

Ketterson / Nolan Research Group Collection

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

1952

BLOOMINGTON, INDIANA

Volume II

From June 16

Val Nolan Jr.

June 16. Hot and sultry, sky cloudless. Temperature over 80° at 0800. Present 0830-1145. Arrive 0830.

T-15 at 0845: Adults not at the nest; 1 young has its head out.

2 N
feeding/det

0852. M-15 sings at a distance; I just barely heard him. He draws a little nearer singing. I hear calls near the nest, probably 15F. She perches 20 feet up in a tree, with a large green caterpillar. M-15 is still many yards away.

9

0858. M-15 goes straight to the nest, probably from a good distance, and 15F drops immediately to a spot near the nest tree. M-15 feeds 2 young with green caterpillars, hops out to and sits on a limb of the nest tree with his back to nest. 15F goes to the nest and feeds 1. M-15 leaves the tree after she feeds the young. She takes a fecal sac and leaves with it.

0905. I began banding the young, first 1, then 2 at a time, then 1. They are ideal size for banding. The brood mark is red over silver, left leg:

2162086 - 15R;
2162090 - 15Y;
2162091 - 15G;
2162092 - 15B.

The young had their eyes open a little, could make faint noises; they gaped at me, even while in my hand. Two young defecated.

15F came up at 0912 while I had 2 young. She continues now at 0921½ to call "tsu" around me. She

is not really alarmed I think, though she perched on the nest tree once when I took young. No display. 0919. M-15 sings 3 times very near the nest but doesn't go to it. 3

0924. M-15 returns and sings within 15 yards of the nest. 15F hops about over my head, opens her bill at me. Calls and flips her tail with great vigor, though her call is "tsu," which I think indicates less alarm than the "check" sometimes uttered. She "checks" occasionally. 2

0931½. M-15, who sang only twice before, now begins to sing again near the nest. His song is a much more typical skid than it usually is. 3

0932½. M-15 flies to the nest without hesitation. He feeds 2 young, one with what looked like a small beetle; he had to offer it several times. He eats something, probably a fecal sac. He sits on rim for 30 seconds, looking in, hops away, returns and sits for 35 seconds poking into the nest. He then hops 6 inches from the nest, then 1 foot, sings, flies away. 15F has quit calling; she quit when M-15 came, I think.

0943½. 15F comes in 25 feet above me with a green caterpillar, calling "tsu." She moves toward the nest, but stops 4 yards from it, 15 feet high, and sits quietly, calling faintly. She makes no nervous motions. She sits thus for a long time.

0953. A Chickadee flies in 1½ feet from 15F and begins to call. 15F comes out of her quiet state and begins to flip her tail and hop about nervously. I leave the *doing (?) chickadee*

territory for fear I am preventing her going to the nest.

T-14: No sound. On the strip of good habitat south of III, where I found the overturned nest 10 days ago, I found a singing male with a skid song that ended hoarsely like M-6's. He was well-marked, had a fairly red back, sang frequently on the west end of this strip. I have a doubt whether this was M-14 or M-10. He was as far from the nest I've called 10F's second complete nest as he could be on this strip, and his song seemed not as shrill and high as M-10's. On the other hand, I heard no song on M-10's regular territory for 15 minutes. If this is M-14, he has moved a good distance eastward over fields and woods, and I've no other evidence that he did so.

T-9: 9F is on her nest. FY

T-11: I spent 1 hour making a careful check of T-11, but without luck. M-11 sang 2 or 3 times.

1145. I left the area.

June 17. Sunny day, not quite so hot as yesterday.
Temperature 82° at 1400. Present 1500-1745.
Arrive 1500.

T-15 at 1510: At least 1 young has its head out
of the nest; its bill is open in the gape position when
I come up.

2 N
feeding
dis

1525. M-15 sings 2 skid songs west of the nest in the
heavy growth.

1525½. M-15 comes to the nest tree 1 foot below the
nest, hops up to the nest with lots of green caterpillars.
He feeds probably 2 young, offering 2 times to 1 young.
Immediately takes fecal sac and leaves.

2

1527½. 15F appears in the top of an osage orange 25 yards
from the nest with green caterpillar in her bill. She
immediately begins to call "tsu," flip her tail. One
of her left tail feathers is askew and hangs down, does
not bob with the rest of the tail. After 1 or 2 minutes
she quits tail flipping except when necessary to keep
balance: she continues to call. Probably she is
bothered by my presence.

1534. 15F leaves osage orange and goes to a tree nearer
me, but I can't see her. She calls faint "tsu" note
somewhere out of my sight above me.

1544. 15F goes to the nest tree 15 inches below the
nest. She calls frequently, flips tail; she leaves
tree in 30 seconds without going to the nest. She
stays close by.

1549. 15F goes to the nest tree, perches calling 6
inches to one side of the nest.

1550. M-15 begins to sing at a distance and with each song comes closer.

1551 $\frac{1}{2}$. 15F goes from her perch $\frac{1}{2}$ foot away to the nest and feeds 1 young. She then sits on the rim, hops 4 inches away, returns and looks in; hops to a little branch just below and 1 inch from nest, perches calling. 12

1554. M-15 comes to the nest tree and 15F leaves her perch below the nest. M-15 feeds 1 young with several green caterpillars, all delivered together; he flies away and sings when he lights. He repeats song several times, moving around from west to south of the nest. 4

15F calls "tsu" from near me and now at 1558 is still calling, sitting 8 yards from me in a tree. She hops to weeds on ground. Occasionally she calls "check," or a note intermediate between that and "tsu."

1608. 15F is in a tree 8 yards away, calling, without food. She has been in my immediate vicinity the whole time. M-15 sings twice well to the north of the nest. 2

1609. M-15 goes to the nest but I miss the feeding. He stays $\frac{1}{2}$ minute looking in, leaves toward west.

1610. 15F is now silent. The young gape. I leave territory after inspecting the nest and finding all 4 young healthy. They quit gaping at my mirror's approach. Onesqueaked faintly.

T-14: I found a male marked as the one I saw

yesterday east of here, singing frequently the same song as that one. It must be M-14. There is no sign of the female and a short search turned up no nest.

T-9 at 1630: 9F on nest.

9Y
T

T-11: I searched for 1 hour, without luck, for the active nest. I found a last year's nest in a 3 foot walnut covered with Virginia creeper. This nest was 4 feet high. M-11 never sang.

(The Indigo Bunting's nest Frank Horack and I found last Thursday with eggs was empty today.)

some
IB
8/12/20

1745. I left the area.

June 18. Hot cloudless day, fresh and pleasant.
Temperature 82° at 1200. Present 1200-1715.
Arrive 1200.

T-2 at 1212: I walked slowly north looking for nest. M-2 sang on the center of his territory and I went toward him. After 2 minutes of looking for him I found 2F's third nest in the center of the field on the south end of the territory. It is 5½ feet high in a little walnut tree which is 8 feet high. The nest is built on top of a horizontal limb near the trunk; there are 4 eggs in it. 2F was not in evidence, but M-2 sang several times in the vicinity. This is 29 yards from the first nest, 37 yards from the second; all 3 are almost on a line. This is the first complete third nest I've found. M-5 came to the nest at 1235.

*about 1/2
nest*

T-7: M-7 sang in the vicinity of his second nest. I spent 15 minutes looking for the third in this area; then I followed him as he sang. His most frequent song was a skid of the typical sort, occasionally a type #8 step. He moved out to the pine cluster, went to the ground there and I lost him in the thicket around the pines.

T-3 at 1310: I spent 70 minutes here. During most of it I had M-3 in view. He sang regularly and moved all over his territory, tending to stay off the west end of the ridge. For the first 30 minutes he was almost never out of sight. No food carrying. He spent

most of the time along the valley which bounds his territory on the north. M-8 came to the south end of T-3 once. M-3 and M-8 sang back and forth but never got within 15 yards of each other, this though I thought M-8 was transgressing a little. Is the territorial response waning? Once a male Summer Tanager called when M-3 came near him, erected his crown feathers and drove M-3 away by flying at him. (Later I found the Summer Tanager's nest, 11 feet high on a long horizontal limb of a cherry tree. The female was incubating.)

T-8 at 1420: (See under T-3 for some of M-8's activity.) M-8 was singing frequently along the ravine, songs of all sorts: typical type #8, high skid, typical lilting step, the sort that begins with 3 fine thin notes and ends with Golden-winged Warbler-like buzzes. M-8's head markings are darker than they were earlier, now good and black on the cheeks. His back is still not very red.

(Bob-white on her nest.)

T-11: M-11 was singing at territory's north end. I finished my 3-day careful nest search, without luck.

T-13: I found M-13 singing a very frequent and faint, short, step song on the far end of his territory in the woods. He sang there for 5 minutes, then moved to the little locusts where he sang. I saw the spot which identifies him. Saw no sign of 13F.

(Found a hog-nosed snake. The Indigo Bunting's nest of last week has 1 egg.)

I B Shore
1 Hog snake

(Found a Wood Thrush's nest in the woods; 2 blue eggs.)

W Thrush
nest

T-9: One young had its head out of the nest.

I met Russ Mumford who had found 10F's third (complete) nest and we went to it. It is in a 4 foot high hackberry and is 3 feet high, holds 4 eggs. The site is in the middle of III on the south end by the big hackberry where Russ and I found the 10s the last time he and I went out together.

10
T N

(We found a Whip-poor-will's nest with 2 eggs at the south end of T-10, in the tree row; female incubating.)

Whip-poor-will
nest
2 1493

T-14: Silence.

T-15 at 1557: M-15 was singing at our arrival, getting closer to his nest.

15
N
singing

1600½. M-15 goes to the nest with large green caterpillar. He lit 1 foot below and then hopped up to the nest. He fed 1 of the young (all gaped), took a fecal sac quickly and left. He immediately began a hoarse step song near the nest; once a skid.

hoarse
step

1605. 15F goes to a tree by the nest with several adult insects. She sits calling "tau."

1607. She goes to the nest, seems to drop the food into it; picks it up and feeds 2 young. She then sits on the rim with her bill open, looks into the nest.

1610. M-15 goes to the nest and 15F leaves. He feeds a very large dark caterpillar to 1 young after 3

tries; he takes a fecal sac and leaves. The young have their heads over the nest rim with their bills open constantly. They show no reaction to my squeaking.

1618. 15F comes to a tree somewhere near us and calls. (This call might be something else.)

1621. 15F flies straight to the nest, seems to feed 1 bird. Then she sits on the rim with her bill open. She calls "tsu" as she sits; she closes her bill to call, then opens it.

1623 $\frac{1}{2}$. M-15 sings to the north. He draws closer to the nest singing a fainter, sweeter song with almost the quality of a Goldfinch. This song sounds almost like a Black-throated Green Warbler's.

Song here

1631. M-15 lights 1 foot below the nest; 15F leaves just before he comes. He feeds 1 green caterpillar after offering it 3 times; he stays 15 seconds and leaves, hopping to a branch 8 yards away and calling "tsu" frequently, perhaps at us. 15F preens herself 20 yards away. M-15 sings a strange song with 4 repeated soft notes on the end of a Black-throated Green Warbler-like song. The young all have their heads out of the nest. M-15 sings his faint song, also a repeat song.

Song here

1637. 15F comes to a tree over us with a spittle bug. She sits and calls a very faint "tsu."

1639. 15F goes to the nest tree, quickly hops away.

1640. She goes to the nest and feeds 1, looks in, leaves.

1646 $\frac{1}{2}$. 15F goes to a tree just beside nest, sits

flipping her tail and calling "tsu."

1647. 15F goes to the nest, feeds 2, leaves immediately with a fecal sac. The young stick their heads far out of the nest.

1652. 15F flies to the nest with a green caterpillar and an insect. She feeds at least 2 (fails on several offerings); stays 30 seconds, comes toward us and feeds on a goldenrod. She called "tsu" at the nest, in the weeds; also "check" in the weeds.

1656. 15F comes to a tree over us with a green caterpillar; calls, goes toward nest.

1658½. M-15 sings his typical song to the south.

1659. 15F goes to the nest with 1 green caterpillar; feeds 1 young and immediately leaves, calls.

1700. M-15 flies to the nest with 2 or 3 green caterpillars, offers and feeds young several times. He stays 1 minute, leaves and sings.

1701. 15F flies to the nest, feeds 1 and leaves.

1706. 15F flies to within 10 yards of the nest and calls "tsu" repeatedly.

1709. 15F goes to the nest with 2 green caterpillars which she offers at least 3 times each. In 1 minute she hops below the nest and calls "check" several times, also "tsu." She then catches and eats an insect near us.

M-15 sings to the south.

1712. M-15 flies straight to nest and feeds 1 young with 2 loads, goes to tree 2 feet away and sings hoarse song 3 times within 5 feet of nest. Leaves nest vicinity at

1713½. I check nest, find only 3 young in it; no sign fourth. 1715. We leave area.

June 19. Cloudy day with the sun shining through occasionally; breeze. Temperature 82° at 0900. Present 0935-1310 and 1720-1945. Arrive 0935.

T-15 at 0940: The young are in the nest, 1 with its head sticking out. Eyes are kept shut most of the time, same as yesterday. 15F comes to the nest, calls "tsu," sees me and leaves without feeding, coming toward me and calling.

4 N
feeding
not

0943. 15F goes to the nest tree and quickly away again without feeding. She has insects and a brown caterpillar. M-15 begins to sing his hoarse skid song at a distance.

0944. 15F is silent for a minute, then begins to call again; she has probably retreated from the vicinity a little. 15F flies from a tree above me to some goldenrods.

0948. 15F goes to the nest, feeds at least 1 young. She calls at the nest, hops 6 inches away and calls, goes back to the nest. She stays for 10 seconds and then hops below the nest, then away. She hovers before a leaf 5 yards from the nest as though looking for an insect, then moves around me calling "tsu" and sometimes "check."

0949½. M-15 goes to the nest (he'd been coming closer while singing with much food). He feeds 2 or 3 nestlings; had to take a caterpillar back several times. Takes a fecal sac and leaves, singing in 20 seconds from west of the nest. 15F continues to feed and call within a few yards of me, staying on goldenrods most

15

of the time. All 3 young are in the nest. One has its head up, eyes open, but it soon closes its eyes; head falls forward, bill opens for 10 seconds, then closes and young rests head on rim of the nest.

0956. 15F is still calling about once every 2 seconds within sight of me.

0957. 15F flies away a considerable distance but call is still audible. The sun is now out and it is hot.

1004½. 15F comes to a tree about 1 foot from the nest, calls frequently, then flies up in plain sight 5 feet above the nest with a large green locust or katydid nymph in her bill.

1008. 15F goes to the nest, offers food twice, the last time with success. Then she looks into the nest for 35 seconds, calls while there. She pays no attention to a female Goldfinch a few feet below her in the nest tree and an adjacent sapling. 15F leaves the nest and hops a few feet away and continues calling, gradually getting farther from the nest.

1011½. I looked up to see a bird sitting right at the nest, not a Prairie Warbler; perhaps a Cardinal or a female Cowbird. It left immediately.

1012. 15F goes to the nest, feeds but I don't see whether she feeds more than 1 (probably not). She calls a few times and leaves. She then hops about near the nest (within 1½ feet once) and at 1014½ goes to the nest for 5 seconds but I don't think she took food.

1015. M-15 sings to the east.

dis mg
G F

bird at
GW
nest
C?

4

1015 $\frac{1}{2}$. 15F goes to the nest and feeds 1 young, stays 10 seconds and leaves. She stays within my sight most of the time, not getting much more than 10-15 yards from the nest. She calls continuously, usually her "tsu," sometimes a rare "check."

1017 $\frac{1}{2}$. M-15 flies to the nest tree 2 feet below the nest with 2 green caterpillars. He hops up to the nest and probably feeds all to 1 bird. 15F lands on the rim with a green caterpillar and feeds 1. They stand quietly for a minute. A young raises its behind to nest rim and excretes a fecal sac. M-15 starts to take it, 15F grabs it away from him. I have a feeling he tried to take it back; she left the nest and he followed right after her. She quickly returned to the immediate vicinity of the nest and called as she moved around.

1022. M-15 sings west of the nest, 15F calling near it. 3

1025. 15F hops into sight with a small brown moth in her bill. In 25 seconds she takes it to the nest, feeds 1, immediately leaves the nest and moves about in her usual close orbit, calling every 2 seconds.

1029 $\frac{1}{2}$. M-15 comes silently to the nest with several green caterpillars (2 or 3), seems to give all to 1 young. 15F lands on the nest rim and feeds 1 young an adult insect. M-15 seems to open his bill at her; anyway he opens his bill. She leaves and he sits on the rim for 10 seconds, then flies in her direction.

1030 $\frac{1}{2}$. 15F goes to the nest and probably feeds 1 young.

019

She hops up above the nest on the nest tree, leaves and calls near me. M-15 sings a faint skid twice, apparently from a distance. 2

1035. 15F calls near me after a few moments' silence.

1039. M-15 sings a skid at a distance several times. 3

15F has fallen silent again and I don't see her.

M-15 is drawing somewhat nearer. 2

1040½. M-15 flies to the nest with 3 green caterpillars, seems to feed all to 1 young. All gape eagerly, rise up in the nest to be fed. M-15 takes a fecal sac and leaves. I notice he always seems to go west on the same course when he removes fecal sacs.

1045. I leave the territory. Both adults are out of sight and silent.

T-14: I spent 20 minutes on the old territory looking for a nest; no sound, no luck.

(Found my fourth Whip-poor-will's nest with 2 eggs, under maple and redbud saplings and pretty much out in the open. The female flushed. Whip-poor-will 2

(Also a small nest 6 feet high with many leaves in the foundation; nest has a grass lining, no eggs. It is located like a Prairie Warbler's, too small for a Chat's nest. Almost surely an Indigo Bunting's.) IS nest

T-10 at 1130: 10F is on her nest; 4 eggs unhatched. 94
M-10 is silent.

T-9: The young 9s have their heads a little out of the nest; they jerk them in when I squeak. 9 N
B 98

T-11: (Walked north on the west side of the Towhee
territory and found a female Towhee incubating 2 eggs.)

M-11 sang faintly at the north end of his territory and I went toward him. I found the female hopping to the ground. Suddenly M-11 chased her as she flew north into the trees. I waited and he chased her through the tree tops a minute later. This doesn't seem like the behavior of a pair with young or even with eggs.

I followed M-11, who sang very faintly an entirely new song for him, a step song on a high pitch ending Song
discovery
usually with one low note of the same pitch as his first note. Occasionally he added 2 notes to the end and the second of the 2 seemed higher. I.e., his song sounded as if he was beginning to repeat it. [Signature]
Sometimes there were no added notes. These songs were very faint even when I stood right by him.

M-11 flew back east of the road; I followed and found 11F. I watched her and suddenly she took a strip of grape bark from a tree. She sat quietly with it for over a minute, then flew to a little hackberry sapling in the woods and I saw her nest. It is in a very early stage and is 12 feet high, next to the trunk where a little branch forks off. This nest is in the woods, almost 10 feet from the edge. It is shaded probably all the time. It seems to have in it a lot of soft material which looks very much like spider cocoons. I saw 11F gather cobwebs from

the tree tops and bring them to the nest. Perhaps this sort of material replaces the everlasting down.

Now the question is what has this pair done between the first nest and this new one. [I later found 2 other nests, so the present was their fourth.] I have spent many hours on their territory without seeing the least indication that young were fledged. Twice I thought I saw food carried but I wasn't sure. My best guess is that this is the third nest and that the second was unsuccessful late in its development. Unless I find young I'll continue on that assumption. [Correct; no young.] Other nests will show up when the leaves fall. M-11 sang near the nest most of the time as I wrote the above notes.

I watched 11F build her nest and suddenly noticed her come with a huge load, a bundle of material about 2½-3 inches in length, quite thick and bulky. It was very soft-looking and I think it must come from an old nest. With this in mind I tried to follow her to her source of supply but hadn't succeeded by 1310, when I had to leave. Several others of her loads were large and of a soft mixed-looking material that could well come from a nest and not from single plants. I'll return later and work on this point.

[I never proved this and later very much doubted if Prairie Warblers dismantle old nests; I watched for other indications and saw only those described for 2F on June 24 and 4F on June 28.]

blg.
material

under

I returned 1720 with the sky clear.

T-2: Three eggs have just hatched, 1 is still intact.

T-11 at 1730: The nest is advanced but still is *612g*
in an early stage. 11F brings a spider web, then
leaves. She catches a big soft feather in mid air;
takes it to a branch, drops it.

1735. 11F comes with a small object. She enters nest,
which is only a hollowed out formation, stays 30
seconds, leaves. M-11 sings a type #8 song above the
nest.

1738. 11F comes with material, stays in nest 15 seconds.

1740. 11F arrives with a shred of grape bark 6 inches
long, which she has trouble getting bent around the
nest. M-11 sings. She stays 45 seconds.

1745. 11F comes with a few grass or weed fibers. Enters
the nest and turns around in it, stays 30 seconds.

1746 $\frac{1}{2}$. 11F flies up with a large mass of soft stuff,
stays in the nest for 30 seconds. M-11 is still sing-
ing a regular (not a type #8) step.

1748 $\frac{1}{2}$. 11F comes with a small object. Spends 30
seconds in the nest pulling spider webs over the
present incomplete rim.

1757. 11F flies to the nest with down which looks as
though it came from everlasting; looks pretty freshly
gathered and not from an old nest. She stays on the
nest 2 minutes 40 seconds shaping and working on the
rim. During about 1 minute she was inactive. A Crow
cawed and this seemed to produce the inactivity,

*Crow -
fear
of
cawing*

8/19

which finally ended and she resumed picking at the nest rim.

1801. 11F flies to the nest with bark and shreds of fiber. She stays 2 minutes 40 seconds shaping the nest with her body, feet, and bill (rim worked on with bill). M-11 is singing mixed songs, with many of the short songs where he drops the last note. He sounds a good deal like a Black-throated Green Warbler. Song

1809. 11F comes with fibers and weed bark. She spends 50 seconds shaping.

1811 $\frac{1}{2}$. She comes with grass, spends 45 seconds shaping. She uses her wings at times; it is extended and she seems to turn on her side with the extended wing up. M-11 is singing his "Black-throated Green" song. Song

1814 $\frac{1}{2}$. 11F comes with spider webs which she attaches to the supporting limb, pulls into the nest. She leaves the nest to get a shred of bark which blew out and sticks it nearby on the tree. She puts it in, gets in and stays for 30 seconds. 4

1817. She returns, probably with spider webs because she goes through the attaching and pulling process again. She leaves the nest and goes to the limb, enters again, stays 45 seconds. 4

1820. 11F comes with fiber which she pokes into the rim with her bill, turning to get it placed. She kicks and shapes the nest with her body, staying 55 seconds. 4

1822. 11F arrives with bark fibers and a little soft stuff. She puts them on the rim and keeps

pulling all projecting matter down, bending it from the outside of the nest to the inside, so there is a constant process of turning the loose outside strands inward over the nest rim. She stays 40 seconds.

1826. 11F comes with something I can't see; stays 30 seconds.

1830. She brings spider webs which she attaches to the nest on the outside, sticking them at various points about $1/3$ of the way around the nest. She then pulls them in over the rim. M-11 sings his very odd song with the final note or two low.

1832 $2/3$. 11F brings a large amount of loose soft stuff, puts it in the bottom, stays 15 seconds.

1834. 11F comes with fibers, which she puts on the nest wall, stays for 20 seconds.

1835. She brings unidentified material, stays 15 seconds.

1836 $2/3$. 11F brings spider webs which she loops around the rim for 20 seconds.

1838. She brings spider webs again, stays 25 seconds.

1838 $\frac{1}{2}$. She comes with spider webs gathered just below the nest, near the ground; attaches them to the wall of the nest near the top. She stays 20 seconds.

1840 $\frac{1}{2}$. 11F brings spider webs, sticks them to the supporting limb and pulls them to the nest rim. Stays 15 seconds.

1842. She brings webs gathered in the woods near the nest; puts them on the rim. The last 3 webs looked

more like egg coverings of spiders or insects.

She stays 15 seconds.

1844. 11F comes with a web which she strings around the rim, connecting it at several points on about half of the circumference. She stays 20 seconds.

1846. She arrives with fiber, puts it in rim; cobwebs are then pulled over the fiber as she turns in the nest. She stays 25 seconds.

1848 2/3. 11F brings many strips of dark bark, pulls webs over it for 25 seconds.

I leave. Her trips have been in all possible directions tonight and there is little if any evidence that she is dismantling an old nest. This nest is still flimsy; I can see through its walls, which don't seem to be of full height yet.

T-15 at 1901: There are 4 young in 15F's nest, so I must have been mistaken yesterday when I saw 3.

T-2 at 1915: 2F calls "tsu" excitedly around her nest. None of the newly hatched young are in it, only the 1 egg. No sign of the young on the ground on superficial examination. M-2 and 2F both are in the immediate vicinity of the nest. M-2 goes to the nest tree. Both come to look at me but are relatively calm. I've no idea what happened to these young in the last hour and a half. When I came in on my arrival here there seemed to be a mild mobbing going on with Field Sparrows, a Red-eyed Vireo, Gnatcatchers

all in a group and calling, about 30 yards from this nest. I could not see what was causing the trouble. It is conceivable that the Prairie Warblers took their young when I looked in the nest but highly unlikely. I didn't even touch them or the nest. The nest itself seems completely undisturbed.

I retire a little and both adults fly nervously about within 5 yards of the nest, "tick"-ing, "check"-ing and "tsu"-ing. 2F goes to the nest with food 3 times, which, with the fact that the young aren't in the nest, seems to be some evidence that the adults didn't destroy the young or remove them. 2F catches a small insect and goes toward the nest but never goes to it.

I made a careful search under the nest; no sign of the young. The remaining egg has a very small inward dent in the large end (since inward, not a pip). I left it on the bare chance that the adults will incubate and care for it if it hatches.

1945. I left the area.

June 20. Partly cloudy with east-southeast winds,
temperature 60° at 0700. Present 0710-1320.
Arrive 0710.

T-15 at 0715: 15F is calling "tsu" nervously
every 2 seconds, around the nest and around me where
I sit. I can't see the young in the nest yet.

*FN
feeding*

0726. M-15 sings. 15F after nervous hopping all
around me has caught a caterpillar.

0728. 15F goes to the nest with a green caterpillar
and all the young gape; she feeds 1, leaves immediately.
She comes to feed on a goldenrod near me.

0731½. M-15 comes up with a large horse fly. Before
he can go to the nest, 15F does so and feeds 1 young.
Then M-15 goes when 15F leaves. Before he had left,
15F returns with a small moth. At each trip the
young beg; their squeaking is plainly audible. Russ
said he could hear this when he was out with me; I
didn't record it then since I couldn't hear it, but
I expect he was right.

food

0737. 15F flies into a tree above me, from some
point away from the nest. She calls "tsu" every 2
seconds. She has a caterpillar.

0742. Finally 15F takes her caterpillar to the nest.
Immediately leaves and calls "check" within 10 feet
of me, every 1-6 seconds.

0744½. 15F has caught something again and "tsus" above
me. It is an adult insect.

0747. 15F goes to the nest with food; it looks like a

spittle bug and therefore is not the same as the insect she had. The young gape with their eyes closed. She leaves immediately. One raises its behind to the edge of the nest, deposits a fecal sac on the rim after she has gone.

0749. 15F returns from foraging near the nest, always calling, with what looks like a large black true bug.

0750. 15F goes to the nest, away, right back. She feeds, takes the fecal sac and leaves. M-15 sings several songs above the nest just at this time.

0751½. 15F goes to the nest with an adult insect. She feeds it to 1 young and leaves. The young call with a rattling, vibrating note, raising their heads when 15F hops near the nest. I can't tell if her call or the jarring of the nest or both produce their response.

0752½. M-15 goes to the nest with an adult insect. Again the young call. He feeds 1 young, looks into the nest for 5 seconds, leaves. 15F is calling behind me every 2 seconds.

0758½. 15F brings an adult insect to the nest, feeds 1, immediately leaves with something.

0801. 15F has a moth. Note she is catching nearly all the food within 20 yards of the nest, most of it even closer.

0801½. 15F goes to the nest, feeds 1; she looks in for 5 seconds while the young call, leaves. The young are now moving about in the nest more than when I got here, raising their heads.

0804. M-15 sings. 15F has an adult insect which she takes to the nest at 0804½. The young turn toward her and gape as she leaves the nest, following her with their heads.

0805½. M-15 goes to the nest and feeds; young cry. M-15 takes a fecal sac and leaves.

0806. 15F is feeding on a goldenrod 5 feet from me. She already has one item of food.

(There is a Towhee's nest near me; the female carries food, the male sings.)

0810½. M-15 sings a skid song. 15F is calling near me. M-15 seems to catch his food at a considerable distance from the nest if the place of song is reliable evidence.

0811. 15F brings food, feeds and leaves immediately.

0825. M-15 sings east of the nest. For the last 15 minutes he has been silent. The young are inactive, showing no disposition to leave the nest.

0826. 15F flies to the nest tree with food but leaves without going to the nest and comes toward me.

0827. She goes to the nest, feeds. She hops under the nest and the young continue to gape. She goes up to the nest again and young continue to cry. She calls from the nest, leaves and feeds on goldenrod 5 feet from me.

0830. 15F goes to the nest and feeds 1 young. All beg. I leave the territory since there is no sign that the young will leave soon.

T-4: 4F was feeding and calling below her nest. 9/1
M-4 sang his usual skid song.

T-1: silence.

T-2: I found M-2 singing on the south end of his territory, 2F nearby. She was going rapidly from tree to tree, staying reasonably close to him. Nest site searching was probably beginning. Clear song

I looked at the third nest. The egg was still there with the blood veins of the young bird showing through, patches of the shell getting chalky white. unincubated egg
The egg seems alive; through the shell I saw movement of some of the tissue. There are slight inward cracks in it and at one place the shell is chipped off a little, the sac not broken. I'm going to measure it: 15.9 mm. x 12.1 mm. Color of the spots is same as in eggs of the first nest, with the third nest's egg somewhat more spotted away from the wreath at the small end.

In 2F's first nest, which I examined today, I found a larva wrapped very thoroughly in many layers of green leaves all neatly cut to size and with a plug at the end where the larva (egg) was inserted. With the larva in the cocoon was a good supply of egg yolk from Prairie Warbler eggs. The case was $\frac{3}{4}$ inch long with the final inner layer at least $\frac{1}{8}$ inch smaller than that. The larva was white with 2 little forcep-like processes for mouth parts. It was probably $\frac{1}{2}$ inch insect nest - as noted in sketch

long if stretched out. I'd judge it was clearly hymenoptera.

This first nest was 12 feet high, was poorly concealed from one side and from below on one side, especially so for a high nest.

0930. I leave T-2 to return later, hoping 2F may be building by them.

(I find a Cardinal's nest with 3 eggs and the female incubating; nest was 8 feet up in a walnut of some height, covered with Virginia creeper.)

T-1: M-1 sings on his territory.

T-11 at 0935: 11F was not at the new nest. The top rim of the walls is in place, but the walls themselves are very flimsy; I can see through them easily.

0938. 11F brings fiber and spider web. She pulls webs from limb to nest, spends 25 seconds in the nest.

0940. 11F comes with soft fiber. She spends 50 seconds shaping the nest, turning in it, apparently using her feet too.

0944½. M-11 sings.

0945. 11F comes with a soft bunch of grasses. She puts it in the nest, stays for 30 seconds.

0947. 11F brings unidentified material, stays 25 seconds, pulling loose material on the rim over into the inside of the nest.

0948½. 11F comes with unidentified material; 20 seconds.

0950½. 11F comes with unidentified material; 30 seconds.

M-11 repeatedly sings a skid song to the south.

0952. 11F brings a small object, stays 40 seconds.

0956½. She comes with a little grass, stays 35 seconds. M-11 sings to the west, from which direction she came.

0958. 11F comes with a small object. She stays 10 seconds, flies in opposite direction from M-11's skid song.

1001. 11F brings several strips of dark bark; one is 4 inches long or longer and she has trouble working it in. She stays 1 minute. M-11 is still singing:
20-20-10-18.

1003½. 11F comes with a spider web which she pulls over the rim; stays 20 seconds.

1005½. 11F comes with a small object. She pulls spider webs from a leaf and a branch over the nest rim and into the nest. She stays 30 seconds.

1007. 11F brings weed bark. She stays 1 minute 5 seconds, pulling webs around on the nest.

1009½. She comes with soft down that looks fresh; 25 seconds.

1010½. She comes with unidentified material; stays 50 seconds. She again manipulates spider webs.

1013. She comes with unidentified material; stays 3 minutes 5 seconds, working busily, pulling webs. She got a feather she was putting into the nest stuck on her bill and had a hard time dislodging it.

1020. 11F comes with spider web, I think. She came from a different direction than that in which she departed. She works 50 seconds, leaves the nest and

flies to where a Blue-gray Gnatcatcher had just called 8 yards from the nest. I missed the encounter if there was one. M-11 is singing frequently but irregularly south of the nest. 11F went that way. M-11 is silent now.

1023½. 11F comes with down, not much of it; stays 35 seconds.

1025. She comes with soft material; stays 18 seconds.

1027½. She comes with unseen material; stays 28 seconds during which she jumps out of the nest once. M-11 has switched to a faint step song.

1029. 11F brings unseen material; stays 28 seconds. She comes so fast and directly that it is very hard to see what she brings. She leaves the nest and feeds in an elm nearby. M-11's song is Goldfinch-like in quality.

1032. She comes with spider web; stays 15 seconds. She flies into the woods.

1035. She comes with something so fine that I can't see it; stays 20 seconds. M-11 is now singing his odd song with the falling notes. One song had 3 such notes.

1037½. 11F comes with strips of bark or heavier stuff; she stays 30 seconds. On closer inspection this nest looks pretty substantial except for a good-sized hole near the hackberry trunk against which it is built.

1040½. 11F brings grass; stays 35 seconds.

1042½. She comes with soft material, perhaps grass shreds; stays 20 seconds.

1045. She comes with grass; stays 55 seconds.

1047 $\frac{1}{2}$. She brings spider web and stays 20 seconds.

These trips for material are made in all directions and I can see no evidence that she is using an old nest for her present supply.

1048 $\frac{1}{2}$. She comes with unidentified material; 40 seconds.

1048⁹. She comes with a large strip of bark; stays 45 seconds. I leave since I don't think she will lead me to her second nest. M-11 sings his odd song just before this time.

T-9: M-9 fed the young and removed a fecal sac *gn* as I passed by this nest.

T-10: The nest and the 4 eggs are intact; 10F *SV* was incubating and very reluctant to leave.

T-15 at 1125: I am greeted by M-15 when I'm 20 yards away from his nest with a "check" call; *check* he flutters about me. Obviously some young are out. I sit in my usual spot. Hear chebec-like rattling calls near the nest, probably the young. A Field Sparrow comes to investigate and M-15 drives him away. M-15 "checks" 12 times in 5 seconds; that is about his regular rate now, but when I move he accelerates. I see 15B 2 $\frac{1}{2}$ feet up in an elm 5 yards *positive egg* from me, calling. M-15 catches spittle bugs and *spittle* eats them as he hops within 3 feet of me. His calling is too irregular to time it. Two timed series for 15F who is also beside me give a rate

of 12 times per 5 seconds, then 8. Both adults are calming down a bit. There is no sign of the young in the nest.

1140. 15F begins to call "tsu." She flies to me, with 12 "checks" per 5 seconds again.

A fledgling which I think is 15B sits with half-closed eyes, is very quiet now. M-15 is not near me. I saw him hop on a branch a minute ago. He is 4 yards from the nest. M-15 is hopping about near the ground 22 yards from the nest; I think I hear a young bird there. 93

M-15 is after me again; 12 "checks" per ⁵ seconds, 3 times. 15F lands near the fledgling, without food; the fledgling calls his dry rattle, she leaves. call 5
94
They are still very upset by me.

1152. 15F takes food to the young; he moves his wings, calls constantly, she feeds him. When she goes near him again he flutters his wings and calls. He stretches his left wing down, apparently using or extending his foot too; this looks like a typical passerine stretch. stretching
3 stretch
She lands near him again and he vibrates his wings and calls; repeats. She goes to him and then flies at me every time, calling more frequently when she gets here. He's calling now. There is some down sticking up from his head and back.

She lands near him and he begs again. He looks about him but his eyes are often nearly closed. 1155. He calls, 15F goes to him and feeds and his call

becomes more frequent (constant) and higher in pitch. He extends his right wing 3 times, each time preening under it, i.e., scraping there with his bill.

1200. 15F takes him food and he waves his wings violently, shrieks.

1201. She feeds him again; same behavior. The article of food is very small. He preens in front and behind his left wing 4 times, stretching it a little. Re-peats 8 times in front, once behind. He is calling constantly. This is 15B. His rate of call is 9 per 5 seconds for 15 seconds. He moves sideways 2 inches along the limb, loses his balance and extends his wing to right himself. He then stretches his right wing in typical adult manner. Again he utters 9 calls per 5 seconds 3 times. He can't see me. Adults are now quite quiet so this is probably normal behavior.

1207. 15F goes to 15B; he begs, she leaves. She had no food in her bill.

1208½. M-15 is singing faint step songs near the road, not his usual hoarse songs. With each call 15B vibrates his wings a very little, shakes his body and tail region (he has no tail yet of course).

1211. 15B has been silent for 2 minutes; he now begins calling regularly again.

1212½. 15F goes to him to feed; He reaches out toward her, waves his wings, calls frantically, gapes.

1213. She feeds him again.

M-15 was feeding the fledgling far from the tree a minute ago; he sang a few seconds later. So far it looks as if adults divide up the young to be fed among them. The female is doing all the caring for 15B. I can't see if she tends any others. She gets within 1 foot of 15B; he flaps his wings and calls, starts to open his bill but shuts it as she fails to draw nearer. M-15 calls 18 times per 5 seconds near me. 15B is calling a faint, less vibrant call, 7 or 8 times per 5 seconds. M-15 is calling wildly beside me for some reason. I think 15B just stretched upwards, extending both wings down, or else he did this to gain his balance. 1225. 15B begins to call loudly, 10 times per 5 seconds for 40 seconds.

The young have 2 yellowish or buffy wing bars, upper parts are dull brown, unstreaked. The under side is gray with a few broad streaks of buff on the breast. The under tail coverts are yellowish, or better, buffy yellow.

M-15 "checks" at me from 3 feet away, 16 times per 5 seconds. At least one young bird is in the woods beside the nest tree; I saw 15F take food into it.

M-15 catches a spittle bug while haranguing me. Repeats. Now he carries a green caterpillar about with him as he scolds me.

15B who has sat motionless and unattended,

though calling, moves a step to each side. He calls 9 times per second for 5 seconds.

1239. M-15 is still calling near me; he leaves.

15F is out of sight and silent.

1240. M-15 takes a spittle bug to 15B and gets the usual reaction; increased and higher pitched calling, vibrated wings, neck stretched toward food, bill open begging for more after feeding.

spittle
bug
begging

1241. M-15 feeds 15B again.

I'm going to take the nest now, which should get a big reaction from M-15. 15B falls silent the moment I stand, resumes calling again in 10 seconds. The nest is empty. M-15 follows me to the nest, calls but with no special excitement. 15B lets me come to within 1 foot of him.

I leave the territory.

T-2 at 1300: M-2 sings his regular song frequently. I go to the nest, find the 1 egg hatched and the shells removed. It seems the nestling is being cared for. M-2 sings near the nest. I will be amazed if this nest is not deserted.

(M-7 sings on his territory, a type #8 song.)

1325. No sign of adults at the nest; I can't imagine how the shell disappeared though. As I start to leave T-2, 2F comes to the nest. I didn't see her feed the young, but I think perhaps the nest will be tended now.

2F
29

1330. I leave the area.

June 21. A heavy rain fell from 0230 on last night, a downpour. It rained until 0815. 73° at 0900, partly cloudy. Present 0920-1025 and 1345-1800. Arrive 0920.

T-15 at 0920: I have imagined all young would be dead. I see 15F feeding a fledgling 35 yards from the nest site, 6 feet high in a tree. I was attracted by the calling. *pos 7*

0924. M-15 takes food to the young, who eats it but is altogether silent and doesn't beg in any way.

0925. M-15 feeds again, a small object. The young is silent but gapes after it has eaten. *first gape*

I have noticed that the objects fed to the young after they are out of the nest are smaller than those given nestlings. No big foods are collected; the adult catches and immediately takes food to the young. *food NB*

I can hear a young bird, not the one I'm watching, begging; so at least 2 must have survived the rain. M-15 saw me (I'm 16 yards from the young) but displayed no alarm; "checked" a very little but I think not at me.

0937½. M-15 is in the tree with the young; he calls 2 times, sings a faint step, catches something and feeds it to the young, who calls a little. M-15 leaves and the young preens its breast and under its right wing, stretches its right wing downward and outward, preens its back, sits still.

0939½. M-15 goes to the young without feeding it,

M-15 calling when he approaches. The young is wet and preens itself thoroughly: back, breast, belly, under wings. Also stretches its left wing. It shakes itself once or twice and when through *stretch* shakes wings repeatedly for 30 seconds, not continuously but with a series of shakes. Its feathers are all puffed out. This performance lasts 2 minutes; then the young sits still. M-15 is around him some of the time, calling once or twice. The young is silent.

0946. M-15 sings.

0947½. M-15 feeds the young bird, who calls a little during the feeding, 5 or 6 times afterwards.

Two small birds pass, one slowly pursuing the other; Prairie Warblers?

Plumage of the young: Brown on the breast with a few broad buffy streaks, shading into buffy on the belly with a few brown marks, flecks or streaks. *down*
Throat is brownish, chin lighter. *48*

0950. M-15 feeds the young who gapes and calls a little, no wing movement.

0951. The young bird engages in a new motion, an upward stretch in which it extends its legs straight up to their full length, stretching the body upward. *stretch*
This is probably 15Y. It looks about itself, stretches its neck forward. It preens thoroughly, stretches its left wing.

0954. M-15 feeds the young 2 times, latter vibrates wings once and calls.

0955. The young stretches to full height; then it moves, leaving its perch. I missed this and I don't see the bird now.

I went to the tree where it has been, can't find it. Found a 2-foot green snake on a branch opposite from that where young was. I moved to M-15 and saw 15Y on a blackberry bush 10 yards from the recent perch, so it must have flown. I tried to catch it and it went to the ground. I caught 15Y and it squawked. M-15 "checked" constantly, 15 times per 5 seconds and often more frequently. 15Y was too frightened by me to respond to the green snake, which I had caught and which I extended to 15Y. I put 15Y on a branch and it flew 15 feet to a low berry stem, sat there. M-15 flew about me, caught and ate a white moth during one of his distracted spells (^{redirection?} substitute reaction?).

*gr
snake*

*B.
redirection*

The young now sits on the berry stem, M-15 flying near it and calling. The young bird turns around with some difficulty due to the leaves of the plant.

1017½. M-15 feeds 15Y a white moth; it gapes a little afterward but there is no calling or wing movement.

1018. M-15 feeds 15Y with the same response.

1019. 15Y changes position by 2 feet, half fluttering, half hopping upward, stopping at one spot en route. M-15 catches and eats an insect. He stays near 15Y, within 6 or 7 yards most of the time.

1021. M-15 feeds 15Y who gapes, otherwise is quiet.

Note 15F's absence, even when M-15 was very noisy when I excited him.

I failed to mention that M-15 was not much alarmed by my going toward 15Y till I was quite close. When I picked it up M-15 put on a distraction display, fluttering his wings but not fanning his tail open. Several times he went to the ground among the high weeds and fluttered away, "checking." There was a very little fluttering before I caught 15Y. *dis dis*

1025. I leave. 15Y has moved out of sight.

Return at 1345.

T-2: (Whip-poor-will is still incubating. She put on something of a distraction display for me, flying a few feet and landing with her wings spread. She also hovered in the air once in almost the position of a hummingbird, i.e., with her tail down, her wings fanning as if forward and backward.) *Same thing*

In 2-F's third nest, the one remaining nestling is dead with 2 ants in the nest. The bird is on its back, cold, but I suspect it died recently. I'll try to open the stomach to see if it was ever fed.

M-2 sings on the west side of the territory near the second nest. Since a female who is nest-building can usually be found near the singing male, I'll go and watch.

1403. 2F is on the ground with spider webs; she flies into the woods. I start waiting. I finally see her again and by 1425 trace her to the fourth nest. It is 13-14 feet high in an upright walnut tree fork made by 2 or 3 thick branches. Very early stage, probably begun today or late yesterday. No bottom yet; she seems to be making the walls first, which is contrary to the usual procedure. *Very* The walls too are very meager, the whole thing just a few fibers formed into a thin circular band. I'll measure the distance from the other nests when this one gets farther along; it is very close to the second, a few yards from the third.

M-2 sings a loud skid, also a fainter step song nearby. He sings several songs, then falls silent for a time, then resumes: 10-24 (abbreviated song); he quits when I begin to time him. He sings a skid, then quits again; not worth timing.

I'll leave the third nest here to see if 2F uses it to build the fourth. Once M-2 went to within 5 yards of the third nest and sang. At 1438 he's back by it again singing. He moves away; he never went to the nest.

I opened the dead nestling with a needle and found what seemed to be a small fecal sac. It looks as if he had been fed at least once if I'm right. His organs are still soft and wet so he probably died today; they dry out fast.

T-7: I made a short search for the nest without luck. M-7 sang.

T-5: I am nearly sure there are no young in the second nest. It is not visited by adults. I tried to climb to it but couldn't quite get there. M-5 sang frequently and I followed him for nearly an hour, covering the whole nest vicinity. I saw no sign of fledglings, and M-5 made no attempt to carry food, showed no concern over me even at the closest range. He moved about a good deal though staying near the second nest in the main. So the present indications are that no young ever fledged. This conclusion is supported by the fact that the nest is somewhat beaten up. From 6 feet below it is noticeably pulled apart (though slightly so) on the bottom. The Virginia Creeper around it is deranged. There is no sign of 5F.

M-5 paid no attention to a male Indigo Bunting *d. IB* when both sang within 10 feet of each other. He later flew to an apple tree and when I went to see if the young were there, I found a 4-foot Black *Bl* snake on the limbs. M-5 gave no sign that he had *Snake* seen it.

T-6: M-6 sings his old hoarse song and his "Golden-wing" song.

T-3, T-8, T-1: No sound heard from Prairie Warblers at 1600 as I pass through these territories.

T-11: 11F's new nest is now very substantial, and I'd judge complete. M-11 is silent.

T-9: The young are still in the nest here and both parents are feeding. I debated pulling the tree over to band, letting the young go, but decided they won't leave till tomorrow so I'll do it then. There are at least 3 young; they put their heads up when fed and also between feedings. 1625.

T-10 at 1630: 10F is incubating her 4 eggs. SY

T-8: (The Bob-white is on its nest. She flew and rolled a cracked [maybe she cracked it in flying up] egg out. There were 12 eggs in the nest, plus Bob white the cracked one [there used to be 17]. Thinking the cracked one would be disposed of, I opened it to find a live embryo in it, very well developed. It opened its eye while I was working to get it out of the egg, "cheeped" immediately after it was out. The eyes remained closed most of the time. The yolk was still sizable on the belly. The bird was lightly feathered. I put it back in the nest, without much hope that it will survive.)

(On June 15 I found an Indigo Bunting's nest IB nest on this territory in a little maple. There are no eggs today.)

T-3: I watched M-3 for 25 minutes as he sang for 2-3 minute intervals along the ravine at the northeast corner of his territory. Perhaps his

nest is across the ravine toward T-6.

T-5: On a recheck, still no sign of young.

T-7 at 1730: I found the third nest of this pair while I was passing through. It is about 8 feet up in the top of a dense little American elm, 20 yards from the first nest, 46 from the second. 7F was incubating. The first nest was loose and falling apart on the 12th when Horack and I were here; today there are only a few shreds in the tree with the bulk on the ground. Could it have been dismantled?

T-4 at 1740: 4F was calling below her nest. A pair of Towhees called in the nest tree and 4F came to the tree with her bill open for a second. Then she hopped slowly toward the female Towhee who flew but probably not because 4F was approaching. 4F then unmistakably approached the male, moving in short hops and not attacking it. After the male left, 4F started toward her nest. A squirrel chattered nearby (15 yards) in a tree, but 4F showed no response, entered her nest at 1755.

1800. I left the area.

(One of the flies from 13F's nest emerged from its pupa today, before 0830.)

June 22. There has been a severe thunderstorm with heavy rains from 1030 last night, still going on at 0730. Present from 0810-1210 and 1345-1600.

Arrive 0810. Wait till rain lets up a little; out of car at 0825.

T-2, T-1, T-11: Males all sing as I pass through their territories.

T-9: The young are still in the nest at 0835.
0836. M-9 sings a skid song twice near the nest. *Piding*
0837. M-9 takes a white object to the nest. I can hear the young buzzing. I can't see them because the leaves are wet and drooping. M-9 stays 20 seconds, leaves, sings in a big tree 15 yards from the nest.

0839½. M-9 comes in high with a big caterpillar, lands 15 yards from the nest, calls "check" several times. To nest at 0840.

0841½. 9F brings a green caterpillar. M-9 sings near the nest. The young are quite noisy when the adults come.

0845½. M-9 comes with green caterpillars. 9F comes without food, calls "tsu" 10 yards from the nest. The adults tend to stay as high or higher than the nest.

I decided to take the nest down and band the young. With difficulty I pulled the tree down and put my hand around the nest with the young in it, removing the whole thing.

There are 3 young. I put the nest with the young in it in a paper bag, took it to a bare spot and transferred each young to a cloth pouch for weighing, then banded and released each in turn. The young squawked when I closed my hand over the nest and as I took each from the paper sack. The adults of course were highly disturbed. M-9 put on a beautiful distraction display 3 feet from me on the bare ground, calling, fanning his open wings very fast, spreading his tail wide and dragging it behind him. He kept this up for 30 seconds or more. As I released each bird I squeaked to draw the adults' attention; they responded well. On releasing the second young I saw M-9 with food in his bill so I have no worry that the adults will not tend the young. The young are full sized and I'm now confident that this is their tenth day. *dist. dis.*

Data on these young follow:

The brood mark is silver over blue, right leg.

2162078 - *DP*Y, 6 gm., 230 mg.;

2162076 - *DP*G, 6 gm., 810 mg.;

2162077 - *DP*R, 6 gm., 680 mg.

0917. Ten minutes after the last release, both parents have quit calling. M-9 sings a skid song near the nest site. This nest was wrapped around the side of a limb, was 12 feet high. 9F begins calling "check" 7-5 times per ⁵seconds when I stand

up. I'll leave the territory.

T-10 at 0930: 10F is not in sight but her nest with its 4 eggs is not very wet. M-10 sings ^{9 N} twice at the south end of his territory.

T-14: I spent 30 minutes walking through this territory without seeing any sign of a Prairie Warbler.

T-15: It took me 40 minutes to find a young bird (at 1040). 15F was with it, 1 foot from the ground, 45-50 yards south of the nest. She showed alarm at my approach, stayed in one spot, and finally I saw the fledgling. I had covered the territory, heard M-15 sing twice, seen nothing (except a Field Sparrow's nest with 4 eggs, 1 foot high between 2 blackberry stems). Note the silence of M-15; is it because young have fledged? ^{pos 50}

15F was "tsu-ing" 4 times per 5 seconds, also calling a few "checks" when I got warm in my search for the fledgling. She ate all the food she caught at this time.

The young still has down on its head, though less. It looks more feathered. The tail is still very short, $\frac{1}{4}$ inch. It was watching me curiously when I saw it. I'm now 8 yards away behind a tree. The fecal matter on a leaf under the young looks as though it is in a sac. It sits with its legs so folded under it that I can't see the bands, i.e., it's in a typical juvenal position with the tarsus

and leg together. A house-fly sized fly lands beneath the young and it seems to watch it. It edges along the limb.

feeding

1051. 15F feeds it and it simply opens bill, silent and motionless. It doesn't grab at the food; 15F thrusts it hard into its mouth.

1052. 15F feeds again. The fledgling turns its head as she comes near, gapes a little after feeding and until she turns away. No noise or fluttering.

1055. Twice it seems to doze, slowly letting its eyes close; then opens them again.

1056. It raises its head and opens its bill a second though the female is not near; perhaps at a fluttering leaf.

1057. 15F has been gone a minute or two, now returns, seems alarmed by me again. She calls about 3-4 times per 5 seconds ("tsu"), but with much irregularity in the intervals.

1059. The young dozed off for 20 or 30 seconds.

1101. 15F gives young a large green caterpillar. Young is silent but stretches so far that its head trembles. It then keeps dozing off, eyes slowly closing, then popping open and immediately closing again. Its balance on the branch is still a little poor; it rocks slightly.

1104. 15F lands 3 feet above the fledgling with a small white moth. Its head rises and points up. She hops to it and there is the usual feeding. It

keeps bill open a little longer as she goes away.

1105. M-15 sings a skid 10 times, then half of a step song.

1106½. 15F feeds the young again. It dozes for 40 seconds. It has defecated twice in this spot, sits ½ inch above the leaf where excrement fell; flies gather around. I should think it would be disturbed.

1109. 15F passes in front of the young with food, hops out of sight behind it in her approach, and its eyes close before she gets into feeding position. She feeds as usual; young gapes after feeding, extending its open bill toward 15F.

Query: How do the other young survive when a parent devotes so much attention to one? *2. 1st young?*

15F calls the entire time she forages for food, 3-4 times per 5 seconds. I don't think I'm causing it; it is probably a signal to the young. She stays within 20 yards of it, most of the time closer. It still dozes, then opens its eyes.

1115. I'm going up to identify it. The male comes up just as I begin to approach. The young lets me get 2 feet away, but when I put out my hand it

screamed and flew strongly for 10 yards, landing 7½ feet up in a maple. 15F puts on a distraction display of the usual sort, quite prolonged, calling loud and relatively infrequent for this display.

She hangs onto the side of a little tree and flutters her wings, too. The young is 15R. I got under it *dis' dno*

to look and it flew 4-5 yards to a tree limb 8 feet high, both adults following.

1120. I leave the territory; I hear a song that might be M-14 in the distance but I can't tell its direction accurately.

T-4 at 1125: 4F is on the nest, looking out now and then. M-4 sings skid songs from 20 yards or so away from the nest during one short period; perhaps 10 songs in 3-4 minutes.

1150: 4F is still on the nest, so I think I can assume the eggs are not hatched yet, which is what I came to learn. She looks out a good deal. I leave.

T-1: I walk through this territory to leave and find a nest with 1F incubating. It is about 20 feet high on the outer branch of a 30 foot cherry sapling, near the road. It is pensile with only about 1/4 or 1/3 of the rim attached to a branch. The nest sways with the breeze and I don't give it much chance of succeeding. Under it is a broken shell of a Cowbird egg, in many pieces but an entire egg. Since it is directly below, I'd guess it is from this nest. [This was all an error; I later saw this nest was a Red-eyed Vireo's.]

T-2: The 4th nest is considerably advanced over yesterday, with its bottom in. The walls and bottom are still flimsy though; I can see through them.

(I notice many white blotches on this nest,

spider webs or insect and other arthropod egg cocoons. This is true too of 11F's nest, so perhaps it is characteristic of late nests.)

I leave at 1210.

Return at 1345.

T-8: M-8 sings on the north end of his territory.

T-3 and T-6: The male is where he was yesterday and I wander around in the ravine looking for the nest. I go north of the ravine and at 1445 find a female carrying food, a male following her. I'm on T-6. In a few minutes she goes to a nest 10 yards from me and the young cry out and beg for food. The male follows the female wherever she goes, both calling a little. I'm much puzzled to identify this pair. The male isn't M-3, who sings across the ravine. M-5 sings to the west. The male is fairly marked but without really sharp lines; his back is average red. He sings several songs, some a normal step, some hoarse like M-6. The odds are that this is a second brood for the 6s since I'm on T-6. This nest is 116 yards from 6F's first nest and on the south end of the territory while the first was on the north end. I see no sign of the young of the first brood. Now M-6's song comes from a male nearby, I assume the male I've just been watching. The female feeds these young while I watch the nest, bringing white moths a couple of times. The male switches from an M-6-like hoarse skid to a

m-2d7
btfw/par
TS

fainter, higher step song. The male is very active bringing food.

I am going to band the young. The brood mark is silver over yellow, right. There are 4.

2162075 - G;

2162079 - R;

2162081 - Y;

2162093 - B.

The banding was accomplished without alarming 6(?)F too much. She fed 2 while I had 2, fed the brood several times when I had finished; also removed a fecal sac. For the time being I'll call this the 6s' second brood.

These young are extremely noisy, about 5-6 days old; they gape at a mirror or my hand. They have their eyes open. (The youngs' wing feathers haven't come through their quills yet.)

M-6 and M-3 sing as I band. A flycatcher, probably a Pewee, chases 6F.

*see
Pewee*

The nest is is a hackberry witch's broom. The tree is 20 feet high; the nest is about $7\frac{1}{2}$ feet high on the outer end of a branch.

1556. I must leave. The female is feeding the young and all seems normal.

1600. I leave.

June 23. Sunny, sultry and clear after a night shower. 76° at 0800. Present 0805-1250.
Arrive 0805.

T-2: (The Whip-poor-will is still incubating.)
The new nest is well advanced and looks finished from the outside. I see there is a snakeskin used for nest material on the outside.

T-1: M-1 sings from the brushy area which used to be the south part of T-2. M-1 was silent during the 15 minutes I was on his territory, not in sight. 0830. I leave.

T-8: I spent 25 minutes here, without any luck in finding a nest. M-8 was silent.

(The Bob-whites have hatched. Each of the 12 eggs is neatly cut in a circle around the large end. The young I gave a Caesarian to is dead.)

(I found an empty Indigo Bunting nest 1½ feet high in a 2 foot dogwood on the line between T-8 and T-3. The male was calling above it.)

T-3 at 0855: M-3 sings in a big dead tree growing from the ravine at the north end. He is here most of the time now; I seldom see him away from the ravine. While watching I saw 3F below him but lost her in the breeze. I began a search for the nest and at 0925 found one 60 yards from M-3's song tree, on the hillside not far from the first nest. It is exactly at eye level in a 15 foot hackberry. It is built on

top of a little branch that grows down from a main branch; a leaf is pasted against its side with spider webs. It is empty and it is obvious from the condition of the inside that no young ever fledged from it. Under it is one broken egg, either fairly old or bleached by rains.

M-3 sings a buzzing song during my inspection. Obviously the third nest is reasonably near here.

M-3's consistent singing from the same dead tree is my only solid evidence that male Prairie Warblers have song posts.

(I found a Field Sparrow nest with 2 eggs and 1 Cowbird egg, 4 feet high in a little 6½ foot elm covered by Virginia creeper; a good Prairie Warbler site. The female is incubating.)

T-7: M-7 sings near the pines, which he obviously claims for his territory. 7F is on her nest, which is 9-10 feet high. (Near it is a 2½ foot juniper with a Field Sparrow nest with 4 eggs, 8 inches high.)

I watched 7F for 6-8 minutes, enough to be pretty sure her young have not hatched. She has her bill open for 30 seconds at a time, almost half the time all told.

Query re status of 7F's nest; 25 minutes later while looking for 5F's new nest I saw a male who I thought was M-5 carrying an insect. He took it to a big tree and when I went there I found the tree was only 20

yards from 7F's nest. I am pretty sure he was M-7. Also, 7F sits up on her nest with quite a gap between her breast and the nest wall. I would now say she may have young. Or, conceivably M-7 took *hot dog* food too early.

T-5: M-5 sings regularly in a big tree at the sink hole. It now seems clear that this pair's second nest never fledged. He is silent when I leave at 1030.

T-6 at 1030: The young in the nest are quite noisy, gape and call even in the absence of the adults and do so madly when 6F comes at 1035. M-6 is silent. Note that yesterday he never fed young though 6F must have made 15 trips in the 40 minutes or less I was here. (Her feeding was the most rapid I have seen except that of 15F just before her young fledged.)

1037. 6F feeds again and I can see one young waving its wings, one of which hangs over the nest rim.

1038½. 6F is back, calls "check" and goes to the nest with food, then flies past me calling "check." This is certainly the most vigorous nest I've seen.

1040. I leave this territory.

T-8 and T-1: The males sing on their territories, M-1 a high step song.

T-11: M-11 sings; 11F is not at her nest.

♀ N

T-9: On my arrival I hear young calling about 8-9 times per 5 seconds. I immediately see M-9 fly from the strip of woods, 9R flying after him. 9R flies at least 10 yards, lands 10 feet up in a cherry sapling which sways a lot in the breeze. M-9 feeds it 6 times in 5 minutes between 1100 and 1105, singing 5 times during the period, all step songs. 9R moves a lot, probably mostly because of the breeze. It sidles along the limb, turns around. Calls madly when M-9 approaches, once flutters its wings and begs when M-9 is not there. It flaps its wings pretty violently once to keep its balance.

1106. M-9 sings 6-8 loud step songs.

1108. M-9 feeds 9R whose voice rises almost to a squeak when M-9 gets quite close.

1109. Repeat.

M-10 sings a skid to the south. A young bird calls in the strip of woods to the north, so there are 2 fledglings alive here, at least. M-9 sings regularly: 15 - 12 - 25; I began to time as he quit. 9R is sitting quietly.

1113½. M-9 sings once. He is near the middle of his territory.

1116. M-9 sings once. I can hear a young bird calling near him in the central part of the territory, so all are alive and he is alternating his attentions. The fledgling call is a dry "tunk."

1117. M-9 feeds 9R, who begins to call again, but

tapers off to single occasional calls till M-9 comes again at 1118.

1118. 9R gapes and calls after being fed a green cricket or locust, whose leg sticks from 9R's mouth.

1119. M-9 feeds again, but 9R is not very enthusiastic.

1119½. Repeats, offering a white moth. M-9 is singing fairly frequently but irregularly, always step songs. I'd guess the young are 20, 25, and 65 yards from the nest. This is conjecture though.

1121. M-9 feeds 9R again. Then he goes to the north side of the strip of woods and sings. Note he pays no attention to me though I'm 15 yards from 9R.

1125. I leave this territory.

T-10: M-10 sings his usual skid on the center of his territory, west of the nest. 10F is on the nest, where she is very hard to see. I'd rate this nest in its witch's broom as very well concealed except from above and fairly so from there.

I chased 10F off the nest; the eggs are unhatched. This is a very pretty set, shiny and white with chestnut spots, the spots more scattered than usual and extending toward the small end.

(I hear the year's first cicada.)

I leave the territory at 1136.

T-14: I find M-14 feeding silently on the west side of his old territory where the nest was.

I made a short search for a nest without luck.
I can't understand M-14's total silence most
of the time.

(The Whip-poor-will here is still brooding.)

T-15: I looked for 15 minutes or more without
seeing a sign of this family, but I'm sure they
must be here.

(A male Towhee was feeding a begging fledgling.)

T-4 at 1220: 4F is on her nest, sitting quite
high up in it as though she has young. She keeps
her bill wide open much of the time. About 1236
she begins to look down into the nest and to put
bill in and poke around. By 1245 she is putting
her bill in so much that I think the young have just
hatched or are about to.

fy
bill
open

M-4 sings high step songs from 1240 on.

4F still sits high on the nest, her bill
open almost constantly. She has done so for 30
minutes.

I leave at 1250.

June 24. Sunny and clear with a southwest breeze.
67° at 0655. Present 0800-1300 and 1810-1920.
Arrive 0800.

T-15: I walked through slowly, without observing a sign of the 15s. Note the silence of this male after his young fledge.

(I flushed a Woodcock from the marshy area.)

(Two days ago I found a Field Sparrow nest with 4 eggs and erroneously said it was in a blackberry. It was in an elm tree 2 feet high. Today 8½ yards from it I found a Field Sparrow's nest with 3 eggs, 1 foot high in blackberries. Both females are incubating.)

FS
3

T-14: I made a search here without luck.

(The Whip-poor-will is still incubating.)

Shore
Whys

On the strip of good habitat south of III (on which I found 10F's third nest) I found a female Prairie Warbler. She caught a caterpillar and flew north into the tree row with it and I lost her in the breeze. A 15 minute search here revealed nothing. This might have been 10F of course, but I suspect it was 14F. I have seen M-14 on the west edge of this strip and clearly the old territory is not much used by the pair. This guess was confirmed somewhat by the fact that at 0910 10F was on her nest incubating her 4 eggs. The spot where I saw today's female was only 20 yards from 10F's third nest, but the 10s aren't using this strip any more.

T-10: 10F is incubating 4 eggs; M-10 is silent. 9Y

T-9: I found M-9 singing a typical skid, a step, and a type-#8 song. I went to the spot and 9Y flew out of a clump, going 11 yards to a cherry limb, 5 feet high. *limb*

0925. M-9 fed 9Y. I'm fairly sure 9Y wiped its bill on a limb. M-9 sang 5 yards from it.

0926½. M-9 fed 9Y with no begging or gaping. The fledgling wiped its bill in typical adult fashion. It sits with its leg and tarsus bent as young birds usually do.

0928. After singing M-9 fed 9Y who vibrated its wings, while reaching out, and gaped after feeding.

It now preens its primaries, then behind its left wing, then behind its right, then its back.

Note that 9Y has been altogether silent so far.

M-9 sings to the north near the tree row. 9Y is on mid-territory, 90 yards from the nest site.

M-9 is moving about a good deal singing.

0934½. M-9 comes to 9Y's tree and 9Y calls a very faint note 4 or 5 times, is fed. M-9 "ticks" twice after going 5 yards to a tree to search for food.

0936. M-9 feeds 9Y, who opens its bill wide, trembles, gapes till parent leaves. No sound I think. M-9 forages 5 yards away, sings a step.

0938. M-9 feeds 9Y---no sound, no trembling. M-9 then forages in 9Y's tree, singing a step song; he flies away to the north, sings a step there

1 minute later.

0941½. M-9 flies to 9Y's tree. 9Y is not looking; it sees the adult only when he jars the limb by lighting. There is a silent feeding. M-9 sings.

0942½. M-9 feeds 9Y. 9Y seems to be dozing with its eyes closed most of the time. M-9 sings a step frequently near by.

0944½. A feeding again, 9Y closing its eyes immediately afterward and while still gaping a little. M-9's song interval: 16 - 40 - he moves away. Some songs are as frequent as 10 seconds. 9Y sleeps even when the wind sways the tree

greatly. At a noise from me it opens its eyes.

0950. 9Y with its eyes closed opens its bill wide, then closes it. M-9 has been silent during the last 4 minutes.

0954. With its eyes open 9Y opens and closes its bill.

0954½. M-9 comes silently, feeds 9Y who vibrates its head while gaping for more. M-9 in 9Y's tree sings a step song 3 times about 10-12 seconds apart. He moves off and sings: 11 - 14 - 10 - 13 - 10 - 20 - 23 - 11 - 8 - 8 - 12 - 12. I quit.

1006. I leave the territory.

T-11: I found 11F feeding 3 feet above the ground 187 yards south of her nest, i.e., about on the edge of the territory.

T-13: Passing through, I heard M-13 sing on the west side in or near the woods.

(The Indigo Bunting's nest Frank Horack and I saw being built is empty.)

T-12: I found M-12, 12R, 12G, and the unbanded young together in the locusts 30 yards from the nest. The young are full-grown and apparently molting into the first winter plumage. Their bellies are bright yellow with a few streaks on the sides. Breasts, throats, and heads are juvenal gray brown with heads quite gray. Backs are a nondescript olive. Heads and the front halves of the birds are a little frowsy and ruffled looking. Tails are full-grown. Actions are just like adults' with nervous tail flipping. They were silent but for an adult-like "check" that the unbanded bird uttered. In the grove with them were young buntings, a vireo, etc., so a begging sound I heard may have come from other species. M-12 came to my squeaking and "checked" in a nervous way very near me. I would guess he is still tending the young. The absence of 12F is significant; I searched without luck for a nest, but made only a quick search.

T-8: Silence, so I went to T-3.

T-3: M-3 began singing after I had waited a short while, from his usual position near the ravine. I searched without success for a nest until 1130. I saw a Broad-winged Hawk fly over with what looked like a mole, later without anything. A Pewee chased M-3 during the time I was here.

long Pewee

T-6: I had a very interesting time here. I was greeted by 6F with "checking" when I arrived. She had caterpillars in her bill; collected more, went almost to the nest and left it. I saw no sign of young. She soon returned with no food, went to the nest "checking" and picked around in it. Young gave no response so I went to it. It was empty except for 6(2)R's body in it. At this time M-6 came up and began to follow 6F about as she called "check," most of the time harshly. At his arrival one of them made a little call I cannot describe, but which I have heard and described before as uttered between a pair when they join each other. Once he flew at her, gliding over her head and landing nearby. She fluttered a bit in flight. They behaved as if they were going to reneest. Once 6F chased M-6 and he sang a high step song in flight.

*feeding -
dead
gg*

3F

Then suddenly 6F began a distraction display. It was of the usual sort with calls 12-15 times per 5 seconds, also with her bill opened. Her tail feathers have been lost to a great extent so there was little tail spreading. She kept it up near me for

des ch'

not

3 minutes. I was surprised at this since she had paid relatively little attention to me for the first 10 minutes after I arrived; also it seemed a long display. Then I saw a 4½ foot blacksnake on the ground right under the nest tree. It glided away at my advance. Ten minutes later 6F began to display again, and again I found the snake under the tree. It got away before I could kill it to examine the stomach and see if it ate the young. (There were no large lumps on its body, but probably the snake is thick enough not to show any.) About 10 minutes later her "checking" greatly increased at the nest tree, but I found no snake. *Bl snk*

She went to the nest without food some 6 or 7 times. I got 6(2)R, found 5 maggots of the sort that I've taken from nests, eating it. There was no sign of how it died. The primaries are ¼ inch through their quills. I'd guess it was in its 8th day.

I heard the typical "tunk" of a begging young 60 yards east of the nest and went there expecting to see a nestling that had escaped. I found instead 6Y from the first brood, apparently begging from M-6 who was in the same tree singing. This young is moulting. Only its head is still juvenal, the under parts clear up to the throat being yellow. The upper side is olive-greenish. *docs*
ys

The head is gray and tousled looking with some downy-looking feathers standing up from the normal head contour. This bird begged with the same sound as a very young bird utters. I heard it twice but didn't see it. Each time M-6 was singing very near 6Y.

1255. I leave; 6F is still calling around the nest but not in alarm.

I forgot to mention that 6F's calling when displaying attracted 2 Field Sparrows and 1 male Towhee.

*nothing
me*

T-2: On leaving I looked at 2F's third nest. It has obviously been picked at. The grass lining is nearly gone, the soft everlasting is pulled loose and sticks out into the nest cavity. It may have been used for the fourth nest; if the fourth has everlasting (which has ceased to bear down), it will be clear that the third nest was used.

T-7: 7F is on her nest at 1300.

9 Y

1300. I leave the area.

1810. I return.

T-4: 4F is not on her nest when I arrive. M-4 sings a faint step song nearby. I wait 35 minutes without any sign of Prairie Warblers nearby.

9 N

1845. 4F begins to call "tsu" and I spot her above me with food in her bill. I had almost decided the nest had failed. I now conclude it is still active

and I don't wait for her to go to it since she seems to be quite nervous.

I leave T-4 at 1855. Note 4F's long absence from the nest, the fact that while M-4 sang quite close he never came to the nest.

T-1 at 1857: M-1 is singing his usual skid song on the center of his old territory. He sings 3 or 4 widely separated step songs south of the road in the period until 1915.

1915. I leave the area.

June 25. Sunny, hot, some breeze; temperature 79° at 0800. Present 0815-1210 and 1545-2030. Arrive 0815.

T-2: M-2 is singing.

T-8 at 0825: I walked in west of the valley and at 0855 heard M-8 sing. I found him with an insect in his bill, in the woods along the ravine. At 0915 after searching I found the third nest, 17 feet high on the outer branch of a big dogwood, very well concealed except possibly from above. The nest is about at the spot where M-8 and M-3 used to dispute territory; evidently M-3's move north relinquished this to M-8.

M-8 fed the young with green caterpillars, having some difficulty in getting them to eat; removed a sac. These young are probably 3-4 days old (based on timing---I can't go to the nest). This nest will be very tough to reach for banding [I never could]. M-8 sings faint step songs near the tree when he comes with food. I saw no sign of 8F. I left the territory at 0925.

(I found a Field Sparrow's nest in an 8 foot elm, 5 feet high, poorly concealed. There are 2 Field Sparrow young, 1 Cowbird young, 1 egg. Obviously they just hatched. The female was on the nest.)

FS
2 + 1 egg
1 egg

T-3: M-3 was singing near his ravine and I began to follow him. I saw a Prairie Warbler go into an elm tree at 0945 and found a nest there, 3F's third. It is in the top branches of a big elm growing out of the bottom of the ravine, perhaps 25 feet up from the ground, but near eye level as you stand on the slope. It seems fairly well concealed by leaves. I will have to watch to try to learn the stage of the nesting cycle. 3F was not on the nest, so probably the Prairie Warbler I saw go to the nest carried food. The nest tree is 20 yards east of M-3's singing tree. 1030. No sign of either adult near the nest, except M-3 sang fairly close for a 2-3 minute period. It now seems that this nest is abandoned, and recently if the adult's visit which led me to the nest means anything.

1033. I quit watching the nest; spent some time watching the hillside to see if perhaps 3F is building a fourth nest. Saw nothing and M-3 was silent, which may be significant.

T-6 at 1050: I saw no sign of 6F; M-6 sang 3 or 4 times near the second nest. The wind interferes with me a good deal.

T-5 and T-7: M-5 sang on his territory. I saw a male gather a big bunch of worms on the west side of T-6, then head toward 7F's nest. It was

probably M-7, but he is way off his territory, perhaps 150 yards from the nest.

7F is on the nest with the head of a young bird protruding from under her. It looks 3 days old. 94

T-2: 2F is not on her nest. M-2 is silent (he sang when I arrived this morning). 9N

1210. I left the area.

1545. I returned.

T-1: M-1 sings a high song.

T-4 at 1600: The female was not at the nest and I watched for 15 minutes. She then appeared near the nest calling "tsu." I followed her for 15 minutes as she fed, eating all the food herself. I lost her, returned to the nest and she came back to the vicinity with food and I left. Note her long absence from her nest when the young are 3 days old at the most. Note M-4 is not helping with the feeding.

T-10 at 1645: In the nest were 3 young, 1 egg. 9N
1651. 10F comes to the big hackberry with food. She calls a few faint "tsu" notes. feeding

1653. 10F comes to the nest but is nervous about me and doesn't feed. She hops away, moves about in the trees 5-10 feet from the nest and finally eats the food herself. This is the first time I've ever seen that. I retreat to a more distant post.

1657. 10F goes to the nest without food and begins to brood. M-10 is silent so far.

1705. 10F leaves the nest, hops about in little trees nearby. There are 5 mixed hackberry and maples within 10 feet of the nest. Seven yards from it is the big hackberry.

1710. An adult Prairie Warbler, 10F I think though it could be M-10, flies south from the big hackberry, going 30 yards.

1712½. 10F comes to the nest with food, feeds, stays 30 seconds poking in the nest. She leaves and begins to hop about near it. M-10 comes up and 10F begins to "tick." She goes to the nest tree without food, passes on. M-10 follows, going below the nest and paying no attention to it. He has no food. He follows 10F to a point 15 yards from the nest. She gets food, at 1717 goes to the nest and feeds for 25 seconds. She leaves and hops around on the weeds and ground 10-20 yards north of the nest. M-10 follows her in short flights. One "ticks," I think 10F. M-10 just moves along near her (2 feet at times, at others farther). Each has its bill open for a few seconds at different times, probably due to the 93° heat.

1721½. 10F goes to the nest, feeds, stays 45 seconds picking in the nest, perhaps eating something. I am 18 yards away and the view is poor but she is nervous if I go closer.

1728½. 10F flies in high to the hackberry, goes to the nest without much delay, feeds, stays 20 seconds, hops to the ground below the nest.

1730. 10F goes to the nest but I can't see if she has food. She stays 20 seconds, then goes to the ground under the nest. She gave 1 "tick" just before going to the nest.

1737. 10F goes to the big hackberry. She gives 1 "tick" (not "tsu" but the harsher call), goes to the nest and feeds. She puts her bill into the nest many times for 1 minute, several times seems to eat something, hops to the ground under the nest. She hops up on a weed, opens her bill, goes back to the ground again. A faint step song must be M-10; error, since it is to the north and there is a skid song to the south which is typical of M-10. He repeats several times (1745), goes north and sings a loud step twice 25 yards from the nest. Then he switches to a skid.

1746. 10F is hopping near the nest. She goes to it without food and looks in, hops below it to the ground. In a minute she goes to the nest tree but not to the nest, hops around on the weeds, flies some 20 yards away and calls "tick" 5 or 6 times. Meanwhile M-10 is singing a loud skid on the north limit of his territory.

1752½. M-10 is now singing skids 35-45 yards south of the nest: 11 - 15 - 15 - 15 - I quit.

1754. 10F flies to the nest and feeds the young. After 25 seconds she hops down below the nest, then to the ground, then up into a little tree nearby.

She moves about in the little tree till 1758, then returns to the nest tree but not to the nest. She hops onto a weed. Note she is foraging very close to the nest. (On a recent trip to the nest with food, 10F yielded place to a Field Sparrow who flew at or to her. I forgot to note it.)

1803. M-10 skids twice to the south of the nest, then steps. He is probably 40 yards or more away. He moves closer, skid-singing at intervals of 15, 13, 12 seconds, then quits. This is fairly typical of a male's singing at this stage of the cycle, a few songs and then he quits.

1806. 10F goes to the nest with food, stays 45 seconds and may have eaten something. She hops to nearby trees. All the food is very small and unidentifiable.

1813. 10F flies into the big hackberry from the ground 20 yards from the nest. She moves to the nest in 3 or 4 flights (she's not affected by me at all). She calls "tick" lightly twice. She feeds young, eats something, hops to the ground under the nest after 30 seconds there. Now she searches in low growth quite near me, 10 yards away.

1818½. 10F goes to the nest and feeds. She stays 1 minute, pokes in the nest, hops to the ground but not under the nest. I can see her hunting 6 feet from the nest.

1823½. M-10 skids near the nest: 15 - 15 - 10 -.

1824. 10F goes to the nest, feeds, may have eaten something; leaves in 30 seconds. She then catches food on the nest tree, eats it, flies to a blackberry stem. M-10 flies to her, flutters just an inch or so above her as though to copulate, sings while fluttering and flies away 8 yards. She follows calling "tick" or "check" a few times. He flies to a tree 6 yards from me, sings a skid, flies a long distance southwest. She is hunting near me in the grass and weeds; I can hear her call.

♂ ♀

W-1

1831. 10F goes to the nest, feeds, after 25 seconds hops to the ground below the nest where she can be seen hunting among the weeds. She even hops about at the bottom of the nest tree, staying very close to home for all her food gathering. She is feeding within 10 yards of me when a Field Sparrow flies to a little bush she's in. 10F gives a high squeak and flies right at the Field Sparrow and drives it back 5 or 6 yards. When it lights she immediately flies at it again and drives it off. For some reason it returns and sits 10 yards from the nest on a little branch where it is allowed to stay.

gathering
disturbance

and FS

1900. I leave the territory after weighing the young. All are silent; I can't make them utter a sound. They weigh 1 gm., 490 mg.; 1 gm., 560 mg.; 1 gm. 600 mg. Opening and closing the foot is a

typical and frequent movement of these young and of others of this age. They gape of course.

T-9:M-9 is singing a regular and frequent skid song with some steps. He preens. I watch him and he finally gathers food, takes it to 9Y who was 10 feet from me, 1 foot off the ground; I hadn't seen him there. 9Y gapes but M-9 won't go quite close enough. 9Y then flies 20 yards to a limb 7 feet high, M-9 closely following. 9Y has no difficulty at all flying. M-9 immediately feeds him at 1910, then begins to sing a frequent step song at 10-15 second intervals. 9Y is getting quite well feathered, is grayish below, brownish-gray above. A little down is still on his head. 1916. M-9 approaches 9Y and 9Y gives a faint "ticking" sound rather like an adult's. M-9 gives him nothing, flies away. 9Y bobs his tail (very slightly) several times and then flies right after M-9. I then saw 9Y fly after M-9 again. He shows distinct white in his outer tail feathers now. 1921. After singing frequently, M-9 feeds 9Y who is perched on a blackberry stem. There is no wing fluttering.

9Y again flies after M-9, to a cherry branch 7½ feet high. I approach and he flies quickly 20 yards. M-9 follows close behind him in the air as before. It is amazing how well 9Y flies. He let me get 5 feet away before doing so.

1926. I leave the territory.

T-11: M-11 is singing a step song; 11F is incubating. It is too late to watch 11F so I go on. At 1940 M-11 is singing hoarse M-15-like songs near his nest.

T-3: The nest I found this morning apparently is not active. It looks a little tilted. M-3 is silent. I find M-8 gathering food on the north side of M-3's ridge, i.e., well onto T-3. M-8 is silent while here. I visited 3F's third nest at 2020; no adults were near it.

T-6: There was no sign of a female; M-6 was singing. I heard a young Prairie Warbler calling and thought perhaps a nestling had escaped from the second nest, but I found M-6 feeding 6Y twice. 6Y uttered the frequent, flat vibrant "tunk" and "patunk" of a fledgling.

2030. I left the area.

Reinterpretation re 6's: This could possibly have been second brood of 4 yg of this age - even if 6F began to build on 6/1 when first brood fledged. Also fact M6 w/ 6Y alone suggests 6F elsewhere w/ part of yg. This has to be 2nd ♀, possibly young.

June 26. Hot, sunny, and windy; temperature 80° at 0800. Present 0815-1150 and 1350-1820. Arrive 1815.

T-8 at 0825: An adult is at the nest.

T-3 at 0830: M-3 is singing from the hilltop. I find 3F but lose her because of the wind. M-3's song is faint, repeated 5 times; he then falls silent for 25 minutes. Then he sings about 10 times, is silent for 20 more minutes, sings 6 or 7 times. Next in 7 or 8 minutes he sings 3 or 4 times. I see no sign of 3F. The third nest looks quite a bit more tilted than it was when I found it yesterday.

5-2
25
10 5
20
4 2
4 7
59

Once I saw a Prairie Warbler fly into a clump of sassafras and thought since it was a male it must be M-3. Just then M-3 sang from another place. The bird I was watching emerged in 2 minutes and flew straight and far toward 8F's nest, so it was probably M-8 who had got well into T-3. There was no sign of hostility, if M-3 saw him (M-3 wasn't far away).

28

T-6: I spent 40 minutes here without seeing any sign of nest-building. As I left M-6 began to sing a Golden-winged Warbler-type song.

(I found a Field Sparrow's nest 8½ feet high, 4 eggs, female incubating, in a little elm sapling with Virginia creeper on it. This is the highest

FS
41

nest I've seen.)

T-5: I spent one half hour looking in the maple grove for a nest, without luck. M-5 sang frequently on his territory. He and a second Prairie Warbler sang step songs, both on mid-T-5. The second then flew to T-XX.

(I found a Field Sparrow's nest $1\frac{1}{2}$ feet high in raspberries; 4 eggs, female incubating.)

FS
4

T-7: I saw both adults come to the nest. Once M-7 and another Prairie Warbler sang, both on T-7. M-7 ignored the other. From today's observations it looks as if territories are beginning to dissolve.

FN

T-3: (While passing through I found a Field Sparrow's nest 4 feet up in a little elm; 3 young probably $2\frac{1}{2}$ -3 days old.)

FS
3

T-2: The female is not present at the nest; M-2 is silent.

FN

T-1: I looked for the nest without luck till 1130. I found M-1 singing a high step song at the road. Suddenly as he sat 40 feet up in a tree he began uttering the notes of a young bird begging for food. Then he switched to a song, back to begging, back to song; repeated 5 or 6 times. He kept this up for 1 minute. I expected to see a

AB
like yg (3)
singing notes

young bird till I saw that M-1's bill was obviously synchronized with all the sounds. This is new.

(I found a gray Screech Owl 8 feet high next to a tree trunk on T-1. It had its eyes closed but turned its head as I moved around. After much effort I made it fly but it flew into the grove by the road and no Prairie Warbler saw it I'm sure.)

Screech
owl

T-4: 4F is at her nest. The young have their heads sticking out.

94
71

1150. I left the area.

Returned at 1350.

T-15: Silence.

T-14: I decided to put real effort in on the strip south of III where I saw the female that was probably 14F the other day. After working over the east end near 10F's third nest, I went west. At 1415 I found a female calling "tsu." She became more vocal as I approached, began to call "tick" or "check." A male joined her, both showing alarm. The female caught a green insect and hopped about with it; in 5 minutes ate it. I backed off, began to look for the nest. At about 1500 I spotted it 23 feet high in a big hackberry. The nest was placed in a little upright three-way fork of a big limb

projecting from the trunk. I watched it for 10 minutes, during which the adults didn't visit it. I then climbed the tree, felt the nest and found it empty, pulled it down. When I had descended, I found in the nest the remnants of quills, etc., which indicates the young had probably reached the size to fledge. I began to look around, watch the adults, etc., and finally found a fledgling 30 yards from the nest tree. I couldn't catch it; it flew into the brush and I lost it.

I worked on this territory until 1630 without catching any young. The adults focussed their attention on 2 main areas and the female, who was the one I stayed with, seemed to have 2 young she was caring for, the male one. This pair is clearly the 14s, moved east from their original territory. The nest I just found and 14F's first exactly tally as to dates.

14F put on a distraction display once, tumbling down a little sapling 5 feet high and fanning her wings. This is typical, to cling to the trunk with the feet and descend as though falling. M-14 sang perhaps 2 or 3 times (or it may have been M-10 since the song was always distant).

dis dis

T-10 at 1630: The fourth egg has hatched. 1641. 10F comes to the nest and feeds, stays 30 seconds, hops down to the ground.

gn
feeding

1648. She reappears at the base of the nest tree but doesn't go to the nest; she forages and flies 20 yards away.

1652. M-10 sings a skid 3 or 4 times. 4

1710. M-10 begins a regular skid: 18-8-10-12-15-12 etc.

1711. 10F comes to the nest and feeds, stays 20 seconds, goes to the ground. M-10 continues a skid to the north. 20

1720. 10F comes to the nest with food. She stays 50 seconds, hops to the ground below. M-10 has just begun to sing to the north 35-40 yards, singing a skid every 10 seconds with a few longer intervals. 12

1727. 10F goes to the nest from the big hackberry, taking an adult insect. She stays 40 seconds, then goes to the ground under the nest. I can't see what she does at the nest; it is impossible to see this from any direction but above.

1729½. M-10 skids from nearer the nest than he's been today, about 20 yards. 12

1741. M-10 skids to the north: 18-15-10-14-quits. 4

(It just occurs to me that 10F's fourth nest had eggs which were considerably prettier and more spotted than the eggs of either of her other nests. But I never found others till after they were deserted.)

1746½. M-10 skids 8 times at intervals of 8-10 seconds to the west of the nest, probably 50 yards. 8

1748. M-10 skids northwest of the nest at 5-8 second intervals, 10-12 times; then perhaps 20 times at 10-15 11 20

seconds. I then heard the begging note of a young bird, or perhaps the churring notes of a fighting male. I went north to see if there were young there and found M-10 singing and also giving the "patunk" note over and over again. He often passed immediately into the song from the begging note, "begging" again as soon as the song ended. He was sitting in a little tree top and didn't move or seem excited, so I can't explain the reason for the begging. He kept it up 3 or 4 minutes, then fell silent. I don't think 10F came to the nest during my 1½ minute absence.

1800. I got 2 young to weigh: 2 gm., 160 mg.; 1 gm., 650 mg.

1806. 10F goes to the nest but I miss timing her presence there; it was probably brief. She leaves and feeds in the little trees near the nest. I get the other 2 young: 2 gm., 200 mg.; 2 gm., 200 mg. 1814. 10F goes to the nest, stays 2 minutes, feeds near the nest. There is no indication that she misses the 2 I have. M-10 goes into his singing-begging performance again.

I can't make the young utter any audible notes. Their ventral lateral feather tracts are showing up, branching just inside where the legs join the body, one branch running to the side toward the point where the leg joins, the other back to a point which will be the under tail, i.e., about to point even with the anal opening. 10F has been silent today. 1820. I leave the area.

June 27. Cloudy with showers early (probably at 0500); temperature about 72° at 0800. Present 0815-1350. Arrive 0815.

T-8 at 0825: I heard an adult calling "tsu." Suddenly the fighting or begging note came from behind me and I found M-3 calling there. He was 10 yards from 8F's nest, was unchallenged by the 8s. I couldn't see the object of his anger, if the call was induced by anger. The adult 8s are carrying food so I assume the nest is still active.

T-3: See above. I found 3F flying from east to west on the north side of the hill. She flew from high tree top to high tree top, in long hops. She was not carrying anything. I lost her. M-3 sang after I'd been there 35 minutes. He moved about a lot, sang for perhaps 5 minutes. I'm about to conclude that there will be no renesting. I spent 1 hour here.

T-6 at 0930: I saw no sign of 6F. Then I heard begging and found 6Y and M-6. M-6 sang regularly for 3 minutes. 6Y followed him wherever he went. When 6Y lost M-6 and M-6 later sang, 6Y immediately flew to the tree from which the song had come. ← Probably there will be no renesting here either. M-6 moved about a lot on the south end of his territory.

6Y has a white eye ring.

T-5 at 0943: M-5 silent. At this time M-5 began to sing on the center of his territory. About the same time a begging note came from the east part of T-5 and I found M-6 and 6Y there. M-5 later showed up there (I don't think he came over because of 6Y's notes). He was in the same tree with 6Y, probably with M-6; yet he paid no attention to 6Y at all. M-6 was silent. Soon M-5 went back to the center of his territory and began singing. A little later M-6 sang on T-5 but M-5 paid no attention.

T-7: M-7 was singing as he had been all morning. I found him earlier 25 yards south of his second nest on the edge of M-3's hillside.

I saw 3 young on the nest here.

T-2: M-2 sang on the northern part near the power line, a regular step about 10 seconds apart. He then moved to near the nest and sang. There was no adult near the nest at 1000.

T-1: M-1 sang.

T-11: 11F was on her nest at 1020. M-11 sang at the edge of the meadow at the opposite end of the territory. He interspersed his songs with the begging note I began to hear in M-10's song yesterday.

T-9: M-9 sings regularly, every 8-15 seconds, mostly step. I see him carry food and find young, perched 6 feet high in a dense tangle. I sit to watch. It preens its back, wings and breast like an adult. It stretches up a little. When it raises its wing to preen I see there is still bare unfeathered skin there. It has a broken white eye ring.

The young sits with its bill open several times, leaving it open for 10-20 seconds at a time. The temperature has become very hot. Young preens itself 3 or 4 times, stretches its left wing and side, flips its wings a little but probably in connection with preening. It turns on the limb and sidles along and then seems to perch with legs extended for 2 minutes or so, i.e., sits like an adult. Its tail has grown and is now about 1 inch long, perhaps a little nearer $\frac{3}{4}$ inch.

M-9 sings nearby. The young, 9R, had just stretched and preened and I saw its band. It begins to call when M-9 approaches. M-9 feeds it and leaves and 9R follows, flying to a tree 15 feet away, then making 2 more short flights after M-9, calling. I can hear a begging note 20 yards away so I assume 9R has followed M-9 on farther. I leave the territory.

T-10 at 1055: M-10 is singing, 10F brooding

when I arrive. I make the mistake of frightening 10F from the nest. M-10 begins to call "pa-tunk" and to sing, shifting from one to the other. The song is at regular intervals with the call notes in between. He is north of the nest on the territory's boundary. Sometimes the call notes are extremely rapid, 18-20 every 5 seconds. They sound about equally like begging and a male's fighting notes.

*Male 13
calls
now*

1103½. M-10 flies to the big hackberry and sings skid 5 times, moves north and sings from there with some calling of the same sort as before though not so rapid and vigorous.

1112. 10F arrives with green caterpillars. She goes to the nest silently (note that this is typical of her) and feeds, looks into the nest 45 seconds, hops out and goes lower into the nest tree and I lose her. I stand and discover she is back on the nest brooding.

60

M-10 quits his singing and calling at 1112.

1123. A Prairie Warbler sings from the direction of 14F's nest; I think it is M-10 though, on the far southwest corner of his territory. It is; he returns and sings 35 yards northwest of the nest. He sings almost continuously but at quite irregular intervals, e.g., 10 seconds, 60, 30, etc. Perhaps the majority are about 15 seconds apart.

1129. A farmer drives a tractor within 20 yards of the nest. 10F continues to brood. The sun is directly on the nest so I'd guess the brooding is to shield the nestlings from it. *noise* 15

1133½. 10F hops down the nest tree to the ground.

1136. M-10 begins his singing, with a few calls, on the north edge of the territory. I stand and find 10F sitting very quietly in the shade under the nest on the nest tree. 5

1140. 10F is still sitting below the nest, with her wings slightly extended from her body at the wrist; this is doubtless connected with staying cool. M-10 sings and calls a little.

1141. 10F goes to the top of the nest tree, then to the big hackberry.

1144½. 10F goes to the nest with a green caterpillar; stays 30 seconds, goes to the ground beside the nest. M-10 sings a skid to the northwest. I can see 10F catching food 15 yards from the nest. She "ticks" once. M-10 now sings 25 yards south of the nest, flies to a hickory 35 yards to the southeast. 5

1155. M-10 has been singing for 4 minutes from the north end of the territory. Now he moves up to just east of the nest and over my head and sings 4 times. 12 ✓

1205. M-10 begins to sing northwest of the nest; sings 8 times at 5-8 second intervals. 8

1207. 10F goes to the nest with much food, stays 1

minute, then goes to the ground under the nest. M-10 begins the strange calling notes on the north edge of the territory, mixing them with his song. I'm going there to try to see why he always calls at that point. I find him south of the edge of his territory, 35 yards from the nest. He continues calling but there is no way to tell why. He catches and eats a caterpillar just after calling, flies a long way to the west. 10F is still near the nest when I return 1 minute later. She gives 1 "tick" call. M-10 flies to the big hackberry, sings a skid. 10F hops to the nest tree, "ticks" several times at long intervals. M-10 moves away and sings, still close by.

I go weigh young. The first two weigh 2 gm., 810 mg; 2 gm., 800 mg. On these two the primary quills are 1/16 inch through the skin, the wing coverts less than that. Dorsally, quills have appeared on the interscapular tract, the humeral tract (scapular), the femoral tract, and a few on the crown (these are just dark marks under the skin). Two rows are through on the first leg joint (crural). The ventral tracts show clearly. Both are silent, kick and struggle to turn right side up.

The other young weigh: 2 gm., 860 mg.; 2 gm., 050 mg.

1230. M-10 is calling his odd notes repeatedly 30 yards northeast of the nest.

The sun shines into the nest. When I return the

last young, 1 of the first 2 has its bill open.
1234. 10F goes to the nest. She is brooding or shelter-
ing the young when I leave. Her bill is open. M-10 is
still singing and calling to the north. I go and watch ³⁰
him; there is no apparent cause for his calling thus.
His behavior is normal and he feeds while calling.

T-14: Nothing happening so I leave at 1350.
(I put 14F's nest in a funnel last night but the cat
got it. There were 10 fly pupae in it. Only point of
interest re construction of the nest is the fact that
there were considerably more dead leaves (last year's, ^{more}
quite gray and light in weight) than usual in the ^{constr}
foundation. Otherwise it contained everlasting, strips
of week bark, grass. It was too torn up to weigh.
I'd rate its concealment as fair; I failed to find it
because of its height and the male's silence. One
other point: there were 4 or 5 small recently dead
hackberry (?) leaves stuck to the outside of the nest
with spider webs.)

June 28. Hot and humid; temperature 86° at 0830.

Present 0850-1537. Arrive 0850.

T-2: 2F is on her nest.

94

T-7: I banded the young, reaching them with a step ladder. Brood mark is silver over green, left.

2162066-R, 6 gm. 760 mg.;

2162083-Y, 6 gm. 460 mg.

When I returned to the nest for the third young it was empty except for 1 egg. Since I saw 3 in the nest yesterday, 1 obviously got out. This is not surprising: when I took the first, the second jumped out and I caught it. I was totally unsuccessful in getting either to stay in the nest after banding them. They jumped out many times and I finally left them on the ground. One-half hour later 7F was carrying food to them so I feel pretty sure they are okay. They were larger than I had anticipated, of course, probably 8 days old. They were not quite able to fly, but fluttered their wings madly when leaving nest. The adults were alarmed, but gave no distraction display. This nest's is only the second infertile egg I've found. Note the silence of the young in this nest as compared with 6F's second brood. This fooled me as to their age, which I underestimated.

more young
B

T-3: M-3 sang repeatedly and regularly for $\frac{1}{2}$ hour on the hillside, a little west of his old perch in the big dead tree. He surely acted like a male whose mate had a nest.

T-8: Both adults were carrying food. M-8 sang a #8 type song once. The young in the nest were silent.

T-1: M-1 sang.

T-11: 11F was not on her nest.

ON
T

(About 30 feet from the nest is a Yellow-billed Cuckoo's nest with 1 large oval bluish egg. The nest is made of coarse twigs, flimsy; it is $7\frac{1}{2}$ feet high on a little leaning sapling. A snakeskin is placed around the outside of the nest.)

Yellow
snakeskin

(There are 3 young Field Sparrows, almost ready to leave, in a nest 1 foot high built in a tuft of weeds.)

FS
3 yr

T-12 and T-13 at 1045: I spent $1\frac{1}{4}$ hours here. I found no trace of the 13s.

(I found an Indigo Bunting's nest with 4 eggs, $2\frac{1}{2}$ feet high in the locust thicket.)

IB
4

M-12 sang repeatedly near his old nest. I saw no trace of the young. I had no luck in finding the nests of either pair.

T-11 at 1200: Returning through this territory, I found 11F on her nest.

NY

(One of the 3 young Field Sparrows I found today had left the nest and was 20 yards away from it.)

T-10 at 1212: M-10 was singing a skid song, the 4 young were in the nest all panting with their bills open when I arrived. The temperature is about 100° . There is no sign of 10F.


NY

Reddy

M-10 sings a skid every 5-15 seconds, usually every 10 seconds. In 2 or 3 minutes he begins to intersperse his songs with his "patunk" notes. These are not repeated with great vigor.

1220½. 10F comes to the nest with food. She stays 1 minute and hops to the ground by the nest. M-10 still sings to the north. 50

1229. M-10 begins to sing after 6 minutes of silence.

He flies to the northeast corner of his territory and calls vigorously and rapidly, with a song every 8-15 seconds. I would judge that all or nearly all his odd calling is uttered in a square area 20 yards on each side. *Type B* 

1233. 10F comes to the nest but I miss seeing if she has food and how long she stays. She hops down to the bottom of the nest tree, flies a good distance (30 yards?) southeast and I lose her. M-10 is still alternating his song-call north of the nest, perhaps coming a little closer.

(A Black-billed Cuckoo sings west of III. I heard the same species east of T-12 today.)

1237. M-10 becomes silent.

40

1239. 10F comes to the nest with food. Then she sits on the rim of the nest with her bill open till 1244½.

Meanwhile M-10 calls and sings a little to the west, and a Black-billed Cuckoo sings just east of the Prairie Warbler nest about 40 yards. *60*

1244½. 10F hops quietly down from the nest.

1248. 10F flies straight to the nest tree from 20 yards east, near me. She feeds, stays 40 seconds, goes to the ground below the nest. M-10 has sung a few times east of the nest in the redbud grove.

Now he calls or begs irregularly but repeatedly there, about 2 times per second on an average, i.e., 10 times per 5 seconds. The intervals between call notes are quite irregular. After calling nearly 2 minutes he sings. *File B* 15

1300½. 10F flies to the nest with food; stays 45 seconds, hops down to the bottom of the nest tree and feeds for 1 minute. She returns to the nest rim, stays a few seconds, then hops down to the ground again. Her bill is open all this time. She returns to the nest at 1304 and shelters it from the sun. Her position is very unusual and interesting: she is straddling the cavity. Her wings are extended from her sides so that shade is provided. Her primaries are held parallel to her body, not at right angles, her wings drooping a little. Her bill is open. *sheltering*

M-10 comes and sings twice near the nest, perches above it in the big hackberry; flies away after a minute or so. 2

1312. M-10 skids north of the nest. 10F is still shading the nest. 1

1320. M-10 skids 10 times, calling once or twice between songs. The song interval is 5-6 seconds. 10F is still protecting the young from the sun. Now M-10 is singing 10

at greater intervals (15 seconds) and calling more.

He is north of the nest. Now he is singing every 7-8 seconds, a loud skid repeated over and over for 3 minutes. Then he begins to call again, sings for a minute and quits. *Type B*
25

1333. M-10 begins songs again north of the nest, every 9-15 seconds.

1335. 10F leaves the nest, flies 30 yards east into the woods. I weigh 2 birds: 3 gm., 320 mg.; 3 gm., 660 mg. The larger of these 2 has its primary quills *25*
49 3/8 inch through, the primary coverts 3/16 inch, the humeral tract 1/16. The femoral tract quills are just beginning to come through. The interscapular (dorsal) tract is just through on a strip 3/8 of an inch posterior to the head. The quills are just beginning to come through on the legs (crural), not yet on the head. The ventral tracts are barely through. Alula quills are 1/16 of an inch through. Little bristles (coverts or rectrices?) on the tail are 1/32 inch through, the same as yesterday.

1347. I go to the nest and find 10F shading it. She doesn't leave when I walk up. M-10 is singing and calling. I return with the same young to my observation post. Both young can open their eyes. I can't get either to utter notes. Both kick and move their wings a good deal. They breathe at a rate of 100-112 times per minute. *breathe*
note

1400. 10F still has her wings spread wide, her bill

fully open, and is standing over the nest. I'm going to scare her off and weigh the others. She lets me get 4 feet away, hops off, gives a few "ticks," but no display. M-10 sings. The young are panting in the nest, one with its head extended over the rim. They have their bills open and seem in distress. These 2 weigh 3 gm., 690 mg.; 2 gm., 900 mg. *yg* M-10 sings a very loud skid just above me. I replace the young, scaring 10F off from her sheltering position again. (I had these young 4 minutes.) She calls and M-10 comes to the nest vicinity when I leave. 10F and M-10 approach the nest from opposite directions. He gets about a foot away and she goes to the nest and immediately assumes the sheltering position. He hops away and begins to sing. *near nest*

1410. She is protecting the nest from the sun.

1415. I leave, with 10F still at the nest.

T-4 at 1430: No adults come to the nest for 30 minutes, and there is no sign of young. M-4 sings in the row of trees on the west end of the territory. I begin looking for him and at 1515 I see 4F, carrying spider webs, go to a clump of witch's broom 20 feet up in a hackberry on the west of the strip of woods just west of the usual territory. She leaves the material there. She makes 2 more trips to a point in the vicinity but not to the hackberry. Then she

returns to the hackberry with a tremendous bill full of mixed stuff that certainly looks as if it is from the old nest; she comes from that direction. I go back and watch the old nest at 1525. The new (third) nest is in the most incipient possible state, just a few fibers and bits of down. I see nothing at the old nest for 10 minutes, which together with my first wait there is 40 minutes when 4F did not come to it.

I leave the area at 1537.

June 29. Hot, sunny and sultry; 84° at 0815.
Present 0930-1445. Arrive 0930.

T-8: Both M-8 and 8F are "tsu-ing" on my arrival.
Then M-3 shows up and he and M-8 have a fight with
the churring noises I heard in the spring. Meanwhile
I watch the nest, see no young and no sign of adult
interest. I take it down with great difficulty and
find it looks as if young have fledged. I therefore
set out to look for young and instead find M-3
pursuing 8F as though courting her. He follows a
little behind her everywhere, occasionally flying just
over and past her. Suddenly M-8 shows up and the 2
males have a 10 minute fight just west of the nest,
going through all the usual territorial fighting tricks.
They frequently tumble in the air while pecking at
each other. They chur very frequently, squatting
low with wings a little extended, bills open. Both
sing at times. M-3 seems the aggressor, and the
fight centers (in space) pretty much around 8F.
M-3 frequently flies at her and this provokes a fight.

M-8 seems to retire and he sings from south of
the nest on his regular territory. (I have thought
this nest encroached on T-3.) M-3 then resumes fly-
ing at 8F, doing it over and over, i.e., he always
moves along with her. Meanwhile she occasionally
carries food but I can't see her feed fledglings.
Once M-3 and she drop together into a little tree and

he (4 inches from her) raises his wings and flutters as though about to copulate. She turns and opens her bill and he withdraws a little. It seems beyond question he is courting her, and almost that he has won the territory she is on. I follow M-8 who is singing 25 yards to the south and find him carrying food to a young bird. I try to catch it but it flies well for 15 yards; probably it left the nest yesterday. Query if M-3 has won 8F and that part of M-8's territory, or is M-8 just busy with his family? I suspect M-3 has won the territory and will tolerate 8F whom he courts, but not M-8. It seems very possible that 3F has been lost to M-3, which would explain his pursuit of 8F.

I resume looking and see M-3 following 8F. She goes northeast along the ridge way into T-3. M-3 stays where he fought M-8 and there is another fight. M-3 seems to win them. Both open their bills all the time, but this may be because of the heat. M-8 is singing regularly today, like M-9 when feeding his young. I forgot to mention that a Kentucky Warbler came out of the woods when M-3 and 8F were together. It chased 8F; M-3 flew at it but the Kentucky Warbler repulsed M-3. Note how aggressive M-3 is; this has been typical of him since his arrival here.

Three young fledged from this nest.

↑ ↑

enc
Ky Warbler

T-7: I find no sign of the young. A male Prairie Warbler singing frequently west of the nest tree is probably M-2 on his own territory. I heard M-7's song a few times. I can't be sure the young succeeded.

T-5: M-5 sings.

T-3: See T-8 above. M-3 sang in the center of his territory when I went back through it.

T-8: M-8 sang on the center of his territory.

T-11: 11F was on her nest; M-11 was singing near the meadow.

T-10 at 1305: 10F was on the nest sheltering the young with her wings widespread when I arrived. As yesterday her bill was open, her legs straddling the nest.

1318. She leaves the nest and I go to weigh 2 young. Primaries are $\frac{1}{2}$ inch through, coverts $\frac{5}{16}$ inch, decreasing in length toward the secondaries. Dorsally, the interscapular tract is through along its full length, humeral tract $\frac{3}{16}$ inch through. The tail bristles are darker but no longer. The quills are slightly through between the eyes, $\frac{1}{8}$ inch through on the femoral tract. On the legs (crural) quills are $\frac{1}{16}$ inch through. Ventral tract: $\frac{1}{16}$ - $\frac{1}{8}$ inch. I weigh and band the young. Brood mark is silver over red, left leg.

2162065 - Y, 4 gm., 900 mg.;

2162082 - G, 3 gm., 860 mg.;

2162068 - B, 4 gm., 500 mg.;

2162067 - R, 4 gm., 350 mg.

1326. 10F is back sheltering the nest so I wait with the first 2 young. M-10 sings a skid south of the nest.

1340. M-10 sings north of the nest.

10Y can sit up and hold up its head, open its wings, open its eyes, look around. Then its head drops and its eyes close in 5 seconds.

M-10 is singing north of the nest.

1345. 10F is on the nest in the sheltering position, her bill open.

1355. M-10 is singing every 15 seconds south of the nest, 5 or 6 songs. Then he moves considerably north and sings.

1405. 10F leaves the nest and I get the remaining 2 young. At 1406 she returns with food. M-10 sings in the big hackberry.

1416. I return the young (who are silent) and scare 10F off from her sheltering position.

1420. 10F is back on the nest; I didn't see her come. M-10 sings a skid to the south. He has only called a couple times today; once or twice I thought I heard the begging call.

1422. 10F stands with her bill open, sheltering the nest. I leave.

(I found a Field Sparrow's nest with 4 eggs,
1½ feet high in a weed, 30 yards north of the nest.)

RS
4

T-4: The third nest is now well along in its
gross shape. The old nest looks undisturbed.

T-1: M-1 sings.

I leave the area at 1445.

June 30. Sunny and hot; temperature 82° at 0800.

Present 0815-1235. Arrive 0815.

T-2 at 0825: 2F was on her nest. M-2 sang in the valley west of T-7. 94

T-7 at 0830: Prairie Warblers were silent and there was no sign of life until I got near the pines. There a male flew over me carrying food east. Remembering that M-7 was over here just west of T-6 last week and that he is the only male on III (except M-8 off to the south) who would be flying around with food, I think the male was surely M-7. I take this as ^{not} good evidence that some of this brood survived. A

T-3: Silence.

T-8: I found both adults feeding their young, 2 of whom I saw. I tried without success to catch them; one could fly quite well and quickly flew 15 yards from a low perch to a high one. M-8 put on a distraction display when I tried to catch the young. It was typical, with calls and songs. The singing was loud and of M-8's usual sort, uttered while fluttering on the ground or on weed stems. 8F fluttered less. d/s d/s

Note that M-3 seems to have failed to win 8F, which was to be expected when she had young on T-8.

T-1 from 0915 to 1015: I spent this time without seeing a trace of either bird. They should have young now.

T-11 at 1020: 11F was on her nest.

(A Black-billed Cuckoo sang on T-4.)

T-9 at 1022: M-9 was singing.

T-10 at 1023: 10F took food to her nest and M-10 sang as I came up. All the young are alive.

1025. 10F returns to the nest with food and in a minute M-10, who has come up to within 5 yards of the nest, takes food too. 10F leaves before M-10 goes to the nest; she "ticks" from a big hackberry. This is my first sight of M-10 taking the least interest in his young. He stays 20 seconds looking into the nest from his perch above (and not on) the rim, goes to a big hackberry and sings.

1030. M-10 returns to the nest and feeds, stays 25 seconds looking down.

1037. M-10 sings from just north of the nest. All his songs this morning are skids.

1042. 10F comes to the nest with food, calling "tick." She calls once. She stays 20 seconds, hops to a little tree and sits for a minute, leaves. M-10 sings near the nest as she leaves.

1044½. M-10 comes to the nest with food. He perches 2-3 feet above it and leans way down. He takes a fecal sac and flies well away to the east, probably

35 yards at least.

1048. M-10 sings, goes to the nest, feeds; stays 20 seconds and then flies 50-60 yards west, flying high and perhaps carrying a fecal sac.

1057. I get 10Y and 10B without attracting adults.

10Y - 5 gm., 405 mg.; 10B 5 gm., 325 mg.

1107 $\frac{1}{2}$. 10F comes to the nest with food, stays 1 minute, and leaves with a fecal sac. M-10 sings north of the nest.

Re development of 10Y: Primary quills are nearly 1 inch, coverts $\frac{7}{16}$ of an inch; feathers' ends are just coming through the primary quills and one of coverts' is $\frac{1}{16}$ inch through. Secondaries become longer distally; feathers are not through their quills. Humeral quills are $\frac{1}{4}$ inch long; feathers are just coming through. Interscapulars (dorsal) are now broad and dark, $\frac{3}{6}$ of an inch wide in mid-back; the quills are $\frac{1}{4}$ inch long at most and the feathers are not through. Tail quills are now dark, $\frac{1}{8}$ - $\frac{1}{16}$ inch long. Head quills have come through between the eyes and on mid-occiput, the tract broadening on the nape, $\frac{1}{8}$ - $\frac{1}{16}$ inch long; there are no feathers. The head has down on it. The femoral tract is yellowish, quills $\frac{1}{4}$ inch long; feathers are through $\frac{1}{16}$ inch or a bit more. The leg feathers (crural) are through a very little. The ventral tract is now quite broad, the feathers through a little toward the head and $\frac{1}{16}$ inch posteriorly.

The eyes are open. Young are silent. They can

sit up with their tarsi flat under them.

10B's right leg trembles a good deal; it is not due to the band.

1114½. 10F comes to the nest, stays feeding for 30 seconds; flies to the ground near the nest. M-10 sings north of the nest on mid-territory.

(A Black-billed Cuckoo sings on T-9.)

M-10 sings every 10-15 seconds for 5 minutes, approaches the nest but doesn't go to it.

1119. 10F comes to the nest with an adult insect. M-10, without food, flies to a blackberry 1½ feet away. He sits for 30 seconds, flies to the tree over me and sings once. 10F takes up her sheltering position over the nest, bill shut. I wait to return the young. 10B's right leg trembles almost constantly.

1127. 10F leaves the nest. I get the other 2 young without attracting her attention.

10G - 4 gm., 995 mg. (note rapid increase);

10R - 5 gm., 195 mg.

10R kicks a lot on the balance, turns its head over its back and seems to go through preening motions through there are few enough quills and no feathers on the back.

1133. I return the young to the nest. M-10 is singing north of the nest.

1140. 10F hops down from the nest; I didn't see her go

to it. M-10 is still singing without any long breaks between songs. He has come to a spot over my head.

1200. 10F goes to the nest from the ground below it, carrying food; she feeds. I'm pretty sure I heard the young crying to be fed. She stays 15 seconds, then hops to the ground by the nest.

1204. M-9¹⁰ sings to the north.

1215. I leave the territory.

T-14: 14F is near her successful nest; she exhibits alarm at my approach, calling "tsu." I can't find the young who must be near. M-14 is silent as usual. I find nothing on their old territory.

T-4: The new nest looks well along, the old nest not dismantled so far as I can tell. M-4 sings a few skids.

I leave the area at 1235.

July 1. Sunny but cooler after a cooler night;
78° at 0830. Present 0915 - 1330.
Arrive 0915.

T-2: 2F was on her nest; M-2 sang once. 94

T-1 from 0920 to 1020: I saw no trace of either of this pair. The territory is rather easy to watch, and I'm beginning to think I'd have seen any Prairie Warblers on it even though they were silent. I found a Prairie Warbler nest which presents a slight problem. It was west of the tree row, about 30 yards from the second nest, 9 feet high in an elm sapling pretty well loaded down with grape. The question is is it this year's. It is fairly flimsy and somewhat harder than the fresh nests I've found; also it has less everlasting in it. On the other hand, the everlasting looks fresh in some places, there are many strips of weed bark that are light and dark brown, and there were green elm leaves that looked stuck to the nest. A big point is that a nest built last year ought not have any brown fibers in it; the winter would have weathered them gray. Possibly significant in its location near the second nest. For the present I'll consider this the third nest of 1F. [All to whom I showed this nest agreed it is this year's, and I accepted it as the third of the pair.] Another day or so ought to reveal whether the territory has been deserted.

(Saw a Field Sparrow carrying nest material here.)

T-11 at 1025: 11F is on the nest; M-11 is singing ^{FS} _{alt} ^{9Y}
at the opposite end of the territory by the meadow.

(The Yellow-billed Cuckoo is incubating.) ^{Shore} ^{Yb} ^{Cuckoo} _{not}

T-9: M-9 was silent. (See below.)

T-10 at 1030: Neither adult was in evidence, ^{9N}
all 4 young were in the nest when I approached. One
nestling had its head over the nest rim.

1045 $\frac{1}{2}$. M-10 sings south of the nest.

1047 $\frac{1}{2}$. 10F goes to the nest with a big green caterpillar.

She stays 20 seconds, flies to a hackberry tree 8 feet ^{feet}
away, calls "tick" 4 times, then comes to a tree over
my head where she ticks once or twice.

M-9 sings step songs to the north.

(Today for the second time in 5 days I have seen ^{Robins}
flocks of as many as 10 Robins flying over and calling.
They are too large for single family groups.)

1100. M-10 sings one faint abbreviated step song
north of the nest.

1105. I get 2 young to weigh:

10G - 4 gm., 915 mg.; 10B - 5 gm., 905 mg.

[These weights are in error. See below.]

10B's plumage: Primary covert feathers are $\frac{1}{4}$ inch ⁹⁹
beyond the quills. Interscapular (dorsal) feathers are
 $\frac{1}{8}$ inch through along the entire back. Humeral feathers
protrude $\frac{1}{16}$ inch anteriorly, $\frac{3}{16}$ inch posteriorly.

The head is covered with quills; the feathers are through on the occiput. Femoral feathers (yellow) are $3/16$ inch through. Leg feathers (crural) extend $1/16$ from quills. Ventrally the tracts are broad, the feathers out $1/16$ - $1/8$ inch. The posterior half of the bird had yellow feathers.

Both young call and struggle, won't stay on the scales. I'll not weigh the other 2 for fear they will leave the nest.

1118. 10F goes to the nest, feeds, removes a fecal sac 10G dropped when I took it.

1119. I return the young.

1120. 10F brings a brown moth. She ticks 20 yards from the nest, probably because she saw me go to it. In 15 seconds she goes to the nest, stays for 20 seconds, goes to the ground. M-10 sings his regular skid northeast of the nest; he began singing at 1120. The interval is about 20 seconds.

1124. I return to the nest to be sure the young are settled down; they seem to be quite quiet.

1126. M-10 sings again, east of the nest.

1129½. 10F goes to the bottom of the nest tree with a green caterpillar. She hops up to the nest, feeds, stays 15 seconds, hops away and ticks. (I now notice both young seem to have lost weight. I'll risk reweighing one to check myself.)

1133½. 10F goes to the nest with food. She ticks once before going and once when she leaves 35 seconds later.

She hops to the ground under the nest, then flies 25 yards south.

1136. I get 10G. He weighs 6 gm., 070 mg. Obviously-
ly I made an error before. Cancel those figures.

1140. 10F goes to the nest tree with food, her bill open. She hops about under the nest, leaves.

10Y - 6 gm., 195 mg.; 10B 6 gm., 010 mg. (Obviously
I was 1 gram off on the first weighing.)

I return these young, find 10G on the ground under the nest. I put it back in and it jumps out perhaps 10 times. Once it waits 3 minutes between jumps. The others have their bills open, probably due to the heat.

1208. M-10 sings near the nest. I get 10G in, withdraw, and M-10 comes and feeds in $\frac{1}{2}$ minute. He stays 30 seconds, takes a fecal sac one young had dropped on a leaf 5 inches from the nest, flies away. For the time being the young are calm in the nest. I can hear a thin metallic "chip" from the direction of the nest.

1222. 10F goes to the nest with food. She approaches silently but with more than usual caution. She feeds, stays 30 seconds, flies away with a $2\frac{1}{2}$ inch twig I accidentally dropped in the nest trying to force 10G to stay in.

1230. M-10 goes to the big hackberry, where he sings for $2\frac{1}{2}$ minutes, skid songs of three-fourths the usual volume.

1234. 10F ticks, takes a green caterpillar to the nest. She stays 15 seconds, goes to the ground under the nest and works over toward me. She then flies east past me. M-10 sings 1 step, then several skids, then a step, all from the grove east of the nest.

1236½. 10F goes to the nest, feeds for 10 seconds, then comes again to the weeds by me where she ticks.

1237½. M-10 goes to the nest with many green caterpillars, feeds and stays 20 seconds. He moves to the big hackberry and sings. 10F is ticking near me, but not, I'd judge, because of me.

1240. 10F flies to the nest with a big object, perhaps an adult insect. She feeds for 15 seconds, goes to the ground under the nest. She isn't perching on the rim today but on a twig above the nest.

M-10 sings a skid to the south. 10F forages under the nest, then again flies to within 12 feet of me and searches, ticking.

1245. I check the nest, find all 4 young in the usual positions with their heads up, their tails together toward the center. The crisis seems past.

1246. M-10 sings twice, goes to the nest and feeds, stays 15 seconds, flies away to the north. One minute later he sings.

I should mention two things I saw in the young: I felt fairly sure that they turned their heads in M-10's direction when he sang before coming to the nest when I was trying to get 10G back in. 10Y was very excitable

when I weighed it, hopping all around. I put it in *Long B*
an old nest I was carrying and it immediately assumed
the crouched position of the young in the nest and
settled down. It did so twice. Both times it left
the nest a minute later, but it was alone there and
also could see me.

1249½. 10F goes to the nest, leaves in 10 seconds
with something.

1250½. 10F comes right back to the nest and leaves
in 15 seconds with something. She reached into the
nest just before leaving. Probably she took food
both times and removed fecal sacs. She flew a good
distance each time, but not toward me. A Prairie
Warbler sings west of the nest; it may be M-14 since
70 M-10's song is apparently coming from the north. The
Prairie Warbler to the northwest repeats a skid
several times.

1302. 10F goes to the nest with green caterpillars;
stays 20 seconds feeding, then forages under the nest.

1303½. 10F goes to the nest, I think without food.
She looks in and goes to the ground.

1305. 10F, having stayed within 10 feet of the nest since
her last trip, returns with a very small object; she
reaches in, stays 15 seconds. Then she forages under
the nest and gradually moves away from it.

1310. 10F comes with a green caterpillar to the nest,
feeds and stays 20 seconds, then forages under it.

M-10 sings to the north on the edge of his territory.

1312. I leave with all 4 young in the nest, apparently thoroughly calmed down, sitting with their bills open (heat), their eyes closed.

T-4: I found 4F feeding back near the corner of the north-south shed, M-4 singing not far from the sheds in the field by them. This represents a real extension of their territory; the third nest site could be said to be within the old territory in that it is in a tree in a clump, part of which is on the territory line; but clearly the 4s have moved west. The new nest looks complete.

I leave the area at 1330.

July 2. Hot and sunny after a somewhat cooler night; 90° at 1600. Present 1645-2000. Arrive 1630.

T-2: 2F is not on the nest. M-2 sings.

9 N

T-1 at 1645: M-1 is singing at my arrival. He sang a step song, somewhat faint, most of the time I was there. He obviously has a favorite song post, a 45 foot scrawny elm well to the south of the road and east of the tree row. A female showed up as I chased M-1 around and she went west of the tree row and then well west and south (into the woods) almost to T-4. I doubt if her nest is over that far but I think it is surely south of the first nest and south of where I've been looking. (A male, presumably M-1, once flew way into the middle of M-4's old territory, about to 4F's first nest site.)

←
song post

I found the female 3 times more, always near the tree row, so I expect to find her nest there. Neither she nor M-1, whom I had in view nearly an hour, ever carried food. M-1 once chased another small bird, not a Prairie Warbler, calling his churring notes; on two other occasions he gave the fighting-begging call. On one of them he had just flown to the south-east edge of his territory and may have seen an intruder. He certainly was vociferous today. When I left M-1 was paying no attention to 3 Cowbirds sitting in the top of his song tree with him.

Def B

de
Cowb

T-9: M-9 sings a step song as I pass.

T-11 at 1810: 11F is on the nest, M-11 singing *9 V*
a step song near the meadow as usual.

(The female Yellow-billed Cuckoo was on her nest *same place 300 ft*
10 yards from 11F; 3 eggs.)

T-10 at 1825: M-10 was singing on my arrival,
his usual skid. *FN*
1831. 10F "ticks" a good deal, goes to the nest with a *feet*
big green caterpillar. She stays 1 minute, hops about
under the nest "ticking," flies toward me and I lose
sight of her. M-10 sings 25 yards from the nest several
times, doesn't go to it.

1844. 10F "ticks" 3 times, takes food to the nest and
stays 20 seconds. Then she flies low a few yards away.
Her "ticking" has no apparent connection with my
presence.

1848. 10F goes to the nest after 1 "tick," stays
feeding 15 seconds, flies low a few yards away. All
4 young are in the nest, which I couldn't have bet
on yesterday after my weighing.

M-10 sings skids south of the nest. He's sung
a lot since I came, perhaps $\frac{3}{4}$ of the time at the
usual intervals (perhaps 15-20 seconds).

(Two Field Sparrows just had a silent but very
real fight on ground near me. They flapped about *FS fight*
and seemed to be gripping each other with their bills.
They flew when they saw me.)

1852 $\frac{1}{2}$. 10F goes to the nest, feeds for 20 seconds.

M-10 sings.

1853. 10F flies up to a tree 8 yards from the nest, "ticks," takes food to the nest and stays 25 seconds. She leaves on a low flight to the west. A male Prairie Warbler sings due west of the nest; it is M-14's song, not M-10 or M-9's. M-10 sings east of the nest. It may be that some of the singing I've recorded today is M-14's, especially that northwest of the nest. M-10 is clearly east of the nest in the grove or woods. M-14 seems unchallenged while on T-10.

1857½. 10F flies to the nest tree, "ticks" and bobs her tail, takes food to the nest, stays 20 seconds. She then flies toward me and forages and "ticks" in the tree over me. M-14 is singing every 10 seconds very near 10F's nest to the west. He can't be over 30 yards west-northwest. M-10 is silent.

1902½. 10F goes to a little tree by the nest, "ticks," goes to the nest and feeds, stays 20 seconds and flies low to the west. Today when she goes to the nest she stands on a twig over it, not on the rim. M-14 is now silent.

1904. M-14 sings at some distance to the southwest now. He is moving homeward. I think I hear M-10 way off to the northeast in the field that neither he nor M-9 uses.

1905. 10F goes to the nest tree where she "ticks" 8-10 times quickly, flipping her tail. She goes to the nest and feeds the young for 5 seconds, then to the ground under the nest tree, back into the tree, then toward

me. As she hunts 5 yards from me she calls "tsu"; I think this is the first time I've heard her do so. She calls 2-3 times per 5 seconds. M-10 sings to the northeast but nearer, M-14 well to the southwest. 10F occasionally "checks," then switches to that call exclusively as she searches 20 feet above my head. 1912. M-14 has moved east of me, where he now sings from M-10's usual singing area to the northeast of the nest. M-10 too sings so I'm pretty sure of myself. 1913 $\frac{1}{2}$. 10F goes to the nest, "ticking" several times before going, twice at the nest. She feeds for 28 seconds. She then flies to me and hunts for food within 5 yards of me, calling "tick" and "check" 3-4 times every 5 seconds. M-10 sings east of the nest; M-14 is silent. So far as I can tell M-10 never moved to drive M-14 away. 1917 $\frac{1}{2}$. There is a step song of M-10's quality and quite close. M-14 sings to the northwest, then moves back again toward the nest. I found him 35 yards to the northwest, then he flew back toward his own territory. M-10 sings step north of the nest. 1920. M-10 has moved to within 35 or 40 yards northeast of the nest. He sings step songs: 20 - 10 - 21 - 20 - 27. He continues at about that rate. 1925. 10F goes to the nest tree, "ticks," then flies *to me* toward me and "ticks," paying no attention to a calling Chickadee 8 yards from the nest. She moves away, calls "tsu" twice, then switches to a harsh "check."

1933. 10F goes to the nest with food. She stays 15 seconds, leaves possibly after eating a small fecal sac. She flies toward me where she feeds while "ticking."

1935. M-10 sings a skid, I think from northwest of the nest.

1938 $\frac{1}{2}$. 10F flies to a blackberry stem 6 yards from the nest, where she "ticks." She carries a little green caterpillar. She spends 1 minute moving toward the nest with many intervening stops in which she seems to look for food. Then she goes to the nest, spends 15 seconds there, removes a fecal sac and flies far north with it. This is the first certain fecal sac I've seen removed today.

1942. I leave the territory.

T-9, T-11, T-8, T-1: Males all sing as I pass.

T-2 at 1955: 2F is in her nest.

94

I leave the area at 2000.

*Sing note of 1st female
normal*

July 8. Cloudy and humid, considerably cooler after a rain in the early morning; temperature 76° at 0900. Present 0910-1130 and 1430-1810. Arrive 0910.

T-2 at 0915: 2F is on her nest, M-2 is silent. *94*

(I found a female Cardinal on a nest with 2 young and 1 egg, 10 yards from 2F's present nest; it is 4 feet high in an elm covered with grape.) *Card 2 eggs*

T-1: M-1 sang on his territory for 20 minutes after I got there. I spent most of my time where I saw 1F yesterday without seeing her.

(I found a Bob-white's nest with 8 eggs and the female incubating, 10 yards from M-1's song tree.) *Bob W*

(I found an Indigo Bunting's nest with 4 3-day old young, 2 feet high in a paw paw tree by the cinder road.) *I B 3 eggs*

T-4: 4F was not on her nest; M-4 was singing on old territory. *914*

Showers at 1020 and I went to the sheds; heavy rain failed to materialize.

(At the sheds I found a Bewick's Wren's nest with 3 atleast well grown young. The nest is back in a piece of old drain pipe, placed 8 feet high on a rack and 6 feet into the shed.) *Bewick's nest*

T-1 at 1030: Back on T-1, I searched until 1100 with no success. There was a downpour from 1100 till 1400.

I left at 1130.

Returned at 1430.

T-1 from 1430 to 1600: M-1 sang much of the time and I followed 1F, to whom M-1 led me by flying to her, about 20-30 minutes. She fed quietly on weeds, bushes, and low trees. She ate all she caught, and there was no sign of food carrying. She spent this whole time on the east edge of the territory north of the road (near the cinder pile) and also just south of the road there. Finally she flew high toward the center of the territory, so she was of no help in trying to locate the nest. My present guess is that she has a nest with eggs, her fourth.

T-11: 11F is not on the nest; M-11 is singing at the north end of his territory.

T-10 at 1610: 10F takes a green caterpillar to the nest as I arrive. The young are still in the nest. She "checks" vigorously at my approach to the nest. After feeding she flies to where I'm sitting and "checks" repeatedly.

1615. 10F begins "checking," goes to the nest and feeds a green caterpillar, staying for 15 seconds. Then she comes toward me calling.

1616. M-10 sings a skid song north of the nest.

1618. 10F approaches with a green locust or katydid, "checking" loudly before going to the nest. She has to offer it 3 times before a nestling gets it down. She

stays 30 seconds, but all of this time is spent feeding. There is no waiting at the nest.

1623. 10F begins "ticking," goes to the nest and feeds. "Checks" after feeding for 10 seconds, flies to me and "checks" loudly. The young beg in the nest.

1625. 10F goes to a little tree by the nest. "Checks," goes and feeds for 6 seconds; takes a fecal sac and flies away low with it, out of my sight.

1626 $\frac{1}{2}$. 10F goes to the nest (calling "check") with a green adult insect. She stays 10 seconds, flies toward me calling more vigorously. M-10 sings once.

1627 $\frac{1}{2}$. 10F goes to the nest, calling before feeding. She stays 7 seconds, hops a short distance away; the young call.

1629. 10F goes to the nest tree, calls 4 times, feeds for 10 seconds, flies back in the direction she came from.

1632 $\frac{1}{2}$. 10F goes to a tree by the nest, "checks" loudly. She goes to the nest, feeds a green object; stays 10 seconds. She flies toward me and calls. M-10 sings 3 times to the north, a skid. He is some distance away.

1634. 10F calls and goes to the nest. The young call. She feeds them in 5 seconds and flies away.

1636 $\frac{1}{2}$. 10F calls once at the nest, feeds for 8 seconds, flies away probably with a fecal sac. (Note that I can't see number of young fed per trip.)

1638. 10F goes to the nest with food. She stays 15 seconds, putting her bill way in. Calls once or twice, leaves.

1640. 10F goes to the nest with a green caterpillar, stays 10 seconds, comes toward me and calls 2 "checks."

1643½. 10F flies to the nest from a perch above me, calling in the air and at the nest. She feeds, stays 15 seconds, leaves. M-10 sings to the north. Several Chickadees call around the nest but 10F ignores them.

*10F
Chickadee*

1645½. 10F goes to the nest, calls just before feeding. She stays 20 seconds, takes a fecal sac and flies 25 yards away.

1646½. 10F comes with a green locust; she calls as she comes up to the nest, feeds and flies away in 10 seconds, still calling. Her calls today are always "tick" or the harder "check."

1650. 10F goes to the nest tree, "checks" 4 times. She feeds in 10 seconds, "checks" again twice, leaves. M-10 comes to the tree just above me and sings a type-#8 song 3 times.

1652. 10F goes to the nest tree, "ticks" twice, feeds for 10 seconds and leaves. Her behavior today is almost frenetic; she rushes madly in everything she does, never sits still a second. Note how thoroughly M-10 has left all duties to 10F.

*10F
feeding*

*10F
helping*

1654. 10F goes to the nest, calls once, feeds for 5 seconds, leaves and calls as she goes.

1656½. 10F goes to the nest and feeds in 7 seconds, darts toward me and calls "check" several times, then flies on beyond me to the east. I can hear her

calling, I think. M-10 sings a skid to the northwest.
1659. 10F drops to the nest from the high trees to the east, calling "check" in the air. She feeds a green caterpillar, perhaps eats matter from the nest, drops down to the ground below it after 10 seconds.

1701½. 10F goes to the nest, feeds, pokes into the nest for 12 seconds, flies away to the west.

1703. M-10 sings skids 4 times at 20 second intervals north of the nest.

1704½. 10F goes to the nest, calls twice, feeds for 10 seconds, flies at least 40 yards with a fecal sac. (All 10F's calls are accompanied by vigorous jerks of the tail.)

1705½. M-10 sings a skid 6 times at 6-20 second intervals 20 yards northeast of the nest.

1708½. 10F calling "check" flies to the nest with food, seems to sit down on the nest cavity for 15 seconds, flies away with a fecal sac.

1715. M-10 sings skid north of the nest, then moves to the northwest.

1719. 10F flies to a blackberry stem 10 feet from the nest with food. She calls "tick" 3-4 times. She goes to the nest, pokes into it for 10 seconds, perches 2 seconds with her back to it, leaves.

1719½. 10F goes to the nest calling "check," feeds for 5 seconds, flies away calling. M-10 sings skid 5-6 times.

1720½. 10F goes to the nest with food, calls once or twice. Feeds for 10 seconds, flies away with a fecal sac.

1725. 10F approaches the nest with food, calls 4 times ("tick"), goes to the nest and feeds for 10 seconds.

B. Allen
Colony

She tends to use the same "path" in the tree on every trip, nearly always approaching the nest in the same way. The path is most rigid as she gets quite near the nest (1 foot), is perhaps 2 feet long.

1726½. 10F goes to the nest with food, feeds it and leaves in 3 seconds. She comes near me and "checks" several times. M-10 sings north of the nest.

1732½. 10F goes to the nest with food, stays 10 seconds and leaves. She calls before going and after leaving.

1733½. 10F goes to the nest with food, pokes into the nest for 25 seconds, leaves. Two minutes later she searches for food near me, uttering a loud "check" every 2 seconds.

1739. 10F goes to the nest. I hear calls which sound like the young. She feeds and leaves in 5 seconds.

1739½. 10F goes to the nest and young beg for sure. She leaves after feeding for 5 seconds.

1740. 10F goes to the nest with food; the young beg, she leaves in 4 seconds.

1740½. 10F goes to the nest with food. The young have been begging constantly between last visit and this, and calls increase as she comes near. She leaves in 8 seconds with a fecal sac.

1742. I leave the territory. M-10 and I think M-9 just sang. 10F takes food to the nest and stays 7 seconds as I leave.

T-9: I find 9B following M-9 and begging for *feeding* food a few feet from the site of the successful nest. 9B is full grown, has 2 wing bars, and is a dull gray brown above. It flies typically, bobs its tail exactly like an adult. The bill is yellow; it shakes its wings a little when begging, gives the typical begging call.

T-11: 11F is incubating at 1800. *♀*

I leave the area at 1810.

*♂ song still normal
freq*

July 4. Sunny, fairly cool and fresh; 70° at 0700.

Present 0815-1230 and 1430-1810. Arrive 0815.

T-11: M-11 sings.

T-10 at 0830: I came here first to watch fledging. *Fledging*
B

M-10 sings once.

0831. 10F goes to the nest with green caterpillars.

She stays 20 seconds. She hops to near me, "checks"

3-4 times per 5 seconds many times. M-10 sings a skid song.

0836½. 10F comes with a green caterpillar and an adult insect. She calls after feeding young for 10 seconds. Faint calls come from the nest. 10F then forages behind me, 20 yards from the nest, "ticking."

0841. 10F comes with a green caterpillar. She calls a burst of "checks" as she drops to the nest from the big hackberry. She waits 6 seconds, takes a fecal sac and removes it. M-10 sings a faint skid to the east.

0844. 10F comes with a small object. She "ticks" as she goes to the nest, stays 10 seconds, flies toward me and "checks" every 1-1½ second.

0847. The young are moving about in the nest and one rises high in the nest to feed when 10F comes. She stays 10 seconds. My view of the young in the nest is poor.

0848. 10F goes to the nest and feeds for 5 seconds.

0850. The young are very active, looking around.

10F goes to the nest and feeds for a few seconds. She returns, I think without food; she looks in.

0851½. 10Y flutters its wings, jumps up out of the nest and perches above it. Then it half hops, half flaps, to other twigs on the nest tree and above the nest. 10F has come to me and calls around me. She doesn't seem to be catching food, so I assume this is due to alarm or at least excitement. Once on the ground she may have given a distraction display.

0856½. 10F goes to the nest; bypassing 10Y which opens its bill for food, she feeds the nestlings. 10Y then preens its back. M-10 sings north of the nest.

0858. 10Y sits with its eyes closed.

0859. 10F feeds 10Y 2 adult insects as it sits 5 inches above the nest. It moves to 3 inches above, preens its back, stretches its left wing. Both actions nearly cause it to fall over. 10F forages near me calling "check" about every second.

0901. 10F goes to the nest, feeds nestlings. 10Y spends 2 minutes preening thoroughly, especially its back, wings, and the area under its wings.

0903½. 10F, who now "ticks" or "checks" about once a second, flies to the nest and feeds nestlings for 10 seconds. 10Y sits quietly above the nest.

0905½. 10F feeds the nestlings.

0907. 10B climbs to the nest rim, then to a spot 3 inches above the nest. 10Y is now 8 inches above. They sit and each calls. 10Y flies 10 feet very weakly, lands in the grass. It stretched its wings upward first. 10B preens itself.

0910. 10G climbs from the nest and struggles around on twigs. 10B just went higher; now I can't see it in the tree. The young call a little.

0913. 10G preens.

0914. 10R climbs to the nest rim, jumps to a twig.

0915. 10R preens, shakes its wings to prevent a fall, shakes its wings to settle them, stretches its right side typically. 10G has left the nest tree.

0916. 10F feeds 10R which raises and shakes its wings, then preens itself thoroughly. 10F carries off a fecal sac from a leaf where a young dropped it. ←

0919. 10F goes to 10R and feeds it as 10R begs, then takes a fecal sac from a leaf. ←

0920. 10R stretches upward, preens; 10F brings a green locust and offers it and 10R doesn't open its bill. 10F takes the food to the nest after thrusting it at 10R for 1 minute. 10R kept its bill closed. 10F pokes the food into the empty nest for 30 seconds; she leaves but I can't see whether she has the food. 10R sits preening thoroughly.

0923. 10R scratches its head with its right foot, putting the foot in front of the wing. There is a good deal of chipping from the nest vicinity. A Field Sparrow comes and sits 1 foot from 10R and watches it. Scratch

3 0925. 10R sits with its eyes closed. M-10 sings to the north.

0928. All young are chipping. 10F flies to me, "checks," FS notes

and seems to search around me. Once she flutters *dis dis*
on the ground for 6 feet as though distracting me.
0930. 10F goes to 10R with food, but 10R's back is
turned and 10F goes on. 10R climbs higher in the
nest tree, stretches both wings over its back, preens.
0932. 10R falls from the nest tree and I get it and
weigh: 6 gm., 230 mg. 10F puts on a distraction
display of the usual sort for 1 minute, and M-10
comes and "ticks." All young fall silent at 10R's
squawking and I can't find any of them. 10R opens *2-10*
its bill at me when I take it from my weighing sack. *call*

I weigh 10Y: 6 gm., 610 mg. I then find 10G,
the bird which left the nest in 9 days (i.e., the
youngest). I weigh it: 6 gm., 510 mg., i.e., heavier
than 10R which is one day older. (10G was 12 yards *position*
from the nest when I picked it up.

I can't find 10B but note that the heaviest of
the 3 I weighed left the nest first, etc.

I take the nest and leave at 1005 with all birds
calling, both adults present.

T-11 at 1007: 11F on her nest.

T-12 at 1015: My object here is a thorough nest
search. *FS*

(Found a Field Sparrow's nest with 3 eggs, 5½ feet
high on the outer branch of a dogwood.) *3*

(Found an Indigo Bunting's nest in the locust
thicket, 2 feet high: 1 Indigo, 2 Cowbird eggs. One *IB*
1+2,
Acorn
4.5 2.

Cowbird egg is literally $\frac{1}{4}$ inch longer than the other.)

(Found a Field Sparrow's nest with 3 eggs, $1\frac{1}{2}$ feet high in a little juniper.) FS 3

I searched without luck until 1215. I heard a Prairie Warbler sing several times during the morning, probably both M-12 and M-13. I made a complete check of most of T-12 without seeing a sign of a nest or of the adults until I got ready to leave. Then I found 12F and soon M-12 on the edge of the woods at the north end of the territory. Note that none of 12F's first brood was seen.

T-11 at 1220: 11F is on her nest. FY
1230. A Prairie Warbler sings in the field which used to be M-2's, south of the cinder road.

I leave the area at 1230.

I return at 1430.

T-2: 2F is not on her nest. FN

T-13: I searched at great length, much of the time trying to follow M-13 in the locusts. Once I thought he carried food. Then I checked the good habitat just south of the cinder road, where I saw Prairie Warblers in May.

(Found a Blue-gray Gnatcatcher's nest with 4 eggs, the female incubating, $7\frac{1}{2}$ feet high in a redbud. Eggs have heavy [compared to the size of the egg] brown spots, well scattered.) B2 gnat 4

(Also found an Indigo Bunting's nest with 3
addled eggs, 11 feet high in an ash fork. This is
the highest nest I've found for the species.)

IB
E

1630. I returned to M-13's regular territory. I
saw him carry food, heading into the locusts.

94

1650. I found the nest. It is built 12 feet high
in a 14 foot locust, projecting out from the vertical
trunk without any support or with only the slightest
support from a green twig. 13F was on the nest, so
there must be very young birds in it. She left when
I squeaked persistently, fell to the ground and gave
a short distraction display.

des' des'

1658. M-13 took food to the nest.

1700. 13F resumed brooding.

1703 $\frac{1}{2}$. M-13 brought food and transferred it to 13F.
She backed off the nest and fed the young but saw me
and seemed perturbed. She left the nest, I think
without feeding all the food M-13 brought. M-13 sang
a 4-note rather coarse buzz near the nest, gradually
leaving it. Earlier his song had been a high step
song. (For the record, this is M-13; I can tell by
the spot on the left side of his breast.)

In 13F's 2 spells of brooding she has been
sitting deep in the nest, so there is nothing big
in it. Again, the young must be quite small.

1716. 13F came back quietly to the nest, poked about
in it for 25 seconds and settled on it as though
incubating.

1718. I left. This second nest is 74 yards from the first.

T-1: M-1 sings.

T-2: 2F was not on her nest so I waited. In ⁸/₇N
15 minutes she came, saw me and called "tsu" but
wouldn't go to the nest. Some of her calls were
"tick" or "check." Once she went to the nest but
quickly flew away. M-2 came to the scene, called
once or twice, but showed no alarm; he never got
closer than 15 yards from the nest and probably
didn't see me. He and 2F sat 4 feet or less apart
once. She slowly approached the nest and got to
it but again wouldn't enter so I left.

T-4 at 1750: 4F is not on her nest.

I left the area at 1810.

*Insufficient to keep
any more*

July 5. Sunny, pleasant, windless day; temperature 75° at 0900. Present 0930-1415. Arrive 0930.

T-2: 2F on her nest, M-2 singing his usual song south of the road but due south of the nest (and therefore not on his old territory). ♀ Y

T-1: M-1 silent.

T-11: 11F is not on the nest and I put a mirror to it. There is only 1 egg. M-11 sings west of the nest. I wait for 11F. By 1000 there is no sign of 11F, so I leave to return later.

T-13 at 1010: 13F is on her nest, sitting well down. ♀ Y

1018. She takes a small black object from the nest, sits with it in her bill. new
picking

1020. M-13 comes to within 3 feet of the nest (sings before coming). In 1 minute 13F leaves the nest and M-13 goes to it and feeds the young. 13F stands by and after M-13 seemed to eat something from the nest, she returns, looks in, and finally eats her black object. Then she leaves and feeds just over my head, eating what she catches.

I try without success to get a mirror over the nest; 13F comes and calls in alarm so I leave.

T-12: I spent 1½ hour here looking for a second nest, if there is any. I never saw 12F, but M-12

sang for an hour in the locust woods south of the first nest, and in the field there. I spent a long time watching him; no food carrying. I still think there might be a nest since M-12 is so localized. No sign of the young of the first brood.

(I found a Chat's nest with 4 4-to 5-day old young, 3 feet high in a locust tree. The nest is made of heavier twigs than usual, no leaves.) *cher + yg*

T-13 at 1200: I tried to get a mirror to the nest but 13F was always nearby and she came to the nest each time my pole appeared near it.

T-11: I returned to the nest; saw no sign of 11F. I then went out on the road and moved south to where I heard M-11 singing. I found him in a grove of sassafras trees and as I watched 11F flew up. One of them flew to a little fork in a sassafras limb and squatted in a nest-shaping position. I thought it was 11F, of course. Just then 11F flew to the fork with nest material and I saw that M-11 had been the one behaving like a female. One uttered the peculiar little recognition notes I've heard before when a pair comes together. They stayed there together for 25 seconds, then they left. The nest is the most fragile beginning with just a few soft fibers and cobwebs. It is about 10 feet high, overhanging the road. It probably won't be well-concealed. This was at 1240.

↑ into nest site

nest begun in a m

appear - and

1245. 11F goes to the nest with cobweb or insect cocoons. She seems slow and inattentive in inserting them.

1259. 11F brings something. Her long absences make me wonder if this might be the result of the tag end of an impulse which is petering out.

1300. Extremely odd events: M-11 comes to the nest and sits in it quietly. He then begins moving the nest material with his bill just as a female would do. Then he begins shaping with his body and feet and wings, ending with the little settling motion that is highly typical of females. He has been at this for 3 minutes, acting exactly like a female, when 11F comes. I can see nothing in her bill. M-11 doesn't relinquish the nest to her but sits in it and after 30 seconds moves a little to one side. Both pull at the fibers. Then in 1 minute 11F leaves, M-11 sits in the nest for another minute. He leaves after 5 minutes of this, sings his usual rather dry rattling skid.

1308 and 1314. 11F comes to the nest but I can't see that she brings anything. She is far from purposeful, hopping out of the nest and feeding when she finishes whatever building she is doing.

1317. She is back again. I guess she may build after all.

1320. A Prairie Warbler is near the nest, not in it.

→ moving
m. material

1322. 11F brings webs or white cocoons. She puts them in the nest for 20 seconds. M-11 sings nearby.
1325. I leave the territory.

T-10: I find 10F 40 yards west of the nest site. She calls when I come up. I sit down and she moves about me calling "tsu," "tick" and "check" about 3-4 times per 5 seconds. Suddenly M-10 flies to her and gives the series of thin, squeaking notes mentioned above in re the 11s. He then spends 3 minutes following 10F from shrub to shrub, making every flight she does and often sitting 3-4 inches from her. There is no other sexual behavior and she pays no special attention to him. At the end he flies up and makes a high (35 feet) flight in a semi-circle, going south and then turning east and going into the trees. Presumably he is feeding young there. 10F goes to 10R who sits 3 feet from the ground in a maple 37 yards from the nest. There is no begging and 10F is too nervous to feed him. I leave them and the territory.

T-11: M-11 is singing his Black-throated Green Warbler-type song on his territory near the meadow.

T-1: I spend 25 minutes here without a sign of a Prairie Warbler.

T-4: 4F is incubating.

I leave the area at 1415.

Songs normal today

done 7

also
as if B
+ also
cause
him to be
a target
of his
examination
?

pos
yg

77

July 6. A sunny, still day with a few clouds;
temperature 71° at 0700. Present 0745-1245.
Arrive 0745.

T-2 at 0748: 2F is on the nest, M-2 singing. 94

T-1 at 0750: M-1 sings at the south end of his territory, east of the tree row. I find him and 1F there. He follows 1F in one flight but I lose them in the tree row. I see one of them in silhouette 3 minutes later, but then M-1 falls silent and both disappear.

I wander around the territory north of the road, though I have little hope of finding anything here. At 0900 I find a nest, 1F's fourth, in an elm tree on the north edge of the territory, i.e., well east of the cinder pile and at the edge of the woods. It is 14 feet high, built in a three-way vertical fork of a branch that grows out of and up from the main trunk. It is very well concealed by Virginia creeper and poison ivy. It couldn't be farther from the second nest and still be on T-1. The question is its present status. 1F is not near it, but my timetable and her present activity would indicate that she may well be in the laying or incubating stage. The nest is quite new looking. I'll not wait to see if she returns to it, since I'll be by here again today.

I leave this territory at 0915, seeing a newly fledged Towhee.

T-13: 13F is not on her nest. M-13 sings step songs near it for 10 minutes at intervals of 20 seconds or so. In 10 minutes 13F comes to the nest with a green caterpillar. She looks at me for 10 seconds, feeds the young, then broods. I'll time her brooding period because it seems unusual to brood on what is at least the third day for some of these young.

This nest is very unusual; it is shallow and probably wider than most nests across the cavity. The wind sways the nest tree a lot and it is remarkable that the eggs haven't spilled before this. 13F stays 39 minutes on the nest. Nearly all this time she broods. Occasionally she stands to look into the nest, and she frequently shifts position when the wind blows the tree. When the tree sways she uses her tail to balance.

over down -
go back to
page where
site is described

M-13 sings the first 10 minutes near the nest, then falls silent for 15 minutes, and then sings 3 times at a distance.

At 1030 I put my mirror to the nest and find 1 unhatched egg, young. It is very difficult to judge the young, but I'd guess there are 2, quite small. One may conceivably be a Cowbird from its coloring, but this is much too uncertain to count on in any way. I leave the territory.

T-11 at 1040: 11F's new nest is beginning to take

shape, though only the walls are really built, and they are flimsy. The bottom of the nest is still pretty much just a gap. The old nest (third) is not dismantled so far as I can tell. M-11 sings a type #8 song east of the nest at about 20 second intervals.

24

(The Yellow-billed Cuckoo is incubating.)

Same ybc nest

1048. 11F brings weed bark, stays 10 seconds.

3

1100. M-11 sings a type #8 song to the north. He had been silent for 12 minutes. He sings 3 times.

5/1 dg

1105. 11F brings a big, soft, white web, looks like an insect egg case. She spends 1 minute in the nest shaping it with her body and manipulating it with her bill. M-11 sings a type #8 song to the south as she leaves.

1115 $\frac{1}{2}$. 11F brings some material. She spends 30 seconds in the nest, turning around and shaping it.

2

1122. M-11 sings a type #8 song twice southeast of the nest, probably near the meadow.

1127. 11F comes with her bill covered with soft white cocoons. She spends 1 minute 42 seconds shaping, turning, working the nest with her bill. When she leaves she seems to carry something black with her. M-11 sings to the southeast.

I leave. Note how infrequent 11F's trips are. I still think she may not finish the nest, which is much less developed after 24 hours than was her last one. She comes with nest material as I go at 1130.

T-9: M-9 feeds 9Y twice in 5 minutes. 9Y can *funding* call "check" and "tick" like an adult, is gray-brown in juvenal plumage, has white outer tail feathers. I was attracted by its squeaking. It flew after M-9 when I was so close that M-9 would not bring food to it. M-9 sings 3 times while foraging.

T-10 at 1142: A male is singing skids every 10-15 seconds in the big hackberry. After 2 or 3 minutes he flies to the west edge of the territory by the woods. I go there and find him; he flies back to 10F's last nest site. I then decide this male is M-14. He sang like M-14 (hoarse), and I now hear M-10 at the very south end of his territory while the singer I watched is singing near the big hackberry. Also M-14 flies way west once. A short time later he *27* sings near 10F's nest site and I hear a fighting note *care* and see 2 Prairie Warblers going through a long, high, *pure* and apparently leisurely chase. M-14 sings at its end, again near 10F's nest. M-10 sings an abortive song to the south. Then both fall silent.

I find no young though I walk over the whole territory. Nor do I find 10F.

I hear young near the woods at the south end of III and find 10F there but can't locate the fledglings. *28*
posit
I leave the territory at 1230.

T-14: See above under T-10.

T-1: M-1 silent.

T-4: 4F is on her nest.

♀ Y

I leave the area at 1245.

Long normal.
T not displaying

July 7. Hot, clear, and fairly sultry; temperature 77° at 0700. Present 0800-1300. Arrive 0800.

T-2 at 0800: 2F is not on the nest, M-2 is singing near it. I see no sign of 2F.

QW

T-1: The fourth nest I found yesterday is not in use so far as I can tell. M-1 sings at 0820 and I look for him. I fail to find him but see 1F and follow her. She gets nest material, goes to a nest which she is building, her fifth. It is 6 feet high, was clearly begun yesterday or if she is slow possibly the day before. It is built in a clump of Virginia creeper on the east edge of the tree row and toward the south end of the territory. There is no tree supporting it, just a strand of creeper. It is in the early stage despite what I said above (and that is still true); the nest has assumed some shape but is very flimsy. A snakeskin is woven around its outside. 1F makes 3 trips in the first 12 minutes after I find the nest. I'll time her for a while; it's now 0832. 0836. She spends 45 seconds in the nest shaping. 0838. 1F brings grasses, spends 45 seconds shaping and working with her bill. 0840. 1F comes with spider webs, I think. Stays 25 seconds. 0842. I can't see the material she brings; stays 15 seconds.

0820

~ ~ ~

1710g

0851. 1F comes with white cocoons, stays 35 seconds.
M-1 sings 2 type #8 songs to the north; he has been
silent most of the time, singing perhaps 10-12 songs
since I arrived. 11

0854. 1F comes with webs, I think; stays 40 seconds.
M-1 has sung 3 more type #8 songs, not very loud. 3

0858. 1F goes straight to the nest with unidentified
material; stays 10 seconds.

0859½. 1F comes with weed bark; stays 50 seconds.

0904. M-1 sings 8 type #8 songs at 15 second intervals. 8

0909. 1F comes with weed bark; stays 48 seconds.

0910½. I can't see the material she brings; stays 20
seconds.

0914½. 1F comes with down like everlasting; stays 30
seconds.

0918. 1F comes with weed bark and perhaps webs; stays
10 seconds.

0920. 1F brings unidentified material; stays 35 seconds.

M-1 sings 11 type #8 songs to the north at intervals of
12-20 seconds. All his songs are from the center of his
territory. 11

I leave the territory, having watched this nest
for 1 hour. I rate it well concealed; note again it
is 1F's fifth nest.

(The Bob-white's nest on this territory is destroyed
with no trace of the eggs. The nest is crushed and un-
recognizable.)

Some
Bob.
white

T-3 at 0930: I began wandering around this territory. M-3 was silent. Heard M-8 and M-7 sing.

(I saw a Red-eyed Vireo attack a Blue Jay.) *Red-eyed Jay*
0955. I found 3F's fourth nest, 8 feet high in one of a grove of sassafras trees on top of the hill and toward its northeast end. The tree is in the center of the thicket rather than on the edge. It is $9\frac{1}{2}$ feet high and leans very insecurely and seems about to fall when the wind blows. There are 3 Prairie Warbler eggs, 1 Cowbird egg, in the nest. Neither adult is near and I'm already afraid it is deserted. (Note that M-3 was silent the entire time I was here.) It is possible that 3F is still laying, but I doubt it. The eggs all look fresh and are fairly warm but not enough for me to be sure that they are being incubated. The nest is poorly concealed.

1015. I leave the territory.

T-2 at 1022: 2F is on the nest; M-2 sings. *74*

T-5 at 1025: (I searched toward the power line and found a Bachman's Sparrow's nest. It is directly under the wire, at the base of a little raspberry bush. In it are 3 new young, 1 egg. The female flushed from under foot, scooted a few feet and began a hissing or rasping noise which she kept up without stopping. I thought a snake was under me, or a small hissing mammal. She darted 7 yards, turned and came back toward me still *Bach Sp nest 342 (49)*

hissing. Her wings were drooped and spread, her tail elevated at a 50° angle. She kept this up, moving all the time, for 3 minutes. Then the male [I assume the female was the brooding bird] came and sitting 2 feet up on a little limb gave a sharp, clear "pseet," fairly long and diagnostic [Females give it often when flushed]. He also bobbed up and down like a wren, switched his tail, and turned from side to side.)

1040. I found 5F's nest with 5F incubating.
(I now have all 15 pairs accounted for except for second broods and the possibility that 3F has a new nest.) This nest is in an upright fork of a dogwood at the north end of T-5's sinkhole. It is 14 feet high from the level of the ground, 18½ or 18 feet from the base of the tree in the sinkhole. It is fairly well concealed. 5F sat with her bill open at 1053. M-5 sang 2 faint type #8 songs nearby a few minutes ago. 1053. I left the territory. M-5 sang frequent steps as I left, a typical 9-note song with 4 slow notes on the same pitch, 5 quick rising ones.

f y
insp

T-3: M-3 was singing at the northern ravine. There was no sign of 3F at the fourth nest.

(I found a Field Sparrow's nest with 2 young Field Sparrows probably 4 days old, 1 Cowbird.)

f
2+1
y?

T-8: M-8 sang on his territory and I saw him. He obviously had young nearby since he "ticked" at me.

T-13 at 1130: 13F came to the nest without food, ♀N
hopped all around it calling "tsu" and "tick." She
foraged in the tree tops near the nest, always eating
the food herself. Twice more she went to the nest
without food. I concluded the nest had failed, and
I put up the mirror. Just then 13F came with food in
her bill and giving a rapid "tsu" of alarm. I sat
down without seeing into the nest. Soon M-13 began
to sing near the nest, went to it but I couldn't see
if he carried food. He sat looking into it for 25
seconds, flew to some little trees and hopped about
nervously. 13F went to the nest 2 more times without
food; she stayed only 15 seconds each time, didn't
seem really to pay any attention to its contents.
At 1206 she went and settled on the nest. Now at
1215 she is still there, with her bill open. She
sits high with spaces between her breast and the nest
wall. My guess is that the young have been taken, she
is incubating the bad egg. During the period before
she settled on the nest she never left the vicinity,
and she and M-13 didn't follow each other. She
doesn't seem at all disposed to reneest. I'm afraid
to put my mirror up since it will scare her away. M-13
is nowhere near; he moved away some distance after
leaving the nest.
1220. M-13 sings a step song 40 yards or so away. He
sings for 6 minutes, faintly at 20 second intervals.

1232. 13F is still on the nest. I must leave.

I'll check it first thing tomorrow.

T-11: The new nest is considerably farther along but by no means complete. There is still a good sized hole in one side of the bottom and the nest has an untidy look. I saw no sign of 11F in 5 minutes spent here.

T-4: 4F is not on her nest, but I must leave.

SN

I leave the area at 1300.

Long quite normal

July 8. Gray and cloudy with a breeze and the threat of rain; temperature 72° at 0800. Present 0845-1300. Arrive 0845.

T-4: No sign of 4F at her nest. I'll return later *9N* and check.

T-1: The nest is amazingly built up; it seems complete to me. There are no eggs. M-1 sang a high step song. No sign of 1F.

T-11: The nest is incomplete and messy looking with no progress made since yesterday. Clearly it is poorly constructed. This seems to mark the end of 11F's nesting, my first certain manifestation of that stage of the cycle. I'll continue to check to be sure.

I took the third nest from its position. It was 12 feet high from the base of the tree, 11 feet from the level of the surrounding ground. There was one egg in it with a small puncture hole. The nest is lined with many feathers, my first with that feature so pronounced. Complete data later.

T-13 at 0915: I found 13F near the nest. She *9N* hopped about for 10 minutes feeding and eating all that she found. M-13 sang his slow step song nearby (15 yards).for 15 minutes but the female paid no attention. She "tsued" at me, gave an occasional "check." She drew nearer the nest and at 0925 entered

it and assumed a normal incubating position. M-13 sang a short while (a total 15 minutes as described) near the nest, moved off to the north where his song could be heard occasionally. The problem now is to discover what 13F is incubating.

0940. M-13 sings near the nest.

0944. M-13 comes to the nest with many green caterpillars in his bill. He flutters before it, hovering in the air. One bird of the pair gives the peculiar faint twittering call I've sometimes heard when a pair comes together. 13F leaves the nest, M-13 goes to it in 10 seconds, feeds the food and removes a fecal sac. Clearly I've jumped the gun in saying the young have been lost. The problem then is why doesn't 13F ever take food to the nest. She is foraging now within 10 yards of it, never seeming to leave the vicinity. I've got to put a mirror up somehow.

—NB
call to
each other
?

0951. 13F comes to the nest and immediately settles on it. She carries no food.

I should have mentioned something she has done today and did yesterday before settling: She used her feet a good deal, kicking something around in the nest. If she has young why does she brood so long after they have hatched? Is she incubating the egg I saw on July 6?

1002. M-13 sings near the nest, lands 3 feet from it. 13F leaves and M-13 goes to the nest with much food. He feeds it and stands on the rim for 55 seconds, seeming to dole the food out little by little. He leaves and I try to put up a mirror. This immediately brings 13F to the nest vicinity, calling "tsu" rapidly. M-13 sings a step song a few yards away. I pull the mirror down without looking into the nest. I'll try it when they are more disposed to leave the nest untended.

1012. I leave the territory with M-13 still singing a step song, 7 notes all rising, every 15 seconds or so. *leg*

T-3: The nest I found yesterday is the same as it was with the eggs clearly cold, abandoned. M-3 sang a good deal, always from the north side of the ridge near the old nests. He sang his buzz song, a skid and a step. He acted very much as if there is a nest there. I left the territory at 1055.

T-5: 5F was on her nest. M-5 was singing a step song to the northeast. I watched 5F to be sure her eggs haven't hatched. She sat low in the nest without any motion for 18 minutes, so I concluded she didn't have young. M-5 sang faint step songs east of the nest most of this period; his intervals were irregular but often, about 15 seconds. *9.4*

T-7: I heard a Prairie Warbler sing frequently south of the valley and in the grove. It must have been M-7. I saw no sign of the young, but I wasn't here long. He called the "patunk" call a few times.

T-2: 2F was not on her nest, but she came to it at 1130, 5 minutes after I got there. She wouldn't go to the nest in my presence, but her approach and her obvious desire to get to the nest showed it has not failed. She carried no food, so presumably she is still incubating. 9N

T-1: I put a mirror to the nest; it is still unlined.

T-4: 4F was on her nest. 9Y

T-10: I spent 45 minutes on III. I heard M-14 singing a few yards north of 10F's last nest. I went up and found him bathing in the drops of water that a light shower had left on the redbud leaves. He went from branch to branch, shaking the leaves and seeming to blunder into them, sometimes almost turning upside down on the branch. Then I saw him go to a tree nearby and a young bird flew out toward him, then back into another tree. With difficulty I found the young, an unbanded bird the right size for M-14's. It was shaped like a mature Prairie Warbler but was almost imperceptibly smaller. Its flight was perfect, just like an adult's. It switched its tail and moved with an adult's nervous Bathing
Jock
98
???

mannerisms. Its head was olive gray, mostly gray, its back slightly more olive. It had no eye ring. Its breast was gray with a distinct but slightly blurred inverted V of clear yellow from the throat to the top of the belly. Its bill was black with a tinge of yellow on the cutting edge of the mandibles. This bird was wet looking and I saw it shake out its feathers. It also preened, scratched its head with its foot put over its wing, stretched its left wing and the left side of its tail. Then it stretched each wing upward alternately in a typical bent-wing fashion. M-14 fed it twice and it begged with a series of "tunks." There was a slight rise in tone and almost a squawk when it fed; it fluttered its wings. It never fed itself though once it seemed to pick at something. Then it sat dozing with its eyes closed for 30 seconds at a time.

I found 10F feeding young over by her second nest. She was nervous about me, called "tsu" and "check," and I saw the young only when it made a 15 yard buzzy, tail-less flight to a thicket. M-10 came up and chased 10F for 2 minutes, or perhaps it is better to say he followed her. Once he swooped on her and passed just over her.

Note that the territories here have dissolved: M-14 was at 10F's successful nest; M-10 was on the very edge of his territory. 10F's second nest is 89 yards from the fourth and last.

←
feeding

89

distance
between
nests

T-9: A female, probably 9F, was at the edge of the woods on the northwest corner of III.

I left the area at 1300.

*Scops not much
2 juvs w/ 1 egg not guarding*

July 9. Clear, sunny and wet after a cool night and rain yesterday afternoon; temperature 65° at 0800. Present 0815-1300. Arrive 0815.

T-4: 4F was on her nest, M-4 silent. 94

T-1: 1F's nest is complete, with the usual grass 94
lining. There are no eggs. M-1 was silent.

T-11: 11F's nest was the same as yesterday, clearly to remain incomplete. M-11 sang 2 or 3 step songs.

T-13: 13F was on her nest, M-13 was singing step 94
songs on the north of the territory. I saw him catch caterpillars, go to the nest at 0840. 13F left. (M-13 sang for 3-4 minutes with food in his bill.) A young bird that I could see in the nest seemed to be a Cowbird; its head and bill looked big, its skin color and down light. After being fed it put its tail over the edge of the nest and defecated, and M-13 tried to catch the 94
sac in the air; I couldn't see if he caught it. I'll try to see into the nest today. I left the territory at 0850, to return later.

T-12 at 0850: I heard sounds which I thought at first were Prairie Warblers fighting; then I saw 12R, 94
12B and 12G all chasing an adult and begging. The adult had a red back and its head seemed like that of a slightly poorly-marked male, but a clear M-12-like step song with a buzz on the end was coming from south of the

old nest. I watched the adult feed the young for *fully* 15 minutes. The young stayed close together, begged vociferously and fluttered their wings with great vigor when the adult approached. The adult gave faint "check" calls while foraging. All young had completed the post-juvenal moult and were in immature plumage with gray heads, heavy broken eye-rings. I saw one catch a caterpillar and beat it on a limb like an adult. It then wiped its bill. Another caught a green cricket. One fluttered before a weed top trying to pick something from it.

Then I found the singer south of the old nest site. I never saw his breast to see if he was M-13, but he had an unusual amount of white on the left outer tail feather.

The situation here is obscure. If the feeding adult was a male and the singer was a wandering male, is it not significant that 12F isn't about in sight? I'll have to give this territory another few days' work.

I then found M-12 singing his usual song in the big walnut trees on the north edge of his territory. I watched him for 10 minutes as he caught and ate insects, moved along here on the edge of the woods. There was no sign of the female.

(I found a Red-eyed Vireo's nest, 5½ feet high, *Rev 2 185'* with 2 white eggs with very scattered small black spots. It is built in a little redbud on the edge of the woods.)

T-13: I put my mirror up and could see only 1 young, a Prairie Warbler, and no eggs. The young seemed to be 5 or 6 days old. It did not gape. 13F fluttered to the ground and gave a distraction display.

T-9: M-9 was feeding 9Y and 9G at the very north ^{Tending position} end of his territory, north of the second nest. The young are full sized, molting and frowsy looking. Their heads are dark gray without eye rings, breasts have inverted yellow Vs, yellow chins are coming in. They uttered light "check" notes. M-9 sang twice.

T-10: I found 10F 25 yards south of her second nest, carrying food. She went to a tree and I saw ^{tending} 10B (identified later) sitting 1½ feet high. I moved toward them and a second young flew up with a cry. 10F immediately put on the usual distraction display, fluttering her wings and moving over the ground while ^{dis} "checking." She succeeded and I lost the second young. I went to 10B; it flew to a redbud and perched 4 feet up. I watched it for 15-20 minutes. It is in full ^{gg} juvenal plumage, its head with a little down on it, its tail 1 inch long, its bill darkening but quite yellow on the margins, one full buff wing bar, one short faint one in front of it. During the time I watched, it scratched its head with the left leg, putting it in front of the wing, and then scratched

with the right leg, putting it over the wing. It preened a good deal, stretched straight up and stood with its legs extended 4 times, tending to perch like an adult after stretching and maintaining the adult position for a minute or more. It stretched each wing out in the conventional one-side stretch. It moved about a little. After 10 minutes of silence, 10F "checked" near it and it immediately answered with the same call, repeated a second or so apart. This is interesting; it seems to show that "check" is a position or location note. 10F didn't go to the young and it repeated an occasional "check." She then fed it and it fluttered its wings but didn't give the begging call. I moved to within 5 yards and it flew easily away on a 15 yard flight.

M-10 may have sung once or twice in my 45 minutes on the territory; the song was faint and I couldn't recognize it.

At 1205 I left the territory, hearing M-10 sing a step song at the north end of it.

T-11: M-11 sang 2 step songs, faint, near the first nest.

T-8: M-8 sang a faint song.

T-5 at 1220: 5F was on her nest, sitting quietly 94
and low as though incubating. M-5 sang a step song

20 yards southeast of the nest.

1226. M-5 sang northwest of the nest, a faint, slow step song.

1230. He switched to a skid song of medium volume every 25 seconds or so, moved toward the nest and on past it to the southeast. 5F looked out of the nest but paid no other attention to him.

1244. 5F has never changed her position, never raised on the nest, never looked under her or shown the least interest in the contents of the nest. I therefore concluded the eggs are unhatched and I left.

M-5 was singing a loud skid at the south edge of the sinkhole.

T-2: 2F was bringing food to her nest, so the eggs have hatched.

2N

I left the area at 1300.

long skid song
during

July 10. Fine, sunny, fresh day with a few clouds;
last night's temperature down to the high 50's;
78° at 1300. Present 1330-1735. Arrive 1330.

T-4 at 1340: 4F was not on her nest. I waited ^{FN}
and at 1350 with "tsus" she went to the nest and in-
cubated. M-4 sang skids on old territory.

T-1: One egg is in 1F's nest today. It is large,
more pointed than usual; the spots are more numerous ^{egg}
and heavier. The large end has blotches of light ^{dark}
red-brown as background, with darker, smaller red-
brown spots all forming a heavy wreath. There are
two small, almost black spots. The small end has
scattered spots of red-brown, again more than usual. ^{FN}
I marked the egg. M-1 was silent, 1F not in evidence.

T-11: The last nest is unchanged in appearance.

T-13: 13F was not on her nest so I put up my ^{FN}
mirror. There was a large young sprawled in the nest,
not yet much feathered. It could be a Cowbird, but
its color indicates a Prairie Warbler. 13F came and
fed it and its head looked like a Prairie Warbler's.
It is probably 7 days old today. 13F is not so
attached to her nest today. What happened to the
egg that was in it?

T-12 from 1430 to 1540: I searched for a female or a nest, without luck. M-12 sang a little south of the first nest. None of the first brood was seen.

(I found an Indigo Bunting's nest with one 3-4 day old Cowbird and no Indigos, 3 feet high in blackberries.)

(I also found a Field Sparrow's nest with 4 young within 36 hours of fledging; 2 feet high in a 4 foot white pine.)

T-3: I searched the north side of the hill for the fifth nest, without luck. The fourth is clearly deserted; today its tree had been moved to one side a good deal by the wind, the Cowbird egg thrown out and broken. Perhaps this was a factor in its desertion, but probably the Cowbird egg caused it. M-3 sang on mid-territory, a skid song.

T-5: 5F was not at her nest at 1644, but at 1655 she came and hopped around the nest tree. She carried no food, called an occasional "tsu." In 5 minutes she left without going to the nest. M-5 sang step and step-buzz songs near the first nest, the step songs at frequent intervals for 3 minutes. At 1705, 5F came to the nest without food but immediately flew away without entering. I retreated a little. At 1715 she came and with no hesitation entered the nest and assumed the incubating position.

I couldn't see if she had food this time, but I'd certainly assume not.

I left the territory at 1715.

T-2 at 1720: 2F was not on the nest. At 1727 ^{♀ N} she appeared with adult insects in her bill, M-2 with her but without food. She went to the nest tree, M-2 to a nearby tree. 2F saw me and left the nest tree calling "tsu" nervously several times. M-2 hopped to within 6 inches of her and perched; she flew and M-2 followed.

I retired to a distant spot and at 1733 2F went to the nest, jumped away a few yards, finally returned and fed the young. In 40 seconds she left without brooding.

At 1735 I left the territory and the area. M-2 sang for the first time as I went, a loud skid of his usual sort uttered near the nest. He sang 1 minute later from 30 yards northwest of the nest.

Song unobserved

July 11. Sunny and fresh with a breeze from the south; temperature 70° at 0830. Present 0900-1245. Arrive 0900.

T-4: 4F on her nest, M-4 silent.

24

T-1: 1F was on her nest at 0915, and I made the mistake of scaring her off to see if there were 2 eggs; there were. She called a faint "tsu," hopped about near the nest and when I retreated went to the nest but didn't enter it. A bird came up, possibly M-1, and she moved away from the nest and I left. It is possible that she will lay only 2 eggs this late, so I'll return later to see if she is incubating.

24

T-13 at 0935: 13F was near the nest, M-13 singing in the locust grove where the nest is. He sang step songs there for 15-18 minutes, singing every 15 seconds. There is a young Prairie Warbler in the nest, now well developed with wing feathers almost 1 inch long, head and back feathered. It can lift its head and look around, and I think possibly I saw it preen its back. The nest tilts so that all this is visible from the ground. I am impressed with how great the nestling's development is from 7 to 8 days. 13F fed this bird twice after I'd been there 15 minutes, and it begged long but not very loud. The begging call at this age is not a series of

24

done on 7
call 17
84

"patunks" but a continuous vibrating sound. The young shifted about a lot in the nest. Tomorrow I'll take and band it.

I left the territory at 1010.

T-11: The nest is still just a fragment. The pair can be forgotten as far as further breeding is concerned.

T-10: In 30 minutes I found only a female PrairieWarbler at the edge of the woods on the west of III; she would have been 14F or 10F, hardly 9F. She showed no interest in me. While I was here there was one song I barely heard so I couldn't identify it.

T-1: 1F was not on her nest. I marked the second egg; it is colored like yesterday's. ♀ N

T-5 at 1110: 5F was not on the nest. ♀ N

(A Phoebe was singing to the south, a late date. An odd Field Sparrow song may be a young bird's.) Phoebe song Field song

At 1120 5F showed up without food. She foraged in the nest tree, hopping in a leisurely way around the clump of trees and once going to within a few inches of the nest. At 1130 she went to it without food and immediately settled far down. Clearly there has been no hatch here yet. M-5 sang a few very faint step songs nearby during this period.

T-6: I then worked on this territory for a second attempt at a second brood. On arrival I heard a male singing a type #8 song at the southwest edge of the territory, probably M-6. I found and watched him. A female Goldfinch and a Field Sparrow, especially the Goldfinch, kept following him around, flying to a perch within a foot or so of him in a sassafras grove. He paid no attention to them. A possible explanation is that the Field Sparrow had newly fledged young here (I caught one) and the Goldfinch may have had a nest.

2nd
QFS
FS

The search for the 6's or their nest yielded no sign of either. I spent 50 minutes or so.

(I found 3 nests on T-6, 2 of them in unusual sites: A Field Sparrow's 12 feet high on the top of a hackberry sapling in a witches broom; 2 eggs. An Indigo Bunting's nest 9½ feet high on the outer branch of a big sugar maple; 2 eggs. A Towhee's nest 4 feet in a little elm; 2 young probably 4 days old.)

FS-2
IB-2

Tow-2??

T-2 from 1230 to 1245: 2F carried food to the nest.

FN

I left the area at 1245.

July 12. Clear, still day, not too hot;
temperature 75° at 0800. Present 0815-1200 and
1430-1630. Arrive 0815.

T-13: The young is still in the nest. 13F fed ^{9N} it and it begged violently. After feeding it put its behind to the nest rim and defecated; 13F took the sac.

I decided to get and band it, and I had no sooner started up the tree than it fluttered squawking to the ground. Both adults immediately came to within 5 feet ^{reaction} of me and went through the typical distraction display, ^{to distraction} calling "check" constantly and crawling and fluttering ^{in to leave} over the ground. They kept this up all the time I had the young though they ceased to come quite so close as time passed. When it squawked, as it did whenever I moved it much, the adults came closer and increased ^{dis. dis.} their display. The rate of their calling during very active and alarmed display was continuous. This never lasted long and the rate then decreased to 9-10 calls every 5 seconds. I banded and weighed the fledgling and let it go but caught it again when I saw that the adults paid most attention to me. I then let it go just as I left quickly. It couldn't fly, so I'd say it is 9 days old.

Its weight is 6 gm., 010 mg. The brood mark is blue over silver, left; the individual band is yellow. Number: 2162080.

I took the nest which is extremely shallow and quite different from most in shape, built against the side of the limb and supported only by a little locust leaf. More about it later. There was no sign of an addled egg, but the branch broke off (and I fell hard) so it might have spilled out.

no V
shape

13Y opened its bill at me when I picked it up after the first liberation.

B 899

T-12 at 0900: I spent 1½ hours here, hearing M-12 a few times sing a type #8 step song. I never saw him, 12F, or any of the first brood. I'm beginning to think there is no second nest. M-12 wandered onto the north end of T-13 today.

T-13: 13F was carrying food near the nest site, M-13 was also there. I assume 13Y is safe.

T-1: There are 3 eggs. The latest is much less marked with spots than the others. The wreath is heavy and the same color but farther toward the large end and therefore smaller. There are very few marks otherwise. All eggs have 2 or 3 little, almost black dots on the large end. 1F was not present, M-1 was silent.

egg darker

7 N

T-4 at 1045: 4F was not on her nest. At 1105 she came quietly to the nest tree, hopping calmly about like a female returning to the nest. Finally she came to the nest, looked in for 15 seconds, flew

9 after
sailor

higher in the tree and in a minute flew away some distance.

1117. 4F returned to the nest tree and in a minute after preening went to the nest, but after a few seconds she again moved some distance away.

1128. 4F came back to the nest tree. She crouched in a witch's broom on the opposite side from the nest. Then she went to the nest, sat in it for 10 seconds, left it, and in 15 seconds flew to the northwest corner of the empty field where the sheds are, near the road. It is beginning to look as though this nest has failed. M-4 was silent and 4F made no sounds when she came to the nest.

1200. There has been no sight or sound of any Prairie Warbler since 4F last came to the nest. I left the area.

1430. I return to the area.

T-4: The third nest seems deserted; I saw no Prairie Warblers near it. I stayed till 1540 on this territory without hearing or seeing a Prairie Warbler.

I began a search for 4F building a new nest and found the remnants of a last year's nest, 7 feet high in an upright three-way fork of a 10 foot maple. It may possibly be a Goldfinch's nest, since I found a fresh and apparently complete nest of that species

CF
new

10 feet up in the fork of a maple, i.e., exactly similarly situated.

T-1: 1F is not incubating.

9N

T-5 at 1545: 5F was sitting deep in her nest and not looking underneath her. M-5 sang once or twice shortly after I got to the territory. At 1605 he began singing a step song to the north and sang every 8-15 seconds for 5 minutes. 5F continued to sit in the nest; she made one very slight position shift after I got there.

9Y

At 1615 I left. 5F had made no significant move, sat low, never looking under her or giving the slightest sign that she has young.

T-2: 2F was feeding young at 1630.

I leave the area at 1630.

has Aggie
wid. R song

July 13. Hot and perfectly clear; temperature about 80° at 1000. Present 1030-1530. Arrive 1030.

T-4 from 1030 to 1300: I covered every inch of this territory, not looking for nests but for the Prairie Warblers. I saw and heard nothing, and I therefore doubt if a nest is being built today.

(I found 2 Field Sparrow nests. One was 3 feet ^{FS}₃₄₈ high in a maple with 3 young, probably 6 days old. The other was 1½ feet high in blackberries; 4 young ^{FS}₄₃₉ 2-3 days old.)

(There is a White-eyed Vireo with young on this territory. A Black-billed Cuckoo and a Yellow-billed Cuckoo sang.)

T-1 at 1300: I found 1F on the nest at my arrival. [♀]
M-1 was singing a skid song near the nest, probably in the big elm which is his song post and which is 25 yards from the nest.
1305. M-1 flies to the vine by the nest, hops to the nest. 1F sits there. He goes right to the rim and offers her food which she refuses, not opening her bill. He hops from the nest and the next time I see him he is 3 yards away, without food and with his bill open. ^{AFB}
1306. She slips quietly from the nest. There are 4 eggs in it.

1311. Both Prairie Warblers return to the nest site and 1F quietly and immediately enters. M-1 hops about on the trees by the nest for 45 seconds, flies to the elm song post. *to tree*

1315. 1F leaves the nest.

1321 2/3. 1F flies straight to the nest and without any hesitation enters and incubates.



1333¹. 1F shifts a little in the nest and now seems to be sitting slightly to one side. She was interested in something a few minutes before this move and was looking out over the rim of the nest.

1355. 1F slips off the nest and drops to the ground under it.

1415. M-1 sings a faint type #8 step song from his big elm. This is the first time he's sung since I last noted it. He sings 37 type #8, then 2 regular step songs in 9 $\frac{1}{2}$ minutes, quits.

1417. 1F returns to the nest.

1425. I leave the territory.

T-5 at 1435. 5F was not on the nest. At 1450 M-5 went to the nest and sat there a minute after a "check." In 1 minute 5F appeared calling "tick." She moved all about the nest vicinity, M-5 following and once flying at her. M-5 was silent, 5F frequently calling. M-5 adopted an odd crouching position and didn't flip his tail. He perched with legs thus to the limb:  instead of .

Q N

AB

5F twice went to the nest, the second time standing on the rim and looking. At 1505 M-5 quit following her and she went to the nest and entered. She sat quietly though possibly a little high. She never carried food. M-5 sang a step song at 1510.

At 1515 I left the territory, M-5 still singing a step song infrequently.

T-2 from 1520 to 1530: M-2 sang within 20 yards of the nest. Two young stuck their heads out, with their bills open.

I left the area at 1530.

*Song unobserved
on T-2 song on
150 - 2200 75*

9 N

July 14. Rain from 0700 to 0730, again a little at 0800; temperature 70°; morning a little sultry and cloudy. Present 0845-1245 and 1730-1815. Arrive 0845.

T-4: I spent 1½ hours going over all of this territory, without seeing the least sign of a Prairie Warbler.

T-1 at 0855: 1F was not on the nest, so I examined it; there are still 4 eggs. She called "check" when I went up.

0959. 1F goes to the nest and immediately begins to incubate.

1013. 1F rises a little in the nest and resumes the same position.

1013½. 1F changes position, making a 120° turn in the nest.

1052. 1F slips from the nest quietly and goes to the ground. M-1 has been silent the entire time so far.

1102. 1F appears in the tree row 15 yards north of the nest. In 30 seconds she flies to the nest, stands beside it for 5 seconds, enters and begins to incubate. Almost immediately she turns around.

1105. I leave the territory.

T-3: (I found an adult Whip-poor-will and young just able to fly in sassafras. The adult called "whip"

Whip
99

several times.)

T-7: I saw M-7 catching food near the first nest as I passed through this territory. He ate all of it; no carrying. He sang faint step and type #8 songs.

T-5 at 1115: 5F was on the nest, sitting quietly and low as though the eggs were still unhatched. ♀ Y

1127½. There was a faint skid song, probably from M-5.

1130. Repeat.

1132. Repeat.

(A Broad-winged Hawk soared over. There is at least one pair here; I've seen the birds on T-1, T-3, T-4, T-5, T-6, T-8, T-12, T-13.)

1134. 5F twice sat with her bill open for a few seconds. M-5 sang a faint skid song every 20 seconds, 5 times, to the east of the nest. c
T
opens
bill

1138. M-5 sings a skid song again several times to the east.

1140. 5F was still sitting exactly as before, without the least sign that her eggs have hatched, as I left the territory.

T-6 from 1140 to 1220: I worked over the west part of the territory without seeing or hearing M-6 or 6F. I found a male Prairie Warbler feeding unbanded young of full or nearly full size, juvenal

plumage, near 6F's first nest. This must be either M-7 or a pair from the north of my study area. I'd guess pretty surely it was M-7.

(An Indigo Bunting's nest with 2 eggs is built exactly where 6F's first nest was.)

IB₂

sumner
side
9BW

T-2: The young are still in the nest.

I left the area at 1245.

I returned with Sue and Frank Horack at 1730. We brought a ladder to band 2F's young, but couldn't get to the nest. The adults were mildly alarmed. M-2 was singing on our arrival.

I left the area at 1815.

song unsustained -
no seen 475

July 15. A cloudy, sultry day after a rain last evening; temperature 73° at 0800. Present 0845-1245. Arrive 0845.

T-2: One young had its head out of the nest. ♀ N
M-2 was singing a faint type #8 song; 2F was 15 yards from the nest foraging and eating what she caught.

T-1 at 0900: 1F was on her nest. ♀ V

T-4: I spent 1½ hours here. At 0925, M-4 began to sing occasional faint step songs. I found him in the center of the territory and watched him for 15 minutes. He sang about once a minute. There was no sign of 4F.

There are no changes in M-4's plumage yet.

T-1 at 1015: 1F was not on her nest, but just as I arrived she came to the nest vicinity with M-1. ♀ N

She goes to the nest, he sits 15 feet above her and gradually approaches to within 5 feet of the nest after she has gone to it. He then moves away. There is no sound from either. 3 sec
♀ to
nest

1113. 1F, having remained completely motionless the entire time, rises, perches a second or so on the rim of the nest, flies to the ground.

1129. 1F flies to a little tree 15 yards from me, looks at me silently flipping her tail, flies to the nest and enters it. I leave the territory.

T-5 at 1135: 5F was on her nest.

py

T-6: I made a careful 1 hour examination of this territory without finding any trace of a Prairie Warbler.

(The Indigo Bunting's nest I found yesterday in 6F's first nest site has 3 eggs today.)

same
IB -
3

T-5: 5F was off the nest and with M-5 near it. They moved about together with 5F seeming to follow M-5 a few times. When he flew away she didn't follow but hopped about within 20 yards of the nest. She called "tsu" and "tick" consistently but infrequently. She came to the nest tree without food, left it, finally returned at 1245 and entered the nest. She never carried food.

9v

I left the area at 1245.

Long unobserved
(M-5, B's song on
all the other trees
family, etc. active seen
after long period
No - seen 475-

July 16. Rain at 2400 yesterday and during the night and morning, clearing at 1130; temperature about 78-80° at 1200. Clouded over at 1700. Present 1530-2015. Arrive 1530.

T-2: I spent 45 minutes here establishing that the nest is still active. M-2 sang for 3 minutes near the nest; 2F called "tsu" and "check" and hopped about within 20 yards of it the entire time. Twice she carried food, the first time eating it herself, the last time never quite getting courage to go to the nest though she went to the tree. She carried it thus for 20 minutes. At 1610 one young stuck its head up from the nest and I left since 2F would not feed them in my presence. ♀ N

(A Cooper's Hawk flew over the territory low, the first I've seen here since May.) Cooper's Hawk

T-5: 5F was on her nest. ♀ Y

T-6 from 1640 to 1805: I worked this territory thoroughly, hearing M-3 and M-5 but never M-6. I saw no Prairie Warblers here. East of the territory on the extreme edge of the Prairie Warbler habitat, I found a male feeding 3 young about 12 to 14 days old, full or nearly full size in juvenal plumage. This may be a pair I missed, one that must have arrived late; I checked over this far to the east in May without (from N)

seeing a trace of a Prairie Warbler. Another possibility is that this is a family from north of my study area; [correct] I never heard any songs from this point. At any rate I know they brought off 3 young.

(The Indigo Bunting's nest at 6F's old nest site has 3 eggs.)

same
13

(I found a Field Sparrow's nest with 3 eggs, the wreath on the small end, 1 egg brownish on most of its surface; the nest is 2 feet up in a bittersweet vine east of T-6.)

FS

T-5: 5F was on her nest from 1805 to 1825, crouched down and clearly incubating. M-5 sang skids to the south, then to the east for the entire 20 minutes, about 20 to 30 seconds apart.

94

(All males seem to be singing more today than any time this week. I have noted a decided decline in song for the last 3 or 4 days. I see no signs of a male plumage moult yet.)

T-3 at 1830: M-3 was singing a loud skid song. When I came on the territory a female Prairie Warbler was feeding on the northwest corner near the valley. She was flycatching, making many sorties out into the air and turning to return to a nearby branch. I followed her for 15 minutes and lost her. Then I saw a male Prairie Warbler, well marked, but heard M-3 singing at the same time. I.e., another male was feeding on the

♀ feeding

center of the territory without any challenge from M-3 (assuming M-3 knew he was there). I feel sure the territories are breaking up. Thus this male might have been M-7. I can't tell if the female was 3F, though she moved around a lot and always near the center of the territory. She was frowsy looking, as though just *molt* beginning to molt. Later I saw M-3, thus confirming the fact that the male I first saw was not he. I took 3F's fourth nest, with 1 egg now broken.

T-1: 1F was not on her nest at 1905. All 4 eggs *FN* were there.

T-4: In 20 minutes I saw and heard nothing.

(I found a Field Sparrow's nest with 3 5-6 day old *FS* young, 2½ feet high in a little maple sapling.) *3-72*

T-1 at 1925: 1F was on her nest and I began to *fy* time her movements.

1945. M-1 sings a faint, quick step song once.

1947. M-1 begins faint steps, mostly very quick and run together but with a single, slower one. He sings 8 or 9 times; one 15 second interval, most 20-30 seconds.

2001. 1F drops out of the nest to the ground for no apparent reason. It is now beginning to get a little dusky, partly due to clouds in the east. The sun has set.

2010. 1F slips into the nest very quickly. I couldn't see her approach though I watched for it. This is surely her last move for the night so I leave at 2015.

See 473 - young of song after 3-4 days decline

July 17. Cloudy and very humid after a rain at night; light mist falling during the morning; temperature 73° at 0800. Present 0845-1245. Arrive 0845.

T-2: I went to the nest and saw no young. At 0900 2F came silently to the nest vicinity without food. I was quite far back, so she went to the nest tree, hopped around in it and looked into the nest and soon left. No young responded to her presence. *FB N
nest fail*
M-2 came to within 15 yards of the nest and sang once or twice. Both adults left, not together. I watched the nest till 0915 and still saw no young. I began to look around, saw M-2 fly from the northeast toward the nest. He sat 1 minute on top of a little tree near it and sang, then flew back. At 0925 I saw 2F fly from the same direction toward the nest. She went quietly to it without food, sat near it after hopping over it but paying no attention to it. Then she went back northeast and I lost her. Once more M-2 flew from the northeast to his perch near the nest, sang high, slow, faint, short step songs 20 seconds apart for 4 minutes without otherwise moving. Then I lost him. I looked about his territory till 0945 without seeing either of the pair.

I conclude the nest has failed. There is nothing to indicate likelihood of re-nesting. 2F is quiet and silent, and M-2 and 2F do not move together. I'll

check of course to be sure.

T-5 at 0948: 5F was on her nest, sitting quietly ^{fy} as though still incubating. By 1010 she hadn't moved, so I concluded her eggs were still unhatched. M-5 was silent.

T-3 from 1010 to 1040: I searched for the fifth nest, staying on the west side, and had no luck. M-3 was silent.

(I found a Towhee's nest in a juniper; the nest ^{low} was 5 feet 8 inches high, 2 eggs, not warm enough for ²⁴⁹⁷ incubation it seemed to me.)

T-1 at 1045: 1F was on the nest. A light rain ^{fy} was falling. I began to watch the nest.

1126. 1F, who hasn't changed position since I arrived, begins to look about a good deal, turning her head from side to side.

1128. 1F, after continuing to look around, stretches her wings out a little on each side, jumps to the nest rim, flies toward the ground.

1138 $\frac{1}{2}$. 1F flies into the vine where her nest is, coming from the west and moving low apparently. She climbs to the nest, settles facing in the same direction as she faced before leaving, incubates. She uses her feet a little in settling on the nest. I leave the territory. ^{NB}
Note M-1 has been silent. ⁴⁹⁷

T-2: I spent another hour here. I found M-2 singing at the south end near the road for 10 minutes at 20-30 second intervals, his loud, very distinctive skid song. There was no sign of 2F, but M-2's behavior and his centering his activities on one spot is like that of a male whose mate is building or will build. At 1245 I left the area.

still song

July 18. Wet, cool, and breezy after a rain last night; temperature 67° at 0800. Present 0800-1140.
Arrive 0800.

T-2: The fourth nest seems clearly abandoned, so I began to search the territory. I heard M-2 sing near the south end once and began my nest search near there. I found 2F immediately (at 0830) moving near the ground. She flew some distance north and I followed but couldn't find her. I returned to where I'd seen her (where M-2 sang yesterday), and at 0845 she flew high into a wild cherry tree with nest material. Then she hopped to a 13-14 foot high dead walnut covered with Virginia creeper and reappeared without the large bill-full of bark. She then began to feed in the cherry.

I haven't gone to the new nest site yet, but note how much her behavior resembles 11F's when she built her last fragmentary nest. I'll time 2F for a short while.

0902. 2F is back but I can't see material. She stays 30 seconds, flies to a high cherry tree 15 yards away and preens for 1 minute, then goes to another cherry and I lose her.

0905. 2F comes with something I can't see; she stays 20 seconds, hops to the walnut beside the nest, sits 15 seconds and leaves.

0915. 2F is not back, so she has made 3 trips in $\frac{1}{2}$ hour.

I'll go see what she has done: This nest is about 14 feet high, consists so far of the barest sprinkling of fibers, perhaps 25-50 of them, almost invisible. It probably will never be completed.

I removed 2F's fourth nest from its tree. There was nothing in it at all. A snakeskin around it is ^{Snake skin} probably a green snake's. The nest is lined with a few feathers. More later on it.

T-5 at 0925: 5F was sitting on her nest but hardly [♀] in it. She was quite high, and at 0930 she appeared really to be standing up at one side of it. Her eggs are due to hatch today and her position indicated they had begun to. She remained thus for 10 minutes; I assumed they have hatched. As I left she turned in the nest and settled down lower. I'll return if I can.

T-1 at 0942: 1F was on her nest. A Prairie Warbler sang several faint type #8 step songs to the north of [♀] the nest, probably M-1. He continued till 0951 (from 0945).

0953. 1F, who has been looking around a good deal, leaves the nest without any preliminaries; she hops to its rim and flies down toward the ground.
1005. 1F flies to the nest vine, in 5 seconds she hops to the nest rim and sits looking in for 10 seconds. Then she enters and begins incubation. (She returned

to the nest site in a quick direct flight but I couldn't see how far away she had been. There was no sign of M-1 with her when she came.)

1013 $\frac{1}{2}$. 1F seems to shift slightly. She sits with her bill open.

1038. A breeze blows the nest vine a good deal and 1F settles deeper into the nest.

1046. 1F leaves the nest, not flying to the ground but flying straight away from it. I leave.

T-12 from 1050 to 1135: I found a female calling "tsu" and later "check" consistently near the locusts on T-12, south of the first nest site. Since she moved almost not at all, I waited and finally saw her carry food. After 30 minutes, on her second food carrying trip, I saw her go to a young and found 13Y, note on T-12. It was about $\frac{1}{4}$ adult size with a tail 1 inch long; *pos. 1/4* juvenal plumage, bill with much yellow on the cutting *downy* edges. It was perfectly silent. I saw it stretch to *stretch* the side. Once 13F gave the upward stretch of both wings.

M-12 and M-13 were silent; no sign of M-12 or 12F.

(I found a Field Sparrow's nest, 3 eggs, 1 $\frac{1}{2}$ feet *FS* high in blackberries, the female incubating.) *3*

T-13: See above under T-12.

At 1140 I left the area.

Song clearly, many 113

July 19. Hot and clear; 80° at 0800. Present
0830-1230 and 1430-1745. Arrive 0830.

T-2: M-2 was singing a slow step song and a few
skid songs on his territory near the nest. The nest
is rather well developed, about as much as I would ex-
pect a nest to be if the female were in the height of
her breeding phase. I sat to watch for 2F.

0842-0849. No sign of 2F.

0849. 2F comes with grass; spends 10 seconds on the nest.

M-2 is singing a faint step to the south, 3 times.

0852. M-2 sings a faint step to the north, 7 times at
20-30 second intervals.

0901½. 2F comes with unidentified nest material and stays
1 minute.

I leave the territory. I can't be sure now whether
the nest will be completed or not. It is a much better
structure than I expected it to be but it has no real
bulk yet; it is still a shell.

T-7: No Prairie Warblers seen or heard as I passed
through.

(I found a Red-eyed Vireo's nest 4 feet high in a ^{Red}
little maple fork; 2 eggs. The female let me get within
3 feet of her.)

T-5: 5F stood at the nest to one side.

T-6 from 0920 to 1025: There was not the least sign of any Prairie Warblers.

(I found a Field Sparrow's nest with 2 6-day old young, 2½ feet high in a little white elm.)

FS

287

T-5: 5F was standing over her nest with her wings spread, just as 10F did. There was no closing of wings when a cloud passed over the sun. After 5 minutes (at 1030), M-5 sang 3 faint steps, flew into a nearby sycamore with food. In 1 minute he went to the nest and 5F closed her wings and opened her bill to take a green caterpillar. M-5 saw me and left without giving her the food. She gave 4 or 5 very faint "tsips" and then spread her wings again. He gave a few faint "tsips" and then sang a faint step song from the cherry tree by the first nest. At 1040 she was shielding the nest from the hot sun with her wings. I left.

same Red

T-13 at 1055: (The Red-eyed Vireo has 2 young today.)

13F was about where she was yesterday, but I couldn't find the young. Her behavior indicated it was near. Twice she made a female or young Yellow-throat who seemed to follow her give way and drove it.

inc y then

T-12: 12F was found in a locust grove, southeast of the old nest, carrying food. After 25 minutes during which she hopped all around me and swallowed

the food, I followed her a few yards to a young bird that flew before I could see it well. She followed behind it and put on a full scale distraction display for me for 2 minutes. I couldn't see the young. I then found her feeding a young bird which could only have fledged yesterday, a few yards from the two other centers of her attention. It was of nestling size, with no tail, quite downy on the head, and it let me get within 2 feet before it flew. So, 12F has raised a second brood of 3 which fledged on July 18. I'll now work on finding the nest.

I left at 1230.

I returned at 1430 after a shower at 1330.

T-2: M-2 was singing loud near the nest. It looks well advanced to me and I now think 2F will lay.

T-1 at 1440: 1F was on her nest, M-1 singing first a faint step, then a loud and more rasping than usual skid. He sang for 3 minutes at 20 second intervals. 1507. 1F leaves the nest. I check and find 4 eggs. 1522. 1F flies to a big elm by me and calls a loud "check" for 2 minutes, every 2-3 seconds. She hops about the tree, then flies very fast directly to the nest rim, hops off the rim to a perch within 2 inches of the nest. She sits there 2 seconds, and then enters the nest and settles on it, turning 2/3 of the way

dis di

/ F

around as she settles. This is at 1524. M-1 has been silent since he sang on my arrival.

1603. 1F seems a little restive on the nest, looks around, twice seems to pick at the nest rim. She continues looking about for 2 minutes.

1604. M-1 sings faint step songs to the north 4 times.

1610. M-1 sings a faint step song to the north.

1625. 1F slips off the nest to the ground. She has seemed to be a little restive for the 5 minutes preceding this. She never changed position while on the nest this time. I leave the territory.

T-12: I spent 1 hour here in the locust grove where I found the second brood this morning. Both adults are here with the young, both calling "tick" and "check" when I got too close. I got a good look at a fledgling and saw him fly and decided this brood fledged the day before yesterday, July 17.

At 1745 I left the area.

2 ↑ (192)
25 July. 6:22 w/
active nest 2

July 20. Hot with scattered clouds toward noon and with a good west-southwest breeze; temperature 86° at 0930. Present 1000-1445.

Arrive 1000.

T-15: I spent 2 hours searching here without seeing the least sign of a Prairie Warbler west of the road. I was looking for evidence of a second brood.

(I found several nests:

Catbird, 6 feet high on the outer branch of an osage orange; 3 young with quills well developed. Cats 3 71

Goldfinch's nest being built on the outer branch of a big sugar maple, 25 feet high. G.F.

Probably a Yellow-breasted Chat, or possibly a Cardinal, 5 feet high against the trunk of a good sized elm; 1 egg. Chat - And?

Field Sparrow, with 3 Field Sparrow and 1 Cowbird egg, 2 feet high in a little sugar maple; female incubating. FS 3+1 199
good lam
C data
see p 511
519
527
528

Field Sparrow, 3 eggs, 1 foot high in a blackberry; female incubating. Fs 3

Field Sparrow, 2 young, 1 foot high in a blackberry. FS 2 77

T-9: I spent $\frac{3}{4}$ of an hour without detecting any sign of a Prairie Warbler on all of III. I was looking here too for a second brood.

(I found a Field Sparrow's nest with 3 new young, 5 feet high in a witch's broom in a hackberry.)

FS
3.27

T-11: The last fragmentary nest effort has washed or blown away. I heard no song.

T-1 at 1255: 1F is on her nest.

cy
T

1305. M-1 begins a 4-minute period of song, high faint steps about 20 seconds apart. He sings from the big elm near the nest; 1F stays on the nest.

1313. M-1 sings 4 high step songs in the tree row near the nest. 1F seems to pay no attention, but at 1314 she leaves the nest.

1317-20. M-1 sings 2 steps in the tree row south of the nest, flies high to the elm song post, sings 1 faint skid; he then sings 5 step songs. The interval is about even, about 30 seconds. Note 1F is not with him though she is off the nest.

1331½. 1F drops from above to a branch over the nest, immediately goes to the nest rim and looks in, and then settles on the nest. She has faced west nearly all the time, as she does now.

I leave immediately to check on 5F and to return in time for 1F's next departure from the nest.

T-5 from 1339 to 1401: 5F never went to her nest but sat in a nearby apple tree and called "tsu" and

SN
T

preened herself. Once an adult took a big green caterpillar almost to the nest but left because of me (though I was 20 yards away). I assume the nest is active.

5F by preening dislodged some feathers from her neck and throat, perhaps a sign of molt. The only other signs of molt I've seen so far are frowsy looking females, especially 13F. molt

T-1: Back to 1F's nest with 1F still (presumably) on it at 1410.

1413. 1F leaves her nest.

1439 $\frac{1}{2}$. 1F flies into the trees 20 feet above the nest. She slowly drops a few feet, then drops straight to the level of the nest but 6 inches away, jumps to a few inches above it, hops to the rim, sits 5 seconds and at 1440 $\frac{1}{2}$ enters and settles. I leave the territory. She was silent at all times so far as I could tell.

T-2: 2F's fifth nest seems complete. 2F came to the vicinity of the nest tree when I was there. She brought no nest material. Probably she is putting the lining in today. M-2 sang twice on his territory.

At 1445 I left the area.

*Spice & Litter
6/9*

July 21. Hot, sunny day, slight breeze; temperature 78° at 0800. Present 0845-1200.

Arrive 0845.

T-2: 2F came to the nest with soft plant down as I stood under it. This must be for the lining since the nest looks complete.

T-7: No sound as I walked through.

(The Red-eyed Vireo's eggs are still unhatched.)

T-5 at 0900: 5F was standing quietly on the nest rim.

T-6: I worked here from 0900 to 0945, finding no sign of any Prairie Warblers. I'm about convinced that 6F quit after her second brood failed.

(I found a new Field Sparrow's nest, 2 eggs, 2 feet 3 inches high in a 4½ foot elm.)

T-3: I began a systematic search here at 0945. At 1000 M-3 began to sing, first a skid, then his step-buzz song. He continued for 10 minutes, singing probably every 30 seconds, loud. I followed him for some time without luck.

At 1040 I found 3F's fifth nest, 3F incubating. It is on the north side of the ridge, farther east than any nest yet built but not far from the second and third. (I'll measure later.) It is 22 feet from the ground in a big dogwood, built on a wild grape vine,

well concealed and probably well beyond my reach under any circumstances. Since the nest tree grows on a steep hillside the nest is probably only 14 feet from my level as I stand nearer the hill top. 3F stayed on it during the 10 minutes I stood there.

(I found a Yellow-billed Cuckoo on a nest 10 feet high, under the canopy of a big redbud.)

(The Towhee's nest in the juniper has 3 eggs in it.)

Y 1/2 Cuck

same Tow

T-1 at 1100: 1F is on the nest. She faces west as usual.

♀ 4

1133 $\frac{1}{2}$. 1F, after remaining motionless except for looking around from time to time, raises her tail region a little and seems to work the eggs with her feet, then leaves the nest and flies toward the ground. I check the nest and find all 4 eggs.

1155. 1F appears in the vine in which the nest is located, jumps quickly up to the nest and looks in, enters and settles facing west.

I leave the area at 1200.

1 ♂ 500

July 22. Sunny, humid day; temperature 90° at 1000.
Present 1000-1315. Arrive 1000.

T-15: I spent 1 hour here east of the road and a few minutes west of the road; saw no sign of any Prairie Warbler.

(I found a Red Screech Owl in a little maple.) *Scr Owl*

(I found a Field Sparrow's nest 1 foot 7 inches *FS - 3/28/4* high in blackberries, 3 eggs; female incubating.)

(I found a Goldfinch's nest 21 feet high in the *G F* upright fork of a 25 foot maple; female not present.)

T-1 at 1105: 1F is sitting high on her nest. When she leaves I'll weigh and measure the eggs.

Times of taking the eggs are indicated below. The data are: Egg #1 weighed 1 gm., 190 mg. and measured 17.3 mm. by 12.2 mm. Egg #2 I broke. Egg #3 weighed 1 gm. 340 mg. and measured 17.7 mm. by 12.9 mm. Egg #4 weighed 1 gm., 300 mg. and measured 18 mm. by 13.1 mm.

1121½. 1F leaves the nest, goes to the ground and I weigh eggs #1 and #3. I'll wait till she goes again for the other 2. The eggs are beautifully, because *egg* heavily, marked. I note that all eggs turn a chalkier *down* white as they near hatching date. This has been true of several sets, including this one.

1142. A Prairie Warbler sings 3 faint type #8 step

songs south of the nest in the tree row; there is no reason to think it isn't M-1.

1143. 1F flies to the nest vicinity from the big elm, i.e., not from the direction of the male's singing; she hops to the nest and enters without delay. There is no indication she notices my handling the eggs. She hardly looks into the nest before entering. I leave to check other nests and return.

T-3: 3F is perched on the nest rim at 1155. She ^{gy} acts as though the eggs are hatched.

T-5: 5F is covering her nest by standing on the ^{gy} rim, spreading her wings. At least 3 young are in the ^{showing} nest. They have their heads out, bills open. 5F too has her bill open.

T-3: I return to 3F's nest at 1203. 3F is still on the rim. At 1205 she leaves but by 1220 she hasn't returned and I must go. I'd judge the eggs have hatched, since it is highly unlikely otherwise that the female would stand on the rim and look in.

T-1: I return here at 1225. 1F is still on the ^{gy} nest, again sitting with her breast higher than usual, her tail and rear parts farther down in the nest. I.e., the belly seems to be in the nest rather than the breast. Again today she faces west.

1234. 1F hops from the nest, then slowly hops down a stick that projects through the vine in which the nest is built and passes below. She goes 1 foot from the nest, slowly hops back up to the nest, looks in it about 45 seconds, reenters it at 1236. She settles facing south.

1245 $\frac{1}{2}$. 1F shifts a little on the nest.

1249. 1F leaves her nest and I get eggs #2 and #4, dropping and breaking #2. Embryo: The skin is dark *pinkish* human flesh color, eyes very large. There is black down in two rows on the head, just inside the eyes, also on one spot on the occiput; also on the humeral region, on the second wing joint at posterior, on femoral area, on the spine in the middle of the back; none on ventral side. The bill is small with the egg tooth appearing. The feet are fully developed. The greatest difference from a newly hatched young is in the size of the body, which instead of being fat and containing all organs, ^{is empty} is thin, with the egg yolk trailing out from the bird.

1310. 1F returns to the nest vicinity, hops and looks in, leaves the rim but probably stays in the supporting vine. In 1 minute she enters the nest and settles down facing north. Apparently my bawling won't prevent her continuing with the nest.

At 1315 I leave the territory and the area.

No 1 6 507

July 23. Hot, humid, sultry, and partly cloudy;
temperature 86° at 1200. Present 1445-1845.
Arrive 1445.

T-2: 2F's fifth nest is complete. There is no ^{9N}
sign of Prairie Warblers as I walk through the terri-
tory.

T-7: I spent 15 minutes here. No sign of Prairie
Warblers.

T-5: 5F was at her nest, apparently shading it, ^{9Y}
but without open wings. One young had its head out. ^{Shading}
Later when I was at the southwest corner of T-6 I saw
M-5 there and heard him sing 2 skids as he went back ^{song}
toward the nest.

T-6: I spent 40 minutes here, seeing no sign of ^{molt}
the 6's. I did see M-3 near 6F's second nest; I clearly
identified him by his back (which may be getting less red
through molt) and his breast spot. He caught and beat ^{feeding}
a caterpillar, sang and carried it away, presumably
toward his nest which is only just across the ravine.
Also I saw M-5 here a few minutes later (see mention of
this above).

(A Field Sparrow nest in a little elm has been
mentioned before; the female was incubating 2 eggs today,
so that is the full complement.) ^{Done}
₁₀₅

T-3: I have already mentioned M-3's catching and carrying food from T-6, so I feel sure the eggs hatched yesterday. 3F was on the nest. The sun was shining into it so probably she was shading it. M-3 sang 3 loud Golden-winged Warbler-type songs near the nest (4 and 5 notes) as I left the territory. 94 207

T-1 at 1558: 1F is on the nest so I didn't cause her to desert by breaking an egg yesterday. 94
1601. 1F leaves the nest. The 3 eggs are intact.
1620. 1F comes to the big elm near me and sits high in it for 45 seconds calling "check." She then swoops down low toward the nest and I lose sight of her.
15 seconds later, at 1621, she enters the nest and faces west.
1630. 1F seems to poke in the nest (she faces away from me), then settles down deep in it.
1633½. 1F rises a little in the nest, then settles.
1643. 1F seems unusually active on the nest, perhaps looking into it, stirring around restlessly.
1705. 1F leaves the nest. The eggs are unhatched.
1719½. 1F appears at the nest, stands beside it for 10 seconds, enters facing east, settles around so she faces north. I leave the territory. Note that M-1 has been silent the whole time.

T-11: A male with a well-marked head was singing a loud skid every 30 seconds for 10 minutes west of the 207

road at the northwest corner of the meadow. It could have been M-9 since the point is not far from the limits M-9 took for its second nest. No sign of the female.

T-9: See above. I spent 1 hour here looking without success for the 9's and the nest of a possible second brood.

(I found a 4 foot blacksnake [blue racer] in a *racer* grape-covered tree.)

1845. I leave the area.

3 B 2-1

July 24. Sunny, fresh, and cool after a cool night;
temperature 70° at 0800. Present 0900-1230.
Arrive 0900.

T-1 at 0915: 1F is not at the nest; 2 eggs have ^{9 N}
hatched and the shells are gone. The egg tooth is still
well defined on the young. The color of the skin is
an orange-red getting yellower or oranger on the ex-
tremities. E.g., the wings are less red than the back.
The eyes are deep bluish black. The inside of the
mouth is the same color as the skin. The down tracts
are as described on the embryo on July 22. The bill
is yellow at the margins, much the color of the skin
elsewhere, but lighter in color. The young gaped for
food when jiggled.

0940. The nest has become more difficult to see because
of the leaves; they must have moved. 1F is at the nest,
I think for the first time since my arrival. She broods
deep in the nest. By 0943 she is gone but I didn't see
her go.

0950. I go to the nest and examine the remaining egg;
it is #4. I take a little of the screening foliage
from the nest so I can now see it.

*hatched
Sign.*

0955. 1F comes to the nest, feeds, looks in for 20
seconds, broods. She comes straight, is silent, seems
to pay no attention to me. I have moved to within 13
yards of the nest now; I watched incubation from 21 yards.

1000. 1F sits up in the nest, looks in, settles deep again.

1010. 1F slips quietly off the nest and I lose sight of her.

1013½. 1F comes to the nest with a green caterpillar about ½ inch long and a black object. She disposes of the caterpillar in 2 tries, waits a few seconds and feeds the black object. She looks for 10 seconds into the nest, enters and broods. Again she is silent and direct and altogether heedless of my presence. She sits low in the nest.

1023½. 1F rises or draws back a little and looks into the nest; settles down again.

1030. 1F draws back and looks into the nest, settles down. Men are shouting near the nest (25-30 yards), surveying.

1035. After the surveyors pound a stake for 30 seconds 1F leaves the nest. There is no necessary connection between the events though she looked around attentively at the noise.

1038½. 1F returns straight to the nest with what seem to be 2 pieces of food. She pays no attention to the noisy surveyors. She feeds for 25 seconds, looks into the nest, settles to brood.

1042½. 1F looks into the nest and settles back.

1044½. Repeats.

1048. Repeats.

1049 $\frac{1}{2}$. She repeats, looking into the nest for 1 minute.

1056 $\frac{1}{2}$. 1F looks briefly into the nest, settles down.

1059. 1F quietly slips from the nest and flies toward the ground. I inspect the nest; still 2 young, 1 egg.

1104. 1F comes to the nest with a green caterpillar about $\frac{1}{2}$ inch long. She has trouble getting it into a young, having to take and soften it once at length.

She eats a small fecal sac, settles on the nest 1 minute after coming to it. She comes swiftly and without any hesitation or sound, as usual.

1110. I leave T-1. No sign of M-1 yet today.

(A Broad-winged Hawk soared over the territory calling a few minutes ago.)

T-2: 2F is on her nest, which surprises me greatly. 94
She was still building on July 21, which means that she has 3 eggs at most, more probably 2. This is my first real piece of evidence of waning ability to lay eggs ouch late in the season.

T-7: No sign of the 7's. Jame
REV

(The Red-eyed Vireo's nest contains young probably 2 days old.)

T-5: A young bird had its bill out of the nest. 9N
I retired to watch from 30 yards away and M-5 came to the tree above me and sat nearly motionless, calling "tsu" and a light "tick" 4 times per 5 seconds. After

10 minutes of this I moved up toward the nest and he followed. Neither adult went to the nest.

T-3: 3F was on the nest toward one side, possibly sheltering the young from the sun.

T-1 at 1150: 1F is on the nest.

♀ 4

1153. I may have heard a very faint step song.

1155. 1F looks briefly into the nest, settles deep.

1203. Repeats.

1205. Repeats.

1210. 1F after a few seconds' restlessness looks out of the nest toward the ground, leaves and flies toward the ground. It occurs to me that she was looking to see if it was safe to leave and that this may be a regular procedure that I've missed. Indeed I think now that I've seen it before.

I inspected the nest; situation unchanged.

1215. 1F flies to within 4 feet of the nest with a thin green caterpillar 1 inch long. In 10 seconds she goes to the nest. She feeds the caterpillar to a young, in a minute picks it up by one end and I can see the young gulping on the other end. She holds her end a moment and drops it, then picks it up; the young had it $\frac{3}{4}$ down this time. She releases it, pokes in the nest twice, settles to brood at 1216.

1220. I leave the territory.

T-2 at 1230: 2F on her nest.

I leave the area.

July 25. Hot and clear, but fresh; temperature 80° at 1200, 84° at 1700. Present 1730-1945. Arrive 1730.

T-2: 2F not at the nest. ♀ N

T-5: A young bird has its head out of the nest. ♀ N

T-3 at 1740: 3F is at the nest. She leaves in 5 minutes. I see a 2½ foot green snake with its head 8 inches below the nest, unseen by 3F. I sit to await developments. The snake is certainly high in the tree, and it may have gone after the nest. It is perfectly immobile, looking at me. M-3 brings food, goes to the nest and sees me, leaves; returns and feeds, eats fecal sac at 1747. M-3 then feeds in the nest tree and near the snake, but doesn't see it. At 1750 with the snake still staring at me I withdraw a little to see what develops. 92 snakes or more
1755. The snake's position is more or less unchanged, so I again retire.

1759. A Prairie Warbler flies to the nest but I'm too far back to see much.

1800. The snake has not moved much, if at all, away from the nest. There is no Prairie Warbler at the nest.

While awaiting developments I measured the distance between the second and third nests; it is 40 yards. The third from the fourth is 90 yards; the fourth from the second is 50 yards, possibly shorter because I dist
was
near

walked over the hill crest; the fourth from the fifth, 83 yards; the third from the fifth, 27 yards; the first from the third, 86 yards. (The snake is about the same at 1810.) I leave the territory to return.

T-1 at 1815: 1F is on her nest facing west and sitting low and deep. In a minute she draws down even farther.

9
T 1
feeding

1820. 1F sits a little higher in the nest.

1823½. 1F draws back and pokes in the nest for 40 seconds. I can see a young bird gaping at her as she does so (the nest naturally tilted a little my way). She seems to pick a few times at the young or at the nest itself.

1831. 1F draws back a little and looks into the nest for 45 seconds. I can see the young gaping.

1833. Repeats for 30 seconds.

1835. M-1 appears in the tree row 20 yards north of the nest carrying a green caterpillar. He hops toward the nest in short leisurely hops, silent at all times.

He then flies to the nest vine, moves to the nest rim.

Just before his arrival 1F draws back from the nest.

M-1 gives her the food and she gives it to the young.

M-1 sits on the nest rim for 30 seconds, then flies.

She settles on the nest 10 seconds later. The entire operation lasts 1½ minutes, is conducted silently.

1840 $\frac{1}{4}$. M-1 flies to within 2 feet of the nest and 1F immediately leaves it. M-1 flies to the nest and perches on a twig to deliver a little bit of food. He then stands for 30 seconds on the rim to look in. Then he hops a few inches away and begins a slow movement by short hops to a point 20 yards from the nest, then flies a good distance. There was no calling or singing at any time. No fecal sac was taken this time, perhaps one eaten the last time.

I find 3 young, all squirming and gaping at my touch on the nest. Bird wing beats were heard when I went toward the nest; perhaps 1F was about to return.

1858. 1F comes to the nest with food. She feeds a young, stands on the rim and looks in for 20 seconds, eats a fecal sac. She then hops down below the nest and flutters for food for 30 seconds. She hops to the rim. Just then M-1 flies to the nest vine 2 feet below the nest with a large green or white caterpillar, 1 inch long. He hops to the nest and gives it to 1F who is still on the rim. She thrusts it toward a young but M-1 takes it on the way down and himself gives it to the young. Both stand looking into the nest for 40 seconds. M-1 hops a few inches away and begins to forage away from the nest. 1F looks in for 30 seconds more, enters the nest and begins to brood. This took 3 minutes; the birds were completely silent.

1908. 1F looks into the nest for 15 seconds, settles.

1912. 1F is sitting very deep in the nest.

1919. 1F becomes a little restive, looks around, quietly hops from the nest toward the ground.

1926½. 1F flies straight to the nest, feeds 1 young, looks in for 15 seconds, eats a fecal sac, enters and broods. The sun is now down and it is distinctly cooler and a bit damp.

1930. I leave the territory. I've not heard a single Prairie Warbler sound since I came.

T-2: 2F is on her nest.

I leave the area at 1945.

f m

July 26. Hot and sunny; temperature 85° at 1000.
Present 1030-1230 and 1430-1810. Arrive 1030.

T-2: 2F not on her nest.

9 N

T-7: No sign of Prairie Warblers.

T-5: The young have fledged. I found 5F near her first nest calling "tsu" and "tick" and carrying food. I caught 2 young and banded them with silver over yellow, left leg:

2162069 - 5B;

#2162071 - 5R.

They were more silent than young usually are when caught, becoming docile in my hands pretty quickly. Nor did 5F give a real distraction display for me; she fluttered and called near me but did not resort to formalized display. I was beginning to wonder if M-5 had been lost somehow when I found him 35 yards south of the nest calling "tsu" and "check." Obviously there were young there, but I didn't have time to search for them.

One very satisfying point: I got quite close to M-5 and saw that he had a spot out of line and toward the center of his upper belly just off the right line of lateral spots. I had seen this on M-5 in May and there-after somehow missed it. This led me to consider the possibility that M-3 (which has a spot higher, on his breast) had originally been on T-5 (though has, and has always had, a brighter and more extensively red back

than any male here). It is now safe to say that M-3 and M-5 are where they always have been and their territories are unchanged.

T-2: 2F is on her nest at 1230.

I leave the area.

1430. I return.

T-5: I found M-5, 45 yards southeast of the nest and after watching I soon saw him carry food. A search led me to a young bird perched 4 feet high. I caught and banded it as 5Y, # 2162070. M-5 put on a long, typical distraction display, fluttering, tumbling down weed and bush stalks, and calling "check" from 9 times per second to continuously when most excited. His tail was spread and his lowered wings were fanned. 5Y was much more vigorous than the young banded this morning. 5Y weighed 5 gm., 810 mg.

I took down the nest and kept it. There were no eggs in it, a few feathers in the lining, nothing immediately striking.

I found 5F 35 yards north of the nest, a few yards from her first nest. 5R was in the top (6½ feet high) of a juniper and I just missed catching it for weighing. 5F was alarmed of course, and as is usual, she flew along behind 5R on a 20 yard flight about 10 feet high.

I went back to M-5. I heard a young bird calling

and saw it fly in the manner of a brand new fledgling into an apple tree 15 feet high. It was an unbanded young Prairie Warbler, so I have determined the point that I would have regretted most to miss: this pair fledged 4 young. I chased this bird from tree to tree, with M-5 exhibiting great alarm and calling and the young bird always lighting at least 12 feet high. I never did catch it for banding, and it finally flew about 23 feet into an elm. I then began to entertain doubts of its species. I checked it quite closely in comparison with 5Y nearby. After I had convinced myself it was a Prairie Warbler, it began to call in the persistent vibrant, begging note of the species. M-5 came 20 yards to its tree. They were both in the tree calling (M-5 a "tick" or "check") when I left them at 1545.

As I left the territory I saw a Prairie Warbler flash by me with food, near and going toward 5Y; so it occurs to me that the Prairie Warbler which responded to the calling of the unbanded young (5U) was 5F, an unusually bright female, and not M-5.

Miscellaneous: Note that M-5 and 5F had each 2 young to tend and that they had spread from the nest, M-5's 35-50 yards, 5F's 20-25 yards. Neither adult responded to the alarm notes of the other when I caught the young. Two young, 5U and 5Y, begged, a dry "pip" and "tunk." M-5 scratched his head in the usual

←
call-?
87
Scratch

passerine way, putting his feet over his wings. Both 5F and 5Y opened their bills a little. 5Y dozed 1 minute while I was in its sight.

T-3 at 1555: 3F was at her nest, so it is still active. 9 Y

T-1 at 1605: 1F was not at her nest. I went to it and found the young alive and gaping. 9 N

1610. I think I hear one faint type-#8 song, but I'm not sure. fading

1642. 1F, calling faint "checks," appears near the nest. She may have been nearby for 5 minutes, for I think I heard her calls. She goes to the nest with much food, gives it all to one nestling. She waits 10 seconds, takes and eats a fecal sac, looks into the nest for 15 seconds, flies toward the ground.

1654. 1F comes with a good deal of food. She makes 3 different thrusts with parts of it, but I'll guess all is given to one young (I can see them). Then she sits on the nest rim for 1 minute, most of the time with her bill open. Then she hops up the vine above the nest, taking 25 seconds; she flies away.

1714. M-1 comes straight and silently to the nest with a green caterpillar. He feeds a young, looks into the nest for 35 seconds, leaves the nest by short hops and flights, getting progressively higher.

1731. M-1 flies into a tree 20 feet above the nest, but without food. He hops about there.

1732. LF goes to the nest, feeding 1 young so far as I can tell. Then she sits quietly on the rim looking in.

1733. M-1 drops to the level of the nest, 4 feet away from it; LF sits quietly.

1733½. M-1 moves on; LF looks into the nest again for ½ minute more, then flies toward me, dropping to the ground.

1737. M-1 goes to the nest, but I can't see how many young he feeds. He then looks in, eats a large fecal sac, hops up to 10 or 15 feet above the nest. Note the silence of adults today.

1755. I can see the young gaping in the nest; no sign of the adults.

1805. M-1 flies up 25 feet above the nest with food. A few seconds later LF goes to the nest with food, feeds 2. The young rise high in their hunger. LF looks into the nest for 30 seconds, flies low toward me. M-1 arrives within 10 seconds. He feeds most of his food to 1 bird, a little to another. He looks at the young; one raises its rear and defecates, and M-1 takes the fecal sac as it appears and eats it. He then hops 2 feet above the nest, leaves.

1810. I leave the area.

may be 1 song

July 27. Hot and sunny; temperature 86° at 1000.

Present 1015-1530. Arrive 1015.

T-15 from 1020 to 1200: Looking for a second brood, I twice thought I may have heard Prairie Warbler songs, but it was quite uncertain. Song?

(The Field Sparrow's nest that I found on July 20 with 3 Field Sparrow eggs and 1 Cowbird egg today had 3 young Field Sparrows, probably 3 days old, 1 Cowbird egg.) FS

(A Goldfinch's nest was found east of the road 20 feet up in a maple. No adult was near it. I thought it might be a Prairie Warbler's, but it seemed too wide, not deep enough. I'd say the biggest external difference between the two species' nests is in the Goldfinch's heavy walls and greater width and bulk. It also has many of the external fibres woven in vertically, while a Prairie Warbler's go around the nest horizontally.) GF

(I heard these songs: both Cuckoos, Field Sparrow, Song Sparrow, Bachman's Sparrow, Towhee, Cardinal, Goldfinch, Chat, Yellow-throat.) Songs?
Hear?
to

T-4: No sign of a Prairie Warbler as I walked through.

T-1 at 1210: 1F was not at the nest. Only 2 young were in it. I noticed yesterday that one seemed small and weak (and not simply younger). My guess is it was ♀ N
young

feeding

sick or defective.

1222. M-1 goes to the nest but I miss the feeding. He eats a fecal sac, leaves after hopping 2 feet away from the nest. He was there 30 seconds.

1233. 1F goes with food but I miss the feeding. She eats a fecal sac and looks into the nest. Then in 45 seconds she changes her position and straddles the nest with her feet on the insides of opposite rims. She immediately begins to pick at something in the bottom of the nest, several times doing so so vigorously that the nest shakes. Once or twice she seems to eat something. She keeps this up with decreasing intensity for 10 minutes. The young both stick their heads over the side of the rim for a minute or so at a time. 1F once preens her back, once seems to reach out for something on a leaf by the nest. She stays on after her picking stops, continuing to look into the nest bottom from time to time.

1255. 1F leaves the nest.

1317. 1F goes to the nest with food. She feeds both young, eats a fecal sac, then sits on the rim and pokes around in the nest. Once she opens her bill and leaves it open for 30 seconds. One young puts its head over the side, twice leaving its bill open for 30 seconds.

1320. M-1 comes to the nest from above with a green caterpillar. When he gets within 2 feet of the nest, 1F leaves

and flies toward me. M-1 feeds 1 young, waits 10 seconds for a fecal sac and eats it. He then looks into the nest for 15 seconds, flies away.

Note: Neither bird has uttered a sound that I have heard yet today.

1326. M-1 flies straight to the nest from near me with a long $1\frac{1}{2}$ inch caterpillar. He gives it by the end he holds to 1 young, takes it back after the nestling has half swallowed it, and gives it to him again. He then sits back from the rim 1 inch and looks into the nest for 25 seconds, flies low toward me.

1338. 1F goes to the nest, but because she perches on that part of the rim which is out of sight (and which is not where she usually perches) I miss the feeding. She sits quietly for $3\frac{1}{2}$ minutes, thrusting her bill into the nest occasionally. Then she hops up from the nest in a leisurely fashion, flies away when she gets 2 feet above it.

1355. A Fox Squirrel climbs the trees within 4 yards of the nest and probably within sight of it. Unfortunately the Prairie Warblers are not here to react. There is no indication that the squirrel saw the nest. *Squirrel*

1403. Both young have their heads on the nest rim, their bills open.

1409. The young are still projecting their heads. Then they fall backward into the bottom of the nest.

1413. M-1 sings a step song north of the nest near the hawthorns, the first sure song from him in 3 days. 1F arrives with a green caterpillar. She feeds it, sits on the nest rim looking in. She leaves 1 minute 45 seconds later, going to the ground by the nest.

I leave the territory. M-1 sings as I go.

T-3: 3F at the nest.

T-5, T-6, T-7: I put in 1 hour on all of T-6, much of T-7, and that part of T-5 which adjoins the other two. I found no trace of any Prairie Warbler but M-3, who fed very slowly and lackadaisically near 6F's second nest (and near his own present nest). His song (infrequent) was odd, half between a skid and a step; frequently it consisted of 10 notes, 2 identical ascending series of 5. I noticed he had loose feathers on his back and breast, surely due to molt.

(I saw a Red-shouldered Hawk over the woods east of T-6, the second time I've seen one in 2 days. I neglected to mention it yesterday.)

T-2: 2F was on the nest at 1530.

Leave the area.

1 + 3 song

24

July 28. Hot, sultry, and sunny; temperature 96°
at 1200. Present 1630-1930. Arrive 1630.

T-1: The young are gone from the nest with no indication how or why. I put in an hour all over the territory without seeing the adults.

T-3: Two young, surely no more than 7 days old, *FN* had their heads out of the nest. M-3 brought several green caterpillars and the young gaped wildly for them, then put their heads with mouths open over the rim of the nest as M-3 hopped near me and called "check" frequently. I'd guess there are only 2 nestlings here.

T-5, T-6, T-7: I walked slowly on the south margin of these territories without seeing a Prairie Warbler.

T-2 at 1750: 2F is on the nest. *94*

T-1: Passing through this territory I thought possibly I heard a male sing once near the latest nest. *Sing?* I went slowly, saw nothing.

T-9: I began a slow and rather hopeless search for a second brood. Quite soon, about 1840, I found a female on the extreme east edge of the territory, near the southeast corner. She "ticked" at me. I waited, saw her carry food, and immediately found a nest about 7 feet high in an 8 foot redbud. It held

4 young ready to fledge, sitting on top of each other and likely to crowd each other from the nest. 9F carried caterpillars and other insects at about 5 minute intervals and the young begged eagerly but silently. Occasionally one raised its anal region to the nest rim and defecated and 9F took the sac. Once she carried it away, once ate it. One nestling preened its back.

I'd band these tonight and not risk their fledging but I have only 2 numbered bands.

1915. They have subsided somewhat as it grows darker (due to clouds), so I should be safe until tomorrow. I notice there is a strand of wild grape growing in the upright fork of the redbud, both supporting the nest and sheltering it with leaves. The nest is fairly well concealed.

1930. I leave, find the nest is 175 yards from the first successful nest of 9F.

dist
below
me as

long possibility

July 29. Cloudy and cool with showers at 0715.

Present 0645-1220. Arrive 0645.

T-9 at 0700: I went straight to the nest. 9F "checked" repeatedly; no sign of the young in the nest. After 10 minutes I saw 9F go to the ground and at the same time I saw a nestling's head in the nest. I found 3 young still there; 1 had fledged. I caught them all and banded them with a brood mark of silver on the left leg.

#2162073 - 10(2)R, 6 gm., 620 mg.;

#2162074 - 10(2)Y, 6 gm., 430 mg.;

#2162072 - 10(2)B, weight impossible, sack wet;

#2162001 - 10(2)G, weight impossible, sack wet.

(All weighed with sack, 10(2)B with bands. The sack was wet when last 2 were weighed so I couldn't get an accurate weight.)

9F put on a distraction display on my arrival, fluttering and tumbling down weeds. She "checked," of course, during the banding. A male Prairie Warbler sang a skid nearby, so call notes coming from near me may have been he. I never saw him, but presumably it was M-9.

The nest is 9 feet 2 inches high. I left the territory at 0745.

T-11: M-11 sang as I passed.

T-1: M-1 was singing an irregular and quite frequent erratic step song when I arrived, sometimes tremulous and broken; often he repeated songs immediately. Then he switched to a regular step 15 seconds apart and later to a skid. He sang for 45 minutes, mostly from the tall elm song post on the south center of the territory. I saw him chase a Field Sparrow, chased by a Kentucky Warbler. The Field Sparrow turned on him and he did not press the attack. He also took a bath by rustling wet leaves.

song

in c FS
Ky W

bathes

T-2 at 0910: 2F not on her nest.

♀ N

T-3 at 0920: The young had their heads out of the nest, so I left. M-3 sang twice.

♀ N

T-1: I spent another hour on this territory without seeing M-1 or 1F at all. No sound this time.

T-4: I walked slowly through this territory without seeing or hearing a Prairie Warbler.

(I found an Indigo Bunting's nest with 3 young probably 2 days old, 4 feet high on the outer branch of a little maple.)

IB
347

T-15 from 1030 to 1130: A Prairie Warbler sang a high faint step song about 7 times from east of the road and north of M-15's old territory. The song was not like

song

M-15's rasping one, so I can't be sure, especially now that territories have begun to break up and some adults have quit trying to breed (pair 11, and I suspect pair 4).

(I found a Field Sparrow's nest 1½ inches high in blackberries with 2 day old young.)

FS
97

(I found an Indigo Bunting's nest with 4 eggs, 12 feet high on the outer limb of a maple.)

IB4 ?

(The nest I decided on July 27 was a Goldfinch's had a female on it today.)

Sharon GF

(The Field Sparrow's nest with a Cowbird egg on July 27 today had a Cowbird and only 2 Field Sparrows.)

Sharon
FS

T-4 and T-1: On my way back through these territories I saw no Prairie Warbler.

T-2 at 1200: 2F on her nest.

97

Note that Prairie Warblers and all species were singing more today, probably due to the rain. All summer residents sang.

I leave the area.

4 BS song

July 30. Cool and partly cloudy; temperature 70° at 0800. Present 0850-1220. Arrive 0850.

T-2 at 0900: 2F is on her nest.

♀

T-3: The young are still in the nest. They are fairly active and again today I saw only 2. They don't seem big enough yet to take and band and liberate, so I'll wait until tomorrow. An adult came at 0921 and fed them; one lifted its anus and the adult took and flew away with a fecal sac. I spent 40 minutes at the nest and feel sure there are only 2 young. At 0940 an adult fed them again as I was leaving, so I saw 2 trips, 20 minutes apart.

♀

T-1: I then spent 2½ hours here looking for the building of a new nest. I saw no sign of 1F. I found M-1 singing 2 or 3 times on the center of his territory and saw him feeding quietly just north of the road in the valley.

sing

(I saw a hawk, probably a Cooper's or a Broad-winged, in the tree row, and a minute later saw him leave with a small animal that might have been a bird.)

T-3 at 1220: The young are still in the nest.

♀

I leave the area.

1 ♂ sing

July 31. Cool and cloudy with showers at 0700 when I arrived; temperature 70° at 0700. Present 0700-0830 and 1630-1930.

T-3: I found the young still in the nest. It began to rain hard and after a 10 minute wait I climbed the tree for the nest. I got it and put it in a sack without either the young or the adults making a sound; the adults were not in evidence. I climbed down and found the young still in the nest in the sack, very quiet. Perhaps the rain had depressed their activity in some way. Note the adults had made no effort to shield them from the downpour. The nest contained 2 young, 1 infertile egg. I banded them with blue over silver, right leg. ←

#2162002 - 3R;

#2162003 - 3Y.

The nestlings were probably 9 days old, possibly 8. They were quiet during the banding and when I finished they sat on my hand and made relatively little effort to escape. I still had attracted no attention from the adults, and when I saw one return with food and look for the nest I began squeaking. This caused the young to turn to me, open their bills and beg and call for food. There was little adult response at first. I finally got one to swoop toward me when the young called, so put them in a little tree. One began preening its

B7
88

back. I retired and saw that the adult was not coming to them; so I went back, got them and began squeaking, again only causing them to open their bills. I then tried to arouse the adults by climbing the tree to cause a disturbance. No response for 15 minutes, and since it was pouring I decided to take the young home. I got to T-2 and by then the young had become noisy for the first time, so I returned to the nest site and jostled them till they called. This time an adult responded and flew low to me, so I released them on the ground and left. Since the rain stopped about 0830, I have hopes they will live.

T-2: 2F is on the nest. C Y

I leave the area at 0830.

I return at 1630. The day became clear and pleasant at 1000.

T-4: I made a very thorough search of half of T-4 without finding a sign of a Prairie Warbler.

(I saw a Worm-eating Warbler, obviously a migrant, and flushed a female Bob-white with very young chicks, one of which I caught.) Worm
eater
Bobwh

T-15 at 1615: I worked over this territory east of the road.

(I found a Cardinal's nest 7 feet high with 3 eggs, Card
3 eggs

the female incubating, in a sassafras.)

I heard a Prairie Warbler song west of the road in the University plantings and searched there, 200 yards north of 15F's first nest, for $\frac{1}{2}$ hour. The male sang a high step song 10 times or so, unlike M-15's song. I never saw him.

I leave the area at 1930.

1 ♂ song

August 1. A clear, sunny, fresh day; temperature 64° at 0800, 86° by mid-afternoon. Present 0900-1215. Arrive 0900.

T-2: 2F is on the nest. 94

T-1: No sign of a Prairie Warbler as I walked through.

T-4: I spent 2 hours on this territory without seeing or hearing M-4 or 4F.

I saw 10Y following a female along the south edge of T-4, being fed some 5 or 6 times and always staying close to the adult. 10Y was in full post-juvenal plumage, acted like an adult, and though I never saw him catch food he foraged for it. He seemed to have a trace of red on his back. He was silent at all times, fluttering wings a little when fed. The female must have been 10F but I could not actually identify her. This is an interesting record because the birds were so far from their territory; it shows how clearly territories have broken up for some pairs. Indigo

(I found these nests:

Field Sparrow, 2 feet 3 inches high in a maple, 3 eggs, the female incubating; FS 3

Indigo Bunting with 2 eggs, 3 feet 3 inches high in a maple, eggs warm as though being incubated; IB 2

Goldfinch, complete but without grass lining, 8 feet high in upright fork of a maple, no eggs.) GF

T-3: I found 3F carrying food and catching it all over the northwest end of the territory (and not simply near the young). Finally I heard a young bird call; I waited and saw 3F with food and thus located 3Y. It let me touch it without flying, but it opened its bill and kept it open as in threat. *feeding* It called when picked up, flew 4 feet when put down but then let me touch it again to check its band number. 3F didn't respond to its calling, showed little alarm. She never "checked" at me, though I noted she called a regular "tsu" when she foraged for food. It is good to know these young are alive; I think that any effect I may have had on them is now dissipated.

1215. I leave the area.

no sig

August 2. Hot, sunny and clear; temperature about 80° at 1200. Present 1240-1640. Arrive 1240.

T-2: 2F is on the nest.

♀ Y

T-14: I spent 1½ hours slowly covering M-14's old territory, the new territory (where he successfully nested), and much of the adjacent parts of T-9 and T-10. I saw one Prairie Warbler, an unbanded young in post-juvenal plumage, almost surely a 14U.

? Nests

(I found a Field Sparrow's nest 2½ feet high in a sugar maple with 1 egg, the female incubating; another 1½ feet high in a blackberry, 3 eggs, the female incubating.)

FS 1

FS 3

(I scared 2 Whip-poor-wills up at one spot on old T-14, from under a maple tree. A good deal of excrement suggests it is a regular roost.)

T-15: I put in 1½ hours here, covering the whole territory and much of the scrub north, west, and south of it. I saw only a molting male on the center of the territory. I followed him for 15 minutes and saw him eat much food, carry none. He was tame and silent and could well be any of my males or a migrant or wanderer at this time of the year

molting

(The Cardinal's nest in the sassafras, which I found 2 or 3 days ago, has 1 Cowbird, 2 Cardinal eggs. [Was I in error the last time I mentioned the female

Card
C + 2
3

incubating?7)

(The Field Sparrow's nest with the Cowbird egg, ^{8 am}
found 2 weeks ago, now has 1 Cowbird, 2 Field Sparrows
nearly full grown.) _{FS}

(I found my first Black-billed Cuckoo's nest, $6\frac{1}{2}$ ^{B b Cuckoo}
feet high on the outer end of a long white elm branch,
with 4 eggs, the female incubating. The nest is like
a Yellow-billed Cuckoo's; the eggs are light blue with-
out gloss.) ₄

(The songs of all summer residents but the Prairie
and Kentucky Warblers were heard, specifically, both
Cuckoos, Bachman's Sparrow, Field Sparrow, Goldfinch,
Indigo Bunting, Yellow-breasted Chat, Yellow-throat,
Wood Thrush, Catbird (faint), Towhee, Cardinal, Blue-
gray Gnatcatcher (call), Summer Tanager, Red-eyed Vireo,
Yellow-throated Vireo.)

1640. I leave the area.

207

August 3. Sunny with slight overcast at times, hot but not humid; temperature 80° at 0900. Present 0945-1445. Arrive 0945.

T-15: I spent 1½ hours, mostly on the north, south, and west margins and beyond them. I saw only 10Y, 10R, and 10F. They ranged pretty far. I saw them 3 times, moving from the area where the University maintains the spruce planting, east toward T-4. The young stayed fairly close to 10F, flying to her to be fed, shaking their wings while fed. They also caught food themselves. All were silent at all times.

(The Field Sparrow's nest on this territory has 2 nearly grown Field Sparrows, 1 Cowbird today. The Cardinal is incubating.)

T-4: I was here for 1½ hours during which I saw no sign of a Prairie Warbler.

(I found an Indigo Bunting's nest with 2 eggs, 4½ feet high in a maple, female incubating.)

(I also found a Field Sparrow's nest 4½ feet high, 1 egg of a light bluish color and with few markings; couldn't tell if the female was incubating.)

(The Goldfinch's nest I found 2 days ago is still without eggs; no further construction work.)

T-12: I spent 1 hour here looking unsuccessfully

for 12F's second nest. I saw no Prairie Warblers.

(I found a Goldfinch's nest 16 feet high on the outer end of a big ash branch; the female was on the nest.)

(I also found an Indigo Bunting's nest 10 feet high in the woods just beyond the fields.)

T-2: 2F was on the nest for 25 minutes so I assume the eggs have not hatched.

1445. I leave the area.

Alma

August 4. Fresh after a rain at night; cloudy in the morning, sunny with a strong breeze from the west in the afternoon. Temperature 83° at 1500. Present 1525-1725. Arrive 1525.

T-2: 2F was carrying food to her nest. The young should have hatched today.

T-4: No sign of any Prairie Warblers during a 1½ hour search.

(The Indigo Bunting's nest with 2 eggs is as before.) ^{same} JB

(The Field Sparrow's nest with 1 bluish egg is probably not being incubated.) ^{same Rd}

(The Goldfinch's nest is possibly a little farther completed, with the lining having perhaps been worked on.) ^{same Gf}

(I found another Goldfinch's nest 15 feet up on the outer end of an elm branch. The nest is not at all like a Prairie Warbler's; it is messy and bulky. The female was incubating.) ^{Gf}

1725. I left the area.

August 5. Sunny with some clouds, fresh and pleasant;
temperature about 80° high. Present 1315-1430.
Arrive 1315.

T-2: 2F was sitting on her nest. 94

T-8: I worked on the west side of the territory
without seeing any sign of a Prairie Warbler.

1430. I left the area.

August 6. Sunny with a slight overcast disappearing at noon; temperature about 89° high. Present 1630-1830. Arrive 1630.

T-2: There was no sign of the female till 1645 ^{FN} when she arrived near the nest with green caterpillars and a green spider. She went to the nest after a minute's hesitation, stayed for 30 seconds. Then she caught insects near the nest, uttering an occasional faint "check." It is possible that the "check" was not hers, since it seemed to come from a slightly different angle; it was quite faint.

1651. She went to the nest again with food, stayed for 30 seconds.

1705. I left. I saw no sign of M-2 while I was here.

T-4: There was no sign of a Prairie Warbler.

(The Goldfinch's nest on this territory seems better lined than ever and therefore still under construction.) ^{Same} _{GF}

T-15: I walked slowly through the east side of the territory; no Prairie Warblers.

T-14: I spent 1 hour on this territory, extending into the west side of III to T-9. No sign of a Prairie Warbler, except for 1 step song like M-9's from the center of T-9.

(Bachman's Sparrows were singing regularly today.) ^{Bach} _{GF}

1830. I left the area.

Silence

August 7. Sunny and pleasant with some clouds;
temperature 83° at 1600. Present 1640-1840.
Arrive 1640.

T-2: 2F was not on her nest at 1645. At 1708
she flipped on to her nest suddenly and silently,
stayed 10 seconds and left. I saw no food, but the
swift approach is an almost certain indication that
the nest is still active. She would have come up
by slow hops if the nest had failed and she were still
not quite ready to lose interest in the spot.

9 N

I leave the territory at 1710.

T-4: I spent 1½ hours here without detecting a
trace of a Prairie Warbler.

(The Goldfinch's nest had 1 whitish egg today, small
and thin. It was not the "bluish or greenish" color
attributed by the books to the Goldfinch.)

G & F
4/2/13

1840. I left the area.

August 8. Slightly overcast and sultry; temperature 85° at 1500. Present 1630-1830. Arrive 1630.

T-15: I walked slowly through half of the territory without seeing or hearing a Prairie Warbler.

T-2: No adults at the nest at 1710. At 1800 2F came (perhaps she had been there for a while) to the tree behind me, carrying adult insects in her bill. She called once or twice. I left.

(I found a Field Sparrow's nest, 3½ feet high in a maple in the lot southeast of the road fork as you enter; 2 young 4 days old.)

T-15: I made a slow return to the car through this territory without seeing any Prairie Warblers.

1830. I left the area.

GN

FS
299

August 9. A light rain at 0500; temperature 70°. Russ Mumford and I went to Oaklandon, returning to my Prairie Warbler area at 1400. By this time it had become hot (83°) and sultry. Little rain today. (At Oaklandon we found a Goldfinch's nest with 4 eggs like the eggs on T-4, so that nest is a Goldfinch's.) Present 1400-1600.

T-2: Russ climbed the tree and saw that there are 2 young in this nest. 2F fed them and stayed in the vicinity of the nest, called "check." There was no sign of M-2. We were at the nest at 1415 (no sign of 2F) and at 1530 we looked into it.

T-12: We spent a half hour here looking separately and unsuccessfully for the second nest.

There was no sign of Prairie Warblers elsewhere on the area.

1600. We left the area.

(N.B. Mumford saw 2 Prairie Warblers, one calling "check," in his yard at Cortland on August 1, a mile from the nearest Prairie Warbler territory. Probably they were migrating.)

August 10. Cool and clear in the morning getting hot and sultry about noon; temperature 72° at 1000. Present 1100-1420. Arrive 1100.

T-15: I spent 1½ hours without finding any indication that there is or was a recently nesting pair here.

I saw 10Y and an unbanded bird that must have been an adult female; she lacked the young's gray head but had a somewhat more evenly olive head than a breeding plumage female. 10Y and she stayed close together and ranged rather quickly over that part of the territory west of the road. I tried to see if she fed 10Y; I never saw it though 10Y followed her like a young bird still seeking to be fed. 10Y fed itself, fluttered at weeds like an adult. I think it is fairly safe to conclude the female was 10F. They paid no attention to numerous Field Sparrows near them. *doing*

I covered the whole territory pretty well.

T-2: 2F came to the nest with insects after I had spent ½ hour here and had finally climbed the tree to see if the young were still there. I saw only 1 young in the nest. As usual she uttered quite a loud, harsh "check" (i.e., as usual in the last 2 days). There was no sign of M-2. *9 N*

T-8: In 40 minutes on the south and east parts of the territory, I saw no Prairie Warbler.

T-4: I worked over the whole territory from 1350 to 1425; no sign of a Prairie Warbler.

(I found an Indigo Bunting's nest with 3 warm eggs, 4 feet high in a maple.) IB-3

(The Goldfinch's nest today was being incubated by the female Goldfinch, contained 4 white eggs.) GF
4

(I heard Bachman's Sparrows singing 5 or 6 times today.) Bach

1420. I left the area.

August 11. Cool, cloudy day after a rain last night; temperature 72° at 1700. Present 1700-1810. Arrive 1700 with a light rain falling.

T-2: I went to a spot near the nest but out of sight, saw 2F go twice to the nest with insects after I'd been there 20 minutes. ♀ N

1810. I left the area.

August 12. Cool morning with a very light rain falling; temperature 70⁰ at 0800. Present 0815-0945 and 1700-1745. Arrive 0815.

T-2 from 0825 to 0945: 2F left the nest vicinity with a loud "check" as I arrived. She then came back and fed the young 4 times between 0825 and 0900. She called "check" 3 times per 5 seconds and generally displayed great nervousness at my presence, backing and filling a good deal before each feeding. She gathered food quite near the nest several times. When she went farther away for food she fell silent (I'm pretty sure that I didn't hear her because she was silent, not because she was out of earshot). Hence, away from the sight of the stimulus she calms down. Her "checks" are quite loud. 94

At each approach to the nest, especially when she jarred it by landing nearby, the young called but I couldn't see much gaping. Once though, one became so impatient that it almost leapt from the nest. This grew worse as time went on and I eventually left for fear I would stimulate a premature fledging. I think it is possible. 13 27

Between 0900 and 0925 when I left 2F made 4 more trips, always coming to call and watch me from 6-10 feet away after feeding.

There was no sign of M-2, who is surely dead or departed; he would not have stayed away during all of

2F's calling today.

By 0925, I was fairly sure the young wouldn't fledge today so I left.

(Bachman's Sparrow and Acadian Flycatcher were singing when I left.)

B8 07

0945. I left the area.

1700. I returned to be sure that the young hadn't fledged. The day was now fairly clear and warm (80°) and I was eager to see if late-hatched young would fledge in 9 days instead of 10. But they were still in the nest and 2F brought food to them twice. As usual she "checked" vigorously at me.

1745. I left the area.

August 13. Perfectly clear morning after a cool night, heavy dew; temperature 64° at 0630.

Present 0645-0900. Arrive 0645.

T-2: 2F was carrying food at my arrival. I soon satisfied myself that the young were in the nest. They called a couple of loud "checks" and the nest moved, so I feared they were about to fledge. 2F twice went to the nest without feeding, carried a green caterpillar around. I climbed the tree by the nest tree with 2F now calling "check" excitedly and flying almost to the nest, getting nearer to it in her alarm than she usually will when I am near and she is only moderately excited. When I began to pull the nest tree to me, the young crowded very low in the nest and were silent. I took the nest, put it in a sack, climbed halfway down and dropped it. When I got down and prepared to weigh and band the young they were still silent, still compressed into the bottom of the nest, which was upside down in the sack. This fear reaction is probably in part produced by the adult's behavior, but in any event it is typical of them to act thus when the nest is taken. All but 13F's one young have done so.

There were 3 young in the nest, so Mumford was mistaken last Saturday when he saw only 2. I banded

them with a brood mark of silver over green, right leg. Band numbers and weights were:

2162004 - 2R, 6 gm., 040 mg.;

2162005 - 2Y, 6 gm., 545 mg.;

2162006 - 2G, 6 gm., 050 mg.

During the banding 2F flew around me calling "check" and displaying alarm but not the most extreme excitement. Her rate of calling was about 6 times per 5 seconds. M-2 never appeared, so I think it is quite obvious that he is no longer on the territory. (It will be interesting to see if I have enough late nests like this to justify a conclusion that the males leave before fledging. If so, what is the effect on the young of having one less adult to care for them? Or, finally, do young fledged this late nearly always die because the parents begin migration before the fledglings can care for themselves?)

These young were a little less vigorous than the 10-day olds that I have seen before have been. Had I not seen 2F carrying food on August 4, I would conclude they were in their ninth day today. They squawked less and when released fluttered along the ground and lay quietly. Twice I recaptured birds to try to make them fly or be more conspicuous for their mother. When I left at 0800 she was caring for them.

T-8: I spent an hour here without seeing a Prairie Warbler.

0900. I left the area.

Note: This was the last day on which I saw Prairie Warblers that had to my knowledge either bred or been hatched on my study area. A few birds were seen, as will appear, but they can just as easily have been migrants as locals.

August 13 was the last of my daily visits, which began on April 18. Hereafter I was on the area irregularly at two or three day intervals in August and less frequently at time went on.

August 15. Warm and cloudy. Present 1500-1700.

Arrive 1500.

I walked slowly over the area (except for T-12 and T-13) but saw no Prairie Warblers. Most time was spent on T-3 and T-2. On the latter particularly I looked carefully for the young birds, but there was no trace of them or of 2F.

1700. I left the area.

August 19. Warm and cloudy in the afternoon.

Present 1600-1750. Arrive 1600.

Again I pretty well covered the area with special attention given to T-2. No Prairie Warblers were seen or heard.

Left the area at 1750.

August 21, 24, 27, 29. I made one or two hour visits on all these days but saw no Prairie Warblers. I continued to be most attentive to T-2 and T-3 since they produced young most recently. Either they have moved off the area, or I missed them, or they died after fledging.

September 1. A sunny, warm day. I left the car at the end of the new road, walked through III, II, and along the road to the University lake. There were small mixed flocks of fall warblers in the trees, but I saw no Prairie Warblers.

I then went into the valley which has been dammed to form the lake and went down it to where it runs into Griffey Valley. Here I found a silent Prairie Warbler, almost surely a bird of the year. It was less gray about the head than the other post-juvenals I've seen, so it could have been a female, but I doubt it. It was feeding a few feet above the ground and was quite tame. I watched it for 10 minutes. It was not in the company of other birds.

September 2. Sue and I heard 2 Great Horned Owls calling at 2000 from the woods between T-15 and III.

September 5. Sunny and warm in the afternoon.

Present 1500-1700. Arrive 1500.

I walked through III and II, seeing a few warblers at the edges in the trees. Where the north-south road through II meets the main east-west cinder road I found a large flock of Dendroica warblers moving quickly through the trees. One was an adult male Prairie Warbler. As I watched it a second Prairie Warbler sang a fairly loud and perfect step song. I looked for him and heard a second song. I may have seen him briefly, but the warblers were passing so quickly that I couldn't be sure it wasn't the adult male I saw first.

Nothing else developed during my stay and I left at 1700.

During the rest of September I took walks through the whole study area every few days, but I saw no Prairie Warblers. I spent much time completing a map of the area, plotting territories on it, and marking nest sites and their heights on the map. I also made two or three visits to T-12 to look for the nest of the second brood, but I couldn't find it. Since I thought I may have missed a nest of 5F, I also worked over that territory carefully but without luck. /There was none./

In October I continued my search for nests I knew I had missed, and Alan Garrett and I made a complete tree count on T-1 and T-3, both of which territories had 5 nests. The counts appear later as an appendix.

October 15. At 1715 I heard 2 Great Horned Owls calling east of T-8, probably near the lake.

October 19. Cool, sunny afternoon. Present 1500-1700. Arrive 1500.

I searched T-12 and found the second nest without too much trouble now that some leaves have fallen. It was in one of the locust groves, and the locusts are almost bare. The nest was 56 yards south of the first nest, 11 feet high and placed in a tree on the edge of the grove. This grove is not the one where I found the 12's feeding their second brood but it is quite near it. It was here that M-12 did most of his singing during the pre-fledging stage of the brood.

I left at 1700.

October 22. Sunny day, warm until late afternoon.
Present 1400-1730. Arrive 1400.

I worked over T-11 and found both of the missing nests, the second and third of the pair. One was in a sassafras fork in the same cluster where the abortive fifth nest was built. This second nest was 8 feet 2 inches high, 94 yards south of the road junction. It was quite flimsy, but was of obvious identity. It contained feathers, as did 11F's fourth nest. Detailed analysis later.

The other nest (number 3) was on the top of a horizontal branch of a sugar maple of greater than average size, perhaps 25 feet. The nest was 9 feet 7 inches high, and the tree 72 yards east of the road and 21 yards south of the junction. It was quite fresh and contained a good deal of feather debris, indicating that it failed at the last moment before fledging.

I have put the order of the nests as they appear above because of the following facts: Nest #1 I found; it was deserted about May 14 (page 113). I then spent days looking for new nests but found none until June 19 (page 316). Meanwhile on June 10 (page 279) and June 13 (page 292) I saw possible food carrying in the direction of the latter of the two nests I've described here. Not until June 19 did I

find 11F nest building again; between May 14 and June 19 the pair could have been, and in the ordinary course of things would have had to be, occupied with two nests. Thus the June 19 nest was the fourth. The only evidence that the nest with the feather and quill material in it was built after 11F's abortive July nest is its good condition. But I have found other Prairie Warbler nests from the 1951 season in quite good shape, so nest condition seems to depend on protection from the elements more than on age. Counter evidence is the abortive nest in July (surely that late a female would not begin a nest in a desultory way, then quit, then build a nest and lay in it), and the fact that I saw no young on T-11 in July. The only remaining question is which of today's two nests was built first. If the 11's were carrying food on June 10-13 it could only have been to the more advanced of the two nests. I found today (since it surely contained well developed young and the 35 day time interval will not permit two nests to have got that far); thus it would have to be nest #3. If I was mistaken in thinking I glimpsed food-carrying, there is no way of knowing which nest was earliest unless the unreliable criterion of degree of preservation is used.

In any event, this clears up pair 11 very well.

On T-5 I looked long and carefully for a nest but found none. I think I'd have seen any nest on the territory today. There have been few winds or rains during this mild fall, so it is unlikely a nest would have been washed away yet. Therefore it is possible I found all of 5F's nests and she built the third some time after the second failed.

There were no other relevant facts or developments observed on the area during 1952. On December 17 I made a 2 hour unsuccessful search to find the Great Horned Owls heard calling during the fall.

March 20, 1953. Cloudy and cool. Present 1400-1600 with Duane Carmony. Arrive 1400.

We walked over the entire study area. On IV we found a last year's Prairie Warbler nest on the southwest edge of T-3. This nest was in an apple tree (20 feet high) 11 feet high against a thick branch, my first nest in an apple. It was well preserved, clearly an early nest (pearly everlasting the main lining material), and had never held young of an age to leave quill debris. It was 60 yards southwest of nest #1. I gave much thought to the possibility that this was a nest of 8F, but every evidence makes it 3F's: It is on T-3 at a place where T-8 was not contiguous; the 8's never were near it and 3F was; 3F could easily have had a nest in the rather long interval when I lost her early in the season; I once saw her gathering nest material nearby after nest #1 had failed, and the nest I have thought of as nest #2 was quite far away. This means 3F built six nests, and this is almost certainly the second. All references in these notes to nests built after nest #1 should therefore be advanced by one; thus what I've called nest #2 is nest #3, etc. / See above, pages 120-21, for probable description of early stage of building; bird called 8F was more likely 3F. /

APPENDICES

APPENDIX I
REPRODUCTIVE SUCCESS BY PAIRS

Pair 1

Nests complete - 5

Nests incomplete - 0

Nests successful - 0

Eggs per clutch - 5, 4, (4), (4), 4. Total: 21 eggs.

Young fledged - 0

Stage at failure - 1: egg; 2: young; 3: egg; 4: egg;
5: young. Total: 13 eggs, 8 young.

Cause of failure - 1: 1 egg Cowbird, 4 eggs, probably man;

2: unknown;

3: unknown;

4: unknown;

5: 1 young, possibly sickness or
starvation, 3 young unknown.

Cowbird parasitism - 1 nest in 3 known.

Cowbird eggs per nest, where known - 1: 2; 2: 0; 5: 0.

AI - 2

Pair 2

Nests complete - 5

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 4, (4), 4, 4, 3. Total: 19 eggs.

Young fledged - 3

Stage at failure - 1: egg; 2: egg; 3: young; 4: young.

Total: 8 eggs, 8 young.

Cause of Failure - 1: desertion probably due to Cowbird;

2: unknown;

3: unknown predator and consequent

desertion of remaining young;

4: unknown.

Cowbird parasitism - 1 nest in 3 known.

Cowbird eggs per nest, where known - 1: 1; 3: 0; 5: 0.

AI - 3

Pair 3

Nests complete - 6

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 5, (4), (4), (4), 4, 3. Total: 24 eggs.

Young fledged - 2

Stage at failure - 1: egg; 2: egg; 3: egg; 4: young;

5: egg; 6: 1 egg unhatched.

Total: 18 eggs, 4 young.

Cause of failure - 1: unknown; 2: unknown;

3: unknown; 4: unknown;

5: probably Cowbird;

6: 1 egg failed to hatch.

Cowbird parasitism - 2 nests in 3 known.

Cowbird eggs per nest, where known - 1: 1; 5: 1; 6: 0.

AI - 4

Pair 4

Nests complete - 3

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 4, (4), 4. Total: 12 eggs.

Young fledged - 0

Stage at failure - 1: 1 egg and 3 young;

2: young; 3: egg. Total: 5 eggs
7 young

Cause of failure - 1: 2 young probably starved due to
nestling Cowbird; 1 egg taken by
Cowbird; predator of other nest-
ling unknown.

2: unknown

3: unknown

Cowbird parasitism - 1 nest in 1 known.

Cowbird eggs per nest, where known - 1:1.

Pair 5

Nests complete -3

Nests incomplete -0

Nests successful -1

Eggs per clutch -2 /incomplete due to failure/ 4, 4.

Total: 10 eggs.

Young fledged -4

Stage at failure -1: egg; 2: young. Total: 2eggs, 4 young.

Cause of failure -1: Cowbird; 2: unknown; perhaps mammal.

Cowbird -1 nest in 2 known.

Cowbird eggs per nest, where known -1: 1; 3: 0.

AI - 5

Pair 6

Nests complete - 2

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 4, 4. Total: 8 eggs.

Young fledged - 3

Stage at failure - 1: egg failed to hatch; 2: young.

Total: 1 egg, 4 young.

Cause of failure - 1: 1 egg failed to hatch; 2: snake(?).

Cowbird parasitism - None in 2.

Cowbird eggs per nest - 1: 0; 2: 0.

Pair 7

Nests complete - 3

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 2 [incomplete due to failure], 4, 4.

Total: 10 eggs.

Young fledged - 3

Stage at failure - 1: egg; 2: egg; 3: 1 egg failed to hatch. Total: 7 eggs.

Cause of failure - 1: bird predator; 2: unknown;
3: 1 egg failed to hatch.

Cowbird parasitism - 1 nest in 2 known.

Cowbird eggs per nest, where known - 1: 1; 3: 0.

AI - 6

Pair 8

Nests complete - 3

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - (4), 4, 3. Total: 11 eggs.

Young fledged - 3

Stage at failure - 1: egg; 2: egg. Total: 8 eggs.

Cause of failure - 1: possibly Cowbird; 2: unknown.

Cowbird parasitism - 1 in 3.

Cowbird eggs per nest - 1: 1; 2: 0; 3: 0.

Pair 9

Nests complete - 3

Nests incomplete - 0

Nests successful - 2

Eggs per clutch - 3, 3, 4. Total: 10 eggs.

Young fledged - 7

Stage at failure - 1: egg. Total: 3 eggs.

Cause of failure - 1: Cowbird.

Cowbird parasitism - 1 nest in 3.

Cowbird eggs - 1: 1; 2: 0; 3: 0.

AI - 7

Pair 10

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: egg. Total: 8 eggs.

Cause of failure - 1: unknown; 2: probably mammal.

Cowbird parasitism - none in 1 known.

Cowbird eggs per nest, where known - 3: 0.

Pair 11

Nests complete - 4

Nests incomplete - 1

Nests successful - 0

Eggs per clutch - 4, (4), (4), (4). Total: 16 eggs.

Young fledged - 0

Stage at failure - 1: egg; 2: egg; 3: young; 4: egg.

Total: 12 eggs, 4 young.

Cause of failure - 1: Cowbird; 2: unknown; 3: unknown;
4: unknown.

Cowbird parasitism - 1 in 1 known.

Cowbird eggs per nest, where known - 1: 2.

AI - 8

Pair 12

Nests complete - 2
Nests incomplete - 0
Nests successful - 2
Eggs per clutch - 4,3. Total: 7 eggs.
Young fledged - 7
Stage at failure - none
Cause of failure - none
Cowbird parasitism - None in 2.
Cowbird eggs per nest - 1: 0; 2: 0.

Pair 13

Nests complete - 2
Nests incomplete - 0
Nests successful - 1
Eggs per clutch - 5, 3. Total: 8 eggs.
Young fledged - 1
Stage at failure - 1: young; 2: eggs. Total: 2 eggs,
5 young.
Cause of failure - 1: 2 young perhaps starved, others
unknown;
2: 2 eggs for unknown reason.
Cowbird parasitism - None in 1 known.
Cowbird eggs per nest, where known - 1: 0.

AI - 9

Pair 14

Nests complete - 2

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 3[incomplete due to failure], 3.

Total: 6 eggs.

Young fledged - 3

Stage at failure - 1: egg. Total: 3 eggs.

Cause of failure - 1: unknown.

Cowbird parasitism - None in 2.

Cowbird eggs per nest - 1: 0; 2: 0.

Pair 15

Nests complete - 1

Nests incomplete - 0

Nests successful - 1

Eggs per clutch - 4. Total: 4 eggs.

Young fledged - 4

Stage at failure - none

Cause of failure - none

Cowbird parasitism - none in 1.

Cowbird eggs per nest - 1:0.

APPENDIX II

SUMMARY OF REPRODUCTIVE SUCCESS

Nests complete - 47

Nests incomplete - 2

Nests successful - 14

Nests complete per pair present - 3.133

Nests complete per female present - 3.133

Nests successful per pair present - .933

Nests successful per female present - .933

Nests successful per total completed - 1 in 3.357, or
.298, or 29.78 percent.

Pairs:

Pairs successful once - 10

Pairs successful twice - 2

Pairs unsuccessful - 3, or 20 per cent

Eggs:

Total eggs laid - 178

Egg failures in egg stage - 90, or 50.561 per cent

Egg failures in nestling stage - 44, or 24.720 per cent

Eggs successful - 44, or 24.720 per cent

Eggs per pair present - 11.866

Eggs per female present - 11.866

Egg sets known to contain 5 - 3

Egg sets known to contain 4 - 19

III - 2

Egg sets known to contain 3 - 7

Average size of known set - 3.865

Incomplete clutches - 2 of 2 eggs, 1 of 3 eggs, or
potentially 5 eggs

Potential total of eggs - 183

Fledged young:

Total young fledged - 44

Young fledged per pair - 2.933

Young fledged per adult present - 1.466

Young fledged per female present - 2.933

Young fledged per egg laid - .247

Young fledged per nest completed - .936

Young fledged per nest successful - 3.142

Young fledged as to size of brood - 1 of 1, 1 of 2,
7 of 3, 5 of 4

Young per brood, average - 3.142

Of broods successful, per cent totally so (no young
lost) - 71.428

Of broods successful, per cent losing 1 egg or
nestling - 21.428

Of broods successful, per cent losing 2 eggs or
nestlings - 7.142

Broods totally successful per nest completed - .227

Broods totally successful per nest completed,
per cent - 22.727

Broods totally successful per nest completed, ratio- 4.700

Cowbirds:

Total nests of which Cowbird status is known - 30

Total nests parasitized - 10, or 1 in 3, or 33.33 percent

Parasitism where known, according to succession
of nests:

First nests parasitized - 9, nonparasitized - 5

Second nests parasitized - 0, nonparasitized - 6

Third nests parasitized - 0, nonparasitized - 6

Fourth nests parasitized - 0, nonparasitized - 0

Fifth nests parasitized - 1, nonparasitized - 2

Sixth nests parasitized - 0, nonparasitized - 1

Parasitism by more than 1 female - 2 first nests,
2 eggs

Total number Cowbird eggs - 12

Warbler eggs removed per Cowbird egg laid - 10

Egg for egg - 8

2 warbler eggs for 1 egg - 1

0 warbler eggs for 1 egg - 1 (nest with 2 Cowbird eggs)

unknown - 2

Effect of parasitism on Prairie Warblers:

Failures directly due to Cowbirds - 4

Failures after, but unrelated to, parasitism - 3

Failures possibly due to Cowbirds but where cause
is unknown - 3

Cowbird success - None in 12 eggs, 10 nests.

Egg failures as eggs - 11, or 91.66 per cent

Egg failures as nestlings - 1 or 8.33 per cent

AII - 3

Egg failures due to desertion caused by parasitism, i.e., risks Cowbird imposes on self - 5, or 41.66 per cent.

APPENDIX III

NEST SITES AND HEIGHT STATISTICS

Pair 1:

- 210.8 5/3 nest 1 - 6' 11" high, in Virginia creeper, horizontal branch, 7½' white elm. Concealment average. *Concealment poor, not visible*
- 431.8 5/17 nest 2 - 14' 2" high, in witch's broom, horizontal branch, 20' hackberry. Concealment good.
- 254 6/10 nest 3 - 8' 4" high, in grape, on horizontal branch, 10' white elm. Concealment average.
- 548.6 6/20 nest 4 - 18' high, in vertical fork, 25' white elm. Concealment average.
- 193 7/5 nest 5 - 6' 4" high, in Virginia creeper, growing between sassafras and dead sapling. Concealment poor.

Pair 2:

- 348 5/9 nest 1 - 11' 5" high, in small fork against trunk of 18' sugar maple. Concealment poor.
- 246.4 5/19 nest 2 - 8' 1" high, in top of black walnut covered with Virginia creeper and grape. Concealment average.
- 129.7 6/1 nest 3 - 4' 7" high, on horizontal branch of 8' black walnut. Concealment poor.
- 452.6 7/21 nest 4 - 15' high, in new growth at top of black walnut. Concealment good.
- 528.3 7/18 nest 5 - 17' 4" high, in Virginia creeper on horizontal branch of 19' black walnut. Concealment good.

AIII - 2

Pair 3:

144.8 5/2 nest 1 - 4' 9" high, in fork of horizontal limb
of 15' sugar maple. Concealment average.

535.3 100' 120' high nest 2 - 11' high, against vertical branch of 20'
apple. Concealment average.

177.8 100' 120' high nest 3 - 5' 10" high, between small branches grow-
ing from horizontal branch of 15' white
elm. Concealment poor.

609.6 nest 4 - 20' high, in vertical fork of 35' white elm
growing in a ravine. Concealment average.

266.7 100' 120' high nest 5 - 8' 9" high, against trunk of tilted dead
12' sassafras in a grove of sassafras. Con-
cealment poor.

701 100' 120' high nest 6 - 23' high, in vertical fork of 30' dogwood
growing in a ravine. Concealment good.

Pair 4:

30.5 100' 120' high nest 1 - 1' high, in vertical fork of 2½' sugar
maple. Concealment poor.

670.6 614 nest 2 - 22' high, in vertical fork of 30' white
elm. Concealment average.

731.5 612 nest 3 - 24' high, in witch's broom of horizontal
branch of 35' hackberry. Concealment
average.

AIH - 3

Pair 5:

152.4 nest 1 - 5' high, in grape vine hanging from low limb of 30' black cherry. Concealment poor.

513.2 nest 2 - 17' high, in Virginia creeper and against trunk of 25' sugar maple. Concealment good.

563.9 nest 3 - 18' 6" high, in vertical fork of 24' dogwood growing in a sinkhole. Concealment average.

Pair 6:

221 nest 1 - 7' 3" high, in vertical fork of 11' sugar maple. Concealment average.

251.5 nest 2 - (second brood) 8' 3" high, in witch's broom on horizontal limb of 16' hackberry. Concealment average.

Pair 7:

88.9 nest 1 - 2' 11" high, on horizontal limb of 10' sugar maple. Concealment average.

304.8 nest 2 - 10' high, in grape tangle on horizontal limb of 14' walnut. Concealment good.

312.4 nest 3 - 10' 3" high, in vertical fork of 15' white elm. Concealment average.

AIH - 4

Pair 8:

426.7 nest 1 - 14' high, in Virginia creeper and against
5/15 trunk of 17' black walnut. Concealment
average.

313 nest 2 - 10' 4" high, in fork of horizontal limb
5/23 of 17' dogwood. Concealment poor.

502.9 nest 3 - 16' 6" high, in vertical fork of 24' dog-
6/2 wood. Concealment average.

Pair 9:

81.3 nest 1 - 2' 8" high, in Virginia creeper clustered
5/12 at top of dead white elm. Concealment good.

381 nest 2 - 12' 6" high, against vertical limb of 14½'
5/25 hackberry. Concealment average.

279.4 nest 3 - (second brood) 9' 2" high, in vertical fork
7/2 of 10' redbud, sheltered by grape. Con-
cealment average.

Pair 10:

71.1 fragment-2' 4" high, on horizontal branch of 8'
sugar maple.

68.6 nest 1 - 2' 3" high, against main trunk of 8' sugar
maple. Concealment poor.

276.9 nest 2 - 9' 1" high, in Virginia creeper on horizontal
branch of 20' white elm. Concealment poor.

83.8 nest 3 - 2' 9" high, in witch's broom on horizontal
6/7 branch of 4½' hackberry. Concealment good.

AIII - 5

Pair 11:

- 96.5 nest 1 - 3' 2" high, in vertical fork of 6' white
elm. Concealment poor.
- 292.1 nest 2 (probably) - 9' 7" high, on horizontal branch
of 25' sugar maple. Concealment average.
- 248.9 nest 3 (probably) - 8' 2" high, in vertical fork of
15' sassafras in sassafras grove. Con-
cealment average.
- 360.7 nest 4 - 11' 10" high, against trunk of 15' hack-
berry. Concealment poor.
- nest 5 - (fragment) 11' 2" high, in vertical fork
of 18' sassafras in sassafras grove.

Pair 12:

- 340.4 nest 1 - 6' high, in vertical fork of 10' white
elm. Concealment average.
- 335.3 nest 2 - (second brood) 11' high, against trunk of
15' black locust. Concealment average.

Pair 13:

- 81.3 nest 1 - 2' 8" high, in grape growing in 4' redbud.
Concealment good.
- 429.3 nest 2 - 14' 1" high, against trunk of 20' black
locust. Concealment poor.

Pair 14:

223.5 nest 1 - 7' 4" high, in vertical fork of 10' white
5/16 elm. Concealment average.

701 nest 2 - 23' high, in vertical fork of horizontal
5/28/29 limb of 40' hackberry. Concealment average.

Pair 15:

193 nest 1 - 6' 4" high, in fork against trunk of 10'
5/22 sugar maple. Concealment average.

Summary of trees selected:

white elm - 12	sassafras - 4
sugar maple - 10	redbud - 2
hackberry - 7	black locust - 2
black walnut - 6	black cherry - 1
dogwood - 4	apple - 1

Nests concealed in grape, witch's broom, Virginia
creeper - 17

AIII - 7

Statistics on height:

median height - 8 to 9 feet

mean height - 12 feet 6 inches

average height - 10.45 feet

mode in terms of 2-foot intervals - 8 to 10 feet

APPENDIX IV

*Duplicate
by error*

DISTRIBUTION OF NEST SUCCESSES BY HEIGHTS

Height of nest	Success- ful	Failed	Total	Percent of nest success by 5' units of height
1-2 feet		1	1	
2-3	1	4	5	
3-4		1	1	11.11%
4-5		2	2	
5-6		2	2	
6-7	2	2	4	
7-8	1	1	2	
8-9		5	5	28.57%
9-10	1	2	3	
10-11	1	2	3	
11-12	1	3	4	
12-13	1		1	
13-14			0	36.36%
14-15	1	2	3	
15-16		1	1	
16-17	1		1	
17-18	1	1	2	
18-19	1	1	2	50.00%
19-20			0	
20-21		1	1	
21-22			0	
22-23		1	1	40.00%
23-24	2		2	
24-25		1	1	

APPENDIX V
DISTRIBUTION OF NEST HEIGHTS AND NEST SUCCESSES
BY PERIOD WHEN NEST WAS BUILT

Explanation: May, June, and July are each divided into thirds, each third numbered successively from 1 to 9.

Heights in feet per period	Periods									Total
	1	2	3	4	5	6	7	8	9	
1-2	1									1
2-3		4		1						5
3-4	1									1
4-5	1			1						2
5-6		1	1							2
6-7	2		1				1			4
7-8	1	1								2
8-9		1	2		1	1				5
9-10		1	1				1			3
10-11			2	1						3
11-12	1	1			1	1				4
12-13			1							1
13-14										0
14-15		2			1					3
15-16					1					1
16-17				1						1
17-18			1					1		2
18-19						2				2
19-20										0
20-21					1					1
21-22										0
22-23				1						1
23-24			1				1			2
24-25						1				1
Total	7	11	10	5	5	5	3	1	0	

	Periods								
Total	$\frac{1}{7}$	$\frac{2}{11}$	$\frac{3}{10}$	$\frac{4}{5}$	$\frac{5}{5}$	$\frac{6}{5}$	$\frac{7}{3}$	$\frac{8}{1}$	$\frac{9}{0}$
Average height nest per period* (feet)	5.92	7.41	11.30	11.30	14.20	16.50	13.16	17.50	
Successes per period:									
Successful	2	0	3	3	1	2	2	1	0
Failed	5	11	7	2	4	3	1	0	0
% nest success per period and per average height in period	28.57	0	30.00	60.00	20.00	40.00	66.66	100	0
% nest success per month		17.14			66.66 40.00			75.00	

*Using mid-point between each foot interval as a basis (e.g., 1-2 = 1.5 for averaging).

Appendix V shows that average heights rose as the season progressed and that nesting success generally did so too. Since success is revealed in Appendix IV as increasing in some correlation with height, the question is whether the major factor in the increased success was height or time of construction or either or both. In an effort to determine this the nests whose heights yield an average height per period built are here tested for per cent

of success; the latter figure can then be compared with the per cent of success of nests grouped according to the height factor alone. As will appear, there is considerable correlation. No conclusion is attempted on this one year's data, however.

Per cent success by 5 foot units of height:	Average heights per period built:
0-5 - 11.11%	1 - 5.92 feet
6-10- 28.57%	2 - 7.41 feet
11-15 -31.36%	3 - 11.30 feet
16-20 -50.00%	4 - 11.30 feet
21-25 -40.00%	5 - 14.20 feet
	6 - 16.50 feet
	7 - 13.16 feet
	8 - 17.50 feet

In periods 1 and 2, 18 nests were built; 11.11% were successful. Compare this with the percent of success of all nests whose heights were 0-5 and 6-10 feet. In periods 3, 4, 5, and 7, 23 nests were built and 39.13% were successful. Compare this with the percent of success of all nests whose heights were 11-15 feet. In periods 6 and 8, 6 nests were built and 50% were successful. Compare this with the percent of success of all nests whose heights were 16-20 feet.

APPENDIX VI

NEST SUCCESS CORRELATED WITH DEGREE OF CONCEALMENT

In rating the degree of concealment of a nest I excluded the height factor and attempted to consider the visibility of the nest from all directions and from both within and without the tree in which it was placed. That is, I sought its concealment not from me but from other mammals and from snakes and birds.

	Good	Average	Poor
Failure	6	15	12
Success	3	10	1
Total	9	25	13

Percent of failure:

Good	66.6
Average	60.0
Poor	92.3

Of the total of 17 nests sheltered by or built in grape, Virginia creeper, or witch's broom, 14, or 82.3%, failed.

APPENDIX VII

DETAILS ON NEST CONSTRUCTION

1F's third nest--

Condition fair; somewhat matted, nest material considerably washed away.

Gross external: Typically gray and soft, but with many more fragments of very old weathered leaves than usual. This is the only remarkable feature of the nest and the only reason for saving it. The leaves are a really substantial proportion of the outer shell.

1F's fifth nest--

Condition poor because torn by cat.

Weight: 3 g., 530 mg.

Construction as usual, with horizontally woven outer shell of soft and hard fibers 3-6 " long. Snake skin 26" long in soft outer layer. Unusual amount of spider webs cementing the material; single strands and not egg cases. Also grass in the outer layer. Within it and especially heavy on the bottom is a pad of downy fruits of grass; in pad are also grass stems. Lining is of fine strands of yellow-brown grass, dry.

2F's fourth nest--

Condition good, very slightly matted.

Measurements:

Cavity width outside-62mm.

Cavity width inside-42mm.

Center width outside-57.2mm.

Depth outside-62mm.

Depth inside-40mm.

Weights:

Total-3 g., 820 mg.

Lining-1 g., 700 mg. (debris excluded).

Gross external appearance: Four or 5 small dead black walnut leaves attached by spider webs. Snakeskin visible in foundation and outer wall. Rest typical gray; largely fibers from milkweed, grasses, down, insect egg cases and spider webs.

Gross internal: Cavity lined with grasses, down, several feathers.

Detail: Outside layer and foundation composed very largely of strips of skin from milkweed, some coarse and woody, some fine and soft and apparently an inner layer. Mixed in are many spider webs and insect cases. A few fruits of broom sedge in the outer layer. Perhaps 12" of snakeskin, probably of both green and blacksnake or racer.

Lining composed nearly entirely of fruits of broom sedge under a thin, rather incomplete final layer of fine grasses. Also present in lining are 7 very small soft feathers, perhaps grouse's; several long fine fibers like mammal hairs, but 4" long and too fine and kinky to come from any mammal I know; 1 or 2 rabbit guard hairs; 2 hairs possibly from a dog or opossum (2½-3" long, whitish).

Floyd Swink: many fruits of *Andropogon virginicus*.

2F's fifth nest--

Condition good; quill debris.

Measurements:

Cavity width outside-61mm.

Cavity width inside-41.5mm. by 47.5mm.

Depth outside-72mm.

Depth inside-37mm.

Weight total (some debris remaining)-4 g., 860 mg.

Gross external appearance: Gray fibrous milkweed material and possibly grape, grasses. A few feathers near top; snakeskins prominent. Soft-looking and without sharp outline, with plant down conspicuous, especially at bottom. Rim slightly constricted. A few dead leaves adhering; not placed by PW. A few insect or spider

egg cocoons:

Gross internal: Lined with grass and a few horse hairs.

Detail: A soft loose basal structure of plant fiber and snakeskins, easily separated from a tight cup. Snakeskins mostly from rough green, a few pieces possibly from larger species. All scales keeled, ventral plates of larger skin single. About 36" of skin, largest piece about 6" but I may have broken some. Some green snake skin woven into outside of inner cup.

Solid cup composed of tightly woven grasses (with fruits) and bits of outer skin of herbs; all placed horizontally. Some broom sedge-like down. Among above materials and toward inside, soft feathers (20 of them), most 3-4" long. Some stuck together as though picked from dead bird. One hard dark flight feather, possibly Robin's. Others downy; light or light laterally with large brown bars or gray-brown tips; probably from hawk, perhaps Broad-wing. Next toward the interior are increasing quantities of down (most from broom sedge, all from fruiting plants) and fewer fibers. Thick pad, nearly exclusively down, with final lining of a little grass, 106" of horse hair, 3 or 4 animal hairs 3-4" long.

3F's first nest--

Condition fair; considerably worn by weather, so weight is affected, measurements not.

Measurements:

Cavity width outside-63mm.

Cavity width inside-43mm.

Center width outside-60mm.

Depth outside-61mm.

Depth inside-37mm.

Gross external appearance: Typically gray; only weed bark and milkweed bast fibers visible.

Gross internal: Lined with grasses or wiry fibers, much more heavily than usual.

Detail: Less platform than in most nests. A few grasses on external shell, especially at rim; probably woven in as loose ends from cavity. Lining has thick layer of broom sedge down, a few grasses and strips of herb skin. Thick final lining composed largely of rootlets, with a few stiff grass stems; heavy pad formed by these.

Floyd Swink: *Andropogon virginicus*.

3F's third nest--

Condition good.

Measurements:

Cavity width outside-61mm.

Cavity width inside-41mm.

Center width outside-61mm.

Depth outside-55mm.

Depth inside-36mm.

Weights:

Total-3 g., 990 mg.

Lining-1 g., 540 mg.

Gross external appearance: Typical. One hackberry leaf of the year attached by spider web. Fairly large flap of foundation material extends from the nest. It was probably the first material brought and the nest then built slightly to one side of it.

Gross internal: Unusually heavy lining of stiff fibers.

Detail: Heavy platform as stated above. Outer shell very largely of cottony milkweed fiber. A few webs and insect cocoons, one with eggs in it. Some grasses, especially fruiting heads; a few rootlets. Stiffer material forms rigid rim. A little pussytoes and a few cottony seeds of unknown plant.

First lining layer mostly broom sedge with a whiter down, probably pussytoes. A few grasses; one strand of what looks like sheep's wool. Substantial final lining, largely of fruiting heads of grasses, a few rootlets.

Floyd Swink: *Andropogon virginicus*.

3F's fourth nest--

Condition good; nest small.

Measurements:

Cavity width outside-66mm.

Cavity width inside-45mm.

Depth outside-47mm.

Depth inside-30mm.

Weight: 3 g., 450 mg.

Gross external appearance: Typical. Numerous strands of spider web attached nest to leaves of sassafras tree in which placed. No cocoons.

Gross internal: Piece of a 3/16" broken branch sticks out into cavity; was part of supporting fork, probably projected 1/4" when nest was in place.

Detail: Construction interesting and different.

Pad on which nest was built is small and scant. It and outer shell made of usual plant fibers, but with grape and more heavy material than ordinary. Inner downy layer of cup a good deal thinner than typically; composed of grass and other plant down; also one 2 1/2" soft feather, proximal 2/3 whitish, distal 1/3 brown or reddish (much like chicken's, possibly hawk, owl, grouse). Next a lining of grasses, very unusual in that it is tightly woven, rigid. Also composed of many red-brown rootlets.

3F's sixth nest--

Condition good; removed at fledging; some debris.

Measurements:

Cavity width outside-55mm.

Cavity width inside-43.2mm.

Center width outside-63mm.

Depth outside-66mm.

Depth inside-35mm.

Weight: 3 g., 960 mg., total; lining 1 g., 450 mg.

Gross external appearance: Typical.

Gross internal: Final lining almost entirely rootlets.

Detail: Base mostly of insect cocoons, strips of herb skin (many 5" long); a few wiry fragments seem axes of flowers of Queen Anne's lace. Foregoing are also the major components of rest of nest except lining; webs and cocoons almost supplant plant down, with some broom sedge near lining and in it. Lining also has a few milkweed fibers, considerable tufts from grass fruits. Final layer of rootlets.

Floyd Swink: Many fruits of *Andropogon virginicus*.

4F's first nest--

Condition fair; intact but collected late.
Measurements:

Cavity width outside-63mm.
Cavity width inside-46mm.
Center width outside-63mm.
Depth outside-63mm.
Depth inside-36mm.

Weights:

Total-4 g., 570 (some quill debris).
Lining-1g., 820 mg. (some quill debris).

Gross external appearance: Typically almost entirely of soft gray, cottony fibers with a few stiffer strips.

Gross internal: Grass on bottom; pussytoes down visible especially on sides.

Detail: Outer shell just as appears, of old herb fibers (milkweed mostly) throughout. Almost no grasses except for a few around the rim, making it stiff.

Lining somewhat unusual, with a layer of wiry grasses laid first on the outer shell; on this is a thick lining of plant down (mostly broom sedge, a little pussytoes); final layer of wiry grass stems on bottom of cavity.

Grasses in nest look like Purpletop (except the broom sedge, of course).

5F's third nest--

Condition good, but much quill debris.

Measurements:

Cavity width outside-60mm.
Cavity width inside-41mm.
Center width outside-64mm.
Depth outside-74mm.
Depth inside-42mm.

Weights:

Total-5 g., 180 mg.
Lining-1 g., 790 mg.

Gross external appearance: Bulky, with a heavy, somewhat lopsided foundation pad. In addition to usual gray fibers of soft material are bits of very old dead leaves and a few strips of dark grape bark toward the rim.

Gross internal: Thin layer of grass, 1 or 2 feathers; obscured by debris.

Detail: Foundation pad composed of soft weed fibers, but with more pieces of leaves (maple) than I have seen before. Rest of outer shell the same but with very many dark brown and black strips of herb and grape skin.

Inner cup with abnormally little plant down (broom sedge and pussytoes); also grass, some herb fiber, a little matted rabbit fur. Final lining not as separated from inner cup as usual; made of a heavier mixture of grasses than in cup,

tuft of short, coarse fur of unidentified mammal, 3 small blue contour feathers, plant down, fibers like those on outer shell, 1 large soft egg case.

6F's first nest--

Condition good.

Measurements:

Cavity width outside-67mm.

Cavity width inside-46mm.

Center width outside-59mm.

Depth outside-68mm.

Depth inside-28mm.

Detail: Nest composed of an outer shell of herb fibers, especially soft, cottony milkweed bast, some grape bark. They are mainly woven horizontally around the nest, a few around the vertical limb which supported it. In the outer shell is one small fragment of paper about $\frac{1}{2}$ " square. Inside at the bottom is a thick pad of pussytoes down about 9 mm thick. The walls inside are lined with pussytoes, but less of it. A thin layer of grass and 1 long black horse hair form the final lining, which is rather sketchy.

8F's third nest--

Condition good, some quill debris in bottom.

Measurements:

Cavity width outside-62mm.

Cavity width inside-43mm.

Center width outside-63mm.

Depth outside-56mm.

Depth inside-31mm.

Weights:

Total-3 g., 900mg.

Lining-1 g., 450 mg.

Gross external appearance: Typical except that 2 pairs of green dogwood leaves are attached to the outside by spider webs.

Gross internal: Thoroughly lined with wiry rootlets, some grass.

Detail: Outer part of outer shell is exclusively of soft weed fibers. Inward toward the lining is a large proportion of stiffer dark material, strips of coarser weed skin, grass stems, more than the usual number of short stiff objects, including a few rootlets. Inner shell mostly downy seeds of broom sedge; some grass, many rootlets, 1 small bit of moss. Final lining about 66% rootlets, rest grass stems, forming layer sufficient to hide the down on the bottom of the cavity.

Floyd Swink: Many fruits of *Andropogon virginicus*.

9F's third nest, second brood--

Condition good; much quill debris.

Measurements:

Cavity width outside-62mm.

Cavity width inside-40mm.

Center width outside-62mm.

Depth outside-52mm.

Depth inside-32mm.

Weights:

Total-3 g., 050 mg., most debris extracted.

Lining-1 g., 185 mg., as above.

Gross external appearance: Typically gray with soft fibers predominating; few stiff strips; 3 egg cocoons.

Gross internal: Grass of thin final lining looks a little coarser than usual; somewhat obscured by quill debris.

Detail: Very little grass, and for a late nest surprisingly few webs or cocoons (perhaps 6). Herb fibers are brown, a good deal less gray and cottony than milkweed's. Possibly dead weeds of the year were used. A few broom sedge seeds.

Inner cup (i.e., lining first layer) largely of plant down, mostly broom sedge but with milkweed (query is this the plant that only looks like milkweed?) conspicuous. Final lining sparsely of grass, mostly on cavity bottom.

Floyd Swink: Several *Andropogon virginicus* fruits.

One *Lactuca canadensis*, wild lettuce, fruit.

10F's fourth nest--

Condition poor; collected late; measurements reliable.

Measurements:

Cavity width outside-60mm.

Cavity width inside-46mm.

Center width outside-57mm.

Depth outside-62mm.

Depth inside-41mm.

Gross external appearance: Eight or 9 small dead leaves (probably hackberry) of the year attached outside. Nest wall thin at one point, almost a hole.

Detail: Outer shell almost entirely milkweed bast fibers except for following: one 1" twig, evidently not part of nest tree; about 20 strips of heavy herb skin (unusually few) weighing about $\frac{1}{2}$ gram; several insect or spider egg cases; piece of dead leaf.

Lining mostly of large pieces of milkweed down with fruits attached; a few pieces of grass running through this mass of down. Final cup lining a thin layer of wiry grass stems on bottom of cavity. Also 1 rootlet, 20 or more rabbit hairs.

Floyd Swink: *A. virginicus*, *Asclepias* sp., fruits.

11F's second nest--

Condition poor, only a fragment.

Detail: Two interesting materials are 29 small soft gray feathers of the Mourning Dove (Mumford confirms) and 1 feather reddish-brown on distal end, possibly a Screech Owl's; many small hooked seeds covered with a yellowish wooly substance-evidently *Anemone virginiana*, thimbleweed.

11F's third nest--

Condition good.

Measurements:

Cavity width outside-60mm.

Cavity width inside-42mm.

Center width outside-60mm.

Depth outside-60mm.

Depth inside-42mm.

Weights:

Total-4 g., 340 mg.

Lining-not taken

Gross external appearance: Twig of maple nest tree projects through 1 side of foundation pad. Outer surface dark with unusually numerous coarse herb fibers. Many white egg cocoons and spider webs. Fairly heavy foundation pad with 3 small soft feathers with thick quills; more egg cases than I've seen in a PW nest.

Gross internal: Many feathers in lining; rest difficult to see.

Detail: Nest almost a duplicate of 11F's 2nd and 4th; heavily built with strips of herb skin, few grasses, many cocoons throughout. In it are 57 small feathers like 4th nest's only smaller; 6 reddish distally; most Mourning Dove's, others possibly Screech Owl's. *Anemone virginiana* fruits common. One little shred of moss. Several rootlets. Feathers most numerous in lining but a few through outer shell.

11F's fourth nest--

Condition good.

Measurements:

Cavity width outside-53mm.

Cavity width inside-40mm.

Center width outside-60mm.

Depth outside-66mm.

Depth inside-41mm.

Weights:

Total-4 g., 510 mg.

Lining-1 g., 320mg.

Gross external appearance: Dark with unusual number of strips of weed skin, many white egg cocoons. A slightly loose, not fully integrated foundation pad. One side much indented where nest was built

somewhat around tree limb.

Gross internal: More heavily lined with feathers than any nest seen in 1952. Grass also visible. Almost a hole in wall at point of contact with tree.

Detail: Foundation pad with usual milkweed bast fiber, some heavier strips, many webs and cocoons.

Outer shell lacks softness of most nests, contains more stiff shreds and more by far of egg cocoons.

It also contains 13 feathers, from soft ones to a rather stiff one 60 mm long. Most are Mourning Dove's, large one quite possibly pigeon's. Almost no grass in outer shell.

Inner cup is most unusual in that it has no plant down. Its basic form is given instead by many wiry pieces of grass. Among them are several hundred fruits of thimbleweed. Final inner lining is of 54 feathers of all sizes up to 60 mm. Most are grayish, from Mourning Dove; 4 are reddish, probably a Screech Owl's but possibly Wood Thrush or thrasher's; all are very soft.

Floyd Swink: Many fruits of *Anemone virginiana*.

13F's first nest--

Condition good.

Measurements:

Cavity width outside-56mm.

Cavity width inside-44mm.

Center width outside-63mm.

Depth outside-49mm.

Depth inside 41mm.

Gross appearance; Typical.

Detail: Typical. Took 5 large maggots from the cavity. The day after young disappeared and I collected nest, 2 puparia were beside it; when I dissected nest I found 2 more. *Proto-calliphora*.

13F's second nest--

Condition good; almost no quill debris.

Measurements:

Cavity width outside-69mm.

Cavity width inside-51mm.

Center width outside-55mm.

Depth outside-48.5mm.

Depth inside-26mm.

Weights:

Total-3 g., 150 mg.

Lining-1 g., 100 mg.

Gross external appearance: Most unusual looking nest found in year. Compares with other nests as a saucer with a cup; cavity broad, shallow, tapering. Materials are not soft gray fibers, but coarse dark strips and stiff little twig-like plant and grass stems.

Gross internal: Lined with grasses and stems, little

down visible.

Detail: As it appeared, outer shell contained much smaller proportion of soft fibers, many more long, dark herb skins and short (70-80 mm) stiff stems of grassy plants. Two small brown locust leaflets. One or 2 colorless egg cases or spider webs. Some of the grass had been pulled up; at least, small pieces of roots were still present. The stiff material was sole substance in contact with the inner cup, thus forming an extra layer or component in this nest (not weighed with cup). Plant down layer which followed, thin but complete, made solely of broom sedge down and bits of grass. Final lining a thin but solid and complete layer of fine wiry bits of grass stem, like axes of inflorescence-many hundreds of pieces. No rootlets.

14F's second nest--

Condition poor, measurements impossible because nest crushed in collecting from high tree.

Weight: 5 g., 340 mg.

Gross external appearance: Typical, with 5 small leaves of the year adhering.

Gross internal: Quill debris and crushed condition prevent accurate observation.

Detail: Very large quantity of pussytoes down present, as in early nests sometimes. Some grass, but I can't tell where it was in nest. In the inner cup are 2 small leaves. Milkweed down but without fruits also in the soft layer.

Floyd Swink: Many fruits of *Andropogon virginicus*, several of *Anemone virginiana*.

Nest of unidentified female(record not kept)--

There are several feathers exactly matching in color a female tanager's, 1 or 2 probably from a Blue Jay.

Nest of unidentified female--

Typical nest. Mentioned here because it contained little mats of fur, probably rabbit, and 27 very soft, small gray feathers, probably from grouse or bird of prey.

APPENDIX VIII

INVERTEBRATE NEST ASSOCIATES OF THE NORTHERN PRAIRIE WARBLER

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To judge from the literature, one aspect of birds' nests that has received little attention from American ornithologists is that of the invertebrate animals to be found in them. Yet it is obvious that in addition to the possible value to the ecologist of a study of such circumscribed biotic assemblages, a species' nests should provide one of the chief sources of information concerning its relationships with ectoparasitic and commensal mites and insects. During the summer of 1952, as one facet of a long-term study of the natural history of the Northern Prairie Warbler, Dendroica discolor discolor (Viellot) on a 200-acre tract near Bloomington, Indiana, I attempted to collect all invertebrates from ten warbler nests. At least 20 species, 19 of them arthropods, occurred; no nest contained more than 6 different species, but 7 nests harbored at least 3 species. Since, perhaps unfortunately, 8 nests had succeeded in that the nestlings had fledged prior to my examination, no conclusion can be attempted concerning the impact of invertebrate upon bird. Moreover, I have observed over 90 nests throughout their periods of active use by Prairie Warblers without discovering sufficient evidence to justify any statement in this regard.

In every case but one, collection was accomplished, at the suggestion of Professor Frank N. Young, through the use of the Berlese funnel. This device consists of a sheet metal, box-like

receptacle about a foot square, open at the top; instead of having a conventional flat bottom, the box tapers below to form a funnel and spout. The entire instrument stands on legs which raise it so that the lower tip of the spout is a few inches above the floor. Lying flat across the plane where the sides of the box begin to constrict into the funnel, i.e., where a flat bottom would regularly be, is a coarse-meshed screen. On that is laid a piece of thin cardboard of a diameter slightly greater than that of the nest to be examined, and on this cardboard rests the inverted nest. As the nest dries, its inhabitants leave it, move on to the cardboard, and reaching its edge fall through the funnel into a container of 70-85% alcohol placed to receive them. Nests should be taken immediately after the birds cease using them and kept in a closed paper bag. Before putting the alcohol container in place, the investigator should insert the cardboard beneath the spout, shake the bag vigorously over the top of the box to dislodge animals that may already have left the nest, then return the cardboard to the screen and continue as described. Covering the box prevents escape, e.g., of flies that may have pupated and emerged as imagines; more important, it minimizes the risk of accidental introduction of insects into the funnel.

While the subject of this paper is the 10 nests and the animals found in them, such a discussion would have little meaning without a brief description of the local breeding habitat of the Prairie Warbler, its nest sites and construction materials, and the duration of the phases of its nesting cycle. This is especially true because

published facts concerning the bird's life history are scanty and often do not agree with my own data.

In the hilly unglaciated terrain near Bloomington, upland plant associations not presently directly affected by human use consist principally of climax forests of mixed beech-maple and oak-hickory, and of fields in the early stages of succession back to climax. Warbler territories are confined to sloping, relatively open fields on which are exposed blotches of bare clay and occasional outcroppings of limestone. The tract under investigation is nearly surrounded by cultivated land or pasture; within its bounds are patches of field of from 2 to 10 acres in area, cut off from each other by bits of woods and transected by rows of trees along abandoned fences. In a few fields have been planted rows of black walnut Juglans nigra L.,* black locust Robinia Pseudo-Acacia L., and sugar maple Acer saccharum Marsh.; the height of these plantings is from 6 to 25 feet. On most territories trees are scattered at random and are especially numerous in sink holes and along the steep beds cut by the few spring-fed streams. Relative tree frequency can best be indicated by a count made on a typical Prairie Warbler territory 3.67 acres in area. Of 2,263 trees (90% of them under 20 feet in height) commonest were redbud Cercis canadensis L., 728; sassafras Sassafras albidum (Nutt.) Nees., 490; American elm Ulmus americana L., 240; flowering dogwood Cornus florida L., 164; shining sumac Rhus copalina L., 163; sugar maple, 99; black cherry Prunus serotina Ehrh., 88; ashes Fraxinus

* Plant nomenclature follows Deam, Charles C., Flora of Indiana (State of Indiana Department of Conservation, Indianapolis, 1940), 1236 pp.

spp., 88; eastern red cedar Juniperus virginia L., 66. A frequent ground cover is pussytoes Antennaria plantaginifolia (L.) Richards; while prominent plants in the field cover are broomsedge Andropogon virginicus L., Purpletop Triodia flava (L.) Smyth, prairie three-awn grass Aristida oligantha Michx., and daisy Chrysanthemum leucanthemum L. Characteristic of the shrub layer are raspberry Rubus occidentalis L., and blackberry Rubus sp.

Prairie Warblers place the very great majority of their nests in deciduous trees whose heights range between 3 and 25 feet, about half the time selecting spots sheltered by Virginia creeper Parthenocissus quinquefolia (L.) Planch. or grape Vitis vulpina L. Favored trees are sugar maple, American elm, flowering dogwood, and sassafras; but many other species are resorted to. Almost all nests are located in a fork, perhaps half of them placed against the main trunk at a point where a small branch diverges. There is some indication that average nest heights vary during the season from year to year; the 1952 average was 10.45 feet.

The cup-shaped nest itself is typically made up of three parts, a bulky foundation and outer shell, an inner cup, and a thin final lining. The outer shell, composed largely of the soft cottony bast fibers of the milkweed Aesclepias syriaca L. and fragments of the epidermal layer of the grape, is often bound together by spider webs and in July by insect cocoons. Cast snake skins, particularly of the locally common rough green snake Opheodrys aestivus (L.), are sometimes wound round the exterior of the outer shell. The inner cup is made of a substantial layer of down taken almost entirely

from the fruits of broomsedge and pussytoes. The final lining is the most variable element of the nest; common materials are axes of the inflorescence of Purpletop, rootlets, small feathers, and occasionally hairs of the eastern cottontail Sylvilagus floridanus Allen. A nest such as the one described weighed after drying 3 grams 900 milligrams, the outer shell alone comprising 2 grams 450 milligrams. Its dimensions were 62 millimeters total diameter at the top, 63 millimeters total diameter halfway between top and bottom, 43 millimeters cavity diameter at the top, 56 millimeters total height, and 35 millimeters cavity depth.

A pair of Prairie Warblers which has the good fortune to succeed in bringing off young (one of my pairs succeeded only on the sixth nest, five attempts are not at all unusual, and there are pairs each year that never achieve success) uses the nest for 28 days or more from the time it is begun until the nestlings leave. Construction usually takes 3 days, longer if weather conditions are adverse; after building, the female remains idle 1 day. She then lays 1 egg on 4 successive days and begins to incubate. Incubation lasts from 12 to 13 days; on the morning of the tenth day after the first egg hatches, all young fledge and disperse from the immediate vicinity. In most cases the nest then loses all stimulus value for the adults and they do not return to it.

The following account of the 10 nests examined treats their sites, the stages attained in the nesting cycle, and the dates on which the warblers ceased to use the structures (which are also the

dates of collection). All nests were of typical construction unless otherwise indicated.

1. Nest 2 feet 8 inches high, concealed by grape, in a 4-foot redbud. Five eggs laid, all hatched. Two nestlings disappeared 4 days after hatching; their weights on the third day of life indicated they may have been starving. Remaining 3 nestlings found dead under nest on ninth day, June 11.

2. Nest 6 feet 4 inches high in fork against trunk of 8-foot sugar maple. Four eggs laid; all hatched and all young fledged June 16. Berlese funnel not used; larvae and pupae collected by dissecting nest.

3. Nest 23 feet high, 4 feet from trunk on horizontal limb of 40-foot hackberry Celtis occidentalis L. History unknown except that 3 young fledged June 26.

4. Nest 2 feet 9 inches high, in witch's broom on 4-foot hackberry. Four eggs laid; all hatched and all young fledged July 4.

5. Nest 14 feet 1 inch high, fastened precariously to trunk of 20-foot black locust. Although built by same female that built nest 1, this was highly atypical in its shallow, saucer-like shape and in materials used. Compare its dimensions with those previously stated: 69 millimeters total diameter at top, 55 millimeters total diameter halfway between top and bottom, 51 millimeters cavity diameter at top, 48.5 millimeters total height, and 26 millimeters cavity depth. Outer shell almost devoid of milkweed fibers, made instead of stiff material from grape and from grasses. No appreciable inner cup; final lining composed of same material as outer

shell. Number of eggs laid unknown; for some time nest contained 1 unhatched egg and 1 nestling. Egg gone on July 12, when nestling fledged.

6. Nest 15 feet high in fork of 20-foot black walnut. Four eggs laid; all hatched, but young were destroyed and removed by unknown predator when 9 days old, July 17.

7. Nest 18 feet 6 inches above base of 24-foot flowering dogwood growing in a sink hole. Outer shell unusual in that numerous fragments of last year's sugar maple leaves were used. Four eggs laid; all hatched and all young fledged July 26.

8. Nest 8 feet 10 inches high in 11-foot redbud. Four eggs laid; all hatched and all young fledged July 29.

9. Nest 23 feet above base of 30-foot flowering dogwood growing in a steep ravine. Three eggs laid; 2 hatched and the other remained in nest until 2 young fledged on July 31.

10. Nest 17 feet 4 inches high in new growth at top of black walnut. Three eggs laid; all hatched and all young fledged August 13.

Animals collected were determined by specialists to whom they were referred by C. F. W. Muesebeck of the Division of Insect Detection and Identification, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture. Obviously the cooperation of these men and particularly the kindness of Dr. Muesebeck were indispensable to the preparation of this paper. In addition to taxonomic information, the material that follows includes the names of determining specialists; where known, the numbers of each species identified from the various nests and the stages attained in their life cycles; and an attempt to indicate the invertebrates' ecological niches in the nests. For the Acarina, E. W. Baker was good enough to provide the information last mentioned; C. W. Sabrosky did the same for the fly Protocalliphora metallica (Ths.). Frank N. Young was generous with advice on ecological matters.

MOLLUSCA

Gastropoda

Pulmonata

Pupillidae

Gastrocopta armifera (Say), determined by J. E. P. Morrison. One in nest 1. Casual.

ARTHROPODA

Arachnida

Acarina

Dermanyssidae

Bdellonyssus sylviarum Gastrini and Fanzago. Two in nest 5, 13 in nest 7, 3 in nest 8, 10 in nest 10. Parasite.

Phytoseiidae

Amblyseius sp. Two in nest 10. Predaceous, e.g., on small plant feeders.

Tarsonemidae

Tarsonemus sp. One in nest 5, 1 in nest 6. Fungus feeder.

Tydeidae

Tydeus sp. One in nest 6. Predaceous on small insects and mites and their eggs.

Trombiculidae

Trombicula alfreddugesi (Oudemans). Unknown numbers in nests 4 and 8. Parasite.

Oribatulidae

Oribatula subgenus Zygoribatula sp. One in nest 1, 1 in nest 6. Relationship unknown.

Ceratozetidae

Trichoribates sp. One in nest 4. Debris or fungus feeder.

Insecta

Collembola

Not determined. Unknown number in nest 5. Scavengers or feeders on bacteria or other microorganisms; probably casual.

Neuroptera

Hemerobiidae

Hemerobius sp., determined by S. Parfin. One larva in nest 6. Predaceous on small insects.

Psocoptera

Liposcelidae

Liposcelis sp., determined by A. B. Gurney. Five adults in nest 8, 2 adults in nest 9. Scavenger on decayed animal and plant material.

Thysanoptera

Phlaeothripidae

Haplothripinae, determined by Miss Kellie O'Neill.
Two larvae in nest 6, 1 adult female in nest 9.
Relationship unknown.

Hemiptera

Anthocoridae

Genus and species not determinable, R. I. Snailer.
One nymph in nest 5. Predaceous, e.g., on other
insects; probably casual.

Lepidoptera

Tineidae

Genus and species not determinable, H. W. Capps.
Twenty-two early stage larvae in nest 4, 45
early stage larvae in nest 9. Scavenger on
dead or decayed animal and plant material.

Diptera

Psychodidae

Psychoda alternata Say, determined by A. Stone.
One in nest 10. Scavenger on decaying organic
material, possibly a coprophage.
Psychoda sp., determined by A. Stone. One in nest
4. See remarks immediately above.

Itonididae

Glinodiplosis sp., determined by R. H. Foote. One
adult female in nest 6, 1 adult female in nest
10. Larval habits vary greatly; probably
scavenger, for some larvae of this family feed
on bird excrement.

Milichiidae

Family determined as a possibility only, by W. W.
Wirth. Five larvae in nest 4. Probably plant
feeders, casual.

Calliphoridae

Protocalliphora metallica (Ths.), determined by
C. W. Sabrosky. Two larvae from nest 2 pupated
and emerged as adults, 1 male and 1 female.
Ten larvae from nest 3 pupated and emerged as
6 females and 4 males. "The larvae of these
flies are obligatory, blood-sucking maggots,
and feed externally upon the nestlings, retiring
into the nest to pupate, or dropping to the
ground to do so." The Northern Prairie Warbler
is one of 54 species of birds from which this
fly is recorded. (C. W. Sabrosky, in litt.)

Protocalliphora sp. probably metallica (Ths.), determined by W. W. Wirth. Five larvae from nest 1, 11 larvae from nest 2.

Coleoptera

Chrysomelidae

Chlamys sp., determined by O. L. Cartwright. One, stage unknown, in nest 6. Plant feeder, probably casual.

Hymenoptera

Formicidae

Monomorium minimum (Buckley), determined by M. R. Smith. One worker in nest 7, 1 worker in nest 8. Workers gather honeydew and secretions of extrafloral nectaries; probably casual.

SUMMARY

Invertebrates were extracted in Berlese funnels from 10 nests of the Northern Prairie Warbler. All nests were built in 1952 near Bloomington, Indiana; therefore, local breeding habitat, nest sites and building materials, and duration of the nesting period are described. At least 20 species of animals, 19 of them arthropods, were collected and are identified to the extent possible. Two nests contained 1 species, 1 contained 2, 2 contained 3, and 3 contained 4, and 1 each contained 5 and 6. Probable niches are stated, but it is impossible to go farther and to draw conclusions as to the effects of ectoparasites, for example, on the host warblers.

APPENDIX IX

TERRITORY SIZES

Territories shift somewhat. The following figures exclude areas used only rarely or for brief periods.

Territory 1	- 4.82 acres
2	- 4.13 acres
3	- 3.67 acres
4	- 4.59 acres
5	- 2.52 acres
6	- 2.50 acres
7	- 2.06 acres
8	- 2.93 acres
9	- 2.75 acres
10	- 2.98 acres
11	- 5.75 acres
12	- 3.20 acres
13	- 2.75 acres
14	- 1.60 and 2.30 acres
15	- 3.25 acres

Largest - 5.75 acres

Smallest - 1.60 acres*

Smallest used consistently - 2.06 acres

Mean size - 3.90 acres

Median size - 2.98 acres

Average size - 3.34 acres

Mode, to .25 acres - 2.75 to 3.00 acres

*abandoned, and therefore this figure is not used for other calculations above.

APPENDIX X

TREE COUNTS

Territory 1, 4.82 acres-

sassafras--555 plus 275, est., in dense stands
white elm--347
ash sp. or spp.--240
flowering dogwood--211
black cherry--199
sumac spp.--176
sugar maple--109
red cedar--84
hawthorn spp.--83 plus 150 est. and 300 est. stands
black walnut--71
hackberry--42
wahoo--28
red mulberry--21
osage orange--19
red elm--17
honey locust--15
redbud--10
pawpaw--8
apple--7
hickory sp. or spp.--5
black gum--4
sycamore--4
tulip--2
white pine--2
Scotch pine--1
spicebush--1
privet--1
white oak--2

TOTAL--2264 plus 725 est. in dense stands

Territory 3, 3.67 acres-

redbud--728
sassafras--490
white elm--240
flowering dogwood--184
sumac spp.--163
sugar maple--99
black cherry--88
ash sp. or spp.--88
red cedar--66
apple--23
hawthorn spp.--18
chinquapin oak--13
black walnut--10
hackberry--10
white pine--8
honey locust--7
wahoo--4

Territory 3, continued-

pawpaw--4
 osage orange--3
 spicebush--2
 Kentucky coffee--2
 tulip--2
 black oak--1
 hickory sp.-1
 ironwood-1
 white oak-1
 sycamore-1
 Scotch pine-1
 red elm--1
 willow sp.--1
 persimmon--1
 red maple--1
 beech--1

TOTAL--2263

Note: Identification on the Scotch pines seems likely to be error. More probably the species is red or yellow, both of which are widely planted in the vicinity; the species that stands in the southwest corner of the entire university farm is quite probably the same as the one here called Scotch.

APPENDIX XI
RECORDS OF YOUNG BANDED

<u>Pair</u>	<u>Date</u>	<u>Number</u>	<u>Color bands</u>
2	Aug. 13	21-62004	R-SOG; L-R
		21-62005	" ; L-Y
		21-62006	" ; L-G
3	July 31	21-62002	R-BOS; L-R
		21-62003	" ; L-Y
4	June 2	21-62084	L-BOS; R-G
		21-62085	" ; none
5	July 26	21-62069	L-SOY; R-B
		21-62070	" ; R-Y
		21-62071	" ; R-R
6	May 29	21-62094	R-GOS; L-Y
		21-62095	" ; L-R
		21-62096	" ; L-B
6	June 22	21-62075	R-SOY; L-G
		21-62079	" ; L-R
		21-62081	" ; L-Y
		21-62093	" ; L-B
7	June 28	21-62066	L-SOG; R-R
		21-62083	" ; R-Y
9	June 22	21-62076	R-SOB; L-G
		21-62077	" ; L-R
		21-62078	" ; L-Y
9	July 29	21-62001	L-S ; R-G
		21-62072	" ; R-B
		21-62073	" ; R-R
		21-62074	" ; R-Y
10	June 29	21-62065	L-SOR; R-Y
		21-62067	" ; R-R
		21-62068	" ; R-B
		21-62082	" ; R-G
12	June 2	21-62097	R-YOS; L-
		21-62098	" ; L-
		21-62099	" ; L-
		21-62100	" ; L-
13	June 8	21-62087	L-SOR; R-R
		21-62088	" ; R-Y
		21-62089	" ; R-B
13	July 12	21-62080	L-BOS; R-Y

see note 4.

A XI-2

<u>Pair</u>	<u>Date</u>	<u>Number</u>	<u>Color bands</u>
15	June 16	21-62086	L-ROS; R-R
		21-62090	" ; R-Y
		21-62091	" ; R-G
		21-62092	" ; R-B

Notes-

1. Abbreviations under "color bands" can best be explained by example. L-ROS; R-R means that the brood of which the individual bird was a member was banded with a family or brood mark on the left leg. The bands were arranged with red over silver. On the right leg was the individual band, red, green, yellow, or blue, and in this case red.
2. Bird number 21-62085 of pair 4, with no individual color, was a Cowbird. Cowbird-size bands were unavailable in the field when it was marked.
3. The following broods were destroyed or died without fledging but after I banded them: Pair 4's, banded June 2; Pair 6's, banded June 22; Pair 13's, banded June 8. Brood color combinations for these nestlings were then reallocated to later, living broods.
4. When the 4 young of Pair 12 were removed to be banded on June 2, one escaped and could not be found (although it survived). In addition, one numbered band was lost at the same time. Individual color bands used were blue, green, and red; but since I do not know the numbered band which I lost, I cannot indicate on which young the colored bands were placed.
5. Color band combinations used in 1952 were;

Right-SOG	Left-SOR
BOS	BOS
SOY	SOY
SOB	S
YOS	ROS
GOS	SOG

APPENDIX XII WEATHER, APRIL THROUGH AUGUST

	April					May					June					July					August								
	H	L	4	M	P	H	L	4	M	P	H	L	4	M	P	H	L	4	M	P	H	L	4	M	P				
1	59	53	56	56	120	85	52	81	68	57	79	56	73	67	5	91	69	88	80		85	57	82	71					
2	56	40	47	48		86	52	82	69	5	80	55	77	67	5	93	72	90	82	5	90	59	87	74	5				
3	60	35	56	47	5	82	55	77	68	57	81	60	80	70	5	18	90	69	73	79	5	86	95	66	89	5			
4	56	44	48	50	5	82	87	56	84	71	57	81	54	76	67	5	84	66	81	75	T	89	57	83	79	7			
5	48	34	40	41	34	90	68	88	79	79	82	59	80	57	0	5	88	62	82	75		84	64	79	74				
6	38	34	38	36	0	1	88	62	77	74	72	89	65	85	77		89	67	85	78		80	57	77	68	5			
7	58	32	55	45		77	57	68	69	2	4	92	71	88	81	5	92	67	88	79	5	22	86	59	83	72	5		
8	65	35	64	50		73	53	57	63	2	4	90	70	87	80		88	65	65	76	5	90	65	86	77	5			
9	80	44	77	62		72	53	57	62	7	30	87	66	80	76	5	77	55	75	66		88	70	82	79	T			
10	77	38	39	57	5	47	74	51	57	62	5	83	68	82	76	5	72	80	58	78	69		83	63	80	73	T		
11	50	30	46	40		57	44	50	50	5	11	82	59	77	57	0	7	87	59	83	73		81	64	69	57	2		
12	66	43	65	54	5	28	52	40	55	0	4	7	80	59	79	69	5	90	64	86	77		81	69	79	75	T		
13	65	50	50	57	5	18	67	43	65	55		86	70	82	78		93	66	89	79	5		85	63	83	74			
14	50	36	41	48	10	73	44	66	58	5		88	68	86	78	15	89	70	78	79	5	11	84	69	81	76	5		
15	45	38	45	41	5	02	80	61	75	70	5	94	72	90	83		81	68	59	74	7		85	68	84	76	5		
16	62	32	56	1	47	2	75	53	60	15	5	5	96	75	91	85	3	84	67	83	75	5	1	33	86	67	82	76	5
17	71	41	68	56		76	48	63	62		91	71	82	81		85	73	83	79	T	86	66	83	76					
18	76	49	76	62	5	63	49	55	56	20	91	61	85	76		90	70	86	80	09	84	69	78	76	5				
19	79	49	74	64		55	49	55	52	5	11	86	65	81	75	5	90	73	88	81	5	0	85	61	83	73			
20	81	54	78	67	5	56	52	54	54	12	85	58	80	71	5	90	73	89	81	5		87	64	58	57	5			
21	80	55	72	67	7	73	45	70	59	2	T	86	64	86	75	1	10	93	75	90	84		85	72	76	78	5		
22	76	56	74	68	2	77	55	74	56	T	87	65	78	76	2	31	96	76	91	86		77	59	74	56	8			
23	74	58	58	66		78	62	78	70	21	90	70	87	80		91	72	87	81	5		75	50	73	62	7			
24	58	46	54	52	2	79	64	72	71	53	2	92	74	89	83		88	60	78	74		80	51	78	65	5			
25	65	48	63	55	5	73	59	65	66	16	92	74	90	83		88	60	86	74		85	54	82	56	2	5			
26	71	43	68	57	57	79	53	75	66		93	76	90	84	5	98	65	95	81	5		86	61	82	75	5			
27	74	43	72	58	5	81	58	77	68	5	95	73	92	84		99	76	95	87	5		89	58	58	74				
28	83	52	80	67	5	77	52	66	66	5	16	96	76	92	86		98	75	96	86	5		88	62	86	75			
29	80	57	79	65	5	69	48	65	58	5	97	77	93	87		96	68	80	82	T	91	70	89	80	5				
30	83	52	81	67	5	76	46	74	61		-	72	88	-		-	65	83	-			89	69	86	79				
31						83	53	79	68													87	68	85	77	5	50		
	Total P. 4.26					5.90					5.41					2.62					2.99								

April 3---High wind.

The foregoing data are taken from the records of the Indiana University weather station.

The daily mean is for practical purposes also an average, according to Stephen S. Visser.

A XII-2

Bloomington normal daily mean for 46 years:

AP MAJE JY AU

1	47 59 69 75 75
2	47 59 69 75 75
3	48 59 69 75 75
4	48 60 69 75 75
5	48 60 69 75 74
6	49 60 69 75 74
7	49 60 70 75 74
8	50 61 70 75 74
9	50 61 70 75 74
10	51 62 70 75 74
11	51 62 70 75 73
12	52 62 70 75 73
13	52 63 71 75 73
14	52 63 71 75 73
15	52 63 71 76 73
16	53 63 71 76 73
17	54 64 72 76 73
18	54 64 72 76 73
19	54 64 72 76 73
20	55 65 72 77 73
21	55 65 72 77 73
22	55 65 73 77 73
23	55 65 73 77 73
24	56 65 73 76 72
25	56 65 73 76 72
26	57 66 74 76 72
27	57 66 74 76 72
28	58 66 74 76 71
29	58 67 74 76 71
30	58 68 75 76 70
31	68 75 71

See Visher, The Climate of Indiana, Table 34, p.462.

A XII-3

1952 averages:

April-

average daily high---66.2
average daily low---44.0
average daily mean---55.28

May-

average daily high---74.6
average daily low---52.9
average daily mean---63.8

June-

average daily high---87.9
average daily low---66.6
average daily mean---77.2

July-

average daily high---89.5
average daily low---67.2
average daily mean---78.5

August-

average daily high---85.7
average daily low---63.3
average daily mean---74.39