A WINTER SURVEY OF THE MAMMALS OF THE MARYVILLE COLLEGE WOODS

A Report of an Independent Study

by

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CHAPTER I

INTRODUCTION

This is a report of a survey of the mammals of the Maryville College Woods. Estimates of the population may be made both by studying field guides and journals on wildlife by the process of elimination, i.e. removing those species which are not described as living in an area and by identifying species from trappings, sightings, and tracking. This study was undertaken as a field research problem to determine which mammals inhabit these woods.

Many factors must be considered in this type of survey in order that the conclusions may be kept in proper context. Geographically, Maryville is located near and west of the Chilhowee Mountains which parallel the Great Smokies. The Chilhowees, rising to an altitude of approximately 2000 ft., provide an extensively forested area (Map of the Great Smoky Mountains National Park and Vicinity, Tenn.- N.C., 1957) from which such animals as fox, bobcat, and bear sometimes roam. Maryville is at an altitude of approximately 1000 ft., the College Woods varying between 940 ft. and 1020 ft. (Maryville Quadrangle Map, 1966). The terrain of the Maryville vicinity is hilly but not steep, with bare rock exposed only in a few places.

The woods are bordered on the east and south-east by

pastureland and farms. The south and south-west border is a paved road which separates the woods from the suburbs. To the west and north is the Maryville College campus which includes large open areas and athletic fields. The woods are within the city limits of Maryville and cover approximately 83 acres or 0.13 square miles (see Appendix V).

East Tennessee is in the temperate deciduous forest biome. This biome lies between the Carolinian area of the Upper Austral Zone and the Transition Zone (Orr, 1967, pp. 270-74). The climate is generally moderate with mild winters and warm summers. Factors of the climate are of importance in determining the types of vegetation found in an area. The extensive deciduous forests of Tennessee indicate that heavy precipitation (annual average for the area is 47.8 in.) falls throughout the year (Local Climatological Data, 1963). In this area, certain species of trees can be used to indicate different habitats. For instance, on moist, upland sites are found several species of Maple (Acer, spp.), as well as Beech (Fagus grandifolia), and Yellow Poplar (Liriodendron tulipfera). Species found on drier sites include Oaks (Quercus, spp.), Hickorys (Carya, spp.), and Scrub Pine (Pinus virginiana). Stream bottoms usually support Sycamore (Platanus occidentalis), Elms (Ulmus, spp.), and Willows (Salix, spp.). The understory is well-developed and diversified (Kormondy, 1969, pp. 121-22).

Seasonal change is an important factor to be considered in this kind of research, for many mammals hibernate or change their behavioral patterns with the approach of winter.

Most of the data collecting was done between late fall and mid-winter (October 22- February 11). Temperatures dropped to below zero several times, breaking several records and possibly affecting the wildlife population count. Trapping was conducted through most of January, the coldest month of the year. According to climatological reports for the East Tennessee area, Maryville's location between the Appalachians and Cumberlands modifies the general weather pattern, with extreme changes in temperature rarely occuring. Snow usually does not accumulate over four inches, not staying on the ground for more than a week (Local Climatological Data, 1963). During this survey, snow fell six times with a total accumulation of approximately fifteen inches but no more than five inches on the ground at any one time.

The pressure of civilization has drastically affected the mammal population of the area. Dogs, cats, hunters, and even strollers should be considered among the influences of man on this woodlot. The history of man in the East Tennessee area goes back even before the American Revolution. Careless deforestation, hunting, and erosion have been the story ever since. Extirpation, or the "elimination of a species from a given locality" (Wing, 1940), is the reason such animals as the cougar, wolf, black bear, elk, deer, bison, beaver, otter and others are no longer found here in the Maryville area. After many years of being burned, cut-over and influenced in other ways by civilization, the College Woods still maintains a small mammal population. This report is an attempt to describe just which mammal species are still able to live here.

CHAPTER II

METHODS

In this survey, every available means was used in attempting to establish an accurate list of mammals in the Maryville College Woods. A list of mammals found in East Tennessee was drawn up from various field guides and journals (see Appendix IV). This list presented all of the species that could possibly appear in the area. Actual evidence was necessary before it could be established which species lived here.

Between late October and early February (1969- 1970) the woods were inspected almost daily, except for a period between December 18 and January 5. Sightings and other evidences of mammals were recorded in a journal along with sightings reported by other people who were familiar with the College Woods. (see Appendix III for a list of all mammals trapped, sighted, tracked, or reported). Identifications and nomenclature were checked against Burt (1961), Golley (1962), and Miller (1955). Sightings were included in the journal only when positive identifications could be made. The woods were checked at various times of the day from before dawn to well after sunset, and, of course, different species were seen at different times; that is, bats would only be seen at dusk, and squirrels only shortly after dawn or in the late afternoon.

This daytime factor was kept in mind when estimating the population density from the number of sightings made. Whenever people were met in the woods they were asked as to what kinds of mammals they had seen. They usually remembered nothing more than squirrels and opossums, but upon being quizzed further, they were sometimes helpful in verifying or adding to the list.

Tracking was attempted throughout the survey but proved to be of limited value except after fresh snowfalls. The many people and dogs walking the paths usually obliterated wild animal signs. Even when tracks were found, positive identification could not always be made. However, more than just footprints were looked for; scats were studied in hopes of finding small rodent bones; pine tree bases were watched for signs of gnawing voles; trees were checked for nests of squirrels, flying squirrels, and golden mice; and many other clues were used to help find hidden mammals. Population densities were estimated from the number of trails found after a snowfall. These estimates could be made by comparing the ground covered with the total area of the College Woods, and using this ratio to compare the number of animal trails seen to the total population.

Most of the data were based on various trapping techniques. In 1966 an ecology class from Maryville College studying animals in the College Woods used a number of Museum Snap Traps baited with peanut butter and oatmeal. They trapped a small section of the woods for a week but found nothing. Snap traps were used only once in this survey. The trap was

placed in fresh vole diggings with crackers for bait, but with no success.

An attempt was made to use jar traps, that is, bottles sunk to their rims in the forest floor. Their mouth openings varied from one to four inches in diameter. It was hoped that small, ground-dwelling mammals would fall in. The traps were located in a variety of sites, usually where there were some signs of animal activity, but with care taken to hiding the traps from cats, dogs, and people. The five locations chosen were as follows (see Appendix IV, Figure 2, for 1-j to 5-j in squares):

(1) under a hedge bordering an uncultivated field with dense honeysuckle, and with oak, hickory, dogwood and many pines for an overcover;

(2) at the edge of the forest where the slope levels out, with a lower-story of oak and hickory, an upper-story predominately of pine, and a ground cover of dense honeysuckle;

(3) near a dirt road on level, high ground with an upper-story predominately of pine, a lower story of oak and hickory, and a dense ground-cover of honeysuckle;

(4) on a steep slope near a stream edge with a scattering of tall oaks, sycamores, and elms, and a lower-story of ironwood and dogwood, but relatively little vegetation on the ground;

(5) close to the stream in a low, moist area with a canopy of tall tulip poplars and sycamores, with a variety of shrubs and trees in the under-story, including

much honeysuckle;

(6) under a powerline on high ground with tall oak and hickory forest around, buried in a digging that was just below the surface and ran across the cut area under the powerline.

Various baits were tried for different periods and in different combinations, including apple chunks, bread, crackers, peanut butter, honey, tuna, insects, and an earthworm. Traps 1-j to 5-j were run for twenty-eight days and were checked ninteen times between October 22 and November 26. Trap 6-j was run from February 2-6.

Metal live traps (Havahart Traps No. 0, No. 1, and No. 3a) were also used. The smaller traps (No. 0) were used in a distribution study to be explained later. The larger two traps were set in selective locations with the best chances for finding specific animals, such as raccoons, muskrats, or opossum. Numbers were assigned to these two traps, the larger (42" X 11" X 13") being 7-L and the smaller (18" X 5" X 5") being 6-L. Trap 7-L was so large that it could not be easily moved about. It was set with a variety of baits that might attract such animals as foxes, muskrats, opossum, raccoons, or skunks. These baits were suggested by W. E. Sanderson (1969) in a booklet on Havahart Traps. Trap 6-L was also set for specific animals such as chipmunks, flying squirrels, mink, muskrat, rat and opossum (see Appendix I for locations, bait, and results of these two traps). Both traps were well camouflaged to avoid interference from dogs and people. They were set in locations where they would least likely be dis-

covered. Relocating these traps never proved to be a problem although occasionally ribbon markers were used to help relocate the smaller traps.

Five small Havahart Traps (No. 0, 10" X 3" X 3"), were used in a distribution survey established by Hanson (1968). This system allows for calculated estimations of population densities based on cursory observations. For this study the College Woods was divided into the following three areas: (1) pine-oak stands on high ground, (2) low, moist ground near streams, and (3) oak-hickory stands. Intermediate areas were excluded and other factors such as distance from the stream or fields, density and height of brush, and proximity to roads were noted but not considered as separate areas. Within each of the three areas, five sample plots were established with a No. 0 Havahart Trap for each plot. The traps were moved about within these plots to the best advantage of trapping techniques. For approximately five days the traps would be run in one area, then they would be moved to a second area, rotating around the three areas twice (see Appendix II for locations, bait, and results of these traps). The formula used for the distribution estimates was (Hanson, 1968):

$$\hat{K} = \frac{x_1}{1-\left(\sum_{i=2}^{n} x_i \Big/ \sum_{i=1}^{n-1} x_i\right)^{1/2}}$$

$\hat{K}$ = estimated total population
n = number of surveys
x_i = total number of observations
i = 1,2, . . .

$\sum_{i=2}^{n} x_i$ = sum of observations on all surveys except the first

$\sum_{i=1}^{n-1} x_i$ = sum of observations on all surveys except the last

A "universal bait" was use in these traps, usually consisting of peanut butter, oatmeal, rye bread, crackers, honey, and peanuts. The traps were set for mice, voles, shrews, and other small mammals. Locations were chosen where these animals would most likely be found, usually in decaying stumps or under fallen logs, which also provided shelter from snow and rain and helped in hiding the traps. In order to use Hanson's method, traps were run on their particular plots until an animal was caught, then the trap would be removed from that plot and relocated elsewhere until all of the traps were moved to the next area. This allowed for trapping with No. 0 traps outside of the systematic research pattern. These miscellaneous traps, assigned the numbers 1-0 to 5-0, were set in places where animal activity was noticed outside of the areas covered by the distribution study (see Appendix II).

CHAPTER III

RESULTS

Trapping results in general were a 17 % success (including only Havahart Traps). The largest Havahart Trap (7-L) had the best results with a 30 % success. It caught six different opossums (Didephis marsupialis), three domestic cats (Felis domestica), and two birds, the Towhee (Pipilo erythrophthalmus), and White-throated Sparrow (Zonotrichia albicollis). The second largest trap (6-L) had a 24 % success, including trapped birds, but only a 5.4 % success with mammals. Only one Harvest Mouse (Reithrodontomys humulis), one opossum and seven birds, all White-throated Sparrows, were caught in this trap. Possibly, the lack of success was due to the fact that this trap was intermediate in size. Most animals were either too small or too large to fit into this trap (the opossum had somehow squeezed in until it filled the whole trap).

No. 0 Havahart Traps in Area I had a 9.6 % success, those in Area II had 5.7 %, and those in Area III had 15.9%. A majority of the times that the traps were checked, there was some sort of interference, so a comparison was made of the number of times the traps were not touched at all to the number of successes (see Table I).

Table I indicates a greater success in oak-hickory

TABLE I

TRAPPING SUCCESS

Trap numbers	No. of times untouched		No. of successes		Percent success
7-L	10		9		30.0 %
6-L	14		2		5.4 %
Area I					
1-a	3		0		
2-a	7		1		
3-a	9	(av. 5)	1	(av. 1.2)	9.6 %
4-a	2		3		
5-a	4		1		
Area II					
1-b	8		1		
2-b	7		0		
3-b	4	(av. 6)	0	(av. 0.6)	5.7 %
4-b	3		1		
5-b	8		1		
Area III					
1-c	7		2		
2-c	1		3		
3-c	5	(av. 4.4)	1	(av. 1.4)	15.9 %
4-c	5		1		
5-c	4		0		

stands than in the other two areas. Area II was often flooded which is probably the reason this area had the lowest success.

According to Hanson's distribution survey (1968) there was an estimated 3.6 mice in Area I, 6.7 in Area II and an average of 5.0 for all three areas. No estimation could be made for Area II as allowance was not made in Hanson's formula for zero observations in a survey. Comparing the study areas to the total woods would give an approximate total mouse population (all species included) of 73 to 125. This was calculated by estimating each trapping plot to be representative of 22,000 to 29,000 sq. ft. respectively. The total unrepresented area was found by subtracting the studied areas and unlivable areas (roads, houses, and streams) from the total area of the College Woods. The population of White-footed Mice (Peromyscus leucopus) was estimated to be an average of 3.4 per study area. This would mean somewhere between 63 and 84 White-footed Mice in the total woods, assuming that the forest was well represented by the particular study areas.

Area I traps were run for as many as fifteen trapping nights in three series (Nov. 8-12, 21-25, Jan. 13-18). Area II was trapped for thirteen days in two series (Nov. 30- Dec. 5, Jan. 19-25). Area III was trapped for ten days in two series (Dec. 4-10, Jan. 26-30).

As indicated earlier, five jar traps were run for twenty-eight days from Oct. 22 to Nov. 26, and one trap was run for four days from Feb. 2 to Feb. 6. These traps did not prove at all successful inspite of great care in selecting their locations, in hiding scents, in avoiding unnatural appearances,

and in careful setting of the traps. Rain proved to be one problem, for it left bad smelling water that might have warned away small mammals.

Appendix II contains a summary of the results from the miscellaneous No. 0 Havahart Traps. Five traps were run at different times from Nov. 23-24 to Dec. 6-13 to Feb. 6-10. One White-footed Mouse was caught on Feb. 8 in an oak-hickory stand (3-0), and a Pine Vole (Pitymys pinetorum) was caught in a buried trap (4-0) under a powerline on Feb. 11. The other traps (1-0, 2-0, and 5-0) were unsuccessful.

CHAPTER IV

DISCUSSION

In Appendix III is a summary of all trappings, sightings and tracking identifications. Twenty different species were listed, of which seven were trapped, sixteen were sighted directly by the researcher or by others, and thirteen were tracked.

One sighting of a bat (species undetermined) was made early in the survey (November 23). It could have been any one of the twelve species found in this area as listed in Appendix IV. The scarcity of bats indicates that there are no large bat caves or roosting sites in the immediate vicinity. Bats are found only at dusk and spend most of their time hiding in cavities or roosting in trees where they are difficult to find (Golley, 1962).

A Black Bear (Ursus americanus Pallas) was reported in the Maryville community in the spring of 1969. This bear, as well as others, probably roamed down from the hills. The Black Bear is the only large, black animal in the area and might be confused only with wild boars or young black cattle at a distance.

Domestic cats were trapped three times in this survey, each one with different markings. Although they were rarely seen, the number of tracks (nine) indicated that cats fre-

quently visit the College Woods, probably from the neighboring residences. They appear irregularly but probably take a heavy toll of birds and small mammals.

The chipmunk (Tamias striatus L.) is supposed to be common to the area, but only one sighting was reported. Tamias is a small, russet-colored squirrel with five dark stripes and two white marks on the sides of the head and back, with the same color on the underparts. The bushy tail is gray on the upper side and russet on the lower. It is found mostly in open woodland, with an average home range of 0.37 acres for adult males, varying from 4 to 9 per acre. The den is burrowed 30 or more feet into the ground, with a wide entrance (Golley, 1962). Diggings attributed to woodchucks in the College Woods may actually belong to the chipmunk, but both are inactive for most of the winter and could not be identified by sight in this survey.

The Eastern Cottontail (Sylvilagus floridanus J. A. Allen) and the New England Cottontail (Sylvilagus transitionalis Bangs) are found in the area (Burt, 1961). The Eastern Cottontail is a medium-sized rabbit with long ears. Undersides are white with the rest of the body in various shades of grayish or reddish buff. Upland woods and open areas are its common habitat, with special preference for old fields. Their grass-lined nests are well concealed in thickets, along logs, or in dense grass. In Pennsylavania 13.5 rabbit nests were found per acre. Home range is approximately 1.4 acres for adult males, varying from 0.15 to 4.9 acres (Golley, 1962).

The New England Cottontail or Wood Rabbit is smaller than the Eastern Cottontail and has shorter ears. A black patch between the ears contrasts with the pinkish buff fur mixed with black hairs. Open woodlands are preferred to overgrown fields (Golley, 1962).

Of these two rabbits, the Eastern Cottontail is probably the one most often seen in the College Woods. It was sighted at least twelve times in this survey and was tracked about six times. Comparing the locations where sightings were made to the overall woods, it is estimated that there are fewer than fifteen rabbits to be found here.

The Whitetail Deer (Odocoileus virginianus Zimmermann) was never reported as having been seen in the College Woods, although several winters ago, deer tracks were noticed by Dr. and Mrs. Campbell (who reside in the College Woods) after a severe storm which drove the deer out of the nearby hills. This is the only animal of its kind in the area, the elk having been extirpated many years ago. Wild pigs might be confused with a deer at a distance, but the deer is so much thinner and taller that any view at close range will serve for positive identification. Deer are found from deep forests to woodlots on farmland, preferring mostly the brushy stage of successional progression. Thirty two acres are needed for the home range of one deer (Golley, 1962).

A wide variety of domestic dogs roam through the College Woods -- most of them hunting dogs, and usually of some type of beagle. None were trapped, but in the sixty days that the woods were inspected, seventy sightings were recorded (not

each of a different dog), and their presence was commonly reported by others. Thirty-one dog trails were counted, more than any other animal except squirrels, but this figure is questionable since dogs run in large loops when hunting, and the trail of a single animal may have been found in different places. Dog footprints are the predominate marks on trails all year round, but it was only after snowfalls that dog tracks were counted. Few dogs, if any, reside in the woods, most belonging to nearby residences. There they receive food, water, and shelter, using the woods only for "recreation," most likely to the detriment of the wildlife populations.

Both the Gray Fox (Urocyon cinereoargenteus Schreber) and the Red Fox (Vulpes fulva Desmarest) are found in the East Tennessee area (Burt, 1961). According to Golley (1962), they are medium-sized carnivores with gray pelage on the upper parts of the former and yellowish-red on the back and tail of the latter. Tips of the tails of the Gray and Red Foxes are black and white respectively. The Gray Fox is found in a combination of field and forest, locating its den in dense thickets near water. More open habitat is preferred by the Red Fox who burrows deep into the ground in making a den that may support several families. The range varies from two miles in the spring to fifteen or more miles in the fall (Golley, 1962). Foxes appearing in the College Woods are probably on the outskirts of their range, for the pressure of dogs and hunting are too much for making a residence. Only the Gray Fox was sighted in the Woods, and that only rarely by others. Diggings were found that appeared to have

been done by a fox trying to get at an underground honeycomb.

Mice were never reported as sighted, for they are very shy creatures and spend most of their time well hidden under shrubs and leaves, coming out only at night. Mouse tracks were seen in the snow, but identification as to species was impossible. Only through trapping could positive identification be made. Three kinds of mice were trapped, the Deer Mouse (Peromyscus maniculatus Wagner), the Harvest Mouse (Reithrodontomys humulis Audubon and Bachman), and the White-footed or Wood Mouse (Peromyscus leucopus Rafinesque).

The Deer Mouse is recognized by its sharply bicolored tail which is almost as long as one-half the total length of the whole animal. The pelage varies from pale gray to red-brown with a dark midstripe down the back. It is commonly found in oak-hickory forest, usually at higher elevations. Dens are found in hollow logs, trees or fallen logs. Seeds and berries are stored for the winter months, although the mice do come out occasionally to feed (Golley, 1962). Only one Deer Mouse was trapped in the oak-hickory area; no sign of this species was noted anywhere else.

A Harvest Mouse looks much like a House Mouse with its brownish-gray pelage, long tail, long ears, and grooved incisors. It prefers abandoned fields and brushy or grassy areas as well as honeysuckle thickets. The nests are composed of shredded leaves and plant fibers, found on the ground or a little above the ground in a clump of grass. They are grainivorous, feeding on small grass and herb seeds, but storing little. Their home range varies from 0.42 to 1.65

acres (Golley, 1962). Two Harvest Mice were trapped in this survey, both in the pine-oak area; no other signs were noted.

The White-footed Mouse is about the same size as the Deer Mouse, but the tail is less than one-half the total body length and is usually not bicolored. According to Golley (1962), the winter pelage is gray-brown with white underparts. Oak-hickory forests with dense undergrowth provide a suitable habitat, although they may often be found in hardwood river-bottom forests. Nests are located in hollow logs, tree cavities, old squirrel nests, in ground burrows, and near buildings. Sixty-eight percent of their diet is of plant origin, including seeds of berries, grass, oak, and conifers. In Michigan population densities varied from 3.08 to 10.87 mice per acre, with the greatest densities occuring in the fall (Golley, 1962). This was the most often trapped animal in the survey. It was found two or three times in each of the areas (Pine-Oak Stands 3; Low, Moist Ground 2; and Oak-Hickory Stands 3). By Hanson's distribution survey, there are an estimated 63 to 84 White-footed Mice in the College Woods. This would mean a density of 0.76 to 1.01 mice per acre.

The Opossum (Didelphis marsupialis L.) is the only representative of the order Marsupialia found in the area. Golley (1962) describes the opossum as a cat-sized animal with fur varying from almost white to dark gray with black underfur. An omnivorous habit allows it to eat almost any vegetable or animal food available, although insects are preferred. The range includes deciduous forests in bottomlands and along streams. Fallen logs or ground burrows are needed for pro-

tection during the day because the opossum is strictly nocturnal. Although highways take a heavy toll of opossums, they are one of the most common mammals in the state. Opossums along with squirrels were the most often reported sightings by almost everyone who was asked. Seven different opossums were trapped in this survey, but only a few times were they sighted personally because traps were usually checked during the day when opossums were not moving.

The Raccoon (Procyon lotor L.) is an easily recognized, medium-sized mammal with a ringed tail and masked face. The fur color varies from yellowish-gray to black. Golley (1962) indicates that their range includes farm land and mixed woodlands as well as marshes and uplands. This home range varies from one raccoon per 16 acres to one per 46 acres. Seventy-five percent of their diet consists of vegetables, and the rest is of various animals. Although they were never trapped in this survey, there is sufficient evidence from tracks and reported sightings that raccoons do occasionally visit the College Woods. Apparently one resided here for about a month in the early winter.

A number of rats are found in the East Tennessee area, including the Eastern Wood Rat (Neotoma floridana Ord), the Northeastern Wood Rat (N. magister Baird), the Rice Rat (Oryzomys palustris Harlan), the Norway Rat (Rattus norvegicus Berkenhout), and the Hispid Cotton Rat (Sigmodon hispidus Say and Ord)(Burt, 1961). None were trapped or tracked in the College Woods although there were reports of sightings in the area. Rats are apparently rare here, for even in prime loca-

tions there are no signs of them.

The Short-tailed Shrew (Blarina brevicauda Say) is about the same size as a small mouse. Its tail is very short, and its pelage is a velvety slate-gray. Ears are hidden in the fur and the nose is pointed as in other shrews. They are most often found in moist, deciduous forests where snails, earthworms, and other invertebrates are abundant. It tunnels under leaves and humus in search of prey. Dens are made of grass, leaves or hair and are found under logs or in burrows. The shrew is active throughout the year (Golley, 1962). In this survey, two shrews were caught in low areas of the pine-oak forest. They were often seen in oak-hickory woods, usually in low areas. Several days after a snowfall, many tunnels would be found in the lowest layer of snow. They were probably made by shrews searching for food along the surface of the ground.

Of skunks, both the Striped Skunk (Mephitis mephitis Schreber) and the Spotted Skunk (Spilogale putorius L.) (Burt, 1961) are found in East Tennessee. Golley (1962) describes the former as having a black coat with varying white stripes, while the latter has dorsal stripes breaking into spots on the rear. Tails are bushy and noses pointed on both. Stripe patterns vary with individual skunks. They are abundant on agricultural land and open wasteland. The Striped Skunk nests in old mammal burrows or under buildings, while the Spotted Skunk dens in trees as it is a more able climber. Both are nocturnal omnivores, their diets including fruit, insects, small mammals, and carrion. In East Tennessee the

Striped Skunk is more abundant than the Spotted Skunk (Schultz, 1954). The only evidence of skunks in the College Woods was their odor and reported sightings by others. They apparently wander into these woods frequently.

Three squirrels are found in East Tennessee, the Gray Squirrel (Sciurus carolinensis Gmelin), the Fox Squirrel (Sciurus niger L.), and the Red Squirrel or Chickaree (Tamiasciurus hudsonicus Erxleben)(Burt, 1961). Of these, only the Gray Squirrel was reported. According to Golley (1962), this is a large tree squirrel with a gray coat and a long, bushy tail. It is found in hardwood forests, preferably in oak-hickory woods, but they seem readily adaptable to city living. Their shelters are in den trees or in temporary leaf nests. Hickory nuts, acorns, pecans, beechnuts, buds, roots, fruit, leaves, and insects make up the squirrel's diet. In West Virginia their density was found to range from 0.2 to 1.5 squirrels per acre (Golley, 1962). In the College Woods, more squirrel trails were found in fresh snow than all of the other trails combined. Squirrels were sighted or heard fifty-eight times during twenty-one of the sixty days of research. This would average out to about three sightings per day, counting only days on which squirrels were seen. As many as nine squirrels were seen in one day. Sightings were kept separate by only counting squirrels that were seen well apart from each other, unless several were seen at once. Their strict feeding habits during only certain parts of the day restricted sightings to days when traps were checked at those times. From sightings it was estimated that one squirrel could be found

every 100 yards which would mean about 125 squirrels in the College Woods. Other estimations were made by counting the number of squirrel trails after a snowfall; then, by comparing the distance traveled to the total forest area, a ratio could be set for the number of squirrel tracks seen to the total squirrel population. These estimates ran from 37 to 70 to 125 squirrels. Because these estimates were made from counts taken shortly after severe weather, the estimates might have been low.

Two kinds of flying squirrels are found in the area, the Northern (Glaucomys sabrinus Shaw) and the Southern (G. volans L.)(Burt, 1961). Golley (1962) describes them as small squirrels with dense, silky fur and unusually large eyes. The tail is flattened and a loose flap of skin extends from the wrist to the ankle, allowing the squirrel to glide from tree to tree. They are most often found in hardwoods, but because of their nocturnal habits, they are rarely seen by humans. Their diet includes acorns, hickory nuts, seeds, fruits, insects, and small birds. Dr. and Mrs. Campbell reported that the only sightings in the College Woods were thought to be of an escaped pet.

The Pine Vole (Pitymys pinetorum LeConte) is a mouse-like mammal with short, rounded ears and a medium-short tail. The pelage is dense and soft with dark chestnut on the back and sides and gray on the underparts (Golley, 1962). It is rarely found in pine stands but lives instead in deciduous forests inspite of its name (Burt, 1961). Two Pine Voles were trapped, both along or near a powerline running through tall

oak-hickory forest. Tracks and diggings are easily confused with those of shrews, moles, and mice. Their long, subterranean tunnels were found commonly on upland areas. Two sightings were recorded but identification relied on later evidence, such as trappings.

Golley (1962) describes the Woodchuck or Ground Hog (Marmota monax L.) as a large, well-furred rodent with a short tail and short, round ears. Its legs are adapted to digging and traveling close to the ground. Pelage varies from a grizzled yellow-gray to dark brown, with underparts of a lighter color. This mammal is found in wooded and semi-cultivated areas with a recognizable den burrow surrounded by a mound of dirt. They rarely go more than 100 feet from their dens. Woodchucks are diurnal during most of the year except during the winter when they hibernate. Their diet consists of various grasses and herbs (Golley, 1962). Although common to the area, only doubtful signs were found in the College Woods. No reported sightings were made.

CHAPTER V

CONCLUSION

As stated in the introduction, this is a report of a survey of the mammals of the Maryville College Woods, an isolated woodlot within the city limits of Maryville. This study has emphasized the reporting of the mammals found, with suggestion as to what animals might appear if hunting, trapping, and stray animals were controlled. The results are surprizingly poor for the amount of time put into this research (105 field hours). Some of the problems that were run into included upsetting of the traps by squirrels (65 cases of interference are blamed on squirrels as they are the only animals that would take the bait out of a trap, upset the trigger, and not get caught. Smaller animals would have been caught, and larger animals would have removed the trap from its position, or at least left signs of their presence in the surrounding leaves and twigs). Freezing of the traps after heavy snow or severe cold, flooding which prevented the traps from being checked at times, and camouflaging also reduced the percent of success. This last problem was at the fault of the researcher who sometimes prevented the trap's mechanism from functioning correctly by over-cautiously hiding the traps from people and dogs. But the major reason the results were so poor is evidently because there simply were not many mammals in these woods.

During this winter survey the number of strollers in the woods was at an expected low, although two or three men took regular walks on pleasanter days (always with their dogs), and on very warm days as many as a dozen people might be found in the woods. Inspite of occasional group events, most people were undestructive and did no more than walk through and enjoy the woods; on the other hand, litter was common, the picnic grounds were poorly treated, and as many as eight hunters were seen with firearms. Most of these hunters were spoken to, but they either indicated that they had some sort of clearance or that the law had never bothered them before. Cats hunted at night, and any estimate of their destruction to the wildlife population would only be a guess. Dogs are far more obvious, but, somehow, they are almost totally ignored. They were found on an average of 1.2 dogs on each of the sixty days the woods were checked. Rabbits, squirrels, opossums, raccoons, skunks, and foxes as well as many other animals probably have their populations greatly reduced in this area by the incessant hounding by domestic dogs. Robert Ardrey recently stated (1970), "An infinite variety of self-regulatory mechanisms, physiological and behavioral, provide that animal numbers -- except in the case of climatic catastrophe -- will never challenge the carrying capacity of the environment." However, the invading dogs and cats in the College Woods are not controlled by these "self-regulatory mechanisms" because they find sanctuary with their human masters who provide shelter, food, and drink, and satisfy almost every other instinct except hunting which is expressed

in the College Woods.

Opossums and squirrels were reported as the most commonly found wild mammals in these woods. These are also animals whose population increases with the spread of civilization, opossums being found on most farms within their range and squirrels adapting even to city life. The truly wild animals have long ago been extirpated from the College Woods, leaving animals that more easily adapt to the pressure of man. In this sense, the College Woods are quite similar to a city park.

PREFIX TO APPENDIXES I AND II

Listed dates for Appendixes I and II indicate the day on which the trap was set out or the day on which the bait was changed. Results were found the day after but are written on the same line. Therefore, where the listing indicates Dec. 1, it was on that date that the trap was set, but results, which were actually found on Dec. 2, are written on the same line with Dec. 1. Two dates appearing on the same line indicate that the traps were not checked one day. For instance, Dec. 9-10 would mean that the traps were checked only on the 11th and not on the 10th, combining the results of two days.

Location numbers are indicated on the maps in Appendix V. The first map describes the College Woods in general while the second map indicates the various plots on which traps were set. Jar traps are written in squares, No. 0 Havahart Traps for Area I are in one circle, traps for Area II are in two circles, and traps for Area III are in three circles. Location descriptions are found at the end of each section for Appendix I and at the beginning of each section for Appendix II. Further explanation as to why the woods were divided in this manner may be found in Chapter II.

The various baits used were abbreviated in order to fit them into the limits of the page. They are listed in order of the most often used bait to the least used. The abbreviations are as follows:

TABLE II

BAIT ABBREVIATIONS

pb = peanut butter	kc = kidney and chicken parts
om = oatmeal	tn = tuna
br = rye bread	sm = salmon
cr = crackers	ap = apple
hn = honey	ce = cheese
pt = peanuts	gp = grape
pc = popcorn	tm = tomato
sd = sardines	ss = Sugar Smacks (cereal)
cb = cabbage	

Results were shortened to a brief phrase in order to help simplify the listings. "Untouched" indicates that no animal tried the bait or bumped the trap. "Locked but empty" might mean that the trap was set off by a breeze or other slight movement or that a larger animal attempted to get at the bait. It upset the trigger but did not get inside, or if it got inside it was large enough to prevent the doors from locking and could back out. "Sprung but unlocked" indicates a mechanical error, such as when leaves or twigs prevent the latches from sliding all of the way into the locked position, allowing the animal to escape. "Unsprung" means that the trigger was not released at all, either by mechanical fault or because snow and extreme cold kept the trap proped open. "Overturned" refers to the trap being tipped on its side or rolled all of the way over. When a trap is upside-down it cannot lock.

Only common names of trapped animals were used. Scientific names and more details on each species may be found in Chapter IV.

APPENDIX I

RESULTS FROM NO. 3a HAVAHART TRAP (7-L)

Date	Location*	Bait	Results
Dec. 1	7-La	hn,sd,cb	untouched
2		"	Opossum
4		pb,cr,sd,cb	sprung but unlocked
5		"	untouched
6		"	Opossum
7	7-Lb	pb,br,hn,sd,cb	locked but empty
8		"	untouched
9-10		"	locked but empty
11		tn	locked but empty
Jan.14		pb,br,kc	untouched
15		"	Domestic Cat
16		cb,kc	untouched
17		"	locked but empty
18		"	locked but empty
19		"	untouched
20		"	unsprung
21		cb,sm	locked but empty
22		"	Sparrow and Towhee
23-24		sparrow	locked but empty
27		pb,om,br,cb	locked but empty
28		"	Opossum
29		no bait	untouched
31	7-Lc	hn,cb,sm	Domestic Cat
Feb. 1		pb,br,cr,hn	untouched
2		"	Opossum
3		sd,tn	untouched
6		"	Opossum
7		pb,br,sd	untouched
8		pb,br,cb,sd	Opossum
9		sd	Domestic Cat

* See the end of this appendix for location descriptions and Appendix V for maps.

Total number of trapping nights: 32

Location Descriptions: (next page)

APPENDIX I -- Continued

7-La-- forty yards from a pasture; twenty yards from a stream; tall tulip trees and sycamores common; thick shrubs and honeysuckle.

7-Lb-- under a shed near a house in the woods; low area with oaks and sycamore surrounded by pine; near an open field.

7-Lc-- at the edge of the forest, fifteen yards from a field; twenty yards from a stream; under a dense cover of honeysuckle and shrubs.

APPENDIX I -- Continued

RESULTS FROM NO. 1 HAVAHART TRAP (6-L)

Date	Location	Bait	Results
Nov. 21	6-La	pb,om,br,hn	unsprung
22		"	unsprung
23		tn	unsprung
24		pb,cr,hn,pt	Harvest Mouse
25	6-Lb	pb,br,hn,cb	untouched
30	6-Lc	"	untouched
Dec. 1		"	locked but empty
2		"	Carolina Wren
3		"	Opossum
4	6-Ld	pb,cr,pt,pc	locked but empty
5		pb,br,hn,pt,pc	untouched
6		"	untouched
7		"	overturned
8	6-Le	pb,br,cb,ap	locked but empty
9		"	locked but empty
11		pb,cr,hn	overturned
Jan. 14	6-Lf	kc	untouched
15		"	untouched
16		"	unsprung
17		shrew	locked but empty
18		pb,br,cr	locked but empty
19	6-Lg	pb,om,br,cr,hn	Sparrow
20		pb,br,cr,pt	Sparrow
21		sm	Sparrow
22		no bait	Sparrow
23		"	untouched
26	6-Lh	pb,om,br,hn,cb	untouched
27		"	locked but empty
28-30		"	overturned
31	6-Li	pb,cr,ce,ss	untouched
Feb. 1		"	untouched
2		"	Carolina Wren
3		"	Carolina Wren
6		"	untouched
7		"	untouched
8		"	untouched
9-10	6-Lj	pb,br,cr,ce	untouched

Total number of trapping nights: 39

Location Descriptions: (next page)

APPENDIX I -- Continued

6-La-- near a pine stand with very dense honeysuckle and shrubs; high ground.

6-Lb-- on low ground near a stream; in a deep thicket of brush and honeysuckle.

6-Lc-- low ground 30 yards from a stream; 25 yards from a pasture; low honeysuckle; dense stand of saplings; tall oaks and sycamores scattered about.

6-Ld-- on a low area surrounded by a stream; tulip tree and hackberry overcover; privet stand.

6-Le-- on low ground 20 yards from the stream; dense honeysuckle and brush in an old field returning to forest; pastures near by; scattered tall oaks.

6-Lf-- in a gully on higher ground; 50 yards from the stream; low cover of honeysuckle; overstory of sycamore and pine trees.

6-Lg-- in pine woods on higher but level ground; honeysuckle dense nearby.

6-Lh-- low ground 20 yards from the stream; dense vines, honeysuckle and brush nearby.

6-Li-- in a shed near a house in the woods; amidst trash and logs.

6-Lj-- on high ground with scattered tall oak-hickory forest and thin undercover.

APPENDIX II*

RESULTS FROM NO. 0 HAVAHART TRAPS

Area I (Pine-Oak Stands on High Ground)

Plot 1-a (Located on the top of a knoll in dense oak and pine growth to about forty feet; honeysuckle in dense clumps)

Date	No. of Trapping Nights	Bait	Results
Nov. 8		pb,om	untouched
9		"	sprung but unlocked
10-12	5	pb,om,cr,hn	overturned
21		pb,om,br,hn	sprung but unlocked
22		"	sprung but unlocked
23		pb,om,br,cr,hn	locked but empty
24		pb,om,br,cr,hn,pt	untouched
25	5	"	sprung but unlocked
Jan. 13		pb,br,cr,hn,pt	locked but empty
14		"	locked but empty
15		"	overturned
17		pb,br,pt	untouched
18	5	"	locked but empty

* See Appendix V for locations on a map, and prefix to Appendixes I and II for meanings of abbreviations.

APPENDIX II -- Continued

Plot 2-a (Located on high, sloping ground in an area predominately of pine with scattered oaks and honeysuckle.)

Date	No. of Trapping Nights	Bait	Results
Nov. 8		pb,om	untouched
9		"	untouched
10-12	5	"	unsprung
21		pb,om,br,hn	sprung but unlocked
22		"	untouched
23		"	untouched
24		"	untouched
25	5	"	untouched
Jan. 13		pb,br,cr,hn,pt	untouched
14		"	locked but empty
15		"	locked but empty
16		"	overturned
17	5	pb,br,pt	White-footed Mouse

Plot 3-a (Located in a hilly area with many pines and oaks; much undergrowth and honeysuckle close to the ground.)

Date	No. of Trapping Nights	Bait	Results
Nov. 9		pb,om	untouched
10-12	4	"	untouched
21		pb,om,br,hn	locked but empty
22		"	untouched
23		"	untouched
24		pb,cr,hn	untouched
25	5	"	Harvest Mouse
Jan. 13		pb,br,cr,hn,pt	untouched
14		"	untouched
15		"	untouched
16		"	untouched
17	5	"	overturned

APPENDIX II -- Continued

Plot 4-a (Located in a thick stand of tall pine on level ground with only occasional clumps of honeysuckle.)

Date	No. of Trapping Nights	Bait	Results
Nov. 9		pb,om	untouched
10-12	4	"	locked but empty
21	1	pb,om,br,hn	White-footed Mouse
Jan. 13		pb,br,cr,hn,pt	untouched
14		"	unsprung
15		"	Shorttail Shrew
16		"	overturned
17		"	overturned
18	6	pb,br,cr,hn	Shorttail Shrew

Plot 5-a (Located on level ground with a scattering of tall pines; open areas nearby with much honeysuckle; near a pasture.)

Date	No. of Trapping Nights	Bait	Results
Nov. 9		pb,om	sprung but unlocked
10-12	4	pb,om,cr,hn	White-footed Mouse
21		pb,om,br,hn	untouched
22		"	overturned
23		pb,om,br,cr,hn	untouched
24		"	overturned
25	5	"	locked but empty
Jan. 13		pb,br,cr,hn,pt	sprung but unlocked
14		"	untouched
15		"	locked but empty
16		"	locked but empty
17		"	locked but empty
18	6	"	untouched

Area II (Low, Moist Ground)

Plot 1-b (Located near a spring; rocky ground with hickory and ash common; dense undergrowth.)

Date	No. of Trapping Nights	Bait	Results
Nov. 30		pb,br,hn,pt,pc	untouched
Dec. 1		"	untouched
2		"	untouched
3		"	Carolina Wren
4		pb,cr,hn,pt,pc	untouched
5	6	"	untouched
Jan. 19		pb,om,br,cr,pt	locked but empty
20		"	locked but empty
21		"	locked but empty
22		"	untouched
23-24		"	untouched
25	7	"	untouched

Plot 2-b (Located in a low area covered with grasses near several springs and an old springhouse; tall sycamore and ash common; scattered honeysuckle.)

Date	No. of Trapping Nights	Bait	Results
Nov. 30		pb,br,hn,pt,pc	untouched
Dec. 1		"	untouched
2		"	locked but empty
3		"	locked but empty
4		pb,cr,hn,pt,pc	untouched
5	6	"	untouched
Jan. 19		pb,om,br,cr,pt	untouched
20		"	locked but empty
21		"	untouched
22		"	untouched
23-24	6	"	locked but empty

APPENDIX II -- Continued

Plot 3-b (Located near the stream on low ground covered with shrubs and dense undergrowth; few tall trees but much forest debris.)

Date	No. of Trapping Night	Bait	Results
Nov. 30		pb,br,hn,pt,pc	overturned
Dec. 1		"	overturned
2		pb,cr,pt,pc	locked but empty
3		"	locked but empty
4		pb,cr,hn,pt,pc	untouched
5	6	"	untouched
Jan. 19		pb,om,br,cr,pt	untouched
20		"	untouched
21		"	frozen open
22		"	overturned
23-24	6	"	overturned

Plot 4-b (Located between a stream and a pasture in thick underbrush and windfalls; scattered tall sycamore.)

Date	No. of Trapping Nights	Bait	Results
Nov. 30		pb,br,hn,pt,pc	sprung but unlocked
Dec. 1		"	sprung but unlocked
2	3	pb,cr,pt,pc	White-footed Mouse
Jan. 19		pb,om,br,cr,pt	untouched
20		"	untouched
21		"	frozen open
22		"	untouched
23-24	6	"	overturned

APPENDIX II -- Continued

Plot 5-b (Located in a low area near a stream and pasture with an overcover predominately of sycamore and ash; dense brush and honeysuckle.)

Date	No. of Trapping Nights	Bait	Results
Nov. 30		pb,br,hn,pt,pc	untouched
Dec. 1		"	untouched
2		"	untouched
3	4	"	White-footed Mouse
Jan. 19		pb,om,br,cr,pt	untouched
20		"	untouched
21		"	untouched
22		"	untouched
23-24		"	untouched
25	7	"	locked but empty

Area III (Oak-Hickory Stands)

Plot 1-c (Located in a low area near a stream with tall oaks and sycamore above and thin underbrush below.)

Date	No. of Trapping Nights	Bait	Results
Dec. 4		pb,cr,hn,pt,pc	untouched
5		"	untouched
6		"	untouched
7		"	untouched
8		"	sprung but unlocked
9-10	6	"	Deer Mouse
Jan. 26		pb,om,br,cr,hn,pt	untouched
27		"	untouched
28		"	untouched
30	4	"	Carolina Wren

APPENDIX II -- Continued

Plot 2-c (Located on low, level ground with several tall oaks and hickorys around; undergrowth dense to about twenty feet.)

Date	No. of Trapping Nights	Bait	Results
Dec. 4		pb,cr,hn,pt,pc	untouched
5	2	"	White-footed Mouse
Jan. 26		pb,om,br,cr,hn,pt	overturned
27		pb,br,cr,hn,pt	locked but empty
28		"	Carolina Wren
29		no bait	locked but empty
30	5	pb,br	White-footed Mouse

Plot 3-c (Located near a house in the woods; under large oaks and hackberrys surrounded by pines; relatively little under-brush and open areas nearby but thick honeysuckle on the ground.)

Date	No. of Trapping Nights	Bait	Results
Dec. 6		pb,cr,hn,pt,pc	untouched
7		"	untouched
8		"	untouched
9-10	5	"	sprung but unlocked
Jan. 26		pb,om,br,cr,hn,pt	untouched
27		"	locked but empty
28		"	untouched
29		"	locked but empty
30	5	"	Carolina Wren

APPENDIX II -- Continued

Plot 4-c (Located on high, level ground near a powerline; several tall oaks were nearby; undergrowth and honeysuckle dense.)

Date	No. of Trapping Nights	Baits	Results
Dec. 6		pb,cr,hn,pt,pc	untouched
7		"	untouched
8		"	Pine Vole
9-10	5	pb,br,cr,hn,pt,pc	locked but empty
Jan. 26		pb,om,br,cr,hn,pt	untouched
27		"	locked but empty
28		"	locked but empty
29		"	untouched
30	5	"	untouched

Plot 5-c (Located on high ground in tall oak forest scattered with pines; undergrowth dense.)

Date	No. of Trapping Nights	Bait	Results
Dec. 6		pb,br,cr,hn,pt,pc	overturned
7		"	overturned
8		"	untouched
9-10	5	"	untouched
Jan. 26		pb,om,br,cr,hn,pt	untouched
27		"	locked but empty
28		"	locked but empty
29		"	untouched
30	5	"	locked but empty

APPENDIX II -- Continued

Miscellaneous Trapping with No. 0 Havahart Traps

1-0 Located near the cemetary in a low, gully-like area; set in deep grass and vines near a thick stand of saplings. Untouched from December 6 to 11.

2-0 Located inside a shed near a house in the woods; set near trash and woodpiles. Untouched from December 11 to 13.

3-0 Located at the edge of deep oak-hickory forest; set in a decaying stump. Untouched February 6 and 7, but on February 8 a White-footed Mouse was caught.

4-0 Located along a powerline near the cemetary; set underground in an active digging site. Untouched from February 6 to 10, but on February 11 a Pine Vole was caught.

5-0 Located next to the cemetary fence on open grass; set under leaves and tall grass. Untouched from November 23 to 24.

APPENDIX III

SUMMARY OF TRAPPING, SIGHTINGS, AND TRACK IDENTIFICATIONS

Common Name	No. of Times Trapped	No. of Sightings	No. of Trails Noted
Bat	0	1 (rarely by others)	0
Bear	0	(rarely by others)	0
Cat, Domestic	3	(rarely by others)	9
Chipmunk	0	(once by others)	0
Cottontail	0	12 (often by others)	6
Deer	0	0	(by others)
Dog, Domestic	0	70 (often by others)	31
Fox, Gray	0	(rarely by others)	(diggings)
Mouse, Deer	1	0	1
Mouse, Harvest	2		
Mouse, White-footed	8		
Opossum	7	1 (often by others)	2 (plus a skeleton)
Raccoon	0	(occasionally by others)	2
Rat	0	(rarely by others)	0
Shrew, Shorttail	2	4	2
Skunk	0	(occasionally by others)	(odor)
Squirrel, Gray	0	58 (often by others)	86
Squirrel, Flying	0	(rarely by others)	0
Vole, Pine	2	2	3
Woodchuck	0	0	(5 to 7 diggings)

PREFIX TO APPENDIX IV

Four authorities were used in establishing a list of the mammals of East Tennessee (Howell, 1952; Conaway, 1953; Collins, 1959; and Burt, 1961). These authorities appear in chronological order in the columns labeled 1 through 4. Column 5 indicates which species were found in the College Woods. Howell and Conaway did research in the East Tennessee area, Howell, et al (1952) in the Cumberland Mountains and Conaway, et al (1953) in Johnson and Carter counties of Tennessee, as well as in Avery County, North Carolina. Collins (1959) and Burt (1961) are field guides with maps indicating the ranges of various species. Question marks indicate that the species' range bordered on the East Tennessee area.

Thus the numbers represent the following: (1) Howell (1952), (2) Conaway (1953), (3) Collins (1959), (4) Burt (1961), (5) species found in the Maryville College Woods.

APPENDIX IV

MAMMALS OF EAST TENNESSEE

Scientific and Common Name	1	2	3	4	5
Blarina brevicauda (Short-tailed Shrew)	*	*	*	*	*
Castor canadensis (Beaver)		*	*	*	
Clethrionomys gapperi (Boreal Red-backed Vole)	*	*	*	*	
Condylura cristata (Starnose Mole)		*	?*	*	
Corynorhinus macrotis (Eastern Big-eared Bat)			*		
Corynorhinus rafinesquii (Rafinesque's Big-eared Bat)				*	
Cryptotis parva (Small Short-tailed Shrew)	*		*	*	
Didephis marsupialis (Virginia Opossum)	*	*	*	*	*
Eptesicus fuscus (Big Brown Bat)	*		*	*	
Felis concolor (Cougar)		*			
Glaucomys sabrinus (Northern Flying Squirrel)		*	?*	*	
Glaucomys volans (Southern Flying Squirrel)	*	*	*	*	?*
Lasionycteris noctivagans (Silver-haired Bat)		*	*		
Lasiurus borealis (Red Bat)	*		*	*	
Lasiurus cinereus (Hoary Bat)			*	*	
Lutra canadensis (River Otter)			*	*	
Lynx rufus (Bobcat)	*	*	*		

APPENDIX IV -- Continued

Scientific and Common Name	1	2	3	4	5
Marmota monax (Woodchuck)	*	*	*	*	?*
Mephitis mephitis (Striped Skunk)	*	*	*	*	?*
Microtus chrotorrhinus (Yellownose Vole)		*	?*		
Microtus pennsylvanicus (Pennsylvania Meadow Vole)		*	*	*	
Mus musculus (House Mouse)	*	*	*	*	
Mustella frenata (Weasel)	*	*	*	*	
Mustella vison (Mink)	*	*	*	*	
Myotis grisescens (Gray Myotis)			*	*	
Myotis keenii (Keen's or Say's Bat)	*		*	*	
Myotis lucifugus (Little Brown Bat)	*	*	*	*	
Myotis sodalis (Pink Bat)	*		*	*	
Myotis subulatus (Small-footed Myotis)				*	
Napoeozapus insignis (Woodland Jumping Mouse)			?*	?*	
Neotoma floridana (Eastern Wood Rat)		?*	*		
Neotoma magister (Northeastern Wood Rat or Cliff Rat)	*	?*	*	*	?*
Nycticeius humeralis (Evening Bat)			*	*	
Odocoileus virginianus (White-tailed Deer)	*	*	*	*	?*
Ondatra zibethica (Muskrat)		*	*	*	
Oryzomys palustris (Rice Rat)	*		*	*	
Parascalops breweri (Hairy-tailed Mole)		*	*	*	
Peromyscus gossypinus (Cotton Mouse)	*		*		

APPENDIX IV -- Continued

Scientific and Common Name	1	2	3	4	5
Peromyscus leucopus (White-footed Mouse)	*	*	*	*	*
Peromyscus maniculatus (Deer Mouse)	*	*	*	*	*
Peromyscus nuttalli (Golden Mouse)	*	*	*	*	
Pipistrellus subflavus (Georgian Bat)	*	*	*		
Pitymys pinetorum (Pine Vole)	*	*	*	*	*
Procyon lotor (Raccoon)	*	*	*	*	*
Rattus norvegicus (Norway Rat)	*	*	*	*	?*
Reithrodontomys humulis (Eastern Harvest Mouse)			*	*	*
Scalopus aquaticus (Eastern Mole)	*		*	*	
Sciurus carolinensis (Gray Squirrel)		*	*	*	*
Sciurus niger (Fox Squirrel)	*	*	*	*	
Sigmodon hispidus (Hispid Cotton Rat)	*		*	*	
Sorex cinereus (Masked Shrew)		*	*	*	
Sorex dispar (Longtail Gray Shrew)		*			
Sorex fumeus (Smoky Shrew)	*	*	*	*	
Sorex longirostris (Southeastern Shrew)			?*	*	
Sorex palustris (Water Shrew)		?*			
Spilogale putorius (Spotted Skunk)	*	*	*	*	
Sus scrofa (European Wild Boar)			*	*	
Sylvilagus floridanus (Eastern Cottontail)	*	*	*	*	*
Sylvilagus transitionalis (New England Cottontail)	*	*	*	*	

APPENDIX IV -- Continued

Scientific and Common Name	1	2	3	4	5
Synaptomys cooperi (Lemming Mouse)		*	*	*	
Tamias striatus (Chipmunk)	*	*	*	*	?*
Tamiasciurus hudsonicus (Red Squirrel)		*	*	*	
Urocyon cinereoargenteus (Gray Fox)	*	*	*	*	?*
Ursus americanus (Black Bear)	*	*	*	*	?*
Vulpes fulva (Red Fox)	*	*	*	*	
Zapus hudsonius (Meadow Jumping Mouse)			?*	?*	

APPENDIX V

KEY TO FIGURES 1 AND 2
(Adapted from Maryville Quadrangle, 1966)

two lane, hard surface road

one lane, hard surface road

gravel or dirt road

major foot trails

buildings

fence

powerline

forest edge and edge of clearings

elevation contours

stream and bridge

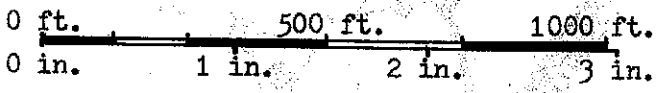
1-j jar trap locations

1-a Area I (Pine-Oak Stands) traps

1-b Area II (Low, Moist Ground) traps

1-c Area III (Oak-Hickory Stands) traps

Scale:



1 inch = 340 feet

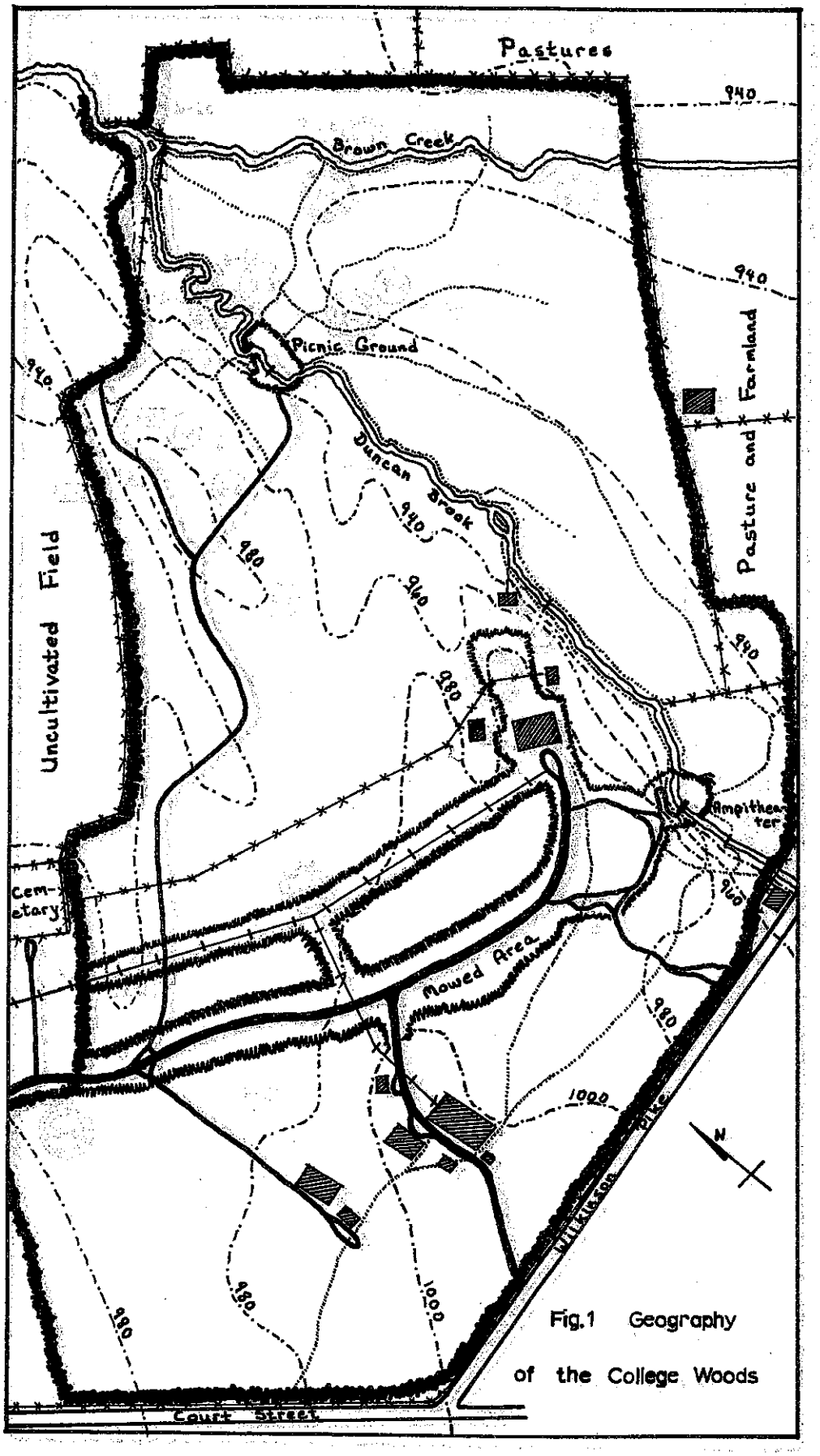


Fig.1 Geography of the College Woods

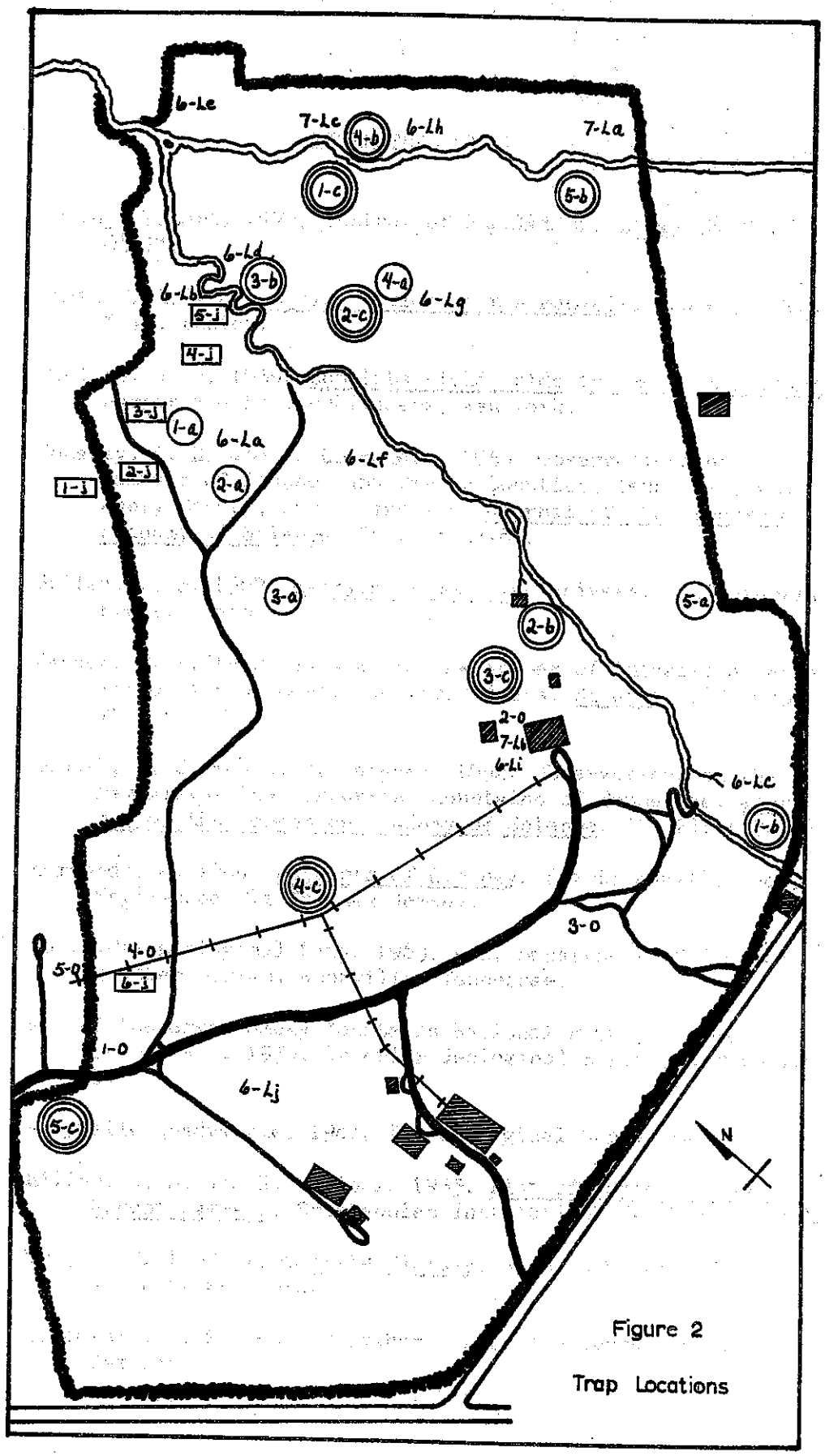


Figure 2

Trap Locations

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