A Population Study
Of Birds
Of A Pine Community

Advanced Ornithology

K. W. Prescott

1946

A POPULATION STUDY OF BIRDS OF A PINE COMMUNITY

Introduction

A Red Pine forest located in Emmet Co. Michigan, S-26, R-9W, T-37N, was selected for a population study. It was desirable to learn the number of breeding pairs per hundred acres of the pine association.

Method and Procedure

It was decided to use the "plot census" type of census taking. First the woods area was examined to determine that portion whichcontained a predominance of Red pine (Pinus Resinosa) and a minimum of Aspen(Populus tremuloides) influence. This proved difficult for the woods as a whole represented an aspen climax association, however, approximately twenty-five acres were located which seemed to show a dominant evergreen growth.

North-south lines were layed out and 4"x 6" cards were posted every fifty meters. Cards were posted on two sides of the trees and secured at a height of six feet, with thumb tacks. The designations, ie. "A-5", were printed in three inch red letters. Four rows, "A", "B", "C", and "D" were layed out in this manner. Originally it was planned to have at least six rows approximately 450 meters long. However, another row, on either side would have taken in a definite aspen area, therefore the original four rows were lengthened to 650 meters. This lengthening forced the

inclusion of an aspen island in the north-western section. While regretable, this inclusion was unavoidable because more acreage was desirable.

Census Taking

The area was readily covered by three north-south trips. A fourth trip was used to return to the road from the northern portion of the area; no definite line was followed, but rather a general wandering throughout the entire area. Birds were recorded on field maps as they were identified, their actual position, if seen, and their approximate position if identified by song was determined by bearings from the nearest visual locality card, the distance was approximated.

The daily census area maps include all species observed and the manner in which they wer identified; ie. numbers "squared" are those actually seen, and those numbers "circled" were birds identified by song or call. Species numbers on the maps with the letters "a", "b" and "c" indicate that they were seen or heard singing at the same time. Arrows from a number indicate the direction of the birds flight.

Is this important as long as they are identified correctly?

Census trips were made approximately every other day beginning on July 5, 1946 and the last one was made on July 16, 1946, giving a total of six trips. The time spent per trip varied from one and a half hours to three hours. Two hours seemed sufficient to cover the area, additional time was usually used in general wandering or in investigating specific areas.

Daily Trips

Copies of the field charts showing daily trips and the species observed, locations, etc. are included in this paper as are apparent territories and a general discussion of the species. It is believed that data on the daily field trip charts are self explanitory and no further discussion is offered here.

Territories

Compiling the daily field trip data for individual species on individual charts readily makes apparent the minimum territories claimed by breeding pairs. In only a few instances were these territories wholly within the census area proper; many extended, in part, sometimes as much as two-thirds, off the plotted twenty-five acres. These fractions of territories were computed in one total as an entire breeding pair. For example, six Hermit Thrushes were observed on the census area, yet their territories were only partially located on the census area; fractions of territories were computed to give a total of four pair for the census area.

The territorial boundries, as outlined on the individual maps, must be considered as the minimum territory in as much as they embrace only a few specific observations and no detailed study was made to obtain the accurate territory. In addition, dotted lines indicating territories not entirely in the census area must be considered quite inaccurate and thought of as existing for greater distances because only those observations were recorded which were adjacent to the area.

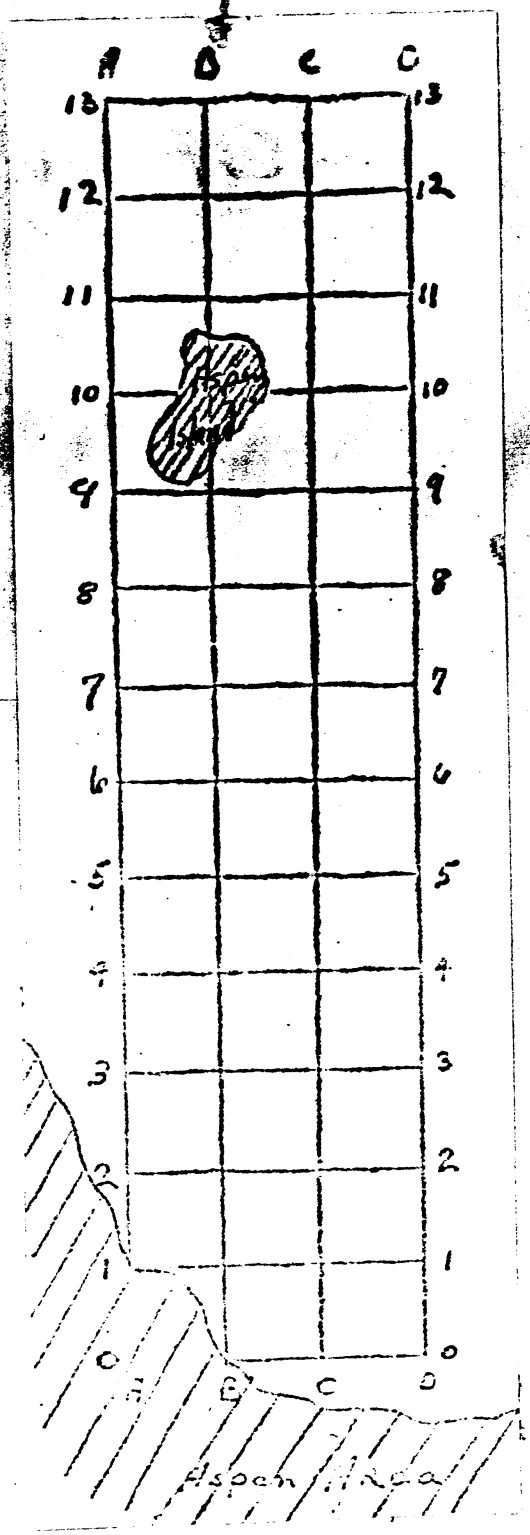
Description of Area

This red pine association is a (seral climax) area of pine in which plants are found at each level. In 1892 this area was burned over and plant succession started anew with sprouts arising from aspen roots. The dominant tree is Pinus resinosus with Populus tremuloides as secondary species. Other trees found in order of frequency are Pinus strobus, Tsuga canadensis, Betula alba, and taxus canadensis. The high shrub level consists of saplings of Tsuja canadensis, Salix bebbiana, Populus tremuloides, Picea glauca, Pinus resinosus and Pinus strobus. The low shrub level has some tree seedlings, Pteris aquilina, Rosa blanda and Vaccinum canadense. The ground level plants are Gaultheria procumbens, Agropgron teneium, Oryzopsis asperifolia, Fragaria virginiana and Aster species, all growing in a heavy needle cover.

In plotting the area 4x6 cards were placed on trees at 50 meter intervals, trees were not chosen for convienence or size, but the closest tree to the 50 meter distance point was tagged. A record was kept of the type of tree and its diameter(by estimate). The following chart gives this data. It is beleived that while this may not give an accurate description of tree growth in the area, it does give a relative picture of a given sector and comparison of actual bird territories with this chart may indicate the actual tree or type of tree where the bird was observed. By count of trees posted, 31 were red pines(P. resinosus), 17 aspen(populus tremuloides), 3 white pines(p. strobus), 2 Hemlock (Tsuga canadensis), and 1 each of cedar(Thuja occidentalis) Birch(Betula alba) and one spruce.

TABLE

Types, Locations and Diameters of Trees



Row A

A-0 Red Pine (4")
A-1 Red Pine (10")
A-2 Red Pine (12")
A-3 Dead Aspen
A-4 " "
A-5 Red Pind (6")
A-6 Aspen (4")
A-7 Red Pine (12")
A-8 Red Pine (14")
A-9 Red Pine (14")
A-10 Red Pine (15")
A-11 Red Pine (10")
A-12 Red Pine (14")
A-13 Aspen (6")

Row B

B-0 White Pine (11")
B-1 Red Pine (7")
B-2 Red Pine (3")
B-3 Aspen (2")
B-4 White Pine (3")
B-5 Red Pine (5")
B-6 Hemlokk (4")
B-7 Dead Aspen
B-8 " "
B-9 Red Pine (10")
B-10 Aspen (3")
B-11 Red Pine (7")
B-12 Red Pine (5")
B-13 Red Pine (5")

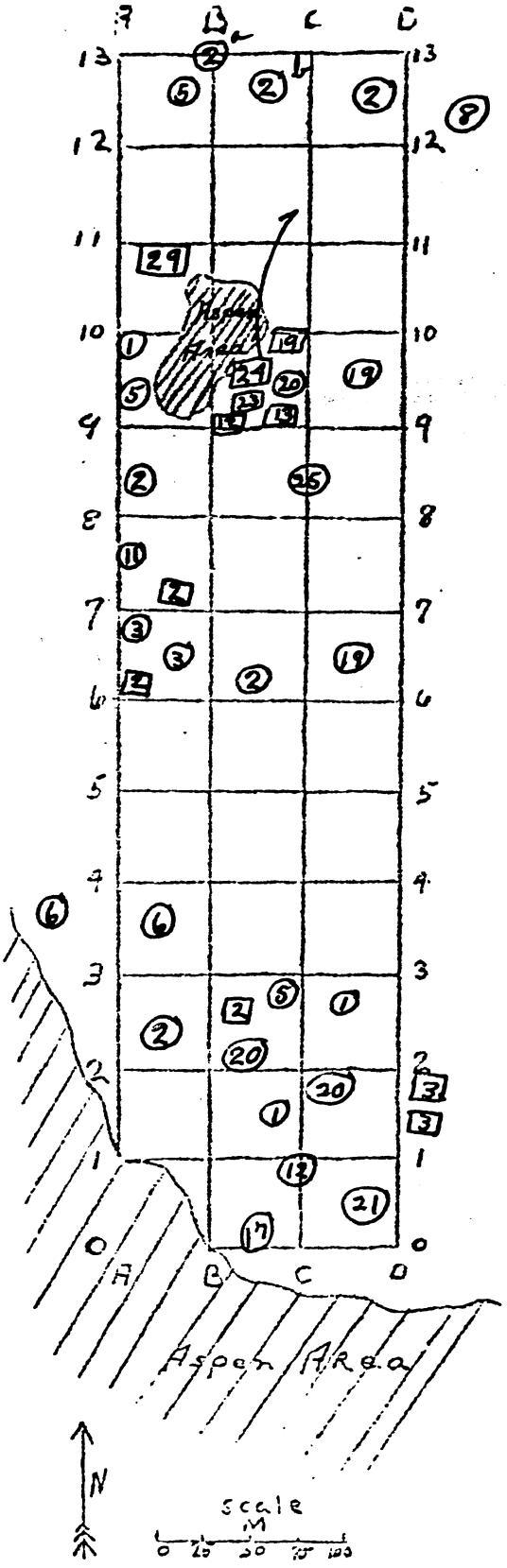
Row C

C-0 Red Pine (6")
C-1 Red Pine (16")
C-2 Red Pine (6")
C-3 White Cedar (4")
C-4 Red Pine (4")
C-5 White Pine (4")
C-6 Red Pine (5")
C- 7 Aspen (4")
C-8 Aspen (3")
C-9 Red Pine (14")
C-10 Red Pine (10")
C-11 Red Pine (10")
C-12 Red Pine (6")
C-13 Red Pine (12")

R Row D

D-0 Red Pine (6")
D-1 Red Pine (16")
D-2 Aspen (3")
D-3 Red Pine (8")
D-4 Aspen (3")
D-5 Birch (3")
D-6 Aspen (4")
D-7 Aspen (4")
D-8 Aspen (4")
D-9 Hemlock (3")
D-10 Red Pine (12")
D-11 Dead Aspen
D-12 Spruce (15")
D-13 Red Pine (6")

Daily Field Charts



CENSUS AREA

PINE FOREST

EMMET CO., S-26 R-9W T-37N

✓1	Wood Peewee
✓2	Oven Bird
✓3	Black-capped Chickadee
4	Purple Finch
✓5	Robin
✓6	Red-eyed Vireo
7	Myrtle Warbler
✓8	Hermit Thrush
9	Red-Eyed towhee
10	Brown Thrasher
✓11	Cowbird
✓12	Slate-colored Junco
✓13	Chipping Sparrow
14	Mourning Dove
15	Blue Bird
16	Crested Flycatcher
✓17	Blue Jay
18	Flicker
✓19	Cedar Waxwing
✓20	Black-throated Green Warbler
✓21	Pine Warblers
22	Ruffed Grouse
✓23	Least Flycatcher
✓24	Sharp-shinned Hawk
✓25	Veery Thrush
26	Hairy Woodpecker
27	Red-breasted Nuthatch
28	Crow
✓29	Nighthawk
30	

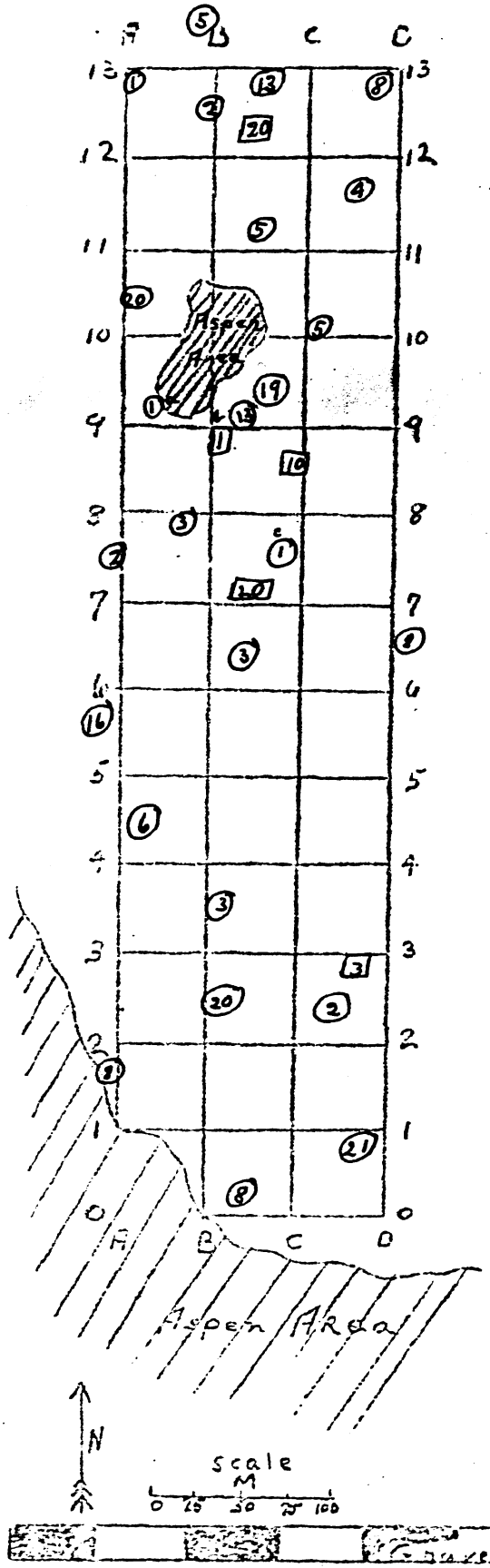
DATE 5 July '46 TIME 0500 to 0700

WEATHER clear, warm

PAIRS ____ SPECIES 17 NESTS 0

□ = SEEN ○ = SINGING △ = NEST

Gravel Road



CENSUS AREA

PINE FOREST

EMMET CO. S-26 R-4W T-37N

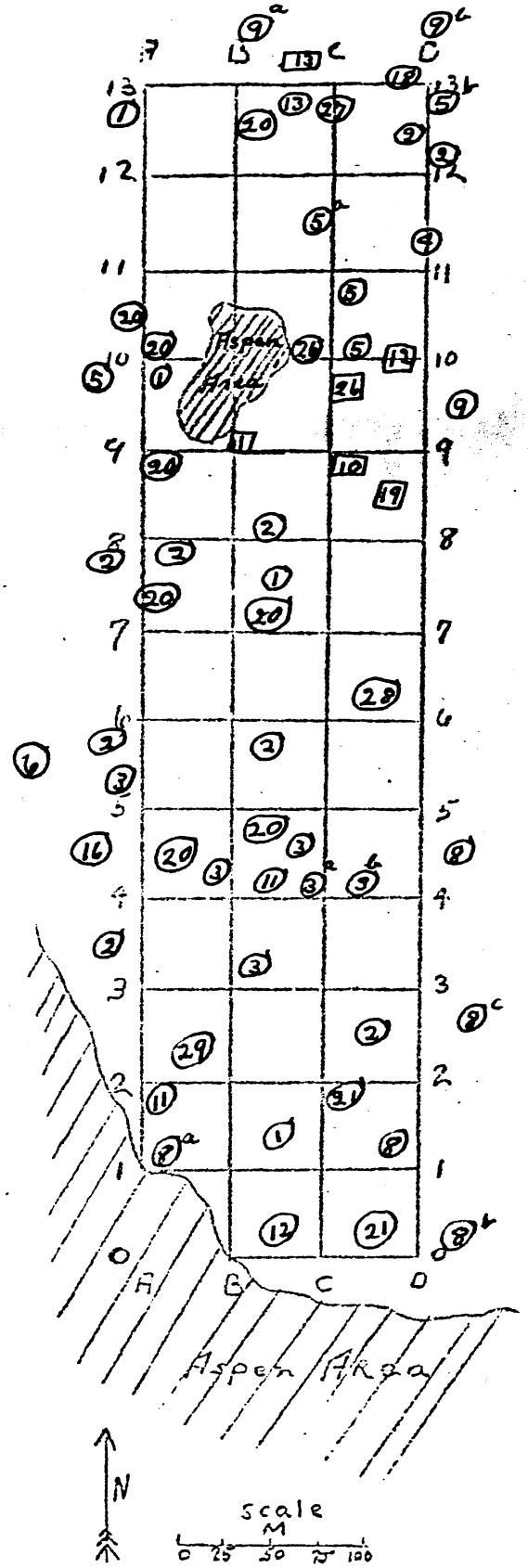
1	Wood Pewee
2	Ovenbird
3	Black-capped Chickadee
4	Purple Finch
5	Robin
6	Red-eyed Vireo
7	Myrtle Warbler
8	Hermit Thrush
9	Red-Eyed towhee
10	Brown Thrasher
11	Cowbird
12	Slate-colored Junco
13	Chipping Sparrow
14	Mourning Dove
15	Bluebird
16	Crested Flycatcher
17	Blue Jay
18	Flicker
19	Cedar Waxwing
20	Black-throated Green Warbler
21	Pine Warbler
22	Ruffed Grouse
23	least Flycatcher
24	Sharp-shinned Hawk
25	Veery Thrush
26	Hairy Woodpecker
27	Red-breasted Nuthatch
28	Crow
29	Nighthawk
30	

DATE July 7, '46 TIME 0500 to 0730

WEATHER clear, cool

PAIRS ____ SPECIES 23 NESTS 0

□ = SEEN ○ = SINGING △ = NEST



CENSUS AREA

PINE FOREST

EMMET CO. S-26 R-4W T-37N

1	Wood Peewee
2	Oven Bird
3	Black-capped Chickadee
4	Purple Finch
5	Robin
6	Red-eyed Vireo
7	Myrtle Warbler
8	Hermit Thrush
9	Red-Eyed towhee
10	Brown Thrasher
11	Cowbird
12	Slate-colored Junco
13	Chipping Sparrow
14	Mourning Dove
15	Bluebird
16	Crested Flycatcher
17	Blue Jay
18	Flicker
19	Cedar Waxwing
20	Black-throated Green Warbler
21	Pine Warbler
22	Ruffed Grouse
23	least Flycatcher
24	Sharp-shinned Hawk
25	Veery Thrush
26	Hairy Woodpecker
27	Red-breasted Nuthatch
28	Crow
29	Nighthawk
30	

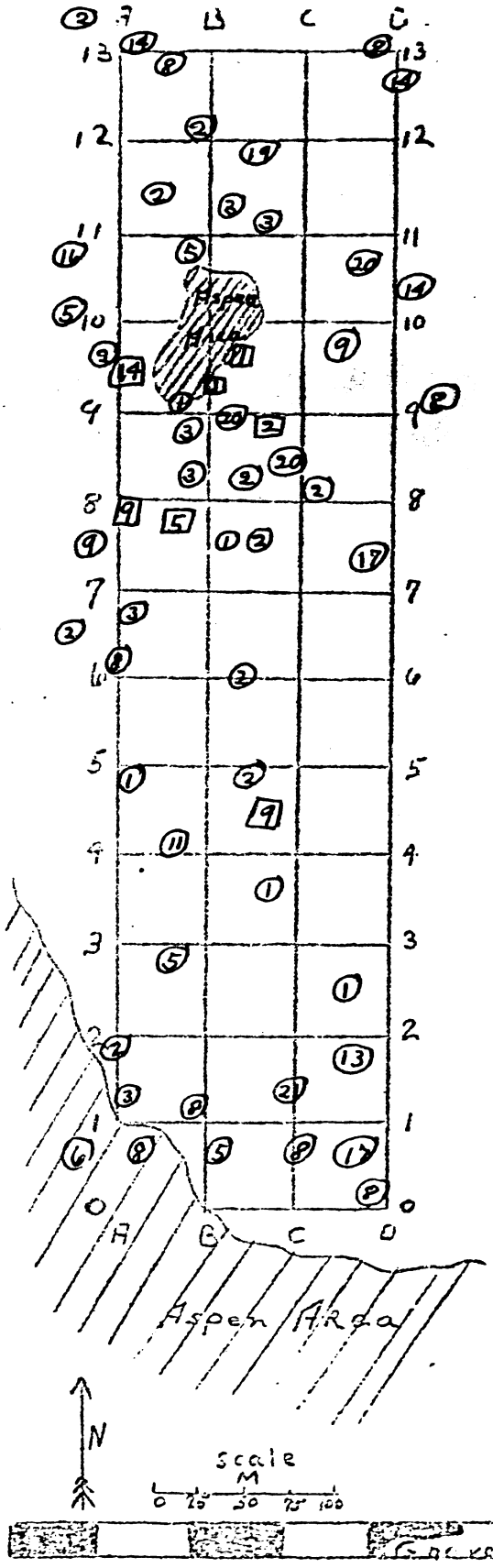
DATE 9 July TIME 0800 to 1000

WEATHER clear, Warm

PAIRS ____ SPECIES 21 NESTS 0

□ = SEEN ○ = SINGING △ = NEST

Gravel Road



CENSUS AREA

PINE FOREST

EMMET CO. S-26 R-4W T-37N

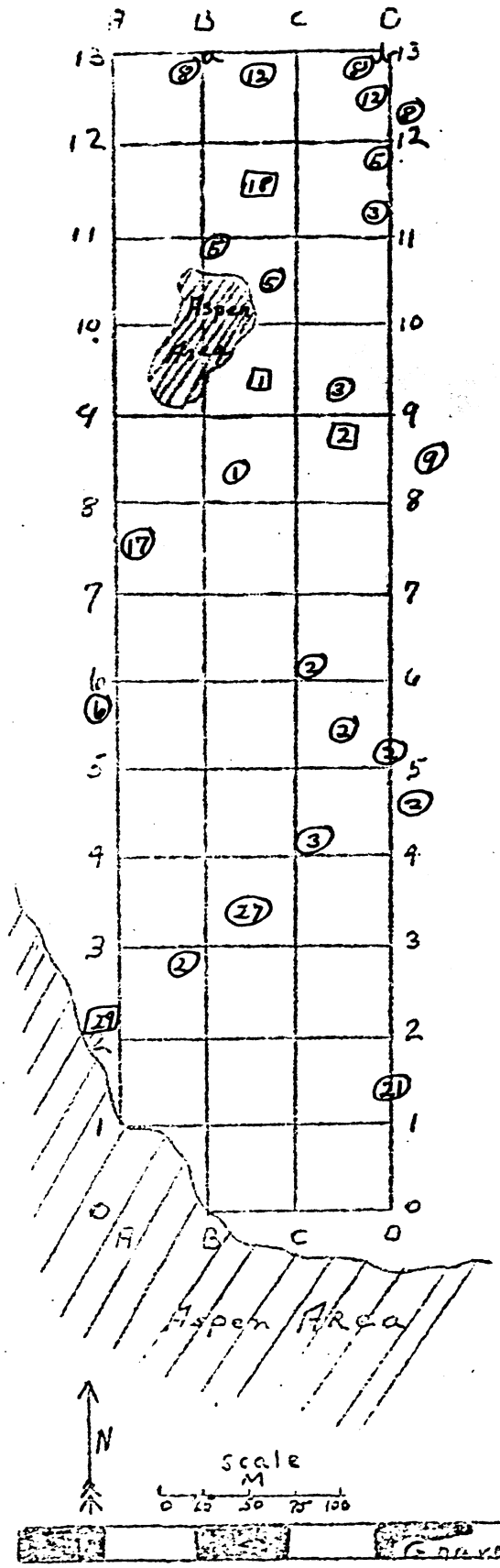
✓1	Wood Pewee
✓2	Oven Bird
✓3	Black-capped Chickadee
4	Purple Finch
✓5	Robin
✓6	Red-eyed Vireo
7	Myrtle Warbler
✓8	Hermit Thrush
✓9	Red-Eyed towhee
10	Brown Thrasher
✓11	Cowbird
12	Slate-colored Junco
✓13	Chipping Sparrow
✓14	Mourning Dove
15	Bluebird
✓16	Crested Flycatcher
✓17	Blue Jay
18	Flicker
✓19	Cedar Waxwing
✓20	Black-throated Green Warbler
✓21	Pine Warbler
22	Ruffed Grouse
23	Least Flycatcher
24	Sharp-shinned Hawk
25	Veery Thrush
26	Hairy Woodpecker
27	Red-breasted Nuthatch
28	Crow
29	Nighthawk
30	

DATE 12 July '46 TIME 0630 to 0745

WEATHER _____

PAIRS ____ SPECIES 15 NESTS ____

□ = SEEN ○ = SINGING △ = NEST



CENSUS AREA

PINE FOREST

EMMET CO. S-26 R-4W T-37N

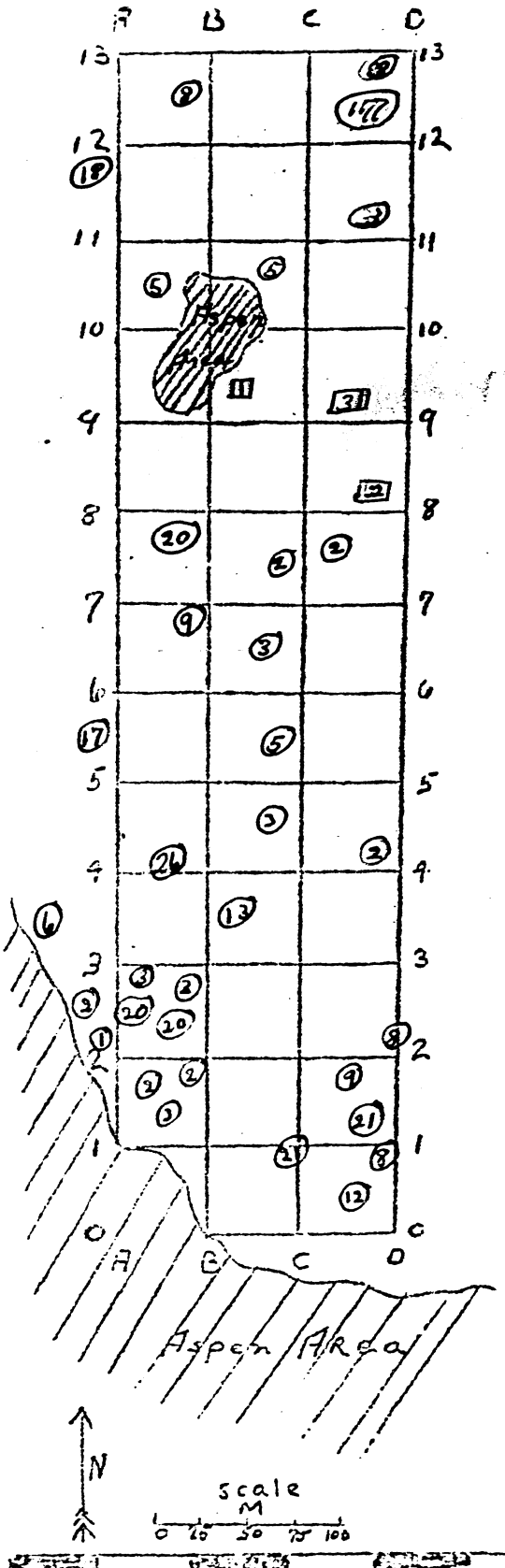
✓1	Wood Pewee
✓2	Oven Bird
✓3	Black-capped Chickadee
4	Purple Finch
✓5	Robin
✓6	Red-eyed Vireo
7	Myrtle Warbler
✓8	Hermit Thrush
✓9	Red-Eyed towhee
10	Brown Thrasher
11	Cowbird
✓12	Slate-colored Junco
13	Chipping Sparrow
14	Mourning Dove
15	Bluebird
16	Crested Flycatcher
✓17	Blue Jay
✓18	Flicker
19	Cedar Waxwing
20	Black-throated Green Warbler
✓21	Pine Warbler
22	Ruffed Grouse
23	Least Flycatcher
24	Sharp-shinned Hawk
25	Veery thrush
26	Hairy Woodpecker
✓27	Red-breasted Nuthatch
28	Crow
✓29	Nighthawk
30	

DATE 13 July '46 TIME 1000 to 1130

WEATHER Bright, warm

PAIRS ____ SPECIES 12 NESTS ____

□ = SEEN ○ = SINGING △ = NEST



CENSUS AREA

PINE FOREST

EMMET CO. S-26 R-9W T-37N

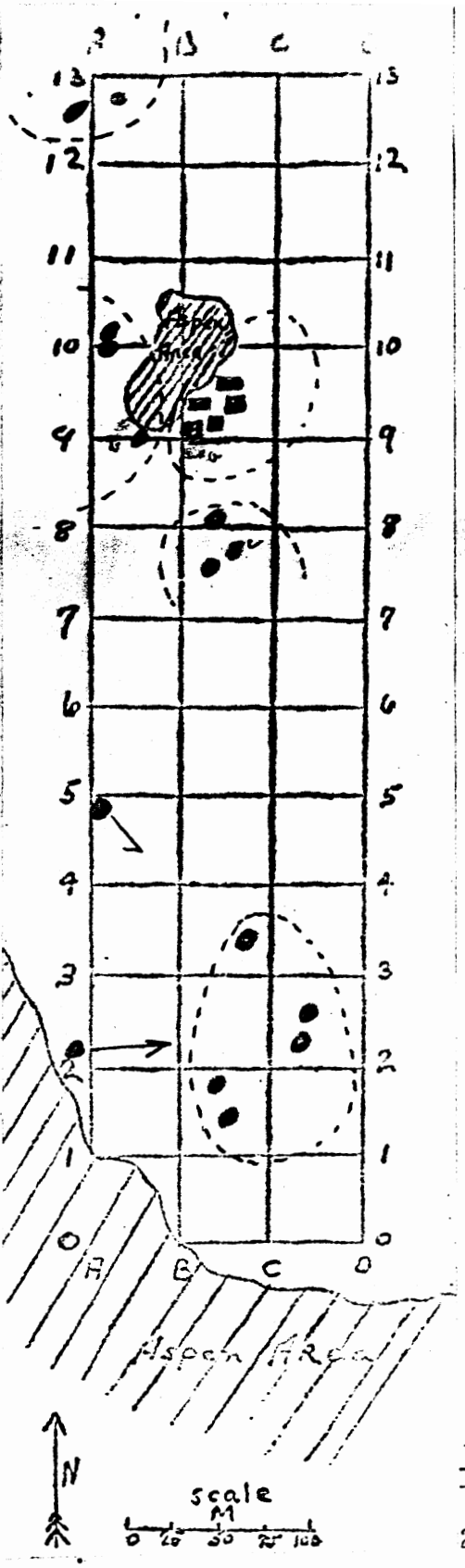
1	Wood Peewee
2	Oven Bird
3	Black-capped Chickadee
4	Purple Finch
5	Robin
6	Red-eyed Vireo
7	Myrtle Warbler
8	Hermit Thrush
9	Red-Eyed towhee
10	Brown Thrasher
11	Cowbird
12	Slate-colored Junco
13	Chipping Sparrow
14	Mourning Dove
15	Blue Bird
16	Crested Flycatcher
17	Blue Jay
18	Flicker
19	Cedar Waxwing
20	Black-throated Green Warbler
21	Pine Warbler
22	Ruffed Grouse
23	least Flycatcher
24	sharp-shinned Hawk
25	Veery Thrush
26	Hairy Woodpecker
27	Red-breasted Nuthatch
28	Crow
29	nighthawk
30	

DATE 16 July '46 TIME 0730 to 1030

WEATHER _____

PAIRS ____ SPECIES 13 NESTS 0

□ = SEEN ○ = SINGING △ = NEST



Wood Pewee
Myiochanes virens

Observations on July 9, 1946 from point 9B showed three singing males in rather proximous territories. While two of the territories border the aspen edge, they do include a little of the darker forest and some of the medium sized red pines. The territory in the south-eastern quadrant embraces almost entirely, larger red pines, which is a little more characteristic, according to Chapman[1], who reports this bird as preferring a darkened woods.

Its singing perches and food observation perches in the cooler lower limbs of the[2] larger trees are readily available; there is no shortage of insect food; nesting materials consisting of grasses, rootlets, mosses etc. are quite common; therefore it is not suprising to find this bird located throughout this pine area.

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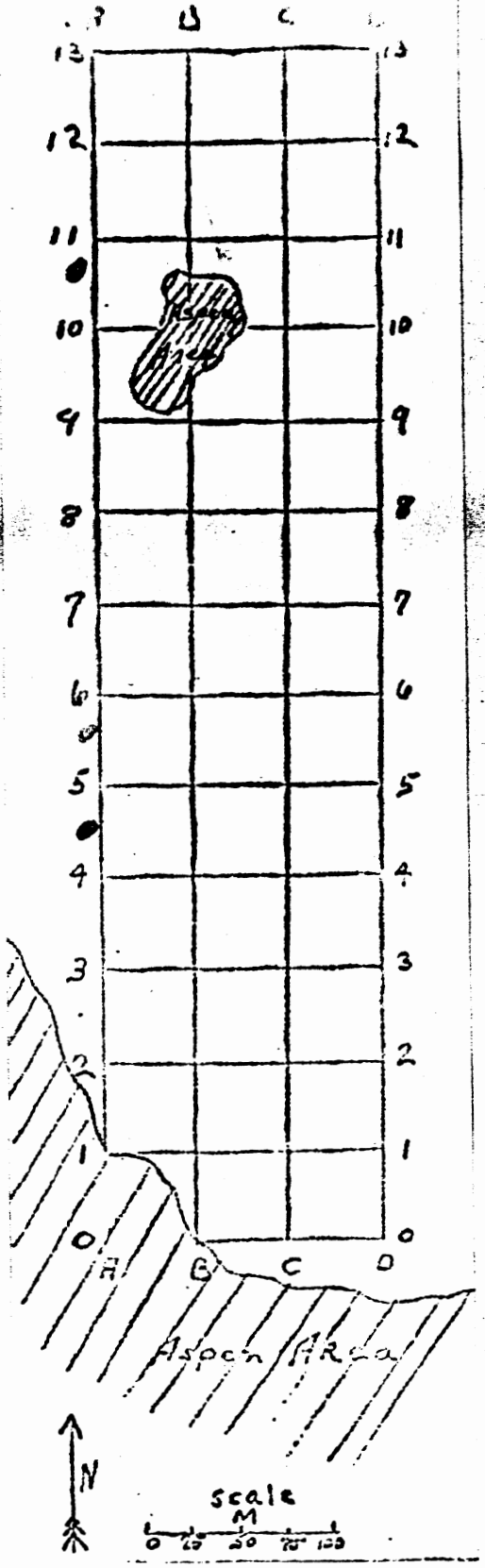
1. Chapman, Handbook of Birds; p. 372
2. Forbush & May, Natural History of the Birds p. 320

Legend
Red-----July 5 ident's
Blue----July 7 ident's
Brown---July 9 ident's
Green---July 12 ident's
Yellow--July 13 ident's
Black---July 16 ident's
Squares-Sight recognition
Circles-Singing recognition

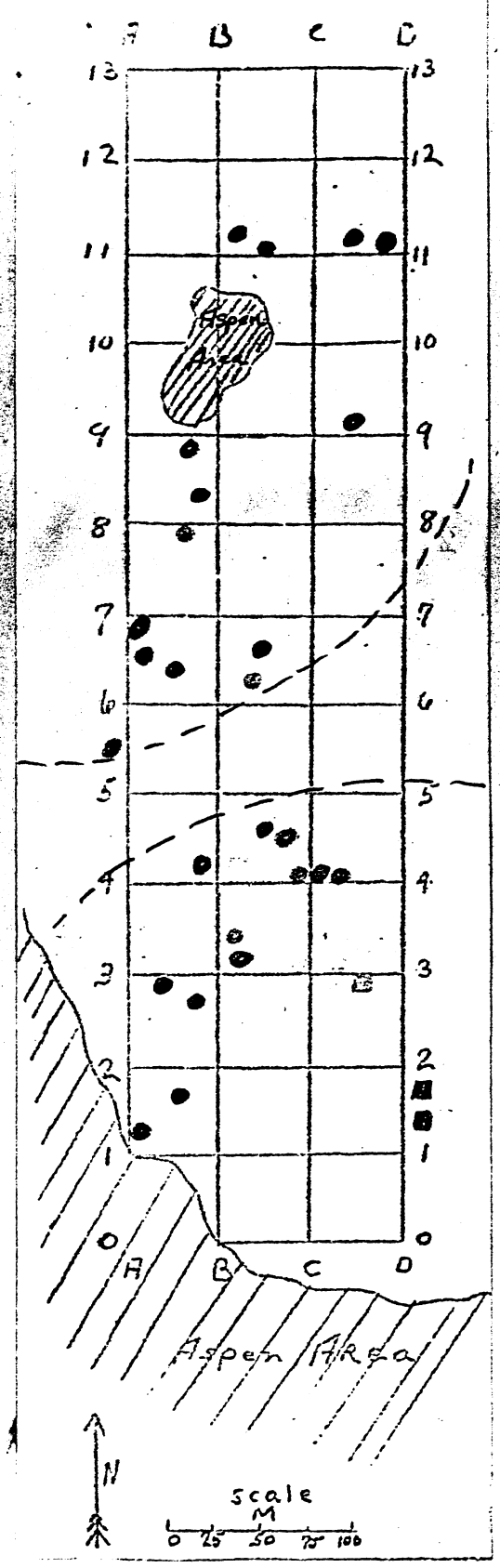


Legend
Red-----July 5 ident's
Blue----July 7 "
Brown---July 9 "
Green---July 12 "
Yellow--July 13 "
Black---July 16 "
Squares-Sight recognition
Circles-Singing recognition

Crested Flycatcher
Myiarchus crinitus boreus

Apparently one pair was partially supported by this area even though no observations were actually made in the study area. The feeding habits of this species carry it over a large area and edge observations suggest that he was feeding both in the forest edge and in the forest interior.

His preference for a suitable woodpecker hole seems to overrule that for an for an actual type locality; he may have located his nest in the forest edge, clearing or forest interior in as much as woodpecker holes were available in each type or locality.

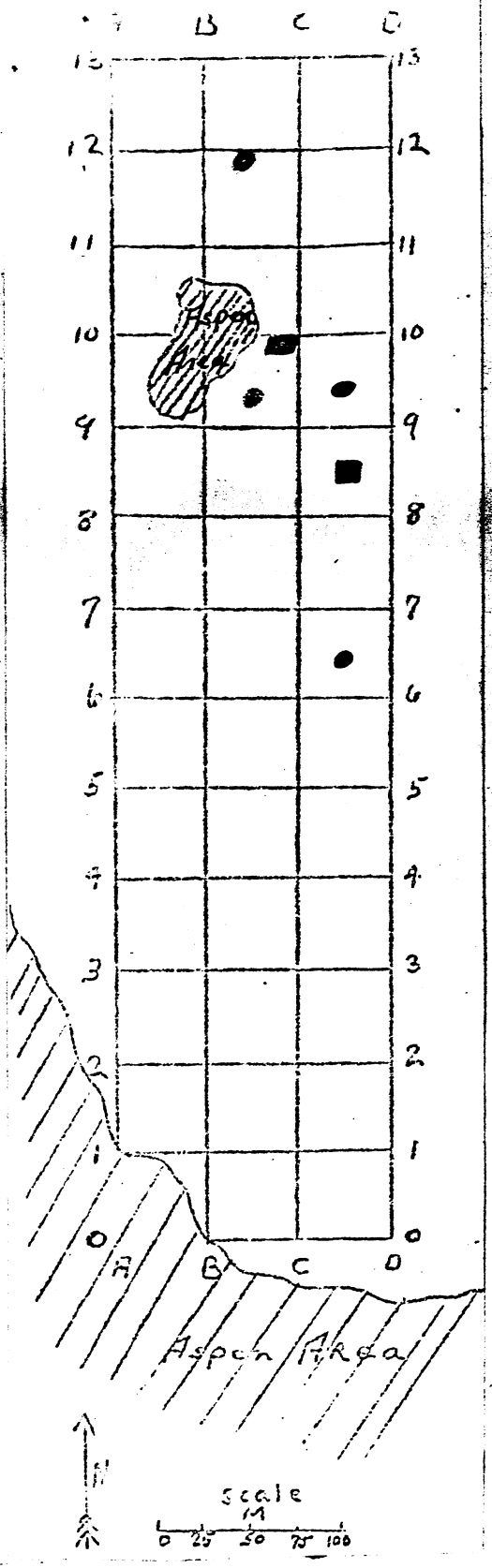


Legend
Red-----July 5 ident's
Blue----July 7 ident's
Brown---July 9 ident's
Green---July 12 ident's
Yellow--July 13 ident's
Black---July 16 ident's
Squares-Sight recognition
Circles-Singing recognition

Black-capped Chickadee
Penthestes a. atricapillus

Observational data indicates that the census area supported two families of Chickadees. One family located in the southern portion seemed to rove with ease throughout the entire sourhern pine area as well as penetrating the aspen and woods edge. The other family appeared to be confined to the northern portion of the study area and did not seem to penetrate north of the E-W line #12, however, this family appeared to work well to the west of the study area. The northern family seemed to number six individuals while the southern family numbered approximately nine. I do not believe that a territory boundary actually existed at E-W line #5; it is probable that the families may have roamed over the entire middle section of the census area, showing, however, a preference for their own territory(proximous to nesting site?)as indicated by the position plotting.

Throughout the woods could be found woodpecker borings, so that nesting cavities could easily be found and enlarged. At no time did the woods show a shortage of insects; there was ample food material to supply two roving bands as these.



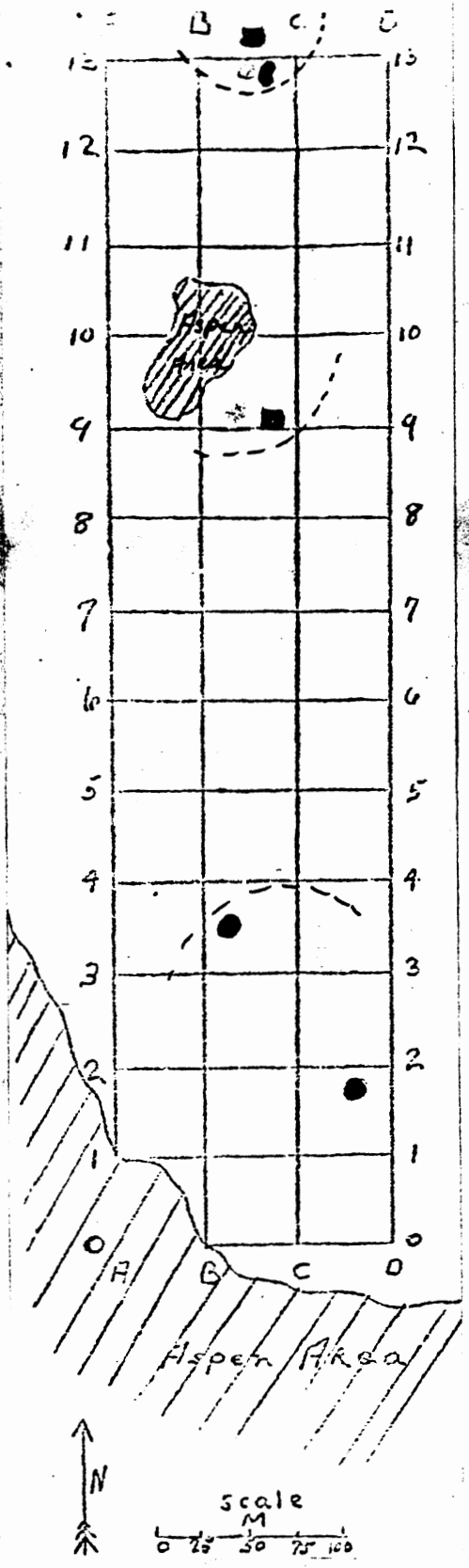
Legend
Red------July 5 ident's
Blue----July 7 ident's
Brown---July 9 ident's
Green---July 12 ident's
Yellow--July 13 ident's
Black---July 16 ident's
Circles-Singing recognition
Squares-Sight recognition

Cedar Waxwing
Bombycilla cedorum

The few observations of this species seem to suggest that one pair was found in the study area. The two visual observations were of the bird when perched on branch tips of red pine and when engaged in short flights in the air catching insects.

A suitable nesting site could have been available in the aspen inland, where the bird was observed twice, or in the forest edge. Nesting materials of grasses, weeds, stems ect. were plentiful.

No observations were made of fruit feeding, although short flights to the neighboring open areas would provide this food requirement.



Legend
Red----July 5 ident's
Blue---July 7 ident's
Brown--July 9 ident's
Green--July 12 ident's
Yellow-July 13 ident's
Black--July 16 ident's
Squares-Sight recognition
Circles-Singing recognition

Eastern Chipping Sparrow
Spizella p. passerina

Each of the territories seem to embrace an edge of aspen or an open area. Thus while Allen[1] mentions that the Chippy oftens invades woodlands, still the more natural open habitat is available.

They can readily find exposed sunlit singing perches on the open edges of their territories, and insect food is abundant. Grasses and rootlets and nesting sites are plentiful.

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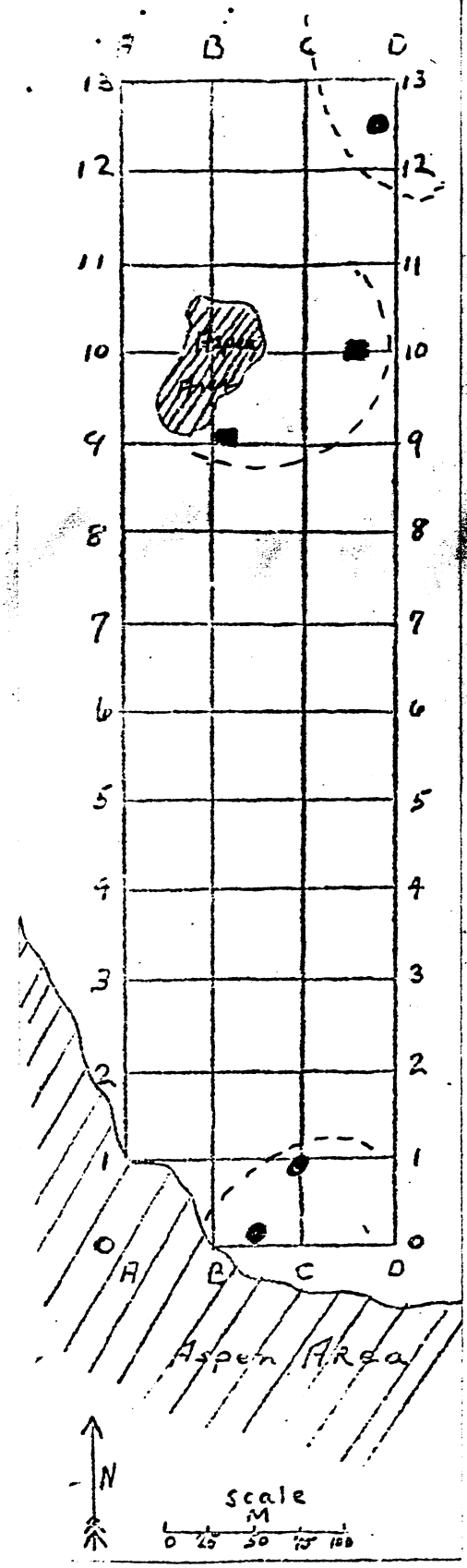
1. Allen, The Book of Bird Life; p.44



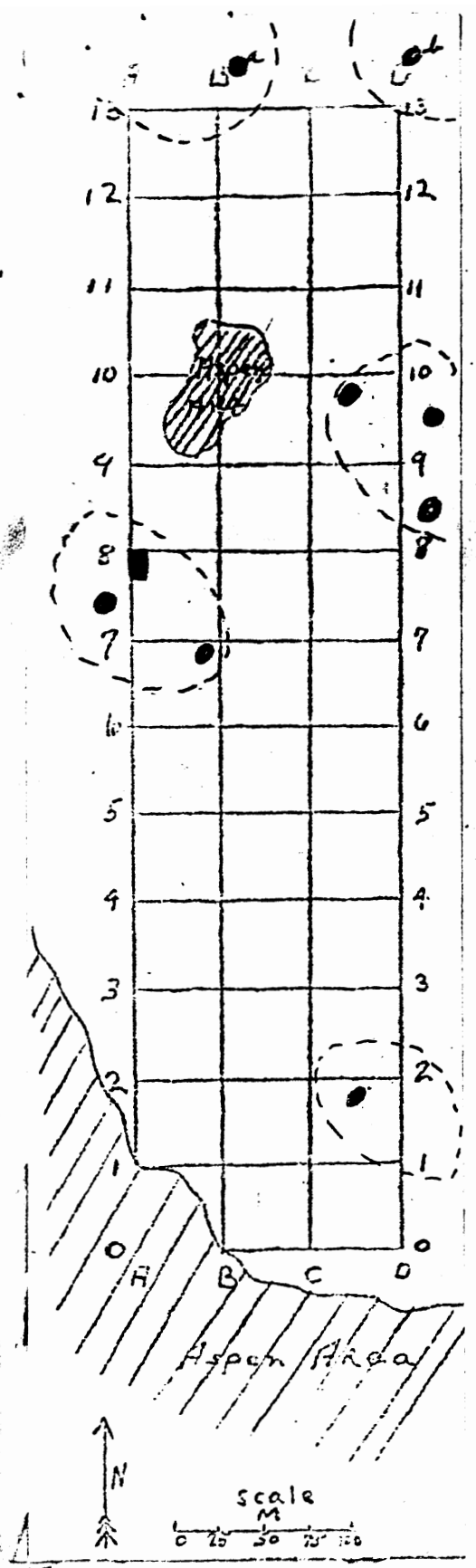
Legend
Red-----July 5 ident's
Blue----July 7 "
Brown---July 9 "
Green---July 12 "
Yellow--July 13 "
Black---July 16 "
Squares-Sight recognition
Circles-Singing recognition

Slate-colored Junco
Junco h. hyemalis

Allen found ~~that~~ the bird "occasionally in the heart of the forest.....however seems to prefer the forest borders and the clearings".[1] The observations to the north and to the south of the area show that this preference for forest edge is present. The partial territory located within the census area provides a forest edge, the aspen island and the island itself provide the clearing, while the heart of the forest is also part of the territory.

Grasses, moss, and rootlets are plentiful for nesting materials and there is sufficient ground brush for a protective nesting site.

1. Allen, The Book of Bird Life, p. 40



Legend---
Red-----July 5 ident's
Blue----July 7 ident's
Brown---July 9 "
Green---July 12 "
Yellow--July 13 "
Black---July 16 "
Squares-Sight recognition
Circles-Singing recognition

Red-eyed Towhee
Pipilo e. erytheophthalmus

Not an entire territory was located on the census area alone, yet five singing males were observed in the area. One singing perch was in the the tip of a medium sized red pine in the N. W. corner of area A-8. The locations of each of the minimun territories were adjacent to rather thick, tangled undergrowth, portions of which in some cases invaded the pine area, thus providing cover and a natural habitat for this spices. According to Allen, "the towhee is another bird that may well be included in this group of forest birds, although more often he is found about clearings.." 1

An abundance of insects and a heavy cover of deciduous leaves on the forest edge satisfy his feeding requirements. Its nesting materials of dead leaves, strips of bark and five grasses were abundant.

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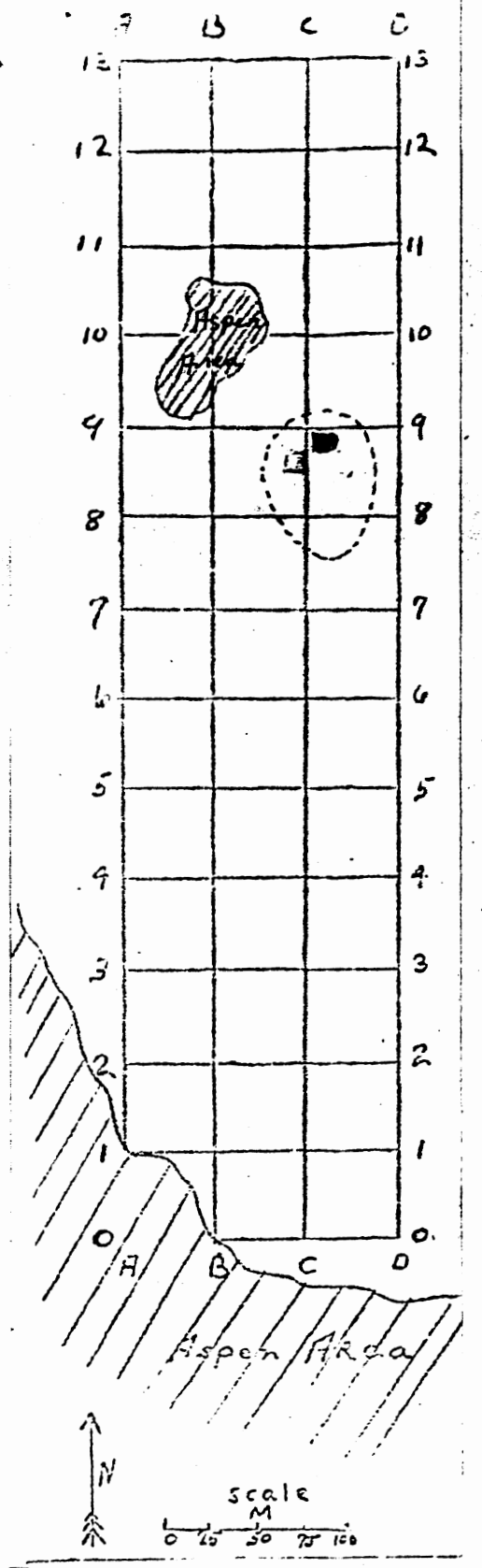
1. Allen, The Book of Bird Life p. 40

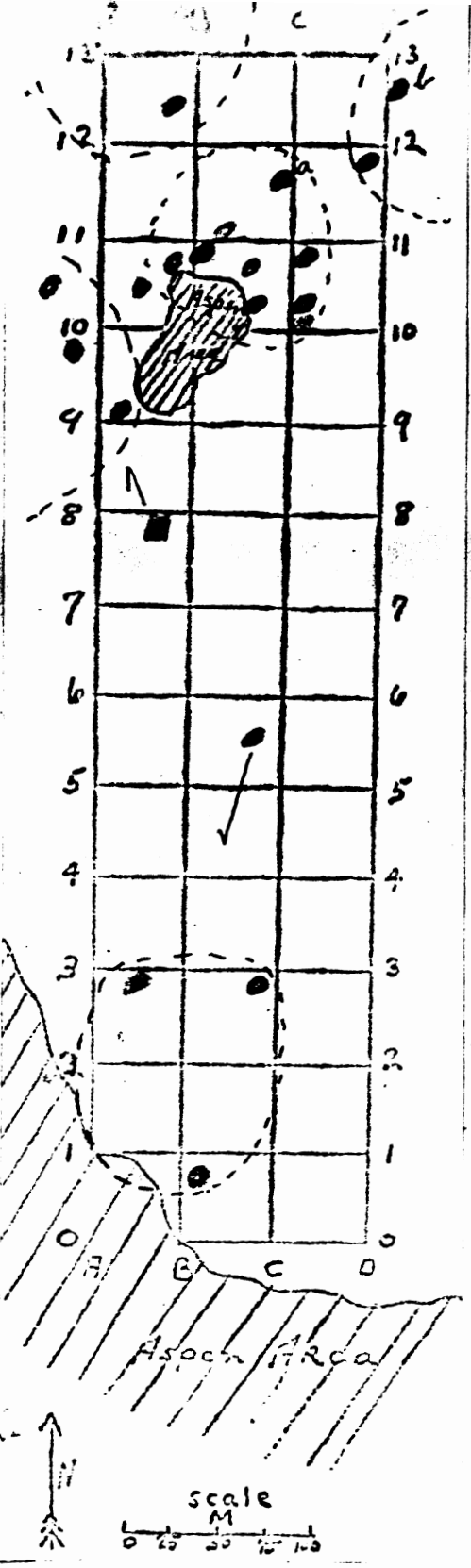


Brown Thrasher
Toxostoma rufum

One pair of thrashers was seen on two occascions during the study period and prior to that, when posting trees 9C and 8C with signs, this pair would circle around me scolding but very seldom actually exposing themselves to full view. The beautiful thrasher songs were never heard, nor were the birds in evidence unless their territory was actually invaded.

The territory, while in the midst of Red Pines, was characterized by dense shrubery and low hanging branches of birch and a few small aspen. The nesting site requirments of brush or low trees with dense cover was thus fulfilled. Its insect feeding habits were satisfied by the numberous insects found throughout the area.

Legend
Red-----July 5 ident's
Blue----July 7 ident's
Brown---July 9 ident's
Green---July 12 ident's
Yellow--July 13 ident's
Black---July 16 ident's
Squares-Sight recognition
Circles-Singing recognition



Legend
Red-----July 5 ident's
Blue----July 7 ident's
Brown---July 9 ident's
Green---July 12 ident's
Yellow--July 13 ident's
Black---July 16 ident's
Squares-Sight recognition
Circles-Singing recognition

Robin
Turdus m. migratorius

Each of the minimun territories outlined include an edge or aspen area. This would provide suitable nesting place, as would some of the lower branches of the forest proper.[1]

Two territories are, apparently, wholly within the cencus area, while approximately a third of three others are so located.

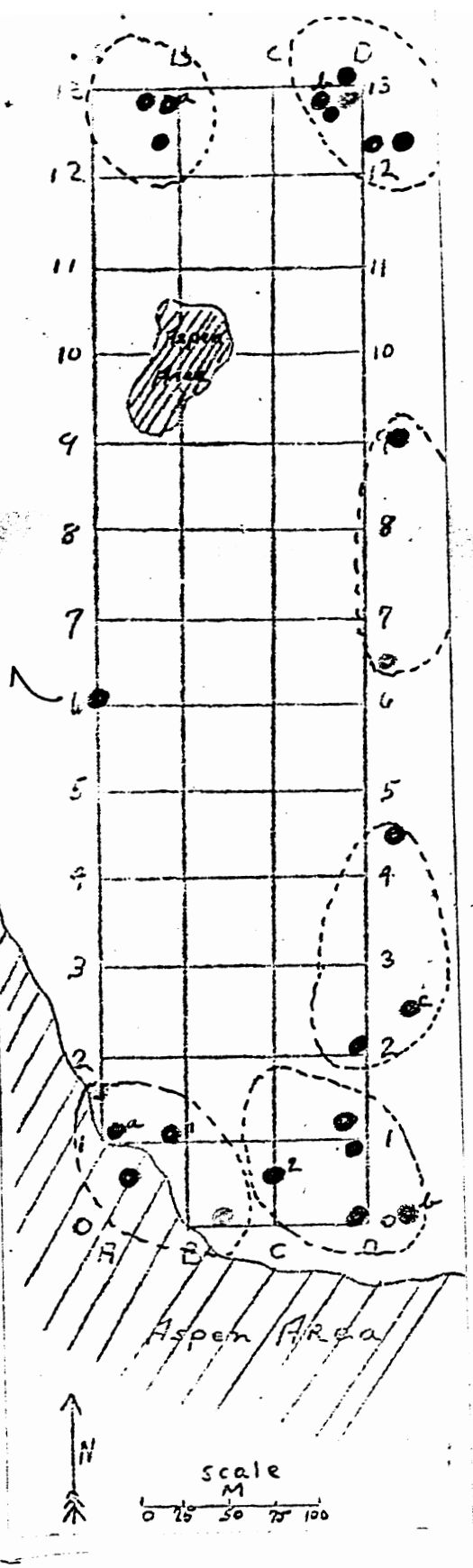
The insectivorous feeding habits of the robin present no problem. Forbush mentions that there is hardly a fruit of any description produced in North America that Robins do not eat.[2]

The Robin's habit of using any and all nesting materials, its ease in locating a nesting site, and its omnivorous feeding habits may account for the relatively high population in this area.

1. Allen, The Book of Bird Life, p. 41
2. Forbush & May, Natural History of the Birds p. 378

Hermit Thrush
Hylocichla guttata pallasi
Hermit Thrush

Six singing males were recorded from this area computed to represent four families or breeding pairs. On July 9, 1946, from an observation point at B-3, three males were heard singing at aproximately the same time, all three calls were given within the space of a minute or a minute and a half. Again on July 12, 1946, two males were heard singing. This time the distance between the two seemed much less as indicated by the map. Presumeably, the males were anouncing their territories. A similar observation was recorded in the northern sectors where two males were heard singing almost simultaneously. On many occasions, these five males were heard from their respective territories, ans it is beleived that these are definite territories, although limited in size on this map due to limited observations.

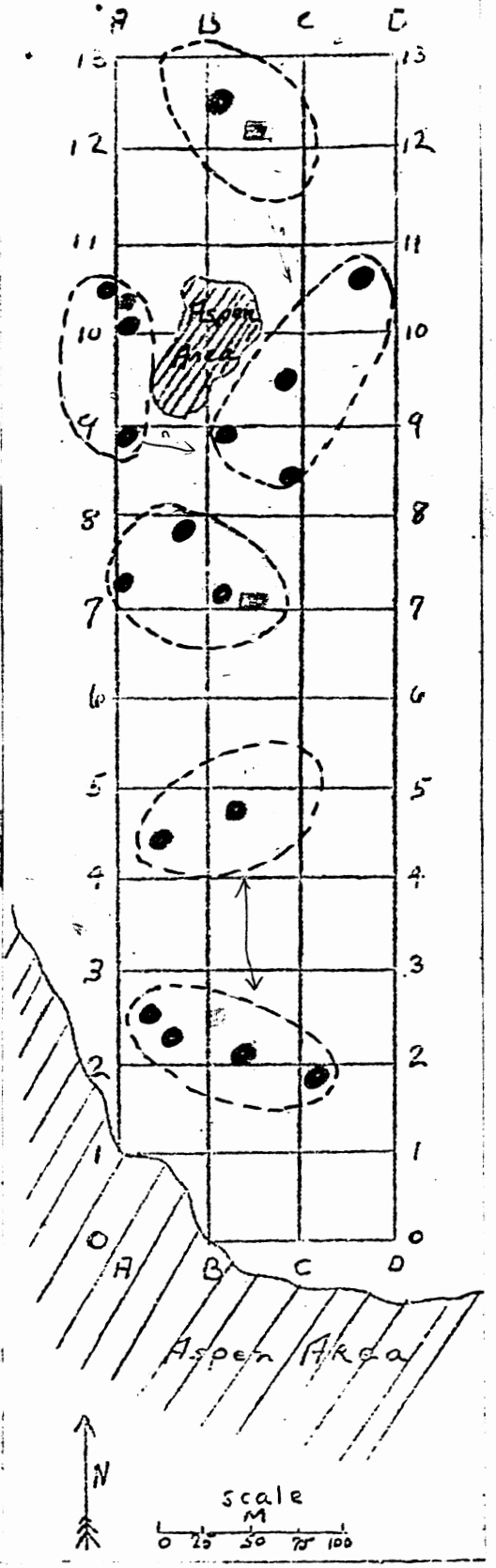


Legends
Red-----July 5 ident's
Blue---- " 7 "
Brown--- " 9 "
Green--- " 12 "
Yellow-- " 13 "
Black--- " 16 "
Squares-Sight recognition
Circles-Singing "

Pettingell mentions that three gray birches offered protection for one nest.[1] If this species does have a preference for birch protection, they very well may find it in this area, for birches are scattered throughout. The deep forest affords excellent cover; the abundance of beetle larve, flies, and other insects would well support the food requirements of these birds.

Moss, coarse grasses, leaves, pine needles[2] were all plentiful for nesting materials. Forbush reports of the nesting site: "evergreen woods seem to be a necessary concomitant". However, the denser portions of the pines were avoided and all territories claimed some of the edge, including open areas and some aspen effect.[3]

References on back of page



Legend

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Circles-Singing "

Black-throated Green Warbler
Dendroica virens

The minimum territories of five pairs were wholly on the census area and only one bird of the other territory was plotted off the census area. This warbler proved to be the most plentiful species, followed by the Oven bird.

Brewster reports that its favorite haunts are extensive, well matured woods of white pines";[1] Thayer writes, "A very common or abundant summer bird through all the region, high and low; ranging from the pine woods of the lowest valleys to the half open copses of spruce and other trees, ...its beat lies between the summit tops of middle-sized pines, spruce and other trees, and their bottom branches on the outer borders of the groves. The deeply shaded wood-interiors it seems rather to avoid;it is a great haunter, especially while singing, of the spindling tops of fair-sized conifers."[2]; Burtch writes that its nest is often found in hemlocks, and that the woven exterior of its nest is of small hemlock twigs.[3]

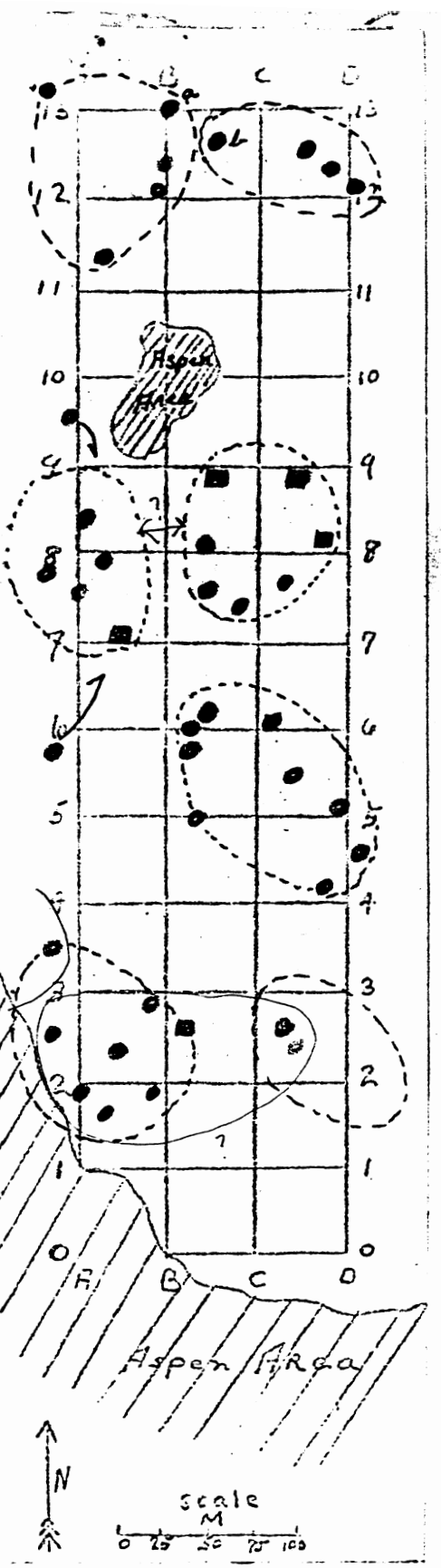
It is not suprising, therefore, to find this warbler so plentiful, for the entire area is characterized by middle-sized red pines amongst

1. Chapman, The Warblers of North America, p. 159
2. Ibid. p. 160
3. Ibid. p. 161

Black-throated Green Warbler--con.

a few scattered larger red pines. Hemlock occurs periodically throughout the area and would provide nesting places for those birds that preferred the actual hemlock trees and an abundance of hemlock twigs for nest building in other trees.

This stand of pines does not offer an area of deeply shaded wood-interior; the scattered aspen, yound white pines and birch offer sunlit areas. This may explain the complete coverage of this area by Black-throated Green territories. There were many singing perches in the tips of medium sized pines. Second growth and occasional aspen patches would satisfy this warblers occasional preference for second growth and woods-edge.



Legend

Red-----	July	5	ident's
Blue----	"	7	"
Brown---	"	9	"
Green---	"	12	"
Yellow--	"	13	"
Black---	"	16	"

Squares-Sight recognition
Circles-Singing recognition

Oven Bird
Seiurus aurocapillus

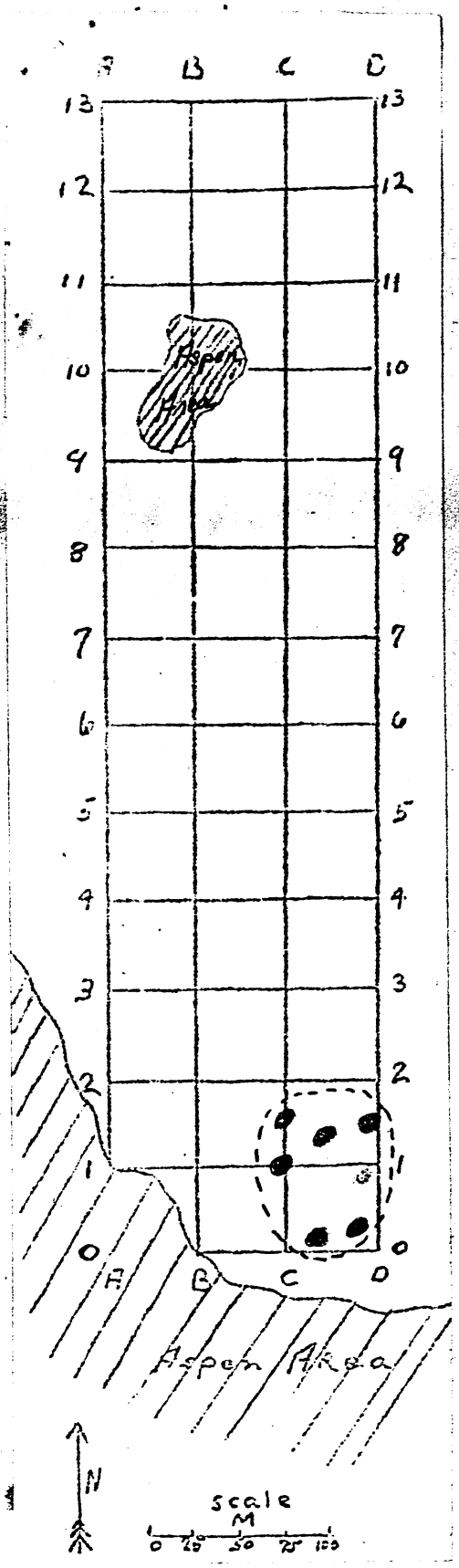
Seven males were heard singing, however, only two of the observed territories were within the census area, fractions of the other five were found in adjacent areas or edge, giving a hypothetical number of five breeding pairs per twenty acres of Red pine.

The Oven birds prefer forest lands with heavy undergrowth; evidently, the latter factor proveds sufficient in this instance, for, growths of rather dense under brush were located sporatically throughout the entire area. However, the ampunt of open space within the woods would satisfy the nesting requirements, allowing both "ease of approach and a certain amount of light"1. Nesting materials, grass, weed stems, woody stems, fibrous stems, rootlets, dry leaves, moss, ect. were plentiful.

The two families in the upper or northern section of the area seemed to call back and forth repeatedly, as if re-establishing or asserting their territorial rights.

A glance at the map at the left shows the equal distribution of territories throughout the area studied. If sufficient time warranted the complete study of the territories of this species, these minimum territories would undoubtedly expand and interlace so as to almost cover the entire census area. Indeed, the Oven bird is the most wide-spread of the terrestial forest birds.

1. Mann, H. W., Wilson Bulletin Reprint, pps. 165 & 170



Legend
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Blue---- " 7 "
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Black--- " 16 "
Squares-Sight recognition
Circles-Singing "

Pine Warbler
Dendroica v. vigorsi

Only one breeding pair was found, and it was found in the south eastern corner of the area characterized by some of the larger red pines. Chapman reports that it is never found nesting in other than pines, and quotes Thayer as saying "it sticks to pine woods as a cocklebur sticks to a dog's tail."[1] Forbush reports its breeding among red pines.[2]

Choice of a nesting site as recorded by Chapman varies from eight feet to fifty feet from the ground and this requirement of course is fulfilled.[3] The females habit of "gathering nesting material from the trunks and limbs of trees and from the ground and from both near the nest and as far as several hundred yards"[4] should suffice to supply the necessary nesting material.

1. Chapman, Warblers of North America p. 203
2. Forbush, Birds of Massachusetts, Vol. 3, p. 268
3. Chapman, Warblers of North America, p. 204
4. Ibid. p. 205

Sharp-shinned Hawk
Accipiter v. velox

On July 5, 1946, an adult was observed circling over the aspen island. It had food dangling from its talons, apparently a small rodent. It disappeared northward and this species was not observed again.

Mourning Dove
Fenaidura macroura

This dove is an adaptable bird and it has a variable choice of nesting sites. Quite possibly one may have nested in this area, however, there was only one observation o n July 12, 1946, and it was on the edge of the area. This is not sufficient data to include as a breeding pair.

Nighthawk
Chordeiles m. minor

This species was recorded three times as flying over the area. It is not included in the breeding bird total.

Flicker
Colaptes auratus luteus

Three daily observations, one visual and two by call, were recorded, all in the northern quadrant of the census area. It is quite possible that a breeding pair was sustained by this red pine area. Ants were plentiful for ground food.

Hairy Woodpecker
Dryobates v. villosus

While reclining against a tree and smoking a cigerette on July 8, 1946, an adult hairy flew into view and settled

near the top of a dead aspen. Then followed a wild tatoo of its bill striking the dead tree, then its loud call was given. This was repeated approximately four times, picking and calling until a young Hairy appeared and setteled next to the adult bird. The adult would peck the tree two or three times, look expectingly at the youngster and then peck again. At first there was no reaction from the youngster. Finally the adult became quite excited, pummeled the tree, called excitedly and even seemed to peck the air, going through the pecking motion as it looked at its young. After this excited behavior, the youngster gave two or three indifferent pecks at the tree. Both parent and young seemed satisfied with this achievment and they flew noisly away. They were not seen nor heard again; on July 16, 1946, a Hairy was heard calling from A-7.

There were many dead aspens throughout the area; food as well as nesting sites were plentiful for this species.

Least Flycatcher
Empidonax minimus

A pair of Leasts were observed perched on an exposed aspen limb on the edge of the aspen island on July 8, 1946. They were never seen again. That this bird should nest in red pine is unusual, however, it must be considered as a a decided edge effect in as much as the aspen island and clearing would fulfill its nesting needs as well as provide nesting sites.

Crow
Corvus b. brachyrhynchos

Crows were often heard flying by or near the area, but only on July 9, 1946, were they actually seen on the census area. Three birds were seen in an aspen at C-6, but they immediately flew away and were not seen again.

Red-breasted Nuthatch
Sitta p. pusilla

This forest-loving Nuthatch was observed on two occasions and in widely separated areas. Quite possibly the same individual was observed. Cone bearing trees should attract this species. Many dead trees and some remaining stumps 15-20 feet high were in the area and should have provided suitable nesting sites.

Veery Thrush
Hylocichla f. fuscescens

While the Viery is fond of moist woodlands, wooded swamps and banks of streams, he may also be found in mixed pine woods. Only one observation was made, at C-9, and it is doubtful if this observation should be included as a breeding pair.

Red-eyed Viero
Vireo olivaceus

Only one breeding pair was located on the area and

evidently only an apparent one-third of the territory is actually in the census area. This might be explained by the fact that the Red-eye seems to prefer a little more sunlight than the denser red pine affords; in addition, the aspen edge embraced by this territory, included as well as additional light, lower branches suitable for a nesting site.

Cowbird.
Molothrus a. ater

Four observations were recorded, all within a rather close area, which possibly represents only one pair. In as much as nests of Vireos (three observations were made in an area adjacent to the Red-eyed Vierio's territory), warbles, (one observation was made in each of two Black-throated Greens's territories) suggest that the cow-bird pair were able to find nests for their eggs, either with these two species or perhaps in peewee nests.

Purple Finch
Carpodacus p. purpureus

Only one observation, on the edge of D-11, was recorded. This forest bird that is found frequently in coniferous trees should have been more in evidence. There is no explanation for this apparent rariety.

Palmgren Method

This study provided an opportunity to review Palmgren's method of census taking. Data in the folloing chart is arranged to show totals and percentages as presumably would be tabulated by the use of his method, in addition a column has been added to show the actual breeding population by territory as determined by plotting of bird observation positions.

The progressive totals are computed according to Palmgren's method, as is the % of ultimate total whichis based on the progressive total of 47 breeding pairs. The "%oof actual population" is the percentage of the progressive totals to that of the pairs (43) actually plotted for the area censused. The last column "% Palmgren estimated" represents Palmgrens estimated percentage of the breeding population found on each sucessive trip as determined by his experiments.

The descrepency is due, I believe, to the fact that an observor cruising the area would include birds as part of the census whose territory, in reality, was not wholly in the area under study; ie, it is understandable for an observor to report seven Oven-birds in as much as seven actually do sing on the area; however, subsequent study shows only one territory wholly in the area, and fractions of six. This difficulity would be eliminated, possibley by choosing an area with less edge; a square area or at least an area not as rectangular as this. Under the circumstances I believe Palmerton's method reasonably accurate in this instance.

The table illustrating the comparison of the two systems is on the following page. It will be noted that the % of actual population figers vary with Palmerton's estimate only slightly on the first three trips; 2% high on the first trip, 6% high on the second trip, and 6% low on the third trip. The density population of breeding pairs for this area computed from any one of the first three trips useing Palmgrens method would have been quite accurate.

TABLE

Palmgren Method - Plot Method

Species	Observation Dates 5 July	7 July	9 July	12 July	15 July	16 July	Pairs by Territories
Mourning Dove	0	0	0	1	0	0	1
Flicker	0	0	1	1	0	1	1
Hairy Woodpecker	0	0	1	0	0	1	1
Crested Flycatcher	1	0	1	1	0	0	1
Least Flycatcher	1	0	0	0	0	0	1
Wood Peewee	3	4	4	3	2	2	4
Blue Jay	1	0	0	1	1	1	1
Black-capped Chickadee	2	2	2	2	2	2	2
Red-breasted Nuthatch	0	0	1	0	1	0	1
Brown Thrasher	0	1	1	0	0	0	1
Robein	3	1	3	4	3	2	3
Hermit Thrush	1	2	3	6	2	4	4
Veery Thrush	1	0	0	0	0	0	1
Cedar Waxwing	1	1	1	1	0	0	1
Red-eyed Viero	1	1	1	1	1	1	1
Black-t. Green Warbler	2	4	4	1	0	2	6
Pine Warbler	1	1	1	1	1	1	1
Oven Bird	5	3	7	5	3	3	5
Purple Finch	0	0	1	0	0	0	1
Red-eyed Towhee	0	0	3	2	1	2	2
Slate-colored Junco	2	0	2	0	1	0	2
Chipping Sparrow	1	2	1	1	0	1	2
Progressive Totals:	26	32	42	47	47	47	43
% of Ultimate Total:	56%	68%	89%	100%	100%	100%	
% of Actual Populat.:	60%	74%	97%	109%	109%	109%	
% Palmgren Estimated:	62%	80%	91%	96%	-	-	

TOTALS

	Species	Pairs Birds per 25 acres	Pairs Birds per 100 acres
+1	Sharp-shinned Hawk	-	- +
+2	Mourning Dove	~~1~~ +	~~4~~ +
+3	Nighthawk	-	- +
+4	Flicker	~~1~~ +	~~4~~ 2
+5	Hairy Woodpecker	~~1~~ +	~~4~~ 1
+6	Crested Flycatcher	~~1~~ +	~~4~~ 1
+7	Least Flycatcher	~~1~~ ?	~~4~~ +
+8	Wood Peewee	4	16
9	Crow	-	- +
10	Blue Jay	~~1~~ +	~~4~~ 2
+11	Black-capped Chickadee	2	8
+12	Red-breasted Nuthatch	~~1~~ +	~~4~~ 1
+13	Brown Thrasher	~~1~~ 1	~~4~~ 2
+14	Robin	3	12
+15	Hermit Thrush	~~4~~ 2	16 9
16	Veery Thrush	~~1~~ +	~~4~~ +
+17	Cedar Waxwing	1	4
+18	Red-eyed Viero	~~1~~ +	~~4~~ 1
19	Black-throated Green Warbler	~~6~~ 4	~~24~~ 16
+20	Pine Warbler	1	4
+21	Over Bird	5	20
+22	Cow Bird	-	-
23	Purple Finch	~~1~~ +	~~4~~ +
24	Red-eyed Towhee	~~2~~ 1	~~8~~ 4
+25	Slate-colored Junco	~~2~~ 1	~~8~~ 4
+26	Chipping Sparrow	~~2~~ 1	~~8~~ 4
	Totals:	~~45~~ 43	~~172~~ 110

Twenty-six species of birds representing forty-three pairs of breeding birds (table above) were found on the approximately twenty-five acres of pine association. Computed to a common figure of 172 breeding pairs per 100 acres. This total does not include the nighthawk, crow, nor the cowbird. The actual population of this area would be much higher for this total includes family groups, ie. 14 chickadees are recorded as 2, the hairy and young as one, etc.

The rather high total might be accounted for due tothe pronounced edge effect and the availability of many bird communites within the 25 acres. For example the Red-eyed Towhee attracted to areas with sprouts and seedlings 1-10 feet high; where the forest crown is closed over the Robin, Red-eyed Viero and Oven-bird are found; in 20-40 ft. trees the Blue Jay, Slate-colored Junco and Black-capped Chickadee were found, and at highter forest levels the Black-throated Green was found and alsothe Hairy Woodpecker.[1]

[1] J. Hickey, A Guide to Bird Watching; p.109

Summary and Conclusions

1. A population study of breeding pairs of birds in a pine community located in Emmet Co. Mich. was made in July of 1946.

2. The plot method, of census taking, was used.

3. Approximately twenty-five acres were plotted. The area chosen, while a part of the aspen ~~climax~~ forest, in reality was represented by a predominance of Red Pines.

4. Daily field census maps were kept and birds plotted as they were observed, copies of field maps are included in this paper,

5. Minimum territories for breeding pairs were outlined.

6. Palmgren's method of census taking was compared with that of the plot method for this area. Data computed for Palmgren's method was obtained from the daily fielf trip chats and compared with known breeding territories. His hypothetical figures for this area were high as regards breeding pairs, yet the percentages he advocated were very close and if used would give an accurate representation of breeding pairs for the area.

7. The forest edge effect was markedly pronounced. The territories of many pairs included edge. Some species were present in this association due to the fluctuating foest edge which at times entered the census area.

8. An aspen island was included in the norht-eastern portion of the area and had a pronounced effect on the population of the immediate vicinity.

9. This association yielded 172 pairs of breeding birds per one hundred acres. I do not believe this total too high. The census area included aspen areas, low bush, some birch as well as evergreens; this type of plant succession attracted birds other than those of the true evergreen forest.

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