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This document is part of a collection that serves two purposes. First it is a public archive for data and documents resulting from evolutionary, ecological, and behavioral research conducted by the Ketterson-Nolan research group. The focus of the research is an abundant North American songbird, the dark-eyed junco, *Junco hyemalis*, and the primary sources of support have been the National Science Foundation and Indiana University. The research was conducted in collaboration with numerous colleagues and students, and the objective of this site is to preserve not only the published products of the research, but also to document the organization and people that led to the published findings. Second it is a repository for the works of Val Nolan Jr., who studied songbirds in addition to the junco: in particular the prairie warbler, *Dendroica discolor*. This site was originally compiled and organized by Eric Snajdr, Nicole Gerlach, and Ellen Ketterson.

Context Statement
This document was generated as part of a long-term biological research project on a songbird, the dark-eyed junco, conducted by the Ketterson/Nolan research group at Indiana University. For more information, please see IUScholarWorks (https://scholarworks.iu.edu/dspace/handle/2022/7911).

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PRAIRIE WARBLER NOTES
1954
BLOOMINGTON, INDIANA
Volume II
From June 1

Val Nolan Jr.
June 1, 1954

There was a truly violent rain and windstorm (50 m.p.h.) during the night, knocking over two trees in our yard and doing considerable damage to trees in town; rain heavy. The morning was relatively dry and windy, and the afternoon was rainy from 1430 to 1530; wind made searching difficult; temperature 69° at 1330. Present from 1330 to 1800.

III3 - A fairly well marked male is singing slow skid songs in the east part of this field, singing frequently and loud from the brush near the ground. He may be the male that sang yesterday in the orchard. This late moving around is very interesting and may be typical of the species in a year of cool or rainy weather. Note that M 33 and M 02 seem to be without females, which might mean there are more males than females.

T 31 - 31 F is incubating while power saws roar within 75 to 100 yards of her. I don’t hear M 31.

T 30 - Silence for 15 minutes.

T 42 - 42 F is incubating.

T 32 - This nest was overturned by the storm and the eggs are lying under it. Number four is 15.4 x 12.3. I weigh them (all but two) and they weigh:
1 - 1 gm. 160 mg.
3 - 1 gm. 200 mg.
4 - 1 gm. 210 mg.

M 32 sings in the northwest part of the orchard.

West Orchard - Yesterday's male seems to be gone.

T 44 - This nest has not been worked on much if at all since yesterday. It has the full shape but very sparse look of a fragmentary nest, and if it is left incomplete I'd be inclined to attribute this to 44 P's internal state rather than to the storm. Silence during half an hour; a good deal of wind and rain.

T 02 - M 02 sings loud but infrequently. Evidently there is no female. I watch him for 10 minutes.

T 33 - I find M 33 at the south valley bounding his territory. He is singing frequent little skids and insipid steps, so faint that I can just hear them from about ten feet away as he climbs and flies over a grape-covered honey locust clump about about five feet high.

Then three times within about a minute he does a very interesting thing: As he moves over or comes to a branch he extends his wings a little and flutters them, lowering his anal region as though copulating with the branch. Each performance lasts about a second but seems unmistakable. This
is probably vacuum activity; if so it's a very remarkable example.

T 35 - 35 P has laid egg one, measuring 14.7 x 12.1 mm. It has a heavy, darkish wreath with few spots elsewhere. M 35 is silent.

T 34 - I search the pines running east-west on the south part of the territory. In the multiflora roses are two Indigo nests, each with one egg; and one Field Sparrow nest with one egg. No sign of a Prairie Warbler.

T 36 - 36 P is incubating. M 36 is silent.

T 37 - Silence.

T 38 - The nest is empty and there are no eggs under it, so it's failure is not due to the storm. The nest is perfectly intact and well anchored. M 33 sings type-8 steps on the hill that was old T 3, and near the northeast part. His songs are infrequent.

T 39 - Complete silence.

T 41 - Silence.

T 40 - Silence.

I decide to look for a new pair, in the event that construction operations ruin my record for birds now under
study. I therefore cross the road to the north, where at least one male sings, and in 10 minutes I find a nest. It is about five feet high in a nine-foot elm, located in an upright fork. In it are three eggs whose chalky color indicates they will soon hatch. From now on this pair will be the 43 's. There is an unused 1954 Prairie Warbler nest in an elm on this pair's territory, so this is pretty clearly a second nest.

1800 - I leave.
June 2, 1934

A cool gray morning without any wind; temperature 60° at 0715. Present from 0730 to 1030 and from 1715 to 1930.

T 31 - 31 F is on the nest and M 31 is singing. [See under T 30.]

T 30 - I hear two males, both singing weak colorless skids and at 0742 find M 30 and 30 F feeding near him. M 31 flies up and there is a fight with fighting calls. 30 F stays a few feet out of the way, then is chased by one of the males and goes to the ground, the other male following. Both males call angrily; the pursuer seems to have been M 30. I follow them and keep 30 F in view till 0815. During that time she feeds along over to the burned over spot and M 30 stays near singing weakly. M 31 also keeps within 25-35 yards of the 30's and there are several fights. All three are within 40 yards of 31 F’s nest but this seems to be T 30 (31 F is still on the nest). Once while I watch 30 F she suddenly begins to call “check” four or five times and I see her begin to crouch in the position inviting copulation. The head is withdrawn and pulled back so that the bill sticks up at a 45° angle. The legs crouch stiffly and the anal region is lowered with the tail maintained stiffly at a 35-40° angle. The rear half of the body quivers slightly up and down with a rapid vibration. After four seconds of this M 30 flies to within three feet of her, his wings thrust out to the sides and the primaries extending back in a plane nearly level with the ground. He immediately flies away without any further action.
M 30 "crouched" when fighting M 31, i.e., he humped his back and thrust his head forward and down.

Workmen arrive so I leave at 0815 with all three Prairie Warblers still near the burned spot and brush piles. I'd say 30 F has not begun to build (note she is seen in different areas every day) but is ready to do so.

T 42 - 42 F is incubating. A male which is probably M 42 sings a skid by the meadow gate, then goes south into the orchard and sings very regularly and frequently there. This is where Davis and I saw the male the other day; so there is a very good chance this is T 42, especially since he holds so little of II.

T 02 - M 02 sings loud and regularly at timed intervals of ten seconds. He acts unmated. He has moved west some so that he runs to the locusts along the little valley.

T 44 - M 44 sings very infrequently but I finally find him and see 44 F nearby. After 30 minutes I see her gather spider webs and go to a scrubby half-dead elm about 17 feet high. She flies into a leafy upright fork about six to seven feet high and M 44 flies out of the same tree. She then sits in the fork for eight to ten minutes, part of the time seeming to work with the spider webs, the rest of it just sitting. Perhaps this is typical of behavior at the very beginning of building. I can't see any nest yet but I'm afraid to approach the tree.
T 33 - M 33 sings loud and regularly from high perches and I conclude he is still unmated.

T 32 - Complete silence for 25 minutes.

T 34 - M 34 and M 35 are having a silent encounter just south of the east-west pines, i.e., in the clearing where 15 F built last year. They simply move about near each other, sometimes within four feet. Most of the time they stay low. Both sing the combination high-buzz step at a very low volume and infrequently. Both flip their wings a little, the only other sign of attention to each other.

T 35 - [See above under T 34.] 35 F is near the nest when I approach so I retire to the southeast locusts. M 35 sings combination songs there.

Egg two measures 15.4 x 11.7 mm and has a finely spotted wreath. M 34 now sings his song, half skid-half step, beyond the foxes' den. M 35 sings a combination just east of the valley.

T 36 - 36 F is on the nest and I don't disturb her, despite my desire to time the end of her incubation period.

T 38 - A male sings type-8 steps on old T 8, in the valley. Then a type-8 step singer sings on the north side of old T 3. I don't know if they're the same. In ten minutes I see no sign of 38 F. The bird that is clearly M 38 gives me no help - he moves a lot and sings loud.
T 37 - M 37 and 37 F are together, 37 F carrying food. I can't tell whether M 37 is staying close out of interest in her or in the young; certainly his behavior could be thought of as typical following of the female before or during nesting if I didn't know there is a fledged brood.

T 36 - 36 F is still on the nest.

1030 - I leave.

1715 - I return. The day is less cloudy and the sun shines at times.

T 41 from 1715 to 1745 - M 41 sings a high, rather faint song regularly all over the territory. Once he flies to another small bird on the west end of the territory and they disappear. For ten minutes he is silent; then he sings and soon works back to where I've waited. I'd guess the nest is nearby.

T 43 - The eggs have all hatched and the shells are gone. M 43 sings a medium-pitched skid near the nest and 43 F returns to it.

T 39 - M 39 sings type-8's near the sink hole.

T 38 at 1755 - M 38 is moving about silently on the hill top near the first two nests. I do not search for the female.

T 36 - I flush 36 F from the nest (she lets me get within two feet, then flutters off) and find all four eggs unhatched.

T 31 - 31 F is on the nest. [See under T 30.]
T 30 - from 1810 to 1840 - M 30 and M 31 sing at each other faintly near the burned over spot and I find 30 F there. I follow her for ten minutes and see her crouch in several suitable nest sites, the first time she's done this since her nest failed. She then goes to the burned area and hops along the ground there (it's odd how much time she spends there when the food supply must be scant). M 30 flies near her, getting within three or four feet. M 31 approaches too and the two males make silent feints in each other's directions. I doubt if it's worth staying here.

T 32 from 1840 to 1920 - After 20 minutes M 32 gives his first song since yesterday and I almost immediately find 32 F gathering material. She three times carries it into a patch of blackberries, so certainly she has a new nest there. I don't go to it for fear I'll frighten her. He keeps close to the site and once flies down to the berry bushes near her. He sings very sporadically and infrequently but at normal volume.

1930 - I leave.

There was a migration last night. I saw several Black-throated Greens (singing), a female Blackburnian, an Alder (singing "way-bee-o") and a Yellow-bellied Flycatcher.
June 3, 1954

A very dark early morning after another night of rain and violent winds; temperature 63° at 0730. It threatens rain till 0840, then clears completely and becomes quite windy. An hour later it is cloudy again and this succession lasts all morning. It rains in the early afternoon; the gusty south wind continues. Present from 0800 to 1145 and from 1620 to 1750.

T 31 - M 31 sings near the nest and 31 F broods (she must have young, but I'm unwilling to add to her troubles by looking). M 31 sings type-8's, which I've heard from him only once before, yesterday.

T 36 at 0820 - 36 F is off the nest, which contains three young and one egg; no egg shells. She calls when I look in and gives an elaborate distraction display 15 feet away. As usual, the wings are fanned, the tail spread wide and lowered, and she moves in a fluttering, painful-looking fashion down the trunk of the small tree she's in. M 36 is not visible.

T 30 from 0825 - to 0900 - M 30 sings thin, faint, irregular songs, staying within a 75-yard area. I can't see 30 F though. Once M 31 and M 30 fly back and forth in 10-yard hops within 5 to 20 yards of each other. They are about two to five feet from the ground. Each gives ground when the other moves, and flights toward the other are abruptly
terminated with the would-be attacker turning back and lighting on a weed stem.

T 42 - 42 F is incubating. M 42 sings beside the meadow, the same song I've heard the last few days in the orchard. Today there is no song in the latter place and I think it is quite likely that the male there has been M 42.

T 44 - The tree to which 44 F was carrying material yesterday seems to have nothing in it and I conclude it must have blown out last night. I then watch for M 44 for 15 minutes and find him near the place where 44 F was building yesterday. On re-examination of the tree I see one or two shreds of fiber in it and a few minutes later 44 F goes to it. She repeats this in five minutes, carrying material. I am now relatively sure she is building there, and can only suppose that most of yesterday's material blew away.

T 02 - M 02 is singing loud and regularly (14-20 seconds) as usual and is still unmated. It looks as though he'll be my first example of a male that stays into the summer and never finds a female. It will be interesting to see how long he stays.

T 33 - M 33 is evidently without a new mate. He sings and behaves as he has since the nest failed.

T 32 - M 32 sings loud on the west edge of the field. Without going close I see 32 F twice carry material to the new site.
T 35 - When I go to the nest no adults are present and I measure the third egg at 15.3 x 11.8 mm. Egg one is gone. When I start to return the egg 35 F flies up and calls several times and is joined by M 35. I withdraw till 1040, then go to the nest. 35 F is incubating and she hops off as I approach. I quickly retreat and watch her. She returns to the nest and settles on it, remaining till 1105, when I get the egg back at last. During this time on the nest she moves about a good deal (as best I can see). Once M 35 who is singing at M 34 to the west, flies to the nest for a second, then leaves, singing just before and after he is there.

M 35 sings the whole time I'm present.

T 34 - I don't search this territory. M 34 sings a frequent skid.

T 36 - 36 F is on the nest at 1110.

T 38 - A male sings a faint high insipid step on old T 8 and T 26 near the cinder pile. The song is infrequent. I look for a female on the chance that it is M 38, but I find none. It might also be M 37.

T 36 at 1130 - The last egg has not hatched yet.

1140 - I leave.

1620 - I return. It has rained off and on all afternoon and heavy showers fall all the time I'm present. Strong winds
accompany them. This very much impedes my work and I decide to leave early.

T 30 - M 30 sings two or three times but I don't see 30 F.

T 36 - 36 F is incubating or brooding.

T 38 - Silence at 1645.

T 39 - A few high songs near the pines.

T 40 - The tree cutting has begun here, a wide path along the wires. [When I found nest three, it was clearly beyond the effects of this cutting.]

T 43 - 43 F is brooding. The nest is quite tilted, presumably due to the weather; it may not get through.

T 38 - A male and a female fly up as I plod through the rain by the valley at the line between old T 3 and T 8. They are quite nervous, move about jerkily. The female calls "check." In a few seconds the male sings a very faint high step. [These were more likely the M 46's, a pair later discovered.]

T 36 at 1740 - 36 F is on the nest and the rain and wind are so hard that I'm afraid that it would cause her to abandon if I frightened her off. I therefore give up timing this set's incubating period and pass her by.

1750 - I leave.
June 4, 1954

A very chilly gray morning with a northwest wind and a fine drizzle falling at 0500 for a few minutes; the day continues cold and windy (the sun showing very slightly in the late afternoon, the wind abating a little at the same time) but no more rain falls; temperature 50° at 0445. Present from 0455 to 1135 with Gordon Thurow and from 1630 to 1900.

T 35 - I hurry to this territory hoping to see a Cowbird lay since an egg was gone yesterday. It is beginning to be a gray light when I get to the territory at 0507 (en route I hear a male, probably M 33, sing at the sink hole). I can soon see 35 F on the nest. M 35 begins to sing some few minutes later. At 0537, 35 F quietly leaves the nest, not in response to the male’s song so far as external factors show. Note that this is probably the first time off the nest today. I go to it and see that it still contains only two eggs, so I thus have an indication that eggs are not laid this early or before she leaves the nest for the first time (which may be the key fact and if so may be an important one). At 0539 she returns to the nest vicinity but seems alarmed by me, although I’m 20 yards away and in a locust grove. I withdraw for two minutes and immediately her calling stops and she goes to the nest.

By 0615 no Cowbird has come and I leave the territory.

T 3h - M 3h has sung a good deal.

T 32 - The nest is one and a half feet high and has all but the final lining. M 32 is silent.
T 42 - M 42 sings his usual song on III. The female is not on her nest. 

T 31 - 31 F is brooding (I have never seen her young but they are due now).

T 30 - Silence and I go on to meet Thurow at the reservoir. A male is singing on III S today

T 30 from 0700 to 0730 - Weather conditions are so poor that whether there is song or not can not be attributed to anything about the breeding cycle. Very few songs of any sort are heard. After 15 minutes M 30 sings from a little northwest of the hackberry and we watch him as he moves about on and near the ground there. His song is full volume when he sings at all. He works over this general area for five minutes but we never see 30 F.

T 44 - The nest is a very flimsy shell, fairly well-shaped but so thin that it resembles an abortive structure. M 44 is silent and there is no sign of any Prairie Warbler.

Field Sparrow nest, broom sedge, female on three eggs. 

T 02 - Silence.

T 33 - Silence. Note M 33 may have sung earlier at the sink hole or just south of it.

T 35 - 35 F is on the nest so we don't disturb her.

T 34 - We cover the entire pine planting without finding 34 F's nest. M 34 sings a good deal of the time.
Other nests found are: Indigo which I found a few days ago has four eggs, each with a hole a quarter of an inch in diameter; feathers from the female are on the nest and nearby branches. (I can't think what predator would kill or attack the adult and break but not eat the eggs - is it a weasel?) Towhee's nest four and a half feet high in a Virginia pine, female incubating four Towhee and two Cowbird eggs from the same Cowbird. Towhee's nest four feet high in pines, three eggs. Chat's nest, three and a half feet high in pines, three eggs. Chat's nest with a broken egg in it and feathers around it. Indigo nest, two feet high, one egg.

T 36 - 36 F brooding.

T 37 - Silence.

T 38 from 1020 to 1100 - Complete silence on the whole territory, but most of the time I spent in the main north-south valley where I saw the adults yesterday. [Probably the M 46's, later discovered.]

T 39 - M 39 sings type-3's.

T 43 - The young are alive.

Chat's nest, three feet high in an elm fork, female on four eggs.

II N - Silence from [M 36], as has been true for some time.

T 42 - at 1115 and 1125 - No sign of 42 F on the nest.
T 44 - The nest may have been added to since we were here earlier.

1135 - I leave.

1630 - I return. The day is lighter and less windy.

T 41 from 1630 to 1700 - M 41 sings enough from different places to convince me the nest is still active.

T 38 from 1705 to 1740 - There are more Prairie Warblers here on the west end of the ridge than there ought to be, and their behavior is odd. A male sings a high song from 30 yards into the maple planting. On the edge of the planting are two males and a female, about 40 yards south of the valley. Both males pay attention to the female, i.e., fly to spots near her, and neither makes any concerted effort to evict the other from the territory. Both sing very faintly and there are many little skirmishes and much dry rattling combat calling. But they stay in the same tree much of the time. Note that no aggressive behavior is ever displayed by or toward the female. She hops along and feeds in the trees, the males following. Finally she goes east along the hillside and one male stays with her. There are two males (presumably the two which have been together) singing by the valley, so I'd guess this whole encounter was between M 38 and M 39. Another possibility is that M 40 has come in here and since M 38 doesn't "know" him as a neighbor is fairly tolerant toward him. This does not account for
...the male in the maples, [probably M 46].

A little later M 38 sings on the hillside.

II-N - Silence.

T 42 - 42 F is incubating. I had almost given her up.

T 33 - M 33 sings on his territory.

T 02 - M 02 sings loud and regularly. I see nothing to suggest a female is here.

T 44 - The nest is much built up so it hasn't failed due to the weather.

T 30 - from 1815 to 1900 - M 30 sings all over the center of III, most of the time a few loud songs from a perch, with long periods of silence. I see no sign of 30 F and almost fear she has nested (his irregular and scant song would tend to contradict this if it weren't for the bad weather.)

1900 - I leave.
June 5, 1954

A clear cool dawn with a heavy dew; temperature 50° at 0515; the rest of the day partly cloudy with the sun shining most of the time, the temperature in the high 60's. Present from 0530 to 0730 and from 1600 to 1900.

III 5 - Again a male sings here, a loud chatter skid. He is moderately marked.

T 31 - I feel young in the nest.

T 30 - Silence as I go through.

T 42 - 42 F is incubating.

II N - Complete silence.

T 36 - 36 F is brooding.

T 32 - The nest looks finished. It is a little over two feet high, well concealed except probably from below.

T 34 - M 34 sings. No sign of the nest.

T 35 - 35 F is off the nest so I measure her fourth egg: 15.4 x 11.9 mm, with a reddish blurred wreath like a Field Sparrow's egg. This nest is poorly concealed.

T 33 - M 33 is silent.

T 02 - M 02 is silent.
T 44 - The nest is well along but not yet finished. Light is still faintly visible through it.

T 30 for 30 minutes - M 30 sings over the center of his territory and moves so much that I get no help about 30 F's nest site. His songs are high but of normal volume when they are audible at all.

0730 - I leave.

1600 - I return; the day is fair with large clouds passing over quickly.

T 41 from 1600 to 1620 - M 41 sings over the territory. I never see him carry food, and he clearly is never with a female; his nest is presumably still active.

T 43 - There are only two young left in the nest.

T 39 - M 39 sings.

T 38 from 1630 to 1730 - I walk slowly over the whole territory down to the south edge by the ravine. A song here leads me to a male a little distance from 38 F's third nest and soon a female appears. She flies west across the ravine, seems to gather some small object 30 feet up in a tree, and flies out of my sight, I think to the south. The male calls several times. I think these are the 37's and the female got food, but it is possible they are a strange pair.
[Correct, the 46's.] I soon learn they are not the 38's for I go back to the old T 3 ridge and find M 38 singing two or three very faint songs there. In a minute 38 P appears and I follow her for 15 minutes as she feeds in a slow and placid way along the wooded edges of the east tip of the ridge. M 38 flies into a bush with her once, but there is no overt sex behavior other than the usual keeping an eye on her. I leave them since she surely will not build today, or she has already done so.

II N - Silence.

T 33 - M 33 sings loud and regularly and in ten minutes seems still without a mate.

T 02 - M 02 also seems unmated.

T 44 - The nest is more developed.

T 30 - I follow M 30 as he flies all over the territory in long flights to tree tops, from each of which he sings a few loud songs. He then goes to the little projecting woods and sings faintly and 30 P appears. She immediately flies without material to a little elm six feet high and settles in a fork four and a half feet high. In it are a few fibers so at last (after 12 days) she seems to have begun to nest again. I back away to avoid frightening her.

1900 - I leave.
June 6, 1954

A slightly overcast dawn with a very light shower at 0545; it clears up in an hour and the day is hot with a south breeze; temperature 59° at 0545, 75° at 1545. Present from 0600 to 0900 and from 1545 to 1745.

T 41 from 0600 to 0645 - I follow M 41 all over his territory as he sings regularly. I hope to see him carry food but have no luck.

T 43 - 43 F is not on the nest. There are two young. I sit and listen to try to learn M 43's song; it is a skid.

T 39 - M 39 sings.

T 36 - 36 F is on the nest.

II N - I listen for five minutes but hear no song.

T 32 - The nest is finished; it seemed to be yesterday, but it looks as if more of the hair of the black cows from the field has been added. The lining is quite black. M 32 sings loud skids.

T 35 - 35 F is on the nest.

T 34 - As I walk out into the field south of the pines a male flies up to within ten feet of me in some blackberries. To my surprise a female is with him about five feet away from him. She gives a high call note and suddenly ducks into cover.
a nest right beside me. It is about one and a half feet high, well concealed in a blackberry; it seems to have become slightly dislodged and now rests rather precariously. This of course is J 34 F. I back off and postpone trying to examine the nest's contents.

M 34 then goes on south to the big elm in the field and beyond it to the edge of the woods. He sings frequently here, antiphonally with M 33. It may have been M 34 that has been crossing the field to the woods all along and not M 35, or more likely, it is a sort of common ground or a spot never tenaciously held.

T 33 - M 33 sings and behaves as though unmated.

T 02 - M 02 still sings loud and frequently and is without a female.

T 44 - The nest is complete, still empty.

T 42 - 42 F incubates.

T 30 - 30 F has abandoned the nest she began yesterday. It is a very slight mass of fibers, loose and obviously never to be completed. I follow M 30 for 20 minutes as he sings rarely and never long from one spot, but I don't see 30 F.

T 31 - The young are still alive.

T 37-38 - A male sings type-8's in the valley of old T 8. I don't think it is either M 37 or 38. I may hear M 37 on his regular
territory. [The male became M 46.]

T 38 - I go to where I saw 38 F last night and find M 38 singing faintly. Almost immediately I see the fourth nest. It is six feet high in an eight-foot elm covered with creeper, well concealed. In it is one egg measuring 15.4 x 11.9 mm, i.e., rounded like 38 F's first eggs, and very faintly spotted like them. Note that the behavior seen the last two days is that of the pair between nest completion and laying.

T 39 - M 39 sings.

0900 - I leave.

1545 - I return. It is sunny and hot.

IIIIS - Silence. Evidently the male here didn't stay.

T 30 for 40 minutes. M 30 sings irregularly, usually faintly, and in no special place. I get no help in finding 30 F; I doubt very much that she has begun to nest.

T 34 - I wait for 15 minutes at the nest to examine it but 34 F stays on it.

T 36 - There seem to be only three young present.

T 37 - I am beginning to look for a second brood nest; no luck in a curiiory examination today.
T 39 - As I come on the territory to look for the nest 39 F appears at the south end. She calls frequently, bobs her tail, and moves about very rapidly, always staying high in the trees. She moves north in long flights as though she were returning to the nest; but I keep her view for 15 minutes before losing her, and I'm convinced she goes away from the nest on these flights. Her calls are irregular but frequent enough to help me follow her. M 39 sings as usual during this period but moves north as she does. Most of the time he is not near her, but once he flies into a tree with her and flutters away in a 15-yard flight. She pays no attention and moves on away from him. Her movements give the impression of much energy; she feeds and darts about, jerking her tail. When I lose her I think it is because she flies some distance, judging from the time I have her in sight, back to the nest. M 39 does not follow. This is an interesting example of female activity when off the nest during incubation. [I found the nest after the leaves fell. It was in the southwest corner of the territory, very close to where she first appeared and where she returned.]

T 30 - Nothing learned.

1745 - I leave.
June 7, 1954

A partly cloudy dawn, clearing soon into a hot day; 64° at 0545. Present from 0600 to 0900 and from 1600 to 1830.

VIII E - A male sings a faint skid in the tree row north of the pines, probably a wanderer.

T 36 - An adult is at the nest.

T 37 - M 37 sings once or twice.


T 38 - The second egg is present. It measures 15.9 x 12.7.

T 39 - M 39 sings his usual loud type-6's. I make no search for the nest.

T 43 - I listen for M 43's song and hear him sing both type-3's and slow skids. The two young are all right.

II-N - Silence. [The reason for this prolonged silence is M 36's family duties on VII.]

T 32 - The first egg is present, measuring 15.5 x 12.3 mm. M 32 sings in the field.

T 35 - 35 F is incubating.

T 34 - 34 F is on the nest.

T 33 - I walk over the territory slowly and see and hear M 33 but no female. A Red-eyed Vireo's nest six feet high on the outer
tip of a limb has one vireo and three Cowbird eggs, two from the same female. The female vireo incubates.

T 02 - I watch M 02 for ten minutes. He sings from high perches at timed intervals of ten seconds and seems obviously unmated.

T 44 - The nest is still empty.

T 31 - An adult is at the nest.

T 30 - I watch for 25 minutes but never see 30 F. M 30 sings rarely, just as he has for the last two or three days, a few songs from high perches, most rather faint.

T 42 - The nest seems to have failed. In three trips I never find 42 F on it.

0900 - I leave.

I return at 1800. It is sunny and hot.

T 41 - About two-thirds of the little apple orchard has been cut down today; I had thought 41 F might have a nest there [she did not]. M 41 sings loud from mid-territory, then goes north and I lose him.

T 40 - M 40 sings loud and as before on the south end of the territory, I’ll try to get back in touch with this situation.

T 39 - M 39 is singing at the pines, then a little north and west of them. The tree cutters began here on 6/3 to cut a path south-
west parallel with the light wire; today they did a little more. Clearly I'll have to watch M 39 to see if the nest has been cut down. (no.)

T 42 - Again, no sign of 42 F at the nest, and it has certainly failed. I won't try yet to get up to it, but it is in no way disturbed or messed up. M 42 sings two or three high faint songs at the west side of the meadow. I make no search.

T 30 - for 40 minutes - M 30 is singing high in the north tree row, loud frequent skids, when I arrive. I follow him all the way to the trees between III and III S and back again, and he continues to behave in this way, singing loud from the big trees. I get no help at all on the whereabouts of 30 F, but I doubt if she is building.

1830 - I leave.
June 8, 1952

A slightly cloudy morning with clouds continuing off and on all day and with a heavy thunder storm in the middle of the day; no wind; temperature 66° at 0600. Present from 0600 to 0900 and from 1600 to 1830.

T - from 0600 to 0700 - M T sings regularly and loud within my sight for the entire hour, never joined by a female and never collecting food. Further, he stays within a 75-yard circle on the east end of T. His songs are 12 to 15 seconds apart. Once he starts to fly to a new perch as he begins to sing and he sings an entire normal loud skid in flight. I've seen this once before.

T - A Vesper Sparrow has sung on the territory lately and is doing so today. M T sings four or five high thin notes, in pattern like the song of a Golden-winged Warbler. The two young are well feathered, the nest tilting precariously.

T - M T sings 10- and 11- second intervals after 10 minutes of silence, goes north of the electric wires and the new cut. I spend 20 minutes without learning anything.

T 39 - M 39 sings as though the pair has an active nest going.

T 38 - 38 F is near the nest so I pass it to return later.

(T - A male sings an ordinary step song here. I think I must have
seen a female of this pair when I was looking for 38 F's fourth nest.

T 37 - M 37 sings a high skid near the first nest site and 37 F sits preening in a tree close by. She then gathers food, presumably for the young. She may have a second brood nest.

T 36 - The young are alive.

T 32 - The second egg measures 15.1 x 12.4 mm; the first egg is gone.

T 42 - M 42 is singing loud frequent chatter skids just north of his regular old territory. I follow him for 25 - 30 minutes and learn a good deal from him: He covers II N, which means that the male there (M 36) has disappeared. M 42 then goes south into the orchard and sings where the male I have never been quite sure of sometimes stays. 42 F never appears.

T 38 - The third egg is 16 x 12.9 mm, a big one.

0900 - I leave.

1600 - I return. It is hot and sultry.

T 31 - There are four young in the nest.

T 30 - I follow M 30, which sings mostly near the little woods on the south end of III. Then he begins to sing type-8's, an odd song for him. South of the woods I find 30 F and see her go to a redbud in a fairly grown up part of the field. The nest is there, about 7½ high, moderately concealed by
Virginia creeper. It looks as though it was begun today; she is very active (at last) making four trips to it in about 3 minutes.

T 44 - M 44 sings faint frequent chatter skids in the tall elms north of the nest. He pays no attention at all to me when I go up to the nest, turning his back and facing the other way. The first egg is present, but I don't like to risk getting it to measure.

T 02 - I sit at the 33 - 02 line to listen for M 02. A male comes up soon and fights with M 33 at the ravine, the two singing very quietly and frequently from the same tree, flirting their wings a little. This male is probably M 44; at least his few songs are like M 44's (though this is not very significant during a male v. male encounter), and M 44 was singing earlier from trees M 02 has been using.

T 33 - M 33 fights the male to the south, as described above. He sings many insipid steps, very hard to hear because high and faint, on the hill. Then he goes to the north edge of the wood and twice drives a male Indigo Bunting several yards. Two female Indigos, one near him in the same tree, he lets alone (the two show no animosity to each other). He also fights M 32, who sings at the edge of the field. The two give the fighting call and fly back and forth near each other for 30 seconds.

T 34 - The nest contains four eggs. It is so tilted that I can't think the young will ever survive in it. Their weight could cause it to fall.
T 35 - The nest has failed, sometime before the noon rain fell. There is no disturbance of it, so probably a snake got the eggs. It was poorly concealed. M 35 sings all over T 35, making rather long flights. I look without success for 35 F.

T 42 - I find a Field Sparrow nest in broom sedge, female incubating three eggs.

M 42 is now singing much less frequently than this morning, the songs slightly less loud and less assertive; they have the tentative quality noticeable when a male is with a building female. 42 F, a very yellow female, flies up near me when I look for her and sits calling at me in little elm trees. She seems so nervous that I retreat, thinking her nest must be here. I sit to watch, but see no carrying of material, and she disappears in the rather dense growth typical of II. 42 continues to sing. I decide to let her get settled more and to come back tomorrow. Just as I am leaving, M 42 flies into a little elm beside the road and silently crouches down in a fork covered with creeper. He flexes his legs, spreads his wings a little; his belly touches the stems and branches that form the fork. This is repeated in the same spot. 42 F flies to this tree and M 42 leaves it and goes 15-20 yards away. In a few seconds he sings a loud song, then several more (compare with his faint ones earlier). I think she has no nest yet, so I leave the territory.

1830 - I leave.
June 9, 1951.

A sunny morning and a hot, generally fair day; temperature 69° at 0600. Present from 0600 to 0900 and from 1600 to 1845.

T'43 - M'43 sings insipid steps near the nest. It still has the two young, despite its severe cant.

T'40 - M'40 sings very little; when he does he is on the south part of the territory.

T'39 - from 0640 to 0715 - M'39 is silent till 0650, then sings frequent and regular type-8's till 0715. He moves over the south-west part of the territory to the sink hole. No sign of the female.

T'38 - 38 F is incubating and M'38 singing type-8's from the hill top.

I don't try to measure the fourth egg.

T'37 - M'37 sings one high skid as I pass without trying to find the young.

T'36 - The nest is destroyed and really very little of it is left.

M'36 is not far away singing his regular song at full volume but infrequently. 36 F is near him, neither paying attention to the other. She preens at great length.

T'33 - I go to try to see whether M'33 has a mate and whether M'02 is still here. M'33 sings persistently, much of the time from the hill top, and I doubt very much if 33 F or any other female is here.
T 02 - Not a sound in 25 - 30 minutes, and I think that the territory is empty.

T h4 - The second egg is present. M h4 is silent, as he seems always √ to be.

T h2 - M h2 sings west of the road and a little south of the spot where attention seemed focused last night. In a few minutes h2 F appears. She doesn't explore during the short interval I see her, though she once shows what seems special interest in a creeper-covered elm. I am fairly sure that she hasn't begun to build yet. No attention to each other by the pair.

0900 - I leave.

1600 - I return. It is hot and sunny.

III s - A male is singing here on the east end. His song is not so high as M 30's, but since the latter's new nest is now quite near here it seems possible that the male is M 30.

T 30 - Silence. The nest seems well advanced. In five minutes or so I neither see nor hear the 30's.

T 31 - The young are still alive.

T h2 - M h2 is singing at a normal rate and volume about where he was yesterday afternoon. I soon see h2 F moving along low some distance from him. I then watch for 30 or 40 minutes and see nothing more of her. Meanwhile M h2 is not singing like a
male whose mate is building, i.e., as he was yesterday. Also the center of activity is not near where they were this morning.

T 32 - There is a third egg, no Cowbird egg as I had expected. Egg three measures 15.5 x 12.5 mm.

T 34 - F is incubating.

T 35 - M 35 sings faint fragmentary songs, usually of the three - four note, Golden-wing type. It is obvious that 35 F is building but I have trouble finding her. In an hour I see her once. She flies into a locust grove, M 35 nearby. After feeding for three - four minutes she goes into the field and vigorously gathers material for outer shell of the nest. I lose her when she carries it, but she seems to go north into the woods or to its edge. M 35 then sings in the woods and I finally go in myself. Twenty-five yards in is a little clearing that the sun reaches; possibly she's nesting here.

A male sings over in the little enclosed field M 23 used last year, singing type 8's most of the time. I'll explore it soon. Oddly, I've heard nothing here before today; while I've not gone in, I've listened carefully enough, I thought.

VIII - Silence.

1845 - I leave.
June 10, 1951

A clear sunny morning and a hot day, over 90°; temperature 71° at 0700. Present from 0700 to 1045 and from 1300 to 1700.

T 41 - from 0710 to 0740 - M 41 sings constantly from the east end of his territory where he now spends almost all of his time. He has a 40' maple tree that he uses as a song post much more consistently than males usually do.

T 43 - The young are still alive.

T 39 - Silence as I pass.

(T 46) - The male sings here. He is definitely on territory. Call him M 46.

T 38 - 38 F is incubating.

T 35 - A Ruffed Grouse flushes from the edge of the woods as I arrive, the first I've ever seen on the area. The next 2½ hours I look for the new nest. M 35 sings faintly most of the time, usually a short step song of four notes. I find 35 F only twice in the whole period, and on both occasions she gathers material and flies into the woods with it. The first time she gets the little curling climbers of a dead grape vine, taking them from about 10' high. The next time it is milkweed fiber pulled from the stem in the usual way. The nest is clearly in the top of a tree in the mature woods, higher than the branches of redbud and dogwood which grow under the bigger
trees and make it impossible to see what's going on. I climb trees to try to see over the lower canopy, but without luck. This nest is over 20' high, is probably in the sun, and therefore the location is not as odd as at first it would seem. M 35 behaves throughout the morning in the way typical of a male whose mate is building, concentrating his attention on the vicinity of the nest, sometimes following 35 F, and occasionally flying from one high tree to another on the extremities of the territory.

T 34 - 34 F is off the nest, which still holds four eggs.  

T 32 - Surprisingly there are still only eggs two and three. I don't know whether the nest has failed or it is one of the very rare occasions when there is an interval between laying the full set. M 32 sings.

T 42 - M 42 sings loud and regularly on the center of the territory. I spend 10 minutes, but can't find 42 F.

T 36 - Silence as I pass through.

10h 30 - I leave.

1300 - I return.

III S - The male here sings.

T 30 - The nest is complete. I may have been mistaken in thinking it
had just been begun the day I first found it.

T 31 - The young are still alive.

T 44 - The third egg is present.

T 33 - M 33 sings as usual, staying on the hill.

T 02 - Silence.

T 35 - In another one and a half hours of searching I learn nothing in addition to what I found out this morning. I am not sure I ever see 35 F. The puzzling thing to me is where she gets her material, since I cover all openings without seeing her.

An Indigo Bunting nest, two feet high in a 3½ foot maple, contains two Indigo eggs, one Cowbird egg; female incubating.

Enclosed clearing - The male sings a lot here. Field Sparrow nest four feet high in an elm, two Cowbird eggs from different females.

T 32 - Still only two eggs, numbers two and three.

T h2 - I follow M h2 for 45 minutes, see no sign of a female. He sings loud and steadily at ten-to-twelve second intervals.

At 16h5 a very interesting thing happens. He flies to a little tree and for 20 seconds gathers spider webs there until his bill is full of them. He then turns and flies very purposefully to a 10-foot elm nearby and in a leafy spot six feet high he deposits the webs and spreads them around with his bill like a female. Four or five times he crouches down
in the spot and spreads his wings as does a female shaping a
nest, raising his tail up at a 45° angle from his body so he
can push his body deep down in the supposed cavity. At this
time his anal opening seems to project somewhat. He sings once
a loud regular song, during this performance, which lasts 30 -
40 seconds. He stays on a few seconds longer, shaping, then
flies away and continues to feed and sing normally. I leave
territory.

T 36 - M 36 sings a very odd slurred song of from three to five notes,
sometimes rising and sometimes falling in pitch. Its volume
changes too, right in the middle of the song. The effect is
of speeding up a recording. Some of the songs end in buzzes
and little trills, some sound like Black throated Greens.
He then gives the harsh male fight note and follows it
immediately with four or five notes like the end of a Field
Sparrow song. Some few are faint, most are abrupt and loud.
This odd vocal performance occurs in the east end of the
territory and may mean 36 F is rebuilding. A power saw crew
has been cutting down big ash trees on the north-west part of
VII all day and this din and the crashing trees may have
affected 36 F's drive. I don't see her.

1700 - I leave.
June 11, 1954

Another hot sunny day; temperature 72° at 0600. Present from 0600 to 0900, 1015 to 1315, and from 1600 to 1800.

T 36 - Almost immediately on arriving I see a new nest that looks like a Prairie Warbler's; 11 feet high in a scruffy 15-foot elm, poorly concealed. It has so many rotten leaves in the bottom that I can't be sure of it, so I wait to hear or see the 36's. At 0612 M 36 sings a few faint skids or li-note step songs and I find 36 F feeding. I then follow her, having her constantly in sight till 0637. She feeds in a restricted area, most of the time in a tulip poplar. It almost looks as if she is following a method or regular pattern: she flies to the top of the 20-foot tree and flutters down almost to the ground, repeating this over and over. Presumably she catches insects in the air, possibly dislodging them when she lights on the branch. M 36 sings occasionally nearby, always faintly. Once 36 F seems alarmed by, or interested in, two male Cowbirds going through noisy courtship display some 15 yards away and above her. She sits quietly and pretty clearly watches them. At 0637 I lose sight of her.

0703 - 0723 - I find and follow 36 F again as she feeds. Finally she gathers broom sedge down and goes to the nest I found. Note the long quiet intervals of no building; if I
had not seen the nest I had have long ago decided she was not yet ready to build. The interesting thing about this nest is that she has rebuilt at the regular speed, with no delay before beginning, while a crew of men with a power saw has been felling large ash trees only 50 yards from the nest. The motor noise and crashing are terrific but obviously have no effect on the bird.

I find mammal fecal material with yellow feathers in it on the territory; it is not fresh.

T 37 - Silence.

T 41 - from 0745 to 0900 - M 41 sings the entire time until 0850, his interval from 10 to 20 seconds. Most of the songs are in long series from high perches, and none of the time is spent on or near the ground. The perches are without exception on the east end of the territory; there are three which are used almost exclusively with 5-7 minutes spent on one at a stretch. Two or three times he crosses the road to the south a little; he is never with a female and it is possible that he has no mate. Between 0850 and 0900, when he begins again from his favorite maple singing tree, he is silent and I don't see him.

0900 - I leave.

1015 - I return. The day is very hot, over 90°.

III S - The male here sings his rather undistinguished skid song but
I have no time to follow him.

T 31 - The young have their heads out of the nest.

T 42 - M 42 sings on the center of the territory. I watch him for 10 minutes but see nothing to lead me to the female. I think it is possible she has gone.

T 32 - To my surprise 32 F is incubating so she must have laid today. (Error, it's a three-egg set) I have only one other case of a female leaving a day's gap between any of her eggs.

T 34 - 34 F is incubating, her bill open.

T 35 - from 1035 to 1230 - I find both birds almost as soon as I arrive. M 35 stays very close by 35 F, sings rarely and faintly. She feeds along on the ground and after five minutes gathers a bill full of grass stems. When she flies up to a tree M 35 swoops down on her and she moves on a few feet. She then flies into the woods and I am able to follow her line of flight to an ash with grape and creeper on it. However, I am unable to find the nest despite persistent searching, climbing, and lying on my back trying to see more flights. I feel sure I know its location within a five yard square and I suspect it's in a dogwood. (This is all correct; the nest was in the dogwood when the leaves fell.) Twice more I see 35 F gather nest material. Once she is on the ground for five minutes and M 35 is flying from branch to branch above her looking down and showing the greatest interest in her. When finally she flies to the woods
he chases her again and hinders my chances to see her goal. Finally I leave, knowing I can't do any more. Note that 35 F's trips with the final lining material are infrequent and she gathers it in a leisurely way.

T 42 - I watch M 42 again for ten minutes, learn nothing.

III S - The male is singing.

1315 - I leave.

1600 - I return.

T 30 - The nest contains one egg, which confirms my belief that it was begun a day earlier than I'd imagined.

T 44 - F is at the nest, leaving it as I come up. Her bill is open. See below under T 02.

T 02 - Silence except that M 44 seems to hold the territory. He sings frequently.

A pair of Broad-winged Hawks flies over, one apparently chasing the other.

T 33 - M 33 seems to go onto T 02. He sings insipid steps and goes on back to the hillside, then wanders over near the first nest site. No female seen.

T 30 - M 30 comes into the orchard and sings frequently and shrilly from the south-west part of it. I am rather certain it is he, because he then flies back to III and can be heard singing there.
I suppose M 02's withdrawal and M 42's concentration on the center of II have opened up the orchard somewhat.

T 32 - M 32 sings frequently, though I don't go on the territory.

T 42 - for 30 minutes - M 42 sings in the usual places, including an area west of the road. Once he goes through a period of singing insipid steps and uttering the harsh male flight notes. I can see nothing to suggest why. Shortly thereafter he catches a caterpillar and flies purposefully away with it as though to a nest. When I see him a few seconds later it is gone and he's behaving as usual (cf. yesterday's nest building). Once he catches a robber fly about 5/8" long and carries it to the ground where he seems to have trouble with it. I go up to scare him away and try to identify it and he is very reluctant to leave it, hovering over it till I'm quite close. The fly's wings are off when I find it.

I doubt if 42 F is still here.

1800 - I leave.
June 12, 1954

Another hot sunny morning foreshadowing an above-90° day; temperature 72° at 0615. Present from 0630 to 1130 and from 1800 to 1910.

T 43 at 0630 - The two young are already out of the nest, perched on a little branch to which the rim is attached; right at the point of attachment they are huddled together. I take them to band and they squawk, drawing the two parents. Oddly, M 43 seems to combine chasing the female with his distraction display, i.e., both display and he clearly pursues her and drives her to the ground. I put the two young in a Potter trap to try to catch the adults but in 30 minutes I have no success. 43 F shows a great deal of interest, going to the ground many times (I can't see her there) and spending all the time calling near the trap. M 43 brings food, but finally seems to eat it himself. When I go to release and band the young, one has escaped so I band only one, with 21-62028 on the right leg.

T 39 - Silence for many minutes. Finally M 39 sings a few very faint songs and 39 F appears. I follow her from 0750 to 0815 as she feeds in a leisurely way near the ground, M 39 singing faintly above her. She then gathers grass stems and takes them to a well developed and poorly concealed nest 25 to 30 feet high in the top upright branch of an elm. Clearly her second nest failed, and by this time it might just have had young. I'll look for it later (found).
T 40 - M 40 sings all over the territory, dropping to half volume at a spot near the little north-south ravine. I think the third nest must not have been affected by the tree cutting (correct).

T 38 - 38 F is incubating; M 38 is silent.

T 46 - at 0900 - After ten minutes' silence M 46 sings faintly up on the west end of the open hillside. I see a Prairie Warbler in a little dogwood and find a nest here, poorly concealed about 17 feet up on an outer branch. I sit to watch it and at 0930 46 F carries grass to it. (Note how infrequent the trips have been with the final lining material lately.) This pair explains a good deal. It was they I saw when looking for the 38's fourth nest. I'm sure they had an earlier nest and am reasonably sure from the date of their arrival that this one is the second.

M 46 flies up with 46 F when she brings material; he is behaving in the usual way.

T 37 - I go here quickly just to be sure that the nest I just saw isn't 37 F's second brood. Immediately I find M 37, so it isn't. He is singing a Golden-wing-type song and feeding the young bird with the bright red band. It is full size except that the tail may be a very little bit short. It has yellow tracts on its flanks and the quills of the yellow feathers that come in on the breast to form the inverted V with the yellow flanks are showing but haven't burst. He behaves like an adult in his hopping and tail bobbing, calls the young's begging note and
an occasional "tsu." M 37 feeds him several times in the hawthorn thicket where he seems to stay. M 37 sings high skids and insipid steps. No sign of 37 F or of a nest in 20 minutes.

T 42 - M 42 sings constant low skids and I see no sign of a female or of behaviour to indicate one is present. (Note that several days ago I examined the first nest; it had no eggs in it and had not been disarranged)

T 02 - No sound except that M 44 seems to have this territory.

T 33 - Silence for 20 minutes.

T 44 - The female is off the nest so I sit to watch. In 8 minutes she returns, accompanied by M 44 which flies into the tree with her.

A male sings high skid songs in the west part of the orchard, then falls silent. Presumably it is M 30; the song is exactly like his.

A Cooper's Hawk soars high over the orchard.

T 31 - The four young have their heads out of the nest.

T 36 - Silence. The nest looks complete.

1130 - I leave.

1800 - I return to try to find the male on III S. In an hour I neither see nor hear him.
T 31 - The young are still alive.

T 30 - The second nest is present. M 30 sings only two or three times during my hour on III and III S, unless he is out of my earshot.

1900 - I leave.
June 13, 1954

Another sunny morning, 73° at 0645. Present with Don Auster from 0650 to 1150.

III 3 - Silence.

T 31 - We go immediately to the nest where the young will fledge today. I take them and band three, a fourth jumping from the nest when I put my hand up. While I prepare my banding equipment 31 F comes to the nest tree looking wet. She calls "tsu" at a rate of 13 and 14 times per 15 seconds, showing no great nervousness. M 31 sings in the cherry nearby. When I take the young both adults give distraction displays, coming to within three feet of me. The male displays as much as the female. The young squawk in my sack. Their numbers are 21 - 62029 21 - 62030 21 - 62031

with a brood mark of silver over green, left leg.

T 42 - M 42 is singing irregularly, faintly, and rather tentatively as I start to pass, so I go to search for the female. She soon appears near him and goes to a 30-foot elm where she hops around for one minute. I lose her but in five minutes she's back in the elm and I see her nest. It was begun yesterday, is about 30 feet high and is poorly concealed. Note the interval before building here.

Orchard - A male sings skids in the south-west corner. It doesn't sound like M 31.
T 33 - M 33 sings as usual.

T 02 - Silence.

T 44 - 44 F is incubating.

T 34 - 34 F is on the nest, sitting up from it slightly.

T 35 - I don't search for the nest here.

We see a 5'6" racer in a 6-foot cherry tree. It is the biggest snake I've seen on the study area.

Field Sparrow nest on ground, three Field Sparrow eggs and one Cowbird egg, which I take.

T 37 - Nothing of note.

T 38 - The four eggs are intact and warm.

T 40 - from 0915 to 0940 - I follow M 40 and find 40 F but can't stay with her. He is silent as she feeds north of the north-south ravine, resumes singing in 10 minutes north-east of this spot. I think the nest must be here (correct). 

T 41 - from 0950 to 10h0 - M 41 sings irregularly and moves a great deal over the territory. I don't think he carries food and I see no female.

T 32 - 32 F is incubating.

T 42 - from 1100 to 1130 - The male sings constantly and I follow him over the east part of this section. No sign of a female.
although I suspect there may be one.

1130 - I leave.
June 14, 1954

A perfectly clear humid morning after a good rain last night; temperature 70° at 0600. Present from 0630 to 1130.

T 41 - from 0630 to 0800 - M 41 sings from his high song posts in long series of skids; e.g., one is of 29 songs, but this is not the longest. Until 0745 nothing happens of note except a male comes up from the south-east and M 41 flies after him and chases him away. At 0745, 41 F appears and I follow her as she feeds just south of the road, for six or seven minutes; then I lose her, she may have carried food. M 41 continues to sing in her presence, staying near her overhead, but his songs are infrequent. If they have young he isn't helping feed them.

T 36 - Silence.

T 37 - M 37 sings high steps, feeds the noisy young bird with the bright band.

T 32 - 32 F is incubating.

T 34 - 34 F is near the nest with a green caterpillar, so the eggs have hatched. They probably did so yesterday.

T 33 - from 0845 to 0945 - M 33 sings on the hillside the entire time except that at the end of the period he goes north into the field for a minute. His song is regular except for one break
of two minutes. I have him in view constantly; no sign of a female.

T 02 - Silence for the hour on T 33; this male can be forgotten from now on.

T 44 - The nest has failed, with only the lower part of the shell left in the tree. Probably a mammal. M 44 sings very occasionally near the stream bed, at full volume. He may be fluttering a little in flight (he feeds low) but I can't find the female.

T 30 - M 30 is singing in the tree row between III and the meadow as I pass through.

T 42 - The nest looks complete from below. M 42 sings frequently well north of it on II.

T 37 - from 1025 to 1055 - M 37 is singing as I pass so I go on the territory. 37 F is near the road in the south-east corner, nervously catching insects and eating them, paying no attention to the begging note of young some distance away. She calls "check" frequently with the note having a kissing sound. For ten minutes she hops about alone, then gathers food and starts to a young bird. M 37 swoops at her, lights 10 yards from her with his wings spread a little. 37 F tends the young (unbanded) for ten minutes, then abruptly leaves it and returns to the spot I found her in and resumes nervous calling and hopping about. M 37 approaches and flies at her; he sings irregularly, usually a high insipid step most of the time I'm
here. After five minutes 37 F again abruptly returns to the young bird, starting to fly across the territory to it. For the third time the male swoops at her as she flies. When I go she is feeding the juvenile. I'd judge from all this that she is preparing to renest. Certainly she isn't incubating yet.

T 46 - Silence.

T 38 - 38 F incubates.

1130 - I leave.
June 15, 1954

A very humid sunny morning after a heavy wind and thunderstorm at 1900 last night; temperature 72° at 0530. Present from 0545 to 0820, with Carmony from 0900 to 1115, and with Gordon Thurow from 1830 to 2000.

T 39 - I go to see if 39 F is on the nest laying, somewhat afraid the storm may have affected her. She is not there but the nest looks all right. I visit it twice more before 0700 but see nothing. M 39 sings irregularly and loud.

T 46 - 46 F is not on the nest, which looks undamaged. M 46 sings from the maples to the west.

T 41 - I begin a systematic search where I suspect the nest is, in the walnut planting south of the road. I soon find it there in a 12-foot high elm. It is moderately concealed, nine feet high. 41 F is on it. M 41 sings irregularly and sometimes faintly near it and just north of the road. Note T 41 and last year's T 24 are identical so far this year.

T 40 - M 40 sings all over the territory. I look it over in a desultory way but see nothing.Chat's nest, three feet high in six-foot elm, three eggs.

T 38 - 38 F is incubating.

T 37 - Both adults are feeding the fledglings, M 37 singing a few four- or five-note steps. I follow 37 F for 15 minutes and see no sign of building or courtship. Three young are here together; only the one with the dull red band not seen. One catches food,
fluttering before it like an adult. This bird has a full inverted V on the breast.

T 32 - 32 F is incubating.

T 42 - Silence for ten minutes, but I am not near the nest.

T 36 - 36 F is not on the nest at 0800. M 36 sings loud near it, perhaps 15 yards away.

0820 - I leave.

0845 - I return with Duane Garmony to take pictures.

III S - Silence.

T 30 - 30 F is incubating. M 30 sings near the big hackberry, later in the west tree row.

T 32 - 32 F is on the nest at 0910.

T 44 - For 25 minutes we search for nest building activity. M 44 sings twice. I see a male on the south edge of T 33 and hear M 33 elsewhere, so this must be M 44. No sign of a female.

T 33 - M 33 sings as usual, perhaps more faintly.

T 34 - The young are in the nest.

II N - A male sings type-6 steps on the north edge. I spent so much time on T 42 last week that I'm sure no male was on II N then.
T 36 - M 36 sings. 36 F is not on the nest.

T 46 - 46 F is not on the nest. M 46 sings near it.

--- We leave.

The following pictures were taken for me by Carmony, in the order shown:

1,2 South edge of III, facing north-west toward woods.
3,4 South edge of III, facing due north.
5,6 By the hackberry on III, facing due north.
7-9 On T 44 by the osage oranges, facing west-north-west toward T 33.
10,11 Center of the east field on V (T35), facing south-west across the dogwood and farther fields.
12,13 Old T 8 just east of the wooded valley, facing north-north-east.
14,15 Old T 8 (T46) west of the wooded valley, facing north-north-west.
16,17 Old T 3, just south of third nest, facing north-east.
18,19 T 46 from top of the high west end of the ridge, facing north to T 39.
20,21 Northeast corner of III, facing south-west.
22,23 Center of III, facing north-north-east.

1630 - I meet Gordon Thurow to help him census III's whole bird population.

III S - Silence for the 45 minutes we have this area in earshot.

T 31 - M 31 sings a good deal; some of his songs are type-3's.

T 30 - M 30 sings on the usual territory. Oddly enough, many songs
lack the high trill on the end and are just medium skids.

T h4 - For ten minutes silence.

2000 - We leave.
June 16, 1954.

A warm morning with a light overcast; temperature 76° at 0600. Present from 0600 to 1130, with Paul Davis.

T 31 - M 31 sings.

T 30 - 30 F is incubating. I don't hear the male as I pass.

T 42 - 42 F is not on the nest. M 42 sings his usual song.

T 33 - at 0630 - M 33 sings once or twice as I arrive. My purpose is to concentrate on finding the second nest being built. Paul Davis arrives at 0630. At about that time M 33 sings faintly and we see him glide down at the female and they flutter to the ground. We lose them and begin to look for M 33 again. He sings almost inaudibly ranging from one high tree top to another over the circumference of a circle about 100 yards across. At 0715 I see 33 F with nest material. She takes it to a 20-foot elm and places it in a nest about 15 feet high. It is in a little cluster of leaves growing out of a thick upright branch, is well concealed, and was clearly begun yesterday (its finished form has been pretty well assumed except that the rims are not built up).

T 33 - M 33 sang at 0630, was not heard again while we were on T 33. We then spend 40 minutes on T 33. For the first half hour there is silence. At 0800 M 33 sings faintly at the sink hole in the field and we find him singing there. He chases a male Yellow-throat a few yards, then flies back to his territory.
where we leave him.

T 34 - There are at least three young in the nest.

T 32 - 32 F is incubating, M 32 singing in the field and from the edge.

T 37 - from 0830 to 0920 - M 37 sings typically and seems to be watchful near the road where 37 F seemed to be isolating herself from her young the other day. He doesn't feed young (which are silent) for five or ten minutes, then begins. We find at least two young in a dogwood on the center of the territory and watch, both adults feed them somewhat sporadically. Once 37 F crouches motionless for almost a minute, her body horizontal. A minute later a Broad-winged Hawk soars over the territory; possibly he was overhead for some time before we saw him. M 37 seems to leave the young and sit perched quietly in trees for two or three minutes at a time. I find the beginnings of a Prairie Warbler's nest 8\(\frac{1}{2}\) feet high in a woody multiple fork of a 20-foot sassafras. It is bound to have been built since the first brood fledged; it is the barest start of a nest, the fibers are not matted. In addition, 37 F began to nest promptly after arrival and any beginnings of a structure would have blown or washed away long ago. We watch it for 20 minutes and see her fly into a tree above it (15 yards away) and she seems to look down toward the nest. She never visits it, nor is it the spot in which M 37 seems to be interested. It is 30 yards from where the young are.
T 46 - A strange male seems to be present between M 37 and M 46. I see him calling in the wooded valley while I hear both of the other males. Probably another example of the wanderers that show up rather regularly.

M 46 F is not on the nest.

T 38 - 38 F is incubating, the male silent.

T 39 - 39 F is on the nest for the first time. M 39 sings.

T 40 - M 40 sings a combination high step and harsh buzz on the west side of his territory.

T 43 - All the field cover and low trees have been cut off here.

T 41 - 41 F is standing over the nest when I get there and she continues to do so while I sit and watch; occasionally she looks into it. Then M 41 sings at half volume nearby. I watch her. Suddenly she lowers the fore part of her body so that her head is a bit lower than her tail; she opens her bill and gapes (though forward instead of upward) like a young bird. I can't see her body but her head vibrates as though she were moving her wings. She is silent. All this begins just a second or less before M 41 arrives on the nest rim. He disregards her, feeds a young bird. She seizes the food and herself returns it to the young. M 41 leaves. The young look to be four days old; there are almost surely four.

T 37 - Nothing new.

T 36 - 36 F is not on the nest. Earlier M 36 was singing.
T 32 - I finally get a chance to see the contents of the nest; there are only eggs two and three, so I suppose this is a three-egg set. If so I was wrong in thinking 32 F waited one day between eggs three and four.

T 31 - M 31 feeds young on the west side of III in the center. I don't see 31 F.

T 30 - M 30 sings loud medium skids in the south-west corner of III, then flies to the area of the hackberry and has a momentary encounter with M 31, then flies far north to the tree row. Note the odd new song again.

II N - Again today a type-3 singer is here. I watch him as he sings every ten seconds for 15 minutes, then falls completely silent and disappears.

III S - Silence.

II130 - I leave.
June 17, 1954

A sunny morning with a heavy dew; temperature 68° at 0600. Present from 0600 to 1130; with Paul Davis from 0630 to 0900.

T 41 - 41 F brings food to the nest. M 41 sings.

T 39 - 39 F is incubating. M 39 sings very little.

T 40 - from 0620 to 0610 - I find 40 F in the north center of the west section of the territory (where a tree cut was widened yesterday and where brush will be burned today). I lose her almost immediately. We then look and listen for M 40 for the rest of the time. He is very quiet, singing perhaps 20-25 times during the entire period we're here. His songs don't come from any one area and on the rare occasions when we see him he is moving over the whole territory. He seems more interested than usual in the fringe of trees north of the electric line and the tree cut, where on May 30 and 31 I thought 40 F might be building. It's impossible to say what the situation is here. I'd guess there are new young in the third nest.

A female Goldfinch is building on the outer limb of a maple, about 20 feet up. This is the first nest for the species this year.

The male's nest in the little elm has four eggs, female incubating.

T 38 - 38 F incubates. M 38 sings only infrequently.
T 46 - 46 F incubates for the first time.

T 37 - The nest beginning found yesterday is undeveloped and probably won't be continued. It is bound to have been built very recently, and I'd guess that it indicates that 37 F hasn't sufficient drive to go on to a second brood. Both adults are feeding the young (at least three) in the hawthorn thicket. If I find 37 F doing this much longer I think I can assume she has quit breeding. On this territory for 40 minutes.

T 36 - The nest contains three eggs; 36 F is not on it when I visit many times. I get a very interesting insight regarding the II N male. M 36 sings loud frequent type-3 steps just north of VII for five minutes. Suddenly he flies due east over the hawthorn trees in exactly the direction of the north end of II, where the male has sung the last few days. I go there and find a male singing exactly the same song for 15 - 20 minutes. I then give up on seeing him return to VII, but at 1120 when I come back past there is no male singing on II and M 36 is singing frequently on T 36. Incidentally he sings for one minute in the nest tree, sitting five feet above the nest, one of the few times I've seen this.

I think it's reasonably safe to say that M 36 and the recent male on N II are the same. This means M 36 crosses a 50 - 75 yard strip of high mature trees to a distinctly different strip of habitat.

T 32 - 32 F is incubating.
T 34 - 34 F is standing on the nest rim and the young are alive.

T 35 - M 35 sings enough and in such different spot that I'm sure the third nest is still going.

Fox squirrel on the territory.

I find the slightest beginning of a Prairie Wabler's nest, about five strands of fiber, four feet high in a seven-foot elm. It was probably begun at the start of the season, when 35 F built another, more advanced, abortive nest.

T 33 - for 30 minutes - M 33 sings regularly, with a few two-to three-minute breaks, over the whole territory. I see him catch and eat food several times. He seems still to be unmated. He does a thing I've never seen in a Prairie Wabler before: Perched 30 feet high and preening actively he suddenly turns his body so that the right side is up, the right wing slightly extended, maintaining the position for 30 to 45 seconds and repeating it twice more. This looks definitely like sunning himself and is in fact almost the identical positions Robins take for that purpose, the difference being that they do it on the ground.

T 44 - The nest looks complete from below. Silence.

T 42 - 42 F is not on the nest; M 42 sings a little.

T 30 - 30 F is on the nest rim, her wings extended in the typical posture of a female sheltering nestlings from the sun, her bill open %-inch at the tip. I have never before seen this done to shelter eggs.
T 31 - Both adults are feeding young about 40 yards from the nest site in the dense west edge of III, south of the nest. I'll not start watching 31 F for a second brood nest yet.

1130 - I leave.
June 18, 1954

A clear humid morning; temperature 70° at 0600; at noon it clouds up and there is a heavy rain and thunderstorm which a strong east wind. Present from 0630 to 1115.

T 41 - A young bird is visible from below the nest. M 41 sings a good deal, north of the road.

T 39 - The field has been cut by a mower to within 30 yards of the nest, leaving only the larger trees standing. 39 F is on the nest.

T 40 - from 0640 to 0820 - M 40 sings on the center of his territory, then moves east. I go there and see a male sing east of the little ravine and strip of wood which have always bounded T 6 and T 22. M 40 has sung there before and I think this male is M 40. A female flies toward him and I begin a long careful search of the little field with emphasis on the spot the female came from. In 30 minutes I see her again, follow her, and see her carry food. I then focus on the tree she went to and see her come again. To my great surprise she goes to a young bird, about four to five days cut of the nest. This must be 43 F and her unbanded fledgling, moved down from the recently cut field to the north. The male is her mate I suppose. I now think I can hear two males and a few minutes later I think I see M 40 chase the female (this is not usual and can't be relied on here). In order to clear things up here I'll work on both pairs.
T 46 - 46 F is not on the nest. Nearby a crew of men is cutting sassafras trees and I learn that the recent rains have caused plans for the golf course to be changed to include more tree cutting on T 37 and T 46. I go to P. Harrell and get him to avoid the nest tree and those around it. When I get back to T 46 at 0905 46 F is still, or again, not on the nest. I sit to watch and in 10 minutes hear M 46 sing. He and 46 F fly up together and 46 F goes to the nest. M 46 flies to the tree, hops around in it for a minute and then leaves. His song is usually a type-3. T 37 - The nest is undeveloped. 37 F is feeding the young.

T 36 - 36 F is incubating for the first time.

T 32 - 32 F is on the nest.

T 34 - M 34 is at the nest with food.

T 33 - M 33 sings on the hillside and for ten minutes acts as he always has.

T 42 - 42 F is not incubating yet.

T 30 - 30 F is on the nest.

T 31 - from 1025 to 1100 - I get some good information on the behavior of the adults, possibly before the second brood is attempted. 31 F is in a clump of trees along the west side of III. For 25 minutes she behaves in the same way, calling "tsu" five or six times every five seconds (and not because I'm here I think), hopping over the branches of little trees between heights of
three and twenty feet, bobbing her tail but moving in a fairly slow and leisurely way. She holds her bill slightly open most of the time, possibly because it is hot. She never feeds her young although she seems herself to be eating (the young are silent somewhere north of us), nor does she explore for nest sites in the sense of stopping and crouching in good spots.

During the period I watch her M 31 is with her for all but about two minutes, when (after 15 minutes) he leaves her to carry a moth to the young. Note she is not tending them. He sings only once, as I come up. His behavior is interesting and indicates that he is somehow aware that she is likely to renest: He follows her, keeping her in sight and much of the time hopping or flying along about two feet behind her. As she moves over an entire tree limb by limb he stays right behind. There are no sudden approaches, no swoops, no fluttering or posturing, no calls. I finally leave since developments seem unlikely today.

1115 - I leave.
June 19, 1954

A very damp morning with an extremely heavy dew; a thin cloud layer until about 0800. Present from 0630 to 1230 and from 1730 to 1915. Note that yesterday’s violent wind and heavy rain did no damage to any nest.

T h1 - After a ten-minute wait I see h1 F with food near the nest. N

T 39 - 39 F is not on the nest. I visit it three times at wide intervals, and never see her. M 39 sings only one or two times. I am inclined to think it may have failed.

T h0 - from 06h5 to 0900 - I hear M h0 singing on his regular territory near the nests and I sit at the electric line for 30 minutes to be sure the new nest is not north of it. He crosses to the wire once, perches on it and goes south. I think it is safe to say he isn’t especially interested in that section.

M h0 moves around a good deal, sings intermittently and sometimes softly. Most of his songs are loud. I see h0 F fly to an elm (about 28 feet high) and notice grass or grape vine bark in her bill. She hops to a nest built against one of the main trunks, about 13 feet high and moderately concealed. I am so surprised that I doubt that I saw this correctly, so I sit for 30 minutes more to watch. She does not return so I go to the nest; it is a well-built but still thin outer shell. I go back and watch; she comes twice in rapid succession. M h0 is not behaving typically; his songs are loud and he doesn’t show the nervous excitement most males do during building.
This is the fourth nest. I'll look for the third, which must have failed when the young had just hatched. It is odd that M 40 paid no attention to the nest area yesterday, when the nest must have been begun. I was probably watching M 43 much of the time but M 40 was not acting as I expected.

T 38 - 38 F is on the nest.

T 46 - 46 F is incubating.

T 36 - 36 F is incubating. See below under T 37.

T 37 - Both adults are feeding at least three noisy young (in full adult plumage except for the head and a little dingy tract on the lower breast, center). 37 F seems to be showing some signs of renesting in that she spends most of the time (25 minutes) hopping about over all the trees on I W, covering them thoroughly. She is relatively silent, calling two or three times, and she never crouches or gathers material. M 37 does not approach her or display any interest. Much of the time he sits about 25 feet up and preens, singing a high thin step song. Unfortunately 37 F is going over trees which are in the path of the fairway being cut.

M 36 sings on the south end of I and then moves north along the east edge of it to the road; i.e., he is well on to T 37, singing regularly all the way to trees near the successful nest. Once he chases a Hairy Woodpecker across the very heart of the territory to the north-west. M 37 never appears from west of
the tree row to defend the ground. I wonder if this doesn't mean that the 37's are about through for the year. (Is it M 37's fault that 37 F never finished a second brood nest?)

T 32 - The nest is empty, otherwise undisturbed. M 32 sings loud typical songs near it and on the south edge of the field. In 10 minutes I don't see the female.

T 34 - M 34 carries food and is about 20 yards from the nest. I can see the young.

T 35 - I go here to be sure that M 35 is behaving as though 35 F is sitting and find that he is not. He sings faintly, frequently, very irregularly, and flies nervously about from tree top to tree top the way males usually do when the mate is building. I see 35 F twice 25 minutes apart so think she is not incubating. Finally I see her twice high in the big trees on the edge of the woods by the fox den so I sit to watch. In ten minutes she flies to a nearby complete nest (externally at least) about 22 feet high on a drooping limb of a 55-foot honey locust, covered with grape. It is poorly concealed. The third nest must have failed just as incubating began.

T 33 - M 33 sings on the east edge of his territory by the big elm. M 32 has encroached to the west but is unchallenged.

T 30 - The nest is undamaged by the rain.

T 30 - M 30 sings in the south-west corner of the orchard.
T 42 - I wait 25 minutes but never see 42 F at the nest.

T 39 - 39 F is not on the nest.

T 41 - I can't see young in the nest, but after I wait both adults call nervously in the clearing to the west.

41 F carries food.

1230 - I leave.

1730 - I return.

T 30 - 30 F is on the nest.

T 31 - from 1740 to 1810 - 31 F is behaving exactly as yesterday except she calls four times in five seconds and does not keep her bill open. Once or twice she goes low in trees and finally to the ground but she doesn't show interest in nest material. She seems to be eating all the time she hops around. Twice she carries food for a few seconds but both times eats it herself (this could be because I'm here).

M 31 follows her as he did yesterday, with great persistence. Neither feeds the young, which I can't see or hear. M 31 does not sing but he may call part of the time; the adults are so close together I can't be sure. If he does, the call is "tsu" or tsi.

T 42 - from 1815 to 1835 - 42 F is still not on the nest so I go to where M 42 is singing high step songs. When I get there he begins to sing more frequently and loud; I had thought his songs were quiet from a distance. I see 42 F and follow her. She heads toward
the nest, going forward about one tree at a time until she's 35 yards away, when I lose her. I look to the nest and find her incubating. Did she stay off the nest today for longer-than-usual periods?

T 39 - 39 F is incubating.

T 41 - I can see a young bird in the nest.

IX - When I pass, a well marked male is singing frequent high insipid steps.

1915 - I leave.
June 20, 1954

A hot sunny morning; temperature 75° at 0615. Present from
0830 to 1300.

III S - A male may be singing here.

T 30 - The four eggs are all present. See below under T 33 for M 30's
activity in the orchard.

T 31 - from 0840 to 0930 - I fail to find 31 F or the young after following
M 31 for 25 to 30 minutes of regular and constant song. He
goes to the clearing where 14 F had her successful nest and onto
the west end of III S.

T 32 - 32 F is incubating.

T 32 - from 0940 to 1045 - M 32 sings loud and regularly from the edge of
the orchard. He stays in the tree tops, moves little, and
confines his activity to a very small area. I see no sign of
32 F. M 32 has moved east on M 33's old land and I learn today
that M 33 has finally gone.

T 33 - M 33 never sings and M 32 and M 30 make very large encroachments,
singing all the time without ever drawing a fight. M 30, sings
high skids, moves from the meadow down the top of the hill to
M 33's clump of high sassafras trees; so he is on the center of
the territory. M 32 comes up the hillside several times.
Clearly M 33 has left.

T 34 - The four young are in the nest.
T 36 - 36 F incubates. M 36 sings on the south part of I again today but doesn't invade T 37 as deeply as he did yesterday. M 37 is busy feeding young quite nearby and never challenges him.

T 37 - from 1100 to 1200 - I find the young calling noisily (probably two of them) in the tree row toward the south end of I. Only M 37 feeds them, so after 15 minutes I begin a search for 37 F. I cover the whole territory very slowly, concentrating on the path of the new fairway, without ever seeing her. Once more I watch the young, but she doesn't show up.

T 46 - 46 F is incubating.

T 38 - 38 F is on the nest. She may have young.

T 39 - 39 F is incubating. M 39 sings faintly near the pines.

T 41 - To my surprise I see a large Cowbird nestling here. There is at least one Prairie Warbler and I should guess that they will fledge on June 22 or 23. When I first found this nest it had four young in it.

1300 - I leave.

There is a Cowbird perch in a big dead tree on the west side of III. Two males sat there this morning. A little later a female flew across III, lit in the tree and called. The two males and four more appearing from the margins of the field all flew to her.
June 21, 1954

A hot morning with a slight overcast till 0800; temperature 72° at 0600. Present from 0600 to 0900 and from 1900 to 1945. T 30 - 30 F is incubating.

T 44 - 44 F is not on the nest. She should begin today or tomorrow. M 44 sings several typical songs later when I'm on T 32. M 44 has sung very little since 44 F arrived.

T 34 - at 0630 - The four young have already left the nest and are scattered. I find two and give them a brood mark of green over silver, left leg. The numbers are 21 - 62027
21 - 62032.

The first flies up from near me, which attracts my attention to it. It can fly about 15 yards. Both parents come as it calls but put on very little display or other evidence of alarm.

T 35 - No birds at the nest. M 35 sings.

T 32 - from 0655 to 0725 - M 32 sings loud and steadily from the north edge of the woods, moving little. I see no sign of a female or of any interest on the part of M 32 in any particular spot.

T 36 - 36 F is on the nest. M 36 sings on T 37's south edge.

T 37 - M 37 is feeding the young across the road by the cinder pile, singing an occasional high step. I find 37 F at the tree row and beside the road, i.e., across the territory from the other bird. I watch her for 25 minutes as she feeds over the high trees, giving no sign of nesting behaviour. (She attempted a nest in this tree row, to the south.)
There is incubating.

T 31 - from 0815 to 0845 - 31 F is in much the same area as she has been recently, feeding low and sometimes going to the ground but never gathering nest material. She calls "tsu" about once a second, probably because I'm near the young. I'm afraid to stay too long for fear I'll scare her into abandoning whatever nesting site she may possibly have chosen. M 31 sings a few times, follows 31 F about for a few minutes of the 20 in which I have her in sight.

M 31 fights the III S male on the south end of III.

0900 - I leave.

1700 - I return.

T 41 - The young are still in the nest.

T 39 - 39 F is incubating.

T 38 - There are some young in the nest, having hatched yesterday or today. No adults present.

T 16 - 16 F is off the nest when I come up but returns in ten minutes. She shows nervousness at my presence and I retire and she immediately begins to incubate.

T 37 - I cover the territory carefully and find 37 F just north-west of the hawthorn thicket and east of the tree row, about where she was this morning. M 37 flies to her once and sits quietly.
about three feet from her as she moves over the vines and low trees by the thicket. As usual she gives no other indication that she may nest. M 37 is feeding young in this thicket, singing high steps rarely, so he isn't necessarily following her about.

The tree cutting didn't resume today, so perhaps this territory will not be disturbed.

T 32 - for 60 minutes - M 32 sings loud and regularly from the spot he's sung from ever since the nest failed. Occasionally he quits for a minute or so and once or twice he flies down into the field to feed, but all the indications are that 32 F has gone.

1945 - I leave.
June 22, 1951

A cloudy morning with a very faint trace of rain at 0700; temperature 74°F at 0630; later it becomes sunny, but there is a thundershower at 1400 and again at 1600. Present from 0630 to 0915 and from 1630 to 1915.

T h1 - The young Cowbird and one Prairie Warbler are still in the nest, the Cowbird moving around in it and almost falling out or at least climbing onto the rim. This is hard on the warbler, which seems to be half crushed under the Cowbird most of the time.

T h6 - h6 F is incubating.

T 37 - from 0645 to 0730 - Again 37 F is between the hawthorns and the tree row, but the most careful search never reveals any of the moving around that characterizes building. I have her actually in sight only a few minutes. I think it very unlikely she will ever get over the threshold of nesting. M 37 sings high steps on the center of the territory and I see him feed at least one young.

T32 - from 0730 to 0800 - M 32 behaves as he has since the nest failed. He sits high in the trees, shows none of the excited moving about, sings regular loud songs without a single break. I think it's a safe bet that 32F has left.

T 33 - M 32 now encroaches here without any sign of M 33.
T 44 - I climb the tree after watching the nest for 15 minutes; it is empty. About this time M 44 begins to sing loudly and I follow him for 30 minutes. He shows no interest in any particular spot and in general does not act at all as he did when 44 F built. I'd figure two eggs for this nest before it failed (and nothing about it indicates why it failed).

T 42 - 42 F is not on the nest.

T 38 - The young are alive, the adults not in evidence.

T 39 - 39 F is incubating.

0915 - I leave.

1630 - I return. A light rain falling for a few minutes.

T 30 - 30 F is incubating.

T 31 - from 1640 to 1720 - I search for the female and finally find her in the trees on the west side of III, near where she's always been. M 31 sits near her and once swoops on her as she begins to fly and drives her toward the ground. I watch for ten minutes, enough to make me think she has not begun to renest. Her behaviour is not even nest site-searching since she doesn't crouch down; no time on the ground. The young aren't in evidence.

T 42 - 42 F is incubating.

T 32 - for 30 minutes - No change in M 32's behaviour. He never quits singing, using the same perch he's sung from the last few days.
T 44 - for 30 minutes - M 44 is singing when I come on the territory, and he never quits. His interval is 15 to 20 seconds, his songs loud and sung in long series from scattered perches. Most of them are high, but once he sits about five feet up in a little hawthorn and sings for six or seven minutes. I'd guess 44 F has left (correct).

T 36 - 36 F is incubating.

T 37 - A path has been cut through the trees on I W, just west of the tree row. M 37 sings frequent high steps on the center of the territory. I look for 37 F but don't see her in 20 minutes.

T 41 - The young are still in the nest.

1215 - I leave.
June 23, 1951

A fine fresh day with no clouds; temperature 65° at 0600.
Present from 0630 to 0900 and from 1615 to 1800. 

T 36 - 36 F is incubating.

T 37 - M 37 is feeding at least three young and probably four. He sings high steps and some loud skids. I search for 20 minutes without finding 37 F.

T 46 - 46 F is incubating.

T 41 - The young have fledged by 0655. I can hear the Prairie Warbler's calling but I don't stay; both parents are alarmed and I don't want to disturb them.

T 40 - 40 F has not begun to incubate. M 40 sings on the center of the territory.

T 39 - As I come to the little group of trees where 6 F had her second brood nest a female Prairie Warbler flies into the weeds near me and begins to feed. For seven or eight minutes she takes her food almost as a hummingbird would, fluttering for several seconds before the goldenrod and other plants. She comes to within 3½ feet of me and I can hear her bill snap as she grabs insects. (I have heard this before.) Then suddenly she calls the sharp kissing calls, turns and in about six or seven short flights goes to the nest. She calls four or five times while she moves
in that direction. Note that M 39 doesn't sing. I wonder if he's gone.

T 36 - 38 F is sitting quietly on the nest rim.

T 35 - 35 F is not on the nest yet.

T 34 - Silence and no sign of the family as I pass through.

T 32 - M 32 for ten minutes behaves as he has every day since the nest failed. When I'm on T 44 for some time I can still hear him. This female is almost surely gone.

T 44 - from 0815 to 0845 - I neither see nor hear M 44.

T 31 - No sign as I pass.

T 30 - 30 F is incubating. M 30 sings.

III S - The male sings on the south edge here; recently he's always been on or near III.

1000 - I leave.

1615 - I return.

T 31 - from 1625 to 1700 - M 31 appears for brief intervals, always on the west side of the field. He sings very faintly, seems quite interested in a spot about 10 or 15 yards back in the woods and beyond the edge growth. He returns here several times and once I see him sitting silently high in a dead walnut looking down at the spot. He never seems to feed the young. I walk carefully over the territory but never see 31 F.
M 31 is chased by a male Indigo, then follows him about at a four- or five-foot distance for one minute; the Indigo stays within a 10- to 15-yard circle so the following isn't really pronounced but it seems to be that. It looks like a sort of curiosity; the Prairie Warbler just tags along.

T 30 - M 30 sings all over the territory to the north tree row.

T 33 from 1700 to 1750 - When I come on the territory I see a male Prairie Warbler across the field on the edge of the old T 33 - T 34 line. He seems to dive on a gnatcatcher. For the next 50 minutes I search without result. The old nest is empty.

T 32 - While on T 33 I listen to T 32; hear nothing.

1800 - I leave.
June 21, 1951

A cool sunny morning with a heavy dew; temperature 62° at 0600. Present from 0615 to 0900 and from 1715 to 1900.

III S - The male sings quite near 30 F's nest.

T 30 - 30 F is on the nest and M 30 is the full length of III away, singing from the top of one of his cherry trees.

T H2 - H2 F is incubating. A gnatcatcher explores the tree 3 feet from the nest, but she doesn't react. M H2 sings.

T H4 at 0635 - Complete silence till 0700 when I leave. I walk over the territory and see nothing.

T 32 - During the time I'm on T H4 I've heard no sound from M 32. To my surprise he sings just as I come up and to my greater surprise there is a female with him. I follow her 25 minutes while he sings at his normal volume, irregularly and most of the time from the field, not the trees. She hops about in the woods' edge for 5 minutes and M 32 flutters down toward her once. She eats and preens. She then goes into the blackberry field and probably explores for nest sites; at least she flies 10 or 15 yards to a thicket, disappears for 2 minutes or so, then moves on. M 32 flies near her and many times flutters away from her. Still more interesting, she follows him, flying 25 yards or so to him; just as she gets near he flutters on. This occurs several times. Once she starts to fly in his direction (I don't know if this was coincidental) and he flies toward her. They meet in mid-air and flutter for one second about two feet above the ground facing
each other almost like two males. She then drops to the ground
and he follows and sings a short fragment of a song, 2 seconds,
fluttering slowly away. In short, all this looks like behavior
on a day in late April. The big question is whether the female
is 32 F; I'd think the presumption is that she is. If she lays
I'll know from the eggs. (This was a new female as her eggs
showed. Note that the major difference in today's behavior from
that of an established pair was not the male's courtship but the
female's response to it.)

T 34 - M 34 is singing type-5's when I come on the territory at 0730, one
or two faint weak songs.

T 35 - M 35 also is singing type-5 steps, loud and regular. 35 F has begun
to incubate.

T 36 - 36 F is on the nest. M 36 is silent.

T 37 - M 37 sings skids, feeds three young on the south end of T 37.

I think I see 37 F but I don't stay. The young are in nearly
perfect juvenile plumage now.

T 46 - 46 F is incubating.

T 41 - 41 F is south of the road near the nest. She calls nervously when
I come up. I'm trying only to keep track of the pair's movements,
so I leave.

T 40 - at 0800 - 40 F has begun to incubate. M 40 sings his combination
song and a Golden-wing buzz.
T 39 - 39 F is incubating. In 12 minutes I don't think I hear M 39. The buzz I mentioned above just may be he; it's from the east line next to T 40.

T 38 - 38 F is at the nest. I don't hear M 38.

T 31 - from 0820 to 0850 - I find 31 F right away in the usual spot on the west edge of III. She feeds within my sight for 20 minutes, calling "tsu" three times per five seconds and pretty surely not because of me. I think she may be exploring and crouching in nest sites along the edge. M 31 pays no special attention to her, nor does he sing. I see him carry food, so young are alive.

0900 - I leave.

1715 - I return.

III S - I come to find and follow the male but he sings only two times in 30 minutes so I can't find him. I map the songs of singing males of all species.

T 32 - at 1745 - M 32 sings a loud but somehow a rather tentative and unassertive song as I come into the blackberry field. In 60 seconds he repeats it a little more faintly. I immediately see the female in a blackberry, 1 3/4 feet above the ground, building a nest. It is well along as a loose mass, though clearly begun today. When she leaves and flies quickly north (after 60 seconds at the nest) M 32 flies along near her but off at a slight tangent so that it isn't pursuit.
T 44 for ten minutes - Silence.

T 30 - 30 F is on the nest.

T 31 - 31 F is at the usual spot on the west edge of the field.

She sits in a tree and calls "tsu" rather nervously.

M 31 sings irregularly. I watch 31 F for 15 minutes.

See under III S below.

III S° - (T 45) - I follow the male for 25 minutes, in which he twice fights M 31 at least 100 yards north of the III S line. He sings most of the time. I lose him when he flies to the hackberry, quite an extension of his known territory.

1900 - I leave.
June 25, 1961

A sunny morning; temperature 68° at 0600. Present from 0615 to 0900 and from 1700 to 1930.

III S - (T h$\frac{3}{5}$) - from 0615 to 0715 - I follow the male without losing him for more than a few seconds during an hour. He sings loud and regularly in the south-west corner of III, never going on to III S. I see no sign to tell me anything as to whether he's mated. No fights with M 31; once he chases a Field Sparrow 25 yards.

T 31 - I see nothing as I walk through. M 31 has sung very sporadically.

T h2 - h2 F is incubating. Silence.

T 36 - 36 F is incubating, M 36 singing on the territory.

T 37 - M 37 is feeding loudly begging young well north of the road, about where the Bob-white nested two years ago. No sign of 37 F as I walk very slowly through.

T h6 - h6 F is incubating.

T h1 - I see nothing as I walk through. I think M h1 sings north of the road.

T h0 - M h0 sings; h0 F incubates.

T 38 - 38 F has food and is near the nest. She is very nervous at my approach so I go on.

T 35 - 35 F is incubating.

T 34 - Silence as I listen carefully.

T 32 - 32 F carries material to the nest and M 32 swoops down toward her and passes on 15 to 20 yards beyond.

T 44 - I hear two faint songs here and look for 30 minutes without getting any other indication that a Prairie Warbler is present.

T 30 - 30 F is crouched at the nest, over but a little off the cavity.

She has young as of today.

0900 - I leave.

1700 - I return.

T 31 - from 1700 to 1730 - Silence, and my search turns up none of the 31's.

T 44 - from 1730 to 1830 - Complete silence. They are moving the crop to the south, and a Dickcissel from there has come onto T 44, and is singing vigorously.

T 31 - 31 F is apparently feeding young near the old nest. She calls "tsu" at me. M 31 sings occasionally with one burst of loud skids for five minutes. He carries food. I map singing males on XXX.

1930 - I leave.
A hot clear morning; temperature 75° at 0700. Present from 0700 to 1100.

T 30 - The nest is empty, tilted very slightly but undisturbed. In 75 minutes on III, I hear nothing from M 30.

T 31 - 31 F is feeding two (at least) full-grown birds in juvenile plumage in the thicket near the successful nest. No sign of building. M 31 sings only four or five times in about an hour.

XII S - I follow this male as he sings for five minutes. My purpose is to be sure 30 F is not with him; apparently she is not.

Four Cowbirds posture and call in the top of a dead tree in the south-west corner of III.

T 42 - at 0615 - 42 F is incubating.

T 44 - from 0615 to 0630 - Silence.

T 32 - I didn't hear M 32 while I was on T 44, but he is singing very faintly near the nest, barely audibly. I don't go to it for fear I'll disturb the pair in some way.

T 36 - 36 F is incubating.

T 37 - M 37 is feeding the young at the place where the valley crosses the road. They beg noisily and once one begs of another when the latter flies up. There is no response. In 20 minutes I don't see 37 F.
T 36 - 16 F is incubating.

T 38 - The young are alive.

T 39 - 39 F is incubating. A stumping machine is making a lot of noise on the north end of the territory. M 39 sings near the nest.

T 40 - 40 F is incubating.

T 35 - 35 F is incubating. M 35 sings type-0 steps.

T 34 - I come here to try to find signs of a new nest. The pair is back on the center of the territory in the locusts; I find them when they respond to a White-eyed Vireo's loud scolding of some unseen object. In 25 minutes I get a good idea of where they are concentrating their attention, M 34 singing type-0's occasionally. Since 34 F calls a good deal near me I'm afraid to stay.

T 41 - for 40 minutes - Complete silence, but after about 20 minutes I see a male Prairie Warbler at the valley and he goes south. It seems likely that the pair is still here.

T 30 - M 30 sings one series of loud skids from a cherry tree for perhaps three minutes, then becomes and stays silent. I can't find him in 30 minutes.

1100 - I leave.

I heard the summer's first cicadas today.
June 27, 1954

Another hot sunny day; temperature 68° at 0615. Present from 0615 to 1130 and from 1800 to 1930.

III - from 0615 to 1015 - I spend most of my time trying to find the 30's and some sign of their nest building. For two hours and 55 minutes I hear and see nothing of them, although I cover the field many times. Then M 30 sings in the north-east corner and moves in three minutes into the orchard where he is silent. His songs are loud and sung regularly from very high trees, and I never get even an idea of where 30 F may be.

III S - I follow this male for perhaps an hour all together, trying to be sure he has not acquired M 30's mate. Only once do I see a female and that is 31 F. She comes just south of the tree row; the male dives on her, she flies a few yards out of sight and then moves high and far to the north part of T 31. Male returns and sings as before. I'd guess he is unmated.

T 31 - See above under III S. M 31 sings irregularly. Once he's with 31 F on the south part of the territory where they seldom go. They quickly move back to the regular area of their attention.

Field Sparrow nest, two eggs, two feet high, elm.

Yesterday I found a Bachman's Sparrow nest, female on four eggs. She is on the nest today. When she flushed yesterday she flew straight away without display.

T 42 - T 42 F is incubating.
T 32 - The nest is complete, empty.

T 35 - 35 F is incubating. M 35 sings.

T 34 - Silence as I pass.

T 36 - 36 F is incubating.

T 37 - M 37 sings.

T 46 - 46 F is incubating. (Meet Alan Garrett.)

T 38 - M 38 goes to the nest with food after singing two or three skids as I stand near it.

T 39 - 39 F is incubating.

T 40 - 40 F is incubating.

T 43 - We go north of the road into the brushy field east of the cut-over area where the first brood was. Two males sing here, the south one M 43. He feeds the two young (I see my band). 10 yards away in an 18-foot elm is a Prairie Warbler nest 15 feet high. It looks fresh, is unmatted. No female on or near it.

T 41 - Both adults are south of the road near the first nest. 41 F calls a little at us but seems relatively undisturbed. She may be exploring for nest sites; she seems to go through most of the notions in a hickory tree but doesn't crouch down all the way or linger. When she leaves it M 41 follows so soon that it looks like pursuit.
VIII - A male sings a slow skid on old T 15 near the nest site.

1130 - I leave.

1800 - I return.

T 30 - at 1805 - M 30 is near the big hackberry. He chases a male, probably the III S male, to the south-west, then returns. I follow him for one hour and hear him for 20 minutes more. In this time he covers the territory from east to west, from the sassafras grove on the north to the little woods on the south. He sings enough to make him easy to follow, but the songs are not regular. Sometimes he has spells of quiet singing for five minutes at a time while he sits on one perch (usually about 15 to 20 feet high) and preens or looks restlessly and carefully around. Most of the time he moves between high perches after a minute or so of observation of the ground below him; he seems very alert. There are three periods of quick feeding on the ground. Twice he flies far on to T 31, to the woods, and I lose him for a minute, only to hear him sing soon back on the territory. I never see a female and his quiet songs are not associated with any spot. Thus his behavior is much like that of the period between the first and second nests. Probably 30 F is still here.

T 31 - M 31 sings irregularly, sometimes frequently, and both he and 31 F feed the young. She does this so consistently that I can't think she will try a second brood.

1830 - I leave.
June 28, 1951

A sunny morning after a sudden cool wave; temperature 59° at 0600. Present from 0600 to 0730 and from 1500 to 1700.

T 36 - 36 F is incubating.

T 37 - M 37 sings loud. The young are audible.

T 46 - 46 F is on the nest. She should have young.

T 38 - The young are alive.

T 39 - 39 F is on the nest. The eggs will have begun to hatch.

T 40 - 40 F is incubating.

T 43 - M 43 and the young are where they were yesterday. The female is not on the nest or otherwise in evidence.

T 35 - 35 F is incubating, M 35 singing.

T 32 - The nest contains egg one, measuring 16.4 x 12.4 mm. It is rather long and more pointed than many, marked with scattered spots on much of its surface. One distinctive character is a series of round blackish spots almost as big as a shotgun shot. I would say from this egg that it looks as if the female is not the original 32 F. (Correct - I have compared eggs saved from the overturned nest of 32 F and find no resemblance.)

T 42 - 42 F isn't on the nest and doesn't come to it in 10 minutes. M 42 sings loud and regularly a few yards from the nest tree, then moves on and sings.

T 30 - M 30 sings in several short series near the center of T 30,
falling silent for a few minutes after each series. I see nothing helpful.

0730 - I leave.

1500 - I return.

III S - The male sings very little and irregularly.

T h2 - This nest has surely failed. I visit it several times in 1 1/2 hours and never see the female. The first time I come up M h2 flies to the nest tree and sings loudly in it for two or three minutes, then moves on a few yards but continues to sing within 20 to 25 yards of the tree.

T 30 - I follow the male for two separate periods of about 20 minutes each. He sings fairly loud, moves a good deal over the north half of the territory, and two or three times flies completely across T 31 to the woods. I lose him each time this happens until he resumes singing on his own territory. M 31 does not resist so far as I can tell, but M 30 is always silent on these invasions.

T 31 - Both adults are feeding the young. 31 F is doing so as I come up, calling "tsu" irregularly; she continues to feed them for ten minutes or so. See above, T 30.

1700 - I leave.
June 29, 1951

A clear morning; temperature 65°. Present from 0600 to 0730 and from 1500 to 2000.

T 42 - for 65 minutes - M 42 sings loud and regularly at the south end of the territory, with the recent nest site as the general center of the singing area. He comes to within ten yards of it several times, never goes to the tree. I never see the female.

T 30 - M 30 moves over the center of the territory and several times to the tall trees of the north tree row. His song is irregular, fairly loud.

0730 - I leave.

1500 - I return.

T 31 - In 15 minutes I don't see any of the family.

T 30 - M 30 is singing faint type-8's on the north central part of the territory when I come up. Since he sang this song during the building of the last nest I go to the spot. 30 F flies out of a little bush with material in her bill and I follow, losing her almost immediately. However, I see her leave an 18-foot cherry tree with the direct, quick flight typical of a female building, so I sit to watch. In 20 minutes she doesn't return; I go to the tree and find what looks like a complete nest, about 12' high and moderately concealed. The tree is well covered with grape. I retire to watch her return to the tree; in 10 minutes
she does not. I take it the nest is in the very last stages of building. Around the outside is wound a snake skin. Note that this nest was begun without delay after the second failed; M 30's behavior has certainly not been typical.

T 42 - from 1550 to 1650 - M 42 sings in the south-east corner of the territory, almost never breaking the regularity of his song. I follow without losing sight of him and find no female and nothing in his actions to indicate a female is here.

At one time he suns himself in an interesting way, only the second time I've ever seen this. Sitting 8 feet up on a horizontal twig of a dogwood, for two minutes he leans his body almost on its side. The tail is spread upwards i.e. away from the direction in which he leans (his left side is upward). The left wing flight feathers are spread about half way, the wing lying stretched backward against the body. The bill is open.

T 32 - Egg two is here, measuring 16.7 x 12.5 mm. It has large brown spots (without a reddish cast) well distributed over it; there are not very many, so they do not fuse. M 32 sings high skids, an unusual song for him.

T 35 - I watch the nest for 30 minutes and find that it has failed; it is undisturbed so far as I can see. M 35 sings a combination step to the south, but I don't see 35 F.

T 34 - I cover part of the locusts very carefully looking for the new nest. M 34 sings a combination irregularly. I don't try to see him.
T 36 - In 15 minutes or a little more 36 F does not come to the nest. I'll return on my way back. See below.

T 37 - M 37 sings high skids, feeds a begging young bird on the center of the territory.

T 46 - 46 F brings food to the nest.

T 38 - M 38 is near the nest and he calls nervously as I come up. The four young have fledged; the adults are carrying food. I don't try to band.

T 39 - M 39 brings food to the nest.

T 40 - 40 F is incubating.

T 43 - The nest I found has no female on it.

T 36 - In 15 minutes 36 F does not appear. M 36 sings most of the time, all of it sitting about 30 feet up on the north edge of the territory. His song is very odd, consisting of type-3's varied with the peculiar slurred skids and steps he sang when this nest was being built. The songs speed up, suddenly slow down, follow immediately after each other occasionally, and rise and fall in volume. I suppose this means the nest has failed (error).

2000 - I leave.
June 30, 1954

A hot partly cloudy morning with a threat of rain until 0800, when it clears; temperature 70° at 0600; partial eclipse of the sun at 0615. Present from 0615 to 1000.

VIII - Silent.

T 36 - 36 F is on the nest to my surprise. It has four young today.

T 37 - M 37 sings loud and regularly on the center of the territory. I'm beginning to think 37 F may still be here.

T h6 - h6 F is at the nest.

T 38 - 38 F is nervous, carries food to the fledglings.

T 39 - M 39 brings food to the nest.

T h0 - h0 F is incubating.

T h2 - from 0700 to 0820 - M h2 sings the full time at 12- to 18-second intervals, never once stopping. He stays high, sings long series, moves slowly over the south end of the territory. I feel fairly sure h2 F is not building. (M 30 did not stay with 30 F while she built but he moved about restlessly and his song was not so completely regular as M h2's)

T 32 - The third egg measures 16.7 x 12.5 mm, and I can say with assurance that this female is not the original 32 F. This is the first
time I've had a male lose a mate and acquire another in mid-
season. It is possible the new 32 F is old 34 F; I'll know
better when I see the state of affairs on that territory. The
new egg doesn't look like the others; it has a few rather large
light reddish brown spots on the large end.

T 35 - M 35 probably sings on the west edge of the territory near T 34. I
stand south of the foxes' den and 35 F flies by me to the north.
I follow her, lose her, and in two minutes see her head south
high over a locust planting carrying nest material. I wait; see
nothing, go after her. I then sit for ten minutes waiting for
her to head for the nest from a new direction so I can get a
second bearing on it. She doesn't appear so I stand up to try
something else. I then see her with spider webs in her bill; she
goes about $7\frac{1}{2}$ feet high on the outer limb of the ten-foot dogwood
under which I've been sitting. Evidently I didn't frighten her;
for in 15 minutes she returns to it. The nest was almost surely
begun today, though I don't take the chance of going up to it.
Oddly M 35 has not sung nearby and is going through none of his
usual nervous attentions. This is my first fifth nest of the
year; there are three fourths if I count M 32's two mates.

T 31 - M 31 sings faintly and irregularly near the nest site. 31 F appears
once but I can't follow her.

III S - The male sings regularly for five minutes; his status is still
unknown.

1000 - I leave.
July 1, 1951.

A hot sunny morning; temperature 73° at 0600. Present from 0600 to 0930 and from 1700 to 2000.

T 36 - 36 F is brooding.

T 37 - M 37 sings loud skids on the territory.

T 46 - 46 F is on the nest.

T 39 - from 0645 to 0725 - 39 F is not on the nest and no adult comes to it while I wait. It has certainly failed, though I'll continue to check it. There is nothing to indicate the predator; the nest is so high in the small branches that I doubt if a snake or a mammal is responsible. I'd guess Blue Jays may have taken the young; they are relatively common and are on this territory regularly.

There are no sounds from M 39.

T 40 - 40 F is on the nest and M 40 sings frequently.

T 42 - from 0740 to 0840 - There is no sound from M 42, and I walk carefully over the whole territory without seeing a Prairie Warbler. I think it very likely that they have left.

T 32 - 32 F has begun incubation today.

T 34 - M 34 carries food, sings irregularly.

T 35 - 35 F is still building, making frequent rapid trips. Oddly, M 35 either isn't singing or else he is over so near T 34 that it's
difficult to distinguish the two males. Both possibilities are unusual; he has been very attentive during nest building in the past.

T 30 - 30 F is not at the nest; it is moderately well concealed. M 30 sings on III.

T 31 - I hear the young calling in the west woods and go quietly in to see if 31 F is feeding them. She is, and I think it's likely that she will not nest again at this date and after so long a wait. M 31 sings irregularly, some songs loud and others faint; he stays with the brood and probably feeds the young.

III 3 - The male sings.

0930 - I leave.

1700 - I return.

T 39 - In 70 minutes I never surely hear M 39 sing, and I feel reasonably sure that he does not. I go to the south-west part of the territory where a male sings; in the woods he seems to carry food back to one tree and when I go there a bird flies silently but rather clumsily out. I think this is M 41 and the Cowbird well off territory. (See July 3, 5, 6, 8.)

T 41 - See above.

T 46 - This nest seems also to have failed. In 15 to 20 minutes no adult comes to it and M 46 does not sing. Note that the predator got it since 0620 this morning.

T 37 - See below under T 42.
T 42 - from 1830 to 1930 - Total silence from M 42. More significantly, M 37 is over here singing loud and frequently and feeding his whole brood of young. They are noisy. It is interesting that they have wandered so far, and M 37's unchallenged songs from within 25 yards of M 42's major singing area seem surely to mean that the 42's are gone.

T 38 - 38 F feeds young just south of the white pines.

2000 - I leave.
July 2, 1951

A hot partly cloudy morning; temperature 72° at 0615. Present from 0615 to 0930.

T 36 - M 36 is very nervous when I go to the nest, so much so that I feel sure it is still active.

T 37 - M 37 sings loud on the territory. Later he is on ill with the young, about where I saw them last evening. I think his returning to T 37 and singing there must mean that 37 F has a nest.

T 39 - From 0630 to 0730 - M 40 comes over to the sink hole and sings there for two minutes without M 39's appearing. I cover the territory and see nothing of the pair, which has probably left. I'd stay longer but machines are making a good deal of noise not far away, beginning at 0730.

T 46 - The nest has failed and in 30 minutes I see and hear nothing. Again the noise of machines makes it seem worthless to stay, though I know they would not affect Prairie Warblers if they are here.

T 42 - Silence for 15 minutes.

T 32 - 32 F is on the nest.

T 30 - M 30 sings in the orchard at the west side. The nest is still
unattended; presumably the second egg was laid today.

T 31 - I see an odd thing: One of the young is in the field at the usual place on the west side. He is in the normal rather shoddy plumage of his age. With him is a Prairie Warbler in the neat plumage of a fully molted immature bird in autumn. Not even the young 37's are so well along toward full immature plumage yet.

III S - The male sings on III S, loud and frequently. Once he chases a bird back on to III; I am sure it is a Prairie Warbler, maybe a wanderer from the adults that are beginning to leave their territories, possibly a 31.

0930 - I leave.
July 3, 1954

After what seems to have been a heavy rain during the night, the day is partly cloudy and very sultry and humid; temperature 73° at 0630. Present from 0700 to 1145 and from 1700 to 1830.

T 36 - 36 F is brooding.

T 37 - M 37 sings on the territory. Note that the young seem to have left it; they are probably wandering around II together. (I have never seen young from different broods mingle so far as I recall.) Later M 37 sings north of the road on the south edge of T 46.

T 39 - from 0715 to 0900 - I do not see or hear any signs of the 39's, and I think they can be written off. Males do appear on the territory but I'm sure they are M 38 or M 40, or M 41.

T 40 - 40 F is incubating, M 40 singing frequent skids.

Field Sparrow nest two feet high in blackberries, female incubating.

T 43 - The nest is still not occupied by a female.

T 41 - M 41 is south of the wide lane cut for a fairway, almost on the open edge of VI (which has been leveled). He sings high insipid steps frequently and irregularly. I go to him and the Cowbird flies quickly away. See above under T 39.

T 46 - from 0920 to 10h0 - No sign of the 46's. At the north-east corner of their territory I find a female, which goes onto T 38.
A little later M 38 comes onto T 46, then goes back and feeds a young bird near the line between the territories. (The young looks no bigger than fledgling size but it can fly quickly and well; also it will not allow me to approach it at all any more.)

Two males fight on T 46 but I'm relatively certain they are M 38 and M 37.

T 36 - See above under T 46.

T 35 - The nest is complete and still empty. It is lined with feathers. M 35 sings combination step-buzz songs.

T 34 - Silence as I pass.

T 32 - 32 F is incubating; M 32 sings on the hillside on old T 33.

T 42 - Silence here. M 37 sings on the north end and I hear the young. No sign of M 42.

Towhee's nest on the ground in grass, 3 eggs, female incubating.

T 37 - See above under T 46, T 42.

T 41 - Silence for ten minutes.

T 30 - 30 F is not on the nest yet. M 30 sings frequently and loudly.

T 31 - M 31 sings faint irregular songs.

III 6 - The male is silent.

Field Sparrow nest on the ground in the grass, 3 eggs, female incubating.
1145 - I leave.

1700 - I return to collect plants on III.

III S - The male is silent about half the time; most of his songs are insipid steps. I follow him for 20 minutes. Once there's a chase that he is probably involved in. He sits in a big cherry on III, then goes to the hackberry by the little woods. There he sits high and gives fight calls for ten minutes, never fighting but looking around alertly and seeming belligerent in his aggressive looking, intent inspection of everything. There are no other Prairie Warblers seen nearby to account for this behavior. Several times he gives very odd wheezy chickadee-like notes, presumably an abortive song.

1830 - I leave.
July 4, 1954

A hot sunny day; temperature 72° at 0700. Present from 0700 to 1130 and from 1700 to 1830.

T 36 - 36 F is at the nest and M 36 is not singing.

T 37 - from 0710 to 0850 - I begin a search for a second brood nest. M 37 sings for only two or three minutes on the territory, later is heard on II as I pass there; I'd judge he spends most time there now. I never see 37 F as I walk over the territory looking for nests in a fairly orderly way. I do find a nest built by her but not completed; it is 11 feet high in a 15-foot sassafras sapling standing in a sassafras grove in the tree row. It is recent, contains an insect cocoon and is built typically for incomplete nests. I.e., it is well shaped and on superficial examination looks complete, but seen close at hand has holes in its sides where lining was never put in. I can bend the tree enough to see that lining is hardly present at all. I'd say this was built after the other abortive nest and pretty surely means 37 F will not lay eggs for another brood. I'll continue to check.

A female Summer Tanager is on a nest 12 feet high in an 18-foot sassafrass.

T 46 - Silence. I take the nest down and find it lined with rootlets; nothing to show the cause of failure.
T 39 - In half an hour I see nothing on T 39 and am sure there is no building going on.

  Bachman's Sparrow nest with the aperture straight up and without a dome, built in high grass and under little sumacs; female incubating, four eggs.

T 40 - H 0 F is incubating for the last day. M 40 singing regularly.

T 41 - M 41 sings skids back on his regular territory.

T 42 - Silence. The nest is not occupied.

T 43 - Silence.

T 34 - I spend 1 1/2 hours walking through the locusts once and the dense blackberry tangles without finding the nest or seeing 34 F. M 34 sings from time to time, staying well west in the locusts. M 35 seems to have most of them; he sings a lot.

  Indigo Bunting nest, three Indigo and one Cowbird egg; four feet high in an elm, female incubating.

T 35 - M 35 sings loud and regularly. The nest has its first egg.

T 32 - 32 F is incubating.

T 30 - 30 F has begun to incubate.

T 31 - M 31 sings irregularly and faintly. No sign of the rest of the family.

III S - Silence.

11:30 - I leave.
1700 - I return to gather plants and see what I can on III.

T 31 - M 31 is feeding the young, which make a lot of noise, in the little clearing in the south-west corner of III where 1/4 F and her young stayed. M 31 sings once or twice. Later I see a young bird at the regular place where they have been, near the old nest. I can't be sure but I think an adult is tending it.

III S - [Blank] - A male begins to sing a high combination in the little woods. M 30 is silent at the time, so it may be he. I look for ten minutes for some signs of a female.

T 30 - M 30 sings frequently in bursts of three or four minutes at a time.

1830 - I leave.
July 5, 1954

Another sunny day, not quite so humid as yesterday; temperature 70° at 0730. Present from 0730 to 1230.

T 36 - 36 F carries food to the nest.

T 37 - The nest I found yesterday is undeveloped. In 15 minutes I hear nothing.

T 46 - A male sings a type-8 on the territory near the old nest. However he then goes north onto T 36 near where M 36 has been recently. Since M 36 sings a type-8 sometimes I don't think this means anything.

T 41 - I begin a long (two hours) careful search of the woods south of the wire and north of the fairway; the walnut grove, and a less careful (because it's impossible to do it thoroughly) search of the woods east of the walnut grove. I find nothing except a Cardinal's nest, four feet high in a walnut, the female on three eggs, all Cowbird's; at least two of them are the same Cowbird's, and perhaps all are.

Prairie Warbler males sing north of the road and south of the fairway, which is puzzling. The south bird sings a type-8 stop and a high plaintive step. He is where the male has fed the Cowbird for several days and from his actions today he is the same male, still feeding. I have thought this was M 41. I then check the north male and find him and a female feeding a young Prairie Warbler. These may be the 41's on their regular territory.
I think it possible that all I've seen re the other male shows he is M 39 and that he has been grabbed by the Cowbird and is feeding it. This is suggested by the facts that that male sang type-3's on T 39 and then went to where he now is and fed, that he was feeding young when his nest failed, and that Cowbirds follow birds other than those that reared them from the egg. Also, the 41's have no Cowbird today. (See July 8 under T 39)

T 39 - See above under T 41.

T 40 - 40 F carries food to the nest. This is the day the four young were due to hatch. M 40 sings.

T 43 - In 40 minutes there is complete silence. I get the nest, which is empty. It is quite recent (there is an insect egg case) and may be an unsuccessful second brood nest. I think this possible because I find a newly fledged brood of three or four young for the pair that was immediately north of the 43's. These come from a nest begun before the field was cut over, and my doubts about the ownership of the nest found last week as the 43's were because I thought the cutting might have caused a territory shift. Now that I find the other pair was centered elsewhere prior to the cutting I think it is reasonably safe to conclude the 43's tried a second nest and failed before the eggs hatched.

T 35 - at 1200 - Very oddly 35 F is on the nest. This is most likely premature incubation and not a two-egg set.

T 24 - M 24 feeds young in the locusts. There is almost surely a second brood nest here. (Correct)
T 32 - 32 F incubates and M 32 sings on the hillside nearby.

T 30 - 30 F incubates.

T 31 - Nothing noted.

III S - Silence.

1230 - I leave.

Little song - 285
July 6, 1954

A cool sunny morning; temperature 65° at 0600. Present from 0630 to 0900.

T 36 - 36 F feeds the young. Later a heavy crane loads tree roots into trucks within 60 yards of the nest, making much noise. M 36 sings at this time. I don't go to the nest again to see the effects of this.

T 37 - Silence.

T 46 - Silence.

T 38 - Silence.

T 39 - Silence.

T 41 - from 0650 to 0720 - M 41 sings his regular high skid frequently and I find 41 F feeding the fledgling near his song tree. I watch her for 20 minutes, during which time she feeds the young constantly except for two breaks of about one minute each when she flies to the walnut grove south of the road. It seems clear she is not incubating a second brood nest; probably she doesn't have one.

T 40 - 40 F comes to the nest with food as I pass.

T 43 - I listen for ten minutes and hear nothing.

T 34 - Nothing learned.
T 35 - at 0800 - 35 F is again on the nest. She should have laid her third egg this morning.

T 32 - 32 F is incubating.

T 30 - 30 F is incubating.

T 31 - Silence and in ten minutes I can't find the family.

0900 - I leave.
July 7, 1954

A cloudy day with rain in the late morning and a soaking rain at 1700 while I'm out; temperature between 70° and 80° all day, 74° at 1600. Present from 1600 to 1745.

III S - Silence.

T 31 - Silence. Very threatening weather.

T 30 - 30 F is incubating. Silence.

T 32 - 32 F is incubating. Silence.

T 35 - 35 F is incubating. Silence.

T 34 - I don't stop to look around. It has begun to rain.

T 36 - 36 F brings a large load of food to the nest.

T 37 - Silence.

T 46 - Silence.

T 39 - Silence.

T 40 - There are no adults at the nest and I sit for 30 minutes watching it in the pouring rain. Neither comes to it, so it has failed. M 40 sings irregular step-buzz songs on the west part of the territory, so I go to watch him. He switches to plaintive steps, some repeated without pause in series of two and often with only a few seconds between each of several songs; the rain doesn't
see a to slow him down. He moves from tree to tree, staying within 10 to 15 feet of the ground and remaining for a minute or two in a tree. I think there are indications that H0 F is still here, but I won't get far in the rain so I go.

1741 - Silence.

1745 - I leave.
July 8, 1954

A cool sunny morning with everything wet after last evening's rain; temperature 65°F at 0600. Present from 0600 to 0900 and from 1700 to 1900.

T 39 - M 39 sings constantly on the center of his territory at the sink hole, for the two hours I'm on T 40. The song is his usual loud type-3, sung every 15 seconds or more frequently. Once he fights M 40 at the south-east corner of T 39, calling the harsh call and drooping his wings as he would in early spring. The fight lasts one minute, rather a long time. Of course the singing on the south-west part of the territory, south of the fairway, stops; i.e., there is little doubt that the male was M 39. I would guess that he tended the Cowbird till it got big enough to be independent (it is about 25 days old today). This can be checked by finding the age at which a Cowbird reaches independence of an adult host. (Two to four weeks after fledging.)

T 40 - M 40 sings regularly for long intervals, ten minutes or so, then falls silent for three or four minutes at a time. Nearby all songs are from the west edge of the territory; all are loud. Since I never see a female here (after good coverage) it seems likely that the cause of the singing is M 39's new loud singing. M 40 fights M 39; see under T 39. He goes east onto that half of the territory once but spends little time there. I cover the territory without success. The nest is empty and not in any way
disarranged. There are two Blue Jays 20 yards from it today.

T 36 - The young are alive.

T 38 and T 46 - M 38 sings a Golden-wing buzz song well south of h6 F's nest site, near the cut sassafras trees. I follow him as he carries food twice to his young on T 46. This seems to be complete assurance that the h6's are gone.

T 41 - Silence.

0900 - I leave.

1700 - I return.

T 31 - The young are together on the west edge of the territory, calling and being fed, so far as I can tell only by M 31. Watching one I see a very interesting thing: It catches food, then a few minutes later suns itself on a little branch six feet high in a grape tangle. The position is exactly that of the two adults I've seen do this. It rotates the body so that the left side is almost straight up, fans the wing out so it is nearly fully open (more than the adults), and spreads the tail toward the uppermost side but so that it is nearly parallel with the ground. It maintains this attitude for one minute.

T 30 - 30 F is incubating.

T 32 - 32 F is incubating.
T 35 - This nest has failed and the three eggs are gone. In appearance it is undisturbed. M 35 sings at the south end of a locust clump over at the west edge of his territory, sitting high, occasionally interrupting his regular song with fighting calls. I'll search for 35 F tomorrow.

T 34 - Silence.

T 37 - Silence; no sounds on II either.

T 40 - In 45 minutes of following M 40, no sign of 40 F. The male sings loudly, mostly from the west side of the territory, for 25 minutes (fighting M 39 again), then goes east onto the strip which is generally not used. He then crosses the road and flies 40 yards or more north, perching quietly about 45 feet high on the west edge of the woods there. In eight minutes he returns to the east part of the territory, falls silent. I cover the territory carefully.

T 39 - M 39 sings as he did this morning. See above under T 40.

1900 - I leave.

A Sharp-shinned Hawk flies over VIII going west as I pass.
July 2, 1951.

A cool sunny morning with a heavy dew; temperature only 59° at 0600. Present from 0630 to 1000 and from 1530 to 1700.

T 36 - The brood fledges this morning, three young and no eggs in the nest.

I number them 21 - 62033
   21 - 62034
   21 - 62035.

Little display from the adults although considerable excitement.

T 37 - Silence.

T 39 - M 39 sings as loud and frequently as he did yesterday while I'm in the vicinity, staying near the sink hole and east of it. No female.

T 41 -- from 0710 to 0810 - M 41 sings as I arrive and I find him bathing by shaking the dew from the wet leaves onto himself, doing this for five minutes. He then preens for 5 to 10 minutes, singing only a few times during this activity and moving a few feet every two or three minutes. Then he begins to feed. I hear the fledgling and find it being fed by 41 F. I follow these two as a means of determining whether 41 F (which I watched for quite a while three days ago) has a second brood nest. For 25 minutes she feeds the young bird, which then ceases to beg and sits quietly about 12 feet high in the walnut grove. Every two or three minutes (or a little more) 41 F returns to it. Once I think food was rejected, but it happens too fast to be sure. I thus
keep h.1 F in view for 30 minutes, enough to make sure she has not begun to incubate and reasonably sure she is not building

T 40 - from 0615 to 0650 - H 40 sings on the west side of the territory and I cover it carefully without seeing any sign of H 40 F.

T 35 - from 0900 to 0930 - M 35 sings constantly at the line between his territory and T 34, usually a combination step-buzz, and very frequently uttering the male's fight notes. There is nothing to show what, if anything, causes these harsh calls. M 34 is not in view. I walk over the territory slowly. At the north edge by the woods a Prairie Warbler is on the ground; in ten seconds it flies into the woods after calling a "chuck" like a female. I can't be sure it is 35 F or even a female (in view of later discoveries it seems clearly to have been 34 F).

Field Sparrow nest two feet high in a blackberry, female incubating three eggs.

T 32 - 32 F is incubating.

T 30 - 30 F is incubating.

1000 - I leave.

1530 - I return.

T 31 - M 31 and young are on the west edge of the territory.

T 30 - 30 F is incubating.
T 3h - M 3h silently feeds a fledgling south of the pines, just over in the blackberry field.

T 35 - for 75 minutes - M 35 sings as loud and regularly as he did this morning, giving fighting notes a lot. Not a sign of 35 F.

1700 - I leave.

Same as were singing
July 10, 1954

A sunny morning with the temperature 65° at 0730. Present from 0730 to 1130 with Paul Davis.

III S - Silence.

T 31 - The young, at least three of them, are on the west edge of the territory at the usual place, calling noisily. M 31 is with them and probably feeds them. In 15 minutes we see nothing of the female.

T 30 - 30 F is incubating.

The Bachman's nest has four young about five days old.

T 32 - 32 F is off the nest so I check it and find four eggs; the nest is tilted badly but this never seems a threat to the young. M 32 sings in the orchard behind us, gradually moving toward the field. We leave for fear we'll upset the birds in some way.

T 35 for 90 minutes - We cover the territory in every possible way, together and separately; see no sign of 35 F. M 35 has changed his behavior since yesterday. Today he sings loud and regularly but most of the time the song is a type-6. There are no fight notes. He covers the territory, singing for series of 20 - 30 from high perches. We time his interval, find it is 12 seconds once, 10 another (this over a series of 10 songs each time).

A Bachman's Sparrow nest is discovered here, domed as usual but built in the open field out of grass brought for the
purpose instead of being built into growing grass. It contains four eggs, one cracked slightly with one outward and one inward crack; presumably it has been pipped and is about to hatch.

The female is incubating.

T 34 - Silence.

T 37 - We sit for 25 minutes and hear nothing here.

T 39 - M 39 sings as loud as he has been usual during the last few days. The Bachman's Sparrow nest found here five days ago (and not noted at the time) has three young, one egg. When I found it, the female moved off and made nasal whining noises not unlike a Red-eyed Vireo's "cow," an odd note I've never heard before. She kisses with a little sound injected so that it isn't pure sibilance and has a slight whine in it. We don't see her.

T 40 - from 10:40 to 11:30 - M 40 is silent throughout and we see neither him nor any female on a careful search. As we arrive on the territory a strange male is feeding slowly over its west quarter almost up to the ravine where the nests were. I follow him for 15 minutes; he is definitely not M 40. His presence for all this time (while M 39 sings on T 39) suggests territories are breaking up and that the 40's are gone.

11:30 - We leave.
July 11, 1954

A hot dry, sunny morning; temperature 75° at 0800. Present from 0900 to 1300.

III S - The male sings and I follow him for 20 minutes in the south-east corner of III, south of the little woods. This is an area he has never used before, and I wonder how to account for his having moved. He sings infrequently but regularly and loud, shows no sign of having a female.

T 31 - The family (except 31 F, which I don't see) is in the north-west corner of III. There are at least three young, probably four. One picks at a spider web or possibly at an insect in it. From their noise I'd say that M 31 occasionally feeds them.

T 30 - 30 F is on the nest.

T 32 - 32 F is at the nest. She has four young today.

T 44 - I sit for 40 minutes here and hear nothing. A male does fly from old T 33 south-west down the valley between T 33 and T 44, and probably into T 44. I can't find him again but I'll watch for him.

T 35 - In a 25-minute walk I see and hear nothing.

In the Bachman's nest found yesterday are three young, one egg.

T 44 - Silence in ten minutes.
T 37 - A male is singing a quiet insipid step in the valley by the road, feeding along in a tame and leisurely way about two to five feet above the ground. I follow for 15 minutes and learn nothing. The song is not like H 37's, but at this date that cannot be counted on.

T 39 - H 39 still sings.

T 40 - Silence. I spend 30 minutes without finding any sign of the 40's.

T 41 - I find 41 F in the walnut grove feeding along and calling a soft "check" occasionally. Soon the young flies to her and is fed. I then follow them for 30 minutes, enough (coupled with similar experiences during the last week) to assure me there is no nest. Of course none will be built at this date, so this pair is finished. The adult and young are generally silent, occasionally calling a "check" note that sounds alike in each, and the young bird calling in excitement when it is fed. 41 F is tame, moves in a calm way, stopping to preen. Most of the time she stays within 10 feet of the ground.

1300 - I leave.
July 12, 1954

An extremely hot dry day with a strong south breeze; temperature 100° at 1:00. Present from 1:00 to 1600.

T 30 - 30 F is incubating.

T 32 - 32 F is at the nest.

T 35 - Silence for 15 minutes.

The Bachman's Sparrow's nest here has four young today; no adult is at the nest.

T 34 - I cover the north half of the pines without seeing or hearing a Prairie Warbler.

Two Field Sparrow nests, one nine feet high in a white pine, the female on it; the other 7½ feet high on the outer branch of a short-leaf pine, three eggs.

T 31 - Silence.

III S - Silence.

1600 - I leave.
July 13, 1915

Another hot day with the temperature reaching 100°. Present from 1600 to 2000.

T 31 - Silence.

T 30 - 30 F is incubating and M 30 sings his usual high skid very frequently.

T 32 - 32 F is at the nest.

T 34 - In 30 minutes I find no sign of the 34's except that M 35 comes to the white pine row and sings and calls very belligerently. There are so many calls that some may come from M 34.

T 35 - M 35 sings type-B steps over the entire territory, then goes to the south-west corner and sings combination step-buzz songs and calls like a male in combat. No sign of 35 F.

T 37 - for 30 minutes - I walk over the territory and listen but find no Prairie Warblers.

Indigo Bunting nest 6½ feet high in a cherry covered with grape. One nestling about five days old.

Towhee nest ten feet high on top of an elm heavily covered with Virginia creeper; female on the nest.

T 36 - 36 F calls nervously as I pass. Undoubtedly she is feeding young.

III - I collect plants for 1½ hours.
T 30 - Field Sparrow's nest 2½ feet high in a wild rose tangle, female on three eggs.

T 31 - The young, M 31, and possibly 31 F are feeding and moving noisily south on III going into the area south of the little woods, in the south-east corner. I can't be sure about the female.

2000 - I leave.
July 11, 1954

An extremely hot dry day; temperature 105° at the hottest. A thunderstorm at 2000, but not enough rain or wind to destroy nests. Present from 0630 to 0900.

III S  – Silence.

T 31 – No sign of the 31 family. I suspect last night’s movement into the south-east corner of III means the bond with the territory has been broken (probably correct as to the young).

T 30 – 30 F is incubating, the last day of the period.

T 32 – The young are in the nest, which is tipped very badly.

T 34 – Silence in a 15-minute search.

T 35 – M 35 sings loud type-S steps on the center of the territory. His behavior is that of an unmated male seeking a mate, like that of M 39 last week. Most males are now silent or have disappeared. The Bachman’s Sparrow’s nest has failed.

T 34 – I walk over the territory but see and hear nothing. A Cooper’s Hawk flies over the territory into the woods.

T 37 – Silence.

0900 – I leave.
July 15, 1934

A clear day, much cooler; temperature in the high 70's or low 80's at the hottest. Present from 1600 to 1800.

III S - Silence.

T 31 - Silence.

T 30 - 30 F is standing at the nest rim, so the eggs have hatched. 

T 32 - The nest has failed without any indication of what the predator was. It is much tilted but no more than yesterday, so the storm is not the cause. Nor are the young under it. Presumably (?) therefore a snake destroyed the brood, but the nest is low enough to have been reached from the ground by a mammal. M 32 sings loud and regularly from the sink hole. I'll begin a search for the new nest tomorrow, without much hope that there will be one. 

T 34 - Silence in 20 minutes spent here.

An adult Worm-eating Warbler calls in the hawthorn thicket, a sign that the breeding season for that species is ending.

T 34 - M 34 feeds a young bird in the white pine row on the territory.

T 35 - M 35 sings his loud type-3's, but I don't go to investigate.

T 37 - Silence.

1800 - I leave.
July 16, 1954

A clear fresh day like yesterday. Present from 0630 to 0900.

III S - Silence during 15 minutes here.

T 31 - Silence.

A Field Sparrow carries nest material, so the season for the species is still going.

Indigo Bunting's nest, four feet high in a walnut tree, female on three eggs.

T 30 - 30 F is at the nest.

T 44 - Silence.

T 32 - M 32 sings at the sink hole when I arrive, but I notice that his song is irregular and that he moves about a good deal. Soon I see another Prairie Warbler in the very thick blackberries by the sink hole; M 32 flies toward it but not in a fluttering manner. I am too far away to distinguish the sex. This happens again, again at a distance. I have about concluded the Prairie Warbler is a female when I see one of the banded 34's in the field and soon see M 34 carry food to it. It is still possible that a female is present.

M 32 and M 34 get into a fight at the sink hole, showing that they treat each other belligerently; this was not the impression I got of the attitude of M 32 toward the Prairie Warbler first seen. The fight consists of a fluttering-up flight
of perhaps 20 feet, the two then dropping and one opening its bill at the other. M 32 flies quickly back and forth between the sink hole and the hillside to the south, never staying more than a minute in one place and often stopping in the field en route. He goes well east, to the ground-hog den. Later I see a young 34 in the high trees at the south edge of the field; M 34 carries food to it, so this brood seems to be moving off its territory. This may mean there is no second brood, or perhaps M 34 will return to T 34.

T 34 - No activity or sound here. See under T 32.

T 35 - M 35 sings.

T 37 - Silence.

0900 - I leave.
July 17, 1954

A hot dry day with the weather changing from that of the last two days. Present from 0900 to 1300 and from 1600 to 1930.

III S - Silence during 20 minutes.

T 31 - Silence.

T 30 - 30 F is at the nest, the young three days old. M 30 is silent.

T 34 - A Prairie Warbler sings a high skid, then switches to the harsh chatter song of M 32 and M 3h. I find the male at the valley between T 33 and T 34, follow him back north to T 32; so this is M 32. On T 34 again I hear a young bird calling and find one of the banded young 3h's and with it a second unbanded young bird in fuller immature plumage. The two stay together, so I'd guess both are 3h's; of this I can't be sure. Later the banded bird (or a second one) calls on T 33, the hillside, and M 32 comes up and chases it 15 yards. The young bird utters a loud squawk, that I can't describe except to say that it sounds like the regular fledgling note repeated many times and run together, all on a higher key. Three times in about 1½ minutes M 32 comes up when the fledgling begins to call, always chasing it (on T 33, note) and causing the squawk. After a few seconds' chase M 32 stops and hops around in or near the tree where the fledgling sits, calling helplessly (though it is full size and flies well).

Next I find a banded fledgling in the field south of the sink hole,
calling loudly; this is probably a different bird. M 32 sings intermittently, often keeping silent for 10 to 15 minutes, then singing either the high skid or the chatter. Most of the time he stays on the north hillside on T 33.

After two hours I find M 34 feeding one banded and the unbanded older looking immature on T 44 by the osage oranges. (I don't actually see the unbanded bird fed.) M 34 keeps silent, feeds very steadily. It seems sure that the 44's are gone, and M 32 does not seem to have a female.

T 32 - See above under T 44.

T 34 - See above under T 44. Nothing seen on T 34.

T 35 - M 35 sings; I don't go on the territory.

T 37 - In 30 minutes I see and hear nothing.

1300 - I leave.

A female Touhee is incubating a nest with two eggs on VIII. It is in the west woods, is 4 feet high in grape.  

1800 - I return.

T 36 - Silence as I pass through.

T 37 - Silence as I pass.

T 35 - M 35 sings his loud type-8.
T 31 - Silence.

T 32 - I spend almost all of my time here, keeping in the field. Twice a female flies into the field from the woods to the south, hops around out of sight in the blackberries, and goes back to the woods. She does not gather nest material, I'm nearly sure.

M 32 sings loud and frequently all over the territory, ranging from the west edge of the field (which he has ignored lately) to the sink hole and the east limits of T 33. He pays no attention to the female, never going near her, if he sees her. It seems possible that she will renest, although the fact that she didn't begin immediately at this late date makes it unlikely. M 32's behavior is surprising.

1930 - I leave.
A very hot sunny day, 103° at the highest. Present from 0830 to 1300.

III 5 - Silence. This male has left; he never did have a mate.

T 31 - Silence.

T 30 - 30 F is at the nest.

A Yellow-breasted Chat is incubating two eggs in a four-foot nest in a little elm.

T 44 - No sign of a Prairie Warbler in 20 minutes. The h'ls are surely not present.

T 32 - from 0915 to 1115 - M 32 is silent for all but two brief periods of a minute or so when he sings insipid and spiritless songs of about half volume from the high woods south of the blackberry field. I cover the field and the hillside thoroughly and see no other Prairie Warbler. Yesterday's female evidently has left.

T 34 - for 20 minutes - No sign of a Prairie Warbler in the south-west part, the white pines and surrounding areas.

T 35 - M 35 sings a loud type-3 step and as I come on the territory he flutters by me, beating his wings like a male in early May, and lands about five feet up in a dogwood beside me. Almost immediately I see a female moving along in the weeds and bushes.
a few yards away. For the next 25 minutes I watch as M 35 courts her, acting just like a male with a newly acquired mate at the beginning of the nest season. I.e., he flutters low from one low perch to another, all of them near her; watches and flies up to within a few yards of any place to which she flies; sings very irregularly but most of the time loudly (as opposed to the faint songs of nest building). She never follows him but pursues her very quiet and liesurely way over the low trees and shrubs eating a good deal.

My guess is that this female is the one I saw yesterday on T 32 and that M 32's lack of interest in her last evening may indicate that he is unable to go through the necessary sex behavior. If so the female may have moved on; it would also be an example of a male's determining the sexual success, while usually it seems to be the female that is unable to reach the threshold. I'll check tomorrow.

T 37 - Silence.

T 39 - Silence.

T 40 - Silence. I'm within earshot of this and the last territory for 20 minutes and hear nothing.

T 43 - I walk slowly over the territory but see and hear nothing.

T 41 - Silence as I pass.

1300 - I leave.
July 19, 1951

A hot overcast morning and a sunny afternoon after a thunderstorm last night; the storm was only moderate, without any really violent winds; temperature about ten degrees lower than yesterday. Present from 0630 to 0930.

T 37 - from 0630 to 0710 - A male sings an insipid step just south of the road and I follow him as he feeds slowly southeastward. His song is a little less than full volume (although this particular song pattern never sounds loud) and is slow, infrequent, and rather regular. He eats all food caught and gives no indication that he may have a nest of young. I think he is probably M 37.

T 34 - Silence and no activity.

T 35 - from 0725 to 0845 - M 35 sings a loud type-O as I come up and almost immediately I find him with the female. There is little to add to their behavior of yesterday: He flutters and flies up to her, evidently never letting her out of his sight. Every time I lose her I pick her up again by going to where he sings (most songs are loud, the timing is irregular). She remains in the general vicinity of the foxes' den but pays no attention to any one spot. Most of the time she hops quietly over small trees or goes to the ground. Once she seems to pick up some sort of bark or fiber but if so she drops it right away.

The most interesting event is the appearance of another male Prairie Warbler which M 35 twice drives off the territory. The first time the male appears near the female and M 35 immediately
flies right at him. The new male turns and flies high toward the north-east woods, M 35 right behind. The intruder utters a note I've never heard as he is chased, a long-continued whining, skid-like series of rapidly repeated call notes. That is, the notes are as close together as are the usual aggressive notes, but these are not harsh and they give the impression of a bird protesting or afraid. While the chase goes on the female continues to feed and calls once or twice, just as one does in spring during a territory fight. In a few seconds M 35 returns, and a minute later so does the other male. The chase is repeated, this time toward the north in the direction of the woods by the foxes' den. The same cry is uttered by the intruder as M 35 attacks him and all during the pursuit. Again M 35 quietly returns and follows the female. I leave with the assurance no nest has been begun but feeling it is a possibility that one will.

T 34 - See above under T 35. Female may have been 34 F.7

T 32 - Complete silence for 15 minutes.

T 34 - Silence.

T 30 - The nest is much tilted, probably by the rain, but it seems securely enough anchored. The young are in it and both adults visit it as I watch for a few minutes.

T 31 - Silence.

0930 - I leave.
July 20, 1954

A clear hot day with a thundershower in the evening; temperature in the 90's. Present from 0700 to 0930.

T 31 - Silence.

T 30 - The young are alive.

T 32 - Silence as I pass through.

T 34 - None of the family seen in 30 minutes here and on the fringes of T 35.

T 35 - M 35 sings a frequent high skid, a song almost never used by him, with only occasional type-3's. The songs are loud and he stays mostly high in the trees, a lot of the time in the locust grove back by the white pines at the edge of T 34. This type of behavior is very unlike that of the last two days; nothing to indicate the presence of a female. I spend 1½ hours walking over the territory and never see her.

T 37 - M 37 is still here but I see no sign that he is feeding nestlings.

0930 - I leave.

An Upland Plover flew up from the field behind the house when I went through it today.
July 21, 1954

A wet day with mild rain falling off and on throughout. Present from 1500 to 1830.

T 31 - Silence.

T 30 - The young are in the nest. As I walk away a female calls "tsu" about 45 yards from it and shows more alarm than I would expect. Soon a male joins her. Their behavior is so odd for the pair that I wait and watch them expecting to find young nearby. Soon the male comes up with food and then a second male, T 30, appears, also carrying food. He chases the stranger and once dives at the female. Now anxious to see what is happening, I search for young. Finally after 40 or more minutes I see a juvenile about 3/4 grown and in gray-brown plumage sitting three feet up in a little tree. To my surprise it is one of the young 36's. T 36 hasn't been disturbed by the golf course work since well before these birds left the nest so it's odd that they'd move off the territory when the young are only 22 days old; note that the family unit is being maintained despite a move of 2-300 hundred yards.

T 36 - See above under T 30.

T 44 - Silence.

T 32 - Silence.
T 34 - In all my time on T 35 I see and hear nothing of the 3h's, nor do I
during 15 or 30 minutes on this territory.

T 35 - M 35 is courting the female again today. For 1½ hours I watch them
as they behave as usual, i.e., she feeds quietly along, he fol-
loows, flutters, or sits in a low tree and watches her intently.
She moves all over the west half of the territory and out into
the field south of it. Whenever I lose her I wait for him to
begin his type-3 (no skids today) again and find her near him.
Singing is irregular, tending to come in bursts of frequent songs
for a minute or so followed by silent periods. All are loud.
Before I leave, the two are in the south-west corner of the
territory near the white pines and locusts. Clearly the female
is not building.

T 37 - M 37 sings a high insipid step. I hear young calling and find the
fledgling 38 being fed by 38 F by the big hawthorn thicket.
M 37 dives at 38 F once and chases her a few feet but other than
that I see no indication that the presence of all the other
Prairie Warblers bothers him. He is moulting and looks pretty
shoddy.

1830 - I leave.

All species that nest in my area are still singing, although
it may an atypical day on which to judge; rain at this time seems to
stimulate song.
July 22, 1934

Hot sunny day. Present from 0700 to 0930 and from 1700 to 1900.

T 31 - Silence.

T 30 - The young are alive.

T 32 - Silence.

T 35 - Shortly after I arrive I see the female just east of the easternmost locust grove. M 35 is singing his usual type-B in the big trees at the foxes' den, then comes over near the female and seems clearly to be aware of her. She picks up some object from near the ground and flies up a few feet. As she starts off again he flies at her and I lose them in what may be a chase and is surely a speeded up flight. I have the feeling she goes north, i.e., into the nature woods. It is just conceivable she carries food, in which case she may be 34 F. I wait around for another hour but never see her again. M 35 sings over the territory, not near her so far as I can tell. I walk slowly over the territory without luck.

An adult Blue-winged Warbler is feeding in the locusts; and a few minutes later I see a Black and White. Obviously the locally nesting warblers have begun to move off their breeding grounds.

T 37 - Silence and no sign of a Prairie Warbler.

0900 - I leave.
1700 - I return to work over T 35.

T 35 - M 35 is again singing in the fox den trees and the female is hopping quietly about below him. For 15 minutes (or perhaps a little less) I watch her. After 10 minutes she catches a large brown caterpillar in the weeds and flies into a little tree with it. Instead of beating it on a limb there as I expect her to do, she keeps on carrying it and hops about in the trees. In a few minutes she flies north again as she did this morning. It now seems very likely to me that this female is 3h F, that her nest is across the strip of woods and on X, and that all week M 35 has been trying to court a female that enters his territory to find food for young of a second brood nest. So the probable reason that he courted her when she first appeared is that he had just lost his mate. I'll check this by searching X for the 3h's. Did M 35 chase M 3h on July 19?

Another hour's scouring all of T 35 reveals nothing. M 35 sings over the entire territory.

T 3h - The young of the first brood are back calling noisily near the first and unsuccessful nest. There are at least two. The unbanded one that several days ago seemed much farther along in its plumage now seems no more advanced; presumably the other has caught up. M 3h is not with them and they move along together feeding themselves. Their reappearance and M 3h's emancipation of them both suggest a second brood here.

1900 - I leave.
Note: An immature Prairie Wartler in the gray-headed but otherwise full immature plumage appeared in our back yard today at noon. It was unbanded. This plus other signs noted in the last five days all point to the fact that for many pairs the nesting season is completely over and all territorial bonds have been broken.
July 23, 1954

A sunny hot morning. Present from 0730 to 0900.

T 31 - Silence.

T 30 - The young are still alive.

T 32 - Silence.

T 35 - for 30 minutes - M 35 sings his regular loud type-3 step. I walk over the territory without seeing a female.

T 34 - I go on to X and sit down to rest by the ravine a few yards away from the warbler habitat. In a minute a male flies into a tree near me, carrying food. He then goes to a little dogwood some 15 yards away, at the edge of the field habitat. In 30 seconds he reappears without food and begins to gather more. When he returns to the dogwood and then leaves I go to inspect. There is a nest, the 34's second brood. It is 10 feet up, against a fork on an outer upright branch of a 16-foot tree. I pull the limb down and find the nest full of young. I can feel that they are feathered and that there are four of them. The nest must have been begun about a week after the first brood left their nest. I haven't time to stay to watch.

On the usual territory are at least two young of the first brood, calling noisily and following each other around. Both are in nearly full immature plumage. Note that M 34 fed this brood until a few days ago, went with them off the territory, and that while they have now returned M 34 devotes himself to the
new nestlings.

T 37 - M 37 sings a few very faint steps on the territory. He is molting a great deal and has been all week; today though he looks extremely frowzy. No sign of female or young in ten minutes.

0500 - I leave.
July 24, 1954

Another hot clear day. Present with Paul Davis from 0800 to 1200.

T 31 - Nothing seen or heard.

T 30 - The four young have fledged when we arrived at 0830. Both adults are feeding them, two. 35 yards south-east of the nest, one 20 yards north, one still in the nest tree. Both put on extravagant distraction display in all respects typical. We catch and band two young, yellow over silver right leg. The number are: 21-62036 21-62037.

I notice that these young Prairie Warblers bob their tails like adults when I come close to them and before flying to escape from me (which both tried to do). Of course the movement is barely noticeable since the tail feathers are only about 1/8-inch long.

T 32 - M 32 is here today singing a faint skid on the north slope of the hill sides. I follow him for 20 minutes but see nothing of note.

T 35 - M 35 is singing.

T 34 - The young are still in the nest, so they won't fledge today.

T 37 - from 0945 to 1100 - We cover the territory many times looking for a second brood nest, but without seeing even M 37.

M 38 is feeding at least two young in the tree row about half way between the road and T 36. Once I see a female by the
tree row. Almost surely she is 38 F since she was here earlier in the week; but I'll continue to check.

Cardinal's nest, seven feet high in an elm covered with grape; two young about five to seven days old.

I caused two Field Sparrow nestlings about eight days old to leave the nest when I reached into it. It was 7\(\frac{1}{2}\) feet high in an elm; there were no other young.

T 38 - See above under T 37.

T 39 - Silence.

T 40 - We walk over the territory carefully but see and hear nothing.

T 43 - Nothing during a 20 minute search.

1200 - We leave.

A Cardinal began to build a nest in our yard today.
July 25, 1954

Another hot day, over 100° in the afternoon. Present from 0930 to 1300 with Gordon Thurow.

T 31 - Silence as we pass.
T 30 - Silence. We make no effort to find the young.
T 32 - Silence.
T 35 - Silence.
T 34 - The young are still in the nest. I pull the branch down and feel four in it.
T 37 - from 1015 to 1200 - We go over the territory with the greatest care and find only M 38 and two or three of his young following him about, begging and being fed. I now feel reasonably sure the 37's are gone.
T 38 - See above under T 37.
T 39 and T 40 - We walk slowly over the territories and sit between them without seeing anything.
T 43 - Nothing during 25 minutes of walking and sitting and listening.

1300 - We leave.
July 26, 1954

A very hot day. Present from 0900 to 1000.

T 3h - The young have left the nest. One of the adults gives the usual alarm note "tsu" in the woods between V and X, but I haven't time to look for the young. It is too late for banding to be useful. To my surprise the nest contains a Cowbird egg with a dead embryo about three days away from hatching. This is the second instance I've found where a Cowbird probably did not remove a host egg. (It is highly unlikely that a second brood, laid about July 1, would have consisted of five eggs.)

T 37 - No Prairie Warblers in a few minutes as I pass.

1000 - I leave.
July 27, 1954

Hot. Present from 1700 to 1900.

T 37 - for one hour - No sign or sound of a Prairie Warbler.

T 39, T 40 and T 43 - Nothing seen or heard.

1900 - I leave.
July 28, 1954

Hot. Present from 1700 to 1800.

T43 - No warblers.

1800 - I leave.
July 29, 1954

Still hot and now terribly dry (has been for several weeks).
Present from 1800 to 1930.

T 39, T 40 and T 43 - No warblers. Note no song has been heard since July 24.
All other nesting species are singing, but only very little.

A Broad-winged Hawk in full immature plumage is giving frequent adult calls over the territories.

1930 - I leave.
July 30, 1954

Hot. Present from 1830 to 2015.

T 37 for 40 minutes - Silence; no warblers seen.

T 38 - I walk carefully over the valley (old T 8) and then the maple grove to the west. Nothing seen.

2015 - I leave at dusk.
July 31, 1954

Clear, but a little cooler. Present from 0915 to 1115.

T 36 - Nothing.

T 37 - Nothing.

T 38 - A female Goldfinch is on a nest 19 feet high in a 25 foot maple sapling.

T 39, T 40, and T 43 for 75 minutes - No sign of a Prairie Warbler. I'm now convinced that there is nothing more to learn on this end of the area.

1115 - I leave.
August 1, 1954

A cloudy day, a good deal cooler, with a heavy rain in the evening. Present from 1100 to 1330.

T 31 - As I come on to III S I hear the alarm note of an adult Prairie Warbler with young. A female hops nervously about in a thicket on the south edge of the field and I watch her for 25 minutes, becoming surer and surer that she is tending young. Finally I get an idea where they are and go forward to look for them. I see the first, a bird without a tail and only a shade larger than the nestling on the day it leaves the nest; the head and bill are the only perceptibly larger parts of the body (something I'd not noticed before). I would say it left the nest no longer ago than four days, i.e., on July 29. In all I find three young; they show great reluctance to fly and let me get within about seven feet of them (only one ever does fly). The female once displays when I squeak. Only after I've been here an hour does the male come up. Unlike the female, he is molting. He hops about me only three or four feet away at times, so he does show concern at my presence.

These birds look like and can only be the 31's, and this is a second brood. The nest must have been begun about July 1, probably in the tree row between III and III S. I'm sure there are three young and would say from the thorough search I make that there are only three. I'll search for the nest later. (Found it after the leaves fell.)
T 30 - 30 F feeds an unbanded and later a banded young about 50 yards from the nest. They are noticeably bigger than the young 31's (perhaps 2/3 full-size) and fly readily when I approach. No sign of M 30.

All species are singing today except Prairie Warbler.

1330 - I leave.
August 2, 1954

I miss my first day on the area since April 10, 1954.
August 3, 1931

The weather continues rainy, with many sunny intervals; a very heavy rain at about 23:15 today. Present from 13:00 to 14:30.

T 31 - I search without luck for the 31's nest; no sign of the birds.

Bachman's Sparrow, Yellow-throat, all others but Chat still singing.

A Cardinal's nest with three warm eggs, six feet up in an elm-grape tangle on III 3.

14:30 - I leave.
August 6, 1954

An immature Prairie Warbler came into our back yard today. MB
August 7, 1954

A sunny morning after much rain all week. Present with Paul Davis from 0830 to 1130.

III - from 0930 to 1015 - We count trees. M 30 feeds a well grown banded young south of the little woods and near the second nest site. M 30 is very active, makes many trips. The young bird stays in a grape thicket, about three to five feet high, calls only once, when M 30 approaches. This is a good fact on the duration of the period of caring for late hatched young.

The rest of the day we search for arrow heads.

1130 - We leave.
August 8, 1951

Very wet rainy day. Present from 1330 to 11:00, counting trees on III till the heavy rain sent me in.
August 11, 1954:

Sunny morning. Present from 0800 to 0930.

III - M 30 and 30 F are feeding their young on the middle of the area, a little south of the projecting woods. There are at least two young, probably three or more. M 30 is very noisy, calling frequently. He ranges over III to the little woods but is attentive to the fledglings. This is excellent information about the family bond.

I find a skunk's skull (later verified) on III; this is a mammal I've never seen here.

A ground hog is in the cut between III and VII.

0930 - I leave.
I made trips to the area to count trees, summarize habitats, measure nest heights, take pictures, etc., on September 15, 17, 24, 26, 30; October 17, 30; November 3, 7, 9, 27. Paul Davis and Duane Carmony frequently accompanied me; Davis did a great deal to help in the tree counts.

Of the few odd details observed, the following are noteworthy:

September 15, saw an adult male Prairie Warbler in the northeast part of III.

September 15, a female Bob-white had her brood on III S; presumably she nested there or on III.

September 26, saw deer tracks on the area for the first time in three years' intensive work.
September 26, 1951

Present from 1115 (CST as of last night) with Duane Carmony, taking photographs of habitat extremes, not typical fields. My plan is to get pictures especially of open fields, thickets, tree rows, and other heavy cover.

We took the following shots:

1. III S, from the south-west corner facing east-north-east. It is 233/4 yards to the hickory in the foreground.

2. III S from the center facing east-north-east. It is 30 yards to the sassafras with the brushy top in the center of the picture. Tree row in the background.

3. III from the south and facing due east into the south-east corner. The cedar is 17 yards; thicket is shown.

4. III from the cedar in three above, facing east into the south-east corner. Background tree row is about 120 yards distant.

5. III at the north end just east of the little woods, facing due west and showing a grove of 25-foot sassafras trees about 35 yards away.

6. II from the road a few yards north of the dynamite shed, north-north-east across the meadow. Trees are about 40 yards distant and picture shows their density.
7. II from the road, facing north. The cherry to the right of the road is 25 yards away.

8. II from the road, facing north-east. Shows varying tree heights, goldenrod, etc.

9. Orchard from about 25 yards in from the gate on the track, facing east down the track.

10. Orchard road, facing due east through the trunks of 25-to 40-foot elms and walnuts (mostly the latter). Shows the light nature of the woods; a little more shade in mid-summer.

11. Orchard road near the valley, facing east-south-east to the rock outcrop 40 yards away at the head of the wooded ravine.

12. Blackberry field near 32 F's nest three, facing north-east. At the right are the sink hole trees 120 yards away.

13. Blackberry field at the center of the south edge, facing east and showing the north edge of the woods in the orchard.

14. Exactly as in 13, but facing east-north-east.

15. Blackberry field in the very center facing east-north-east across shallow sink hole filled with goldenrod and blackberries.

16. V just east of the Virginia pines, facing east-south-east to the locusts, which the picture is taken to show. Locusts are 20 to 25 feet high, 23 yards away.
17. I just south-west of the road, facing north-east onto IV S just south-east of the wooded valley (toward the 1952 Bob-white's nest). Prairie Warblers use all the big trees shown.

18. T 41, south of the road, from just below the wire at the west edge of the broom sedge strip, facing north-east through the walnut planting. The picture is to show these 10- to 20-foot trees, 10 yards distant; more foliage in mid-summer.

19. T 41, south of the road, from the broom sedge strip, facing east-north-east into the walnut planting. Large-leaved trees are paw paws; 41 F's third nest tree is among them, an elm 15 yards distant.

20. About 30 yards north of the spot from which 19 was taken, facing north-north-east into the walnut planting; taken to show the planting.

21. On the north road at the west edge of the broom sedge strip, facing east-north-east onto T 41.
APPENDICES
APPENDIX I

REPRODUCTIVE SUCCESS BY PAIRS

Pair 30

Nests complete - 3
Nests incomplete - 1
Nests successful - 1
Eggs per clutch - 4, 4, 4 Total - 12 eggs
Young fledged - 4
Stage at failure - 1: egg
  2: probably young
Total: 4 eggs, 4 young
Cause of failure - 1: unknown; partially destroyed
  2: unknown
Cowbird parasitism: 0 in 3 known

Pair 31

Nests complete - 2
Nests incomplete - 1
Nests successful - 2
Eggs per clutch - 4, (3) Total - 7 eggs
Young fledged - 7
Stage at failure - None
Cause of failure - None
Cowbird parasitism - 0 in 2 known
Pair 32

Nests complete - 4
Nests incomplete - 0
Nests successful - 0
Eggs per clutch - 1, 4, 3, 4  Total - 15 eggs
Young fledged - 0
Stage at failure - 1: egg
   2: egg
   3: egg
   4: young
   Total: 11 eggs, 4 young
Cause of failure - 1: unknown; broken egg below
   2: storm
   3: unknown
   4: unknown
Cowbird parasitism - 1 in 4 known
Cowbird eggs per nest - 1: 1

Pair 33

Nests complete - 1
Nests incomplete - 0
Nests successful - 0
Eggs per clutch - (4)  Total - 4 eggs
Young fledged - 0
Stage at failure - 1: egg
   Total: 4 eggs
Cause of failure - 1: unknown, nest demolished
Cowbird parasitism - unknown
Pair 34
Nests complete - 3
Nests incomplete - 0
Nests successful - 2
Eggs per clutch - (4), 4, 4  Total: 12 eggs
Young fledged - 8
Stage at failure - 1: egg
Total: 4 egg
Cause of failure - 1: unknown; 1 egg gone
Cowbird parasitism - 2 in 3 known
Cowbird eggs per nest - 1: 1; 3: 1

Pair 35
Nests complete - 5
Nests incomplete - 2
Nests successful - 0
Eggs per clutch - 3, 4, (4), (4), (5) Total: 18 eggs
Young fledged - 0
Stage at failure - 1: probably 1 egg, 2 young (plus Cowbird)
2: egg
3: egg
4: egg
5: egg
Total: 16 eggs, 2 young
Cause of failure - 1: unknown
2: unknown; 1 egg lost early
3: unknown
4: unknown
5: unknown
Cowbird parasitism - 1 in 2 known
Cowbird eggs per nest - 1: 1
Pair 36

Nests complete - 2
Nests incomplete - 0
Nests successful - 1
Eggs per clutch - 4, 4 Total: 8 eggs
Young fledged - 3
Stage at failure - 1: young
(2: 1 young gone)
Total: 5 young
Cause of failure - 1: unknown, nest demolished
Cowbird parasitism - 0 in 2 known

Pair 37

Nests complete - 1
Nests incomplete - 2
Nests successful - 1
Eggs per clutch - 4 Total: 4 eggs
Young fledged - 4
Stage at failure - None
Cause of failure - None
Cowbird parasitism - 0 in 1 known

Pair 38

Nests complete - 4
Nests incomplete - 0
Nests successful - 1
Eggs per clutch - 4, (4), 4, 4 Total: 16 eggs
Young fledged - 4
Stage at failure - 1: egg
2: egg
3: egg
Total: 12 egg
Cause of failure - 1: unknown; 1 egg gone
2: unknown
3: unknown
Cowbird parasitism - 0 in 3 known
### Pair 39

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<tr>
<td>Eggs per clutch</td>
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<tr>
<td>Young fledged</td>
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<td>Stage at failure</td>
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<tr>
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### Pair 40

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<td>Young fledged</td>
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<tr>
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<tr>
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<tr>
<td>Cowbird parasitism</td>
<td>0 in 1 known</td>
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</table>
Pair 41

Nests complete - 3
Nests incomplete - 0
Nests successful - 1
Eggs per clutch - (4), 2, (4) Total: 10 eggs
Young fledged - 1 PW, 1 Cowbird
Stage at failure - 1: egg
2: laying
(3: young starve)
Total: 6 egg, 3 young
Cause of failure - 1: unknown
2: unknown
Cowbird parasitism - 2 in 2 known
Cowbird eggs per nest - 2: 1 (laid after nest failed); 3: 1

Pair 42

Nests complete - 2
Nests incomplete - 0
Nests successful - 0
Eggs per nest - (4), (4) Total: 8 eggs
Young fledged - 0
Stage at failure - 1: egg
2: egg
Total: 8 eggs
Cause of failure - 1: unknown
2: unknown
Cowbird parasitism - Unknown
Pair 43

Nests complete - probably 2 or 3
Nests incomplete - unknown
Nests successful - 1
Eggs per clutch - 3, - , -  Total: 7-11 eggs
Young fledged - 2
Stage at failure - (known nest: 1 young)
Cause of failure - unknown
Cowbird parasitism - 0 in 1 known

Pair 44

Nests complete - 2
Nests incomplete - 1
Nests successful - 0
Eggs per clutch - 4, (2)  Total: 6 eggs
Young fledged - 0
Stage at failure - 1: egg
2: laying
Total: 6 egg
Cause of failure - 1: unknown, nest demolished
2: unknown
Cowbird parasitism - 0 in 1 known

Pair 45

Probably no nests
Pair 46

Nests complete - probably 2 or 3
Nests incomplete - unknown
Nests successful - 0
Eggs per clutch - (4) Total: 4-12 eggs
Young fledged - 0
Stage at failure - Known nest: Young Total: known 4 young
Cause of failure - unknown
Cowbird parasitism - unknown
APPENDIX II

SUMMARY OF REPRODUCTIVE SUCCESS

Data on pairs 43, 45, and 46 are too incomplete to be used in these computations and are therefore omitted. The remaining 14 pairs are called "pairs studied."

Nests:

Nests complete - 39
Nests incomplete - 9
Nests successful - 9
Nests complete per pair studied - 2.78
Nests successful per pair studied - .64
Nests complete per female studied - 2.78
Nests successful per female studied - .64
Nests successful of total complete - 1 in 4.33 or .230, or .23.07%

Pairs:

Pairs successful once - 5
Pairs successful twice - 2
Pairs unsuccessful - 7, or 50%

Eggs:

Eggs laid, total - 144
Egg failures, egg stage - 79, or 54.96%
Egg failures, nestling stage - 34, or 23.33%
Eggs successful - 31, or 21.52%
Eggs per pair studied - 10.28
Eggs per female studied - 10.28
Egg sets known to contain 5 - 0
Egg sets known to contain 4 - 17
Egg sets known to contain 3 - 3
Average size of known set - 3.85
Incomplete sets - 2 of 2 eggs, 1 of 1 egg, or potentially 7 eggs
Potential egg total - 151

Fledglings:

Fledglings, total - 31
Fledglings per pair 2.21
Fledglings per female - 2.21
Fledglings per adult - 1.10
Fledglings per egg laid - .215
Fledglings per nest completed - .794
Fledglings per nest successful - 3.44
Fledglings as to size of brood - 1 of 1 (plus Cowbird), 2 of 3, 6 of 4
Fledglings per brood, average - 3.44
Of broods successful, number and percent totally
so - 7, or 77.77%
Of broods successful, number and percent losing 1
egg or nestling - 1, or 11.11%
Of broods successful, number and percent losing 3
eggs or nestlings - 1, or 11.11%
Broods totally successful per nest completed -
.179, or 17.94%

Cowbirds:

Total nests of which Cowbird status is known - 24
Total nests parasitized - 6, or 1 in 4.0, or 25.00%
(using 24 as my base)
Parasitism where known, according to succession of
nests -
  First nests parasitized: 3; unparasitized: 8
  Second nests parasitized: 1; unparasitized: 6
  Third nests parasitized: 2; unparasitized: 3
  Fourth nests parasitized: 0; unparasitized: 2
Parasitism by more than 1 female - 0
Total number of Cowbird eggs - 6
Warbler eggs removed per Cowbird egg laid:
  Egg for egg - 3
  2 PW eggs for 1 Cowbird egg - 0
  0 PW eggs for 1 Cowbird egg - 1
  unknown - 1
  other - 1 (egg laid after nest failure)
Effect of parasitism on PWs:
 Failures directly due to Cowbirds - 0 nests;
  3 young died in successful nest, and 3
died in nest later destroyed by predator.
 Failures after but unrelated to parasitism -
  4 nests with 7 PW eggs or young (exclud-
ing PW losses due to Cowbirds' egg re-
movals or to starvation)
 Other - 1 Cowbird egg laid in nest already
failed
Cowbird success - 1 in 6 eggs, 6 nests
Egg failures as eggs - 4, or 66.6%
Egg failures as nestlings - 1, or 16.6%
Cowbird egg failures due to self-imposed risks:
Abandoned - 0
Laid too late - 1
APPENDIX III

NEST SITES, BY PAIRS

Pair 30 -

Nest 1: In a 7 1/2-foot white elm, which is 27 yards due S of the N tree row, 19 yards E of the E edge of the projecting woods. The tree stands, unshaded, with another elm the same size among blackberries and goldenrod. The nest is 43 inches high, in a vertical 3-way fork of 1 of 3 main leaders, the SE one. Thus the nest is on the SE side of the tree in full sun except as the leaves and foliage of the nest tree shade it. Concealment medium.

Nest fragment: In an 8 1/2-foot white elm, which is 20 yards due S of the S edge of the projecting woods, 62 yards due E of the big woods W of III. The tree stands alone among broomsedge and smooth sumac. The nest fragment, just a beginning, is 46 inches high in the vertical fork of a main side branch on the NW side of the tree, partly shaded by nest tree's foliage. Concealment medium.

Nest 2: In a 12-foot redbud which is 40 yards due N of the fence line at the S end of III, 77 yards W of the E fence of III, The tree is surrounded by other redbuds the same size or smaller, with a 20-foot elm to the W giving some shade late in the day. The nest is 8 feet 5 inches high, on top of a diagonal limb at a point where 2 smaller branches diverge within 2 inches of each other and also where Virginia creeper crawls over the top of the nest limb. The nest limb is on the N side of the tree, angling N. The nest is thus well shaded except from sun directly overhead. Concealment good except possibly from the N and from below.

Nest 3 (successful): In an 18-foot black cherry which is 43 yards due SE of nest 1. It stands from 5 to 10 yards from similar-size trees to the W, S, and SE, but alone enough to get full summer sun. The nest is 13 feet 8 inches high, against a main leader on the E side of the tree.
Grape vine crosses and touches this limb, and the nest is in the "fork" provided by the tree and vine. It is shaded only partially, by the nest tree and the grape. Concealment medium.

Pair 31:

Nest fragment: In a 4½-foot white elm which is 137 yards N of the S tree row, 45 yards E of the woods. The tree stands alone, unshaded among broom-sedge. The nest is 15 inches high in a vertical fork of the main leader, thus below and in the center of the tree, which would shade it lightly. The nest was not quite completed. Concealment medium.

Nest 1 (successful): In a 16-foot white elm, which is 59 yards from the fragment and 2 degrees W of N of it (29F had a successful nest in the tree in 1953). The tree is at the NE edge of a brushy thicket of blackberries, scrubby elms, 2 black locusts; it is shaded from the S. The nest is 9 feet 11 inches high, on the S side of the main leader, which is 1¾ inches thick at that point; the nest support comes from 2 or 3 little 10-inch branches coming from the leader. Shade would be furnished by a locust to the S and by the nest tree itself, but when directly overhead the sun would hit it. Concealment good.

Nest 2 (successful, second brood): In an 18-foot white elm, which is 12 yards W of the fence which bounds III S on the E, 20 yards S of the III - III S tree row. The tree stands 8 yards N of a 40-foot, fully rounded cherry, 4 yards S of a 16-foot elm. The tree forks 1 foot from the ground, has 2 main trunks. The nest is 9 feet 10 inches high on the N side of the N trunk, built in a crotch between a ½-inch elm branch and a grape vine. Virginia creeper also grows along the nest branch. Shade probably throughout the day, with the nest tree and vines sufficient to give most of it. Concealment good.
Pair 32 -

Nest 1: In a 4-foot blackberry cane which is 28 yards E of the fence between II and the field, and 31 yards N of the fence at the N edge of the orchard. The location is a medium dense stand of blackberries, with no trees nearby. The nest is 34 inches high, built against the main stem and supported by a side branch. It would be shaded by the surrounding blackberries, some of which are as much as 5 feet tall; but for 4 or 5 hours when the sun is overhead it would get little shelter. Concealment is moderate except from directly overhead.

Nest 2: In a blackberry cane about 4 feet in height, 28 yards N of the S fence and 55 yards E of the W fence. The nest plant stands in a brushy spot but not in a thicket, which was also true of nest 1. The nest is 18 inches high, built against a cane where a small branch forks off. It is well shaded by surrounding blackberries except for several hours when the sun is overhead. Concealment poor if a predator is within 3 or 4 feet, good against more distant animals.

Nest 3: In a blackberry plant about 4 feet high, which is 31 yards due E of the spot where the fence angles from due N to NE. The nest plant stands in a small and dense thicket, with some blackberries as much as 6 feet high. The nest is 28 inches high, built against the sides of 2 canes and supported by both but woven more tightly against 1 than the other. It would get shade most of the day, probably never getting direct and unimpeded sun. Concealment medium, but see above under nest 2.

Nest 4: In a 5-foot blackberry, 97 yards due E of the fence and 18 yards due N of the line between the orchard and the field. The nest plant stands on a hillside sloping S, among other blackberries but not in a thicket. The nest is 21 inches high, built solely against the vertical cane and without other support (and it tipped badly as the nest cycle advanced). It gets sun, probably always flickering through nearby blackberry leaves, for 4-5 hours at
mid-day.
Concealment - see nest 2.

Pair 33 -

Nest 1: In a scrubby 25-foot white elm which is 71 yards E of the meadow fence, 38 yards due N of a line projected E from the S edge of the meadow, i.e., the tree row on the N of III. The nest tree is surrounded by other trees of similar height, 5 yards or more away. The nest is 11 feet 3 inches high, built in a thick clump of Virginia creeper at the very tip of a dead stub 4 feet long and 1½ inches thick, projecting SE from the main trunk on a 45° angle from the vertical. The surrounding trees would admit sun for only a few hours a day and the creeper would always shade the nest. Concealment good, complete.

Pair 34 -

Nest 1: In a 6-foot white elm which is 33 yards S of the N fence on V, 2 feet W of the E line of the main N-S pine planting. The tree stands among pines at least twice as tall, but there are none to the E, where the open field is. The nest is 26 inches high, built in the fork of the main leader and of a ¾-inch branch angling up toward the SW; the body of the leafy part of the tree is overhead and the nest is not exposed to the SW. No full sun at any time; while the sun is in the east and till mid-day, some flickering sun. Concealment poor.

Nest 2 (successful): In a 2½-foot blackberry, 33 yards S of the S edge of the pines, 69 yards E of the SW corner of the pines. The nest plant is one of the northernmost among several plants but is not in a thicket and is near no trees. The nest is 15 inches high, built on the S side of the cane and unsupported (and drooping severely to the S). It receives flickering sun all day, perhaps direct sun at mid-day. Concealment good except to an animal very close at hand.
Nest 3 (successful, second brood): In a 16-foot flowering dogwood, on X and 102 yards due S of the road from a point 28 yards E of the E end of that part of X's clearing which is N of the road, or 79 yards W of the E end of that part of the X clearing S of the road. The tree stands 20 yards NW of a woods of 30-40 foot trees along a ravine through the mature woods; it rises above a number of 6-foot smooth sumacs and is 8 yards from a 20-foot dogwood to the NE. The nest is 8 feet 9 inches high, built 3 feet out from the trunk of a branch angling at 45° to the N side of the tree; it is in a fork of this branch and of 2 little 6-inch twigs. It receives little shade from surrounding trees, but since it is on the N side of the nest tree itself it gets no full sun. Concealment medium.

Pair 35 -

Nest fragment 1: In a 5-foot black locust 12 yards N of the S line of V and 25 yards E of a line projected due S from the pair's fifth nest (see below). The tree stands just beside the SE locust grove on V and is dwarfed by these 30-foot trees. The nest is 40 inches high, built against a small diagonal branch and at a fork where a still smaller branch leaves it. The nest is shaded till noon but is fully exposed to the W. It was never completed. Concealment poor.

Nest fragment 2: In a 4½-foot white elm 39 yards S of the N fence and 39 yards W of the E line of V. The few fibers are 35 inches high on the S side of the tree against a main branch.

Nest 1: In a 7-foot sugar maple 15 yards S of the N line and 106 yards W of the E line of V. The tree stands alone among blackberry canes and goldenrod but with 13-foot redbuds in an E-W line 5 yards to the S. The nest is 56 inches high, placed in a fork formed by the main trunk and a little diagonal branch on the E side of the tree. While there is no shelter from the sun except the foliage of the nest tree, the cavity gets no direct sun.
Concealment medium.

Nest 2: In an 8-foot flowering dogwood, 41 yards S of the N line and 35 yards E of nest 1. The tree is as high as most of the scattered scrub trees around it, except for a 15-foot cherry 5 yards E of it; it stands in a generally open field of broomsedge and goldenrod. The nest is 58 inches high, built in a 4-way vertical limb in the center of the tree; the limb looks like a stunted leader, surrounded by higher diagonal branches. The nest receives shade all day from its tree. Concealment poor since there is little foliage below the nest or even at its own height.

Nest 3: In a 35-foot flowering dogwood 23 yards N of the fence at the N line of V, 42 yards W of the E edge of V. The tree stands in the thick, mature woods, composed mostly of 30-foot, dogwood, redbud, ash, and some higher tulip and chinquapin oak. The nest is 31 feet high, therefore at or above the ceiling of the woods, built in a 3-way fork of the largest upright branch. The branch is covered with Virginia creeper sufficient to conceal the nest from every direction but above. Between 1000 and 1700 there would be flickering sunlight into the cavity. Grape grows thickly in the tree but not around the nest. Concealment good.

Nest 4: In a 40-foot honey locust on the S edge of the woods to the N of V and 151 yards W of the E corner of the area. The locust is surrounded by trees of the same size except to the S, where sun hits the trees. The nest is 22 feet high, built on top of a thin, waving, sagging branch 7 feet long and projecting W from the trunk 22 feet from the ground. Grape vine grows along this branch, and the nest is built on a slightly wide spot, on the branch and the vine, 4½ feet from the trunk. There is little leaf shelter near the nest, but the overhang of the woods keeps it in the shade. Concealment poor except for the unexpected location; when you look in the nest's direction it is very easily seen.
Nest 5: In a 15-foot flowering dogwood 64 yards N of the S line of V (the pines) and 168 yards E of the W end of the N-S pine planting. The tree stands alone, unshaded. The nest is 8 feet 6 inches high, built in an upright fork formed by a diagonal limb and 3 little branches coming from it. It is 2 feet (horizontally) from the center of the tree, on the N side. It therefore receives no direct sun in the cavity, but the outside gets sun in the late afternoon. Concealment medium. (The nest contains many feathers.)

Pair 36 -

Nest 1: In a 10-foot white elm 4 yards N of VII's N line, 40 yards W of VII's NE corner. The nest tree stands just E of the tree row, which here widens out to the W to form a woods; these trees are 50-40 feet high and overhang the nest tree. The nest is 73 inches high, placed where a branch leaving the elm's trunk and a Virginia creeper's numerous twigs provide a good location. The nest is not built on any special side of the tree; it probably receives very little sun, with no greater exposure during any particular part of the day. Concealment medium.

Nest 2 (successful): In a 15-foot white elm 40 yards from the N edge of VII and 21 yards W of nest 1. There are no trees nearby as high as the one the nest is in; the closest of the scattered smaller trees is 5 yards away. The nest is 8 feet 10 inches high, built on the W side of the trunk where a small diagonal branch forks off. It is shaded only by the nest tree's foliage, probably is in full sun from 1300 to 1500. Concealment poor.

Pair 37 -

Nest 1 (successful): In a 10-foot white elm used first by IF in 1952, later by 2AF in 1953. It stands in the open except that a crataegus of the same height is 1 foot to the S and 2 slightly smaller trees are 8 yards away. The nest
tree is thin and leans over northward toward the horizontal at a level of about 7 feet, to escape the crataegus growing so near it; Virginia creeper covers the tree and probably is also responsible for pulling it over. The nest is 82 inches high, in a fork of a small diagonal branch and supported by several strands of creeper. Foliage of the elm and the creeper would shade out the direct sun at all times.
Concealment good.

Nest fragment 1 (second brood): In an 11-foot sassafras 29 yards E of the tree row, 72 yards S of the center of the road where the tree row hits it. The tree stands among 6 others of the same species and height, with 30-foot trees 10 yards away to the E and W. The nest, a beginning only, is 86 inches high in one of the typical multiple forks of sassafras trees; the branch grows horizontally W for 7 inches, then forks in all directions with stiff upright and diagonal sticks. It is probably shaded from direct sun most of the day.
Concealment poor.

Nest fragment 2 (second brood): In a 14-foot sassafras 107 yards S of the center of the road at the tree row. The tree stands in a sassafras thicket in the tree row, sassafras all around it and tall trees overhanging. The nest, almost complete, is 11 feet 9 inches high, built in a fork of the main trunk and of a ¾-inch branch diverging to the S. It receives no direct sun at any hour, very little flickering sun.
Concealment poor.

Pair 38 -

Nest 1: In an 11-foot elm with 2 trunks, 21 yards due S of 3F's first nest in 1952 (see map). The tree stands alone, 10 yards from a 15-foot apple on the E and a 25-foot ash on the W; large cherries, 40 plus feet, are a little farther W. The nest is 6 feet 7 inches high, fixed to and between the 2 trunks; these are each 1 inch thick, their fork 4-5 feet below the nest. The tree's foliage is nearly all of it above the nest's
level; it would provide shade till late afternoon, when the shadows of the trees to the W would then do so.
Concealment poor because there is no foliage at the nest's level.

Nest 2: In a 23-foot white elm which is 71 yards from 3F's nest 1; the direction is 20° E of due S of the 1952 nest. The tree stands among many elms and redbuds of about the same height, each about 4-8 yards from the other. The location is the S hillside of the ridge. The nest is 10 feet 9 inches high, placed against the main trunk on the NW side of the tree and supported by a brushy, witch's broom-like cluster of 5-10 twigs growing from the main trunk; many similar clusters are on the trunk from a height of 3 to about 12 feet, where the true branches begin. Sun probably seldom hits the nest; the tree trunk shelters it (not the foliage) and 10 yards to the S is the thicker growth along the ravine.
Concealment poor if you stand on the N side of the tree, complete if on the S; by my standards and considering the probable predators, poor.

Nest 3: In a 16-foot flowering dogwood, 152 yards from a point in the center of the South E-W road, which point is 20° W of due S of the nest and 62 yards E of the valley as it crosses the road. The tree stands pretty much alone on the SE side of the ravine, i.e., across the ravine from nest 2 and on a slope; the ravine trees are 15 yards away. The nest is 8 feet 9 inches high in a 4-way upright fork of a diagonal branch from one of the tree's 3 multiple trunks; it is on the E side of the tree, with a few other branches reaching farther E. A little filtered sun touches the nest all day.
Concealment medium.

Nest 4: (successful): In a 10-foot white elm, 41 yards from 3F's nest 1 in 1952; for the direction, if you stand at the nest tree and turn a compass so that the needle points due N toward you, the angle to 3F's tree is 240°, i.e., that tree is to the SW. The nest tree is generally in the open except that a 14-foot elm and an 18-foot bushy dogwood grow 4 yards to the E.
The nest is 6 feet 2 inches high, built against and on the E side of the main trunks, on top of a little 12-inch branch which grows eastward. Virginia creeper grows thickly in the tree, dividing and branching near the nest and concealing and shading it. Flickering sunlight only, none after 1500. Concealment good.

Pair 39 -

Nest fragment 1: In a 5-foot scrubby white elm, 20 yards S of a point in the middle of the N road, which point is 39 yards E along the road from the fence corner. The tree stands alone in full sun on a S slope. The nest, incomplete, is 3 feet high, built in a 2-way upright fork on the SW side of the tree. It is in direct sun except for a little shade from the nest tree foliage. Concealment poor.

Nest fragment 2: In a 9-foot elm which is 50 yards from the E edge of the white pines, which is 30° W of due S. The tree is 5-15 yards from others which are 25 feet or higher, on all sides but the N; it is thus shaded till mid-morning and after 1600. It stands on the W side of a little ravine running S into the main valley. The nest tree is so covered by grape that it is bent nearly double, and it is 9 feet high in this bent-over position. The nest is 6 feet 2 inches high, saddled on the top of one of the 2 leaders where there are 2 grape vines (3/8 inch) running parallel with the leader. The nest is in full shade all day from its tree and the grape leaves. Concealment good.

Nest 1: In a 35-foot elm, 8 yards N of the ravine and immediately beside the SW side of the white pines. The pines are 40 plus feet, as are a cherry and a sycamore 15 yards to the W and SW. The nest is 30 feet high, built in a 2-way upright fork of a small branch in the top of the center of the tree. It receives only flickering sunlight, perhaps none after 1630. Concealment good so far as I can tell; perhaps a predator in the tree could see it better.
Nest 2: In a 25-foot sugar maple 7 yards W of the E edge of the maple planting; 11 yards N of the ravine. A 19-foot maple is 4 yards to the E, other trees are to the S, and a big (50-foot) cherry and sycamore are SW about 20 yards. The nest is 15 feet 7 inches high on the N side of the tree, built in an upright fork. From its own and the nearby trees it gets good shade after 1300, flickering shade until then. Concealment medium.

Nest 3: In a 25-foot elm, 10 yards from fragment 2 and 4° E of SE of it. The tree stands on the W slope of the little ravine running into the main valley, at the NW edge of the trees, all about 25 feet, which fringe the ravine and valley. The nest is 23 feet high, placed in a 3-way upright fork of an upright branch toward the SW part of the tree. It receives much sun, probably directly for 3 hours after 1200. Concealment medium, by the many ends of branches nearby; perhaps more visible to an animal below it and in the tree.

Nest 1: In an 8-foot white elm 72 yards S of a point on the telephone wire, which is 166 yards E along the wire from the fence corner. The tree stands on the E side of the N-S ravine running into the valley, about 15 yards from scattered 30-foot trees to the E and 4 yards NE of a 25-foot elm. The nest is 70 inches high, built against a 3/8-inch diagonal branch in the center of the trees and in a fork formed by the branching of a limb of the same size; additional support comes from 1/8-inch twigs. The nest tree would always give flickering shade, the surrounding trees heavier shade early and late in the day. Concealment medium.

Nest 2: In a 30-foot white elm 28 yards due N of nest 1. The tree stands above a few scrub elms on its W, is 4 yards W of a 35-foot ash. The nest is 21 feet high, saddled on a main
branch going W at a 45° angle from the vertical and cradled by twigs and the stub of a bigger branch coming off the main one at the point. Though there is much grape and creeper in the tree, neither grows on the nest branch. Very little shade after 0800; some direct sunlight hits the cavity. Concealment poor, except that like a gnatcatcher's nest, this one looks like part of the tree.

Nest 3: In a 22-foot sugar maple 47 yards S of the center of the road, 249 yards E along the road from the fence corner. The tree stands among others of the same species and size; sunlight still enters among these trees, 5-15 yards apart, but in a few years they would form a woods. The nest is 10 feet high, built in the upright fork formed by the branching of a main diagonal branch on the SE side of the tree, 2 feet horizontally from the trunk. Only flickering sun would reach it at any time, due both to the surrounding trees and the nest tree itself. Concealment medium.

Nest 4: In a 25-foot white elm 4 yards SW of nest 1's tree. The tree is higher than the few other surrounding trees, may get a little shade from those along the ravine to the E. The nest is 11 feet 1 inch high saddled on top of a large limb 45° off the vertical, going E from the trunk; support comes from a little twig of the limb and from 2 twigs of a Virginia creeper growing along the nest limb. The nest is 18 inches horizontally from the main trunk. It is lightly shaded in the morning, more heavily so in the afternoon. Concealment generally good, but with medium or poor concealment from above.

Pair 41 -

Nest 1: In a 25-foot apple tree, 26 yards N of the fence on the S edge of the little apple grove and 122 yards W of a line drawn W from the fence corner. The tree stands at the W edge of the dense orchard growth with a blackberry field on to the W. The nest is 11 feet high, built in a diagonal fork on the W side of the tree and also connected to a little branch from an entirely different limb.
It is sheltered on all sides by leaves, since it is not placed on the outer end of the branch; little or no sunlight reaches it. Concealment unusually good.

Nest 2: In a dead 4-foot smooth sumac, 138 yards W along the road from the fence corner and 6 yards N of the road (could also say 3 yards W of a line drawn S from nest 1). The sumac stands just beside 2 sassafras trees 5-7 feet high, the 3 trees being covered by Virginia creeper and forming a thick tangle which is on the N side of a thicket of 5- to 7-foot sassafras trees and grape; a 35-foot cherry 5 yards to the W overhangs, and a good many big trees are to the NE. The nest is 47 inches high placed on a ¼-inch dead sumac branch with creeper growing all over it and providing support for the nest. Very little if any sunlight reaches the spot. Concealment good.

Nest 3 (successful): In a 12-foot white elm, 9 yards E of the W row of the walnut planting and 29 yards S of the middle of the road at a point 138 yards W of the fence corner as you walk along the road. The tree stands in the walnut planting, is as tall as most of the walnuts nearby (they range from 6 to 20 feet). The nest is 8 feet high built in a 3-way upright fork on a diagonal branch of a diagonal branch from the trunk, on the WSW side of the tree. Moderate shade till 1600, then a little more sun but no direct rays. Concealment medium.

Pair 42 -

Nest 1: In a 14½-foot white elm, 19 yards N of the N edge of orchard, 25 yards W of the fence on the E of II. The tree is 4 feet from 2 or 3 other, smaller elms, with a big cherry close enough to the S to shade it somewhat. The nest is 10 feet 8 inches high, built on the top of a diagonal limb arching N almost to the horizontal; it is supported by a cluster of little twigs of Virginia creeper, each about 2 inches long. The vine covers the nest limb, and festoons down from it. The sun would never shine.
on the nest, except for a few occasional rays. Concealment good.
(The tree is probably 20F's first nest site, 1953.)

Nest 2: In a 36-foot white elm, 24 yards E of the center line of the N-S road, 31 yards N of the N edge of the meadow. The tree stands among cherries about its size, 5-15 yards distant to the E and S. The nest is 31 feet high, built in the upright fork of a diagonal branch ¾ inch thick, where 2 smaller (¼- and ⅛-inch) branches leave it. It is on the W side of the tree, shaded by the E branches till about 1100, then in flickering sun the rest of the day (possibly direct sun in the late afternoon). Concealment medium.

Pair 43 -

Nest 1 (successful): In a 6½-foot white elm, 169 yards N of the center of the road at a point 177 yards E along the road from the fence corner. The tree stands on the W edge of a blackberry field with a few little (2- 15-foot) elms and cherries. Near it are rather large and dense blackberries, 2 yards westward is a very recently abandoned corn field. The nest is 3 feet high, built in the vertical fork of a small diagonal branch to the E. The nest tilts, gets direct sun in the early morning, flickering shade from the nest tree during the rest of the day. Concealment medium.

Nest 2: In a 16-foot white elm 44 yards E of the fence and 160 yards N of the north E-W road. The tree is 5 yards S of a 25-foot honey locust and 5 yards NE of a 14-foot redbud. The nest is 14 feet high in an upright fork of 1 of the tree's 2 leaders; it is on the WSW side of the tree. After early morning it would get full sun except that the foliage of the nest tree probably furnishes flickering shade except at mid-day. Concealment medium.
Pair 44 –

Nest fragment: In a 45-foot white elm, 58 yards N of the E-W fence on the S edge of T44 and 79 yards W of where that fence turns to the S. The nest, just at beginning, was 30 feet high, built on top of a diagonal limb on the W side of the tree, in a fork formed by the branching of smaller (¼- to ½-inch) limbs. Only the foliage of the nest tree shaded the nest, so it would always have been in some sun after mid-morning. Concealment poor.

Nest 1: In a 13½-foot white elm, 36 yards S of the fragment and 5 yards W of it. The scrubby thin tree stands alone among goldenrod. The nest is 6 feet 7 inches high, in a vertical fork formed by the main trunk and a ½-inch branch to the W. The nest is thus fully exposed to the W and to the sun after 1430; before that hour it would be in some shade. Concealment poor.

Nest 2: In a 25-foot white elm, 23 yards E of the fragment described above and 56 yards N of it. The tree is alone except for a few walnuts, one-half its size, to the N. The nest is 12 feet 10 inches high in an upright fork of a diagonal limb going off toward the S. The nest is therefore on the SW side of the tree and exposed to the sun from 1600 on; it is probably pretty well shaded till that hour. Concealment medium.

Pair 46 –

Nest: In a 25-foot flowering dogwood, 29 yards N of 8F's nest 2 (1952, on map) and 19 yards E of the E edge of the maple planting; i.e., it is 33 yards from 8F's tree, which is 30° E of due S. The tree stands almost against an apple of the same size; the 2 are nearly alone on an eastward-sloping, open, broom sedge-covered hillside; 8 and 15 yards to the E are 18- and 30-foot cherries. The nest is 18 feet high, placed in an upright fork on the
SW side of the tree. No shade is provided except by the nest tree's foliage; direct sun must hit the cavity at mid-day. Concealment medium.

No other nest for this pair was found.
APPENDIX IV

SUMMARY OF NEST SITES

Nest trees and shrubs were selected by species as follows (excluding pairs 43, 45, and 46):

- white elm - 21
- flowering dogwood - 5
- blackberry - 5
- sugar maple - 3
- redbud - 1
- honey locust - 1
- black cherry - 1
- apple - 1
- smooth sumac - 1

If the excluded pairs are counted, the elm figure is 23, the dogwood 6.

Nest heights were as follows:

- median - 8 to 9 feet
- mean - 16.5 feet
- average - 10.33 feet
- mode in 2-foot units - 8 to 10 feet
**APPENDIX V**

**DISTRIBUTION OF NEST SUCCESSES BY HEIGHTS**

<table>
<thead>
<tr>
<th>Nest height</th>
<th>Successful</th>
<th>Failed</th>
<th>Total</th>
<th>Percent success per 5-foot units of height</th>
</tr>
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<tbody>
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<td>1 - 2 feet</td>
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<td>2</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>2 - 3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3 - 4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4 - 5</td>
<td>2</td>
<td>1</td>
<td>3</td>
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<td>5 - 6</td>
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<td>1</td>
<td>2</td>
<td></td>
</tr>
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<td>6 - 7</td>
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<td>7 - 8</td>
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<td></td>
</tr>
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<td>4</td>
<td>3</td>
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<td></td>
</tr>
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*Note: Nests of pairs 43 and 46 are excluded.*
APPENDIX VI

DISTRIBUTION OF NEST HEIGHTS AND NEST SUCCESSES BY PERIOD WHEN NEST WAS BUILT

At May, June, and July are each divided into thirds and each third is numbered successively from 1 to 9. April is numbered 0. Nests of pairs 43 and 46 are excluded.

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# A VI - 2

## Periods

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Pursuing the suggestion made on pp. 2-3 of Appendix V, 1952, average heights per period built were lumped together when they closely resembled each other. The nests whose heights yielded those averages were then tested for success.

Period 1 is treated separately; no success in 6 nests.

Periods 0, 3, 6 and 7 are lumped; 6 successes in 16 nests, or 37.5%.

Periods 2, 4, and 5 are grouped; 3 successes in 17 nests, or 17.64%.
## SUMMARY BY PAIRS OF HEIGHTS, SUCCESSES, PERIODS, PARASITIZATION

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<th>Success</th>
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<th>Period</th>
<th>Cowbird</th>
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Note - A nest found on June 27 was already out of use. It probably belonged to the l3's, but it is not included in the foregoing table because so little is known about it.
APPENDIX VII

NEST SUCCESSES CORRELATED WITH
DEGREE OF CONCEALMENT

See Appendix VI, 1952 for standards.

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<td>1</td>
</tr>
</tbody>
</table>

Percent of failure:

- Good 58.3
- Medium 83.3
- Poor 88.8

Of the total of 11 nests sheltered by or built in grape or virginia creeper, 7, or 63.6 failed.

Nests of pairs 43 and 46 aren't included in these figures.
APPENDIX VIII

TERRITORY SIZES

Territories shift at times, and utilized territories shift even within a defended territory of constant size.

T30 - 4.00 acres; UT 3 acres or less.
T31 - 2.75 acres; no difference in U.T. Defended territory shifted for second brood; addition excluded here.
T32 - 3.25 acres; UT smaller, with tendency of M32 to stay in high trees on periphery of territory.
T33 - 3.00 acres; about same UT. Figures exclude sink hole outpost used later.
T34 - 3.75 acres; UT 2.75 acres.
T35 - 5.50 acres; UT about 2.75 acres.
T36 - 5.00 acres; UT 3 acres or more.
Figures exclude outpost on II.
T37 - 3.50 acres; UT 2.7 acres.
T38 - 3.70 acres; UT 2 acres. Defended territory figure includes the extension S for nest 3, which perhaps ought to be excluded.
T39 - 2.30 acres; UT same.
T40 - 3.25 acres; UT perhaps 2.5 acres.
T41 - 6.00 acres; UT about 2.5 acres.
T42 - 2.85 acres; UT same. Good habitat in N part of II not used.
T43 - Not known.
T44 - 2.30 acres; UT same.
T45 - Situation too vague.
T46 - 2.50 acres; UT same.

Largest - 6.00 acres
Smallest - 2.30 acres
Mean size - 4.10 acres
Median size - 3.50 acres
Average size - 3.57 acres
Mode, to .25 acres - 3.50 to 3.75 acres

UT - always close to 2.50 acres
# APPENDIX IX

## RECORDS OF YOUNG BANDED

<table>
<thead>
<tr>
<th>Pair</th>
<th>Date</th>
<th>Number</th>
<th>Color bands</th>
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<tbody>
<tr>
<td>37</td>
<td>May 28</td>
<td>21-62024</td>
<td>ROS - R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62025</td>
<td>ROS - R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62026</td>
<td>ROS - R</td>
</tr>
<tr>
<td>43</td>
<td>June 12</td>
<td>21-62028</td>
<td>S - R</td>
</tr>
<tr>
<td>31</td>
<td>June 13</td>
<td>21-62029</td>
<td>SOG - L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62030</td>
<td>SOG - L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62031</td>
<td>SOG - L</td>
</tr>
<tr>
<td>34</td>
<td>June 21</td>
<td>21-62027</td>
<td>GOS - L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62032</td>
<td>GOS - L</td>
</tr>
<tr>
<td>36</td>
<td>July 9</td>
<td>21-62033</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62034</td>
<td>S</td>
</tr>
<tr>
<td>30</td>
<td>July 24</td>
<td>21-62036</td>
<td>YOS - R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21-62037</td>
<td>YOS - R</td>
</tr>
</tbody>
</table>
APPENDIX X

HABITAT DESCRIPTIONS, BY AREAS

The following information consists of exact tree counts, by both species and heights, of several different areas, supplemented by general descriptions of the same areas. All other areas are then compared to those studied in detail. A separate Appendix, XII, contains detailed data regarding the grasses, herbaceous plants, and certain other plants collected on Area III.

The habitat data below were compiled in the fall of 1954 by Paul Davis and me. Our method was to walk together over all the areas, one man calling out the facts to be noted and the other recording. The order in which the areas are listed is explained by the fact that I selected III for most careful study, then certain others that seemed to differ from III. When I felt that I had valid information about all the different habitats, I made no further detailed studies and simply compared the remaining areas with those already examined.

III

Area III, because of its size and its lack of uniformity with regard to tree height and density, I divided into 3 parts. One part was all that lying west of the north-south dirt track; another, the much more heavily wooded part in the southeast corner lying east of the dirt track and extending north to about the north edge of the little woods; the last, the northeast part lying east of the track and north of the little woods. Details follow:

III west of track

General description: Quite open and little covered by trees of any size. Mature trees on the south (the east-west tree row) and the west (the mature woods). Perhaps 15% of the field itself shaded at noon and then only by smaller trees; about 25% shade along the western edge. Few thickets of any sort (2 of sumac and blackberries in the northwest corner); broom sedge the most conspicuous field cover.

Tree count by species (all were counted):
AX - 2

rebad - 426
sugar maple - 555
white elm - 811
flowering dogwood - 42
sassafras - 95
black walnut - 109
hackberry - 64
black locust - 8
black cherry - 117
red mulberry - 18
sycamore - 7
tulip - 18
apple - 11
persimmon - 10
red cedar - 26
white pine - 1
white ash - 11
pear - 8
pignut hickory - 34
shagbark hickory - 19
beech - 6
crataegus - 2
box elder - 24
red osier dogwood - 2
red elm - 10
wahoo - 1
peach - 1
prunus, probably Mahaleb - 2
smooth sumac - 149
shining sumac - 88

Tree heights (about half counted):

1-5 feet - 581 or 57%
6-10 feet - 259 or 25%
11-15 feet - 84 or 8%
16-20 feet - 36 or 3.5%
21-25 feet - 21 or 2%
26-30 feet - 12 or 1%
31-35 feet - 8 or .8%
36-40 feet - 4 or .4%
41 plus feet - 12 or 1%

(Percentages are approximate)

III Southeast corner

General description: Only 30% open; i.e., to reach ground from any point directly above this part of III a PW would have to penetrate tree cover, though the height and density of the cover usually would not be great. Compared to the part W of the track, much heavier growth of high herbs like goldenrod. Few blackberries. Woods over 40 feet high, typically hickory; edges densely grown up with vines like bittersweet. More sumac, almost no broom sedge. Used by PW's but not as much as rest of III.

Tree count by species (all counted except woods):

white elm - 91
flowering dogwood - 15
sugar maple - 65
sassafras - 259
rebad - 1120
hackberry - 60
black walnut - 51
red cedar - 6
black cherry - 104
silver maple - 1
box elder - 7
shining sumac - 73
red mulberry - 3
ash sp. - 14
Shagbark hickory - 3
beech - 5
crataegus - 1
pignut hickory - 22
(Weatherwax says "probably."
red maple - 1
smooth sumac - 1

III northeast part

General description: About 30% covered, as that term is used in connection with the southeast part. Much broomedge and over about 10% of the area thick blackberry. Three thickets. Several tall trees in the center of the field, e.g., the row of cherries so often sung from by PW's.

Tree count by species (all were counted):
redbud - 183
sassafras - 113 plus a grove of 1000 averaging 17 feet high.
sugar maple - 152
black elms - 240
flowering dogwood - 8
black cherry - 181
hackberry - 24
sycamore - 5
tulip - 2
smooth sumac - 266
shining sumac - 137
apple - 5
persimmon - 7
pignut hickory - 1
(Weatherwax: "probably.")
silver maple - 3
black walnut - 72
box elder - 17
red maple - 1
red mulberry - 6
red osier dogwood - 2
Kentucky coffee - 6
red cedar - 16
beech - 5
ash sp. - 62
Persimmon - 1
red elm - 1
black locust - 3
red maple - 4  
white pine - 2
wahoo - 10  
osage orange - 4
red elm - 5  
black gum - 1
crataegus spp. - 4  
red osier dogwood - 1

Tree heights (over 33% of all trees except sassafras grove):

1-5 feet - 286 or 44.8%
6-10 feet - 175 or 27.4%
11-15 feet - 95 or 14.8%
16-20 feet - 34 or 5.3%
21-25 feet - 21 or 3.3%
26-30 feet - 9 or 1.5%
31-35 feet - 9 or 1.5%
36-40 feet - 7 or 1%
41 plus feet - 4 or .6%

III S

General description of the area south of the east-west tree row: Seems similar in every way to the NE part of III. This is true of tree heights too, so no height data appear below.

Tree count by species (all counted):

sugar maple - 52  
silver maple - 2
white elm - 118  
redbud - 255
sassafras - 150 plus  
flowering dogwood - 22
groves of 40, 13, 24
150, 15, 100, 200
hackberry - 14  
tulip - 5
black cherry - 109  
ash sp. - 1
oak, probably black - 11  
black walnut - 14
pignut hickory - 14  
red cedar - 17
(Weatherwax: "probably.")
sycamore - 2  
shagbark hickory - 29
red elm - 7  
smooth sumac - 36
shining sumac - 35  
black gum - 1
beech - 5  
chinquapin oak - 5
red mulberry - 4  
box elder - 3
pear - 1  
persimmon - 1
red osier dogwood - 400, thick stand  
wahoo - 1
Orchard

This area is roughly T33, i.e., it excludes the more open field south of the stream, T44, and also excludes the blackberry field, T32.

General description: An east-west ridge or hill, quite different in topography and tree growth from any of III or III S. High trees are loosely scattered over the area, concentrated on the north hillside and along the south stream. At these 2 places there is a tree understory which the PW's use, unlike the situation in the little woods on III; the understory is redbud and dogwood. The trees consist of old apples, high sassafras, thickets of crataegus and redbud, and the usual species with a higher percent of black walnut than on III. The cover, as the word has been used above, is about 65%; but it is high to a considerable extent, with light and air below. Some blackberry thickets, some broomsedge (not as thick as on III), a good deal of low grass; goldenrod abundant as on most of III.

Tree heights (about 33% counted):

<table>
<thead>
<tr>
<th>Height Range</th>
<th>Counted</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 feet</td>
<td>290</td>
<td>47.5%</td>
</tr>
<tr>
<td>6-10 feet</td>
<td>118</td>
<td>19.3%</td>
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<td>11-15 feet</td>
<td>45</td>
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<td>16-20 feet</td>
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<td>21-25 feet</td>
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<td>26-30 feet</td>
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<td>2.5%</td>
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<tr>
<td>31-35 feet</td>
<td>15</td>
<td>2.5%</td>
</tr>
<tr>
<td>36-40 feet</td>
<td>20</td>
<td>3%</td>
</tr>
<tr>
<td>41 plus feet</td>
<td>28</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

Field south of orchard

General description: Lightly rolling. Scattered high trees, with very thick goldenrod, little or no broomsedge. Two crataegus thickets, several dense blackberry patches. Ratio of tree heights probably like northeast corner of III, but density of trees is much lower. Probably the total tree cover is 20%, but this is not uniformly distributed. There is a woods on the NW; a clump of osage oranges in the
center; an area of scattered scrubby walnuts, maples, and elms to the NE, and an open blackberry field across the south.

Blackberry Field (T32)

General description: A rolling, worn-out field with trees only around a very thickly overgrown sink holes in the center (plus one large elm standing alone in the SE corner near a sink hole.) Almost no grasses, at least none conspicuous, and thus little broomedge. Herbs of various sorts, especially goldenrod. The most conspicuous plant is the blackberry, which at many points grows in nearly impenetrable tangles and occurs to a considerable extent throughout.

V, west half

General description: Nearly flat but with an eroded gulley about 4 feet deep running N along much of the E edge. The area was planted by J. N. Garton to control erosion and with the idea that trees or posts might be harvested. Planting began in 1947 and lasted 4 years, with most work carried on in the first 3. First to go in were black locusts, along the gulley and in little groves at points where erosion seemed to be beginning. Pines were used, Virginia, white, and red, in that order as to number. Most were put in in N-S rows on the W side, Virginia and a few reds. In E-W rows on the S end were whites. In the fall of 1954 the whites (put in as seedlings, like the rest) are almost all 8-9 years old; presumably the other pines are the same age. In the east half of V are scattered whites and Virginias, the whites 5 years old in 1954. (Some exotic deciduous trees seem not to have lived.) In 1951 (possibly 1950) a multiflora rose hedge was planted along the S and W sides of V; with the woods on the N and E the tract is thus bounded and comprises 7 acres. A few yards N across mature woods is X and to the NE is the enclosed clearing, XI, neither of which tracts is described here.
I estimate that the white pines were 5-6' in the spring of 1952; they are 10-12 in late 1954. Reds were 2' in 1952, are 6-7' now. Virginias were 6-8' in 1952, are 11-15' now. Locusts were 12-16' in 1952, are 20-26' now.

There is a thick tangle of blackberries under the locusts, some 5' high. Much goldenrod and some broomedge in the openings. There are the usual native trees, none as high as the locusts and presumably about the same age. Of the non-locusts in the W half, 45% are 1-5' and 45% 6-10' high; locusts outnumber them 10-1. Pines have shaded out deciduous trees, of course, in the pine plantings. The W half is 70-75% under cover. Is it significant that the PW's began to use the blackberry field in 1954; are they being crowded out by the vegetation? In the locusts they tend to stay in the tops, using them much.

In the E half tree cover is 35%; dogwood and redbud are the predominant non-locusts. Excluding locusts, 75% of the trees are 1-5' and 25% 6-10' high. Goldenrod is thick, broomedge not common but easily obtained at edges of eroded spots in blackberry field to S.

II

General description: About 75% under tree cover, with many more trees of medium height than is usual on the PW areas studied. As usual the cover is of the open type, with goldenrod and other herbs and grasses beneath. In the openings, especially to the S, are broomedge patches. One dense crataegus thicket, 2 large tangles of grape. Trees, especially the elms, often have many trunks. Predominant trees are elm, cherry (some medium-large), and sassafras (several groves or stands). The area differs from the SE corner of III, which it most nearly resembles, in that the cover there is more uniform in height and not so high. On II the 1- to 5-foot trees are mostly smooth sumac, sometimes forming an understory beneath the elms.

Tree heights (sufficient samples):

1-5 feet - 195 or 36.5%
6-10 feet - 118 or 22%
11-15 feet - 130 or 24%
16-20 feet - 40 or 7.5%
21-25 feet - 25 or 5%
26-30 feet - 16 or 3%
31-35 feet - 10 or 2%
36-40 feet - 2 or .5%
41 plus feet - 0 or 0%

IV S, to the hilltop or ridge (i.e., to T3)

General description: Tree cover is 75%. Tree heights much like those on II but with 5% more trees over 35 feet (with correspondingly fewer of 1-5 feet), these along the stream bed and valley. The woods are open due to the variable tree heights, often with a redbud understory. There is a true edge of redbud along the wooded strip of the valley. Broomsedge is abundant on the west side of the valley; little on the east side, where goldenrod is thick in the fall and many dead and unthrifty smooth sumac stand. The big trees are largely walnut, with a few honey locusts and cherries. Even under the high trees, i.e., in the densest cover on the area, is a grassy ground cover, largely Poa compressa.

North of north road

General description: The area here included was once called XX and is N of the N east-west road and runs W from the point where the electric wires turn due eastward. It falls into 3 quite different sections, all used to some degree by PWS:

1) A blackberry field like T32 described above, but with perhaps 10 scattered elms of from 5 to 12 feet.

2) A small abandoned apple orchard to the E. The trees are very close together, giving almost total shade; they are between 15 and 20 feet high. On the edges are pole-like 8-foot sugar maples.

3) "Typical" habitat to the S. This segment is about 50% under tree cover, the trees
generally in loose clumps with openings among them. The tree heights are percentagewise about like those of the orchard (T33); there are conspicuous large trees, all cherry and 3 clumps of sassafrases about 35 feet high. Well to the W and beyond my usual limits is a very dense thicket around a sink hole; little sun penetrates it, and PW's do not use it much. There are separated patches of broomsedge and goldenrod, with purple top associated with the former. Even in the shadiest areas under the tall trees there is a green grassy ground cover; see the details under IV S just above.

T41 south of the road

General description: This section has been planted with strips of trees running in north-south rows, so there are zones or bands of rather different natures. Running from W to E, these are: A planting of pole-like walnuts, now 30-35 feet high, 6 feet between rows, 4 feet between trees. Among these are tulips over 45 feet high. The ground cover is grassy and looks like a Foa. PW's go only into the edge of this strip. Next is a band 18 yards wide, open (except for a few 12- to 15-foot shagbark hickories and 4-foot cherries and tulips) and covered by broomsedge and purple top. On E is a walnut planting about 25 yards wide; the rows and trees are 6 feet apart, the trees 12-20 feet high. A few elms and pawpaws are among them. Foliage is generally sparse, the trees stunted, so grass, including broomsedge grows underneath; some raspberry. Next E is an area of maple plantings, with 30 X 30-foot patches where trees seem to have been omitted or to have died. Broomsedge and smooth sumac grow in these patches. The maple rows are 3 yards apart, the trees 25 feet tall. Under them the ground is usually bare and mossy. There are also some small walnuts and elms, a few 50-foot tulips; toward the E the maps are smaller and there is another planting of 12- to 20-foot walnuts with broomsedge and purple top beneath the trees.

The S boundary of the foregoing tract is
the electric wire, the N, the road. The total cover is 80%; but except where the maples and the western strip of walnuts grow (15% of the area), the shade is light and the sun speckles the ground.

IV N, from the road to the valley

General description (from W to E): The maple planting that is the E edge of T41 is the W edge of IV N, except that the easternmost of the trees are somewhat smaller, from 15 to 25 feet high, and irregularly and openly spaced. East of this is an open field sloping S to the valley and cut by north-south gulleys deepening to the S. In the field are scattered 25-foot maples, cherries, and elms and about 10 old apple trees; smaller trees grade down, with the heights distributed in proportions like those on the NE part of III. A sink hole in the open has a 50-foot sycamore, a 40-foot sugar maple, and several 25-foot dogwoods and maples in and around it; a 40-foot cherry is a few yards N of it. To the S at the valley is a clump of 50-60-foot white pines, edged with maples and elms and with a dense stand of 15-foot smooth sumacs, many dead. Except under the pines, light reaches the ground, which is grassy. Patches of field cover are divided in about equal proportions between goldenrod and broomedge-purpletop. East of the pines, at the valley and along a debouching ravine, are 40-foot elms close together and poorly shaped, with some smaller sugar maples between 25-30 feet high. These cast only partial shade; goldenrod grows beneath. Some rock outcroppings here. The tree cover of all the above described part of IV N (T5, T21, T39) is about 22%; the shade is mostly light or at least not day-long.

Eastward (T6, T22, T40) the terrain and vegetation are much like the above but the open fields are brushier. Probably the T5 segment has been periodically cut over or mowed; it has been mowed to some extent during each late summer I've worked here. Except for 3 or 4 tall sassafras stands and the trees (elm and ash) along a ravine, there are few large trees.
Along the foregoing ravine is dense redbud, red osier dogwood, sassafras, and elm cover about 10 feet high. Notable in this area is the number of scattered scrubby white elms like bushes, 10 feet high and under; there are also many smooth sumacs under 3 feet. Also there are several stands of dead smooth sumac, perhaps 4 feet high, the stands 25 feet across. Though there is plenty of broomsedge, goldenrod is more conspicuous. In the cut for the electric wire to the N are low maples, sassafras, redbuds; N of the cut is a fairly dense and shady woods of 30-40-foot maples where PW's seldom spend much time. Total tree cover of the T6 area is about 35%.

General description: A gentle ridge sloping northeast, divided by a 40-foot high tree row running N and S. East of the tree row (IE) the ground is open, a worn out field covered with goldenrod and a lesser amount of broomsedge - purpletop. There are 2 clumps of good-sized sassafras along the edges and 1 or 2 of less height. A dense thicket of crataegus, 15 feet high, is perhaps 40 feet by 75 feet, with a few big cherries rising out of it. There are also a few scattered elms and other trees 25- to 30-feet high, and the usual smaller trees. West of the tree row (IW) there is much more cover, with a woods to the S; then a small clearing about 50 feet wide and 60 feet long; then a grove of big cherries, hackberries, and others; then a brushy clearing about the size of the first. This W side is much less used by PW's, especially the S part. The used portion (by PW's) is about 35% under cover.

Tree species: A complete count of the trees of IE and the tree row is in Appendix X of 1952.

Tree heights: Quite close to those of the NE part of III.

Note: I considered why IW was less intensively used, despite its grassy floor, its Antennaria and goldenrod. Its trees include many 25-foot saplings casting a good deal of shade but no more
than is found in such areas as parts of II, the orchard, and T41. I suggest a PW will prefer a more open field, seeking a certain minimal area in which the land is open or at most lightly shaded. In such a situation it may be crowded into marginal habitat of the IW sort by the pressure of other warblers with which it may have to share the opening. Perhaps you have the open spots thus doing the attracting with the subsequent addition of another male causing the first to resort to marginal land. Cf. II, with the very slight use of II W.

VII

General description: Sloping gently eastward, bounded by woods on all sides but the W, where a high tree row separates the area from a field where the university's sheds and surplus dumps are. (PW's rarely go W of the 40-foot tree row.) Tree cover grows on about 20% of the area, the trees evenly distributed and predominantly maple. Broomedged is by far the most conspicuous field cover, with relatively little goldenrod and scarcely any purpletop. A few red cedars, as usual. A highly "typical" looking area. Tree heights same as on NE III.

IV's T3 hill or ridge

General description: A southeastward sloping ridge with a wooded valley or ravine on the N edge (separating it from IV N) and a similar ravine on the S side of the E end; i.e., the area is the hill or ridge between 2 valleys which converge as they run toward the E and debouch into the university lake. To the W the area broadens out into a gentler hillside and the field meets a north-south maple planting or grove. Tree cover is about 40%, the heights the same as on the NE part of III. Goldenrod is the most conspicuous field cover, with scattered patches of broomedge. There are 5 sassafras stands with the trees from 20 to 35 feet, like groups of poles. In the maple grove the cover is 80%, with fewer low trees. The rows of maples are 22 feet apart, the trees irregularly planted from 5 to 30 feet apart within a row, their
heights 25 feet. Between maple rows are rows of walnuts, 4 to 20 feet high, 8 feet apart. The ground here is grassy with some goldenrod. At the N end of the planting are heavy raspberry and blackberry thickets and the walnuts become the dominant tree (25 feet high).

In general the PW's have used the open part of the area much more than the groves, but I include it because the 17's at times went 25 yards into it and once nested there. Note that the walnut grove runs on W and crosses VI in a band some 25 yards wide from N to S, at the wire. The PW's on VI often used this band and crossed it to the N. It seems possible that the planting is marginal and that the VI birds needed it and the IV birds did not.

Tree species: A complete count of the trees is in Appendix X of 1952.

VI

General description: This is a long narrow opening between a mature woods on the W and the maple grove on the E. It slopes gently to the N. There are 2 plantings in the opening: 2 rows of 30-foot maples run N and S on the E side; perhaps 15 rows of 5- to 20-foot, scrubby walnuts run N-S, west of the maples, the rows 4 feet apart, the trees 5 feet apart within the rows. There are open spots, especially to the W and N, with shrub-like elms and other usual trees. Tree cover is 70%, and excluding the plantings the heights are as on the NE part of III. Shade is never deep; e.g., upland pink star and broad-lipped orchid grow in the walnut planting. Broomedge and purpletop are conspicuous in the openings. PW's used the whole strip, including the 25-30-foot walnuts which run across it at the N end (see IV's T3, above). Grass grows under these high walnuts.
APPENDIX XI

BIRDS BREEDING ON III

Gordon Thurow and I censused III and III S and found the following singing males, presumably members of breeding pairs:

Bob-white - 2  
White-eyed Vireo - 1  
Red-eyed Vireo - 3  
Common Yellow-throat - 3  
Yellow-breasted Chat - 4 or 5  
Cardinal - 6  
Indigo Bunting - 8  
Goldfinch - 5  
Rufous-sided Towhee - 7  
Pine-woods Sparrow - 5  
Field Sparrow - 13

All the foregoing species are typically found on PW habitat. In addition we noted the following breeding pairs, common nesters on more wooded PW areas:

Yellow-billed Cuckoo - 2  
Black-billed Cuckoo - 1  
Tufted Titmouse - 2  
Brown Thrasher - 3  
Bluebird - 1  
Blue-gray Gnatcatcher - 2  
Summer Tanager - 3

On the edges, in or associated with the woods, were a number of species, including woodpeckers, Carolina Wren, Crested Flycatcher, Wood Thrush, Scarlet Tanager, Kentucky Warbler, Wood Pewee, Whip-poor-will, Yellow-throated Vireo, Acadian Flycatcher.

Frequent visitors to the PW habitat were Crow, Blue Jay, Sparrow Hawk.

Not noted but common enough on grown-over PW habitat are chickadee, Robin, Pheobe.

Cowbird is in a separate class.

The foregoing list doesn’t attempt to exhaust the possible species to be found breeding or occurring near PW's.
APPENDIX XII

PLANTS COLLECTED ON III

These plants were collected throughout the season but probably greatest care was taken in late spring and summer. Paul Weatherwax and William Martin made nearly all determinations.

Following many names are letters, which have these meanings: A - abundant; C - common; F - few; L - local or locally; M - midway between common and few; R - rare.

Plants found were:

Achillaea millefolium - Common yarrow - C
Agrostis alba - Redtop - F
Agrostis hyemalis - Tickle grass - F
Anaphalis margaritacea var. intercedens - Pearly everlasting
Antennaria plantaginifolia - Pusseytoes - C
Apocynum cannabinum - Hemp dogbane - M
Aristida sp. - C
Artemisia trifida - F
Asclepias incarnata - F
Asclepias syriaca - M
Asclepias verticillata - Horsetail milkweed - LC
Asplenium sp. - Spleenwort - R (near woods)
Aster pilosus - Heath aster
Aster 3 spp. - C, M
Barbarea vulgaris - Bitter wintercress
Berberis probably thunbergii - Japanese barberry - F (1 or 2)
Bromus sp. - Brome grass - F
Chrysanthemum leucanthemum - C
Cirsium 3 spp. - F, F, M
Cladonia - Reindeer moss
Convolvulus sepium - Hedge bindweed (apparently) - F
Danthonia spicata - Poverty oatgrass - A
Desmodium sp. - Tick clover - M
Erigeron annuus - White top fleabane - M
Eupatorium rugosum - White snakeroot
Euphorbia maculata - Spurge - F
Evonymus obovatus (apparently)
Galium aparine - Bedstraw - C
Galium sp. - Bedstraw - LC
Helianthus decapetalus - Thinleaf sunflower
Helopsis helianthoides - Sunflower heliopsis
Hypericum proliferum - Shrubby St. Johnswort
Hypericum punctatum Lam. (probably) - St. Johnswort - F
Juncus sp. - LC
Lactuca scariola - Prickly lettuce - M
Lespedeza stipulacea - (escape ca. 1925) - F
Lippia lanceolata - R
Lobelia siphilitica - F
Lonicera sp. - Honeysuckle - M
Medicago sativa - Alfalfa - M
Melilotus officinalis - Yellow sweet clover - C
Menispermum canadense - Moonseed - C on edge
Mentha arvensis - Field mint - LM
Oxalis sp. - a wood sorrel - F
Panicum capillare - Witchgrass
Panicum hirachucae - M
Parietaria pensylvanica - M
Parietaria sp. - LM
Parthenocissus quinquefolia - Virginia creeper - C
Penstemon calycosus - Foxglove - F
Phleum pratense - M
Plantago aristata - C
Plantago lanceolata - M
Plantago rugelii - M
Poa compressa - LC, F
Poa pratense - Kentucky bluegrass - LC
Potentilla recta - Cinquefoil - F
Prunella vulgaris - Selfheal - M
Pycnanthemum (probably, certainly a mint) sp. - LF
Rhus copallina - Shining sumac - F
Rhus glabra - Smooth sumac - C
Rhus radicans - Poison ivy - C
Rosa setigera - Prairie Rose - LM
Rubus sp. - Blackberry - C
Rubus (probably a dewberry) sp.
Rudbeckia hirta - Black-eyed Susan - M
Rumex acetosella - Red sorrel - R
Salvia lyrata - Lyreleaf sage - LC
Sanicula probably sp. - F
Scutellaria ovata var. Versicolor - Skullcap - C
1 spot
Smilacina racemosa - False
  Solomon's seal - R (near woods)
Smilax pulverulenta - Carrion flower - LF
Smilax sp.
Solanum carolinense - Horse nettle - F
Solidago canadensis - Canada goldenrod - C
Solidago nemoralis - Old field goldenrod - C
Specularia perfoliata - Venus' looking-glass
Stachys tenuifolia var. hispida - a Hedge nettle - F
Tecoma (Deam's Campsis) radicans - Trumpet - creeper
Trifolium aureum - Hop clover
  (Deam calls T. agrarium)
Trifolium pratense - Red clover - M
Trifolium repens - LM
Triodia (or Triodus) flava (-us) - LC
Tripsacum dactyloides - 1 clump (escape)
Vernonia altissima - Ironweed - M
Veronica sp.
Vitis sp. - M
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