hamilton County: Soddy [Rathburn Station], 1.

Fayette County: Hickory Withe, 3.

Giles County: 1 mile east of Pulaski, 5.

Lincoln County: 6 miles east of Frankewing, 1.

NEOTOMA FLORIDANA HAEMATOREIA Howell: Blood Mountain
Wood Rat

The range of this wood rat in Tennessee seems to be restricted to the eastern Great Smoky Mountains. Arthur Stupka, park naturalist, Great Smoky Mountains National Park, submitted to the U. S. Biological Survey for identification two specimens taken 3

miles above Townsend, on Little River, Blount County. These specimens were caught, respectively, at 1,200 and 1,400 feet altitude. The type specimen was collected by Dr. Francis Harper near the summit of Blood Mountain, altitude 4,400 feet, Lumpkin County, Ga. A. H. Howell in 1931 trapped an immature individual of this race at Highlands, Macon County, N. C., about 40 miles south-southeast of the Tennessee line.

NEOTOMA FLORIDANA ILLINOENSIS Howell: Illinois Wood Rat

This wood rat may inhabit the bluffs and swamp bottomlands bordering the Mississippi River. Rhoads (1896, p. 192) received information from hunters that some form of wood rat occurred in southwestern Tennessee.

NEOTOMA PENNSYLVANICA Stone: Allegheny Wood Rat

The recorded occurrences of this wood rat are all east of the northward-flowing portion of the Tennessee River, but no specimens, so far as known, have been taken in eastern Tennessee. Rhoads (1896, p. 192) states "that this large mountain-dwelling rat [*Neotoma magister*] is found in the cliffs of Roan Mountain and other peaks of the Southern Alleghenies," although he cites no definite Tennessee records. Howell (1909, p. 62) reported that there were numerous signs of wood rats in the rocky bluffs on Walden Ridge, and he found signs also in the bluffs along a creek near Lawrenceburg.

Hamilton County: Walden Ridge, near Soddy (3 miles southwest of Rathburn), 10.

Humphreys County: Duck River, 2 miles southwest of Waverly, 2.

Lawrence County: Lawrenceburg, 1.

Montgomery County: Clarksville, 1.

SYNAPTOMYS COOPERI STONEI Rhoads: Stone's Mouse Lemming

This mouse occurs in sphagnum bogs, bluegrass pastures, old abandoned fields, and hillsides. Rhoads (1896, p. 183) trapped "a lately nursing female and five young * * * in a small springy place on the Carolina side of the summit of Roan Mountain." Komarek and Komarek (1938, p. 157) stated that these lemming mice were taken in grassy patches on the mountains of Sevier County at the following localities: Buck Fork and Roaring Fork of Little Pigeon River, Greenbrier, Little River (altitude 2,900 feet), and Silers Bald. It was found also on the grassy bald known as Spence Field (altitude 5,000 feet), about 1 mile west of Thunderhead Mountain, Blount County.

Hawkins County: Rogersville, 1.

Sevier County: Indian Gap, 1.

CLETHRIONOMYS CAROLINENSIS (Merriam): Carolina Red-backed Mouse, or Wood Vole

The recorded occurrences of this red-backed mouse are all in the eastern mountainous portions of the State. The vertical range here extends from about 3,000 to 6,500 feet. In the Holston Mountains northeast of Shady Valley these mice were trapped in the moss covering the roots of trees and rotten logs in hemlock timber. On Roan Mountain, Mount Guyot, Old Black Mountain, and Inadu Knob red-backed mice were caught in traps set in clumps of moss around roots of balsam fir. Rhoads (1896, p. 186) writes, "Contrary to my expectations, the wood vole of Roan Mountain was not found in wet places but seemed to prefer rather open runways among the fallen logs, moss and ferns on the borders of the forest * * *. Such situations were preferred to the depths of the forest, owing to the variety of edible grasses and weeds only found in clearings." Red-backed mice were trapped by Komarek and Komarek (1938, p. 157) in the humid forests as well as around isolated shrubs on the grassy balds at elevations above 3,000 feet. They list specimens from the following localities in Sevier County: Buck Fork and Chapman Prong of Little Pigeon River and Mount Guyot. It was also taken in Blount County at Spence Field, a grassy bald located about 1 mile west of Thunderhead Mountain.

Carter County: Roan Mountain, altitude 6,000 to 6,300 feet, 6.

Cocke County: Inadu Knob, altitude 5,700 feet, 4; Mount Guyot, altitude 6,300 to 6,500 feet, 9; Old Black Mountain, altitude 6,300 feet, 6.

Johnson County: Holston Mountains, 3 miles northeast of Shady Valley, altitude 3,000 feet, 6.

Sevier County: Indian Gap, altitude 5,200 feet, 10.

MICROTUS PENNSYLVANICUS PENNSYLVANICUS (Ord):
Pennsylvania Meadow Mouse, or Vole

There are no specimens of this vole from Tennessee in the National Museum collection. Rhoads (1896, p. 185) stated that he felt justified in including this mouse among the mammals listed for Tennessee since "on the summit of Roan Mountain two specimens of the meadow vole were secured in a little 'bulrush' swamp below Cloudland hotel, about 100 yards from the Tennessee line in Mitchell County, N. Carolina." Furthermore, runways similar "to those in which the Mitchell County specimens were taken were observed in swampy ground near the summit of the mountain in Carter County, Tennessee, during my ascent thither from the Doe River ravine." Perrygo trapped without success at this same locality from September 14 to 22, 1937.

MICROTUS CHROTORRHINUS CAROLINENSIS Komarek: Smoky
Mountain Rock Vole

This vole was found by Komarek (1932, pp. 155, 158) on "the wooded slopes above 3,000 feet altitude of the Great Smoky Mountains," Sevier County, Tenn., and Swain County, N. C. Two were trapped at an elevation of approximately 4,300 feet on the Dry Sluice Trail near the divide (Mount Collins), Sevier County. The type locality is about 5 miles north of Smokemont, on a tributary of Bradley Fork, a small branch of the Oconalufy River, altitude 3,200 feet, Swain County, N. C. Komarek reports that these voles were trapped "near rotted and moss-overgrown logs resting on rocky terrain, near rhododendron thickets," in a "rather open forest having a dense crown." All were caught within 50 yards of small mountain streams. Subsequent field work by Komarek and Komarek (1938, p. 158) revealed that this rock vole was most plentiful around mossy rocks and logs in the humid forests and in rock outcrops on the grassy balds. They list specimens from the following localities in Sevier County: Buck Fork, Chapman Prong, and Eagle Rocks Prong of Little Pigeon River, Sawtooth Mountain (on the Tennessee-North Carolina boundary line, 5 or 6 miles northeast of Newfound Gap), Silers Bald, and Thunderhead.

MICROTUS OCHROGASTER (Wagner): Prairie, or Buff-bellied,
Meadow Mouse

A small series of these voles was trapped by Perrygo and Linge-bach during April 1937 in runways in an abandoned cloverfield, overgrown with broomsedge and weeds, near Reelfoot Lake. A. H. Howell collected three of these mice during July 1910 near Clarks-ville.

Lake County: Reelfoot Lake, 3 miles north of Tiptonville, 8.

Montgomery County: Clarksville, 3.

PITYMYS PINETORUM AURICULARIS (Bailey): Bluegrass Vole,
or Southern Pine Mouse

This pine mouse shows some preference for the bluegrass barrens of Kentucky and northern Tennessee, digging tunnels in the edges of old fields and open grassy places. Underground burrows made by these mice are found also along the borders of cultivated fields, meadows, and pastures adjoining woods. Rhoads (1896, pp. 185-186) trapped them near Samburg in Obion County, Raleigh in Shelby County, Belleview in Davidson County, and Harriman in Roane County. Near Hickory Withe, Perrygo trapped one pine mouse

in a runway in heavy matted bluegrass on low ground bordering a cottonfield. A pine vole taken June 17, 1937, at Norris, Anderson County, was submitted for identification by Dr. A. H. Cahn.

Campbell County: Higheliff, 2; La Follette, 1.

Fayette County: Hickory Withe, 1.

PITYMYS PINETORUM SCALOPSOIDES (Audubon and Bachman):
Northern Pine Mouse

The northern pine mouse is mainly a forest vole and is usually found along the margins of wooded tracts, but it spreads into dense forests during periods of abnormal abundance. It has been trapped on rocky hill slopes, in dense woods where there is a thick carpet of matted leaves, at low altitudes along the moist banks of mountain streams, and in sphagnum swamps. In eastern Tennessee it has been caught also along edges of cultivated fields. Komarek and Komarek (1938, p. 159) state that pine mice were taken in tunnels in an apple orchard and also in a marshy area bordering woods at Greenbrier, Sevier County, and under matted leaves in open deciduous woods at Cades Cove, Blount County.

Carter County: Watauga Valley, 1.

Hawkins County: Rogersville, 1.

ONDATRA ZIBETHICA ZIBETHICA (Linnaeus): Muskrat

The common muskrat formerly occurred in most of the streams and ponds of Tennessee. At the time the early traders and trappers penetrated into the State, pelts of muskrats apparently were not an important item for barter. No reference is made to them in published accounts until 1788, when the General Assembly of the State of Franklin fixed the compensation for a justice in signing a warrant at one muskrat skin (Williams, 1924, p. 215). André Michaux, while residing at Nashville in 1795, listed (Williams, 1928, p. 335) the muskrat as occurring in the vicinity. Rhoads (1896, pp. 186-187) concluded that the food of the muskrat in Tennessee consisted very largely of mussels. In a fish dam on the Holston River, near its junction with the French Broad River [Knox County], Rhoads found that mussel shells had been wedged in among the rocks by the muskrats.

Local residents of Fayette and Shelby Counties reported to Perrygo that muskrats were getting scarce since the drainage of the cypress swamps. A few muskrats are trapped each year in the marshes around Reelfoot Lake. Perrygo and Schaefer found that they were fairly common during October 1937 along the Cumberland River and some of its smaller tributaries west of Indian Mound.

Those collected were trapped in slides on the river banks and no houses were seen. A few occur along Clinch River near Bean Station [11 miles northeast of Rutledge], Grainger County. Local residents did not believe that any muskrats were left around Roan Mountain Station. Komarek and Komarek (1938, p. 159) report that a muskrat was trapped on Little Pigeon River, 2 miles below Greenbrier, Sevier County.

According to Howell (1909, p. 63) muskrats were reported to be numerous near Briceville, Anderson County, and common near Highcliff, Campbell County.

Campbell County: Highcliff, 5.

Carter County: Roan Mountain Station, 1; Watauga Valley, 1.

Stewart County: Cumberland River, 2 miles west of Indian Mound, 3.

Family MURIDAE

RATTUS RATTUS RATTUS (Linnaeus): Black Rat

The black rat appears to have been introduced at an early date into Tennessee. It may be recognized by its slender body, long tail, and blackish coloration. B. C. Miles, of Brownsville, Haywood County, wrote Rhoads (1896, p. 192) that black rats were formerly present in western Tennessee but that he had seen none for 20 years. Komarek and Komarek (1938, p. 159) state that the black rat is abundant around barns and that three were trapped at Greenbrier, Sevier County.

RATTUS RATTUS ALEXANDRINUS (Geoffroy): Roof Rat

This slender, long-tailed rat, with whitish or yellowish underparts, prefers the attics of houses or the roofs of barns and sheds. A male trapped by W. J. Millsaps on February 15, 1910, at Soddy, Hamilton County, is the sole record for the State.

Hamilton County: Soddy, 1.

RATTUS NORVEGICUS (Erxleben): Norway, Brown, or Barn Rat

The Norway rat is a destructive pest in most of the larger cities of Tennessee. Although it shows a decided preference for buildings in towns, it is frequently found around farm sheds in which stores of feed or grain are kept. This rat also digs burrows in the banks of farm ditches and streams and is found along marshy areas bordering cultivated fields. One specimen was trapped, according to Komarek and Komarek (1938, p. 159), at an elevation of about 3,800 feet on Eagle Rocks Prong of Little Pigeon River, and another at Greenbrier, Sevier County.

MUS MUSCULUS MUSCULUS (Linnaeus): House Mouse

The house mouse, a native of Europe, appears to be abundant and generally distributed throughout the State. As its name implies it shows some preference for buildings, but it occurs also in the wild state in abandoned and cultivated fields. Perrygo and Lingebach trapped this mouse in cotton-rat runways in broomsedge and weeds bordering a cottonfield on the edge of the cypress swamp near Hickory Withe, at least half a mile from the nearest house. Near Pikeville one was caught in runways in weeds and matted grass on the edge of a cloverfield. Another mouse was caught in cotton-rat runways in an abandoned field overgrown with broomsedge 6 miles east of Pulaski. At Shady Valley four were trapped in grass and weeds around the edge of a wheatfield, quarter of a mile from the nearest buildings. Two were trapped in moss in hemlock woods at an elevation of 2,700 feet at the base of the northwest slope of Low Gap, $4\frac{1}{2}$ miles southeast of Cosby. Three specimens taken at Greenbrier, Sevier County, are listed by Komarek and Komarek (1938, p. 159). Rhoads (1896, p. 192) reports that he had specimens of house mice from Raleigh, Shelby County, and Roan Mountain.

Benton County: Big Sandy, 2.

Bledsoe County: Pikeville, 2 miles north, 1.

Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, 2.

Fayette County: Hickory Withe, 2.

Giles County: 6 miles east of Pulaski, 1.

Johnson County: Shady Valley, altitude 2,900 feet, 4.

Family ZAPODIDAE

ZAPUS HUDSONIUS AMERICANUS (Barton): Carolinian Jumping Mouse

This jumping mouse has been taken in the mountains of western North Carolina within the limits of Great Smoky Mountains National Park. Arthur Stupka, park naturalist, lent a male found hibernating November 7, 1935, by Granville Calhoun on Noland Creek, altitude 2,800 feet, Swain County, N. C. The measurements of this specimen are as follows: Total length, 190.5; tail, 114.3; hind foot, 31.75.

NAPAEOZAPUS INSIGNIS ROANENSIS (Preble): Roan Mountain Woodland Jumping Mouse

The woodland jumping mouse is found most frequently in dense woods with little or no underbrush, usually near streams. A. H. Howell trapped two of these mice at Indian Gap. Perrygo and Lingebach caught one on a rotten log in open hemlock timber with dense crown on the west slope of Low Gap, $4\frac{1}{2}$ miles southeast of

Cosby. Woodland jumping mice were trapped by Komarek and Komarek (1938, p. 160) in the humid forest along Eagle Rocks Prong of Little Pigeon River, Sevier County. The measurements of the three females listed below are, respectively: Total length, 185, 221, 233; tail, 120, 133, 142; hind foot, 29, 29, 29.

Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, altitude 2,700 feet, 1.

Sevier County: Indian Gap, altitude 5,200 feet, 2.

Family ERETHIZONTIDAE

ERETHIZON DORSATUM DORSATUM (Linnaeus): American Porcupine

No mention of the porcupine within the State of Tennessee has been found in the accounts of early explorers. Mercer (1897, pp. 42, 58, fig. 2), however, found the dried feces and quills of a porcupine in Bigbone Cave near Elroy, Van Buren County, Tenn. During the recent rearrangement of the mammal collection in the National Museum, a left mandible of an immature porcupine labeled as coming from a "Tennessee cave," but with no other data, was found.

Family LEPORIDAE

LEPUS AMERICANUS VIRGINIANUS Harlan: Virginia Varying Hare

Information received from local residents suggests that varying hares were formerly present in the mountainous district extending from Mount Guyot to White Rock, Cocke County. These residents inquired if Perrygo had seen any of the rabbits that turned white in winter and made such long jumps when chased in the snow by dogs. He was told that they were usually "jumped" from rhododendron thickets near the summits of the peaks. From repeated inquiries, Perrygo learned that these rabbits were very rare now but formerly were often seen during winter months by local hunters.

SYLVILAGUS FLORIDANUS MALLURUS (Thomas): Eastern Cottontail

The eastern cottontail ranges westward into the valleys, foothills, and even the higher mountain slopes of eastern Tennessee. It is abundant and generally distributed over most of middle and western Tennessee and occurs along some of the smaller tributaries of the upper Cumberland River drainage area. It is most abundant in abandoned farm fields overgrown with broomsedge, weeds, and brush, brier patches, and the thickets bordering deciduous woods and small streams. Although largely nocturnal, when routed during the day from their "form" in some tussock or grass and clump of weeds these rabbits run with surprising speed, twisting and doubling across the field or thicket until they reach shelter in a thicket or hollow log.

One of these cottontails was collected by Perrygo and Lingebach at the edge of a hemlock bog behind the camp at Shady Valley. At an elevation of 2,700 feet on the west slope of Low Gap, 4½ miles southeast of Cosby, one was shot in a rhododendron thicket in hemlock woods. A cottontail with short ears, but with pelage coloration and skull similar to that of *mallurus*, was caught at an elevation of 6,300 feet on Roan Mountain in a large-size Schuyler trap set by Perrygo and Schaefer in a rhododendron thicket in a balsam-fir forest. Cottontails were reported as numerous in the open woods and broomsedge fields near Greenbrier, Sevier County, and 14 were collected by Komarek and Komarek (1938, p. 160).

Writing in 1896, Rhoads (p. 182) stated that this cottontail was so abundant in the woods and thickets bordering the canebrakes along the Mississippi River that it had almost become a nuisance. Near Brownsville, Haywood County, B. C. Miles wrote Rhoads that cottontails had doubled in numbers during the preceding 20 years and that he could recall parties of hunters that had killed 100 in a single day's hunt during February 1895. In the vicinity of Hickory Withe, Arlington, Eads, and Hornbeak, in the western part of the State, these cottontails were taken in broomsedge and brier patches on abandoned fields. At Crab Orchard cottontails were found in laurel thickets in deciduous woods. One cottontail was collected north of Indian Mound in dense deciduous woods with relatively little underbrush. Bangs (1894, p. 409) records three specimens from Trenton, Gibson County. Specimens from Samburg, Obion County, and Raleigh, Shelby County, are listed by Rhoads (1896, p. 183).

Nelson (1909, pp. 174-176) referred specimens taken at Arlington, Big Sandy, and Danville during June 1892 to *S. f. alacer*. All these have a much richer suffusion of rusty reddish over the entire upper parts, the obliteration of the grayish rump patch, and decidedly rusty legs. Nevertheless, all the cottontails in the collection received since 1900 have a somewhat different general coloration, being much lighter and more grayish buff. Howell (1921, p. 70), on the basis of more abundant material than that at the disposal of Nelson, assigned the form ranging through the South Atlantic States to *S. f. mallurus* and remarked that "they agree very closely with this race in color and differ only in having slightly smaller audital bullae." The series of cottontails from Tennessee is quite unsatisfactory, inasmuch as relatively few of the specimens have the fresh fall pelage. It is likely that a more adequate series will show that cottontails from the eastern mountainous portion of the State should be referred to *mallurus* and that those occurring in middle and western Tennessee are either *mearnsi* or intermediates between *mallurus* and *mearnsi*.

- Benton County: Big Sandy, 2.
 Campbell County: Highcliff, 1.
 Carter County: Watauga Valley, 2; Roan Mountain, altitude 6,300 feet, 1.
 Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, altitude 2,700 feet, 2.
 Cumberland County: Crab Orchard, 1.
 Fayette County: Hickory Withe, 1.
 Hamilton County: Walden Ridge, near Soddy, 1.
 Houston County: Danville, 1.
 Humphreys County: South of Johnsonville, 2.
 Johnson County: Shady Valley, altitude 2,900 feet, 1.
 Knox County: Knoxville, 1.
 Obion County: Hornbeak, 1.
 Shelby County: Arlington, 2; Eads, 1.
 Stewart County: 8 miles north of Indian Mound, 1.
 Sullivan County: Holston Mountains, head of Fishdam Creek, 1.

SYLVILAGUS TRANSITIONALIS (Bangs): New England Cottontail

No specimens of the New England cottontail taken in the State are listed by Nelson (1909, p. 199). Regarding its possible occurrence in the Great Smoky Mountains, Bangs wrote Rhoads (1896, p. 183) that he had "examined a large series last winter from Roan Mountain, and they were all true *sylvaticus*" [= *Sylvilagus floridanus mallurus*]. Inasmuch as Howell (1921, p. 71) has taken this cottontail at three localities in northeastern Alabama and has recorded its occurrence at Brasstown Bald Mountain in Georgia, more intensive field work should reveal its presence at localities other than those listed below in the Great Smoky Mountains of eastern Tennessee.

- Cocke County: Low Gap, $4\frac{1}{2}$ miles southeast of Cosby, altitude 3,300 feet, 1.
 Hamilton County: Walden Ridge, near Soddy, 1.

SYLVILAGUS AQUATICUS AQUATICUS (Bachman): Swamp Rabbit

The swamp rabbit lives in the canebrakes and deep woods along the Mississippi River and is found elsewhere in the State in the swamps and wet bottoms bordering the Tennessee River. Rhoads (1896, pp. 181-182), after having observed this rabbit on the borders of Reelfoot Lake, writes as follows: "It preferred hiding among the half submerged vegetation and piles of driftwood, and when it broke cover would run with bold, high leaps from log to log for so great a distance that it was difficult to find it again." I have observed in southeastern Kansas that this rabbit will take to water as readily as a raccoon. Rhoads (1896, p. 182) lists one specimen from Samburg, Obion County. Perrygo and Lingebach took a male in the cypress swamp bordering Reelfoot Lake, 5 miles west of Hornbeak. On Caney Island, Reelfoot Lake, two were seen in a tangle of pea vines, fallen logs, and cypress trees. Two were seen in another cypress swamp bordering Reelfoot Lake, 2 miles east of Phillippy. All these

swamp rabbits made for the edge of the lake when routed from their "forms."

A. H. Howell (1909, p. 64) states that swamp rabbits "were reported to be found sparingly at Henryville," Lawrence County, "probably ranging up Buffalo Creek from the Tennessee River." Perrygo thought he recognized a swamp rabbit in the cypress swamp near Hickory Withe.

Obion County: Reelfoot Lake, 5 miles west of Hornbeak, 1; Reelfoot Lake, 2 miles southwest of Samburg, 1.

Family SUIDAE

SUS SCROFA SCROFA Linnaeus: Wild Boar

In the spring of 1912, a stock of 15 wild swine of both sexes, which had been captured in northern Germany, probably in the Harz Mountains, was purchased by a group of English sportsmen and liberated in an enclosure near Hooper Bald, N. C. According to Stegeman (1938, p. 280), this original stock was not disturbed for 8 or 10 years. In 1920, however, when an attempt was made to hunt the animals within the enclosure, about 100 broke through the fence and escaped into the mountains. Stegeman reports that wild boars increased in numbers on the Cherokee National Forest notwithstanding the fact that they were freely hunted by natives with dogs until the outbreak of an epidemic of hog cholera in 1932. It is estimated by Stegeman that there are now some 115 wild boars distributed over an area exceeding 50 square miles.

So far as known to Arthur Stupka, park naturalist, no wild boars have come into the Great Smoky Mountains National Park. He believes that the Little Tennessee River, which separates the park from the Cherokee National Forest, may constitute a real barrier against the northward spread of this introduced species.

Family CERVIDAE

ODOCOILEUS VIRGINIANUS VIRGINIANUS (Boddaert): Virginia Deer

The former abundance of deer in all parts of Tennessee is attested by records left by the early traders, hunters, settlers, and travelers. For many years deer skins constituted an important item in the trade. When dressed they were made into vests, pants, and shirts and also the fringed hunting shirts and leggings. Under the act of March 31, 1785, the General Assembly of the State of Franklin fixed the value of "deer skins, the pattern" at 6 shillings (Ramsey, 1853, p. 297). The same Assembly fixed the salary of the governor, per annum, at 1,000 deer skins and that of the chief justice at 500 deer skins, beginning January 1, 1788 (Williams, 1924, p. 215). Good venison, if

delivered where troops were stationed, was, according to the records of Sumner County, accepted for taxes in 1787 at 9 pence a pound (Putnam, 1859, p. 252).

The first mention of deer in eastern Tennessee seems to be recorded by James Needham (Williams, 1928, p. 27), who traveled in 1673 down the valley bounded by the Holston River and Bays Mountains to the Cherokee Indian town Chota [Monroe County]. From that time onward Virginia and Carolina traders had posts in these Cherokee Indian villages, and large numbers of deer skins and other pelts obtained by barter were transported on pack horses to Charleston and to the Virginia stations.

Lt. Henry Timberlake (Williams, 1927, p. 47) was impressed in December 1761 by the number of deer seen during his trip down the Holston River from Kingsport, Sullivan County, to a large cave below the present site of Three Springs Ford, Hamblen County. Timberlake mentioned that there were an incredible number of deer along the Little Tennessee River near the mouth of Tellico River (Williams, 1927, p. 71).

In Martin Schneider's report (Williams, 1928, p. 253) of his journey to the upper Cherokee towns there appears the statement under date of January 1, 1784, that the traders on the French Broad River had paid one quart of an inferior grade of brandy for two deer skins.

After crossing the Holston River at Stonypoint, Hawkins County, in April 1797, the Duke of Orleans and his party saw deer and wild turkeys (Williams, 1928, p. 435).

In middle Tennessee deer appear to have been even more abundant than in the eastern part of the State. French traders and hunters had posts and station camps on or near the present site of Nashville at least as early as 1714. The "long hunters" of the Carolinas and Virginia did not do much hunting in this general region until 1769. Isaac Bledsoe mentions (Henderson, 1920, p. 125) that during the winter of 1769-70 he shot two deer near the lick that has since been known as Castalian Springs, Sumner County. In 1775, Timothé de Monbreun, a French *voyageur*, had a cabin and depot for deer and buffalo hides and tallow at a mound on the north side of Sulphur Spring branch [Nashville] (Putnam, 1859, p. 65).

When the settlers arrived at the Bluff [Nashville] in 1779-80, deer were plentiful in the vicinity (Ramsey, 1853, p. 206), and large numbers came to the sulphur or salt spring [French Lick] near that settlement. So abundant were deer and buffalo that Col. John Donelson, who settled in 1780 in a tract known as "Clover bottom" a few miles up from the mouth of Stone River [Davidson County], was obliged to keep close watch over his growing corn (Putnam, 1859, p. 622). One party of 20 hunters from Eatons Station [Nashville]

traveled up the Cumberland River in canoes to the region between Caney Fork and Flynns Lick Creek [Smith, Putnam, and Jackson Counties], where they killed more than 80 deer during the winter of 1782 (Ramsey, 1853, p. 450). Deer were likewise plentiful along the wagon road between Clinch River and Nashville when it was opened in 1783 (Ramsey, 1853, p. 501).

John Lipscomb (Williams, 1928, p. 277) reports that he saw several deer on July 1, 1784, in Macon County.

Deer were listed by André Michaux (Williams, 1928, p. 335) as being present in the vicinity of Nashville in 1795. Abraham Steiner and Christian Frederic de Schweinitz, after arriving at Camp Station [Sumner County] on their journey from Nashville to Knoxville, noted in their journal (Williams, 1928, p. 516) on December 8, 1799, that deer were present in the Cumberland settlements in the vicinity of Nashville. These same travelers refer (Williams, 1928, p. 519) to the great number of deer in the wilderness near the Caney Fork road [Smith or Putnam County]. Deer appear to have been plentiful in the region of the Cumberland settlements for many years. Putnam, writing in 1859 (p. 127), mentions that 200 deer were then kept in a woodland tract of several thousand acres at Belle Meade [Davidson County].

Relatively few records are available for the region around Chattanooga before 1800. During the Chickamauga expedition commanded by Evan Shelby, one party of troops in 1779 captured a great quantity of deer skins owned by the trader McDonald at Little Owl's town on the Tennessee River (Ramsey, 1853, p. 188). Francis Baily (Williams, 1928, p. 402) while traveling during July 1797 through the wilderness east of the Tennessee River reported that deer were plentiful in the region between Muscle Shoals and Duck River.

Western Tennessee was visited by traders from the Carolinas before 1700. According to Williams (1928, p. 94) several were with the Chickasaw Indians in 1699, trading for toe-buckskins and Indian slaves. Father James Gravier mentions (Williams, 1928, p. 69) that his party killed four does on October 25, 1700, near the present site of Memphis.

Forked Deer River, which separates Dyer and Lauderdale Counties, received its name from a buck with peculiar antlers that was killed in 1785 by a surveying party organized by James Robertson, Henry Rutherford, and Edward Harris (Williams, 1930, p. 43). This party depended for subsistence on deer, elk, and bears, while surveying in Lauderdale County.

According to S. C. Williams (1930, p. 180) an English visitor, S. A. Farrell, described the deer hunts in the vicinity of Memphis in 1830 as follows: Hunting was done on horseback with dogs. When the dogs came on fresh deer tracks, the hunters were posted and

then three persons set forward with the dogs, always following the deer against the wind. When the deer was started, the hunters fired as he passed their posts.

Obion County, according to Williams (1930, p. 153), longer than any other, remained a good hunting ground for deer. Hallock, writing in 1877 (pp. 152-153), states that deer were then hunted around Reelfoot Lake, Obion County, and in the vicinity of Trimble, Dyer County, that there were deer near Hales Point, Lauderdale County, and that deer afforded good sport in the canebrakes below Memphis, Shelby County. He also says that deer were then found in abundance along the Cumberland River, Davidson County, in the mountains in the vicinity of Sewanee, Franklin County, and also in the mountains in the vicinity of Wauhatchie and Chattanooga, Hamilton County.

During the following 15 years, the number of deer was markedly reduced in many of these areas. A. B. Wingfield (1895, p. 515) states that "the Cumberland Mountain range has been almost entirely depleted of its stock of deer" and that 248 carcasses of deer were shipped from Crossville, Cumberland County, during 1894. The Tennessee State Legislature in 1895 passed a law prohibiting the killing of deer for 5 years in Cumberland, Claiborne, Scott, Morgan, and Anderson Counties. Rhoads (1896, p. 180) was told that there were then about 20 deer in Haywood County.

Komarek and Komarek (1938, p. 161) report that several deer were seen near Cades Cove, Blount County, and also near Cosby, Cocke County, and that until hunting was prohibited with the establishment of the Great Smoky Mountains National Park, several were taken each year in the Butler Tract near Gregory Bald, Blount County.

CERVUS CANADENSIS CANADENSIS Erxleben: Eastern Elk, or Wapiti

Curiously enough, although there are numerous references to other kinds of game, only incidental reference is made to elk in the accounts left by early hunters, settlers, and travelers.

James Needham, who was sent in 1673 on a trading expedition to the Cherokee towns in southeastern Tennessee, wrote in his journal (Williams, 1928, p. 27) that while traveling down the valley bounded by the Holston River and Bays Mountains, he observed a "great store of game, all along as turkes, deere, elkes, beare, wolfe and other vermin."

Ramsey (1853, p. 206) remarks that when the settlers arrived at the Bluff [Nashville] in 1779-80, the surrounding region was "one large plain of woods and cane, frequented by buffaloes, elk, deer, wolves, foxes and panthers." Putnam (1859, p. 81) likewise states that "innumerable herds of buffalo, deer and elk came to the "sul-

phur or salt spring at Nashville. During 1783 when the road was opened from Clinch River to Nashville by way of Crab Orchard [Cumberland County] it passed through "vast upland prairie, covered with a most luxuriant growth of native grasses, pastured over as far as the eye could see, with numerous herds of deer, elk, and buffalo" (Ramsey, 1853, p. 501).

Lewis Brantz, who had been sent out by the merchants of Baltimore, departed from Nashville on December 28, 1785, and traveled with a pack horse 140 miles through the barrens to the Holston River settlements. He noted in his journal (Williams, 1928, p. 286) that while enroute he saw but one elk, although he observed large numbers of antlers.

Henry Rutherford and his guide, while surveying a large tract of land in 1785 on the south side of the Forked Deer River, Lauderdale County, killed elk and other game for food (Williams, 1930, p. 44).

André Michaux, while residing at Nashville, noted in his journal under date of June 21, 1795, that elk were present in that region (Williams, 1928, p. 335).

Putnam (1859, p. 127) states that half a dozen elk were kept in 1859 in a private woodland tract at Belle Meade, or Dunhams Station.

Elk at one time were plentiful in most parts of Tennessee, occurring not only in the high passes and narrow valleys of the mountainous sections but also in association with the buffalo visited the licks of middle Tennessee, browsed along the rivers and creeks in the southern counties, and wandered through the canebrakes of the Mississippi bottomlands.

When the early hunters and settlers first set foot in eastern Tennessee, there were many large tracts covered with native grasses on the low hills and narrow valleys of the southern Allegheny Mountains that afforded pasture lands for herds of elk and in the summer for buffalo (Ramsey, 1853, p. 96).

David Crockett (1834) in his autobiographical sketch repeatedly refers to elk in the bottomlands of Obion and Dyer Counties in the decade between 1820 and 1830.

According to B. C. Miles (Rhoads, 1896, p. 181) an elk was killed by David Merriwether about 1849 at Reelfoot Lake, and another was reported to have been killed in Obion County in 1865.

Under the pen name "Antler" (1880, p. 306) a resident of Piney Creek Falls, Van Buren County, wrote in 1880 as follows: The Caney Fork district "embracing the tributaries of the Caney Fork, remains a wilderness still. The surface is rough and broken. Deer and wild turkeys are found here in moderate numbers, with a few bears, and occasionally some gray wolves are found; but the oldest mountaineer can not remember back to the time when elk and buffalo roamed

through these forests." This report seems to indicate that elk were exterminated on the Cumberland Plateau early in the nineteenth century.

Family BOVIDAE

BISON BISON PENNSYLVANICUS Shoemaker: Eastern Woodland Bison

Bison once roamed in large numbers over some parts of Tennessee, but so far as known not a single skull from a Tennessee locality can be found now in any of the larger museums. All the early explorers followed buffalo trails through the wilderness, and the Spanish and French settlements relied to some extent on the buffalo for meat.

J. A. Allen (1876, p. 102), after commenting on the former abundance of bison in the region around Nashville, concluded that they probably ranged southward to the Tennessee River, since a stream called Buffalo River forms one of the larger tributaries of Duck River. As will be shown hereinafter, bison formerly ranged southward to below Memphis in the western part of the State and at least to Monroe County in eastern Tennessee.

James Needham, who was sent by Abraham Wood (Williams, 1928, p. 28) on a trading expedition, in relating his experiences in 1673 at the Cherokee Indian town Chota [located on the south side of the Little Tennessee River a short distance below Citico Creek, Monroe County] remarked that "many hornes like bulls hornes lye upon theire dunghills." There is at least one bit of evidence to show that the buffalo may have ranged farther south than Monroe County. The left mandible of an immature buffalo (U.S.N.M. no. 200148) was found in 1914-15 by Clarence B. Moore (1915, p. 368) in an aboriginal burial mound at Hampton Place on the Tennessee River opposite Moccasin Bend, Hamilton County. There are other records showing that buffaloes were found before 1700 much farther south than the southern boundary of eastern Tennessee. Boyd (1936, p. 203), quoting from old Spanish documents relating to the expedition of Marcos Delgado from Apalachee to the Creek country in 1686, has shown that this Spaniard saw buffaloes near Russ Creek and northwest of Marianna, Jackson County, Fla., and near the Little Choctawhatchee River, Houston County, in the southeastern corner of Alabama.

On March 30, 1750, Dr. Thomas Walker (Williams, 1928, p. 170) caught two young buffaloes on Reedy Creek and then traveled down this creek to Long Island, Holston River [Kingsport, Sullivan County].

On the trip during December 1761 down the Holston River from Kingsport, Sullivan County, to a large cave below the present site of Three Springs Ford, Hamblen County, Lt. Henry Timberlake

wrote in his memoirs (Williams, 1927, p. 47) that "nothing more remarkable occurred, unless I mark for such the amazing quantity of buffaloes, bears, deer, and beavers." In another entry in his memoir (Williams, 1927, p. 71) Timberlake wrote on January 2, 1762, while residing near the mouth of Tellico River, that "there are likewise an incredible number of buffaloes." Again after crossing the French Broad River enroute to Great Island [Kingsport, Sullivan County] along the Great Path, he wrote on March 15, 1762, that 17 or 18 buffaloes ran among the party (Williams, 1927, p. 120).

The settlers in Carters Valley, Hawkins County, during the winter of 1776 killed bison 12 to 15 miles northwest of the settlement (Ramsey, 1853, p. 144).

From these sources we observe that bison formerly passed over the Cumberland Gap into Tennessee along the Holston, Clinch, and Powell River Valleys. The number of buffalo in eastern Tennessee, judged from the records, was never very large.

By far the larger number of bison occurred in the vicinity of the Cumberland River and its tributaries in middle Tennessee. It will be recalled that French *voyageurs* had been hunting and trading in that region for more than 75 years before the establishment of the Nashville settlement, killing buffaloes mainly for tongues and tallow, and to a less extent for hides. M. Charleville, a French trader and hunter from Crozat's colony at New Orleans, came upon the Shawnees then inhabiting the Cumberland region and built a post in 1714 on a mound near the present site of Nashville on the west side of the Cumberland River, near French Lick Creek, and about 70 yards from each stream (Ramsey, 1853, p. 45). Subsequently other French hunters and trappers from Illinois and New Orleans camped in the same region.

In 1769, Isaac Bledsoe and Kasper Manscoe [sometimes Gasper Mansker] established camp on Station Camp Creek in Sumner County. From that camp each of these men followed in opposite directions the nearby buffalo trail, one finding the salt licks since known as Bledsoes Lick and the other Manscoes Lick. On the 100-acre surrounding flat, Bledsoe saw thousands of bison (Henderson, 1920, p. 125). This lick is now known as Castalian Springs, Sumner County.

In 1770, Manscoe, Uriah Stone, and eight others hunted at French Lick [Nashville], where they found immense numbers of bison and other wild game (Ramsey, 1853, p. 105). Captain Timothé de Monbreun, a French *voyageur* from Illinois, who as late as 1823 lived at Nashville, hunted in that vicinity in 1775. During that summer Monbreun and one companion had a camp at a site since

known as Eatons Station [Nashville]. An enormous number of buffaloes were killed by these French hunters, but only the tallow and the tongues were saved. These were taken down the Cumberland River in a keel boat (Ramsey, 1853, p. 192; Henderson, 1920, p. 128). For more than a decade Monbreun hunted in this general district, and it is quite likely that his or some other party of French hunters was responsible for the slaughter of buffaloes at Bledsoes Lick in Sumner County, which Isaac Bledsoe related to an early settler, William Hall. According to the latter (Henderson, 1920, pp. 128-129), "one could walk for several hundred yards a round the Lick and in the Lick on buffelows skuls, & bones, and the whole flat round the Lick was bleached with buffelows bones, and they found out the Cause of the Canes growing up so suddenly a few miles around the Lick which was in consequence of so many buffelows being killed."

In February 1777, de Monbreun arrived at Deacons Pond [near Palmyra, Montgomery County], where he met a party of six white men and one woman who had traveled by boat down the Cumberland River from a point near the mouth of Rockcastle River [Laurel County, Ky.]. This party reported that they had seen immense herds of buffaloes on this trip (Ramsey, 1853, p. 193).

When the first settlers arrived at Nashville in 1780, bison were still present in the surrounding country (Ramsey, 1853, p. 206). Col. John Donelson's party killed buffaloes along the Cumberland River near the Kentucky-Tennessee line on March 30, 1780 (Williams, 1928, p. 241). When Colonel Donelson settled in 1780 a few miles up from the mouth of Stones River [Davidson County], in a tract called "Clover Bottom" and planted his corn, there were "immense herds of buffalo, deer, etc., ranging through these forests" (Putnam, 1859, p. 622).

According to Ramsey (1853, p. 450) a party of 20 hunters from Eatons Station [Nashville] traveled up the Cumberland River in canoes to the region between Caney Fork and Flynns Lick Creek [Smith, Putnam, and Jackson Counties], where they killed 75 buffaloes during the winter of 1782.

When the road from Clinch River to Nashville by way of Crab Orchard [Cumberland County] was opened in 1783, the top of the mountain was described as a "vast upland prairie, covered with a most luxuriant growth of native grasses, pastured over as far as the eye could see, with numerous herds of deer, elk and buffalo" (Ramsey, 1853, p. 501).

John Lipscomb wrote in his journal (Williams, 1928, p. 276) under date of June 29, 1784, that having come to the lick near Little Barren River [Macon County, Tenn., or Allen County, Ky.], they "crept to

the Lick where we found there had been great slaughter made amongst the buffelow; we had not been there long before we saw two big buffelow bulls coming toward us accompanied with a wolf." Again on August 7, 1784, John Lipscomb's party (Williams, 1928, p. 278) reached Red River Station, and then traveled through the barrens, where they saw a "gang of buffaloes" [Sumner County].

After leaving Nashville on December 28, 1785, enroute to Holston River, Lewis Brantz (Williams, 1928, p. 286) traveled with a pack horse 140 miles through the barrens where nothing but grass grows. Brantz remarked that the buffaloes had been considerably hunted by the woodsmen and were diminished in number. The first records of Sumner County show that "prime buffalo beef" was accepted for taxes in 1787 at 3 pence a pound, if delivered where troops were stationed (Putnam, 1859, p. 252). Bison apparently were still to be found in Montgomery County in 1793. Goodpasture (1903, p. 206) has published a contract signed October 4, 1793, by John Dier for delivery of 35 hundredweight of buffalo beef to John Edmonson, at \$2 a hundred.

André Michaux (Williams, 1928, p. 335) listed buffaloes as being present in June 1795 in the region around Nashville. Abraham Steiner and Christian Frederic de Schweinitz in December 1799 reported that bison were still present near the Caney Fork Road [Putnam County] but were "rarely killed by the hunters, as they are shy and fleet and do not usually fall at the first shot" (Williams, 1928, p. 519). Writing in 1859, Putnam (p. 127) stated that a woodland tract of several hundred acres at Belle Meade [Dunhams Station] belonging to Gen. William G. Harding was stocked at that time with 200 deer, 20 buffaloes, and half a dozen elk. In 1916 Clarence B. Moore excavated a left metacarpal (3+4) and two phalanges (U.S. N.M. no. 216652) from a mound at Hales Point, Lauderdale County.

While collecting in Tennessee, Rhoads (1896, p. 179) received information from local residents that the last buffalo in Fentress County was killed by John Young, but the date was not obtained.

Bison were once present in some numbers in western Tennessee along the Mississippi River. From the journal of Diron d'Artaquette, inspector-general under the Duke of Orleans, we get our first information as to the former presence of great herds of bison in west Tennessee. Traveling up the Mississippi River in March 1723, he saw bison at many places on both sides of the river. It is recorded in his journal (Williams, 1930, p. 10) that a buffalo cow was killed near Wolf River, Shelby County. As he continued on this journey upstream, many buffalo were killed before he passed the present boundaries of Tennessee.

In the course of his journey down the Mississippi River during November 1766, George Morgan (Williams, 1928, pp. 216-218) passed a number of French hunting parties who had ascended the river from New Orleans to kill buffaloes and bears. Along the eastern shore between the mouth of Hatchie River above Prud'homme Cliff and the present site of Memphis, 10 French hunting parties were seen. Again in June 1768, John Jennings saw French hunters on both sides of the Mississippi River in the same region (Williams, 1928, p. 221).

In 1819, Williams (1930, p. 96) states, the "buffalo, once numerous, had disappeared" in west Tennessee. Haywood, writing in 1823 (p. 234), confirms this and says that "at this time there is not one in the whole State of Tennessee."

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