## 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 KettersonNolan 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
1956
BLOONINGTON, INDIANA.

## Volume I

Through May 27

Val Nolan Jr.

Paix 53

| Page 36 | April 27 | M53 arrives with first $\mathrm{PW}^{\prime}$ s. |
| :---: | :---: | :---: |
| 40-43 | 27 | M53 and old M48 fight. |
| 43-45 | 27 | M48 disappears; M53 holds V. |
| 46-47 | 28 | M53 meets female, which probably leaves. |
| 47, 51, 53 | 28 | M53 meets second (probably) female. |
| 48-49 | 28 | M53 meets unbanded male. |
| 54-57 | 29 | Morning behavior. Probably no female. |
| 58-61 | 29 | M53 courts 53F (probably). |
| 63-65 | 30 | Courtship behavior. |
| 64 | 30 | Second female near 53F. |
| 66-69 | 30 | M53 fights Blue-wing. Afternoon behavior. M53's tarsus may be hurt. |
| 70-72 | Nay 1 | Dawn courtship period behavior. |
| 72-75 | 1 | Afternoon and dusk behavior. |
| $\begin{aligned} & 77-79,80-81, \\ & 82-84,84-85 \end{aligned}$ | 2 | M53 fights M54. |
| 81-82 | 2 | Courtship. Preliminary building behavior. |
| 86-87 | 2 | M54 gains on M53. |
| $\begin{array}{r} 89-90,93, \\ 97-99, \\ 100-104 \end{array}$ | 3 | M53 fights M54 |
| 99 | 3 | Courtship. Nest-shaping. |
| 104-107 | 3 | Pair together. Excitement calls. M53 to T55. |
| 110 | 4 | $53^{\prime} \mathrm{s}$ meet 54 's. |
| 114 | 4 | $53^{\prime}$ 's inactive. 53F SE to $S$ woods. |


| 116, 118-119 | May 4 | Encounters with 54's. |
| :---: | :---: | :---: |
| 120, 122 | 4 | Afternoon behavior. Encounters with 54's. |
| 123-127, 131-135 | 5 | Encounters with 54's. |
| 128 | 5 | 53 F drinks locust sap. |
| 128-131 | 5 | Morning behavior. |
| 136-140 | 6 | Encounters with 54's. |
| 148 | 6 | First nest, possibly begun yesterday, found in pine. Fighting decreases. |
| 150, 155 | 7 | Nest progressing. |
| 159-162, 163-165 | 8 | Encounters with 54's. |
| 166 | 8 | Nest may be complete. |
| 169-171 | 9 | Encounters with 54's. |
| 171 | 9 | Nest probably complete. |
| 172, 174 | 9 | Nest blown from pine. 53 F begins second nest in maple. |
| 176, 178-180 | 10 | Building. 53 F gives mild distraction display. |
| 183, 191 | 11 | Nest nearly finished. 53F once sits in it. |
| $\begin{gathered} 194,196,198, \\ 202,205 \end{gathered}$ | 12 | Building. |
| $\begin{aligned} & 207,209,210, \\ & 219 \end{aligned}$ | 13 | No egg yet. |
| 220 | 14 | Egg 1; laying watched. |
| 227 | 15 | Egg 2; laying watched. |
| 229 | 16 | Egg 3; laying watched. |
| 231-233 | 16 | General behavior. 53F begins to incubate. |

Pair 53-3

Page 234-247

267-271
272

278-279

281
285
286-301
286
303
313
314-335

315, 334
336-364
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337, 345
338-340
347
348

350-353
365
367
369-377
379
384

May 17

All day. Egg 4. Incubation.

Incubation. 4-hour watch.
Incubation. 2 eggs measured.

Incubation. 2 eggs measured. Eggs chalky.

Nest intact.
"
All day. Incubation.
Dawn calls.
Incubation.
Nest intact.
All day. Incubation. 4 eggs.

Premature food-carrying.
All day. Eggs hatch.
Dawn calls.
Female Indigo sings.
Eggs 1, 2, 3 hatch by 0720.
Egg 4 hatches at 1112 .
M53 first feeds at 1143 , repeats frequently.

Details on nestlings.
Nestlings.

Feeding. 4-hour watch.
Brooding.
3 nestlings; banded.

## Paix 53-4

| Page 396 | June 4 | Nestlings. |
| :---: | :---: | :---: |
| 397-406 | 5 | Feeding. 4-hour watch. |
| 408 | 5 | Both adults banded. Songs timed. |
| 409-442 | 6 | All day. Adults feed. |
| 409 | 6 | Dawn calls. |
| 416-440 | 6 | Nestlings preen, call,flap wings, stretch, scratch. |
| 439 | 6 | Strange male pursues 53F. |
| 442 | 6 | 53F does not brood at night. |
| 443-453 | 7 | Feeding. 5-hour watch. Details on nestling behavior. Rhythmical activity. |
| 455-456 | 7 | Evening feeding. |
| 457-464, 465 | 8 | 3 young fledge between 0700 and 0800. |
| 476-478 | 9 | Details of fledgling behavior. |
| 483-484 | 10 | Fledgling behavior, including taking food for self, tail-bobbing. |
| 486, 487 | 11. | M53 encounters M54. |
| 488-489 | 11 | Fledgling behavior. |
| 493-495 | 12 | M53 fights M54. |
| 505-508 | 13 | 53 F tends, shows alarm. Strange male near 53F, once carries food. M53 chases male. |
| 516 | 14 | 53 F tends, shows alarm. |
| 526 | 15 |  |

$573 \quad 19$

588-589 20

599-600
600-602

601

602, 603

612-616, 619,

$$
620
$$

619
622, (634)2222

```
53F followed; no alarm. M53 may fight M54. Young (3/4 grown, 1" tail) bill-wipes, flutters.
\(53^{\prime}\) s tend. Young still separated; described.
Second-brood nest found in dogwood, empty. Young gregarious; near full size, tails \(2^{\prime \prime}\). Both \(53^{\prime}\) s probably tend. M53 encounters strange male.
```

Egg 1. M53 tends 53B, which is alone.

Egg 2. Egg idisappears. Young together. Full size, yellow showing for first time.

Egg 3; laying watched.
Young together. Threat behavior, sunbathing.

Male sings unchallenged on T53.

53 F on during afternoon at times.

Egg 4 laid after second inattentive period. $53 F$ deserts nest. Dawn calls.

Last egg differs from others. M53 tends, chases strange male.

Nest now contains I Cowbird egg (new) and 1 PW egg (fertile). Strange male present.

Young dew-bathes, picks at flower. Bathing motions by adult.

Pair 53-6

Page 624

629
$631 \quad 25$

634

637
641
652
665
$674,675-676$

679-680

687-688
697
701-703

704-706

715-716

## 719

736,738

June 23

24
25

26

27
28
29
30

July 2
$53 F$ explores T56, picks up nest material.

M53 tends.
M53 tends. Young nearly all yellow below.

Young still molting only on heads.

Not found.
"
"

M53 tends, chases strange male. Young's heads neater.

M53 tends 3 young, goes to T60. 53F appears and invites, perhaps permits copulation.

M53 tends 3 young, 1 in full plumage. 53 F on T53, later T60, followed by M53.

M53 tends 3 young.
"

M53 tends, puts up little resistance to 54's on T53. Families do not mix.

53Y calls. M53 tends all on T54.

M53 tends. All young go to 1 to roost. Strange male present.

Silence.
M53 sings. Young not found.

Paix 53-7

Page 740

| 742 | 14 |
| :--- | :--- |
| 754 | 15 |
| 782 | 18 |

789, $790 \quad 19$
800
847-848

926-927, (945)

933-934
935

937

938
940
941-942

945
946
947-948

952

956-957

July 13

14
15

18

21
23

29

30
31

August 1

2
3
4

6
7
8

10

11

Young not found. Few songs on $V$.

Silence.
"
$"$
"
"

M53 follows 60F to her nest tree.
$53 F$ (not yet molting) eats a flower, tends secondbrood fledgling (about 21 days old), nearly grown, tail almost $2^{\prime \prime}$.

53 F tends. A male sings.
Both 53 's, not molting, tend.

M53 sings weakly. 53F, throat molting, forages.

M53 seen.
Young heard.
53F, scapulars molting, tends. M53 chases strange immature.

53 F tends.
Not found.
53 F tends. Broad yellow $V$ on young.

3 young 53's gregarious, breasts nearly all yellow. $53^{\prime}$ s tend. Immature PW 's present.
$53^{\prime}$ 's tend on T54. Strange immatures may follow.

Page 959
960

962
964a-965

967-969

973-974

977
980

983-985

987

989

994

996
998
1000-1001, (1002)

1002, 1003

August 12
13

14
15

17

20

22

23

24

27

28

September 1

11

Family together on T53.
53's not found. Kale sings unchallenged.

Not found.
53 F tends 3 or 4 aggressive post-molt young. $53 F$ molting a little. Strange inmature on T53.

M53 (molting generally; 2 rectrices) tends. He and young begin bathing motions when rain starts. 53F tends.

53F, tail unmolted, may tend.

53 F seems to tend.
53F, body ragged, tail unmolted, tends 3.

53 F tends 3 or 4 , may turn on them. Details on her molt. I young invites copulation.

53 F glimpsed, perhaps with 1 young. Post-molt male sings on T53.

M53 molting, has $1^{\prime \prime}$ tail. several $\mathrm{PW}^{\prime}$ s present.

M53's central rectrices $1 / 4^{\prime \prime}$ short. Details.

Post-molt female in 1.
Immature near 1.
$53 F^{\prime}$ s central rectrices $1-1 / 2^{\prime \prime}$; details. 1 or more innatures present.

53 F in I; M53 (molt complete) in 5.

Page 1004
$1008-1009$
1010
1012
1013

September 12

15

16

20
22

53 F , still molting, S of

53F's central rectrices l/4" short; details.

2 imatures in 1 . Unusual bill-wiping.

M53 is $S$ of 4.
M53 active in 5.

Paix 54

| $\begin{gathered} \text { Page } 77-81,82-84 \\ 84-85 \end{gathered}$ | May 2 | M54 arrives, fights M53. |
| :---: | :---: | :---: |
| 86-87 | 2 | M54 gains ground. |
| $\frac{89-99,}{107} \text {, } 100-103$ | 3 | M54 meets, courts 54F. |
| $\begin{aligned} & 89-90,93,95-96, \\ & 97-101,103,104 \end{aligned}$ | 3 | M54 fights M53. |
| 100, 107-108 | 3 | Preliminaries of building. |
| 108 | 3 | 54 F tries to enter waterdrip trap. May pull n.mor |
| 110-114 | 4 | General morning behavior, courtship, fighting. |
| 115-118, 119-122 | 4 | Afternoon behavior, courtship, fighting, nestshaping. |
| 123-127, 131 | 5 | Morning behavior, including nest-shaping. |
| 123 | 5 | 54F sings. |
| 131-135 | 5 | Afternoon behavior, nestshaping. M54 aggressive toward 54F. |
| 136-140 | 6 | Morning behavior, encounters with $53^{\prime \prime}$. |
| 140 | 6 | Year's first Cowbird egg, in Cardinal nest. |
| 141, 142-148 | 6 | 54 F starts abortive nests in elm and crataegus. |
| 147 | 6 | 54 F sits 18 minutes in nest. |
| 150 | 7 | No building early; rain. |
| 151-157 | 7 | Building the haw nest. |
| 157-158 | 7 | Dusk behavior. |
| 159 | 8 | No building early. Encounters with $53^{\prime}$ s. |

Page 163-165

166, 167

169-171

172, 176

177-178, 180

182-191
194,202
196-198, 205
207, 209, 210, 219

227
229, 230, 231
234, 247

248-266

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251-253

255, 259, 261, 263

272-277
275-277

May 8

Nest in haw abandoned. $54^{\prime}$ s E to 2 and 1 ; encounter with 53's. Nest-shaping.

54 F builds abortive nest in maple $E$ of 2 .

Building. Encounters with M53.

Building has stopped in maple nest.

54 F builds first nest in pine, escapes net. M54 still ranges well $E$.

Building.
Nest seems complete.
Pre-laying behavior.
Little activity. 54F gathers at foxes' den, M54 accompanying her.

## Egg 1.

Egg 2.
Dawn calls. 54 F seems to incubate at night.

All day. Egg 4. Incubation begins.

54F dew-bathes.
M48 sings on T54, fights M54.

Premature nest sanitation behavior by 54 F .

Incubation. 4-hour watch.
Premature nest sanitation behavior by 54 F .

## Pair 54-3

| Page 279 | May 21 | 4 eggs. |
| :---: | :---: | :---: |
| 280-281, 282-283 | 22 | Incubation, Eggs measured. |
| 285 | 23 | Nest intact. |
| 303 | 25 | Incubation. |
| 306-310 | 26 | Incubation. 10-hour watch in rain. |
| 306 | 26 | Strange male near nest. |
| 308, 309 | 26 | Premature food-carrying. |
| 365, 366 | 30 | Eggs have hatched. |
| 367 | 31 | Nestlings. |
| 369 | June 1 | Brooding, |
| 379 | 2 | " |
| 384-385 | 3 | 3 nestlings banded, returned. Details. |
| 396 | 4 | 54's feed. M54 banded. |
| 407 | 5 | 54's feed. Songs timed. |
| 409, 422 | 6 | Dawn calls. 54 F broods at night. |
| 455, 456 | 7 | Nestlings. 54 F does not brood at night. |
| 464, 465 | 8 | Fledging in progress at 0830. 3 young. |
| 476 | 9 | Fledgling near nest. |
| 488-488 | 11 | Young 140 yards from nest. Details of behavior. I feeds self, bobs tail. |
| 486, 488 | 11 | Strange male on V. |
| 486, 487 | 11 | M54 encounters M53. |
| 493-495 | 12 | 54's tend, $S$ end of 2. M54 aggressive toward M53, 54F. |

Paix 54-4

| Page 507-508 | June 13 | M54 tends, goes E to 1. |
| :---: | :---: | :---: |
| 515 | 14 | $54^{\prime}$ s tend. $5452 / 3$ grown, tail $3 / 4^{\prime \prime}$. |
| 525-526 | 15 | Family together. Some pre-building behavior. |
| 540 | 16 | 54 F builds day-old secondbrood nest in dogwood. M54 sings, may fight M53. |
| 555 | 17 | Nest looks complete. M54 ranges widely on $V, E$ to 1. |
| 564-565 | 18 | Building. M54 E to 1. |
| 573 | 19 | No egg yet. Silence. |
| 588 | 20 | No egg yet. M54 sings. |
| 602 | 21 | No egg yet. |
| 613, 619 | 22 | No egg. Nest abandoned, |
| 622 | 23 | M54 chases strange male. Young gregarious; trial and error feeding, possible food=passing, threat. |
| 629 | 24 | M54 sings. No egg. |
| 631 | 25 | No egg. |
| 634 | 26 | No egg. Perhaps 1 song. |
| 637 | 27 | M54 tends 54S, its breast nearly all yellow. |
| 640 | 28 | M54 tends, sings loudly. |
| 652 | 29 | Silence. |
| 665 | 30 | " |
| 680 | July 3 | 545 seen. Strange male nearby. |

Paix 54-5

| Page 688 | July 4 | Silence. |
| :---: | :---: | :---: |
| 701-703 | 6 | M54 tends all. Family goes to 1 , does not mix with $53^{\prime}$ s; slight resistance by M53. Strange male may tend. |
| 715 | 8 | M54 sings in 2 at dusk. |
| 719 | 9 | M54 sings, seems to have parted with young, which are not seen. |
| 738 | 12 | M54 sings $S$ of 2. |
| 740 | 13 | Few songs, perhaps M54's. |
| 742 | 14 | Silence. |
| 753-754 | 15 | 54S, 54 Y on T57 with the 57's. T54 silent. |
| 777-778 | 17 | Unseen male sings few. |
| 782 | 18 | Silence. |
| 789, 790 | 19 | 54S, 54Y together on T57. T54 silent. |
| 791 | 20 | M54, molting generally, sings, stands on 1 leg. |
| 800 | 21 | Silence. |
| 933-934 | 30 | A male sings in 4. |
| 937 | August 1 | 54 Y and unbanded young on $V$ with Blue-wing. 54 Y aggressive. |
| 947 | 8 | Nothing seen. |
| 955-956 | 11 | $\begin{aligned} & 60 \mathrm{~F} \text { and brood, } 53^{\prime} \mathrm{s} \\ & \text { on T54. } \end{aligned}$ |
| 958-959 | 12 | 60's and strange immature present. |
| 962 | +14 | M54 has completed molt. Strange immature on T54. |

## Paix 54-6

| Page 964 | August 15 | Unbanded female present. |
| :---: | :---: | :---: |
| 967 | 17 | Strange post-molt male present. |
| 969 | 17 | M54 sings in 2. |
| 971-972 | 19 | M54, post-molt female present. Strange male sings. |
| 974 | 20 | M54 present. |
| 988 | 27 | M54 sings. Post-molt male perhaps nearby. |
| 991 | 28 | M54 sings, chases $\mathrm{PW}_{\text {, }}$ is chased by immature. |
| 996 | September 2 | M54 sings in 1. |
| 998 | 3 | M54 sings on XI, is also in 1 and 2 . |
| 1003 | 11 | Strange $\mathrm{PW}^{\prime}$ s in mixed flock on T54. |
| 1004-1005 | 12 | M54 sings near 3 , chases strange $\mathrm{PW}^{\prime}$ 's, mostly immatures. |
| 1009 | 15 | Immature PW in mixed warbler flock in 5 . |
| 1010 | 16 | M54 with other warblers near 1. |
| 1016 | 28 | Strange immature $N$ of 2 is last PW of year. |


| Page 36-39 | April 27 | M55 (M52) arrives with first $\mathrm{PW}^{\prime} \mathrm{s}$, on $\mathrm{V}_{\text {. }}$ |
| :---: | :---: | :---: |
| 59 | 29 | M55 on V when 53's court. |
| 65 | 30 | On T53 M55 darts at female, probably 53F. |
| 72 | May 1 | M55 sings twice on T55. |
| 104, 105 | 3 | Silence on T55; M53 there. |
| 118 | 4 | Silence. |
| 128, 129 | 5 | M53 only male seen on T55. |
| 140 | 6 | Silence. |
| 162-163, 166 | 8 | M55 on territory, courts female. Silence in afternoon. |
| 175 | 9 | M55 with female. |
| 176, 178, 180 | 10 | Unbanded male sings unchallenged on T55. Silence later. |
| 182-183, 184, 185 | 511 | M55 flies high off T55, returns. |
| 186-190, 191-193 | 11 | Female, probably new, on T55. Courtship, preliminary building behavior. |
| 194-196 | 12 | Courtship. |
| $\begin{aligned} & 198-202,202-205, \\ & 205-206 \end{aligned}$ | 12 | Early building behavior by both 55's. 3 nests begun and abandoned, same dogwood. |
| 207-209 | 13 | Some activity at yesterday's dogwood. 55F picks up, drops material. M55 encounters hummingbird. |
| 210-212 | 13 | $55 F$ builds a little in another dogwood. |

Pair 55-2

| Page 213-219 | May 13 | 55 F begins true nest in third dogwood. M55 very excited. |
| :---: | :---: | :---: |
| 220-222, 222-226 | 14 | Building begins sometime after 0745. 55F caught, injured, freezes. |
| 227-228 | 15 | M55 sings in morning. |
| 230, 231 | 16 | M55 sings, meets hummingbird. |
| 237 | 17 | M55 audible from T53. |
| 267 | 19 | 55 F still hurt. M55 does not act unmated. |
| 272 | 20 | M55 sings. |
| 279 | 21 | " |
| 281 | 22 | Silence. |
| 285 | 23 | M55 probably sings. |
| 302 | 25 | M55 and probably 55F present. |
| 313 | 27 | Pair together, 55P still injured. |
| 354 | 29 | M55 audible from T53. |
| 365 | 30 | M55 sings. |
| 367 | 31 | Silence. |
| 369 | June 1 | " |
| 379 | 2. | " |
| 409 | 5 6 | " |
| 465 | 7 | " |
| 488 | 11 | " |
| 526 | 15 | M55 sings. |
| 629 | 24 | Silence. |


| Page 163, 167 | May 8 | A male, probably M56, present on II. |
| :---: | :---: | :---: |
| 174 | 9 | M56 has female, acquired today or yesterday. |
| 176 | 10 | M56 perhaps seen. |
| 182 | 11 | M56 sings. |
| 207, 209 | 13 | Silence. |
| 278 | 21 | " |
| 280 | 22 | M56 sings, |
| 284 | 23 | 56 F builds day-old nest, probably first, in elm, creeper. |
| 303-305 | 25 | Blue Jay inspects nest while 56F builds. She deserts. |
| 311 | 26 | Nest remains incomplete, |
| 312 | 27 | M56 sings. |
| 335 | 28 | No change at nest. |
| 365, 366 | 30 | No change. Silence. |
| 367 | 31 | Silence. |
| 368,377 | June 1 | " |
| 378, 379 | 2 | M56 sings. |
| 384 | 3 | M56 and probably 56F seen. |
| 396 | 4 | Silence. |
| 397, 408 | 5 | M56 sings in morning, |
| 453, 455 | 7 | Silence. |
| 457, 465 | 8 | M56 heard at 1000. |
| 466 | 9 | Silence. |

## Paix 56-2

| Page 483 | June 10 | M56 possibly seen. |
| :---: | :---: | :---: |
| 489 | 11 | Silence. |
| 493 | 12 | M56 probably sings. |
| 496, 505 | 13 | Dawn calls. |
| 509 | 14 | Silence. |
| 532, 540 | 16 | Silence. |
| 543, 555 | 17 | M56 sings. |
| 556, 565 | 18 | Silence. |
| 573 | 19 | " |
| 580, 588 | 20 | M56 perhaps seen. |
| 590, 599, 600 | 21 | Silence. |
| 603 | 21 | M56 sings. |
| 612, 619, 620 | 22 | Silence. |
| 622 | 23 | " |
| 624 | 23 | 53F seems to go through preliminaries of building on T56, while M56 shows great interest. |
| 629, 630 | 24 | No $\mathrm{PW}^{\prime}$ 's found. |
| 632 | 25 | Silence. |
| 634 | 26 | " |
| 636, 639 | 27 | " |
| 640 | 28 | " |
| 643 | 29 | " |
| 681 | July 3 | " |
| 713 | 8 | " |
| 948 | Ãugust 8 | No PW's found. |

Pair 57

| Page 50 | April 28 | A male sings on XII. |
| :---: | :---: | :---: |
| 72 | May 1 | " |
| 84 | 2 | " |
| 119 | 4 | Silence. |
| 127 | 5 | A male goes W from XII. |
| 167 | 8 | Silence. |
| 176 | 10 | M57 perhaps seen. |
| 207, 209 | 13 | Silence. |
| 272 | 20 | " |
| 278 | 21 | " |
| 280 | 22 | " |
| 285 | 23 | M57 sings. |
| 302 | 25 | Complete empty nest found in cherry. |
| 310 | 26 | No activity at nest, which is not in use. |
| 312 | 27 | 57 F begins nest in blackberry during afternoon. |
| 365 | 30 | 57 F brings grass to nest. |
| 367 | 31 | Egg 1. |
| 368 | June 1 | Egg 2; laying watched. Dawn calls. |
| 378 | 2 | Egg 3; laying watched; eggs measured. Dawn calls. |
| 379-381 | 2 | 57 F incubates in evening and at night. |
| 382-383, 385-395 | 3 | All day. Egg 4. Incubation. |
| 385-386 | 3 | Premature food-carrying. |

## Paix 57-2

| Page 396 | June 4 | Incubation. |
| :---: | :---: | :---: |
| 406-407 | 5 | Incubation. 4-hour watch. |
| 453-454 | 7 | Incubation. 5-hour watch. |
| 454 | 7 | Premature food-carrying. |
| 465 | 8 | Incubation. |
| 466-475, 479-482 | 9 | All day. Incubation. |
| 466 | 9 | Dawn calls, |
| 469 | 9 | Egg 4 measured. |
| 479-480 | 9 | Premature food-carrying. |
| 483 | 10 | M57 perhaps on II. Incubation. |
| 486, 489-491 | 11 | Incubation. 4-1/2-hour watch. |
| 486, 489-490 | 11 | Premature food-carrying. |
| 493 | 12 | Incubation. |
| 496-505 | 13 | All day. Incubation. |
| 496 | 13 | Dawn calls. |
| 497, 502, 505 | 13 | Premature food-carrying. |
| 509-515, 516-523 | 14 | All day, Eggs hatch. |
| 509 | 14 | Dawn calls. |
| 517-518 | 14 | Egg 3 hatches, 1433. |
| 519 | 14 | Another egg hatches, 1705. |
| 520 | 14 | M5s, brings food for first time; too big and 54F eats it, 1736 . |
| 522 | 14 | Another egg hatches, 1940. Last egg unhatched. |
| 527-531 | 15 | 54's feed. 4-1/2-hour watch. |

## Paix 57-3

$\left.\begin{array}{lcc}\text { Page } 527 & \text { June } 15 & \begin{array}{c}\text { Last egg hatches by 0746. }\end{array} \\ 532-540 & 16 & \begin{array}{c}4 \text { nestlings, 4 1/2-hour } \\ \text { watch. }\end{array} \\ 543-554 & \begin{array}{c}3 \text { nestlings. Noon at- } \\ \text { tentive period over } \\ \text { hours. 5 1/2-hour }\end{array} \\ \text { watch. }\end{array}\right\}$
$629-630$
633
635
$636-637,639$

640, 642
651-652

665
670

673
681

688
697
703

706

713-715

741

June $23 \quad 57 \mathrm{~F}$ banded. She broods at night.

3 young fledge by 0730 . 575 may return to nest.

57's tend, display.
57 F tends.
57's tend. Young wipes bill, turns head to sleep.

57F tends. M57 sings.
M57 tends young with l/2- to $3 / 4^{\prime \prime}$ tail.

M57 sings.
57's tend. Young has 1 l/4" tail.

57 F tends.
M57 tends. Strange male seen.
$57^{\prime}$ s tend.
57 's tend only young seen.
N57 tends nearly grown young, $13 / 4^{\prime \prime}$ tail, no yellow. It pecks gall.

M57 tends 2 together for first time, may try to induce them to follow. Young full size, trace of yellow.

57 's tend all 3 together. Little yellow on breast and wrist. Details on behavior.

Silence.

| Page 753-754 | July 15 | M57 tends 2 or 3 young with only trace of brown below. 54S, 54Y with 57 's. |
| :---: | :---: | :---: |
| 778 | 17 | Not found. |
| 789 | 19 | No 57 's found. A male sings E of T57. 54Y and 54S together on T57. |
| 864-865 | 24 | 57's not found. Molting pair with 5 -day old young discovered E of T57. |
| 936 | 31 | 57's not found. |
| 941 | August 4 | " |
| 948 | 8 | " |
| 963 | 14 | " |
| 965 | 15 | " |
| 970 | 18 | " |
| 976 | 21 |  |

Paix 58

Page 209

486, 489

492
495
508
523

526

540
541

543, 554-555

565

May 13 M58 (probably) sings
on III.
M58 sings on territory on III.

M58 sings.
"

Silence.
M58 sings.
"

Nest with 2 small nestlings, 1 egg found in elm.

11 Nestlings alive, egg dead.

58 F banded.
58 F at nest.
"

Experiment with mounted male Cowbird at nest. Strange male watches.

Experiment with mounted male PW.

M58 banded.
2 nestlings removed, released on T53 with M53 watching. Egg contains 5-day old embryo.

58 F disappears for good. M58 sings.

M58 sings as though unmated. Young $58^{\prime}$ s not seen on T53.

## Pair 58-2

| Page 573 | June 19 | M58 sings. No sign of young 58's on T53; clearly they were neglected. |
| :---: | :---: | :---: |
| 588 | 20 | Silence. |
| 599 | 21 | " |
| 624 | 23 | " |
| 629, 630 | 24 | " |
| 632 | 25 | " |
| 651 | 29 | " |
| 713 | July 8 | " |
| 843-844 | 23 | M58 appears on T60 at $60 F^{\prime}$ s nest. |
| 973 | ugust 20 | No PW's found on T58. |


| Page 84 | May 2 | A male, probably M59, on territory on IV S. |
| :---: | :---: | :---: |
| 127, 128 | 5 | Male and female together on IV $S$. |
| 180-181 | 10 | M59 sings near pines. Two abortive nests found in same maple. |
| 191 | 11 | Silence. |
| 213 | 13 | A few songs. |
| 230, 231 | 16 | " |
| 272 | 20 | Silence. |
| 284 | 23 | M59 bathes in stream. |
| 587-588 | June 20 | M59 perhaps seen. |
| 632-633 | $25$ | M59 accompanies 59F to nest in elm. |
| 635, (641) | 26 | $59 F$ incubates 4 eggs with 7 -day embryos. Possible earlier nest found. |
| 637-639 | 27 | Eggs removed at 1110. $59 F$ deserts at 1348 . |
| 640, 641, 641-642 | 28 | Pair together at 0930. 59 F building in dogwood at 1700 . |
| 643-651, 652-656 | 29 | All day. 59 F builds. |
| 657-665, 666-667 | 30 | " " |
| 663-664 | 30 | Snapping sound during male-female encounter. |
| 668-670 | July 1 | $59 F$ to nest 3 times in 3 -hour watch. |
| 671-673, 676-678 | 2 | All day. Egg 1. 3 more attentive periods by 0800, 1 at 1128. |

Paix 59-2

Page 672

682-683

684-687, 688-689

July 5
$59 F$ works on rim. Recapitulation of her earlier nests.

Egg 2; laying watched. $59 F$ has not returned by 1200. 5-hour watch.

All day. Egg 3. 4 scattered inattentive periods. No return during rain. No incubation at night.

All day. Egg 4. Incubation.

Premature food-carrying.
Incubation.
Incubation. 4 I/2-hour watch.

Premature food-carrying.
All day. Incubation.
Premature food-carrying.
Incubation. Egg 2 probably falls out of nest during day. 4-hour watch.

Premature food-carrying.
Incubation.
All day. Incubation. 3 eggs; egg 2 below nest.

Premature food-carrying.
Incubation. 4 I/2-hour watch.

Incubation.
All day. Incubation.
Premature food-carrying.

## Pair 59-3

| Page 759-768 | July 16 | All day. Eggs hatch. |
| :---: | :---: | :---: |
| 759 | 16 | Premature food-carrying. |
| 765 | 16 | Egg 1 hatches, 1534. |
| 768, (769) | 16 | Egg 3 hatches, 1954. |
| 769-777, 778-781 | 17 | All day, 59's feed. |
| 771 | 17 | Egg 4 hatches, 0714. |
| 772 | 17 | M59 may feed at 0757, the first time since hatching began. |
| 774 | 17 | M59's throat is molting. |
| 782 | 18 | Brooding. |
| 790 | 19 | M59 feeds. |
| 795-798, 798-799 | 20 | Nestlings banded, returned. $5 \mathrm{l} / 4$-hour watch. |
| 815-820 | 21 | All day. 59's feed. |
| 821-838 | 22 | " " |
| 826 | 22 | M59 sunbathes below nest. |
| 829, 831 | 22 | 59 F grooms nestlings. |
| 837-838 | 22 | 59 F broods all night, beginning very late. |
| 855-864, 865-868 | 24 | All day. 59's feed. |
| 858 | 24 | 59 F grooms young. |
| 810 | 24 | M59 may sunbathe at nest. |
| 869-877 | 25 | 59's feed. $51 / 2$-hour watch. Usual nestling behavior and scratching. |
| 874-875 | 25 | Young climb almost to rim. |
| 888 | 25 | 59 F does not brood at night. |


| Page 890-893 | July 26 | 3 young fledge between 0645 and 0829. 59's banded. M59 loses some of tail. |
| :---: | :---: | :---: |
| 915-916 | 28 | M59 tends N of nest. |
| 936 | 31 | M59, in advanced molt, tends 59G. |
| 937 | August 1 | M59 tends 59G; others not found. |
| 938 | 2 | M59 seen. |
| 939-940 | 3 | M59 tends 59G, its tail $3 / 4^{\prime \prime}$. Strange immature present. |
| 943 | 5 | M59, molting primaries, tends. |
| 944-945 | 6 | M59 tends 59G. 59F, not molting, and other 2 young present. 59Y's tail nearly $2^{\prime \prime}$; no yellow on breast. |
| 946 | 7 | M59 tends 59G, full size. |
| 947 | 8 | N59 (2 rectrices) tends 59G, with traces of yellow on wrists and breast. |
| 950 | 9 | M59 tends 59G (marked yellow V), may try to induce following. |
| 952 | 10 | Not found. |
| 955 | 11 | " |
| 958 | 12 | " |
| 960 | 13 |  |
| 961, 963 | 14 | No $59^{\prime}$ s. Strange immature chases Field Sparrow. |

$$
\text { Paix } 59-5
$$

| Page 966 | August 16 | 59 's not found. |
| :---: | ---: | :---: |
| 976 | 21 | $59^{\prime}$ s not found. Post- <br> molt female on IV N. |
| 983 | 24 | 59B found twice on II, <br> in full plumage. |
| 995 | September 1 | 59Y found on II. |
| 1004 | 12 | No 59's on II. |
| 1007 | 14 | No 59's on II. Two <br> immatures present. |

## Paix 60

| Page 620 | June 22 | M60 possibly seen on T53. |
| :---: | :---: | :---: |
| 622 | 23 | " " |
| 629 | 24 | Silence on XI. |
| 631 | 25 | M60 on XI, meets a PW. |
| 634 | 26 | M60 holds XI (old T55). |
| 637 | 27 | Silence. |
| 641 | 28 | " |
| 652 | 29 | " |
| 666 | 30 | " |
| 674 | July 2 | M60 is near a female. No informative behavior. |
| 680-681 | 3 | A few songs. |
| 703 | 6 | Silence. 1997 |
| 704-706 | 7 | Pair together. 60 F followed at length. Third PW present. |
| 715 | 8 | No $\mathrm{PW}^{\prime} \mathrm{s}$ found. |
| 719, 721 | 9 | Nest found in dogwood, 60F on 3 eggs. M60 sings. |
| 722-727 | 10 | All day. Incubation. Very little singing. |
| 733 | 11 | Incubation. No songs. |
| 736-738 | 12 | Incubation. No songs. 4 -hour watch. |
| 740 | 13 | Incubation. No songs. |
| 742-750 | 14 | All day. Incubation. N60 has disappeared. |
| 754 | 15 | Incubation. |
| 777 | 17 | " |
| 782-788 | 18 | All day. Incubation. |

Pair 60-2

Page 789, 790
791-795

800-815
839-854
843-844

846-847

847-848

848
878-888

882

893-894

895-907

908-915

917-926, 927
923

928-933

931

28
July 19 Eggs hatch by 1813.
20

21
23
23

23

23

23
25

25

26

27

29
29

30

30
3 nestlings. $41 / 2$-hour watch.

All day. 3 nestlings.
All day. 3 nestlings.
60 F invites coition from unseen male. M58 then appears.

Unbanded male near nest, looks at 60F.

M53 (molting) follows 53 F to nest tree.

A male comes to nest tree.
All day. 3 nestlings. 60 F broods at night.

Unseen male sings near nest.

60 F (contour feathers molting) does not brood at night.

All day. 3 nestlings. 60 F does not brood at night. Young call. $60 \mathrm{~F}^{\prime}$ 's method of holding larvae discussed.

3 nestlings. Behavior. 6 -hour watch.

1 nestling temporarily on rim .

3 young fledge between 0753 and 0815. 60F, 2 young banded.

Young on rim bobs tail.

Pair 60-3

Page 935

937
938

940
945
946
948
954
955-956
958

960
963
965

971-972

973-974
977

979-98D

987

July $31 \quad 60 \mathrm{~F}$ tends young 80 yards from nest.
$60^{\prime}$ 's not found.

27
"
$"$
"
$"$
8
10
11
12

13
14
15

19

20
22

23
,

60 F tends 3 young with broad yellow $\mathrm{V}^{\prime}$ s.

60F, tail not molting, tends young with nearly fully yellow breasts.

60 F tends all young.
60 F , molting little, tends young with trace of brown on breasts.

60 F tends. Young all yellow below. Details.

60F, messy but tail not molting, tends young just at full plumage. Strange immature with the 60's.

## Paix 60-4

Page 993

1013

August 3160 L and strange imatures seen.

September $1 \quad 60 B$ seen alone, then with siblings.

60B with unbanded immature on $V$.

Post-molt male with other warblers on T 60.

60 F seen in 5 ; her central rectrices are 1 1/2"。

## Warch 37, 1956

A sunny rather brisk day; temperature about $57^{\circ}$ at the Whest aptor a frost last nitht. Present froil 2500 to $\mathbf{2 7 0 0}$, but arly about half the time spent on $V$.

Host or all study this year will be done on $V$ and the land surroundins it. No disturbance is planned, I've discovered; I note eicht dogroods have been ramoved and a truck has driven through the open arees, but this mill not afrect Pils.

The aspect of the arca is still as in winter; spring is late so far. On close inspection a fev redluds can be seen to be buadtut, and some chomiles short smath leamouds. Dirds seem scarce too: a Tornee calls, a Cardinal sings, and 13 Crows $12 y$ over. Ilo Piold Sparrows jot.

At the edge of standing wator just to the $S$ of $V$ are the tracks of racoon and fox. I Ifind fox droppings of the area; the don Iooics to be In use. I soare up a rabbit.

A pait of Bluebiris sits in the SE Iocusts, then goes SE to the His trees. A pair in our yend has bsen fuilding slowly for 17 diys. I see no doves; the spectes has been nesting for 10 days.

$$
1700-\text { I I eave. }
$$

## Apeil 1, 1956

A sumpy day rith a slight overcast at times; the varmest day so $\mathrm{Aar}, 72^{\circ}$ at 1200 ; gusty STH wind. Present from 1315 to $71 / 75$.

Boricits Virere and Field Sparrows amived last night. Sevoral Field Sparrows were in our jard, one sang in the meadort, and tro are on V . These are the first Irve seen this year.

A Torthee calls in IE $V$ and the clearing. A Cardinal sings thare ind another sings at the $W$ edge.

$$
1455 \text { - I leave. }
$$

## Aprif 2, 1956

A warm rainy day with showers intermittently from 0830 to 1500; then clearing a lititle; temerature in mid-70rs. Present from 1630 to I730, CIII; note that Bloomington went on daylight time as of today and all tines hereafter vill be on that basis.

Brom Thrashers cane in last night; two heard betreen our yard and the remaining shed. Tho Bertick's wrens are displaying in the tancled trees If of the mursery. Cowfirds are active and noisy in our yard.

On $V$ a Cardinal sings in the middle of the $\mathbb{I}-\mathbb{V}$ multifiona hodge, then one from the center on the $\mathbb{N}$ end; may be the same male. A. Field Sparrow sings in the SE comer.

Tho Great Blue Horons Rly over about 150 yards apart, calling. A pileated calle in the woods to the 15 and $\mathbb{E}$. A Field Sparroir sing in the central locusts. A Corbird whistles once in the aspen voods to the $\mathbb{Z}$ on the edge of $V$, the first I've seen on the area.

Agpens have full-sized caticins and tulip trees have leaf buds. Antennarin stans are one inch high. Blackoarry plants (some) have $3 / 8$ such 1 oaf budis.

Thro Gardinale sing at the edge of the If roods, one in the IVE, one the center. Thro Red-bellies Fl y onto V from the 17 . A , Torthee calls on the $W$ edee. A Cardinal sings in the SIV comer and a Titmouse does the same.

```
    Tho llemilit Tlurusiog near old T, a groundil hog in a bfinc
hola of the firgt tee.
```


## Apri1 3, 1956

A cloudy day after apparently heavy showers from ahout 2l:00 on last 112 ght; clears a Iititle at 7100 , lut strong SIt wind contimes; tomperature in the mid-705. Present from $7 / 30$ to 1530 .

Tho Bluebird femal a using our nest bou Iaid hor first ege since jestarday afternoon at 1800. Birds are quite active todig.

Field Sparrows are the only conspicuous singers on $\nabla$ : one in the S center of the E half, one in the ItE corner, one in the SII comer. The IV hate my hold othors.

Ilo other dovelopmenis. On the way in I find mammal tracke in the ma near $\nabla$.

$$
1530-I \text { leave. }
$$

(Oon Remale Bluebird was on the nest at TH00.)

## Aprin. 4, 1956

A sumpy day after a rain late yesterday afternoon; strong wind in gusts, predominantly from the W; temperature in the wid-50's. Present from 1330 to 1500 .

Fert developments. A dragon fly is the year's first. Field Sparrous arentit singing more today, presumakly bacanse the rind is so strong. I emplore across the valley to the SE of $V$ but find no suitable PN tarritory.
1500_- I Ioeve.

## April 5, 1.256

A sumny day with the ternperature in the mid-70's and 1ittle wind. Present from 0815 to 0930.

Field Sparrows sing, probably foum on V . Other conspicuous binyors are Gardinat, Towhee, and Tufted Titnouse. The yourts first matcatcher calls in the woods nent to the enclosed claaring. First For Sparrow on edge of V. Dragon flies. The shiny crataegus (the one tre don't have) has $3 / 4$-inch leaves.

I cut three poles for यु blind.
Gowisirds are noisy. A male flies over toward the -, passing well over and beyond V. Then I soe a male Corflixd in the contral locusts; it calls. A female flies high over, turns a 2ittie tormard hin in faight, poes on 300 or more yards $\mathbb{E}$.

Later there are two males and one Cemale in the top of a tree in the woods $2 \mathbb{E}$ of 7 . A male flies and the remaiving one bows, ralties, thistles at the fomale. She soon plies to the ton of a tree 40 yards to the $S$. In a minute I hear a rattie, sounding as though It comes from the fomatets direction. She Clies over and the male chases her at least 100 yarde 17 beyond the Iititie clearing (hereafter XI), staying 10 yords bohind her. A ferr minutes later, a pair flies reftiling beotr to KI.

On 敢 wey home I seo a flock of 12 Vesper Spernours; some bing when clughed into treos from brook sedge.

$$
0930 \text { - I I leave. }
$$

## April 6, 1956

Sunny in the afternoon after a threatening morning; temperature in the mid-70's; mild SW wind. Present from 1615 to 1730.

I note the redbuds now all show deep red or purple bucs beginning to develop. A Chipping Sparrow sang near our yard today and a Swallowtail flew by.

On $V$ there is nearly complete silence. Note the possibility that Cowbird searual activity is most intense in the early morning.

Onatcatcher on XI. Mourning cloak on V, but I've seen it elscwhore earlier. A mass of tent caterpillars beve hatched and spun a tent in the Cork of a ten-foot cherry.

1730-I Ieave.

At home I see a female Cardinal carrying nest naterial. Rubycrowned kinglet in the yord.

## ADPil 7, 1956

A cold day with the temperature in the mid-30r s , snoving occasionally, the wind very susty and strong from the 1 mit. Present on the golf course area for 15 minutes from 1545 to 1600 . The snow and trind are so violent that it is out of the question to see एW's, even if one had arrivod prematurely, so I dion't stay out.

## Aprit 8, 1956

Another cold gray day after a Preeze (ca. 300) last night; whind moderate from the $1 T H$ and tenperature in the mid-30rs. Present from 1/00 to 1500 .

Mridontly the freeze did no great ham, though all groen horbs wrere on thotir sides this morming and looked bad.

I spend the time mensuring poles for a blind, see and hear nothing.

$$
1500 \text { - I Ieave. }
$$

## A0xi1. 2, 1956

A more moderate day with sun occasionally and little Wind; tmporature in the 30 s Iast nieht, in the 50\%s today. Present from 1630 to 1730 .

A Candinal singe on the $S$ part of $V$ toward the $W$. Later I hear one short Fiald Sparrow song, several Crows, a Meadorlark, no Cothirds. A Pine-trods Sparrou (silont) is on V.

Redloud florer buds are out and fairly well developed but Rowors have not broten trwough yet. Othan ise thore is 2ittie change.

$$
1730 \text { - I lesve. }
$$

## Anri 17 10, 1956

A rainy day all day with no heavy dompour, but never much reapite; temperature in the 50 :s. I was unable to go out.

## Aywi1 71, 7956

A surny dey after 1000 , the tmperature in the 60 's by nid-day; a moderate $1 T W$ trind keeps it from being balmy. Present from 1600 to 1700 .

Field Sparrows have mates - I see at least two pairs on the SE part of $V$ - and not a sonc is to be heand from them. Mo other songs on the study area ercept a clickadeets.

The vegetation has progressed a Iitilie: blackberry tuds are at leset one inch lons; some cherries have one-inch Leaves and look pretiy greon; the pinic cratagus has leaves hanf size; redlud Aloters are just beginning to break out of the buds; the multinora rose hedge around $V$ is quite lenfy, perhaps half its final. anount; a colony of may apples at the III cormer has recentiy energed (yestorday?) and is nearly intil stise. A oulpinur butteriny ilies by.

A Cardinal sings. Fence lizard, मy Cirst. Rabbit.
Nole hinis. Dove sings 11 of 7 , not on it.
Box elder is Morering and has one-inch loaflude. I find Racoon tracks in the mad just $W$ of $V$.

$$
1700 \text { - I Ioave. }
$$

The vogetation in torm is a good doal farthor alone, especially tho troes. I..., maple and gur buds are quite green.

## April 12, 1956.

A clear sunny morning aiter a clear night; temperature in the 70 's most of the day but cooling a little about 1500 when It clouds over; it clears somewhat at 1545 ; 11 wi wh modorate. Present from 1500 to 1700 .

On $V$ a Cardinal sings and I squeak up two Field Sparrows ripht togetier; not a sound from any Field Sparrows on $t$ he area. Rabbit.

No perceptible change in the vegetation since yesterday. Antennaria is 2 inches high and achillea and penstemon foliase are prominent on the ground.

The weather is so promising I had half expected Pil's to be $4 n$. A loftlo sang in the yard this morning, Cowbirds were quite noisy (silent now on V), and Chipping Sparrows seemed to be mgrating.

A Field Sparrow sings weakly in the X pines at 1600 . A Cardinul, alnost surely fonale, has been killed is the top of a Pive~foat red pine. There are many feathers and the bill still caught in tho needles. Droppings below the spot are extensive and 13ke wiiterash; I'd guess the predetor was surely a birc.

I find opossum or ground hog tracks, otiers I can't
identify. Racoons are nunerous to judge by their frequent tracks. (This remained true all sumber; racoon tracks anpeared along

$$
\frac{15}{4 / 12 / 56} \underset{\mathrm{VII}}{ }
$$

streams. Opossum, or ground hog, wasn't so conspicuous later.)

$$
1700 \text { - I Leave. }
$$

## A2.27. 73, 1956

A fine sump morning after a cool night in the 301s; it will eanily hit the $70 \mathrm{t}_{\mathrm{s}}$ todey; mild H brooze. Present from 0800 to 1000 and Prom 1700 to 1800 .

As I pass the revino I hear the frear's firgt mator-timish.
0015 - I reach $V$. There are many tracks in the solt bare oarth S of the anea, prohaitiy no more then two davs old. Hone dtefer fromt those already found.

Govtirele are noisy, Eying over $V$ and to the tops of the bid trees IV and SE of it. I'd say there are 12 at various points. The anIy chance I have to seo ser is in a Nock of five, with three moles.

Miold Sparroirs are ginging this morning, though It guess not In the moumt that the mano binde wing wive a for deys from nort. I geo tro in rather tiolent, filent plysical contact on the ground, a third matching. A fort seconds Iater tro of the three are hopping 2l onf quictly on the mound vithin a foot of each other. The three are soen acair, thon trio gemarate oub and hop together.

Mtitico ame notiry to tho H, at least thro. Also singing are Cardinnels, but not on V; tho same poes for a thrasher to the SI. Now a Caritnme sings on $\bar{T}$ near tho pines. Inaticatohers catl In the roods imodiately to the $\pi$. The Fierd Spamert enoounton continues. It seans clear that one ind (nale?) is thrying to in-
fringe on a pair or its termitory
Redbud is beginning to turn pink as the flowers come out. On $\nabla$ the little tulip tree leafbud scales have turned back, but there is not much green. In the big trees in the If woods, however, small leaves are out and the tulip trees show green.

At least two Grows land on $V$. The gnatcatcher is now out in the field. I hear a Robin calling on the area, then on $X$. There were many lacevings at our lighted window last nigint.

Some sassafras trees show large round leaf buds, others none. Black locust leaf buds are just appearing on the branches, about I/8-inch Iong.

After one hour on V, I go on S to see if I hear anythine on the remmants of the orchard or of III.

A second Louisiane Natex-thmon sings from the orchard ravine, so last night's arrival must have been general.

Mo sound of a Prairio Warbler.

$$
1000-1 \text { leave. }
$$

1700-I rotwrn. It is in the $70^{\mathrm{t}} \mathrm{s}$, a cloudless day. V is more silent than this morning, of course; nothing of note seen or heard.

$$
\underline{1800-\text { I leave. }}
$$

A Chinney Srift flew over our yaud this afternoon.

## A20.17 71, 1956

A cloar darm zapidiy clouding ovor; 2i:jutning Rlashes far to the SIT; Iititio uind; inperatare 1,50 at 0630 . Presents sron 0630 to 0745 and sron 1530 to 2730 .

Fiold Sparrows are pursuing each othor in the multinora hodee and tuo pairs of Tormoes are engaged in a fight there in the SE corner. Iinally ono pair flites stratifit it along the hedge.

A tunch of Cowtirds engage in evelutione over me; there are 77 Hiris and I thinik all are minles. It ostinate of 12 here pestarday was ions.

A Vespar Sparror Mies up in the PLeld. 1012 restidant apoctos are in frequent song.

At 0730, after one ham on V, I 2eave $3 t$.
It 10 nor quitto gray, thro is a cool, wharp S rind, and I don't dealit it will stomm soon.

0715 - I leave. It is daric vith considerable thundes.
In our gard a lyrillo Nariler and a Buly-cromed Iitinglet aro singling.

1530-I notarn. It was cloudy all moming after 30 mirutos of rain at 07h5. The temperature was in the 50's. At alout 1300 it bagan to clear and is norr beautioul and ramm ( $70 \mathrm{t}_{\mathrm{s}}$ ) athouph quite a guoty a and II vind is iloving.

In the mid a工ont a Iittle creak botween III and VII are Racoon tracks. The enimal mest be mitte comon out heme.

V is rolatively silent, with no ner developmants. Roviee calls are the most prominent some. I wayk over the ared for 30 mimutes or nore, till 1630, then move on to check on IV.

Ilothing found of ary note.

$$
1730 \text { - I leave. }
$$

## Apri1 15, 1956

A cloudy moraing after what must have been a hard rain at nicht; wind steady, If; temperature $50^{\circ}$ at 0615 . Present from 0630 to 0915 and from 1730 to 1815.

Get to $V$ et 0645 . A11 residents singing. See Oowbirds in flocks of three males, two femsles and of two males, two females. At 0720 , six males 11 y rapidly over the area twisting and whistling, are joined and then left by three more neles, then continue for a mimute to f2y around. In five minutes seven fly by, two and then ancthor split off -- all males, very noisy. Presunably all these are the same birds being seen; clearly at lasest nine males. How four nales, three females.

There is a pair of Robins on $V$, although I don't lenow where they are nesting.

Dogwood leaves are juat beginning to come out at the tips of branches.

0750 - I leave 7 and walk over the $S$ end of the farm til1 0915. llothing nev ocours.

$$
\underline{0915} \text { - I Ieave. }
$$

1730 - I return. It is cloudy after a little clear
weather from 1300 to Iheo; temperature in the $50^{\prime} \mathrm{s}$.

$$
\begin{aligned}
& \text { V is fairly silent. No sign of PUI's (or Cowbirds). } \\
& \underline{1815} \text { - I leave. }
\end{aligned}
$$

## April 16, 1956

A cloudy dam and partly cloudy early morning; the wind, in the H a7l day festarday, is now in the W ; temperature $142^{\circ}$ at 0500. Present from $0615^{\circ}$ to $0715^{\prime}$ and from 1700 to 1800 .

On V Field Sparrows are very vocal, the other residents only internittently so. Cowbirds are much quieter than yesterday; occasionally one or two fly over the area or wisistle, but there aro noithor the mass Plights nor the gurgling calls.

I walk over $V$ carefully, seeing and hearing nothing of $\mathrm{PW}^{18}$.

$$
0715 \text { - I leave. }
$$

1700 - I return to V . It is exceedingly windy, from the W and NW , and the temperature hasn't changed moch since morning. During the day there heve been light rain showers and ovon bomo smoti thurries.

There is no activity at anl among birds; it is like vinter. For at least 30 minubes of an hour here, I salk over the area squeaking; not a Fleld Sparrow appars during the whole time.

$$
\underline{1800} \text { - I leave. }
$$

## Apri1 17, 1956

Cloudy, strong W Wind, temperature $38^{\circ}$ at 0600 . Present Pron 0615 to 0730 and frot 1630 to 1730 .

3lo activity of note. Field Spamows and Cowitirds, the trio most conspictous specios on $\nabla$, are sintins and Cortiris occasionally Mying; but the tamo is mouch slowed by the woather. Once
 as if they have divided into pairs for the chase.

$$
\underline{0730} \text { - I Ieave. }
$$

1630 - I return. It is still cold, with a strong $W$ wind; the 6 perature is in the $40^{1} \mathrm{~s}$.

In one hour I see and hear nothing on V.

I730-I Iemve.

## Axpit 18, 1956

Glear at dam, rolativaly calth and uith only a rild IWI vind, temerature $38^{\circ}$; as it gots 75 itht the wind rises someWhat, and it becomes eloudy by 0900 . Present from 0630 to 0730 and with Jon Rickert fron 1530 to 1700 .

Q630 - Residents are tinving on V: Rield Spamorr, Carilinal, Towhee, and noar the woods, tithouse, olvickadee, guatcatchor. Coricirds are present too, orly internittentily notion. Illo sign of a PM.

During the hour a male Narsh Havik cones over very lott, a. IVcthe Warbler calle, I see a Paly-cromed ISinglót, and a Hernit Thurush nakes a secies of chat-7ike noises in a locust thicket.

$$
\underline{0730} \text { - I Ioave. }
$$

1530-I I tum and moot Rickert. It is cloudy with a IVI vind, temperature alout 500 .

In 90 minntes exploring 071 of $\nabla, X$, and XI, we see and hoar nothing of the varhlers. Asout eight Hermit Thrushos. Rncoon trackes at the strean B of VII. We also see mumarous tracks of tho mamis I've seen mary signs of; I'MI identify them later.

$$
1700 \text { - We leave. }
$$

A completely stitl, cloudless morning after a nifit of froezing tomperature; there is a heavy frost and pudiles have ice over then; no vind; tomperature $34^{\circ}$ at 0600 . Present firom 0700 to 0915 and from 1300 to 1500 .

A Whiterthroated Sparrow sings in our yaed, the Lirst, so thare vas a migration last nifht.

At 7 I can hear Hoadoviank, Gerdinal, Field Spamon, Mickar, fituouse, Oowbird, Crow, Dorny lioodjecker, chicicadee, Rod-belly, Ruly-cromedTinillét, 7rom Thrasher (coming to $V$ from the S), Torkee. Thare are at least tho linglets, one Coldencromed in tho S pines. Tho timasher aines at the top of the SE Iocusts.

At 0800 it io varning up fast. Oorbirds finy over, four malos, throo fameles, in one of thair ueual Mights that som to have courtaitin sionificance.

0015 - I move on torard the 11 part of the farn area, I and IV.

OOL5 - I leavo.

1300 - I retum and cover V, the orchard, III, II for two hours; nothing of note. The urind is in the V , the sly partly cloudy since 1200.

## Aprit 20, 1956

A clear vindless darm; tomperature $37^{0}$ at 0530. Present from 0530 to 0800 and from 1600 to 1715 .

The puddles of water S of $V$ are covered with ice when I exrive. Ho PMśs present.

Brom 0530 to 0630 there is a procession of Coubirds, a sun7ler mumber of Red-rings, and a forr erackios, all flying about 75 foet (?) hith and moving steadily Mats. Wo flock contains more than a out 20 biris and most hatre perhaps 10. There are occasional calls.

A fastile Warilet calls on $V$.
I set out to count the pairs of Oardinals actually using V itonif. There is one in the S conter and T , one in the 1 lf center and $\bar{V}$, ane in the SE. I see no more. A female I an vatching trice glinge a full sore.

The rogetation has mot aivanoed much. Redibud is just conting into full Mower (not yet in from Co.) and dogroad floners are amall and groen, juat boginning to open. Oharry trees are Pinely leafed out and show some grean. Locuat and IVacktomery are not peroeptility advancod since 所 last description.

171 resident hirds are very noisy despite the cold.
QBDO - I I leave.

1600 - I return. It is sumin and clear with a faikiy brisk ITH wind; the terperature is $54^{\circ}$, and it hasn't been mich higher today.

V is Vary silent; only a chicickadeo sings in nearly an hour on it. I wall it back and forth mony times and see mo sifm of a PM (and not baty of any other tird.).

A Red-tatiled Hanic soars over.
llote the silence of pairod species Iike the Field Sparrows at this how. Hote too that the Pif rieraition, though a
 boen littlie movenent for ovor a weel.

There is a Iititle Field Sparror calling at 1700 and a Garditul. ninge at a distance.
2715-I losve.

## April 21, 1956

Clear and still at dawn with a $S$ wind rising soon afterwards; temporature $39^{\circ}$ at 0600 , rising last. Present from 0600 to 0800 and with Duane Carmony from 1300 to 1500 .

On $V$ for 75 minutes there are no PV's. The only signs of migration are a singing Black-throated Green and a Hystle (with perhaps a singing Baltimore Oriole). The lyrtle at 0615 called several tines, flevs $S$ about 10 yerds toward me, and then took off on a Iong hich flight straight 11 , mounting as he went and evidently micrating.

There seems to be a fourth pair of Cardinals, in the 175 center.

I cover the IV area and on II without hearing anything. 0800 - I Ieave.

2300 - Camony and I return. It is cloudless with the temperature in tho $1 h^{-1}$ th $60^{\prime}$ s and a strong Hi ant SH wind.

Intwo hours of walking over the farm, most of the time on V, we see only a Hyrtle Warbler (i.e., the only small migrant). Host residents are eltozether silent. An Osprey Rlies over. We flush a Bachman's Sparrow on X.

1700-We leave.

Sue and I and the kids listened carefu2ly at Morgan-Honroe at 1000 and heard nothing.

## Apri1. 22, 2956

A noarly oloudles dam, comletely tindless; temparature $148^{\circ}$ at 05'30. Progent from 0600 to 0830 and from 1330 to I1 130.

Thro adblt and ono imatime Black-cromed 1iight Harons My up fron V, wro in the thite pincs and ono in the fiold or a Zor tree.

I soe four fomble and throe male Combivis togotices, the nost fomales Itve surely idontified on the area. Rive males soen Intor.

There is a smanc hobin movmant at 0615, six or seven Wirds. Nito the ieterinis are i2yint over as on Anvil 20 hut not An the same mumbers or on such a regular course.

Goldeinches ere rather noisy, the first this yoar hore cemt for one or two. nying over.

Thero aro Pave Field Sparrows singing in the miltimora romo haite from Iz to 17 .

Thiseo fermle and four male Cotibiris in the fou den tree.
Nore then one "isite-throatod Sparrou are in the pines in the SII corner. These my be the yoarts first (I could have been wrong in thinteins I heard one in our yard).

I've seen at loast three Townee males this morning'in the SVI, the $1 \pi H$ and the SE comers.

0652 - About 15 Semale Redrines or Cowbirids My over fact and low, going it ( 40 feet high).

0720 - $A$ Warbling Vireo, possibly tuo, is singing
on XI. I see one and satch hin. Once he calls rather like a Rod-aye. A ferr mimutes Inter a Red-eye singe a for noteo in the moods $\mathbb{I}$ of $\mathbb{V}$. Both these are the yoarts first.

Opho - While Irm in the kield $S$ of $V$ a brid Mies
over toward the 3, about 801 foet high. It looks as if it may be a PTV.

I cover the orcliard, III, I, and IV S. Several
Warbling Viroos are singing. On IV S a young night heron Inuthes from tien rye grass.

0830-I leave. At this time a brisk in/ wind rises and the sly borins to fet hazy.

At homo a Tharizing Vireo is singing. Val and I drive to the Yoryan-Nomroe PW areas and in about 20 misutes fran 0920 on hear nothine. It is stiol varm and somentat sumpy.

$$
1330 \text { - I return. It is ifaly and cloudy rith a } 10 \pi
$$

rind; the temporature is folling and is in the low 60rs.
On V I see a Suram Sparrour at the for den; othervise
nothing. Whan I zeave it is just beginning to rain, and a light rain contimics most of the aftermoon.
I430 - I leave.

At night it is parily cloudy, the moon sometimes visilile. The vind is statl in the $\mathrm{w}^{\text {II }}$.

## Apri1 23, 1956

A sunny still dasm with a very heavy frost and quite a Ground mist; temperature $30^{\circ}$ at 0530; there is ice on the puddies and in drops on the trees and other plants. Present Prom 0600 to 0730 and from $15 \% 5$ to 1700 .

On V I find a number of (flive or ten) Euby-cromed. Kinglets, several singing White-throats, and to the If two Myrtles. Ho Pit's. At $0625^{\prime}$ about tive warblors P1y over Iow calling frequent17. One actually lands a minute before going on, but in the mist I con't see it woll. The calls are unrecognizable. About 100 icterids ily over during the hour following daw; nearly all are Coubirds and Reduings going S.

$$
\underline{0730} \text { - I leave. }
$$

1545 - I return. It is partily cloudy with a $W$ wind; temperatare $58^{\circ}$.

Both III and V are silent; I hear fert bird songs of any aort. On III S as I 10 tre about ton Myrtle Farblers and tivo or Ghree Goldon-crommed Kinglets.

$$
\underline{1700} \text { - I leave. }
$$

## April 24, 1956

A clear dam aftex a partly cloudy night before midnitht; moderate $W$ Wind; temperature $36^{\circ}$ at 0530 ; dew and frost. Present from 0600 to 0715 and from 1500 to 1645 .

A Ifyrtile Narbler is in the SW corner of V. Bob-Hbites can be heard from but not on $V$, and this has been true for two days. I thought I heard a Tarred owI two days ago and forgot to note it. Thare are several kinelets, both apecies, here. I see and hear nothing else.

0715 - I leave.

1500 - I return. It is sunny and nearly windless; tomperature in the $n\left\{\mathrm{~d}-\mathrm{cot}^{\mathrm{t}} \mathrm{s}\right.$.

Val and I spent 15 or 20 minutes on PW grounds at Horgan - Momroo at I1I5 and heard nothing.

1530 - I Dogin insect collecting to see what I can Iearn about PV food. Today in excellont, warm conditions I make the followine sreeps, with results indicated:

Deneral herbs and iield cover, mostly dead; five sweops; nothing taken.

Flowerting dogrood, leaves just amerging at tips of branchos; ton sweeps; nothing.

Black cherry, Ioaves half-sized; ten sweeps; three
animals, probably flies and a spider.
White pines; ton sweeps; many animals, perhaps 30 , Charmid
mostly an adult homopteron (probably) and a few flies and a
neuropteron.
Wirginia pines; ten sweeps; about ten aninals, mostly the homopteron and a $11 y$ or two.

Broonsedge; ton sweeps; three animals, two flios and a spider.

Sweeps were made all over the $S$ end of $\nabla$; no tree was swept twice; heights did not exeed 70 or 71 feet. I consider the results very meajer. Hote that a few more conspicuous insects nay be seen flying about; butterflies, an occasional grasshopper. Ants are comparatively numerous.
$\underline{1675}$ - I've covered the area and heard hardly a song of any sort in over an hour. I cover $V$ for 15 more minutes, $t$ an mile s20:1y torerd home.
$161.5-I$ leave.

## Apxil 35, 2956

A cloudy moming aiter a haty nicht; cool, tith a brisk SE unind, tamerature lu 40 at 0530 and only a fer darmees highor throurghout the day. Present fron 0600 to 0800 and from 159,5 to 164.5.

On V I see only the resident species and hear very fer songs, oven from Fiold Spacmorts and Gaxdinals. At 0625 I see tro Fiold Sparroivs fi fiting, locked together and occasionally funiling a fer inches witiin an area about a foot or tro in diamoter. One somen to have e chonr aitrantare; it hold the other tith its clavs and had the feathers of the othert's neme in She bant. Plopping about was sporaitic. A third bird, presurably a formio, sat perchod six inches hifth and 28 inches aray. The fighters were silent during nost of the nimute that the fichit 1 arted, but ocensimally a pote like the Tolinee's "buzz" vas fiven by one (t don't fenor whicit). Then the plyysicieal contact broke off, the thiree Mier arrey about 15 or 20 yards and I lost than. In tho Mifint I'd guess the "loser" uras first, the other Mohter neat a fer foot back, the spectator a for foet behind; thio may bo my thaginstion.

At Least two Xellow-hliroated Vireos are on III; a Ser mimutes earnior I thouefit I hoard ono phrase of the song. Ilyrties aro sinfing hore, perhaps tro or three. A Thip-poor-rith Mies up
from the provind.

$$
\begin{aligned}
& 0775 \text { - I leave V. } \\
& \underline{0000} \text { - I loeve the farm. }
\end{aligned}
$$

At aboat 2300 it boging to rain Ii hitly but sibacitig. This con-
 adranose the leafing out of treas.
25.5 - I retum in the rain. The itporature is 500. I see nothens of note and hour littile.
$1015-I$ Ieave.

Vat. sast a IJue Jxy cany nost morrial todsy; I thought I sair


## April 26, 1956

A hazy morning within an inch of raining, gray and still; temperature $52^{\circ}$ at 0530. It rained heavily last night till at least 1900 but not until 2100. Present from 0600 to 0900 and from 1630 to 1800.

A Frown Thrasher sings steadily from the central locusts on V . Four Cowirds, two males and two females, sit together in the trees above the fox den. A White-throat sings, as do all the birds this morning. A squirrel calls just $\mathbb{E}$ of V . A Pileated flies over $\nabla$ from B to W .

At 0745 I go to II and III. On II, three Crows mob a Barred Owl, which flies out finally to the woods E of the orchard. He flies about 20 feet high. One Crow twice hits him with considerable force.

I see two female Towhees fighting.

0900 - I leave.
There is a Catbird singing in our yard.

1630 - I return. It has cleared up, and from about noon on some sun has shone. It is now quite sunny.

On $V$ Golden-crowned Kinglets and Goldfinches are conspicuous.

$$
1800 \text { - I leave. }
$$

## April 27, 1956

A nearly cloudless daw after a warm, hazy night with a moon that soon will be full; S wind all night and again during the morning; temperature $60^{\circ}$ at 0530 . Present from 0545 to 1145 , with Rickert from 1345 to 1700 , and alone from 18145 to 1945 .

PW's and many other species arrived last night: Wood and Olive-backed Thrush, Aroad-winged Hawk, Grasshopper Sparrow, Yellow-throat, Blackburnian and Nashville Warblers, Indigo Bunting, White-eyed Vireo, Scarlet Tanager.

Arrive on V at 0550. At 0608 I hear a harsh chatter sikid on the $\mathbb{Z}$ half, near the $\mathbb{N}$ locusts. I can't find the PN.

0623 - I hear calling and see a very well marked male for 20 seconds in a hawthorn; I lose him.

0628 - I see a male and to my delight find it is banded, red over silver, right leg (14 52 of 1955, M 55 of 1956). It is approached within 5 feet by a second male after 30 seconds; they fly five yards; the banded male loses and both disappear. Still no more songs. The males have been five feet or less high, and 5 the action has all occurred between the SE locustis and the grove tmedtately .i.t. The males have called several times, "chick."
(For descriptive purposes, V will be broken up as follows: The locust plantings will be numbered from 1 to 5 , with 1 the SE planting, 2 the long narrow $\mathrm{N}-\mathrm{S}$ grove to the IWW of 1,3 the little grove $S W$ of 2 and $S$ of the fox den, 4 the long $N-S$ grove just $W$ and

N of 3, and 5 the N-S grove $W$ of 4 and $E$ of the pines. The rather open field in the $N E$ corner of $V$ is the pine field; $W$ of it is 2 . The clearings can be described by the plantings that bound them, the pines by their location on $V$. A small gully or ravine runs generally N-S through 4.)

0640 - I hear a "tick" call.
0645 - The chatter song heard earlier comes from the W. In $\frac{1}{4}$ minute it is repeated, the singer moving $W$ in the central locust groves. 0646 $\frac{1}{4}$ - The song again.

0647 - A flock of eight Blue Jays flies over and lands in the trees on the $N$ edge of $V$.

0651 - The song again, to the W. A Nashville Warbler appears. 0652 - The song, from near the W pines.

0655 - A new male with fairly dull markings fights a
Field Sparrow in the SW corner, goes E. He doesn't sing but is probably the male I've been hearing.

0657 - There is a PW encounter in the locusts; two males
give fight calls. I follow one and see it has a silver band on its right leg (M 48 of last year, from the $W$ side of $V$ ). It goes $E$ to the SE corner. I'll call this male M 48 for the time being.

0700 to $0706-1448$ sings 13 songs. I'm pretty sure he is the only singer so far today. He is aggressive. He is sitting in the tops of the trees SE of $V$ singing loud and regularly at 0706 .

$$
\underline{0706}-07-M 48 \text { sings two more songs, flies down into a }
$$

low cherry in the SE part of V . Here he feeds, calling "check."

One song, At 0708 he goes $W$ to grove 3.
$0709-$ M 48 ca.lls "check" in the locusts, flies at a Nashville Warbler and drives it away (the PW flies five yards).

07101 - He sings, calls. He is keeping in the middle height range, about 15 feet up.

0711 $\frac{1}{2}$ - I ${ }^{\prime} m$ watching M 48 feed in a 12 -foot cherry. $\mathrm{He}^{\mathrm{t}}$ s sung five times; no calling. There are three or four Goldfinches in the tree calling. After paying no attention to them for at least a minute M 48 swoops on one and drives it 20 or 30 yards $E$; all the Goldfinches join in the flight. (M 48 disregarded a Black-throated Green about five feet from him a few minutes ago.)

0715 - M 48 sings to the SE after the chase is over. I $4 / \imath$ find him feeding five feet up in the scattered pines here, four songs.

0718 - He flies to a two-foot high pine branch, sits motionless except for turning his head about. His feathers are puffed out and I get the feeling he may be about to sleep. He sings five very quiet skid songs while resting, low in pitch and sounding like a Parula. He hops down to a one-foot high branch and continues to sit very quietly, singing five more songs. At 0725 he's been resting six minutes. A PW flies up to within ten feet of $M 48$, who chases the newcomer out of sight. I hear two more of the quiet skids, so M 48 is still in the SE corner.

$$
\underline{0730} \text { - I go to find him again. }
$$

0734-M 48 begins to sing in locust grove number 2, two
songs. He then flies low into the pines to the E and sings a dry skid. He then moves into the $\mathbb{N E}$ corner of V , high into the woods, and goes
$4 / 27 / 56$
TN
slowly W, singing infrequently. By 0742 he has sung 13 songs in eight minutes. I continue to follow him as he goes finally to the SW corner of $V$, then $E$ across the $S$ end to the SE locusts. He is feeding the entire time, $75 \%$ of which he spends within five feet of the ground. Often he gets his food by flycatching. He calls rarely. At about 0755 he switches his song back to a chatter skid.
$0758-M 48$ is in the SE corner. The male with red and silver bands (M 55) flies silently up and M 48 goes quietly back W. M. 55 sits for ten seconds, heads W to locust grove 3 ; two flights get him there. M 48 immediately chases the other back E in silence.

From 0755 to 0804, M 48 sings 18 loud chatters; there was no break in the rhythm due to the encounter above. About ten of the songs were from the tops of grove 2. Note 1155 isn't singing; ir 48 seemed to yield without a fight at a place where he had been singing and had shown aggression 30 minutes ago.
$0806-1 / 2-M 48$ is still feeding in the locusts; four songs since my last note. I begin to watch him again.

0809 - After a silence, one chatter.
0812 - A chatter; he's feeding one foot up in blackberries I
at the edge of 3 .

$$
\text { 0817-19 - A song a minute while feeding about six feet } \quad 3 / 3
$$

up in green trees, mostly cherry, between groves 2 and 3. I lose him.
083 4 - An unbanded male is feeding in the E pines.
0835 - M 48 sings one chatter in the $S$ center of $V$. I watch I the unbanded male for five minutes as he feeds six feet up in a

Virginia pine. He is active, eats little. He goes $W$ at 0847, sings a weak type-8; then into grove 1. He always stays low. I lose him. 0845 - An unbanded male (the fourth male?) feeds on or near the ground in the SB, Rivine three or four weak "check" calls.

I go W to look for $M 48$. It is quite gusty with a S wind that became vigorous about 0800 . Other resident species are singing. 0858 - 0900 - In the extreme SB a male gives four weak $4 \mathrm{~d} / 2$ skids, one chatter. An unbanded bird is there but I don't know that he was the singer. He feeds actively between one and five feet. Note the unbanded male or males are always in the SE corner.

0912 - I hear a type-8 song and find an unbanded male (same?) singing in the SE corner where M 48 was earlier. By $0926 \frac{1}{3}$ he has sung ten type-8's and 20 loud skids. He stays about three feet high most of the time, foraging on white pine branches (rather than needles). He preens. By 0928, five more songs. I quit counting and watchinf to look for $M 48$ on the iV side.

The unbanded male just noted goes across $V$ to the $S W$ corner, sines, comes when I squeak.

09142 - The male is singing frequently, loud and from low perches. He is now in locust grove 4. He chases a gnatcatcher there for two seconds, does not break his song rhythen.

0952 - I an on XT. A Sharp-shin Plies over. No PN's here. 1000 - The yearts first racer, 3弪 feet lonc, is on . 1000-1030 - I put up a water-drip trap. The unbanded male sines the whole time. From 1030 on I follow him as he forages at a six-foot level and below, mostly on blackberry canes.

1039 - I begin to time and count songs, which are now mixed: 12 chatters in three minutes then one type- 8 and two skids in $1 \frac{1}{4}$ mimutes.

1047 - He begins to sing again NW of the pines in the NW cormer; two chatters close together.

1049 - In the pines, three faint type $8^{1}$ s.
1050 - Two chatiers close together in the pines.
$1052^{\frac{1}{2}}$ - He begins to skid after a silence; eight songs to $1055 \frac{7}{2}$.

Tho males fly out and go toward the SE about five yards apart. I find them 30 yards on to the $S$ of grove 4. They are If 48 and the unbanded male. For six mimutes they stay within ten feet of each other, moving normally overthe branches about every ten seconds, as in feeding. They are silent, do not posture or feed or otherwise display. Sometimes they get within one foot of each other; once the unbanded male sits for 30 seconds $1 \frac{1}{2}$ feet above of 48 in the same bush; M48 may possibly hunch his back a little. They never get higher than six feet, simply move around and look at each other in an area about ten yards square.

At the end of the six mimites they sit one foot apart in a two-foot hawthom for 30 seconds, motionless. One flies and the other follows. They quietily go to the ground, where they lock together with theis feet for 20 seconds, the upper bird pecking the lower. In this rare instance of physical combat they tumble over silently two or three times; the activity is not Irenzied. After the 20 seconds the two "flutter up" two or three
times to a height of seven to eight feet, never falling much lower than four feet; so the range of fluttering is small. It's impossible to tell what terminates a flutter. Is it the object to get above the other? If so, why not flutter higher? I can see that there is a shift in the top bird, so that one's relation to the other changes. One flies away and they disappear to the W.

All the above, which was silent, ends at 1104. At 1110 they are still silent, nor do I see them in the SW corner, where they were. .

1112 - I see the two males engaged in a pursuit flight which lasts three minutes and covers the SW corner from grove 5 to 3. It is silent, follows no fixed path but centers on the area where the recent encounter occurred. The height ranges from 3 to 25 or 30 feet, averages 8 . Sometimes they rise to pass over a locust grove, sometimes they pass through it. The distance between them is about ten yards. At first, flights is at normal speed and without any unusual characteristics. M 48 is the pursuer the whole time, as I can see when they land once or twice. After three minutes the unbanded male lands, sings a somewhat faint step, insipid and short. M 48 is ten yards away, perched. The unbanded male flies and is chased, landing after a quick circle or a straight flight. Each time he stops, the unbanded male sings the same song, faintly. M 48 sings too, I think less often; the song is the same but fainter. The pursuit goes on and on in short flights, the unbanded male always being chased but eliciting it by flying first; i.e., M 48 never flies while the other
is at resi.
After ten minutes M 48 seems to be less enthusiastic in the game than the unbanded male which keeps it going by flying toward M 48 or landing nearby. Once the two sit for 20 seconds ten feet apart and the unbanded male takes something from a shining sumac berry cluster. The singing is frequent, perhaps once every 20 to 30 seconds, always an insipid step. The unbanded male continues to fly toward M 48. There is no calling. The flight of the two after the first normal type switched to the slower bobbing sort with the wings flapped in bursts, the tail depressed so that the back shows.

At 1128 I lose sight of them, but I can still hear their songs on the $W$ end of $V$ probably $W$ of grove 5 , when I leave at 1745 .

## 17145 - I Ieave.

1345-I return and meet Rickert who saw a PW singing frequently on the orchard remnant. The day is fair and warm.

The unbanded male, hereafter to be called M 53, is singing a dry skid in the SW part of $V$, foraging at a maximum of eight feet high but usually at about three feet; he keeps in blackberries, locusts, etc. He sings at an average of every 45 seconds, which includes longer pauses. For two minutes he calls "check" once a second. We follow him from near the $W$ pines to the E, staying together for 45 minutes. No sign of M 48 .

I then separate from Jon and at 1430 sweep for insects as I did before. My results are no more plentiful than last time.

Jon follows M 53 and for 10 to 15 minutes I rely on his observations. It goes SE into the woods some 30 yards, stays high, sings three times and falls silent. In 7 to 8 minutes it returns to the pine field. Jon says a second unbanded male sings and that he hears the two males singing simultaneously ten yards apart. (This may be error; we never saw two during the rest of the afternoon.) By 工hlu I'm with Jon and I try to find the new male while he stays with M 53. We see and hear nothing till 1154 .

At 1454 , a male, presumably M 53, begins to sing while feeding from four to ten feet high E of the fox den. He quits at 1500 after 12 songs; I lose hin near 3. A Cooper's Hawk swoops low over V.

1505 - We go to the orchard area, hereafter XII, stay ten minutes and hear and see nothing.

1520 - We go to XI and in 20 minutes find nothing.
1525 - We sit in the SW corner of V. Most birds are silent, no PW 's. It's sunny, with a strong S wind.

1605 - A PW skids in the SW corner. He is unbanded, presumably M 53; I watch him till 1622, when he quits after 27 songs. He is now in grove 3, having foraged at from six feet to ground level. Sometimes he flycatches, and he catches good-sized insects. I lose him $\mathbb{E}$ of the 2-3 clearing.
$1627-$ M 53 shows up 15 feet from us near 3, feeds quietly and flies E.

16297 - He sings twice in $1 \frac{1}{2}$ minutes in 2 and 3 , goes $E$
and apparently circles back westward $S$ of us; he sings three more times by 1635 .

1700 - I Ieave.

1845 - I return.
I spend an hour hoping to learn something about roosting behavior, but without success. There are a few songs, all uttered from low perches. Since the only plants with sufficient leaves really to give cover are pines and cedars, I'd guess they are the roosts. Possibly tangles, e.g., of blackberries, are used.

1915 - I leave.

To sum up today's developments, I'd say that certainly three and perhaps four male PW's arrived on V. M 48 and M 52 [M 55] are banded; the unbanded male which fought M 48 I've called M 53, and there may have been another unbanded bird. Note that M 48 sang repeatedly, fought PW's and other birds, then seems to have lost his aggressiveness. M 55 was not aggressive. Therefore males ${ }^{1}$ arrival dates do not necessarily have anything to do with territoriality.

## April 28, 1956

A warm, sunny morning with the temperature $644^{\circ}$ at 0530 . Present from 0530 to 1715 , from 1345 to 1615 , and from 1845 to 2000.
$0542 \frac{1}{2}$ - There is a skid song on $\underline{V}$, the first today, SW near the pines. The singer ranges $\mathbb{N E}$, feeding and singing 42 times in groves 2 and 3 until 0556. He is about 12 feet high about $80 \%$ of the time, the rest of the time from 1 to 12 feet. Once he chases a Field Sparrow. He sings two or three songs without feeding, but there is very little song alone, i.e., without feeding. This male seems to be M 53 . He sings ten more songs to 0600 .

0600-1 53 flutters in flight and I see a PW fly with him in pursuit. They fly for three seconds, moving in a circle about two feet above the ground. The pursued bird is a female; she lands two feet up in a tree and he lands behind her or hovers there, pulling her tail feathers for one or two seconds. He sings either while pulling or just at the end, then leaves. The female sits quietly, then for two minutes feeds on or near the ground.
14. 0602 - M 53 begins to sing again, singing 14 times while perched 15 feet up in a 23 -foot cherry, He doesn't feed much. At 0607 he flutters out of sight to the ground or to a low perch.

0612 - He's sung ten times in five minutes, now flies out $S$ into the open field on $V$. The female goes after one minute to the cherry he left, for 30 seconds moves through it or sits, then flies out into the field.

0613 - M 53 quickly chases the female as she flies out.

After 20 yards she goes to the ground and he stops, sits two inches above and behind her, sings one full skid. He then flies 20 yards away without much fluttering, lands on a two-to three-foot perch. He sings four times.

0616 - I begin to watch him after a one-minute break. 0628 - He has sung 18 times, most of the period in the $S$ pine row; the female is in the vicinity. Songs are infrequent and irregular.

0628 - I'm watching a female, which suddenly takes off, climbs, and flies completely out of sight, high to the E. Is it the female I've been seeing?

0630 - The male sings irregularly and I follow him. He sings 16 times to 0638. He is in 2, feeding and flycatching from 10 to 1 foot high. A female is 25 feet away at 0638 , $1 \frac{1}{2}$ feet from the ground. She flies on a tangent in his general direction and he flies at her. They move 25 feet, she goes to the ground, he follows out of sight. In 20 seconds he flutters with slow wing beats to a one-foot perch 15 feet from her. There he spreads his wings a little and flattens his body as though in threat. She perches quietly $\frac{1}{2}$ minutes, flies toward and past him. He doesn't move as she passes, then in 20 seconds dives at her. I write; he sings three songs to 0642 , then stops.

$$
\underline{0650} \text { - } \underline{0721} \text { - I put up a mist net, can only time songs. }
$$

There are 70, all regular skids, some rather faint.

$$
\underline{0722} \text { - I begin looking again; they sound as though they }
$$

are on the W side near the pines.
$0725^{\circ}$ - I go S to XII where a male sings high skids 40 feet up in an elm. He goes $W$ to where the meadow gate used to be, and I return to $V$ at 0734 .

0746 - 0754 - The male, still presumably M 53, sings 30 times while sitting without feeding in a 15-foot cherry. He then goes $\mathbb{E}$ into the pine field, then 30 feet up into the $\mathbb{E}$ edge. He sings 12 times to 0758, falls silent. I don't see the female.
$\underline{0758}-\underline{0815}$ - I cover V and XI, hearing and seeing no PW. $0819 \frac{2}{2}$ - A male sings in the SE corner and I follow him until 0835. He sings very irregularly a chatter skid. Until 0832 he stays on the $E$ quarter of $V$, most of the time foraging and flycatching at three feet or lower in the pines, occasionally singing two or three songs from the end of a branch. He is unbanded, seems to be a different male. At 0832 he flies to 2 and sings. A male answers to the $W$ and the male $I^{\prime} m$ watching sings sotto voce. The $W$ male flies to there the new $\mathbb{E}$ male sits; the $\mathbb{E}$ male flies $\mathbb{E}$ and the 17 male follows. They fly in a loose pursuit to within 40 yards of the $\mathbb{E}$ edge of $\nabla$. At the end the $W$ male may land beside the $\mathbb{E}$ male. I lose the two at 0835 as the encounter ends. They are silent now; the $\mathbb{E}$ male sang 26 times in all until this time, and he called "check" four or five times when I was near (possibly because of me).

0842 - I finish notes, hear nothing. The W male is now near 3. He is silent, flies out of sight a short distance to the $\mathbb{E}$.

0845 - The W male starts to skid loudly in the 3-2 clearing. I follow him $\mathbb{E}$. He sings 60 times in exactly 15 minutes, mostly from
the tops of little trees. He stays on the move, flying rather fast from perch to perch. From the time I first see him he covers $V$ thus: $E$ to the SE corner; $W$ to the $4-5$ clearing; $E$ to the $E$ edge; $W$ to the $4-5$ clearing. He feeds little, is clearly singing territorially. I see no female, nor does he act as though he has one. The E male seems to be gone or unwilling to fight.

0900-0915-Nothing on XII.
$0919 \frac{1}{2}$ - I return to $V$ to find the $W$ male singing on the SW part near 4. He flies fast and low to the SE corner, contimues his straight skid songs.

0923 - 0925 - The male moves $W$, about back to where he began from. He is igmoring the $\mathbb{N}$ half of $V$. At $0934 \frac{1}{2}$ he goes babk to the SE corner again, still singing. He is in a leafy tree, feeds while singing, once flycatches. Much of the time I can't see, but I'd say he perches $50 \%$ of the time and forages $50 \%$. He remains in a tree from 30 to 60 seconds.
$0939 \frac{1}{2}-\mathrm{He}^{1} \mathrm{~s}$ sung 82 times in 20 minutes, now goes to the NE corner for two minutes and feeds and sings in the pine field. He returns toward 1 , continues to behave as before but sings less frequently after seven minutes pass. By 09493, 27 songs. I quit timing at 0950 although he's still singing.

0950-1020 - I remove net, put up a drip trap. The male sings most of the time.

## 1030 - I leave $V$.

In the woods $E$ of I are PW songs, evidently from two males. Both are faint. I see one male and note that he sings skids,
type-8's, and steps, all infrequent and spiritless during about 30 minutes. I'd guess he is a migrant. A pair of gnatcatchers has a nest here.

1115 - I leave.

1345 - I return.
XII - A dull male with little red on the back sings weak skids and type-3's.

V at 1355 - After four minutes M 53 begins to sing near and in 2. He feeds within four feet of the ground, flycatches, bobs his tail frequently, moves a lot through low scrub growth. His sone is a loud regular skid, 50 by $1414 \frac{2}{2}$. He then climbs to 30 feet in a cherry $N$ of 2 , sings once, is silent for a minute, goes to the pine field and sings once. He goes to the woods edge in the SE comer, sings and feeds and sometines flycatches. By $1 / 18$ he has sung 12 times. He falls silent and I lose him 30 feet high in the extreme SB comer.

1428 - I sit to listen. All resident species are singing.
1430 - The skid sone begins again in the SB corner, moves into the $W$ edge of 1. He's still in the tree tops. He sits motionless in a 25 -foot locust, sings 14 times to $1434 \frac{2}{2}$. He then goes NW to 2, to the fox den by 1438 , having sung seven times from low perches. I lose him three feet from the ground at the fox den, where he falls silent.

214] - M 53 begins to sing, crosses the ravine toward the NW cormer, in a minute returns to 3. By Il山 4 hets sung sim; he stops.

Ilyle - He is low in 3, from the ground to four feet high. He sings, preens, forages a good deal in the brush, quits after 12 songs to Illit. I lose him.
$1452-1153$ begins to sing from the low growth where I lost sigit of him. After four songs he flutiters out. A female flycatches and in ten seconds flies out and perches about five feet high, then flies on past the male. He follows but not in close pursuit, goes to the SE comer. There he sits about 12 feet up in a locust and without foraging sings 27 times before moving on to another tree. I catch sight of her, feeding actively and flycatching just above the ground in I and the rose hedge. He contimues to sing, moves $S$ in 1 out of sight. (Why does a male with a fenale sing so much; are they mates?). At 1571 he's sung 45 tines since 1452 ; I begin a new series in this cormer.
151.9-He's sung 27 times, $80 \%$ of them while sititing quietily 15 feet up in $I_{\xi}$ five songs are given from a six-foot perch; then he climbs higher again. At 1519 he goes to the field at the edge of 1 , sings about ton loud and regular songs from a low spot, roturns to the locusts.

1529 - It's been $1 \frac{1}{2}$ hours since I began to count. The male has sung 23 times in ten minutes, is continuing. Once he flies quickly from the $\mathbb{N}$ edje of 1 into the pine field. I see no female, though; hets foraging there in low growth ; quite active.

1547 - He is still singing but has just begun to do so more slowly. He's 20 yards SE of 1 , in the big trees off V . His last song (1547) was munber 63 since 1519. In the mimute from 1549 to 1550 he moves $\mathbb{N}$ along the edge of the woods and sings twice. He returns to 1 , begins to sing more loudly, assertively, and at the usual frequency again. A Red-tailed Hawk flies over. 1559 - He's sung 31 times since 1550 and I quit counting, having kept count for two hours. This last series is sung wi.thin four or five feet of the ground, as have been most songs during the last 30 mimutes and more. He's sung virtually without pause. Itve seen the female only once. 敒 opinion earlier was that the original female had left, but now I'm not sure; I sirply can't be sure whether the first female to arrive then leit and was replaced, or whether she has stayed around and been inconspicuous.

## 1675 - I Ieave.

1845 - I return. It is stinl clear and in all respects favorable to observation. I go to V.
(w) 1857 - There is a skid song.

1909, 1910, 1217, 1911 ${ }^{\frac{1}{2}}$ - There are skid songs. At 1911
I catch a glinpse of that seams to be a male-female encounter.
192.5-M53 chases the female to the ground in the usual
close pursuit. They remain together out of sight for ten seconds. He then sings and flies away; and she stays for 30 seconds on the
ground. The two then associate closely, both hopging quickly through the rose hedge; they are quiet, are equally responsible for following the other and main aining proximity; they stay withe in one foot of each other.

1920 - The fomale flies E along the rose hedge and the male follows her closely.

1928 to 1938 - I see the male off and on. He forages Iow in the field $S$ of 3 and $\mathbb{E}$ to 1 . Once he seems to flutter $\mathbb{N}$ from a Virginia pine; he then goes to a litile three-foot white pine where he sits for perhaps 15 seconds out of sight. He then Ieaves (because of me?), retums in five minutes to the same spot, in a few seconds leaves.

1940 - The male is in grove 2 but I lose him in the dusk and never regain contact.

I go to the little white pine and find that it has droppings under it. It is clearly a roost, but is it a PW's? (I checked this pine next day, having covered the droppings up beforehand. There were no fresh ones, so it isn't a regular roost.)

$$
\underline{\underline{2000} \text { - I I leave. }}
$$

Note how the focus today shifted from the $W$ to the $E$. I'd sumarize thus: The two banded males did not appear but an unbanded male did for a short time in the morning. He left and M 53 is the only male on $V$. Probably two females arrived, one left, and one seems to have mated with $M 53$. There was a migration today, and there seems to be a male on territory on XII.

## April 29, 1956

A warm morning, SW wind; a light rain at times, beginning at 0500 and continuing until about 1500 ; temperature $63^{\circ}$ at 0730. Present from 0730 to 11145 and from 1415 to 1700.

V at 0745 - A male is singing in 3 as I arrive, late because it just stopped raining. It is 1153 . He feeds low, moving in the SB part of $V$ until 0808; between 0753 and 0808 I count 50 songs. He then climbs to 30 feet in a locust in I, sines 11 songs to 0811. He drops to four feet, sings twice in $\frac{1}{2}$ minute, flies quickly to 2 and sings once. Not until 0812 is there a pause, and then he stops one minute.

0813 - M 53 begins. All songs are skids with those sung low possibly a little more chattery than those in the higher trees. He sings four times to 0814, falls silent; I think he is N of 2. (The locust trees are still completely leafless with only tiny buds.)

08172 - Faint skids begin N of 2, after three songs moving to the $\mathbb{N}$ end of 4 ; the singer stops at 0820 after eight 30nys.

0821 - There is a faint skid on $X$ or the $N$ edge of $V$, another in a minute.

0823-1/2 - M 53 begins to sing at the fox den and I find hin feeding very low in 3 ; he goes to six feet high at the most,
staying on or near the ground. He sings 42 times to $0836 \frac{7}{2}$, from 3 and the edge. (It rains for five minutes at 0823.) Note that If 53 has covered all of $V$ but the SW and $\operatorname{NE}$ corners and the area W of 4 . He seems to go from I to the field, to 2 , to 3 , to the edge of 4 . This was the area vinere yesterday's activity was concentrated too.

08361 - He moves $E$, still singing; in the pine field. He sings six songs there, goes to the $\mathbb{N E}$ corner, sings twice, falls silent at 0839. I lose him and wait; I think he may be on XI. (The SW wind is strong; no rain.)

0845 - M 53 begins to sing low in the SE part of the pine field. To 08492,$~ I 1$ songs. He then flies fast and low toward the SW, either to the $W$ edge of I or beyond it into the open brushy field. There is silence till 0857, when he sings from 4 or the $S W$ part of the $4-5$ clearing. I find him in 5 , where he sings about 15 songs, then goes into the $1 N$ half of 4 and keeps on singing.

0908 - He is by the ravine at the $\mathbb{N}$ edge of V , ie., near X. I think he is in the locusts there, not in the woods.

0913 - He crosses from the $1 W$ corner of $V$ to $X$, stays $1 \frac{1}{2}$ minutes, returns to 4 and the $2-4$ clearing; loud song continues 271 this time. I see him now, feeding on or within 2-3 feet of the ground. As usual he sings wherever he happens to be

At 0915 there is a light rain for five minutes.
$0921 \frac{1}{2}$ - There is a break in the song for the first time since 0857; hells sung 69 times from his last pause, i.e., from 0857.

0923 - He begins again from the same spot, low on 4 or the $3-4$ clearing. I start a new count, although the $1 \frac{1}{2}$-minute break hardly intermuts the series.
$0925^{-}$- He is $S$ of 4. In two mimutes he is in the blackberries at the edge of 5 in the $S W$ corner. He stays low, feeds and moves regularly. Most of the time M53 is within three feet of the ground, perhaps $40 \%$ on or within one foot of it.

0931 - He goes into the white pines or possibly stops at the edge of them. He moves $W$ into the NW . pines, singing loud and regularly.
$0932 \frac{1}{2}$ - He flies fast at a height of about ten feet, straight to 4 ; goes on singing.

0934 - $\mathrm{He}^{\mathrm{t}} \mathrm{s}$ in 3 , in a mimute in 2.
0937 - Hets in the $\mathbb{E}$ edge of 2 and at 0938 goes into the INE comer of the pine field, where he contimues to sing. He forages from four feet to the ground, sings undisturbed by me, six feet away.

0947 - He goes $\mathbb{N}$ into the big ash, 30 feet up; he sits there silently for 20 seconds, goes dom to the pine field and forages within two feet of the ground.

09432 - He goes $W$ to the $\mathbb{N}$ end of 2, sings on.
0946-47 - There is a one-minute song break, the first since 0923. I don't start a new count.

0947 - He is in 3, going SW.
0948 - He sings in the SW corner, then stops. Since 0923, 87 songs.

0953 - I quit following this male after two hours of doing so. Note that there is no sion of a female. I decide to wait till there is another song, so I can time the pause.

At 0954 the sun is shining, though much of the sky is still dark.
$\underline{1009}$ - One weak chatter from 2. I wait to find him, 1049 - The male begins to sing frequent skids between 2 and 3, so I'leave V. I think he came from 2 out into the clearing.

I, IV - I find no Pits.
1145-I Ieave.

1h15 - I return. It is $70^{\circ}$, windy still rainy, with a shower at 1400 .
$V$ at IUTI $-A$ male is singing in the SW corner and he continueg for a time. This is clearly M 53; note how he seems to have shifted his focus to the SW. I see him off and on in the bare locusts $S$ of 5 , feeding between 8 and 20 feet.

1453 - After 49 songs so far, he goes to grove 4. There is no song break, but I start a new count; I think he's been feedIng low for six or seven minutes and is now moving between the ground and two feet.

1259 - He is still near 4 and between 4 and 3 . The wind is strong, the sly very gray. I'd say M 53 is at one foot or below $60 \%$ of the time, below three feet $90 \%$.

1508 - He's sung 30 songs in this series, all from under
three feet; hets flycatching a lot. He is now in the $S$ end of 3 , moving between 4 and 15 feet.

1510 - It begins to rain rather hard and at 1517 he stops singing after 11 songs in three minutes. I can't tell if the rain affected the singing. He was picking objects off locust trunks before the rain. At 1515 the rain stops and there is a minute of sun.
$1520 \frac{1}{2}$ - He begins to sing in 3, moves around in it keeping under two feet $70 \%$ of the time, between two and four feet $20 \%$, and from four to eight feet 10\%. Song is now irregular. At $1528 \frac{1}{2}$ he stops, after 13 songs. ItII begin a new series.

153I - He starts to sing $S$ of 4 , moves toward the $S$ end of 5. He ${ }^{1}$ s now flycatching and foraging within one foot of the ground (most of the time) in the blackberry field there. I watch as he sits quietly and sings for a minute. He gives a right stretch, repeats this, raises his mings half over his back, finally kicking his right leg out and touching the feathers of his tail, which is fanned out to the right. He then flies to a seven-foot locust tree perch.

1538 - He sits and sings in the locust, flutters out 15 to 20 feet to the N, lands four feet high in a tree. He flies N into 5. There is a close two-second pursuit of a PW, fast; it covers about 25 feet. The PW is a female; she lands six feet high in a locust and he pulls her tail for one second; he then backs off an inch or two or she moves away that much. He spreads his wings and tail; both are on a diagonal branch, the female three
inches below the female. He advances at her and sings about half of a hich skid song; he then turms and flies away. In 20 seconds he sings.

She sits for ten seconds, then begins to move $\mathbb{E}$ from 5 to 2. I follow and have her in sight for ten minutes; no sex behavior. She is very restless and active, feeds in darts, stays at an average height of four feet; she sometimes flycatches. The male sings in the plantings all this time, irregularly. At 1545 the two seem to be about two feet apart in a three-foot tree; no display. He moves $E$ and sings. Now theytre one foot apart; I thinic she flew to where he was. He chases her at 1548 to the $\mathbb{E}$ into the pine field. They move very fast, five feet apart, one or both uttering a series of very rapid notes that have a whine quality (do they rise or fall in pitch?). I now become aware that there is a third PW; he was there just as the pursuit began. It is M 52 of last year ( 1455 of 1956). He sits quietly in a dogrood tree for two minutes, silent; then goes $\mathbb{N}$ into 2. Possibly he sings once.

The male and female are back near 2 from the chase into the pine field. The female is calling freqently (I neglected to note that she called all the time I watched her before) and very irregularly; there may be one call in 20 seconds or one each second, the averace being about one in five. The male flutters in flicht, staying low, about six inches from the ground, and goes 25 or 30 feet $W$. The female seens to follow; she goes $W$. At his third flight she definitely flies toward him and on beyond, passing
just over his head as he sits about one foot high．He flies very fast at her in a close pursuit and I lose them．It is 1553 ．

I sit to write and hear the female calling＂check＂（her irvariable call today）in 3．The male sings irregularly until 1603，stops．He has sung 43 times since 1531 （to 1603）．

1609 －I finish ry notes and begin to look around． Silence．

1610 －He sings six quick songs from 25 feet up in grove 3，half glides down toward the fox den，turns to the E and dis－ appears in the brush at 1617⿳亠口冋⿱⿰㇒一乂夊，．I hear loud＂checks，＂at first two per second and then fewer．It is the female；I see no con－ tact with the male．
$1613^{2} \frac{1}{2}$－The male begins to sing，six slids in the NI part of 2．The final one may have been faint．He＇s sitting 8 feet up， looking down at the brusiny area．He goes down into it，comes Iluttering out to within 10 feet of me．His wings beat slowiy and their arc is small too．He then perches with his wings ex－ tended from his body about $\frac{7}{2}$ inch，his primaries parallel to the body，which is held horizontal with the head thrust forward．The billl is open $3 / 16$ inch at the tip．In ten seconds he moves for－ ward one foot．He keeps the pose for 50 seconds altogether， mavbe more．I cantt see the object which elicits the pose；every－ thing suggests it is the female．

## 1617－1621－I take notes and see nothing．The male

 has been silent since about 1616．I may have heard one faint skidon X while I wrote.
1628 - There are several irregular high skids from the SE comer, then a type-8 song. I see the female in a brushy patch of berries, watch her for five minutes. She forages about five feet high and under, once perches at four feet for $1 \frac{1}{2}$ minutes, sitting quietly. Occasionally she flycatches.

1635 - The male sings his usual skids in the trees at the $E$ edge of $\nabla$. After two songs he flutters into the locusts of 1. His flight is slightly downward, with his wings beating in a shallow arc and I think at less than their usual frequency. When about five feet from the female he glides at her. She begins to Ply and there is a 20 -yard fast pursuit out of sight. At the end of the chase the male sings once. At 1644 he has sung seven times.
(It is very windy and dark, the wind in the SW; it's cooling.)

1615 - I see the male fluttering in the SE corner. His wings are extended, beaten both shallowly and infrequently. He flies five feet to a lit le tree, then back to the tree he had left; both tines he flies one foot above the ground. The female calls loudly once a second for 15 seconds. I see the male silentDy flying near the ground and I think feeding on or near it. The two birds are staying close to each other. There is little calling on the whole, and none that I can attribute to the male. (Is this significant for the question of which sex is the leader, win the follower?)

1700 - I leave.

To sum up: No new male arrived on $V$ to challenge if 53 today, though M 52 (M55) appeared for a short time. If 53 in the morning acted very much as though he had lost the female acquired yesterday; cf . the behavior of MI in 1952. In the aftemoon 2 . female appeared and courtship behavior occurred. It is impossible to judge whether the female was a new one or the one seen yesterday.

## Aori1 30, 1956

A clear cold dawn with liittle or no wind, cloudy at 0630; temperature $42^{\circ}$ at 0500. Present from 0530 to $0745^{\circ}$; Rickert is present from 1300 to 1700 ; I return at 1645 and stay to 1800 . V - at 0535 - I arrive but hear and see nothing.

05417 - There is a song from 3, then seven more to 0550. 3 0550-A female is calling in 3, 18 feet high. In 30 seconds she goes to the ground and calls "chick" once a second.

0552 - The male sings trice from 4. (Blue-winged Warblers 4 and Kinglirds came in last night.) This is 1153 , the female presumably 53 F .

0554 to 0615 - I follow the female, which is very active, bobbing her tail and flirting her wings a litille as she moves. I'd. say she is twice as active and nervous as the male, which is seen feeding low for one minute. The female moves in short flights from S of 5 to 1 . Shet's below one foot $10 \%$ of the time, below two feet $30 \%$, below three feet $60 \%$, below four feet $80 \%$, below five feet $90 \%$. She flycatches. The male sings twice between 0554 and 0600, then is silent. The female "checks" and "chicks" five times per five seconds but not once a second. At 0610 she quits this. Each time the male sings she doubles her call rate for a second or two. The male flies to I whille she is calling near him at 4 , pays no attention to her. She then goes slowly to I. It is clearly 53 F .

At $1,53 \mathrm{~F}$ is in the rose hedge and I see a PW fly up near
her; when the bird is within two feet of her its flight seems a little like a display, i.e., it may be slightily exaggerated. The female pays no attention, in a minute goes into I. I now see the second $P W$ is a female. She calls, feeds low and quietily, goes into $I$, and I write.

$$
\underline{0620 \frac{1}{2}} \text { - } 1153 \text { sings faintly in 1, repeats at } 0622 \text {. I go }
$$ to watch him.

0625 - A male sings two weak skids $N$ of 1 toward the $1[$ comer. I can't find the singer, which may be a second male. .

0629 - 30 - There are three Ioud skids from 1, the typical song of M 53.

0632 $\frac{1}{2}-1453$ sings at 1 and 53 F starts to call. I follow her. Soon I see the second female near 53 F but I lose her and stay with 53 F , which calls irregularly but pretity often. The male sing five times to $0646 \frac{3}{2}$. Once 53 F gives a lititie burst of calls for one or two seconds after the male sings, and once she flies toward the song. I see the male forarging one foot hi.gh (53 F is still staying at the heights given in the percentages above).

M 53 flies with perhaps a slight flutter from the NE
corner where the two are to the $\mathbb{N}$ end of 2. 53 F inmediately 2 follows about $20-30$ yards behind. They feed as before, the female calling at times.

06467 - M 53 engages in close pursuit with 53 F ; after ten yards they go to the ground and I can see them flopping around. In one second he sings; they tumble about for another second, then
go out of sight into 2 .
I quit watching and write till $0650 \frac{1}{2}$.
0652 - I hear a femole calling in the 1 IE comer of 2, go there. In two minutes I see M 52 (M55) three feet high and watching the female. He darts at her while she's on the ground, probably $T$. touches her, then in a flash flies $\mathbb{N}$. There is a faint song, sureiy his. There are other loud complaining (whining) calls just afterwards; a PW?

0655 - The female moves on and M 53 sings once to the $S$. I follow the female into 2, lose her at 0658.
(It's been completely cloudy since 0630, is cold and damp.)

0700 - 0710-I watch a silent female PW at the N end of 4, $W$ of the fox den. She feeds slowly and deliberately within five feet of the ground. She is 53 F . At 0712 II 53 sings several times in 3 near her. He sings five songs to 0716 .

0726 - I've seen nothing but now hear a song in the SE. (A female Cardinal is nest building.)

0731-M53 sings in the $\mathbb{E}$ end of $V, N$ of 1 . I follow him for four minutes, during which he sings six songs, falls silent. He is feeding low; I see nothing of the female. Nlote how his song rate has declined today.

$$
\underline{0745} \text { - I Ieave. }
$$

Rickert present from 1300 to $1645^{\circ}$. At 1300 there is a cumolus canopy breaking in the $W$; slightly chilly. 1329 - An unbanded male skids.
1345 - He skids. I follow all the time as he moves between 2 and 10 feet, seans nervous. No sign of a female.

1355-He sings. Repeats at 1356, twice at 1358. He keeps moving between 3 and 4 , is hard to follow. He feeds in small trees most of the time. At 1410 he is feeding, has almost completeIy ignored me since 1400. Silence since 1358 .
1)/4 - I've lost the male (when?) and will leave 3-4
and check 1 - 2. Few songs of any sort, none of a PW since 1358.
IH17 - There is a skid in I, another in 4 minutes. I find an unbanded male. It sings at 14455 , 1458 . The sun comes out a Iittle, but Red-eyed Vireo, Towhee, Whitethroats are the only singexs and they not often. The PW (thought to be a second male by JR) feeds from I into the woods about 30 feet.

1505-1507 - He sings four songs; sings at 1509, 1511. He feeds very actively, seems too busy to sing. Between 1517 and 1523, three more songs. $\mathrm{He}^{\mathrm{t}}$ s still in $I$.

1526-At Ieast three Blue-wings have just entered. One has a seven-second skimish on the ground with the PW, the two flying at each other and jumping into the air. Immediately thereafter the Blue-wing flies to a limb at ten feet and sings. The PW flies silently away in the opposite direction, this at 1533.

1555 - The PW is stil7 out of sight. I'm at I.

1610 - I see a male moving silentily in 3, ranging between six inches and 22 feet. A Yellow-throat sings. At 1625 the PW is still silent.

The sky is completely covered with a thin high strato cumulus canopy. A chat sings.

1630 - The PW sings for the first time in many mimutes.

1645 - I leave (JR).

1645 - I (WN) return. It is $55^{\circ}$ with a brisk $\mathbb{N}$ wind. The aftemoon has been $20 \%$ sunny. I reet Rickert as I arrive. V - a亡 I64.5 - Silence.

1702 - There is a skid in I and I find a male there acting as if the left tarsus is injured. On a level branch he perches with it retracted almost into his body feathers, or he sometimes lifts it just off the branch. On a diagonal limb, or just after landing on anything, he uses the tarsus only as a brace and doesn't close the digits, which stick out fore and aft. He feeds actively between five and nine feet, mostly at 7 .

In five minutes this male goes 30 yards SE across the open field and into the woods. It feeds in the edge trees there, and I find a female feeding there too. At 1715 he flies to her on a perch 45 feet high; she jumps up an inch or two but contirmes to feed. One of them calls "checis" once or twice and he goes on feeding too. In a minute the female flijes into $I$, forages there betreen 4 and 25 feet, most of the time near 10 . She is silent and I lose her at 1717. I then write for four mimites. Note that the male has sung only once so far. This pair is probably the 531 s .

I go to 3 and 4 and see nothing. From 1730-1745 I check XI without pesults. The sun has come out and the sky is clearing slorify. By 1800 Itve seen and heard no PW.

1800 - I leave.
1803 - Some ten warblers fly over me as I walk between V
and II. They are high, going S, calling. In a few seconds five or six more pass. Species ?

To sum up: The $53^{\prime}$ s are now clearly mated and the questions concern what other PW's are present. [05 55] appeared briefly, and a second female was on the scene in the morming while I watched the $53^{1}$ s. I think the male and female seen together in the SE cormer and beyond were the $53^{\prime} \mathrm{s}$; note their mated behavior, the silence of the male (which corresponds with the silence of M 53), and the fact that I saw and heard no other males while I watched the male and female. The malets injured tarsus may be an only recentily received injury, and it may be temporary. I discount Rickert's report of two males on $V$.

## May 1, 1956

A calm morning with a still, slightly overcast dawn; temperature $42^{\circ}$ at 0515 . Present from 0540 to 0800 and from 1415 to 1715 and from 1845 to 2000 .

V at 05 hO - Silence for four minutes, then a skid in 2 . M 53 is $S$ of 2, feeding actively low (about fou feet) and singing irregularly. The tarsus is held normally. 53 F is nearby calling two or three times per five seconds. I follow her for seven minutes as she feeds quickly but calmly in the $S$ part of the pine field between two and six feet high.

0549 - The male suddenly flies up to the female and there is a close pursuit. It is longer than usual, lasting two seconds and covering 20 yards or so. They twist and turn out of sight and at the end the male gives a full sone.

0550 - The female is calling again. The note is "chick" With a smacking or kissing sound. M 53 sings very irregularly, Trove and the female doesn't seem to be excited by song as she was yesterday. She feeds tamely beside me at from one to seven feet, mostly at tiro to three. She is very active, calls irregularly. In four periods of 30 seconds each (continuous), she calls 2, 15 , che sere 7, 5 times.
(A Ruffed Grouse drums. Many warblers are audible, especially Black-throated Green and Blue-winged.)

The female flycatches or hovers before a branch, covers a small tree, moves quickly to another.

0603 - M 53 sings once at $3 / 4$ volume near me. I follow him to 0611. He forages between one and ten feet, $60 \%$ of the time at about two-three feet. His song is infrequent and irregular.

0617 - He flies quickly $S$ into 1 from the pine field, where he's spent 211 his time this morning in the $S$ half. His flight from tree to tree may use an unnecessarily large mumber of wing beats. The female may call nearby.

06114 - There have been 21 songs in the first hale hour, Snetu irregular, with two or so a mimute and then panses. Note that M 53 has done no high perching to sing on $V$. Is this due to the absence of high trees in the center of $V$ or to the quick arrival of females?

0617 - 1453 sings, flies $1 W$ to 2 . In about two mimutes 53 F goes to 2. I follow them as they eventually go all the way to 5. Once he flutters away from her for 30 yards and in about 20 seconds she follows along behind. Once when he sings she seems to fly toward the song. She is definitely following him; her behavior is as it was earlier, with calls irregular but pretiy contimuous.

Both birds feed at a higher level while in 3 and 4; perhaps this is only because they are in bigger trees than they had to the $\mathbb{E}$. The male is 20 feet up, on bare locust branches much of the time, the female 20 feet up in a cherry. Both behave much as they did earlier. He sings more, 22 times to 0635, then is silent to 0640 while in the $\mathbb{N}$ end of 4 .
$\underline{0640}-\underline{0614}-1153$ is in the tree tops at the edge of the

4-5 clearing; he sings eight faint insipid steps. Is this significant ? I can see no occasion for it --. is he off territory a little ?

0641 - M 53 has sung 30 times in the second hal. i hour. 0646 - He goes back to 2 and the pine field.

I leave this pair to search for other PW's here on $V$ and elsewhere. What are others doing ?

XI - At 0702 I find M 52 (N555) on his last year's territory. After he has sung two loud rasping steps I lose him. He may have called, but there are so many warblers here I cant be sure. In the next 25 minutes on XI, I find nothing more.

XII - An unbanded male sings a loud skid, high as though on territory. He seems just to have bathed.

0800 - I leave.

11175 - I return. It is $68^{\circ}$, sunny; there has been $90^{\circ}$ sunshine today.

IV S - A well-marked male skids here, feeds low.

XII - at IJ HO - Silence.

V - at $1 / 4,5$ - It is silent when I arrive. $1452-A$ female calls $S$ of 2 and I find 53 F . She forages
for one minute, flies $W$ into 3. I follow her until 14,58 as she feeds in 3 and 4.

I458-M53 starts to sing insipid steps on 5 . He begins to intersperse anger calls, to 1503 , when this stops. He is feeding, but his body seems somewhat elongated and his wings slightly extended.
$1511-1453$ has sung 50 times, now is silent until 2513 when he begins again. I don ${ }^{1} t$ see the female. The male stays in 5, about 15-20 feet high, sings frequently with a 10-20 second interval.

1525-After 3h songs, most of then given from about one foot below the top of a 20 -foot cherry in 5, IF 53 switches to a high, full-volume skid. He sings only one such song, falls silent in the $S W$ corner.

1530-1453 calls once a second in the SW corner of $V$ until 2532 ; he is 12 feet up. He then flies high to the N into 4 or 5 and at 1533 sings a typical skid after landing.

1540 - A male sings a weak skid in an 18-foot Cherry near the $S$ part of 3. (İt's tarsus in normal.) It sines again in three minutes, then three songs more to 1546. It is feeding with great rapidity in the cherry, which is about to flower and seems full of insects; he stays at $10-15$ feet. He then flies $\mathbb{W}$ and I lose him. All songs were mild, a lititle faint; was he a migrant ?
$1549-A$ skid, possithly from 1.
154.97 - A weak song from 4 .

There's now a nearly cormlete light overcast, which began
with a haze at 1515. The wind is from the $E$.
$1550^{\frac{1}{2}}$ - There is a skid from 2 or the pine field, tro more within a minute, another at 1555. I can find nothing; songs were weak.

I think there are more insects today.
1600-1602 - There are six weak skids in the SW comer; M 53 is there. By 1613 he's sung five times. I see him the whole time, feeding from one to 12 feet, mostly at 10. He catches flying insects most of the time, reaching out as they fly by his perch or taking them while he is in flight.

Note how inactive If 53 and 53 F have become; since the weather is relativ ly favorable the inactivity seems attributable to the time of day or other factors. I'd guess I've seen more than one male on $V$, that the one near 3 was probably a migrant or nonterritorial bird.

1617-14 53 begins skids, slightly less than full volume and speed, in 4 and 5. Once he calls five times between songs. He moves at 15 or 20 feet through 4 , feeding on the bare locust branches and trunks. He sings 16 skids to 1622, falls silent. Is there a different rate for different songs?

I spend 20 minutes on the E half of V and XI, find no PW .
1645 - I leave $V$. It's getting sunnv.

XII and III - from 1650 to 1710 - Silence.

$$
1715 \text { - I I eave. }
$$

18415- I retum. It is gray, still, $63^{\circ}$.
VIII - I think I hear a weak skid.

V - at 1850-53 F begins to call in the pine field, flies to 2.
For three minutes I see her feed actively from two to six feet high; then I lose her.

1917 - The $53^{\text {ts }}$ s are feeding together between 2 and the woods $\mathbb{N}$ of it. The female calls.

1921 - After one minute of perching, preening, billwiping, the female suddenly Plies quickly into the pine field. 1925 - I see the male and female together near 2. They seem to meet and $\mathrm{fl}_{\mathrm{y}} \mathrm{y}$ or jump up a foot or so. It is getting dusky so conceivably they didn't recognize each other inmediately.

1943 ${ }^{\frac{3}{2}}$ - Ive staved with 53 F since 1925. In this period she has flown from 2 to the pine field and back two or three times calling littile but moving very fast and apparently in excitement. I now lose her, though, and fail of ny goal, which was to see her go to roost. Her association with M 53 at this late hour and her eacited activity are of interest. She has stayed low and I've thought several. tines that some small pines and red cedars E of 2 might interest her. However, I get no good evidence of this. M 53 is now out of sight. He never sang this evening.

$$
\underline{2000} \text { - I I eave. }
$$

To sum up: The 53's are now paired completely and in $53^{\prime}$ s behavior is typical for this stage. A second male probably passed
through his territory, which may account for an accelerated. song rate at times.

## May 2, 1956

A cloudy dam with no wind and a light rain from 0530 to 0515 ; temperature $55^{\circ}$ at 0530. Present from 0600 to 1030 , from 1215 to 1500 ; Rickert present from 1315 to 1645 .

Y at 0600 - After five minutes I am sure there are two males on $V$, one to the $S B$ and one in 5 and the $W$ pines. I stay with the $W$ male for the time being. He keepshigh and sings skids at about 25 feet in the woods to the $N$ and the bigger locusts. He is a now arrival and will be called $M 5$.

0612 - This W male (M54) is pursued for 10 yards by a Blue-winged Warbler, in a minute is in a skirmish with another bird.

It begins to rain lightly.
0625 - I find the W male (M 54) in 4 about 25 feet high.
He goes if suddenly. The $\mathbb{E}$ male (M 53) has come to 4 too. M 54 goes to 5, sings three or four times; M5 53 sings in 3 . M 5 年 flies to the blackberry field $S$ of 4 and 5 , singing high insipid steps; M 53 is skidding to the SE. After 11 or 12 steps M. 54 changes to his usual rattling skid, frequent, uttered from 25 feet up in a locust in S 5 . (He is clearly a newcomer; was he the step singer I thought might be a migrant yesterday?)

$$
\underline{0635}-154 \text { feeds actively for two minutes, } 15 \text { feet up, }
$$

goes S into the white pines. He has sung 95 times since 0605 when I found him; the extremes of his song interval are 17 and 40 seconds.

After one song in the pines of 54 flies back 1 WW calling "check" and singing insipid steps in 4. 53 F is calling "check" in 3 and $S$ of it; M53 also skids once. M5 perches at 25 feet and sings; after 12 steps he skids once, goes on with steps, then two or three skids. If 53 is 15 feet high in the $S$ and of 3 , his back hunched; he sings faint skids, one about $3 / 4$ length. M 54 is still on insipid steps, slower and longer songs than the skid.

The two males are singing back and forth ; the no-mants land between them apparently is the $3-4$ clearing. I cant really see M 54 ; hel's moved II in 4 and is singing. 53 F is calling in 3 ; II 53 sings only occasionally.

06l4 - 53 F goes $W$ to 4, calling and foraging at 15 feet. II 53 immediately follorsher. After a one-minute silence I can hear both males skidding in 5. I cant tell which male is the singer of which song, so I discontinue ny count of $1554^{\mathrm{t}}$ s songs; he's sung 30 to this tine, 064 , since 0635 .

0648 - I go to the $4-5$ clearing. 1153 is in 4 , singing infrequently but loud; 154 is skidding frequently in 5 . Note that M 54 seems always to retreat before $1453^{\prime}$ s moves.

Between 0648 and 0652 M 53 sings about tour times, M 54 sings $10 ; 53 \mathrm{~F}$ calls in 4 . IN 53 swoops on her and chases her a fen feet; then he flutters a little as he goes to 5 . She follows
him, cafling. He turms and chases her, and in flight he utters a. Ioud series of calling notes which would be a twitter if it were longer. The $53^{\prime}$ s go SW and I lose them at 0655 .
0657. - There are weak skids to the IN in 5 and I find II 54 feeding actively 20 feet up in locusts; songs are frequent and I time them from 0658 on. He moves from IN to $S$ in 5, sings 25 times to 0708 while feeding busily; at 0708 he goes $\mathbb{E}$ to 4 , sings on.

Neither of the 53's has been heard in this interval.
0719 - Itve followed M 54 as he has foraged between 0
and 20 feet high, mostly low and sometines flycatching. He's moved to the $2-3-4$ clearing now. Once he chases an insect 20 yards to the ground, leaving a 20 -foot perch to pursue it.

0719 - A bird, possibly if 53 but probably a Blue-winged Warblex, chases in 5443 yards $W$ to the 5-pine clearing, where he goes on singing, (Note that M5 54 seems to have no ability yet to resist the attack of a non-PN.) In a mimite I hear if 53 sing twice to the SE.

0722 - M 54 has sung 42 times since 0708 , now falls silent.
$\underline{0722^{2}}$ - 1454 begins a new series of songs; he's in the 5pine clearing.

0730 - From the fox den I can hear both males. M 54 just sang three faint insipid steps, now switches to skids.

A female PW flies $\mathbb{N}$ through the $2-4$ clearing, goes into the top of a 50 -foot chemry in the woods, in 20 seconds heads $N$. She is surely a migrant.

M53 is in or $\mathbb{B}$ of the $S$ end of 2 , if 54 in the 11 part of 5. M 54 goes $S$ to the SW part of 4 .
(Why doesn't a male PW acquire a harem if the female with which he first mates doesn't repel later females ? Is his song different, or does he devote too much attention to his old female ?)

0737 - $M 54$ flies out to the $4-5$ berry field, then $W$ from there. His song stops after 55 times since $0723 \frac{3}{2}$.

0738-15 54 begins a new series of songs. He is in the white pines, and he may have chased a sparrow there.

M5 53 just sang $3-4$ times to the SE.
0805 - 1454 has sung 53 times since 0738 , but with interesting developments. At 0745 he moved $\mathbb{N}$ into the big open field on $V$ and started $E$. He sang two or three times and went on to $S$ of 2 ; the songs were well spaced. If 53 was singing to the $\mathbb{E}$ in 1 . If 54 stayed near the ground the whole time, went into 2 , then even a fer yards $\mathbb{E}$ into the pine field; he was now silent, or perhaps he gave one or two "tsu" calls. He then went II through 2 to the more open growth, a little $\mathbb{E}$; no sounds. After about five mimites ${ }^{7}$ silence he sang, then in 40 seconds again (type of song ?). Both songs were from low two-foot perches. At $0755^{5}$ he went 20 feet up into the locusts of 2 and sang three times. (M53 had been singing to the SE; I could see no reaction in M54 when these songs were heard. M 54 had called "check" once or twice, "tsu" possibly once.) At M 54 's songs in 53 flew into 2, lit at M 54's level, about 10 or 15 yards away. M 54 inmediately turned and flew IW past the fox den
with M 53 pursuine some ten yards back．The flight was silent， without exaggeration and not very fast．After a minute of silence M 54 began insipid steps in 5 ，switching to skids when he had sung 12 steps at regular intervals．If 53 sang a few skids to the E ． 1154 then foraged between 6 and 20 feet in 5 ，singing loud skids． I quit following him at 0805 （two hours of continuous watching him．）As I go $E$ he is in 4 ，feeding between one and five feet and singing frequently and loud．

XI－Seven male and two female Cowbirds display together in the S C hef central edge，go NE．No PN in 15 minutes．

T 53 at $0834-1453$ is singing skids in the pine field and 2，in 54 to the W．I berin to count M $53^{1}$ s sones；he is low and out of sight．To 0847 there are at least 17 songs．M 54 is singing insipid steps．（There are four male and one female Coubifds together in 2．）
$0052-M 53$ begins to sing in the pine field，goes to the SE corner；then across to 3 ，where I lose him．He feeds between one and eipht feet，mostly near five feet，sings nine times in Li⿱⿸丆⿰丨丶⿱一⿻上丨又 minutes．Note that he covers ground；his singing rate is like that of most of this morning，a few sonfs and then silence．

At 0900 IV 54 is singing insipid steps although he skidded some a few mirutes ago．

091 －N 53 sings in 3 or 2 ．He is in a six－foot dogwood sinping while 53 F calls 20 feet away．At 0919 he flies at her and
there is a 1.5 - to 20 -yard close pursuit to the ground out of sight with one song probably uttered in flight. There were $]_{4}$ songs in five minutes, then the pursuit song.

2920-M 53 begins to sing in 2 and 53 F calls there. M. 53 then goes to the $S$ part of 3,30 yards $E$ of where 1554 is singing. If 53 sings on, stays about seven feet high; in 2 minutes he goes back to 2 and after a slight pause sings.

I see 53 F and hear her call; 1153 sings 20 yards away. He PLies SW to the S end of 4 and he and if 54 sing back and forth there. I've counted 26 songs for II 53 between 0920 and 0935 but perhaps I should also have added some insipid steps.

0935-53 F either picks up or pulls up a sinall bit of plant material. from the ground. In one second she drops it. She doesn't follow 1453 to the SN, and I watch her for ton minutes. She feeds from 0 to 75 feet high, $50 \%$ of the time at or below three feet. For the first five mimes she calls once every two seconds.

0943 - The two males begin a duet of skids. I'm pretty sure that 53 F calls only after if $53^{\prime}$ s songs, doing so one or two times after each. She feeds persistently on aphids which are clustered (with ants) on blackberry stems.
$\underline{0943}-\underline{0948}-1553$ is in 4 (perhaps 3), singing 18 skids. If 54 sings to the $\mathbb{W}$, and possibly some step songs heard ought to be attributed to M 53.

0950 - While I watch 53 F in the S of 4 she suddenly gives a burst of calls and there is the sound of a fight to the $W$
in the blackberries. She and I go toward it and watch the males fight for five mimutes. Observation is complicated by the presence for 45 seconds of a Blue-wing which once chases a PW male five jards. M 53 is clearly the aggressor, flying at $\mathbb{M} 54$, which always jumps from his perch and is either supplanted or chased a few feet (about six) to the ground or to a nearby shmb. There is much calling but littile posturing axcept for tense-looking stances. Several times the birds sit within two or three feet of each other for a second; then II 53 darts forward. Three times if 54 passes IN 53 and flies about six to eight feet beyond to the $W$; he is always chased back. I never see in 54 51y at M 53, and he usually passes below him. The female sits ten yards away, ten feet high, and calls about ten times per five seconds when the fighting is most intense. I' m pretty sure she feeds some during the fight.

0957 - Suddenly if 53 turns and inies away to the E. 53 F must follow; I don't see her. Inmediately if 5h flies E at least five yards beyond the scene of the fight and begins to sing insipid steps. (He had sung one step just before the fight ended, and M53 ingtantly flew at him.) He now sings mamy insipids in the S of 4. (I forgot to note that for a minute after the fight ended blewc II 54 gave the anger call, hard and loud; he didn't do so while cele II 53 was near.)

If 53 sings two or three skids probably at 2 , beginning about one minute after he flew $\mathbb{E}$.

1005 - 1154 switches from his insipid steps to regular
skids and continues them.
1008 - I leave $V$, which now is clearly going to be divided by the two males.

XII - There is a slow skid song but I go on. $I-I V S-A$ male skids on the $E$ edge of I near the road.

1030 - I leave.

1215 - I return. There is sunlight through a nearly full overcast, little wind; temperature $68^{\circ}$.

IV S - A male sings near old T3 [M 59].

V at $1246-1454$ is singing skids, and I count sones and follow him as he goes $\mathbb{E}$. He is in 2, singing on the $W$ edge. M 53 comes, and he and M54 have an encounter that lasts till 1309. 53 F is in 2 calling about $25 \%$ of the time.

The fight between the males consists of $\mathrm{M} 53^{\circ}$ s flying at M. 54 from perches two to 20 feet away. II 54 then jumps and retreats from 2 to 5 feet and lands. Thus this is a supplanting type of attack. Both sing insipid steps, M 54 much more faintly. This song consists typically of nine and ten notes, starting always with four slow notes on the same key and concluding with five or six (usually six) faster insipid notes. M 53 always breaks off the fighting and flies $\mathbb{E}$ into 2 after two minutes or so. He then returns, sometimes after M 54 has advanced farther into 2. Once
for a second they flutter up to 12 feet. M 53 reaches the top first and stops. They sometimes sit stiffly near each other, bills closed but wings very slightly extended at the wrist; they may stay thus for five seconds. 1311 - M 54 goes W , having sung 91 times since 1246 . I stop counting.

1315 - Pickert arrives and we talk for a minute. I put up a mist net in the 2-3 clearing.
$1356-M 53$ is in 1 . He sings 37 songs to 1409 , staying
high and foraging. Then M 54 sings $S$ of 2, perhaps ten insipid
steps. In 53 stays on in 1 and sings.
I try to catch XI 54 without luck, leave.

1500-I leave. Rickert's notes follow.

T 54 - at 1325-17 54 sings skids in 3 ; to 1343 he sings 55 times, ranging in height between $\frac{1}{2}$ and 25 feet, only rarely going above 15 .

1343 - He moves to 4 and goes on singing.
1346 - After five songs M 54 returns to 3. All species seem much more active than on April 29.

1356-M54 goes to 4 after 48 songs since 1346 .
\$106 - He goes back to 3 after six songs, then skids three 7'2 times, sings perhaps ten insipids, and is silent for $2 \frac{2}{2}$ minutes. 1418 - M 54 has sung 22 more times and now moves to 2 from 3.

1123 - After eight songs he goes to the fox den. He forages thore lower than five feet, goes to 4 at Ih3I. He's sung I5 times since 1423. In one minute he goes to 3 ; five songs in that period.

1434 - The cumulus canopy has hidden the sun completely and the cooling seans to have quieted all species slightly.

II 37 - If 54 falls silent after 20 songs since 7432. He remains so until Ih40.

IH147 - M 54 switches to insipids, moves from 3 to 2 . $\mathrm{He}^{\text {t }} \mathrm{s}$ sung five songs in one minute.

H452 - The sun shines more.
1500-I leave T 54. M5 54 has sung 56 times since $14 / 17$ and is still singing insipids.

T 53 - at 1500 - A male skids in 1 and another PW sings in the woods to the E. The latter's rate is much faster, than $1 \mathrm{IN} 53^{\prime} \mathrm{s}$,
which sings five times from 1500 to 1508 , no times to 1512, four times to 1515, five times to 1530. At 1530 the sky clears somewhat. If 53 moves to the $S$ edge of the pine woods at 1530 .

1538-The breeze increases noticeably. M53, which sang eitght times to 1.535 and quit, now moves back to 1 , imnediately goes to the pine field, and at 1541 returns to 1 . Between 1535 and 154 I he sings 12 times, three more skids to 1546 .

1546-1153 begins insipid steps, the first time I've heard him do so. He sings 13 at the center of 1 and at 1555 goes to the $1 \mathbb{N}$ edge of 1 and contimues the insipids; in two minutes after seven songs he changes position to the center of $I$.

1600 - After nine insipids since 1557, if 53 begins skids. He sings five in two minutes, goes into the l-3 field.

1604 - After five songs M 53 returns to 1. 1608 - M. 53 has sung three songs since 1604 . The sky is clouding over and the breeze slackening. I leave the territory.

T 54-from 1608 to 1645 - if 54 is in 3. He sings two skids, two insipids, then skids exclusively except for three insipids between 1623 and 1630. At 1645 he's sung 36 songs since 1608. In this period M 54 moves between 2 and 3 the entire time, staying from five to 15 mimutes in a planting.
164.5 - I Ieave.

VN's summary: M 54 arrived today and seems to be in possession of all of $V E$ to 2 ; he somehow made this gain during the early aftemoon, although in every witnessed encounter II 53 seemed to be the winner. Males are on other territories, and a fomale was seen to pass through $V$. 53 F engaged in preliminary nest building behavior.

## May 3, 1956

A clear still morning with a mist and dew, after a cloudless night; temperature $50^{\circ}$ at 0500 . Present from 0530 to 1100 and from 1300 to 1835.

0543 - $A_{\text {rrive on }} V$ to find the new male, M54, sitting 22 feet up in 3 and singing; he is motionless. As I watch he attacks a small bird that may be a PN. A few minutes later I think I see a female PW follow him; his tail is slightly spread as he is on the ground. I can't be sure which is the aggressor.

0554-M54 pursues a female and drives her to the ground after a short flight; on the ground he pulls her tail feathers with his beak for a second. He is silent, flutters away. This occurs in 3. The female calls.

I hear a few insipid steps.
M54 is in an encounter with an Indigo Bunting; I can't tell the aggressor.

I follow the female, think I see her flutter a little.
0608 - 1454 swoops on the female, chases her only a few inches behind her; she goes to the ground where he pulls very vigorously on her tail for a second. She then turns on him and chases him about 3 feet.

0609 - He goes to 2 and I hear insipid songs. M53 comes and there is a fight with harsh fight calls. The female, 54F, flies toward the two males and calls near them.

0610-1554 has sung 118 times since I arrived, i.e., very frequently. After the fight ends at this time he falls silent. 54 F is calling in 2. The fight is quickly renewed. Several times
the males feed while facing each other. 53F is near too, all 4 PW's within perhaps 10 yards of each other. The males sing insipid steps. The fighting consists of frequent darts toward each other or on a tangent from perches often within 4 feet. No posturing that I see, though the action is very fast. Once, perched about 10 feet up, they flutter up to 20 feet, their bodies nearly vertical.

0615 - The 2 males are still in 2 within 10 feet of each other, singing as belore. 54 F is in 4, calling.

0616-0618 - The fight continues, both males cal7ing the harsh fight notes when the action is fast. Both females are near. All 4 are on or near the ground $S$ of 2 . 54 F flies to within 2 feet of M54 as he sits in a little tree. There are few songs.

54 F catches a medium-sized black skipper and eats it.
M54 sings 1 or 2 skids for the first time since the fight began. M53 sings insipid steps.

0618 - The fight goes on. Both females are still within 10 yards of each side of the line. At 0619 the action becomes more intense, with harsh calling. The females flutter up to 15 feet. Innediately after this the battle stops. 1544 is 15 yards $S$ of 2 ; he begins frequent skid songs at once. At 0620 he returns to the fight.

0622 - M54 stops fighting, goes to the $S$ end of 3, then to 4. 54F follows after him. He is 20 feet high; he glides down away from her and she follows. He goes back to 20 feet; this is his height much of the time; she stays at about 4 feet.

54 F eats a large 1 -inch moth, taking it to the ground, battering it, removing its wings. M54 is singing at 20 feet. He has eaten very little since I've watched; when he's in the trees he sings and often looks down and turns his head.

0633 - He dives down on 54F, chases her 3 yards to the ground, hangs onto her tail and pulls for 3 seconds, sings twice while doing so. He flutters his wings while pulling. She was 6 inches above the ground during this. At the end she turns and drives him, pursuing him 3 feet. She is silent. He goes to 2 and sings.

I find my net ruined after a long attempt to put it up. During most of the time, from 0650 to 0705 , the males fight at the S end of 2 , calling and singing insipid steps.

O710 - M54 has sung about 170 songs since my last count, singing very frequently in the last few minutes.

0721 - I turn to the 54's again. She is silently feeding from the ground to 5 feet, in the $3-4$ clearing. At this time, M54 pursues her 5 feet to the ground and pulls her tail for a second. He sings while doing so, turns and flutters away without being turned on by her this time.
$\underline{0723}-M 54$ sings 4 times. 54 F is near the ground at 3, silent. He goes up to 15 feet and feeds in cherries.

0779 - She flies to within 1 foot of the male, which flutters away and sings. His songs are frequent and regular, in and near 3. Both then go to 2. She's been silent for 30 minutes.

0724 - He's sung 33 songs since last noted. He's 20 feet up in 2 , sings 7 songs to $0726-1 / 2$. At that time he goes to 3, sings 9 songs to 0728 .

0728-M54 flies across deep into 2, falls silent.
0729 - He sings 1 skid there. There is an encounter with M53 with fight calls and with both males singing insipid steps. I can hear a female calling. M54 begins to skid at 2 after 8 insipids. M53 skids. M54 is 20 feet up in 2 singing, M53 somewhere to the $\mathbb{E}$.

0734 - 1454 has sung 17 songs, now goes to 3 and sings from a. $20-f 00 t$ perch. 54 F is and has been out of sight.

0737-M54 glides from his perch down to the W and 54F flies past and over him, going W . He glides N to 3 . He now sits 12 feet up; she feeds at from 1 to 4 feet. She is silent; he keeps looking around.
$\underline{0747}-54 F$ moves and $M 54$ glides down on her. There is a chase ending on the ground, where for 5 seconds he pulls her tail hard while she hops, or tries to, forward. She then turns and pursues him for 10 yards. He sings once during the pulling, has sung 27 times to now. He then goes to 3 and sings. She flies to and beyond him without eliciting any pursuit.

She sits motionless for $1-1 / 2$ minutes, he falls silent after

## 5 songs.

0746 - M54 goes to 2 and sings. She is $S$ of 3 . He sings from 2 to 10 feet; quits after 4 songs. M53 sings insipids to
the SE quite a distance.
0747-1/2 - It grows silent. I've lost the 54 's.
0755 - Both males are 40 yards $S$ of 2 in the field
singing insipid steps. 54F is there. They move along low to the rose hedge, on or near the ground.

0757 - All 3 PN's go N, the males fighting just $S$ of 2, about 3 feet up from the ground. 54 F is on the ground, calling while staying $3-10$ yards away from the fight.

0800 - The fight ends, both males remaining in 2 and singing insipid steps. For the second time today M54 sings a step followed without pause by a skid.

0802-M54 starts to skid after 15 steps since I began to count during the fight. He goes to 4, sits 18 feet up, feeding little if any. He moves his perch after about 10 songs, flycatches several times. There are many more spiders today than previously, the ones with little horizontal webs.

M54 Nlutters $S$ in 4 . 54 F is silent and has been except when near fights; she's out of sight. M54 now sits 16 feet up and sings and preens, then goes through a full right stretch. $0813-1 / 2-545$ is in a tree 10 yards from the male. He glides down to a 2 foot high perch. She follows him, lands 4 feet away. He's sung 49 songs since last note. He now flies up to a 15 -foot perch. His flight method today I think I've got pretty clear: He travels slowly, his wings making full or exaggeratedly large beats but doing so at a slowed-down pace.

Sometimes when he's about to reach his perch or when the flight is descending, his wings seem to stop beating and he glides. In the alternative, they may then beat in a very shallow stroke but I doubt if it's more rapid.

M54 sings in 2.
0816 - After 10 songs M54 glides down from his 15-foot perch, aiming at the female which is 1 foot high. About half-way through the glide, with small beats and few of them, he sets his wings at about this angle (front view) and descends. There is a 4 -yard chase to the ground, where he pulls her tail, sings I full skid and I fragnent. She turns and after 2 seconds of his pulling drives him away; she flies 5 feet after him.

M54 goes into 4 at the $S$ end; she goes to a 2 -foot perch. At 0817-1/2 he begins his usual skid, moves in a minute to 3 and perches at 18 feet. I'd say that typically today he's been perching not at the tops of the trees but about $2 / 3$ of the way up.
$\mathrm{He}^{1} \mathrm{~s}$ singing less frequently, feeds in a cedar. He then flutters with the large beats (this means only that flight is slow and beats not shallow) to a dogwood; back to the cedar.

0818 - He flutters with large beats to 2 after 15 songs to now. At 2 he skids, feeds 3 feet up, The female flies up to him there and instead of pursuing her he flies from her to 3 .

0828-1/2 - After 17 songs he flies SW, going fast and high. She follows.

0829 - He begins to sing from 1 foot up, S of 2. 54F flies to a tree 10 yards from him, then into his tree, I foot from where he sits. He flutters slowly away 10 yards, continues the song.

0832 - After 8 songs $S$ of 2 he begins insipid steps and M53 skids to the SE. M54 goes well E toward I, has an encounter with M53. 54F goes along, is 15 yards $W$ of the action. The 2 males fly from 1 to 10 feet with bouncing flight, keeping within 3 to 10 feet of each other. About $90 \%$ of the time they are within a foot of the ground. 54 F calls a few times, preens while 1-1/2 feet high. M53 makes a supplanting attack on the other male. M54 flycatches during the encounter at least once. When supplanted he sat stiffly on his new perch, body nearly level, head forward, wings slightly out from the body at the Wrist. 54F is calling a good deal at 0839. M53 is giving an anger call. Once the 2 males meet in mid-aix, flying at each other to within an inch or so, M54 turning away. He had started toward M53, who cane out to meet him. In general the 2 males are silent, simply moving near each other.
$0840-1 / 2-M 53$ seems to have withdrawn 10 yards, and both males increase their songs. 54F goes on feeding 1 foot high, calling. At 0842 the males step up their fight, give anger calls. 54 F flies to M 54 , who attacks her, and she withdraws 5 feet. The males are 10 feet apart. M54 flies and is checked by M53. M54 flies toward a little tree and M53 goes to it; the former with-
draws. They are moving slowly $N$ to the $E$ edge of 2 .
0845-M53 £lies to 1, skids. M54 goes 15 feet up in a tree in 2 , sings, 1453 returns and $53 F$ is with him. Twice M5'4 attacks her mildly, flying at her; I think she may have attacked him too. M53 quite surely turns on 53F and attacks her. The 2 males flutter up to 12 feet. All 4 PWb are within a 10 yard area, calling. There are 2 aerial encounters between the males in 2. M53 flies to the ground, holds his tail at a $45^{\circ}$ angle, opens his bill.

0848-1/2 - After 25 steps so far 1454 begins skids.
0850 - He turns away from M53, which is 4 feet away on the ground, flies $W$ to 3 , flutters as he gets near it, begins to sing. He's sung 4 times in the last $1-1 / 2$ minutes. M53 is singing insipid steps in the W part of 2, frequent; he must be the winner.

1954 is N of 3 , goes to 4 . 54F quickly flies to within 1 foot of him, 10 feet up, and he inmediately leaves and glides (i.e., hardly any wing beating) 12 feet to a perch of the same height. He sings one full song in flight. Now he sits and feeds 12 feet up in a cherry, then moves around singing within a 15 -yard area. He flutters slowly to 3 , sits 25 feet up and feeds very little. 54 F is not in view.

0902-54F flies to a tree 15 yards from the male and below NB
glides to a 2-foot perch. He's sung 45 times in this series, goes right on. I quit a minute to rig a trap.

0908 - He's singing in 3, never having stopped. 54F is on the ground at the $S$ end. He moves $S$, then $W$ to the $S$ end of 4 ; stays about 8 feet up. M53 is singing numerous insipid steps. M54 goes SW to the pines at 0915, flutters. His songs stop after a series of 24 .

0916-1/2 -1544 sings in the pines. 54 F goes into the center of a dense 6-foot cedar, stays $I$ minute. Is she exploring for a nest site? M54 sings in a pine 15 feet away. He flutters (with the wing beats shallow at the end) to a 3 -foot tree, sings in the field, feeds on the ground. He flutters on 5 feet more. She is in his sight. He flutters 10 feet up to a tree. She follows him in a second or so and he goes on $N$. She's near him, on the ground.

0925 - He probably swoops on her though I can't see a pursuit. (The wind is in the E.) Both go NV along the E edge of 4 . 0929 - He quits singing after 28 songs, goes $\mathbb{E}$ and a fight begins. His flight over was very direct. The males are at the $S$ end of 2 , 53 F on $\mathbb{E}$ a few yards calling. The fight is noisy; there is a flutter-up and 1154 supplants. There are numerous squeaking calls and at these moments $53 F$ gets quite excited and flies up to the fighters. M54 returns to 3 for 15 seconds, sings once, goes back to the battle in 2. (Note that the 54's haven't gone $W$ of 4 today). There is insipid singing by both males, but it is too frequent and similar to count M54's songs. I think I hear both females. The males go on singing in the $N$ part of 2 .

I'd guess they are about 10 yards apart, not flying at each other but moving parallel or in short hops E and W.
$0942-1 / 2-1154$ breaks off the fight, goes NW into the woods where he sings insipid steps. He goes on $W$ to $X$, still singing steps. He sang 13 times to 0945 (?).

0945 - Silence.
0947 - 54 F comes out of the woods at the N end of V, flies SW to the pines on the $W$ edge. M5L begins to skid at the little ravine $W$ of the fox den.

1954 moves $S$ in 5 or 4, singing loud regular skids. He now sits 20 feet up in 4, fly-catches, goes S. He flutters down 5 feet to a lower perch.

0959-M54 flies W after 44 songs, goes on singing in 5. He moves short distances between songs or after a few of them. He glides into a dogwood near me. (I hear several chatter songs to the $\mathbb{E}$ ).

1004-54F is I foot high, near me. M54 flutters toward the E 20 yards. She inmediately flies the same distance E, i.e., almost to him. He goes on singing, 19 songs since 0959 .

1006-1/2 - After 6 songs, they are perched in the same tree, he 12 feet up, she 5 feet. There is a pursuit out of sight, but evidently it was typical with a song as the end.

1007-1/2-154 begins to sing. After 2 songs there is an encounter with the female, either a pursuit (probable) or a glide. She now feeds on the ground and he sings 18 feet up.

He chases a PW (?) half-heartedly for 3 or 4 feet, and at 1014 he gets into a fight with 1953.

Both females are here. M54 sang 7 times to 1013-1/2 before the fight began.

1015 - I go to T53. The fight is very vigorous at 1017, with 2 flutter-ups to 12 feet, each lasting a second or two. Both females are present.

1022 - The fight ends.
M53 goes to the tree tops at the E end, sings a few faint skids. I see him glide in a dive on 53F; there is a pursuit with a song at the end. I follow 53F; I think he does too.

1028-1/2 to 1034-1453 sings 10 times. The female is very active, feeds from ground level to 4 feet. She goes from tree to tree, but I see no sign of nest materials' being gathered. She flies to a pine where M53 sits. He crouches dow in a fork, sings, flies straight away fluttering a little. She was 2 inches from him. She nest-shapes. I stop to write and lose them. (While I followed her she called a high "chick" about once each 10 to 20 seconds in the pine field. M54 is singing.)

1039 - After a silence there is a faint skid at l, then 4 more.

1045 - I leave $T 53$.
1045 - Silence on 954 for 10 minutes. M54 feeds on the ground, then sings irregularly. While I get ready to go I hear
loud regular skids from M54. No sign of 54F.
I find a Cardinal nest in the NE comer of $\nabla$. 1100 - I leave.

1300 - I return. M54 is singing $S$ of $4 ;$ M53 is singing insipid steps in the SE corner. I begin to watch the 54's.
$1 M 44$ sits 17 feet up in a tulip tree singing, moving little, not feeding.

1303-1/2 - after 13 songs he flies $S$ to the field and I see the female there, 1 or 2 feet high. One song, then silence. She flies $S$ to the pines. He flutters about, feeding at 1 or 2 .

1306-1/2 - M54 flutters $N$ to 3 and sings there. She is 10 yards S of hin, calling.

1308 - He flies across to 2 and fights M53. 54F calls at 2 feet, 15 yards $W$ of them. There were high squeaky notes just before the fight calls. Both males sing insipid steps. The encounter lasts to 1310 .

I follow 54 F as she feeds along to the N about $0-5$ feet high, $90 \%$ of the time at 2 feet. 1154 goes to 3 when the fight ends and sings skids. 54 F keeps going N. I see her at 1313 go to an elm and crouch down in a fork $3-1 / 2$ feet high. She repeats in 30 seconds, turning around twice and clearly showing early building behavior. M54 keeps on singing
and I write. There is no material gathering. M53 sings insipid steps to 1315 , then skids.

1318 - I begin to look again.
1321 - The males fight again in 2, M54 having sung 26
times since 1310. There are squeaky and whining notes before the angry fight calls. 1533 sings steps; now both do. Like the last fight, this one seems to have been simply one angry flight by $M 544$ at $M 53$, with calls. I think 54 F is calling nearby.

1325-M54 leaves the fight at 2 and flutters NW toward the fox den. His flight is definitely with slow wing beats. The are may be great, or the beat may simply be more visible. He flies up to 22 feet in the woods edge trees; this flight is a flutter too. As he prepares to land his wings cover a shallow are and for a short time stop beating. The female is below him at 10 feet. He sits slightly hunched, turning his head a lot. He sings 4 faint skids. She climbs to his height, and when she is 10 yards from him he swoops on her and there is a 2 -second close pursuit to the ground. He sings there as he pulls her tail. She turns on him and flies 5 feet after him, lighting then on the ground.

In 20 seconds, at 1331 , 2154 begins to sing again. (He sang 13 times after leaving the scene of the fight.) I write to 1335 , count songs from 1331. He moves $S$ in 4 , across to 2. There, after 10 skids since 1331, he begins steps at
$1335-1 / 2$. 54F is at 4 feet, below 1554 on the edge of 2 . M53 sings steps near 2. 54F calls 10 times, once a second "chick". She then continues less often.

1340-54F crosses to 3 . 1454 stops his step songs at 1340 after 19, flies to 3, skids twice. He is 18 feet high. She flies to his vicinity ( 5 feet) calling. He glides down 20 feet past her. At 1343 he sings 1 skid in 3 .

1344-54F flies on a tangent toward 154 and lands 15 feet away. He turns and flutters away from her 10 yards, his wings moving in full beats, very slowly. He falls silent till 1346 after 4 songs.

1346-154 sings I skid in 3 .
1349 to 1352 - He begins to sing in 3, 7 times from 18 feet up; he then flies after an encounter with a White-eyed Vireo which was 1 foot from him for 30 seconds. I can't tell which is the aggressor.

M54 sings 12 times to 1358, falls silent. I've been following the fenale as she moves first along the ground $N$ to the fox den, then goes up to 20 feet in a cherry tree. 1954 flutters before her 3 times for 5 or 6 yards at a time, then climbs to 20 feet and moves through the trees as she goes along. From the den he goes to 5 , then $\mathbb{N}$ to the woods, where I lose both. Silence after 1358. She was vocal oniy when indicated. When he fluttered she would fly to the vicinity of the spot he vacated; she almost surely beat her wings slowly too, although not nearly so noticeably.

I see a chipmunk at the fence row.
11406-M54 sings in the high trees $N$ of 4 , goes $S$ to 3, sings 7 times to $1 / 10-1 / 2$, flies from 20 feet to a 5foot perch. 10 yards $E$ and there begins to call a hard "chick" and sing steps $S$ of 2 . The 2 males are 2 feet apart, then separate to 15 feet. 53F is near. 1453 goes E, returns in 5 seconds, and $M 54$ gives a series of loud squeaky notes. M53 sits 12 feet high with open bill. He suddenly chases $M 54$ to the $S$, off $V$ and to the woods across the fairway; their flight is slow, bouncing; they are 10 yards apart. M54 returns in 20 seconds, sings 2 faint skids from the SW comer. M53 sings steps near 2 or in the pine field. The chase was at 1474 . Silence from $M 54$ after 1415 . 11118-1/2 to 1440 - M54 sings 68 times while staying above 15 feet $85 \%$ of the time. I find him in the field $S$ of 4 and follow as he progresses from there to 5 , to $4, N$ through 4 to the woods edge, 5 to 4 , to 3. Nuch of the time he feeds. No sign of 54F. At Ihlo, $S$ of 4 , he flutters in flight with full slow beats, doing so twice over a total distance of 25 yards. I see 54 F within 15 yards of him. She flies to him in a tree; he's 6 feet up. As she lands he flutters away 15 yards. (Note that fluttering is at low heights). She doesn't follow but goes to a tree full of tent caterpillars; there she feeds but not on them. She turns E, though he is W. He follows in a minute, flying high.

M54's song stopped at 1440, began at 2442. I write but count songs; 17 to 1451 , when he is silent.

1453 - There is an encounter $S$ of 2 . The 2 males and 54 F are there, perhaps 53F too. 54F calls, stays low. The males simply stay within 10 yards of each other and sing steps, insipid and faint. The first sign of the encounter is a series of squeaks. At 1457, M53 begins skids, singing 8 in 3 minutes on the $\mathbb{E}$ edge of 2. M54 seems to be just across 2, singing insipid steps.

1500-I see no female and can hear only M53's faint steps. I leave the 54 's for a while to cover XI and T53. As I do I hear 1544 skid in the $N$ end of 4 .

XI from 1505 to 1550 - No sound of a PN while I work on these notes.

1555 - I sweep cherry, dogwood, field cover, and white pines. Weather conditions are ideal; big yield from the cherry, very little from the dogwood.
$\$ 53$ at $1615-M 54$ is singing steps in 2. M53 sings a skid on the $\mathbb{E}$ part of his $T$. I find him 10 feet up in a dogwood uttering 2 bursts of angry calls, at 1616-1/2 going toward 1.

M53 sings only 12 times to 1633, never more than 2 songs from a perch and usually only 1 . He moves a good deal, covering the whole pine field. While I have him in sight he spends $40 \%$ of his time in the small pines, $60 \%$ about $20-25$ feet up in the edge trees. The angry bursts of calls mentioned above he repeats about 4 times during
the first few minutes. I see him in the pines, about 5 calls per burst. Once I hear "tsp" notes though I can't be sure it's he; I look up and he is watching a Broadwinged Hawk come over $V$. He doesn't freeze.

At 1630 I find 53F feeding very quietly on the $\mathbb{N}$ end of the territory in the $\mathbb{E}$ corner. She pays no attention to a song by the male and goes at least 15 yards into the woods, where I lose her.

1633-M53 comes to the NE corner and in 5 minutes sings 6 times, all from 12 feet up and higher. At about 1638 he goes to XI and there sings 8 songs to 1645 . Meanwhile I find 53F feeding 10 feet E of the woods line to the E. She is high, 15-20 feet. Once she pulls an 8 -inch piece of grape bark from a vine, 18 feet up, and holds it for 2 seconds. She then goes on feeding. He returns from XI at 1646, silently. While he is 15 yards from her at her height and silent, she calls for the first time since I've watched her. I take this to be a sign of sight recognition. She flies down into the field but is not followed. He sings 3 times to 1648 , goes $W$ ( $I$ think) and $I$ hear insipid steps there. She flies S to $I$ and I lose her.

I find M53 S of 2 at 1650 . He sings an average of 2 high steps a minute there till $1656-1 / 2$, from 2 perches; the second is 10 feet high and he preens on it.

1656-1/2-M53 sings a skid and goes $E$. Here he sings 2 more skids and, to my surprise, 35 type-8's, to 1710. He
perches 35 feet up in a sassafras at the woods edge and for a time preens. Then he begins to sing sotto voce, and the last 10 or so songs are that; some are quite abbreviated too. He keeps looking down and finally at 1713, after about 4 minutes of this behavior, he swoops down and chases a small bird to the ground (or to a low branch) just out of my sight in the woods; the pursuit is about 15 yards. I squeak and the female irmediately comes from the spot, so there is little question. She then hops about near me ( 6 feet), examining me closely, preening, feeding. She also utters 4 or 5 "tsu" notes, which may therefore be a sign of mild excitement or attention. She then calls 4 "checks."

The type-8 song is usually of 8 notes, the first 4 on the same pitch, the fifth about the same, the last 3 increasingly on a lower pitch and with less stress. Often the last and sometimes the next-to-last notes are omitted.

1722 - I look up to find the two 53's perched within 1-1/2 feet of each other on a branch about 10 feet from me. The female hops on and he flies at her mildly without eliciting a reaction. They move on $S$ along the fence row, staying within a few feet of each other, silent. A Bluewing was within about 5 feet of them, but there was no incident.

## 1725 - I leave T53.

M5'4 has sung at least $1 / 3$ of the time while I've been on 153 ; quite likely he's sung more that I haven't heard. Many songs were steps.

T54 at 1730 - Silence till 1732, when M54 skids once E of 3. At $1733-1 / 2$ a skid. At 1738 he flies into a little tree by me, perches, moves about for 30 seconds with his bill open and his wings slightly extended. He flutters 20 feet, the last 5 with his wings not beating; and 54 F flies up to a spot near the one he left. He flutters on with slow beats and she follows a few feet. She goes to the tree she was in earlier, and in the same fork she goes through nest-shaping motions. She then hops about the tree for 20 seconds, returns to the fork and shapes; each time she does this about 10 seconds. She flies on to the fox den and when climbing over a grape does not pull at shreds of loose bark.

M53 sings a chatter and in a minute M54 sings 3 of them in 90 seconds. He flutters to a perch, flies E across 2 at 1745 . She feeds from between $1 / 2$ and 3 feet near the fox den.

1750-154 returns, probably having sung step songs $N$ of 2. To 2756 he sings 9 times. Neanwhile he flutters before 54 F , stays low, feeds. She moves along in the 3-2 clearing, nest shapes at heights of 2 to 5 feet in elm, red pine, grape. She may flutter a little. I think she
pulls at a plant fiber.
1758-1154 begins to sing chatters $S$ of 3 . (I saw a PW eat a green larva today, the first this year.) She is silent and I lose her. I write to 1802. M54 has sung 4 times to then.

1803 - I begin following again. M54 goes to the field to the S, returns from a low perch, flies through 4 to 5 . His songs are irregular skids. His flights are long, with no fluttering. $M 53$ is singing a chatter and at $1808 \mathrm{M5} 4$ does so. M54 sings 8 songs from 1803 to 1809 , is silent thereafter. 1453 is singing a good deal, all chatters. This song may be described as jerky, staccato.

1816 - M54 begins to sing chatters in 3 . His songs are frequent to 1822, 26 of them. There is a pause to 1827 , then 2 quick songs and silence. Meanwhile I follow 54 F as she feeds for about 8 minutes in 3 and the clearing $W$ of it. She stays near the ground the entire time; her maximum height is 5 feet. She calls repeatedly, perhaps 1 time per second for the first minute I watch her. There is no encounter with the male and at 1828 she flies across to 2 and I lose her. The last 2 minutes in 3 she tried hard to get into my water-drip trap but never got on top of it; she

once. M54 had several encounters with M53. 53F picked up nest material once but seems not to have begun to carry it.

## May 4, 1956

An overcast wam pre-dawn, clearing a Iittle as the sun rises; there is a slight $N$ breeze, temperature $62^{\circ}$ at 0500. Present from 0530 to 0855 , from 1345 to 1625 , and from 1920 to 2000; Rickert present from 1335 to 1635 .

0535 - Arrive on V. M54 is singing and I follow. He's in 3 and $54 F$ is calling low there; his song is irregular. By 0549 he sings 32 times.

0549 - Both birds go to the $S$ of 2 and meet the $53^{\prime} \mathrm{s}$. 54 F calls while the 2 males fly back and forth within $3-10$ feet but do not have a serious fight. Once M53 darts at M54 and supplants him. M53 sings insipid steps, M54 singing nothing I can hear. Once $M 54$ flies to a little tree where $54 \mathbb{F}$ sits, but there is no pursuit. They all go $\mathbb{N}$ into 2 and I lose them.

0556 - 1154 begins songs and I count. 1553 pursues him at about 2 feet in height across 2, past the fox den and the ravine, out of sight. M54 sings in 4 in 20 seconds. He is staying about 20 feet up.

54 F is near me feeding on the ground. She goes up to M54's 20-foot perch; he glides 15 yards down to 1 foot, but she doesn't follow. She is silent, He stays low for $1-1 / 2$ minutes, goes up to the trees in 4 and sings. He moves $W$, sings 2 faint songs, returns to 3 and sings regularly there.

0637-M54 flies to 3, sings. I find 54F S of 3 and watch for 1 minute while she feeds on and near the ground. The male is 10 feet high but not nearby. She is silent. She goes $W$ and I lose her. I see $M 54$ flutter very slowly out across the blackberry field to the pines, feeds about 1 foot high for 2 minutes (in silence), returns to 4 . He begins to sing regularly in 4, perched 17 feet up. He doesn't feed here. His interval averages about 22 seconds. (The weather began to get bad about 0615 . It's cooling, overcast; fairly steady $\mathbb{N E}$ wind, although the wind shifts a good deal.)

0650-M54 crosses to 5, sings. He's sung 23 times since 0637. After 2 songs he returns to 4 , feeds at 15 feet and sings. At 0656 he flutters from I tree to another, still 15 feet up, and I see the female feeding in 4 from ground level to 3 feet. At 0658 M 54 flies NE after 15 songs and I stay to watch 54 F . I think it's notable that he did not swoop on her or remain longer. I watch her feed along low till 0704, when I lose her in 3.1544 has returned and he sings in 3 and 4, staying high. By 0705, 21 songs; then silence. $0711-1 / 2-1154$ sings in the field $S$ of 3 . I follow him till 0717 as he ranges well E to within 30 yards of 1. He stays low, feeds at 1 foot or so, sings only 11 times. At 0717 I lose him until 1718, when he returns $\mathbb{E}$ and has a 1-pass encounter with 1453 ( 53 F present). He then goes to 2, sings 7 times to 0721, and I lose him. No sign of 54 F any of this time.

0723-1454 begins to sing with some regularity and I follow him steadily until 0753 . He moves through the $4-3$ area and stays at 20 feet or so at first. He then gets lower at the fox den and even goes to the bare ground of a tree excavation. Here he twice picks at something; I'd
 pay no attention but a Cape Nay Warbler does the same thing in a minute, and I think the latter is eating the dirt. M54 at 0739 has a brief encounter with M53 at 2, but M53
pays little attention and $M 54$ soon returns. He still sings with considerable regularity. He covers all the territory except 5 and the $W$ side. Frequently his flights are quite direct and fast and cover as much as 50 yards.


At about 0740 M54 goes all the way SE to 1 and sings insipid steps without provoking a fight. In I minute he returns to his territory. At 0715 he makes short flights out to 1 ; I hear $M 53$ to the $N$ of $N$. M54 then moves N
 through the pine field, calling "check" but not singing on this excursion (he also calls "tau" a few times at first). Song stops at 0748 after 86 since 0723 .

Finally 154 meets 153 in the $1 \%$ center of $T 53$. 1453 simply sits 12 yards away and calls "check," moving his body about rather nervously. NSL sits quite still, 7 feet up (053's height). N54 turns his back in 4.5 seconds and atsys thus for 30 seconds. Finally he flies MW toward the fox den and 153 flies in the same direction but not in a true chase. There is some singing, but I write.

During this hale hour $T$ sam no sim of 545 nor anything In M54's behavior to suggest a female's presence. He stayed above 15 feet about 50 / of the time, most of the rest below 6 feet. Ind say he fed about $75 \%$ of the time or more, i.e., took food as the occasion offered.

0815 - I finish writing. An Orange-crowned Warbler is feeding 15 feet from me, the first I've seen in spring.

During the last 5 minutes the male PW's have had what sounds like a slightly more vigorous fight in 2 than any this morming. M53 was singing in 2 prior to that.

I would say that the weather cannot account for the changed behavior of the 54's; they were not paying much attention to each other even before the cold front arrived. At 0815 I go to $\mathrm{T5} 3$, with 1544 now singing regularly again.

T53 at 0815 - No song to 0831, when M53 starts to sing chatters in 1. I hear 53 F calling "chick" there, and I'd say that she calls more frequently after the male sings. I follow her; after 5 minutes she goes $S E$ to the woods $S$ of V, (about 25 yards) and for 5 minutes feeds in the higher trees, 20 to 30 feet high. She quit calling, I think at about the time she left the territory. M53 comes to the woods in a minute and sings along its edge and as much as 20 yards in. By 0852 he's sung 32 times, all but one of them chatters. Then he returns to 1 ; 53 F did so 3 minutes earlier. I can hear a male singing chatters far in the woods.

It almost looks as if the 53's have quit their territorial behavior. Note the lack of fight intensity. I'd say 53F spent $75 \%$ of her time at 15 feet or higher; this of course chts could be due to the leafing out of trees. There was no gathering behavior when she was on the ground.

0855 - I leave T53 and the area.

1245 - I retum. It is completely sunny and has been for $I$ hour; temperature $60^{\circ}$ and wind rather steady in the $N$. XII - No sound in 5 minutes.

T54 at $1302-M 54$ sings between 3 and 4 and $I$ begin to follow. M53 is singing insipid steps near 2.

M54 sings in 3 for 12 minutes, flies $N$ to the ravine at the edge of the woods, and after singing 2 minutes in the high trees there goes $N$ to $X$. He then falls silent at $131 l_{4}$ after 28 songs so far. I'd say he is keeping at high and medium levels.
$1315-1 / 2-1544$ reappears, sings 7 songs 25 feet up in a fox den tree, without feeding. He then flies straight and high to the $W$ out of sight, at 1317. He goes at least to the edge of V .
$1320-1 / 2-1 / 54$ sings in the $S$ of 5 , moves across to 4 , to 3 , to the high trees ( 40 feet up) E of the fox den. His songs are fairly regular but not frequent. In the big tree he sings 2 or 3 fairly faint songs. At 1328-1/2 after 18 songs he flies fast toward the $S$ of 4 . I quit a minute to talk to Rickert; M54 sings a good deal in 4 at this time.

1338 - I begin again. Rickert goes to $\$ 53$. M54 has been silent 8 minutes.

1340-A PN with a red back flies fast over me about 25 feet high, going E; he lands in 2 and then quickly flies
far E. Since his back is red, he's M53 or a non-territorial bird.

1347 - I find both 1454 and 54 F S of 2 in an encounter with M53, a mild one, for the most part silent. The 2 males simply perch for a few seconds at a time within 10 feet of each other and then shift position, usually laterally. Once they get within 6 inches and there are fight notes. I watch 54 F and at one time M54 flies into a tree I foot from her, perches below her, opens his bill, spreads his wings a good deal more than usual, and levels his body as in threat. He then flies back toward. 1453. I follow her as she moves $W$, and until 1405 I have her in sight; she moves through 4 to the $N$, her height ranging from 2 to 15 feet, mostly about 4 (60\%). She was calling "check" faintly during the fight, now is silent except when 1554 sings. At least 4 times she calls a sharp "tsu," more nearly a "tseep" just after he sings but only when there has been a pause between songs. At first he sings infrequently, but after 3 minutes the songs are about 15 seconds apart. From 1352 to 1405,28 songs.

At Il405 I'm watching the female and he swoops on her from 22 feet (she's at 5) and there is a long pursuit with the two separated by about a foot. She doesn't go to the ground immediately but twists around through a tree. Itd say they fly 40 yards in and out before I see them go to the ground out of sight. He sings a somewhat broken song, then
flutters along near the ground for 8 yards. I sit to write this at 1406 , finish at 1415 .

1407 - M54 sings in 3 and 4 till 1417, moving a good deal and probably staying high. He sings 31 songs, goes to 2 and keeps right on singing.

In a minute he emerges from 2 and goes to the fox den tree, where he sings 21 songs to 1425 . He is low all this time, 15 feet and under, $60 \%$ of the time under 10 feet. He flies to 2 at the $N$ end at IL25, is silent till IL427-1/2. I think I hear some calls in 2 .

11427-1/2-1454 begins to sing in 3 .
(I neglected to note that 54 nest-shaped for 5 seconds in an elm 3 feet high in the $2-3$ clearing.)

11430-M54 is silent after 7 songs, the last in the $N$ part of 4 or 5 .

1432 - He begins to sing in the high trees, 30 feet up, at the ravine. After about 5 songs he flies straight to the field $S$ of 2 and feeds there for 6 minutes, about $2-1 / 2$ feet high on an average. He calls a few faint "checks." Then he goes to a 10 -foot cherry on the $S$ end of 3 and feeds. To my surprise he sings 3 type- 8 steps here, plus skids. At about $2 \omega_{12}$ he goes $N$ to the edge of 4 and sings near the woods, working his way back, singing infrequently.
$\underline{\underline{4} 45}$ - He's sung 32 songs since 1432 .

1145 - M54 is in 4 singing occasionally. No sign of the female. He sings twice to $1447-1 / 2$, then goes to 2 at 7449. I find him $N E$ of 2 after 2 songs. He's calling "check" 20 times per minute, going $\mathbb{E}$ at about 2 feet in height. Here I see 53 F (followed by Rickert) sitting 1-1/2 feet up in a little tree calling "chick" at least once a second. She sits motionless, her head somewhat drawn in. 1454 sits 10 feet up, 10 yards away, and watches her intently and silently. This (at 1455) lasts 2 minutes without any movement. M53 comes $N$ (audibly) at the time. At $1457 M 54$ flies a few feet away fran $53 F$ and $M 53$ immediately lands near the vacated perch. He then pursues M54 NW into the woods out of sight. M53's chatter is audible $N$ of 2, and then it comes W. I write to 1505 .

1505-1508-No songs by M54.
$1510-1954$ begins chatter songs, which 1453 is singing too. I leave T53.

XI from 1513 to 1550 - No sound of a PN while I work on my notes.

1553 - As I pass through $V$ there is a fight only 10 yards W of 1 with all 4 territorial birds present. Note the location. 54 flies $S$ to the rose hedge and later I see 53 F there too. In 5 minutes of watching 53F I see no nesting behavior.

One of the male encounters is pretty vigorous with the 2 fluttering up to 3 feet, dropping for an instant to the

# 719 $5 / 4 / 56$ <br> VIN 

ground, then fluttering up to 4 feet before each glides (a little) out of the fight.

XIT at 1615 - Not a sound for 20 minutes. I watch
2 Cape Mays.
1625-I leave.
See next page.

I (Rickert) arrive at 1335. It is warm, fair, cloudless, with a $2-3 \mathrm{~m} . \mathrm{p} . \mathrm{h}$. breeze. I go to T 53 to follow that pair.

T53 at $1335-M 53$ skids 2 times, sings 2 insipids to 1330. He stays between I and 8 feet in 2 .

M53 has a 10 -minute encounter with the 54's, each male singing 6 insipids. He then moves 75 yards N , at 1355 begins skids at 4 per minute. (M54 left the encounter area about the same time as $M 53$, went to $3 ; 54 \mathrm{~F}$ went there a minute earlier.)

I402 - 1453 goes to the pine field, sings 4 skids a minute till 11409. In another minute he goes SW to the E edge of 2 , resumes singing at $2 l_{17}$ after 5 minutes' silence. He sings 8 songs to 1419 , then 3 more, then falls silent and I lose him.

1429 - I find 1453 skidding in 1 . In 8 minutes he goes into the pine field, where he feeds at about 7 feet in a $10-$ foot pine. He sings 4 times here to 1446 , goes $N$ and I lose him. He begins the flight by dipping 2-3 feet just as he leaves his perch, flying at a height of 2 feet or so.

1500 - I rediscover 1453 , singing chatters in the $N E$ part of 2. He sings 7 songs to 1502, then goes to a $35-$ foot perch in a woods edge tree. After 4 songs in 1 minute he disappears.

1510 - I find $M 53$ at the $N$ of the pine field. He chatters 6 times to 1515, falls silent.

T54 from 1545 to $1635-1154$ is in the $S$ edge of 2. He sings 3 times from 1545 to 1547 , leaves his perch in the manner described above, falls silent. I lose him.

1605 - I find $M 54$ in 3, where he stays till 1624. He sings 3 skids between 1606 and 1609 , 5 between 1615 and 1620.

1624 - M54 moves to 4 , sings 1 insipid, immediately goes to the fox den and sings another insipid.

1631 - He flies to 2 where he remains in silence.
1635 - I leave.
See next page.

1920 - I return. It is clear and still. M54 sings in 2 , moves to 4 , goes to the ravine trees, flies to 5 . He calls "check" about 15 times.

1925-1/2-M54 falls silent after 9 songs.
The vegetation is progressing thus: Locusts aren't leafed out, and except for cherries the woods at a distance looks fairly wintry. Tulip poplars have leaves $1 / 4$ normal size, hornbeam and ironwood about $3 / 4$. Poison ivy shows folded leaves today; grape and creeper are bare. Black-and raspberry are in leaf, about $3 / 4$ size. Dogwood flowers are at their peak on some trees, not yet so on others. Very tiny redbud leaves on some trees only. Elm leaves are about $1 / 2$ their sumer size and luxuriance, and maple leaves are still only about $1 / 5$ size, drooping and not flat. Sassafras leaves have burst the buds but aren't unfolded; they form inch-long pear-shaped clusters at the tips of branches. Sycamore leaves have just barely appeared.

Nighthawks arrived tonight.
Not a sound of a PW from $\$ 53$ or XII, and at $1943 \$ 54$ has been silent for some minutes.
$\underline{2000}$ - I leave.
It was $65 \%$ sunny today, $100 \%$ yesterday.

May 5, 1956

A partly cloudy dawn with a mild $S$ breeze; temperature $50^{\circ}$ at 0530 . Present from 0530 to 1130 and from 1430 to 1730.

T54 at 0538 - M54 is singing irregularly, beginning in 3. After 3 skids in 2 minutes he goes to 2 , sings 8 steps, returns to 3 at $0542-1 / 2$.

He feeds and sings IN through 3 at about 15 feet, goes to 2, then into the field SE at 0548. He sings 29 songs to this time. I find the female feeding silently near the ground and on it. At 05501954 meets $M 53$ and until 0558 they sing near each other and make an occasional pass or sortie. 54 F begins to call at about this time and probably because of the fight; I watch her. M54 sings probably 15 or 20 times, nearly all steps but a few skids, l or 2 faint. At 0558 he returns to 3 and begins frequent skids. M53 sings insipid steps.
$0601-1 / 2$ - There is an encounter with 54 F in a tree $S$ of 3 , without a pursuit at the end. I hear a series of high notes uttered close together, a sort of squeak. He flies from the tree and she stays. To this time, 10 songs.

I then follow the two as they feed within 15 yards of each other in the field, staying in the field cover. At 0602 to my surprise 54 F utters a song, throwing back her head and with some appearance of effort giving 2 rasping notes, the first longer, a little like those at the end of a combi-
nation step. I follow her till 0613 and lose her. M54 sings 34 times between 0604 and 0614, all the songs SE of 2 , most of them steps. 54 F feeds $\mathbb{N}$ into 2 and I lose her.

0615 - The 2 males have a noisy fight at the $S$ end of 2 with both females present ( 10 yards) calling. I'm nearly sure that during the meeting each male at one time turns on his mate and drives her. At $0620 \mathrm{M5} 4$ withdraws, followed inmediately by 54F. He returns at $0620-1 / 2$ and begins to sing steps. M53 sings steps 20 yards to the N. "Isu" notes were heard during the fight a few times.
(3 female Cowirds in 3)
I follow 54 F as she feeds low along 2, then flies into the high woods trees, drops to the E and escapes me at 0629. To this time 154 has sung 26 songs since $0620-1 / 2$. He is silent for 4 minutes till 0633, begins again in the 3-2 clearing. (I could have missed faint songs.) When 54 F passed the little elm in the clearing a few minutes ago, she nest-shaped for 3 seconds.
$0637-M 54$ flies over to the $S$ of 2 and begins step songs. 1453 comes to within 15 yards and when M54 flies into 2 the other male follows. 53 F calls nearby.

0640 - So far 26 songs since 0633 . Now a short silence. Then squeaky fight notes, "ehurs," harsh notes (thus 3 kinds) in 2. I can see the encounter in the tree. Once they flutter up to 2 feet, then flutter at that level over a yard
or so horizontally. No singing after 2 or 3 skids by M54. They are in the E edge of 2 .

0647-0652 - All 4 birds move along N and S, S of
2. They are within 10 yards of each other. The males sing faint insipids occasionally. Heights are 6 feet and less. All call. The action is now mild, with only I or 2 passes. The 54's go SE toward $I$ and are not followed until 0654. M53 then flies there, and there is a fight. He sings, but I can't be sure about M54. (A cool E breeze has sprung up.)

0657-1/2 - I find the 54's feeding in the field $S$ of 3 and watch them both for 1 minute before losing the female. Their height is about 1 foot. I stay with the male, which moves slowly N , feeding in the weeds till he gets to 3, then staying under 5 feet. He sings very irregularly. I notice that sometimes in flying between 2 blackberry stems he seems to move his wings more times than would be necessary and I think this is a fairly frequent type of display flight. Thus there seem to be both fast-shallow and slow-deep type flights, the latter more intense. Once in a cherry tree $M 54$ twitters for some unknown reason.

0706 - The female flies up to 1154 as he perches 6 feet up in a cherry. He stays 2 seconds, flies away with a motion showing little display. I follow her till 0710 as
she goes $N$ to 2. At one time she perches 2 feet up without moving for 1 minute. To 0710, 19 songs by M54 since 0640 .

I write till 0717. During this time 1554 sings about 2 songs a minute, possibly a few more.

A close watch of 5\%F so far shows no gathering of nest material despite much time on the ground.

The sun now seems about to come out; the wind is down.

Note the very small area the 54's use compared to that available.

0720 - I begin on the $54^{\prime}$ s again. 1554 is in 4 . He very definitely flies as described above, although the number of beats, not their shallowness, is the conspicuous feature. He feeds along between 2 and 4 , spending a good deal of time gleaning in the fox den tree; he is quite active, moves at all levels so it's hard to fix a height used most--perhaps 12 feet.

To 0731 he's sung 26 skids in 11 minutes. He then flies into the $N$ end of 2 and after a skid or two sings steps. At 0732 I see 54 F in 2 and follow her $S$ in the
elms (few here), blackberries, and fruit trees provide the only typical nest sites so far.

At about 074054 F flies up to 25 feet in a cherry, then at 0742 suddenly takes off and goes far S, I'd guess to the edge of $\nabla$. 1454 has sung about 28 steps to 0742 since 0731. I go to look for the female, hear nothing of the male till he begins to sing irregularly at 0749 in the field. well S of 3. I write to 0750, go to XII to get a chance to warm up by walking. The sun isn't out, though the sky is only partly cloudy.

I see the first spittle bug of 1956 .
0800 - I decide to cover the other areas and see the whole situation.

XII - After 15 minutes' silence here, a PW flies over quite high (I can't say it comes from nearby) and crosses the fairway to the tree strip E of III. Here it sings some 10 skids, then moves about 40 yards $S W$. It perches high and I doubt if it's on territory. This would mean XII is unoccupied. [Query]

IVS - A male sings irregularly here, a series of several songs and then silence. I watch him and find a female within 20 yards. They keep close to each other.

IVN - Silence.
NE untouched area - A very red-backed male sings skids here irregularly. He has a female, and the two behave like
the IV S birds. Both here and on IV S I watch the females for several minutes and see no building.

I - In the remnant of the hawthom thicket a male with a red-streaked back sings a chatter that should be easy to recognize again: It usually contains 1 or 2 extra notes that are added after the song seems ended. His song is quite frequent and like the IV S and NE male he sings while perched low. Ind say he has no female and that he wont stay here. [He didn't.]

XI at 0930 - I listen here for 15 minutes and hear nothing.

I would say that clearly there is a good deal of movement still going on by birds within the area and that some territories will be taken up later.

At 0900 the sky cleared completely and it became hot. The wind is in the SE.

T53 at 0950 - At 0952 I find the 2 males in an encounter in 2, perched 18 feet up and flying back and forth. 53F is 12 yards away calling loud "checks" 8 feet high. Both males sing steps, M54 more often. A locust tree has a wound in it 3 feet high, with a sticky plant fluid running out and trickling down 3 inches. A few ants and 2 beetles are at the wound. $53 F$ twice goes to the bottom of the trickle where the drop is and eats or drinks it. There is no doubt about this.

I begin looking again at 0958 after moving her away so I could examine the tree.

M53 sings insipid steps 15 yards W of 1 . At 1000 he flies at 18 feet to the $N E$ corner of $V$. Silence.

1001-1/2 - M53 begins to sing from 8 feet up in a pine, moves around till 1005 in trees of that height and smaller, sings 10 times. He flies straight NE into the woods at 1005 .

1005-1/2 - He sings in the woods, well in, I'd say, He then moves W, probably on XI's S edge, singing. I see him in the SW corner of XI at 1010, still singing, perched 25 feet up. At 1011 he falls silent after 8 songs.

1017-1/2 - M53 sings in the NE comer of V, flies out and feeds and sings in the pines for 2 minutes, flies $N$ to a 23-foot sassafras, feeds on the new leaves, keeps on singing. He then moves $\mathbb{N E}$ into the big trees, sings. At 1023 he's back on XI singing. Then he drops to 8 feet in the thin woods between XI and V. I watch him without a pause to 1053 , during which period (since 1017-1/2) he sings 88 times, all skids. His movements are these: He goes $W$ low along the $N$ edge of $V$. At 1026 53F flies to within 8 yards of him and gives about 10 loud "checks." He pays no attention and goes on feeding. After about 4 minutes he flies $S$ to the middle of the pine field, where he forages on pines, between 9 and 4 feet high, for about 8 minutes.

He then goes E to the edge of the woods, feeds on insects around sassafras flowers. I was probably wrong in saying that it's the new sassafras leaves he gleans from, for he hops from 1 flower to another (although the new leaves on maples do attract him).

53 F flies over him and lands within 15 yards, calling loud. He does not respond. He moves $S$ along the woods edge of $V$ to the SE comer, staying high. I think his songs ${ }^{\text {t }}$ volume may fall here; once a song peters out weakly. I think I hear 53 F here too, but M53 does nothing. He goes W through 1 to the edge of the field, feeds at 8 feet and below for 3 or 4 minutes. He then flies back to the sassafras trees on the E and again goes to the flowers 25 or 30 Peet up. At 1053, 53F flies into 1 and calls loudly. M53 quits singing but gives no other response.

In the interval from 1017 to 1053 I'd say that $5 \%$ of the male's time was spent below I foot, $20 \%$ below 3 feet, $30 \%$ belor 5 feat, $60 \%$ below 8 feet, $75 \%$ below 20 feet, the rest at 20 or above. He foraged $80 \%$ of the time, preened perhaps 5\%, simply moved around during the rest.

A11 the time I write ( to 1105) he is singing as before, near 1. He began again after only 1 minutes silence, at 1054.

I have seen no signs of building by 53 F today.

Note the absence of fighting in the last hour.
T54 from 2105 to 1730 - $\mathrm{M5} 4$ sings a loud regular skid nearly the entire time. I'm busy marking a Chat and a Catbird caught in my water trap (yesterday I got a Field Sparrow).

$$
\underline{1130-I ~ I e a v e . ~}
$$

Il 30 - I return. There is full sun, a slight $\mathbb{E}$ breeze; temperature in the high 70 's. I spend 15 minutes taking a Field Sparrow and a yellow-throat from my trap. The latter I banded green right, with blue paint on his tail. (This morning's Catbird and chat I simply painted red.)

T54. at 1445 - 1.454 is silent now, though he sang a few minutes ago.
$11450-54 \mathrm{P}$ appears in the $N$ end of 2 and I watch her for 10 minutes. She feeds low and preens, nest-shapes in the little elm and in a dogwood. 1154 sings well to the S beginning at 1455 . 54 F later goes $S$ to 3 but not in response to him. I lose her. He's in S 2 at 1501. He then goes to the fox den elm, sings and preens at 30 feet, and at 1505 flies far onto $X$ and sings. (M53 is singing steps and has been for some time.)

1506-M54 falls silent on $X$ after 28 skids since 1455 . 1509-He sings just $N$ of the fox den, then goes E to the $E$ edge of 2. Here he continues to sing while moving $S$. There is an encounter, with a series of males' anger calls here, and I'm pretty sure the bird attacked is 54F. She sits 10 yards away calling. This is at 1514 . I've never been able to describe the call (I've used "whine") but it now occurs to me that it's very like a Sora's song. I watch him as he sings on with the female near, 33 songs to $1522-1 / 2$, with several periods of silence; some songs are steps. Then 1953 and 53F come up (if they weren't here earlier) and the 2 males fly, mostly laterally, sitting rather stiffly and with wings slightly extended. Once 54F flies into M54's tree and I think he drives her out. The males move $N$, making an occasional pass and staying 6 feet and under (there are few fights at over 15 feet). 53 F is calling very loud "chicks." At about 1526 there is a violent fight involving all but 54F, who flies toward the other 3. The 3 fighters fly E 10 yards about 1 foot apart; I can't tell what their relative positions are. They all go to the ground in a real scramble lasting 2 seconds. They are extremely noisy with harsh calls. Then 1554 flies back to 2, where his female is; he postures toward her with bill open, wings wide spread (primaries still parallel to body). Then he goes to a 10 -foot perch and sits stiffly, making another note I've heard but never described. It's a gnatcatcher-ar
humningbird-like little twitter, barely audible, almost a squeak. He then sits and sings steps, 10 to 1530 . From 1532 to 1535 he sings steps in the high trees $N$ of 2; some are faint. He then falls silent. I write till 1543, begin looking again.

Indigo Buntings are very noisy today, the first for extensive territorial song.

$$
\underline{1600} \text { - All of } \nabla \text { is still silent so far as PN's go. }
$$

Note that there are few if any good nest sites, i.e., correctly shaped and located, sheltered by leaves, available now except for pines. This may be significant.

1603 - Singing begins on T53 at 1. M53 sings regular skids there.
[Break in notes]
1625-M54 sings $S$ of 3 after M53's insipid steps have been audible for 2 minutes. M54 stays at about 12 feet, goes from 3 to 2 and after 13 songs to 1630 , he goes over just $W$ of 1 . To 1633 he sings 15 insipid steps. There ( 3.0 ) is no fight and he goes to 2 at 1633. Here he suddenly breaks into type-8 songs and in 10 seconds M53 does the same thing; very significant. 1544 meets a Goldfinch male $W$ of 2 and drives it away. I haven't seen 54F.

After 19 type- $8^{1}$ s to 1642 , M54 switches to 3 skids, reverts to type-8's and sings 9 of them to 1645 . He goes to the field $S$ of 2, singing type-8's. I see 54 F here, calling
a faint "check." Note that when the female calls loud, the sound has a kissing quality.
$1 M 53$ comes out of the 1 area and the 2 males begin a fight of moderate intensity. They make passes at each other, fly with a bouncing motion, move parallel, start out and turn in mid-air, pick up food, fly out and catch it like flycatchers (actually flying up and then gliding down). Both sing occasional type-8's. M54 once gives the Sora-whine note. Meanwhile both females are visible 15 yards or less behind the lines and sometimes flying up to within a few feet of the males. Once M53 opens his bill. Sometimes the males glide or flutter a litile in their short flights ( 1554 gave a pronounced flutter out of the big fight earlier). Their tails and backs often show as they move away from each other. This fight's first stage is from 1644 to 1654 , when $M 53$ retires.

M54 sings and goes $S$ to the area 10 yards $W$ of 1 and they renew their activity here till 1700 (with 33 type8's since 1645). 54F flies along, and I see an interesting thing: 1554 flies after her in a close pursuit (though it may not be the courtship-type so much as directing his aggression at her), and M53 immediately flies to them as they get near the ground. M54 turns just enough to cause M53 to pull back, then he and 54F flutter up for 1 second to about 5 feet, while 1 or both utter regular harsh fight
notes and "churs." She then goes to the rose hedge, and I write.

M5 4 comes $W$ to the white pines and sings here to 1715 or so. Near me I see 54F; she is clearly following hin. He may flutter very slightly in flight, and she just moves along in his wake. I hear her utter 3 or 4 very faint high notes as she perches near me, just barely audible.

1720-1730 - Silence; then skid songs from both males.
1730 - I leave.
It's hard to know if fighting wanes in the afternoon. I'd almost say not. It's clear that male-female pursuits don't recur much after the first day (at least this year), that the female keeps the male in view, that my thought that mated males are silent is not uniformly correct.

Neither female is building.

May 6, 1956

A clear dawn with $64^{\circ}$ temperature, but as it gets light there is a hazy overcast; wind NW. Present from 0615 to 0840 and from 1230 to 1730 .

T54 at 0622-1/2 - M54 sings in 3 till 0624, 6 times. He is 12 feet up. He then flies 10 yards $S$ fluttering a little, especially as he lands. After 2 songs he flies well $W$ and I see 54F follow irmediately. He is silent.

0626 - I watch 54 F and suddenly $M 54$ flies by chasing a PN in very close pursuit. He catches it once and drives it to the ground for a second, then they go on. I have a notion 1544 tries to grab the PW's tail. He calls the "chur" notes. 54F follows right behind as they twist and circle for 35 yards into 3. 1954 begins to sing at $0626-1 / 2$, first 2 insipid steps, then skids. In a minute he flies to 2 and sings. M 53 is at his E line singing. M54's songs aren't frequent, 30 from 3 os $0626-1 / 2$ to 0635 .

A male is singing in the woods $N$ of 2 , steps at first, then skids. He sounds some distance in and faint; 4 songs.

At $0639 \mathrm{M54}$ begins to sing N of 2, sings 20 times to 0645, when he falls silent. During nearly all of the period I watch 54F, winich is feeding very low $N$ of 2 and
out into the field. Once she nest-shapes but she never picks up material. At 0647, 1454 begins to sing insipid steps SE of 2 and I find him there low, 54F 5 yards behind him, M53 10 yards to the $\mathbb{E}$. The 2 males go through a very low-intensity fight, fly parallel, and make only 1 pass when $M 53$ goes a few feet $W$ of $M 54$ and is repelled. They move $S$ toward 1 and $54 F$, which $I I^{\prime} m$ following, flies about 25 yards to join them. M54 turns and pursues her 6 yards, stops with wings spread a little as in threat. I follow her while he sings 10 songs to 0654 . At 0654 the meeting with $M 53$ ends, and $M 54$ returns to 2 and skids 38 times to 0706 . I have 54 F in view during this 12 minutes. She moves on the ground and never over 4 feet above it, feeds on all sorts of things: a brow caterpillar 1 inch long, probably on aphids. Six times she nest-
 shapes in cedar, red pine, elm, dogwood, crataegus. I think it's a tactile stimulus when she gets in a suitable place, although sometimes it's clearly initially visual--she goes to the fork. From 0706 to 0713 , 1544 sings 13 songs in 2 and then the fox den trees. While I was with 54F I'd say she wasn't following M54 but was moving around within 20 or 25 yards of 2 , where he sang. 0723 - I begin to watch $M 54$ at the $\mathbb{N}$ part of 4 . 54 F is feeding quietily along at ground level; he is 12 feet up.

Each seems to be keeping the other in view. Some of his $101=$ songs are faint; there are 10 to 1717, when there is a 3-bird chase to the NW. I can't be sure whether all are PW's, but I wonder if a third male can be around today. 0718-1554 begins infrequent skids near 4 . In I minute, 2 songs; then silence.

The area covered by the $54^{\text {ts }}$ s in the last few days ought to be plotted; it's quite restricted. 0727-1/2 - 1154 begins to sing skids, not quite full volume, in 4 ; moves $E$ and increases his rate. He goes to 2, returns to 3. I'd say he is not staying in the tops of trees today; frequently I can't see him, but I'd think the middle levels are where he is. He crosses to the 5 area toward the $N$ end of it, quickly returns to 4 . At 0737 he's been moving ever since he began to sing. The song is fast and high, less loud than usual.

0740 - The two $54^{\text {ts }}$ s are $S$ of 4 in the field near the white pines. He is 6 feet up, and she flies into a pine 6 yards away and calls once. He flies low toward the $\mathbb{E}$ for 20 yards, fluttering the least bit but not moving slowly; I'd guess possibly his wings beat more frequently. She immediately follows. He sings in 3, and I watch her. She doesn't always move toward his song, sometimes going in the opposite direction; but I'd guess she nearly always orients her movements generally toward him. He goes on skidding and
moves to 2, then at 0753 well out into the pine field. He's $79 \rho^{x}$ sung 79 songs to 0753 from 0727, most of them at about 12 feet or so. He keeps on singing in the field but the song is an insipid step. M53 sings to the NE, sometimes type${ }^{81}$ s. 5LF is, as usual, about 6 yards back from the male, ( 5,3 ) but 1453 doesn't appear. 1054 goes $S 20$ yards and the female follows. She calls a few times. By 0802 he's sung 48 steps in 9 minutes. He then switches to a new song, still in the area $E$ of 2: He sings 4 songs consisting of 7 loud buzzes with no rising or falling pitch. At 0803 he skids 2 times, and at 0804 I see a $P N$, probably $M 54$, fly to the locusts in 1, land 25 feet up, then fly right on SE into the center of 1 . There is silence for 2 minutes, and I see no female so I write. (Does a male become more daring when unchallenged?)

At about 0810 I hear insipid steps N of me and $\mathbb{E}$ of 2 , so Id guess an encounter occurs there; no fight notes.

0815 - I begin to watch again. M54 sings skids SE of 2. (I've seen 54 F follow the male 4 or 5 times this morning.) It's quite cloudy with a strong W wind; has been so since 0730.
$28 \mathrm{ck}\left(4 \omega^{-}\right) \underline{0823}-$ M5lís sung 28 skids in 8 minutes while I've watched him in 2 and then across to 4 . He perches from 10 to 20 feet up, and sings and feeds. At 0822 I see 54 F 4 feet up to the $\mathbb{N}$ a fen yards. She flies straight into a
tree $M 54$ sits in sone 12 feet up, and lands within a foot or two of him. He imnediately flutters out and his flight, which is about half speed, clearly involves rapid shallow beats. She follows in a few seconds. He flutters as before between 20 -foot perches. I've lost her. He sings 2 faint and 4 normal skids from $0823-1 / 2$ to 0825 . I see him 22 feet up in a locust in 4. He glides domward with wings barely beating (I'd say at their tips only) and I lose sight of him behind bushes. However, in a few seconds he sings from a location I'd not have expected him to be in, so I'd. guess he pursued the female. He then sings in 3 and 4 at from 10 to 20 feet, 17 songs to 0833. He next goes $S$ to the pines, then NE to 3, and I lose him after 2 or 3 songs. 0840 - The wind is rising and a storm looks certain. I leave.

1230 - I return. It is overcast with a good deal of light coming through, quite windy from the SW, and hot ( $78^{\circ}$ ) and humid. It did not rain this morning.

III - Silence.
XII - Silence.
T54 at 1245 - Silence here and on T53.
There is a cowbird egg in the Cardinal's nest on this territory. The nest is 4 feet high. I found a ground Field

Sparrow nest, female on 4 eggs, on T53 yesterday. These are the only eggs so far; I have I other empty Cardinal's nest on T53.

1249-1453 starts to skid regularly at 1.
1258 - I hear 54 F call near the fox den and see her gather spider webs. She takes them to the little elm she has been crouching down in, stays 40 seconds (I'm only 10 yards away) and leaves going $W$ through the edge of 4 . At the same time 154 begins to sing faint insipid steps in 2, about 6 till 1303. I sit to watch after first inspecting the structure (which wasn't there this morning): It consists of about 5 strands of weed fiber in a little circle. M54 switches to the 8 -note buzz. He's in 2 . It begins to sprinkle at 1305. His song is now a loud skid, then a buzz again. He flutters with slow shallow beats from a perch 4 feet high in 2 to the same height in 3 .

1310 - He quits singing after 21 songs. He begins a normal skid $S$ of 2. 1453 sings in the SE. After 3 songs 154 stops at 1312, starts in 30 seconds in 2, sings only twice.

1315-1954 begins skids $S$ of 2 , switches in 1 minute to insipid steps and after 2 songs, to buzzes. Several steps are fragmentary with only 4 notes. To 1318, 11 songs. 2001 1319 - Loud skid in 3. N54 sings 20 times to 1326-1/2;
he is in 3, 2, then for about 4 minutes at the fox den. All songs are loud. At 1327 he sings 2 or 3 almost inaudible steps (or fragments) in 4 . In $1 / 2$ minute, loud chatters begin. $H_{e}$ sings 2 and a fragment, then a whole one.

1330 - Two skids without a pause, then a series of 28 more from the $3-4$ clearing and from 3. Most are high but at nearly full volume. He may sing 2 more from $E$ of 2; I can't be sure. The series stops at 1340.

There is no point in timing a nest that may never be finished. At 134554 F has been gone for 45 minutes. I'Il look for the 54's and observe them directly.
$1345-1154$ sings 3 skids in 3. A strange unbanded male flies into the $2-4$ clearing, lands, goes on $W$, fast. M54 is singing. He quits after a total of 5 at 1349. I'm going to count his songs by periods; they are too irregular to describe at each series.
1351. - I'm near the $2-3$ clearing when 54 F flies up purposefully. On a guess I retreat and she goes to the crataegus. she crouched in this moming and works on a nest. It is much farther along than the other; I'd guess she's been building since about when I left. M54 sings loud in 3, evidently moving little. The nest has a dead leaf fragment in it.

1356-54F brings material, stays 20 seconds. I'I7 watch the building. She goes $S W_{\text {. }}$

1401 - M54 has sung 30 times in 3 since 2349. He goes now to 2 and sings frequently and regularly.

Note both nest sites are places where 54 F went through preliminary shaping motions.
11.05-M54 goes to the nest tree, looks around alertly, perches 10 seconds 5 inches from the nest, goes SE. Held sung 9 times to this point, is now silent. He may be singing insipid steps in the $\mathbb{N}$ part of 2 or E of it. A male is singing steps at 1 . At 14,74 the songs come from 2 often; I'd guess it's M54 but III not counting them; all are steps. The insipid steps consist of 4 high long notes uttered slowly, then 5 or 6 (usually 6) given close together and fast but still quite distinctly.

1115 - No action at this nest. I think it's better to move around on the territory.

1142 - M54 was the singer on the $\mathbb{E}$ edge of 2 . He flies back to 3 , sings 7 steps from 8 feet up, watches the ground intently. At 142154 F takes nest material to the second site, stays 15 seconds, goes W . The male is silent for 1 minute, begins to sing.

1123 - Female to the nest for 15 seconds; goes W. 1154 is silent while she's there, then goes on singing.

IL $24-1 / 2$ - She's back, shapes for 40 seconds, sits in the nest tree for 1 minute. I miss her going. M54's song
is irregular. Evidently he is silent when he sees her at the nest.

II $27-1 / 2$ - She comes and stays 15 seconds, goes W. 1429-1/2 - She returns with material, places it and shapes for 30 seconds, sits 10 in the tree, goes NW .

1431 - She's back; 30 seconds; SE. M54 is now singing in 2 or SE of it.

Ih $33-1 / 2$ - Back, probably without nest material; stays 40 seconds; then S 15 feet and I lose her.

II 35 - Back; 50 seconds; probably N.
1/36-1/2 - From the N; 10 seconds; to the N.
11437 - From the N; 25 seconds; to the N. I'd say she's gathering within 20-30 yards at the most.

1438-1/2 - From the N; 40 seconds plus 20 perched 2 inches above the nest; to the NE a very short distance. M54 has sung 44 times to 1441 ; much of his recent singing is from NE of 2 .

I140 - From the NE; 15 seconds; to the NW.
Il $422-1 / 2$ - From the $N$; 10 seconds; to the Ns. I'm counting M54's songs, loud skids SE of 2; no sign of interest in the female.

IL44 - From the N; 25 seconds; to the E 20 yards, where she gathers.

Ih 4 L- $1 / 2$ - From the E; 20 seconds to the E 20 yards, where I see her feeding in a peach tree. The male quits
singing at about this time, after some 19 songs.
1454 - The male starts to sing chatters, and 54F appears from the NE with cottony material. She sits 25 seconds before entering the nest with it, shapes for 25 seconds, goes SW about 10 yards.

7456 - She returns, stays 20 seconds; I miss her departure.

11,58 - From the SW; 15 seconds; to the NW. She always comes to and from the nest flying quite low.

1458-1/2 - From the NW; 6 seconds; to the NW. 1554 sings loud $S$ of 31 .

1500 - From the NW; 15 seconds; to the W into 3 (which is where all trips generally $W$ take her).

1504 - From the W; 30 seconds; 10 yards to the SW.
1506 - From the SW; 15 seconds; to the W.
1506-1/2 - From the W; 15 seconds; to the SW. M54 is silent, has been for about 4 minutes after 16 songs, most of them chatters.

1509-1/2 - From the W; 20 seconds; to the NW.
1510-1/2 - From the NE; 15 seconds; to the N. M54 begins to sing. A good SW wind is blowing.

1512 - From the NE; 15 seconds; to the NE. M54 sings chatters in 2.

1512-1/2 - From the NE; 5 seconds; to the NE. It's getting pretty cloudy.

1516 - The male falls silent after 6 songs. 1453 sings always from 1 ; it's a safe bet $53 F$ is building.

1521 - 54 F comes to the nest from the $W$; 5 seconds; to the E 15 yards.

1522 - From the E; 15 seconds; SE 10 yards.
1523-1/2 - From the E; 25 seconds; E 10 yards.
1524-1/2 - From the E; 12 seconds; to the IVE.
1525 - From the NE; 10 seconds; to the NE. 1526-1/2 - From the NE; 20 seconds; to the SE. M54 starts to sing in 2, skids and then insipid steps.

1528 - From the E; 35 seconds, perches 5 more; goes NE.
1530-1/2 - From the NE; 35 seconds; to the SE.
1532 - From the SE; 20 seconds; to the SE.
1534 - From the SE; 12 seconds; to the SE. I think M54 may have had a fight $W$ of 1 , where he's singing. He switches from chatters to high steps, to type-8's (2), to a skid.

1535-1/2 - From the SE; 10 seconds; to the S 12 yards from the nest ( 8 from me), then on SW of me.

1537 - From 25 yards to the SW; 18 seconds; to the W. M54 sings type-8's.

1538-1/2 - From the same place as last time; 25 seconds; to the S, probably the SE. M5 4 sings type- $8^{1}$ s, goes to 3 from $S$ of 2.

1541 - From the same place as last time; 10 seconds; back to the same place. M54 sings more faintly.

1542-M54 falls silent after 71 songs. If she takes her break now, note she was very near him.

1544 - She goes to the nest and at the same time 154 starts to sing type-8's.

1602 - She leaves the nest for the first time since 1544; she sat facing $N$, her face out of my sight. M54 has sung 71 times (about every 15 seconds with great regularity) mostly from 2, about 25 feet up. Now he skids. 54F left to the W .

1610 - Counting songs won't work at the moment because M53 seems to have come in behind me to the field $S$ of 2 . M54 is singing faint steps to the $W$.

1613 - 54 F to the nest from the $W ; 20$ seconds; drops a few yards $W$.

145 begins to sing, sings 20 times in 10 minutes to 1623.

1617-1/2 - 54 F is in a tree 8 yards $S W$ of the nest. She perches 4 feet up, preens, then feeds along through trees very near me, about 5-10 feet up. 1454 sits 15 yards from her, 15 feet high; neither pays overt attention to the other.
$1625-1444$ begins faint insipid steps. I can't count then; he's near M53.

1632-M54 begins loud skids in 2 .
1633 - 54 F to the nest with material; 30 seconds; to the $\mathbb{N}$ a short distance.

1635 - She comes with a good-sized piece of paper, from the N; 20 seconds, to the N. M54 quits singing at 2636; 17 songs.

1636-1/2 - From the 1 ; 22 seconds; to the $\mathbb{I E}$.
$1637-1 / 22$ - From the $\mathbb{N E} ; 16$ seconds; to the NE.
1645 - Both males sing, but I cant distinguish their high steps to the $\mathbb{E}$ of 2 . Note that fighting seems to have stopped.

1647-54F comes from the $\mathbb{N E} ; 10$ seconds, after a 5second pause to enter; to the SW 5 yards.

1648-1/2 - From the SW at least 20 yards; 20 seconds; S 15 yards (to within 5 feet of me), then on to 40 yards SE of the nest. 154 sings skids at 1651 in 2. I suspect 54F is simply feeding in the field cover $S$ of 2 . A female Goldfinch goes to the nest and removes a quantity of material from it, sitting beside the nest for 1 minute.

1655 - I've watched the nest 3 hours, so I quit. Building has clearly become very irregular. There are no weather conditions I can attribute this to; it's gray but less windy. (Ind say today there has been $5 \%$ sunshine.)

I inspect the nest, it is just the cupped foundation, without walls.

T53 - I go here to see where the nest is. M53 sings faint songs in the $\mathbb{N}$ end, around $I$, then on the $\mathbb{E}$ edge, $I$ find the nest in a pine, a yellow I think, about $8-1 / 2$ feet up and built on an outer branch. It is a well-shaped loose
shell, begun yesterday possibly, otherwise this morning. The latter seems a litilie more likely. Note that the 2 males have quit fighting and my study apparently must center on single pairs at a time rather than the relations of the 2 pairs. 1954 sings consistently $\mathbb{E}$ of 2, along its whole length; the 53 's seem to be compressed into about a $1-1 / 2$ to 2 acre rectangle. [of. the utilized territory of the 54's.]

1730 - I leave. Both males are singing skids.

May 7, 1956

Raining and misty after a night of thunderstorms, temperature $60^{\circ}$; wind in the NE. Present from 0630 to 0745 and from 1700 to 2000; Rickert present from 1300 to 1700 .

T54 - It is too rainy to take notes, so I simply watch $54 \mathrm{~F}^{\prime}$ 's nest and count M54's songs. He sings almost steadily the first half hour, 67 songs between 0630 and 0700 . Most of the time he is in 3 and 2; his songs are skids. The female never comes to the nest.

0700 - I quit watching the nest. 54 F is feeding about 5 feet up, $E$ of 2 toward the $N$ end. The 2 males have an encounter here for 5 minutes beginning at 0705; I see 1 rather intensive fighting sortie with fight calls. 1954 then goes into the trees at the $\mathbb{N}$ end of 2 and sings from 0710 to 0720 , every 13 seconds. In the 20 minutes after 0700, 52 songs.

T53 - I see no signs of nest-building. To look at the nest I'd judge it was begun yesterday and worked on the full day.

## 0745 - I leave.

In the afternoon I have difficulty over the university's plan to take trees from the area. Rickert watches while I handle this. The day became sunny about 1300; temperature in the high $60^{\prime} \mathrm{s}$; gusty NE wind.

1300 - I [JR] arrive. There is a $10-12 \mathrm{~m} \cdot \mathrm{p} \cdot \mathrm{h}, 1 \mathrm{~N}=\mathrm{NE}$ wind. The sky has scattered cirrus and cirostratus with stratus in the E.

T54 - I sit to watch nest-building but miss Nolan's instructions and therefore sit quite close to it. I see nothing of 54 F till 1500 , which may be due to my closeness.

II 100 - 1154 skids in the $\mathbb{E}$ edge of 4 , his first songs. After 11 songs to 1413 he moves $N$ and $W$ into 4 and falls silent.

1) 29 - 154 skids 4 times from the SE comer of 2, at 1431 goes to the fox den and skids twice.
$\underline{I 435}$ - He goes to the center of 4 , skids once, quits. He is quieter and moves about more than usual.

1440-M54 skids in 2, moves at 1443 to the fox den and skids 3 times. He goes then to the NW corner of 3, skids twice. He moves energetícally, flycatches.

1500-54r leaves the nest tree.
1501 - Returns; 2 minutes.
1504 - Returns; miss her departure
1506-Returns; 30 seconds.
1508-Returns; 30 seconds.
1509-Returns; 5 seconds.
1509-1/2 - Returns; 5 seconds.
1524-1/2 - Returns; 21 seconds.
1526-1/2-Returns; 17 seconds. 1527-1/2 - Returns; 13 seconds. 1528-1/2 - Returns; 9 seconds.
1530 - Returns; 12 seconds
1531-Returns; 10 seconds.
1532-1/2 - Returns; 29 seconds.
1533-1/2 - Returns; 23 seconds.
1534-1/4 - Returns; 14 seconds.
1534-3/4 - Returns; 16 seconds.
1536-Returns; 18 seconds.
1537 - Returns; 13 seconds.
1549-1/2 - Returns; 17 seconds.
1551-Returns; 57 seconds.
1554-1/2 - Returns; 55 seconds.
1556 - Returns; 13 seconds.
1557-Returns; 17 seconds.
1558-Returns; 19 seconds.
1558-3/4 - Returns; 18 seconds.
1600-1/2 - Returns; 5 seconds.
1601 - Returns; 12 seconds.
1602 - Returns; 13 seconds.
1602-1/2 - Returns; 2h seconds.
1608-1/2 - Returns; 71 seconds.
1613 - Returns; 58 seconds.
1649-Returns; 4 minutes 28 seconds.
1654-1/2 - Returns; 20 seconds.

1655-1/2 - Returns; 15 seconds.
1656-1/2 - Returns; 38 seconds.
1658-I leave.
See next page.

1707 - I return and continue Rickert's watch of 54 F 's nest-building process. My watch is synchronized with his. The female is not at the nest and the male is silent. 1io sounds on T53.

Rickert watched the nest for a long time without seeing the female, when he first arrived. This may be because he sat too close, but since he never once saw her I think that this explanation is not the only possibility.

1716-1/2 - M54 sings faint skids in 4 , goes to 2, and incomplete form consists of the 4 initial notes above.

1727-1/2 - Singing stops after 16 songs.
1728 - M54 sings skids at the $N$ end of 2, quickly moves W, probably to 5. Song stops at 2731, after 4 times.

1733 - I hear 154 skid, perhaps faintly, toward 5.
4 Ah- During the next few minutes songs are irregular, infrequent, faint. I hear 7 by 1739 .

1739-1/2 - 54 F comes to the nest from the W; stays 15 seconds; goes W .

1741-1/2 - From the E; 35 seconds; to the $\mathbb{N E}$.
1742-1/2 - From the E; 65 seconds (actively shaping); to the SE.

1752-1/2 - From the SE; 80 seconds; to the SW.
1754-1/2 - From the SW; 90 seconds; to the W. These long periods seem to be taken up with working in the nest, not resting.

1758 - From the SW; 13 seconds; to the SW.
1800 - From the SW; 12 seconds; to the SW.
$1801-154$ skids in 2.
1801-54F comes from the SW; 35 seconds; departure missed.

1454 goes on singing skids, somewhat irregularly. He is $\mathbb{E}$ of 2 , then appears 15 feet up in the $N$ end, then crosses to 3 and falls silent at 1810. He's sung 13 times. Song this afternoon seems to be given away from the nest area.

After $54 \mathrm{~F}^{\prime}$ s next trip to the nest $I^{\prime} \mathrm{m}$ going to quit watching it and follow the male for a little while, returning to the nest to see the hour at which construction stops. I inspect it; work this afternoon has consisted of building up the walls, but they are porous and far from complete.

1820 - She retums from the E, and I go to find M54.
I can't find the male.
T53 - I go to $53 F^{\prime}$ s nest; it has been worked on today.
T54 at $1830-54$ is at her nest.
1831 - She returns; 15 seconds; goes NE.
M54 sings in 3.

I find $M 54$ and follow him for 17 minutes, to 1848 . He sings 19 times, all of these songs in the first 12 minutes. He goes from 3 to 4 to the pines $S$ of 4 , to 3 again, ranging between 5 and 20 feet and spending possibly $50 \%$ of his time foraging, the rest simply perching or moving about. Back at 3 he perches silently 15 feet high 20 yards $W$ of the nest. He sits alertly, body near the horizontal, and at least twice watches very carefully something below him. Twice he sings faintly, one of these times at a moment when I see the female go to the nest. She then flies 20 yards SW of the nest and he glides silently down to a 3-foot perch, then to the ground where she is gathering material. He sits quietly for 30 seconds and when she goes to the nest he goes at least part way. She returns to the SW and feeds in a tree, about 8 feet up. He flies to her and follows her through the tree for about a minute often getting within 1 foot of her. He is silent; she calls "tseep" (not quite a "tsu") irregularly about once every 3 seconds. She goes $W$ to a low perch and he follows inmediately behind, lands near her. His flight is slow, with small wing beats except when he's seeking to catch up with her. She goes to a 10 -foot high perch in a cherry and he quickly follows, goes right up to her as though to land on her back. There is no resistance or display; he
simply moves on with scarcely a pause to another limb. She flies across through 4 to 2, and I see him follow immediately behind her.

I lose them while I write. To generalize from all this, Id guess this male confines his attentions to the female and her nest-building to the occasions when he gets near nee, notices her, and becomes excited. He centainly does not show the usual excitement of most males. Ind judge fighting with M53 has fallen off greatly.

1850 - I watch the nest again. 54 F was last there at about 1845. I have possibly heard 2 songs from 1554 since I lost him; it's 1900. I didn't note that M54 seemed to pay Po attention to a Red-tailed Hawk soaring high overhead when he was in 4 .

1905 - A series of insipid steps, very probably from both males, begins to the NE . They go on sporadically until 1915. I've no reason to think that a fight of any sort is involved.

1922-M54 begins skids $N$ of 2 , comes $S$ in it singing irregularly. He sings 9 times to 1926.

1933 - There's a loud PW fight just N of l; no songs.
4. It lasts 15 seconds.

1934 - M54 sings I skid N of 2 .
1936 - He sines a faint insipid step in the field $W$ of $I$, and I see him there. I then have him constantly in

18 ms alow after 1936, all very faint. The female is never with him, and conditions are such that I can be sure of this. He feeds on the ground or in the field cover during the whole period, never over 3 feet high. He covers the $S$ field from I nearly to the white pines, then $N$ to 3 where he disappears as it gets dark. Activity is intense; he darts around very energetically, flycatching often. Ind judge that insects like gnats (and I know mosquitoes) are especially numerous. Just before I lose him he sits quietly for about 30 seconds, I'II sure preparatory to roosting. 2000 - I leave. It has been $50 \%$ sunny today.

A clear windless daw; temperature $40^{\circ}$ at 0500 . Present from 0530 to 0800 and from 1330 to 1730.

T54 at 0535 - Silence. I sit to watch the nest. A Bachman's Sparrow sings repeatedly from 18 feet up in 3.

0539-1454 sings I skid somewhere to the E. By 0544 he's sung 3 times. At this moment he sings an insipid step; he seems to be near 1. In a minute he begins skids, draws near me. I can see a PN feeding about 3 feet up, $S$ of 2 . By 0550 he's sung only 9 times since I arrived. I'll begin a new count.

0554 - A male sings.high steps to the E; I can't be sure which one it is. There are 3 songs, another in 2 minutes, and in $3-1 / 2$ minutes 2 more. It is probably $1 M 53$ singing. The Bachnan's Sparrow is still singing from the same perch.

0559-1454 begins to skid toward the SE, comes to 2 and crosses to 3 for 30 seconds. He then flies into the $\mathbb{N}$ end of 2. The glimpse I catch indicates he's staying high, at least when he's in the groves. He moves into the field SE of 2 where I can watch him feeding in the weeds. The female is not with him. He moves fast and a lot, coming to 3 (where he's silent), crossing to 2, then evidently going into the field E of 2 . He seems to me to be feeding nearly all the time, at whatever height the vegetation is where he happens to be.

0614 - The female crosses E to the field NW of I from somewhere in the SW part of $V$. I think that I saw her there move to follow the male after she got there.

0615 - M54 has sung 36 tines since 0550 . I cant tell whether a male I now hear (steps) is he or not. Nearly all of the above songs have been skids.
(It's still completely clear, though cold.)
0620 - I hear only an occasional sound that may be a male PN; the notes are too faint to let me be sure.
$0622-1 / 2$ - MS 4 begins skids $W$ of I. I count.
The Bachnan's moved to a 25 -foot perch in 3 about
15 minutes ago and is still singing there. Now he moves E to near 1 .

1454 goes to the white pines and sings. I don't see 54 F with him. He's back S of 2 in 30 seconds. His song becomes really frequent for the first time today, but only for 1 minute. Now he's switched to steps $W$ of 1.
$0630-54 \mathrm{~F}$ comes to a cherry 15 yards SW of the orataegus nest, feeds in it at from 4 to 12 feet. 1154 sings near 1 at the time. I see the female for 1 minute. M54's songs are irregular; there are steps every 10 seconds for 2 minutes, a pause, frequent ( 10 seconds) skids 3 or 4 times, a pause, steps for a minute, etc. By 0640 he's sung 47 times since $0622-1 / 2$, but to take an average for the interval would be very misleading.

0640 - $M 54$ comes to 3 , sings 10 songs at intervals of $10-18$ seconds (all but 1 are $10-12$ seconds), goes $W$ to 4 after a pause, and sings skids (as at 3) more slowly. At 3 he was 20 yards from the nest, about 18 feet high. He then moves $E$ to a point near me and at 0650 flies at 5 feet right over my head, going a little slowly and with his wings beating in a shallow are (and I think rapidly). He is 20 yards S of the nest. He flies in the same way for another 5 yards, feeds for 2 minutes in the field cover. I finally see the female in a dogwood 8 yards SW of the nest. He sings 30 yards away and she flies toward the song, carrying no material. W of 1 he's now singing steps; all his steps today are insipid.

0657 - He's silent after 38 songs.
0700 - I quit watching the nest as $M 54$ starts singing. This female doesn't build early or late.

0701-0709 - There is an encounter W of 1; all 4 birds are present. For the first 3 minutes the males are silent, and the females call faint "checks." Then the males begin insipid steps, except for 1 faint skid by M54. I think the females quit calling at about this time. There are many passes in the air between the males, only one producing fight calls with a 3 -foot flutter up. As usual they sit from 10 to 4 feet apart, sometimes in the same tree; and suddenly
one or both will dart at the other, turing aside at the last moment. Once 54 F goes E to $I$ (a few yards E of the fight), and M54 flies straight at her; she turns when he's a few inches away and return $W$. All the action occurs at 2 feet or less; they are in the field. I think 54 F was leaving the scene without regard to whether M54 continued the fight, but when she was about 25 yards to the $W$ he seems to have stopped. I hear his song in 2. Possibly he quit fighting to follow her, but I doubt it. To 0720 while I write he sings irregularly in the clearing $W$ of 2 .

A very brisk lE wind has come up since dawn.
XI - 1552 of 1955, hereafter called $M 55$, is singing type -8's repeatedly when I arrive. I hear a "check" and find a female feeding along about 3-5 feet up. He sings irregularly but quite often, full volume. I follow her, watch her pick repeatedly at smooth sumac branches and finally see she is eating a scale or aphid (or homopteron) that is the color of the bark. At first M55 seems to pay no attention to the female, but in 10 minutes he glides at her from 15 feet up while she is on a branch 3 feet high. For the last 5 feet he sets his wings and descends slowly. She flies; he chases her 5 yards to the ground,
 pulls her tail, sings a full type-8 while doing so, and
flutters away. I think it's probable M55 began to hold territory yesterday (he wasn't singing here on May 6) and that the female arrived today. She is unbanded. Note $M 55$ is on the territory he had last year.

I watch him for 20 minutes to learn a little about his method of flight. I'd say he doesn't make unusually large beats, that the range is from slow-normal to slow-small, with some of the very shallow ones fast.

He sings repeatedly, always type-8; I see no other pursuits.

$$
\text { II - An unbanded male sings } 12 \text { feet up, very often. }
$$

His back is quite red.

$$
\underline{0800} \text { - I go in. }
$$

1330- I return. It is $63^{\circ}$, bright sunny, with a NE and E wind.

T54 - M54 sings numerous (about 18) skids from 1335 to 1343, falls silent. The female is not at the nest, though I devote the first few minutes to talking to men taking trees.
$1346-1 / 2-1154$ comes $W$ to 3 and begins singing. He's been in and E of $2 . \mathrm{M53}$ is singing chatters to the NE. M54's song is irregular.

1355-1M54 quits singing after 16 songs.

1355-1/2 - 1954 sings insipid steps near 1. I hear perhaps 5 to $H_{1} 02$, when they become easier to count. To 14,05, 6 sones; chatter songs then at 1, maybe his; after 2 songs be quits and there is silence.

1415 - Step songs begin. There are about 10 in 5 minutes; I cant be precise in a count. A few more follow. At $1_{4} 27$ there are 3 skids. All these songs come from the pine field and 1 only, and I am never sure of their source. At 141 l they are continuing. Some are surely $M 54$.

1/419 - M54 begins to skid near 1, comes to 2 and stays high, crosses to 3. He sings regularly, as does M53 across at 1. At $1454, M 54$ goes toward 1 and continues his singing. He sang 14 times since 14149 . At 1455 he flies fast to 4 , goes on singing skids. He moves too fast to make it at all likely the female is with him. He now comes to 3. At Il 457 he crosses to 2. He's sung 30 times since Hhl49, is now silent. In half a minute he sings again to the $\mathbb{E}$, returns in 2 minutes to 2 , crosses to 3 . I see most of this movement; 54 F is not with him, In 2 minutes he flies to a 15 -foot dogwood top $S$ of 2, sings 3 times, goes E. His song stops at 1504, after 23 regular skids since 1457 .

1506-1/2 - He sings about 6 songs in 3 minutes, quits near 1.
15.11 - M54 has an encounter at I with M53. I can see them going through the usual maneuvers there. My attention
is attracted by 5 or 6 "check" calls, but I don't know the source.

1516 - Singing begins near 1 - high steps.
1519-1/2 - There is another (same?) encounter at 1. I go there. AII 4 PN's are there. I see M54 attack 53F, an unusual event, and drive her a few feet. There is a series of squeaks and M53 joins; he and M54 flutter up to 8 feet. As I note this there is a second noisy fight, possibly between a male and female. It is 1526 and the fight goes on, both males singing high steps or parts of them. I don't see 54 For a minute, then find her to the $N$ near the woods, $E$ of 2. The fight seems over; 1154 quit the encounter (first?) at 1534 .

I follow the female for 10 minutes. She goes first from ground-level feeding to 30 feet up in the woods trees. Then she comes down feeds in 2, goes out E into the pine field. About $90 \%$ of the time she is below 3 feet, feeding silently and never picking up material. It is quite certain that she is not following the male as she did earlier. He seems to spend his non-fighting time, about $90 \%$ of it, above 6 feet. He sings quite frequently after the fight until 1545, Ind say about 4 times per minute. At 153654 F goes E to a 2foot maple, seems to be nest-shaping in it for 30 seconds. She moved out there directly away from the male's song position.

1540-I return to watch the crataegus nest. At 1543 M54 comes to 3 , sings loud skids. I think I hear the female 's "tseep" calls. He sings a faint song and I look up to find her at the nest at 1545 . She stays in the tree for 30 seconds, goes NW . He falls silent. I don't know Whether she brought material. Ill continue to watch the nest. She has evidently removed a stick I inserted across the cup. (Incidentally, the full shape is formed but the walls are very flimsy, with large holes in them).
$1600-1154$ has been silent for 15 minutes, and 545 hasn't come back to the nest. I know at least that building occurred this morning (by the development since then) and that it has stopped this afternoon, or has nearly stopped.

I go to check other pairs.
The female Cardinal in the 3-2 clearing is incubating 3 eggs, at least 1 each of her own and of a Cowbird.

T53 - 535's nest is complete. She calls "tsu" nearby when I reach in.

T55 - In hale an hour, not a sound, nor do I see the PN's. This is an interesting contrast with M54.

954 at 1645-54F is building in the little maple she crouched in a short while ago. It now has fibers in it, and it had none when I last looked. I see her near it, and she goes to the nest while I'm within 10 yards of it. I follow her as she moves along low. M54 flies to her and they fall to the ground out of sight for a moment, without
a pursuit. He flutters a few yards away. I follow her, and 10 minutes after I begin she pulls a spider web from a pine, fluttering and tugging with considerable effort, and takes it to the new nest. 1954 sings skids frequently in 2 , occasionally faintly but usually full volume. Once he flies 20-25 yards to a 12-foot dogwood, squeaking in the air just like a gnatcatcher.


This maple nest is $l l$ of 1 , and the $53 s^{\prime}$ territory is thus compressed more than any I've ever seen. The area used clearly to be the $53^{\prime} s^{\prime}$, or at least in dispute. Note that the 54 's are now scarcely going $W$ of 3 . There's been a real shift, evidently attributable to the new nest's location rather than vice versa. 54 F is building at 1700 With considerable regularity, but I'll not count her trips. I can see a few plant fibers, but so far I've seen her carry only spider webs.

M5h sings a great deal, M53 very little and more faintly. XII - Silence.

II - A male flies from the old E tree row out to the old road. He is in sight for 10 minutes, during which he calls "oheck" 18 times (or about that) per minute. He stays low, is unbanded.

VII - There are faint songs near the small maples remaining on the $W$ side. After 4 or 5 skids the bird quits, and I never see him.

I'd say there are clearly unmated males about, possibly some migrants.

1730 - I leave.

A gray daw with what seems to be a fairly light overcast; no wind; temperature $52^{\circ}$ at 0530 . Present from 0530 to 0800 and from 1330 to 1715 ; Rickert present from 1400 to 1600 .

T54 at 0550 - Silence till 0555, when I'm pretty sure I hear a fight. The maple nest has a few fibers at the bottom of what will be the cup.

0558 - The female comes to within 5 yards of the nest, goes W. M54 begins skids, changes to 1 step. M53 comes $W$ to the $\mathbb{N}-S$ line of the nest, flies along $N$; i.e., the nest seems as much on his territory as on T54. M53 really is $W$ of it now. His songs are infrequent and very faint, $M 544^{t s}$ now frequent and loud -- skids in 2. M53 is feeding on or near the ground 25 yards from $54 \mathrm{~F}^{\prime}$ s maple nest, 5 yards $W$ of it; $53 F$ is in a pine 20 yards away. M53's songs are now frequent.
$\underline{0604}-1154$ is silent after 27 songs. He is near the ground 5 yards $W$ of the nest.

0605-54F brings material. M54 flies to her in the nest tree and there is a I-second encounter like a fight. He flies 5 feet away, perches I foot high with his wings spread about half-way for 2 seconds, goes E. She sits with her material in her bill, goes to the nest in a few seconds. All

PW's are silent at 0608; I don't see them.
0612 - Skid songs begin near 1; there is calling near 2. The singer is M54; he flies to 2, quits after 6 songs in 1-1/2 minutes. M53 is silent.

0611 - 154 sings again, 6 times in 4 minutes. 0618-M53 sings once.
0621 - No visible action in the pine field or around the $54 \mathrm{~s}^{\prime}$ nest, so I go $W$ to check the crataegus nest. No development there.

0627-M53 is singing faint steps at and near the ground 25 yards $N W$ of the $54 s^{\prime}$ maple nest. The songs are barely audible. He goes $S$ to within 5 yards of the nest, just $W$ of it. After 10 steps he sings a faint chatter. At 0631 M 54 flies into the field and skids, going $\mathbb{E}$ of the nest. $M 53$ flies on $\mathbb{E}$ without an encounter. 1544 is 15 feet up in a dogwood just $\mathbb{N}$ of 1 , goes into 1 , $1 \mid$ s 54 F is feeding and calling just if of 1 , near the ground. 0635 - Encounter between the males, squeaking calls, just $N$ of 1 . 54 feeds on, 8 feet up in a dogwood.

It is clearing, but a cool S wind has come up since sunrise.

A male is singing steps in 1, probably M53. II pretty sure I saw him disregard 54 F which was feeding below and E of him. cover. He stays there to 0645, feeding, singing 9 songs. 0645 - Both males are singing. Ind guess $M 54$ is at least 5 yards $\mathbb{E}$ of the maple nest. His songs are 15 seconds apart; the interval then decreases to 10; he sings about 10 times.

0650 - I'm going to check other territories. The situation here seems clear: Little building, the males each entering a strip 20 yards wide in which the latest nest of 54 F is situated. 1454 seems to hold the strip and to win out over 1453 when both males enter the area simultaneously.
$0651-548$ goes to the nest, stays $2-1 / 2$ minutes. She sits quietly in it most of this time, works on it some. 154 is still singing near it at this period.

T53 - The nest is empty, is only slightly lined but is almost surely complete.

T55 - Not a sign of a PW in 25 minutes.
IV S - No songs in 10 minutes.
0800-I leave.

1330 - I return. It is very slightly overcast and a strong gusty wind from the $S$ will probably prevent using my mist net as I had planned; temperature $70^{\circ}$.
$\$ 53$ and 154 - I can hear occasional songs but the wind nearly drowns out what bird notes there are.

54F's maple nest shows little or no progress since morning.

1400 - Rickert arrives and we put up the net in a truly violent wind. Both males are singing occasionally, loud skids and insipid steps. Observation is very difficult, but when I do see M54 he is alone.

IU40 - M54 begins to sing skids in 2; quits after 7 songs.

1510 - I've covered the E half of $V$ and seen no PW. I can hear 1453 singing type- 8 steps on the $\mathbb{E}$ edge and in the woods, I think from the tree tops. Near the nest on T53 I hear "check" calls, but I cant be sure it's the female. About all I can say is that there's little or no building or fighting going on.

I check $53 F^{\prime \prime} \mathrm{s}$ nest and find it blow from the tree, the first time I've seen wind alone destroy a nest. It was anchored to no branches but was set simply among a cluster of pine needles formed by 2 different branches. 53 F is building a new nest only a few yards distant. The site is a little stunted maple; the nest height is about 3-1/2 feet (compared to about 8-1/2 for the first nest).

I examine the first. It is very well made, finally lined. On the bottom are a dozen milkweed seeds, placed
 on top of the grasses of the last lining. These grasses
are nearly all the axes of the inflorescence of Purpletop. There are also some 25 black horse or cow hairs, probably the latter left over from the summer of 1954. Old rotted leaves and several pieces of cleaning tissue are on the outside, more leaves than usual. Other materials are typical: grape vine bark, bast fibers, numerous broom sedge fruits. Note that 53F seems to be building actively, so $544^{\text {F's }}$ quitting cant be attributed too much to weather.

Since the wind became strong about 1030 the whole business of $53 \mathrm{~F}^{\mathrm{t}}$ s losing 1 nest and starting another must have occurred since then. The new nest consists of several pieces of rotted leaves, same few fibers, some spider webs. It is not yet recognizable as a nest.

754 at 1550 - Silence here for 5 minutes. Then 1554 begins to sing type-8 steps in 5 and 4. I find him feeding from 4 to 20 feet high, the average height about 10-12 feet. His song interval is somewhat irregular; it varies between 15 and 35 seconds, averages about 25 or 30 . I don't see the female near him. At 1607 he begins high steps, quits after 2 and falls silent.

T53 at 1672 - I'm going to watch the female's building rate and time the male's song. He sings a few yards into the woods, stays high, the songs composed $90 \%$ of type-8's of full-volune, the rest skids, in series. By 1615 he sings 8. A female is feeding in the aspen woods about 5 feet up,
calling.
1619 - She crosses into $V$, goes to the nest. 1453 comes out too and sings in the pine field. The female then comes into the NE comer and calls quite loud "chicks" with the usual kissing sound that accompanies loud calls. By 2623,11 songs (in 8 minutes).

162 $1-1 / 2-53 F$ returns to the nest; 20 seconds; 1IS
(toward me). She calls near me. 1553 begins to sing.
1626 - From the N; 10 seconds; to the $N$.
$1627-1 / 2$ - I see only that she is at the nest. It is blowing very hard and threatens to rain but not immediately.
$1627-1553$ falls silent about this time after 3 songs since my last note.

1655-53F has not returned to the nest and I quit. It is impossible to know whether to ascribe her inactivity to the hour of day, the weather, or to a normal rhythm. I think the second reason is at most only a partial explanation and that all 3 factors may be involved. The male has been silent since last noted.

II at 1705 - The male that I have noted on II on the $W$ edge is singing regularly and frequently there and $W$ to the VII-III cut. He has a female with him but I see no sign of building. She must have come in today or yesterday.

1715 - I leave. Rain still threatens.

Rickert's notes:
14,00 - I arrive and go to $T 55$.
14. 15 - I see 55F feeding in the SE comer and flycatching at from 1 to 3 feet.

11466-1455 sings an insipid step 30 yards from the female.

Ihl 19 - 55 F quits foraging and begins a rapid series of calls flying from tree to tree between 10 and 20 feet high. I lose her to the $S$ at 1502.

1512-155 sings 1 skid on the center of the territory.
1600 - I leave, having seen nothing of either 55 since 1512. The wind is blowing in gusts of $20 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.; there is broken cloud cover.

## May 10, 1956

A dreary gray morning, becoming somewhat clearer about 1030 and partly sunny by 1130. There is a strong S wind; temperature $78^{\circ}$ at 1100 . Present from 1115 to 1800 .

II and XII - The male sings every 10 seconds 40 feet up, for 10 minutes. His song is a melodious skid. No sign of a female during a careful inspection. The male goes E to the little strip of trees in the middle of II, and in 5 minutes I hear a song that is surely his from far over on XII. During 15 minutes on XII I don't hear anything more.

T54 - Yesterday's maple nest and its crataegus peredecessor have not been worked on.

T53 - The new nest is well along. 1453 sings.
T55 - A male sings loud chatter-skids (a sort of combination with the chatter last), and to my surprise I find that he is unbanded. He is extremely red-backed, sings every 12-20 seconds (most of the time every 15) and usually from 25-30 foot perches. In 20 minutes, no sign of $M 55$ or of a female. Situation not clear here.

T53 - I go to the nest and the female flies from it (she was sitting in it, not working I think) with her wings fluttering in infrequent shallow beats as do a male's in

courtship flight. M53 is singing insipid songs in a 12-foot dogwood $S$ of 1 , goes down to 2 feet and continues. $M 54$ is singing steps $1 \mathbb{E}$ of 2 , so I go there.

T54 at $1230-1454$ sings $E$ of 2 and in it, and I follow him for 10 minutes. He never gets above 4 feet, most of the time is at 2 feet. From 1234 to 1240 he sings 25 songs; all but about 3 are insipid steps, the rest chatters. M53 sings chatters to the SE.

At $1240 \mathrm{M5} 4$ quits singing. In a minute or two he sings in 5 and I go there. 54 F is in 5 and in a few minutes gathers material and goes W. The nest is about $8-1 / 2$ feet up, in last year's whorl of a red pine on the $\mathbb{E}$ edge of the planting. W54 sings here with some regularity, always in 5 itself, to 1300. All songs are loud. The 2 times I've seen the female gathering have been in 5 , about 35 or 40 yards from the nest.

The nest is a flimsy, well-shaped cup. She must have been working regularly (despite the clouds and wind) since this morning.


1301-1.154 goes B and either falls silent or gets out of earshot.

1302-54F leaves the nest, comes 15 yards E, flies back to a pine 10 yards $S$ of the nest and pursues a Whiteeyed Vireo a few feet. In a few seconds I see the two within 3 feet of each other and having no trouble.

1310 - She's building actively, but so far she's been so erratic that I'm not going to time her.

1330-1530 - I try without success to catch 54F in my net. She hits it 5 times shortly after it's up, bouncing off each time. Thereafter she goes around it, once pulling up in mid-air to turn away. The only other bird that hits the net, a male yellow-throat, I catch.

54 builds steadily, gathering from a range of 15 to 45 yards, more the longer distance than the lesser.
 She takes several breaks from building; one I timed was 16 minutes long. 1554 sings in 5 about $35 \%$ of the time, the rest is out of earshot or silent (I think pretty
 surely the former). He never goes to the pines or otherwise displays noticeable interest in the female or the nest. His song periods in 5 are composed of quite regular, loud skids.

T55 from 1530 to 1543 - It is silent. I can't understand what's going on here.

T53 at $2544-153$ sings chatters and I watch the nest. His songs are loud.
$\underline{1550}-53 \mathrm{~F}$ goes to the nest, but I cant tell more.
$\underline{1555}$ - After 49 songs $1 M 53$ stops for about 2 minutes, then begins at the $N$ edge of $V$. His songs were skids after the first 10 or so, all given from $S$ of the nest, near $I$.

Now he's singing chatters.
1556 - The female comes to the nest, displays nevvousness over my presence, though I'm 30 yards away. I've noticed before that she is quite shy.

1601 - The female to the nest; 10 seconds, then out into the nest tree and back into the nest for 10 seconds.
$1602-1 / 2$ - The male stops after about 20 songs.
160L-1/2 - 53F retums; 10 seconds. She's gathering SW of the nest at least 20 yards.
$1608-1 / 2$ - Female to the nest. Her periods there are not significant now because she is disturbed by me.
$1612-1453$ begins chatter songs in the pine field, moves to the big trees on the $\mathbb{B}$ edge, goes $S$ toward I. At $1618-1 / 2$ he stops after 22 songs.

1619 - He begins again, near 1 ; 4 songs in 90 seconds.
$1620-1 / 2-53 \mathrm{~F}$ to the nest.
(I can hear a male on T55 chattering. His song is like that of the male on I about 5 days ago.)

1624-153 begins to chatter E of 2 , then apparently moves $W$. He next goes $S$ and continues to sing very irequently and regularly in the vicinity of 1 .

1631-1/2 - 535 to the nest for 35 seconds. The male goes on singing.
$\underline{1634}-53 \mathrm{~F}$ to the nest for 20 seconds.

1635-M53 quits singing after 60 loud chatters since 162h. I timed many intervals at 8 seconds, some at 15 . The average was 17 seconds.
$1637-1 / 2-1453$ begins to chatter near 1; 3 songs, then silent.

1638 - The female goes to the nest for 10 seconds.
1644 - She goes to the nest. I quit timing her. The male has been silent since $1633^{8}$.

T55 - Silence for 10 minutes.
T54 - M54 is singing insipid steps E of 2. M53 chatters about 30 yards on $\mathbb{E}$. 1154 perches 15 feet up, feeds. Occasionally he gives the anger note, a harsh, nearly 2-syllabled "pa-tunk" with a rattling quality. Then he goes into a burst of these, though both he and (I think) M53 do not change position or have an encounter. (Note that M54 still holds much the same territory as he did before, although the female is building about 200 yards $W$ of the maple nest.) 154 then moves $W$ to the big trees near the fox den, then to 4 . His song in these places is a skid.

54 F is building rapidly at 1710 . She gathers material for 3 trips within 25 yards of the nest. M54 sings in 4 or 5 .

IV S - In 20 minutes here I hear the male singing most of the time, always type -8's. He ranges from the hillside across the valley to the $\mathbb{N}$ on both sides of the pines to the S hillside. At no place does his song vary. I find 2 be-
ginnings of nests, interestingly, in the same tree. Both are insubstantial, one a few fibers and the other a flimsy foundation pad. The tree is the northemmost of the 2 maples that have always attracted $\mathrm{PW}^{\prime}$ s as nest sites here. Once the male chases a Magnolia Warbler 10 yards, 20 feet up.

1800 - I leave. The sun shone today about $35 \%$ of the time.

May 11, 1956

A clear humid morning, becoming cloudy about 0800 ; SE wind, temperature $70^{\circ}$ at 0700 . Present from 0730 to 1200 and from 1330 to 1838.

II - The male sings 25 feet up in a still-bare elm, behaving as though unmated. His song is a musical skid uttered every 10 seconds in very long series, perhaps 50 at a stretch.

T54 - 54F is building rather slowly from 0800 to 0830. I see about 4 trips, but she's very hard to see on some Visits. I have an idea not all trips are with material. 1954 sings insipid steps in 4 and around the fox den, later in 2.

T55 at 0828 - Silence till 0833-1/2 when 1155 begins to sing. I then watch him until 0925, when he suddenly flies $N B-2, T ?$ very high to the $N E$, out of sight and $I^{\prime} m$ sure off XI.

M55's behavior in the period I have him in view (and I never lose sight of hin while he's on XI) follows: He spends $95 \%$ of his time above 25 or 30 feet, singing from the higher trees on the center of the territory. These trees are elms and sycamores and most are still relatively

flycatches exactly like an Olive-sided, flying out as much as 10 yards, suddenly setting his wings in midair, taking an insect, and returning to his perch. Sometimes he sets his wins, pauses a moment in flight, and goes on to a new tree after catching the insect. I see little or no gleaning from branches.

He sings 128 times from $0833-1 / 2$ to 0903-1/2 all type $8^{\prime} \mathrm{s}$. There is no break in this series, and he keeps right on until 0912, singing a total of 165 songs to that time. He is silent to 0913-1/2, then sings 57 songs till he leaves KI; again there is no pause. The fourth song is a skid, the rest type-8's. The latter song with M55 consists $90 \%$ of the time of 9 notes, the rest of 8 .

I'll wait a while to see if M55 returns. It seems clear that he is unrated; note the low intensity of his response to the female that was here a few days ago and the fact that the strange male was allowed to sing here yesterday.

0940-145 sings loud type-8's again, at the same rate and under the same circumstances as before. I'll leave for

to pole 1 hour, then return for an hour.

253 at 0945 - $M 53$ sings type -8's, then skids. 53 F is at the nest. I sit to watch.

09448-1/2 - Female to the nest; 15 seconds.
$\underline{0953-1 / 2}$ - Female to the nest; 15 seconds. It not sure
about the songs I hear; M55 is going on as before on 155 within earshot, and I think still another male is singing type-8's somewhere (perhaps it's M54), M53 seems to be singing an occasional burst of 5 to 7 skids in the pine field. The wind interferes a good deal, and I won't be able to record songs here. At 1000 I can hear M55 singing as before and M53 and M54 (the latter presumably near 2) both singing on $V$.

1030 - There is no new development. I'll check the nest to see its stage, though the last time she came, over 30 minutes ago, she brought a large mass of soft material. (I hear 2 males singing so close together on $V$ that I almost expect to find a new bird.)

II wrong about 2 things: 53 F has been on the nest, sitting quietly in the incubating position. I didn't see fill 7 her come to it. The 2 males are the usual ones, but M54 is well $\mathbb{B}$ of 2 at the $\mathbb{N}$ end. He sings full skids there at irregular intervals between 10 and 20 seconds; his average is about 13. 1453 's chatters are more frequent; I time a number of them at 10 seconds. $1 / 54$ switches to type- $8^{1}$ s, the intervals as before. (Note that song type doesn't seem to be correlated with interval; I've many examples of this this year.)

It occurs to me that 53F might have an egg in her nest as the result of the interruption of her cycle for the prior
nest, but she doesn't.
T55 at 1045 - At 1047 M55 begins type -8's. He sings 63 songs to $1102-1 / 2$, breaks for half a minute, begins. During this time he sings from 11 to 19 songs at 25-35 feet
then drops to about 6 feet, feeds for 30 seconds or a little more, ascends and starts a series. He sings while low too, possibly a little less frequently. His rhythm is very even, $20-30$ seconds while feeding low (average 25) and 12 seconds while high. He doesn't feed while high. I watch a 5 -minute feeding period from 1102 to 1107.

1710-1/2-1155 quits after 31 songs since 1103-1/2, which involved an unusual amount of feeding.
$\underline{111)_{4}}$ - He begins, sings 4 to $1115-1 / 2$, quits. The song began as a type-8, switched to an insipid, ended as a skid. I don't know the cause of this chance in routine.
 which I oan't find him. All songs are type-8's, 32 to 1115; they are continuing when I quit at that time. He stays high

1137 - He begins to sing after a long silence during the whole period after I find him again, feeds in the high trees a little. But his rate of song will indicate that he can't be feeding a lot, and he isn't.

$$
1200 \text { - I leave. }
$$

2330 - I return. It is still very windy from the SE, partly cloudy, $80^{\circ}$.
\$55 at 1333 - 1155 is singing his type -8's, but there is a female here. She is calling "check" about once a second (quits this after 3 minutes) and moving around in the SW corner. I can't tell whether she's the same female as the one here 2 days ago; Id guess not from her appearance. $M 55$ stays 20 feet high and more, sings loud and regulaxly.

1340-M55 swoops down on the female with his wings set during the last part of the flight. He chases her to the ground; there is a pause, a song, and another chase. The female may be the pursuer in the latter case. He's sung 29 songs to 1340 .

1341 - He begins to sing again and he flutters between 2 perches 20 feet high. In this flight the wings beat evenly, in a greater are than the shallow wing-tip flight; Ind say

## $21(3.4)$

 Plight is clearly slow.1347-1/2 - After 21 songs he glides down from his 25-foot perch to the female, which is at 10 feet. There is a pursuit 179 to the ground out of ry sight. Again his wings were set as he came dow, raised a little over the back.

1348 - Sones again. He still stays high, sings loud and
as regularly as this morning. He feeds some. The female is in my sight about half the time. I cant tell which is following which; neither is obviously flying up to the other. I'd guess each keeps the other in sight and earshot with the male perhaps more active in following along above.

1357 - After 29 songs, a 10-yard pursuit to the ground with a song at the finish. M55 flutters away at the end and perches about 3 feet high for 30 seconds with his bill open and his wings slightly spread at the wrists.

1358 - I begin counting as he sings again. So far she never flies up to him. To 1407, th songs. The female now appears and $M 55$ flutters slowly before and away from her. She follows in his general direction immediately, but when he moves on again she stays put. He begins to sing.

7h,08 - She picks up plant down, takes it 10 feet to a tree, drops it as she perches.

14,09-1/2 - After 2 songs he's silent. At 1/110 he begins.

14,11 - The female flies right to the male's 3-foot perch. He flutters away; she doesn't follow.

11, 14-1/2 - He swoops dow with set wings and meets the female in midair, They go immediately to the ground, stay 15 seconds in silence and without thrashing around (just barely out of my sight). He sings. She chases him fast for

20 yards, quits before catching him and sits perched.
He's sung 9 songs to this time.
$11175-1 / 2-H e$ begins to sing. At 1421 he stops after 18 songs, sits on a 30 -foot perch.

1422 - He begins to sing.
1426 - He swoops on set wings, pursues the female, which begins to take evasive action just as he reaches her. He sings in flight. They do not go to the ground. Evidently she simply flies on away from him. He perches 2 feet up with his bill open, his head thrust forward, his wings set out a little (just as though in threat). He feeds 1 or 2 times just after landing. Held sung 11 times to this point.

1427 - He begins to sing the usual type-8.
7147 - After 28 songs he falls silent, sits quietly 30 feet up.

11139 - He sings about 6 combination songs with a step ending in a skid; the intervals are only 2 or 3 seconds. In 1 minute he's singing type -8's again. The odd songs were in the SW comer.

I'd say he's spending $90 \%$ of his time at 20 feet and above and she the same percent below 10 feet. She probably nest-shaped once. She is active and nervous; he tends to perch rather quietly and sing. The SW quarter of XI is the area covered. This male may be a good one to study because his behavior seems not to be influenced by any other
neighboring males.
1440 to 1520 - I take a rest, write. 1455 sings type8's without any perceptible respite, probably 4 times a minute, throughout the period. He is silent for a few moments as I begin watching, though.

1522-1/2 - He sings again.
1526 - After 8 songs from 30 feet up, he swoops on the female at 12 feet. She doesn't go to the ground and the pursuit breaks off after 15 yards. He sings a type- 8 in flight, flutters with big, slow beats to a 4 -foot perch. She darts to a 12-foot perch.

1527 - He begins to sing, high as usual. He stops once to eat a caterpillar. He then feeds at ground level, silent1y. There were 6 songs to the pause, at 1530. At 1532-1/2 he goes up to 10 feet high, begins to sing, climbs on up to his usual height, sings. He moves on to 4 other high trees, goes on singing; 27 times till he falls silent at 1539 .

1540-He begins his combination high step-skid in the woods W of XI. Both he and the female have gone W into the woods today. Next he sings to the $S$ in the woods, and at 1541-1/2 is singing type-8's on XI. After 2 , he sings 2 combinations, one of which actually has a type-8 element at the beginning (so there are 3 parts to the song). I see a normal flight and would say that by comparison the flutter beats are bigger, slower, more evenly spaced. He's

moving a lot changing perches every 30 seconds or so.
154.5-1/2 - After 20 songs silence.

1552 - He begins again, 30 feet up. (Normal flight is a series of beats in a series, a pause, a series, etc.)

1556 - He flutters 25 yards to another high perch. The female is calling "check" 7 feet up in a haw. His flight was away from her but it got no response. She's at 15 feet, flies fast away; he doesn't follow.

1600 - After 24 songs he quits. A Sparrow Hawk comes over just at the moment and there are several high "chip" or "trip" notes that may have been his.

1600-1/2 - He begins again. He's on the center of XI.

## 1612-1/2 - After 24 songs sung at 25 feet and with

 some rather inactive feeding intermingled, he flies S into the edge of the woods, falls silent.1614-1/2 - He begins on the center of XI. He yields place to a Red-eyed Vireo, flies on to a 35 -foot perch at 1616-1/2 after 9 songs.
$1617-1155$ begins to sing, flies 50 yards to a high perch; sines once, goes on to another 20 yards away.

1620 - He's sung 13 more times, and I've been following him for an hour. I quit. Note the scant contact with the female during this hour, the nearly invariable high perches, the constant song. His series is continuing as I go.

T53 - The nest looks complete. On top of the final grass lining are a few feathers. I'd say this nest is a little less well-made than the last one. Silence as I pass through the territory.

T54 - 1454 sings type-8's in the S part of 4 . In 5 minutes I see no action at the nest. It is extremely windy from the SW, and for an hour the sun has not shone.

IV S - Silence for 40 minutes while I walk around. The nest beginnings found yesterday are not changed.

$$
954-54 \mathrm{~F} \text { is at the nest. }
$$

T53-1453 chatters.
T55 at $1738-1155$ is singing in the $S W$ corner. He flies to the female which is on a creeper-covered cherry limb, horizontal, 25 feet high, on the $W$ edge of XI. He flies on and she stays there, then comes onto XI at a lower level. He goes on singing 30 feet up, comparatively infrequently. At 1746 he changes his perch for the first time; 20 yards S at the W edge, still high. His interval is from 15 to 25 seconds, average about 20 . At 1751 he comes E into XI itself, in 2-1/2 minutes moves again. He stays high, sits still, sings without feeding.

1755 - I find the fenale and watch her while 1153 sings on. For 5 minutes she feeds on and within 5 feet of the ground, possibly examining nest material. She also hops over low trees; I see no shaping.

1800 - The male dives on the female and there is a pursuit with a song during or just after it. I don't think they go to the ground. He falls silent now after 53 type$8^{\prime}$ s since my arrival. She sits $1-1 / 2$ minutes 4 feet up in a sumac, then goes to a 25 -foot tree and feeds in it, reaching the top. She then flies dow to low trees, flies a good distrance away from M55. This provokes no response; several such flights within his vision and away have had no effect on him.

1802 - He begins to sing, high. His song is less irequent and regular than usual, and it sounds as though he's not moving much. (I forgot to note that an earlier flight-20 minutes ago--to a new perch was a shallow flutter.)

1819 - After 43 songs he flies high to the $\mathbb{N}$, to the edge of XI or off it. Silence thereafter. This flight could hardly have had any direct connection with the female; it was fast, straight, high.

1826-55F flies into a tree near the N end of the territory, 22 feet up, She calls "check" 6 times per 5 seconds. Earlier she ${ }^{1}$ s called occasionally. She now goes $S$ and I can hear her calls. I follow and find her in a tree 18 feet up, with a male which also calls. He moves away quickly so Ic ant see if he's banded. At 1831-1/2 M55 sings nearby, so it must have been he. He sings 23 songs to 1837, moving little and staying in the same tree. He then goes to
the $S$ edge and falls silent.
1838 - I leave. I've been on $T 55$ another full hour.
The day has been 70\% sunny.

Mostly cloudy in the early morning with the sun coming through occasionally; strong S wind; temperature $74^{\circ}$ at 0700. Present from 0730 to 1230 and from 1330 to 1630.

T54 from 0740 to 0755 - No songs. The female doesn't come to the nest in 12 minutes. It feels complete.

T53 - No songs in 5 minutes. The nest has been worked on since I last looked, with grasses added to the lining. The female calls "tsu" when I go to it; I'd guess she's working a little today.

T55 at 0801 - M55 is singing type -8's in the SW corner, moving around. His songs are irregular, infrequent compared $23(2.3)$ to yesterday. At $0810-1 / 2$ he quits after 23 songs. I see him some of this time; at first he's 8 feet up, then goes high.

0812 - He begins again, high in the SW woods. At 0817
$16\left(3 .^{2}\right)$ he's still singing in the bigger trees without anything to suggest where the female is. He quits suddenly at this moment; 16 songs. She's certainly not building in the SW corner.

0822 - He begins nearer the center of the territory. He is 25 feet high singing regularly, feeding little. At 0826 he goes back into the $S$ trees, 4 minutes later across to the W trees. He's at 40 feet feeding occasionally. Ide., he sings a song or two, moves a few inches or feet, takes food, sings,
 etc.

0842 - I think I detect a break in his singing and I hear sharp "check" calls in the SW comer. I find the female there, 8 feet high, moving quickly and nervously and calling.
2176(3,6) 0843 - She moves on a few yards and M55 falls silent after 76 songs. He flies in her direction, but stays high. His flight is slightly slowed down.

0843-1/2 - He begins to sing again but less regularly, less often, possibly a little less loud. He also flutters slightly as he flies between perches, his beats a little shallow.
$\underline{0848}-55 \mathrm{~F}$ is 4 feet high in the center of a dense haw. He is 15 feet or more diagonally above her. He has sung 11 times. He now glides dow on her, there is a rapid, twisting 2-second pursuit. She doesn't go to the ground and he breaks off, sings a type- 8 in flight, flutters a few yards to a 3-foot perch, then on to another. He moves slowly, his bill is open and his body is rigid with the wings held slightly away from the sides. He maintains this pose for 1 minute although he moves to 2 new perches during that period.

0842 - He begins to sing again. In a minute he glides down on set extended wings to a 3 -foot perch in a sumac thicket. A fer seconds later 55 F flies past him, but is not pursued; I think her flight is a very little bit slower than usual, a mild copy of the male's.

0853 - She flies quickly right to him as he sits 12 feet up in a dogwood. He flutters away just as she reaches him, going 30 yards to a low perch. His wings beat very slowly, a full arc. He is still singing, not completely regularly.

0857 - He goes high into the W trees and in a minute goes up to 50 feet in the $S$ aspens.

0859 - He quits singing after 24 songs. He is in the big trees near the center of XI.

0901 - He begins to sing. I write for 15 minutes during which his song goes on as before. Id say no nest is being built but that herl begin one today.

I'm going to watch 1154 to see if his behavior has changed in the last few days.
\$53 - M53 sings I skid near the nest. 53F hasn't removed a stick I put in an hour or so ago. 1953 sings type81 s near. 1 .

T54 at 0920 - It is a good deal less cloudy; the sun I see him until 0934, while he sings 27 songs, some inaudible and detected only by the movements of his throat and bill. He sits 20-25 feet up in the locusts of 5 , seems to be looking dow tensely on something below. I don't see the female. This behavior is fairly typical for a male whose mate is
building, but it seems peculiar that it would emerge in M54 now and 40 yards from the nest.

0938 - He begins to sing in the pines $S$ of the nest $30-40$ yards, goes 30 feet up to a locust. After 3 weak skids he changes to loud ones. I follow him more or less closely to 1000 , during which period he sings 59 songs. All are skids, all but the first ones loud. His intervals are irregular, some as much as 2 minutes. He stays on the area from 4 west, moving freely across and to the $\mathbb{N}$ and S . Several times he sits 30 feet up in the big woods edge trees and sings while feeding little. I'd say he probably never gets dom below 10 feet or so and is in the tree tops nearly all the time. Once he attacks and pursues a small bird in the pines; it is perching when he starts after it, and I'd judge it is not a PN.
$1002-1954$ begins to sing loud skids in 5, about 20 seconds apart. He is moving a lot but without the nervous characteristics of males during building. (Anyway, I see no sign of building.)

1011 - He quits singing after 27 songs. I'd guess he may have moved SE and be out of earshot.

1013 - He begins towand 3, returns to 5, goes back E in 2 minutes, returns.

1020 - He 's skidding in 4 and 5 when I quit. Although he hasn't stopped the series, there are 21 songs in it at

1020, after an hour.
I'd. guess he seldom fights M53, that the former fights were caused in part by the location of the female's nests. He stays high, sings most of the time, seems not to pay overt attention to the female.

T53 - 53F carries grass to the nest. M53 is silent. I put up a water-drip trap 35 yards $S$ of the nest.

T555 at $1039-1955$ is singing in the SW comer. He stays high in the trees of the $W$ edge, going a little $W$ of them.

1044 - I see the female on the W part of the territory, lose her in 1 minute. The male stays $W$ of XI, probably at the little clearing.

1048-1555 is silent after 22 songs.
1049 - He begins on XI, SW comer. I hear the female call here, see $M 55$ flutter to a nearby perch. In a minute I see her again and watch her nest-shape 3 times. In a maple she does so for a few seconds, but at 2 forks in a dogwood, about 8 and 9 feet high she sits and quietly lowers her belly, sometimes spreading her wings, for 2 and 4 minutes. She sits without motion part of the time in each.

1055-1455 falls silent after 17 songs while she nestshapes. He's had her in view $I^{\prime} m$ sure.

1057-She quits; I lose her.

1058-1/2 - He begins to sing. I see him flutter as he changes high perches.

1100 - She's back in one of the same dogwood forks. She calls "check" 2 times, perhans at me under the tree. He sings loud, probably 20 feet high, 20 yards away. 55F feeds from 0 to 3 feet high near me.

1105 - She gathers a great quantity of spider webs, takes them to the dogwood fork. I'm only 5 yards away. (Ten minutes ago she took a spider web.) M55 sings high 20 yards to the $W$ in the big trees. I'll withdraw and time her trips. If she builds here I saw the first material brought.

M55 is still singing, moving around and undoubtedly following the female. His song is irregular with little pauses occasionally.

1111 - A Sparrow Hawk flies over, and I hear some small bird uttering "chips." By coincidence or otherwise, M55 is silent at the time.

1117-1/2 - After 47 songs, those of the last 6 minutes uttered on the center of XI, 1555 is silent.

1118-1/2 - He begins, sings only 1 time, quits.
1119-1/2 - He's singing, but slowly. He's in the tree above the fork. I hear her call "check" twice near the ground.

1122-55F brings spider webs, attaches them for 10
seconds, sits quietily for 5, leaves. He sings on, high. The female probably takes material to more than I place at first, ultimately selects one. I doubt if this is true of a female whose drive is high, e.g., a renesting bird. The male's songs are irregular, some widely spaced. 11730-55F flies rapidly straight to the nest with spider webs. She attaches them for 30 seconds, goes $S$. M55 is singing there.

11122-M55 clides from a high edge tree 25 yards out to a dogwood on XI, to a perch 15 feet high. His song continues, still with occasional pauses a little beyond the normal.
171.3 - He quits after 49 songs. He has never really broken off.

171/4-1/2 - Songs again--but only 1.
17l. 5 - 55 F brings spider webs, cranes her neck around attaching them to leaves and twigs, turns her body once or twice, stretches a wing, leaves in 20 seconds.
171.6 - He sings once.

1117 - He sings, beginning a series.
1151 - She brings webs, attaches for 30 seconds, sits quietly for $1-3 / 4$ minutes more, hops out into the nest tree and departs in a leisurely way. The male is singing repeatedly within 20 yards. (I think she may have left the
nest tree only at 1155 , dropping 10 yards $\mathbb{N}$.)
1156-1/2 - I'm right. She returns with webs, goes through the usual craning motions for 20 seconds, goes quickiy NW. Note the accelerating rate of building.

1157 - She's back with webs; 40 seconds; SE. The male usually quits singing as she first appears.

1158-1/2 - Female with webs; 10 seconds, stretching and extending a wing.

1200 - Fenale with webs. The male glides at her, there is physical contact in the nest tree for 10 seconds; he probably pu7le her tail. He glides away, sings. She goes to the nest and builds for 10 seconds. She showed no reaction to his attention.

$$
1200-1 / 2 \text { - She returns, places webs for } 10 \text { seconds, }
$$ goes SE.

1205 - She brings webs, stays 20 seconds, goes SE quickly. He's still singing.

1205-1/2 - Female with webs; 10 seconds; to the ground 10 yards W of the nest.

1207 - Female with webs; 7 seconds; to the $S$.
1208 - M55 flies to the nest tree, perches 10 seconds 10 feet above it, goes to the nest, sings in it, hops to a perch above it, leaves and sings at a new spot. This all lasted 30 seconds.

1211 - He falls silent after 53 songs.
122) - He begins to sing and she retums with material. She inserts it for 6 seconds, spends 10 more within I foot of the nest, goes NW.

1216 - I leave the territory. He's singing.
T53 - A chat is in my trap.
T554-A mirror indicates the nest is probably complete, but the light is bad.

VII - An unbanded male sings skids in the little remnant woods on the $W$ edge.

$$
\underline{\underline{1230} \text { - I I leave. }}
$$

1330 - I return. It is sunny with some clouds, humid, very windy ( S ), and the temperature is in the 80 's.

T53 - The male sings chatters.
T55 at $1355-M 55$ is singing as usual, and I sit to watch the nest. He flutters when he lands at a high perch, his wings scarcely beating.

Some of $\mathrm{M} 55^{\prime}$ 's songs have as many notes as 10 , some as fow as 7; the usual number is 9 . He's in a run of $10-$ note songs now.

21409-1/2 - 55F comes to the nest tree with spider webs but places then in a new spot, 2 feet above the earlier center of attention. She stays 30 seconds but may have been
slowed by seeing me.
71113 - She brings bits of fiber, places them in still a third fork, from which they fall. 1455 glides into the tree as she is crouched in this fork. He hops to within 2 inches of her, spreads his wings at least half out to their full length, strains toward her. There are 12 very fine "tsu" calls. She remains motionless. In 10 seconds he hops to a limb 10 feet away and in 5 seconds feeds. She continues to crouch for 25 seconds, hops out into the tree. He is init too, but I see no reaction. He's quit singing

11,15 - He begins to sing; 6 songs to 1417.
1117 - She brings material to the original crotch, stays 10 seconds.
$\underline{W_{22}}$ - He sings after 4 minutes' silence. He's in the ash above the nest, leaves, returns.

1129 - She comes to the nest and he falls silent for 1 minute (after 22 songs) while she's there and after. He flies from the ash while she's still in the nest fork (the first one), sings at 1430 . She hops from the fork, stays in the tree 30 seconds before leaving; a female building intensely flies straight away without hopping around.

1437-1/2 - After 15 songs I see him glide into a dogwood 30 yards $\mathbb{N E}$ of the one $I^{\prime} m$ watching and in a minute

2 PW's leave it in a pursuit that takes them out of sight quickly.
14.38 - M55 begins to sing, comes to the nest tree, goes to the ash above it.

1440 - She comes to the nest, stays 25 seconds, hops out. She stands stiffly, bill wide open, tail cocked, body rigid, legs extended, thus: $\qquad$ She looks above her, climbs up while keeping her attention on something above. The male is crouched in a fork at the top of the tree, sitting rigidly in a nest-shaping position. She climbs to him, one utters a few very faint notes like "tsu" close together. He leaves after 5 seconds. She sits with bill open, in 15 seconds leaves. He's silent after 3 songs.

개내 - Be sings once.
114.5 - She comes to the fork, probably without material, pushes her body into it, sticks a foot dow, hops 3 inches away, and in a total of 20 seconds flies $W$ to within 5 yards of me. At 1 foot in height she call "check" once, disappears.

He's singing over my head. I've heard no faint songs or other peculiarities.
$\underline{\underline{1} 52}$ - He stops after 12 songs.
1153 - He begins. He's staying high this afternoon, just as before. After 5 songs in 2-1/2 minutes he pauses for nearly a minute, I'Il not quit counting the series.
$\underline{1500}$ - I break for a few minutes. He's sung 12 times,
and there is no activity at the nest. He's just gone E from the nest tree itself.

T54 - 1.154 skids repeatedly in 2 and 3.
T53 - M53 is silent.
T55 at 1510 - Silence.
1516-1/2 - M55 sings in the SW corner, moves toward the nest. By 1520,70 songs. I'm going to move around, since it's clear the tree is no longer the focus of activity. He's silent now.

1527-1/2 - After 15 songs in the SW corner M55 goes to the N central part of XI and is silent.

1538 - He flies to a high perch in the $N$ center, gliding at the end. He begins to sing. The female calls loud "chooks" while aitting 20 feet up; I'm sure she also calls "tsu" or "tsip" a few times. She then sits silently there for 90 seconds, then preens for 60 , and flies $W$ out of my sight. The male goes to the high trees near the $S W$ and continues to sing. I doubt if 55 F will do any building here; she ${ }^{1}$ s probably exploring or taking material to a new site.

1554 - 1455 coes to the IW comer, falls silent after 53 songs. He's been high and along the $W$ edge nearly all the time. Trice he's glided in plight but neither tine to the female; I $\operatorname{can}^{\prime t}$ find her.

1601 - He begins to sing at the $\mathbb{N}$ end.
1603 - I hear "check" calls near M55. At 1604 there is
a long, twisting close pursuit after a dive by him. He sings at the end of it or during it (they go out of sight). I think it unlikely that 55F has begun a new nest; she appears at too many places too far apart; also I see no carrying.

1607 - M55 quits after 10 songs, including the one given in pursuit.

1610 - I stop at the end of my second hour here. M55 is silent but begins just as I leave; he's in the SE cormer.

1630 - I leave.

Nay 13, 1956

A slightly hazy dawn with a little overcast in the E ; a SW wind that will get strong; temperature $70^{\circ}$ at 0600. Present from 0630 to 1130 and from 1430 to 1800 . II - Silence.

XII - I can hear nothing as I walk slowly in.
T544 - Silence while $I^{\prime} m$ within earshot for 10 minutes.
\$53 - In 10 minutes M53 sings about 7 faint steps near

1. The nest is empty.

255 at $0655-$ M55 is singing type-8 steps in the SW corner. His interval is irregular, somewhat slow.
$0652-55 \mathrm{~F}$ is at the first nest site of yesterday. She then goes to 2 other forks, stays at least a minute in the tree. I'm too far away to see much. I'll sit and watch the tree.

0708-155 is singing 20 feet up in a tree-top 15 yards from the nest. He suddenly Ilies dow at the female 10 feet below him in the tree; they hover in the air at that height, like a stationery $f$ lutter-up, for 1 second. He glides out in a curve dom to 4 feet. His wings beat very shallowly, at the tips, and he sings in flight. $55 \%$ stays in the tree. He sings twice in the next minute, falls silent at 0710-1/2 after 36 songs.
$\underline{0725}-M 55$ is still silent and there is no action at the nest. I'In going to move around on XI .

0732 - At the N end I see a. PN fly high and straight toward the nest tree, possibly following another PW. In a. few seconds $M 55$ begins to sing in the $35-f 00 t$ ash above the nest tree. I can't get there in time to see if the female is there. The male stays a minute, moves around singing from high perches within 30 yards of yesterday's nest tree.

0737 - Something has disturbed M55. He gives a rapid excited burst of "tsu" or "tsip" (more like the latter) notes, keeps it up till 0739-1/2, slowing down to 8 per 5 seconds; he is sitting 20 feet up in a honey locust looking down. He doesn't sing (he'd sung 20 times to 0737) till 0740.

0740-1555 stays in the tree, sings, quits calling, after the first song.

0741-1/2 - He starts to fly to a new perch, is attacked in the air by a humingbird. He instantly drops into a 10foot dogwood below him. The humningbird then weaves slowly back and forth at the PN's level, staying about 8 inches away. The warbler silently and without posturing keeps turning to face the humer. Both are silent. When the humningbird departs, 1455 moves on and continues to sipg.
074) $-1 / 2-1555$ sings from the far SW comer, falls silent after 16 songs. I don't see him.
$0747-1 / 2$ - He begins in the woods at the SW cormer. Staying about 50 feet high, he goes $S$ to the $N$ edge of $T 53$; he and 1453 sing 2 or 3 times. M55 returns, sings in the ash,
goes $W$ to the high edge trees. A humingbird pursues him, but he sings, evidently without having been attacked.

0752 - He quits after 16 songs.
0753 - I hear 55F calling in the SW cormer, see her gather weed fibers I foot from the ground. She immediately drops them. She then goes up to 6 feet, preens, climbs to 25 feet. I follow when she flies high to the 11 center of the territory. There she sits 25 feet or more high, feeds once, preens. At 0800 I lose her as she goes $W$, seeming to drop a little. Meanwhile the male began to sing at 0755. She paid no attention to him. He moved slowly N toward her but I don't think he saw her. I.e., they weren't staying together; she was higher than $I^{\prime} d$ have expected. At 0805 he's sumg 30 songs and is continuing. Itm roing to check other territories.

253 - 1253 is silent as I pass.
T54 - 1454 sings type-8's well SE of 2 , quite near 1 . In 5 minutes I see no reaction from 1153.

XII - Sllence during the half hour I have it in range. III.- The male from II (?) is singing all over the $S$ end of III, from the hackberry to the SW corner. His song and marks are identical: musical skid, red-streaked back. He sings for the 30 minutes I'm in earshot.

II - Silence for 30 minutes.
VII - Silence for 30 minutes.

T54 at 0920 - Silence.
T53 - M53 sings repeated insipid steps in 1. He is 20 feet up in a locust.

T55 at 0929 - 1455 is silent. A. 5-100t pilot black snake is in the Sill comer.
$0930-1 / 2-1455$ begins to sing E of yesterday's nest tree. I'll watch it for a while.

0934 - 1455 sings in the ash above the nest. After 4 songs he moves to another perch.

0938 - He comes to a 30 -foot perch in the W trees, sings in 20 seconds.

0940-M55 goes to the ash.
0947 - He goes NE. Note the rate of movement. He sounds far $\mathbb{E}$ on XI. At 0942-1/2 he has come $S$ on the $\mathbb{E}$ side.

09143-1/2 - 1155 quits after 51 songs.
0959 - Ilo sign of anything at the nest, so I'll move around. M55 is still silent.

1004 - I find the female feeding or foraging silently in the IV center of the territory. I see her for 1 minute. She goes from 1 to 7 feet, tums and flies at 7 feet in the direction of yesterday's nest tree. I'm not sure she flies that far. No.sign of the male.

1009-1155 begins to sing, the first song possibly weak. He's in the center of the territory, 30 feet high. At 1011
he goes $S$; there's a 30 -second break in his singing.
1019 - I see 55 F gather spider webs in the woods at the SE comer and take them to a nearby dogwood. There are a few fibers in it. She calls when on the ground. 1455 sings within 20 yards overhead.

1020-1/2 - She flies into the new nest tree only 2 feet high (the nest is at 9 feet) and the male flies quickly to her. They go to the ground in my sight, under the tree. He sings there, pulls vigorously at her tail, jerking his head as he tugs. She is silent, stands still. In 2 seconds he quits and leaves, but I can't see him go. She sits quietly for 10 seconds, doesn't go to the nest. He sings.
$1023-1 / 2-55 \mathrm{~F}$ goes to the new nest and attaches webs for 20 seconds; goes N .
$1024-1 / 2$ - The male is silent after 34 songs. (N53 chatters on his territory.)

1027-M55 sings within 25 yards of the new nest. At 1029-1/2 there is a 1 -minute pause, but I keep on counting.

1032-1/2 - He stops after 12 songs.
1035-1155 begins. He's on the $\begin{aligned} & \text { IV edge near the corner. }\end{aligned}$
1036-1/2 - He quits after 6 . I'm still watching the new tree. Note that when I first found 55 F about an hour ago she was the length of the territory away from this spot.

I'm going to stay to time the duration of M 55 's song
$1050-1 / 2$ - He sings on the center of the territory, comes S singing. His break was 14 minutes.

I leave to see the situation on $\mathbf{T 5} 4$.
(There's an Indigo male in my trap. I band it with green over silver, left, \#21-62056, red tail.

154 at 1108 - At 1109 I see 154 about 10 feet high in the fox den cluster. He sings 13 very faint 5 -note steps as he sits preening some of the time. In 5 minutes I see that a female is on the ground in the den sink hole. She is slowly and deliberately gathering grass and, I'm sure, animal hair. She goes very quietly over the ground. He bends his head down to watch, singing occasionally. His tail is straight out behind or alittle depressed. So his position is S. At 1715 she flies up to a 6 -foot perch and he joins her there. She goes 15 feet $W$ and he follows. I run $W$ to the nest in time to see the two arrive there. He lands in the nest tree first and she a second later. She goes into the nest. He sits a few seconds at nest level, 1 foot avay. He then flies on a few feet and sings a loud skid. She stays 2 minutes in the nest; when I see her she's sitting quietly. He flies back to within 8 inches of the nest, perches there, goes to a tree 8 yards E , sings a loud skid. He returns to the pines, sings. At 1119 she flies out and he very quickly follows. There may be a pursuit, but they go out of my sight. Note the distance at which she gathered, possibly 100 yards.

It would be useless on such a windy day and on so large a territory to try to count songs.

1130 - I leave.

Ih30 - I return. It is clear ( $99 \%$ sun today) extremely dry and windy ( $S W$ ), with the temperature in the 80 's.

IV S - In 30 minutes here I hear a male sing a few insipid steps, faint, in the valley E of the pines. He then flies V. I see no nest. He is unbanded.

IIE area - There are 2 males here, both unbanded. I see a fight at the $W$ margin of this habitat. The 2 males are singing very faintly, skid and step, almost inaudibly. Suddenly one sings near the spot where the other is. The latter f mediately utters 2 rather rough or sharp notes "tskip" and the series of squeaks; this series does not descend in pitch. Thereafter there are hard fight notes and the second male calls "tskip" 2 or 3 times after the fight. A female is with 1 male. It's impossible to judge the situation without staying too long.

## V - Silence.

255 at 1552 - 145 is singing very irregularly, and some of his songs are insipid steps. The new nest looks to be no further along. I write until 1601-1/2, then go to look for the pair. M55 has sung 14 times to 1602 .

I find the male singing very irregularly, sometimes faintly at the $N$ end. Some songs are insipid steps.

1617-1/2 - The female takes material to a dogwod there. I can see a few strands of material in a fork, perhaps 10.

1620 - She returns and I sit to watch. It will be impossible to time series of songs, since M55 sings so erratically; I'll take total counts. He stays high.
$1622-1 / 2-55 \mathrm{~F}$ goes to this new nest; 25 seconds; to the WI 20 yards, the woods edge.

162h - Returns; 40 seconds; to the SW. It's blowing a gale and she fastens spider webs.

1625-M55 goes to the nest. She returns and gets in it to work. There are little "tsu" calls, about 10. He opens his wings. She turns her head to him, opens her bill. He hops to a new position 2 inches away; she opens her bill. He flutters away after $10-15$ seconds. They were in physical. contact, they were so close.

1626 - Female to the nest; 15 seconds; to the W.
1627 - Female to the nest. The male glides to the nest, gets into the crotch with her. She pecks at his nape with open bill 3 times. He leaves in 5 seconds. Again they touched. She goes in 15 more seconds.

1627-1/2 - Female to the nest; 15 seconds; to the $\mathbb{W}$.
$1628-1 / 2$ - Female to the nest; 20 seconds; to the W.
Both the male's trips to the nest were silent.

1629-1/2 - Female to the nest; 20 seconds; to the W. He's singing insipid steps.

1630-1/2 - Female with webs; 20 seconds fastening them, craning her neck; to the W.

1631-1/4 - Female with webs; 25 seconds; to the $W$.
1632 - Female to the nest; 12 seconds; to the $W$.
1633 - Female to the nest; 13 seconds; to the W. 1455 is silent most of the time.

1634 - Female to 3 feet above the nest; in for 12 seconds; to the W.

1635 - Female to the nest; 10 seconds; to the $W$.
1636-1/4 - Female to the nest; 10 seconds; to the W.
1639-A PN flies past me to the S. It must be $\mathrm{NF5} 5$; he sings from 30 yards $S$ of the nest. He seems to be perching 15 feet up and higher. I think $55 \%$ is calling to the $\mathbb{W}$.
$1640-1 / 2$ - Female to the nest; 10 seconds. She comes 15 yards S to me, calls "check" 3 times, passes me. She was searching near me; I don't think I affect her at all. M55 sings; type-8's are his songs this last 5 minutes. They aren't soto voice, but I'd say some lack full volume.
164.h - Female to the nest; 10 seconds; 5 yards S .

1648 - Female to the nest tree, then the nest; 30 seconds; to the W . The male sings above me, 15 yards from the nest. The wind and her rapid motion make it impossible to see what she carries most of the time. Her acts suggest spider webs.

1650 - Female to the nest; 10 seconds; W 10 yards. The male ${ }^{t}$ s song begins to become more frequent, regular; type-8 predominates in the total count, 10 to $I$, and he's sung no steps in the last 10 minutes.

1654 - Female to the nest; 15 seconds; to the W.
1655 - Female to the nest; 25 seconds; to the W. 1455 sings loud from 25 yards or so away. He's in a big tulip, probably high.

1656 - Female to the nest; 12 seconds; to the $W$.
1657 - Female to the nest; 12 seconds; to the W. She's gathering about 20 yards away.
$1658-1 / 2-$ M55 goes to the nest tree, 4 feet below the nest. He hops up to it. 55 F arrives. He gets in and squats dom. She sits quietly looking at him. In 3 seconds he goes. She builds.

1700 - Female to the nest; 12 seconds; to the SW 10 yards.

1701-55 F calls in a dogwood 20 yards back of the nest to the 11 ; she hops around in it 12 feet up. The male flies to her; they face each other 6 inches away. She lowers her anal region, sits stiffly looking at him. He faces her, may open his bill. He flutters away; she doesn't follow, All this occurs in silence.

1704 - 1155 sings once after a 3 minute pause, then falls silent.

1707-1/2 - Female to the nest; 17 seconds; to the W about 10 yards away.

1708-1/2 - Female to the nest; 35 seconds; straicht down to the NW .

1715 - M55 sings for the first time since 170L, goes on doing so.

1719-1/2 - Female to the nest; 20 seconds; to the WI 15 yards and calls "check" 3 times. The male keeps singing 25 yards S, 22 feet high on a bare limb.

1720-1/2 - Female to the nest; 10 seconds; to the N . 1555 comes to within 10 yards of the nest, sines at 18 feet. He moves closer to the nest in his tree, glides to it after looking at it intently. He enters, shapes for 1 second, hops out, noves up in the nest tree, sincs twice, leaves after 45 seconds. He is 20 feet up, 20 yards $W$ at 1723, watching the nest. He then goes Winto the top of a sassafras in the moods, 50 yards from the nest.

1727 - Remale with webs; she attaches them by moving her bill back and forth 4 or 5 times for 10 seconds; to the NTV.

1729-1/2 - Female with plant fiber, I think; 20 seconds; to the NW 15 yards. The male has sung 26 times since he beran again, but it has been too irregular to call it a series of soncs. IIis totel sones will be given when I finish on the territory.

1733 - Female with webs which she fastens in the usual way for 15 seconds; to the NW.

1733-1/2 - Female to the nest; 10 seconds; 10 yards
W. 1455 is 20 feet up, 15 yards SE.

1734 - Female to the nest; 40 seconds (part of the time sitting as though in a nest and pulling webs into place); to the NI 10 yards. The male sings while she's there, once faintly, twice at full volume. He stays here to 1739 , doesn't feed.

1736-1/2 - Female to the nest; 15 seconds; to the $\mathbb{N}$ a few yards.
$1740-1 / 2$ - Female with many webs; 10 seconds; to the NE.
$2742-1 / 2$ - Pemale to the nest; 15 seconds; to the $E$.
1743 - Female to the nest; 8 seconds; to the E. M55 is singing to the ne evidentily in the woods edge. At 1745 he comes $W$ to an ash 15 yards from the nest. Here he sits 25 feet up.
$1745-1 / 2$ - Female to the nest; 8 seconds; to the E. The male watches her pass below hin.

1747 - 1155 flies to the nest tree, sits 10 seconds 3 feet from the nest, looks around. The fenale arrives and there are the faint notes heard before. Both hop toward the nest. He gets in first; she crowds in beside him, and for 4 seconds they are jostling and sitting side by side. He flutters out to the $\mathbb{E}$ with normal-sized beats. She leaves in 10 seconds to the $\mathbb{E}$.
$1748-1 / 2$ - Female to the nest; 8 seconds; to the E 20 yards.

1749-1/2 - Pemale to the nest; 18 seconds; to the E 20 yards. The wind whips the nest limb pretty violently at times.

1752 - The 2 PVi's pass me in fast pursuit, go to the nest tree. The male gets in the nest; the female pecks at him for 3 seconds. He shapes, crouches dow like a female, flutters out with large slow beats. She leaves in 10 seconds.

I've been here 2 hours and must go. In the last 110 minutes 1155 has sung 128 times, 142 for the 120 minutes. Note the very substantial change in his singing since morning. There must be something different in the behavior of the female in building this nest to account for his excitement and his intense interest in it.

V - Both males are heard as I go through; not many songs. 1800 - I leave.

Kay IH, 1956

After a windy night with clouds, a gray windy dawn; at about 0530 the wind direction seems to me to shift from S to NI and it clears a little temporarily. By 0600 it 's gray again and cooling; temperature $72^{\circ}$ at 0445 . Present from 0500 to 0745 and from 1415 to 1730; Rickert present from 2320 to 1615 .

253 at 0505 - I think I hear a few faint step songs at 0508, with possibly some fight calls at 2. It's too dark to see birds. In any event PN songs are so faint that counts can't be taken with assurance in the violent wind. I sit to find when 53 F will lay.
$0531-1 / 2-53 \mathrm{~F}$ goes to the nest alone from the S , enters and imenediately sits in it. She doesn't move, so far as I can tell, till 0602 when she quickly flies out low to the $S$. I inspect and find an ege.

Keanwhile the male has been singing occasionally. Until 0555 all son s I hear are steps and I may either miss some or count $M 5^{\prime} 4^{\prime}$ s; 26 to this time. He then cones to the NB corner and sings 5 slids. In 4 minutes he begins skids on the E edge in the woods (probably). The female leaves the nest after his fourth song but flies away at right angles to him. He quits singing. At 0615 I've heard only 37 songs $^{\prime}$ probably attributable to him. Note that I very likely did not hear his waking songs.

T55 at 0619-1/2 $-N 55$ is singing at the $N$ end near the
nest, and I begin to count songs. The nest shows no noticeable progress from the situation at 1800 yesterday. No sign of the female when I arrive.

The male seems to be staying high, singing within about 30 yards of the nest, moving every 2 or 3 minutes to a new perch. I see him at 25 feet; he's feeding as he sings, hopping over the branches. At 0629 some animal gives quite loud shrieks in the woods for 30 seconds. M55 quits at this time after 30 songs. I notice most singing stops, and there are faint alan calls. M55 begins again in 1 minute. His song so far is loud and regular. At 0632 after singing in the top of a nearby 20 -foot dogwood, he flies 15 yards to the top of the present nest tree, sings twice, goes 15 yards on, and keeps singing. At 0634 he goes comparatively far $S$ and sings. He stays there, and at $0640 \mathrm{I}^{\prime} \mathrm{m}$ beginning to Wonder if this nest has been abandoned.

064 -1155 quits after 44 songs.
0647 - He begins again near the nest, in the ash-tree 20 yards away. He stops after 3 songs in a minute, begins in another minute at 0649. His interval has become long, however. I can hear another type-8 somewhere. I move $S$ but fail to find another male.

The female is here, 50 yards from the nest, preening; the male sings from 30 feet up, about 25 yards away. I lose
her. 1455 goes on singing high, evidently feeding little.
0702 - He quits after 25 songs.
0705 - He begins, sings 28 songs, to 0719-1/2, an hour after I got here. He goes on singing, but I quit counting. Ind guess the nest won't be completed. From the location of M55's songs (all delivered at 20 or more feet and near tree tops) Ind say the female is still somewhere in the $\mathbb{N}$ end, probably a little $S$ and $W$ of this present place. 0745- I leave.

1/125 - I return. It is gray, humid, windless, about $70^{\circ}$. Rickert has been on $\mathbf{T 5 5}$ timing visits to the nest. T55 at 1 h 18 - The male is singing types's and the female is building the nest she started yesterday. Evidently she's pretty erratic in her times. Rickert seems to be missing the male's songs; Ind say they are sporadic with the pauses equalling the bursts of song in length.

I put up the net. There is a considerable silence between 2515 and 1530 . Once between visits I see the female feeding 35 feet up in the ash tree; she is extremely active. When the female returns to the nest at 1530 (use Rickert's times) the male has just broken his silence 10 seconds before. She calls 10 yards from the nest, seems disturbed by my working on the net. She goes to the woods.

1 1533 -After 7 songs 1555 falls silent. (I'll count songs from now on; Pickert is noting building but I'm
7 watching the net.)
1540-1/2-M55 sings twice. About 3 seconds after a song the female goes to the nest. He seems to me to flutter slightly when he leaves the ash tree to go farther S. Note the coinciding of his beginning to sing and her going to the nest. Presumably they are together during his silences and her long absences from the nest. At 1552 he's singing and has been since noted, though she is not coming to the nest; the situation described above thus doesn't work in reverse.

She's building rapidly at the moment, possibly with Antennaria down, more likely with bast fibers.

M55's sone is very frequent and regular at 1605 and she's building fast.
$1607-1 / 2-550$ leaves the nest to the SE and 11555 stops singing after 80 songs.

1603-1/2 - He sings again and she resumes building.
1617 - I quit counting songs after 4 since my last note.

## We leave $\$ 55$.

Rickert and I then put up my blind frame near 53F's nest. I can hear some calling, but I don't seem to have disturbed anything seriously. The nest is as before.

T55 - I return to find 55 F caught in my net and $M 55$ perched right beside her calling. She is silent but bites me when I remove her. I band her 21-62054, silver over green,
right; and I paint her tail red. She weighs 7.750 grans.
I then release her and find to my horror that she is injured. I recapture her but see nothing wrong. I let her go again and she goes into a small tree where she perches nomally, calls "check" perhans once a second, flips her tail; no display. M55 comes and perches beside her within I foot, calling. I move toward her, and she hops into a sparse grouth of grasses and some broken limbs. I lose her. Since quite a search fails to reveal her, I'm sure she has Irozen on the ground before me. Note the resemblance of this to the behavior of fledglings.

When I leave at 1730 the male is singing normally, 10 minutes after the female disappeared. 1730-I leave.

1320 - I (Rickert) arrive.
\$55 from 1320 to 1625 - I see and hear no Pi near the nest till 1407 .
11.07- 55 F to the nest for 30 seconds.

11,08 - Female to the nest for 15 seconds.
7h.08-3/4 - Female to the nest for 10 seconds.
1509-1/2 - Female to the nest for 10 seconds.
14122-M55 begins insipid steps [?] some 30 yards $\mathbb{E}$ of the nest. He sings 5 times in 1 minute, moves to 40 yards

SE of the nest and sings 15 steps to $\mu_{1} 25$. He then moves to 20 yards NW of the nest, sings once, falls silent.

1122 - Female to the nest for 18 seconds.
1429 - Female to the nest; 18 seconds; 525 or more yards just past me, missing me by a foot or so.

Il430 - Female to the nest for 46 seconds.
1434-1/2 - Female to the nest for 26 seconds.
$1136-1 / 2$ - Female to the nest for 21 seconds.
Il 37-1/4 - Female to the nest for 144 seconds.
1140 - 1155 sings 3 type-8's 20 yards from the nest.
1h42 - Female to the nest for 27 seconds.
114.5 - Female to the nest for 25 seconds.

1146 - Female to the nest for 15 seconds.
114.7-1/2 - Female to the nest for 22 seconds.

14157 - Female to the nest for 11 seconds.
1512 - Female to the nest for 21 seconds.
1515 - Female to the nest for 38 seconds.
1530 - Female to the nest for 30 seconds.
1539 - Female to the nest for 33 seconds.
1548 - Female to the nest for 26 seconds.
1549 - Female to the nest for 24 seconds.
1555-1/2 - Female to the nest for 31 seconds.
1556-1/2 - Female to the nest for 35 seconds.
1558 - Female to the nest for 20 seconds.
1559 - Female to the nest for 12 seconds.
1600 - Female to the nest for 20 seconds.
$160 L_{4}$ - Female to the nest for 6 seconds.
1605 - Female to the nest for 16 seconds.
1607 - Female to the nest for 11 seconds.
1608 - Female to the nest for 10 seconds.
1610 - Female to the nest for 24 seconds. 1612-1/2 - Female to the nest for 24 seconds.

1613 - Female to the nest for 20 seconds.
1614-1/2 - Female to the nest for 28 seconds.
1615 - I leave T55 and quit observing for the day.

## May 15, 1956

A rainy morning and day, beginning with a light shower at 0510; no wind; $60^{\circ}$ at 0515 . Present from 0530 to 0730 and from 1530 to 1700 .

T54. at 0536 - The Pemale is on the nest. At 0715 the first egg is present and I mark it. 1554 sings a few skids during the morning, but very few.

253 at 0540 - Fortunately 53 has not yet come to the nest. 1153 sings only insipid steps, very faint, except for a faint skid at 0607 .
$0545-53 F$ flies to the nest tree, goes to nest level and probably looks in, leaves in silence.
051.6-53F quietly goes to the nest and enters. I see no movement until she leaves silently at 0616. She goes quickly straight $S$. There are 2 eges present.

0620 - Since I arrived 1553 has sung about 32 songs, described above. I may well have missed some.

T55 at 0625 - Silence until M55 begins to sing at 0629. To 0654 he sings 66 typical loud type-8's. Of these about 30 are sung in a series from a high ( 35 feet) bare branch. He doesn't feed during the series or during another one of 12. However, he several times descends to 5 feet and feeds for about 1 minute, and his song interval becomes irregular at these times. He never calls, shows alam at me, or seems
to spend any disproportionate time near the nest site. 0654 - M55 flies 1755 feet high to a big oak in the woods a few yards back of XI and falls silent. 0710 - M55 begins loud regular songs on XI, and I go.

II and XII - Silence.
0730 - I leave.

1530 - I return. It is raining, as it has been most of the day; temperature about $60^{\circ}$.

I put sacking on my blind on $\$ 53$ for an hour, then spend 75 minutes on 755 .

In a total of about 90 minutes within earshot of 3 males I hear only 1554 sing, 1 skid. Very few bird songs of any sort are to be heard.

1700 - I leave.

May 16, 1956

A clear cool morning with little wind, very wet after yesterday; temperature $46^{\circ}$ at $0445^{\circ}$. Present from $0,4.45$ to 0730 and from 1545 to 1950.
$\$ 54$ at 0.50 - The female is not on the nest yet.
2553 at 0459 - No songs from any PN's until 0502 when


1153 sings. I cant be sure if these are his first songs. 171 of them for many minutes are rather faint insipid steps.

0543-53F flies alone to the nest tree, hops to nest level and seems to look in, leaves in 10 seconds.

0514 - 53 F comes alone and silently to the nest tree, enters the nest and seems to peer out for about 30 seconds. Possibly she is standing on the rim for that period. M53 may have sung just at the time she entered. To 0546 he's sung 138 tines, although this figure may not be too accurate; his songs are all faint and M54 may be singing near T53. By 0605 , only 8 more songs.

0550 - I may hear the males fighting.
$0621-53$ silently leaves the nest, flying low to the
S. The third egg is in the nest.

At this time I have a total of $\frac{219}{27}$ songs for 1153 , of which possibly 6 or 7 are skids. At about 0615 , he and 1554 definitely sang back and forth, so there is room for considerable error.

$$
\underline{0625} \text { - I leave T53. }
$$

T54 at 0630 - 1554 sings frequent insipid steps while feeding low SE of 2 . His interval is consistently between 12 and 15 seconds.

The nest has the second egg at 0635 .
T55 at $0638-1455$ is silent until 0642. In the 11

4
49

0654 - 1955 begins his type-8's again. In 3 minutes he sines 2 of his odd songs that start as insipid steps and end as skids. $\mathrm{He}^{1} \mathrm{~s}$ in the SW comer and possibly the sound of 38 2 nt $M 53$ cause these songs.

0658 - A male hummingbird flies at 7155 , which immediately drops from about 30 feet to 6 or so. He calls "checic" 3 or 4 times. The humingoird stays about a foot away and 3 Inches belong, and weaves back and forth before the PWt. The humingbird's head and bill are raised to point at M55, which turns and moves alertly to cover himself, but which exhibits no alarm. In 45 seconds the encounter is over.
$\underline{0704}-7155$ is silent after 38 songs.
0723-1/2 - M55 begins to sing his usual frequent steps. I leave the territory.

I at 0730 - As I co, I hear a skid from the II part of I or the S part of IV.

0730-I leave.

15145-I return. It is cool (about $60^{\circ}$ ) with a $W$ wind; it is partly cloudy, and the day is perhaps $95 \%$ sunny.

IVS from 1600 to 1645 - I sit after a few minutes,
hear only 2 PW songs. They are faint insipid steps, proably from across the valley on IV 11 .

V from 1700 to 1720 - 110 singing though the sum is out. It is cool of course. I may see when I get to $T 55$ if the nesting stage or the weather is the cause of the silence.

T54 - I mark the new egg.
T53 - I co toward the nest and 53F comes to within 5 yards of me and calls "tsu". I withdraw and watch her for 75 minutes. Her behavior may not be natural; I suspect she's watching me too. She perches about 6 to 10 feet up, feeds little or not at all, moves little, is silent. The one fact that I can count on is that 1453 is not with her; I don't know where he is.

255 from 1720 to 1710 - Silence; no sign of the male. This suggests that there must be some more general explanatron for the lack of song on $\nabla$.

T53 at 174,0 - The males are singing faint insipid steps SE of 2 . I find them there at $17 \mathrm{~L}_{4}$ and begin to time $1453^{\prime}$ 's song. (Since they sing antiphonally, the count applies to 154 too.) They are 13 , later 10 yards apart. 1554 is 3 and $M 54$ is 5 feet high in dogwood trees. Both sit quietly,
little or no tail movement, singing. They seem rather puffed out, their bodies horizontal. They could be either alert or cold. Once M54 preens, once he moves a few feet closer. At 1751 he begins to move slowly back toward 3 while 1453 stays in place and both go on singing.

1756 - Song stops after 29; possibly I moved too close and caused 1153 to quit (doubtful).
$1758-1 / 2-1453$ sings 7 steps then 2 chatters near 1 and the $\mathbb{E}$ edge, in about 3 minutes. Then he is silent.

1802 - I hear "check" calls at the E edge and find 53 F feeding about 35 feet up in aspens. She calls once every 3 or 4 seconds for a minute, then falls silent but
 keeps on feeding. At 1807 I lose sight of her. I cant be sure if 1953 is in the trees with her. Her movements are rapid, rather nervous.

1821 - M53 gives a loud slow skid on the E edge. The song is spiritless, and he continues to give others desultoriby. He is high, 25 feet or more, in the woods a few yards back of the fence line. I cant see him or tell if 53 F is with him, but the location is the same as that where I lost 7 h her about 15 minutes ago. By 1829 he's sung 7 times; he then quits for 3 minutes. When he sings again it's exactly as before. He moves slowly 11 through the woods singing his slow half-chatter, half-skid a little more often, until by 1844 he's sung 20 times. He then quits. I've heard nothing from 1544 and 1555 ; both should be audible occasionally if they are singing.

1929 - The first action in a long time (no songs): 53F is within 5 feet of the nest, feeding 10w. In $1-1 / 2$ minutes I see her going on $W_{\text {. }}$

1945-53F calls "check" 10 yards in of the nest.
1947 - She flies alone and silently straight to the nest tree. She inmediately enters the nest.

1950 - I leave. Note that it has been silent since 1844.
I examined $55 \mathrm{~F}^{\mathrm{t}}$ s nest today. She had built up the cradleshaped foundation to about half the height of the finished walls. A very large amount of spider webs were used to anchor the fibers both to twigs and leaves. Very little Antennaria down.

May 27, 1956

A cool perfectly clear dawn with a S wind; temperature $46^{\circ}$ at 0530 . It rained during the night. Present from 01,55 to 2000.
\$54 at $0458-1544$ is singing. He also utters fight calls between songs.

T53 at 0500 - Silence. At 05051553 begins to sing insipid steps. To 0600 I hear about I45, with possibly 2 or 3 type- $8^{\prime} \mathrm{s}$. At 0545 he and $155^{\prime} 4$ sing antiphonally for 3 or 4 minutes and again at 0600 . Possibly they do so earlier. I hear 3 skids but don't know which male sings them.

I cant see 53 F on the nest because of the leaves.
0545 - I think I see the female leave the nest.
$0609-538$ goes straight to the nest after feeding a fen seconds 4 yards away. It will be on this sitting that she lays her egg. It is $46^{\circ}$.

1253 has sung 26 times to 0610; he quits.
0676 - 7453 begins to sing skids, the first skids today that $I^{\prime} m$ sure are his. To 0623, 10 songs; then silence.

0630 - The males begin to sing insipid steps back and forth. This lasts to about 0645 . 1153 sings about 42 songs.

0638 - A little sun shines on the nest for the first time today. The female is facing $1 \mathbf{l}$.

0650 - The Iemale leaves the nest. It is $52^{\circ}$.
off obso 0718
0700-M53 has sung about 44 additional songs since 0645. Note he doesn't seem to be accompanying the female, at least not in silence. He's near 1 and 2. Perhaps 2 or 3 songs have been skids, the rest insipids.

0716 - I hear "checks" behind me in the woods. It is 53 F , which then flies toward the nest tree but passes it and goes on $W$ about 10 yards. $M 53$ is singing skids to the II near M55. She calls "check," so I can tell they aren't together.

0721 - She enters the nest. He's sung 48 times to now, since 0700 .
$\underline{0727-1 / 2}-1533$ begins loud regular skids NW of the nest, probably not much more than 10 yards.

It is $54^{\circ}$. Since 0700 it has been quite gusty from the S.

The female faces $S$ on the nest, possibly a little $\mathbb{W}$.
0736-153 switches to insipid steps after 39 songs. 154 is singing too at this point. It is very difficult to count songs because of the rind. $M 55$ is singing too, and has been much of the morning; his song is loud and regular and his interval is from 10 to $I_{4}$ seconds.

0800 - M53 has sung about 54 steps since 0736. M54 and he have sung across from each other most of this time.

0808-53F leaves the nest. It is $56^{\circ}$; the wind is gusty, switching to all directions at times but coming mostly
off orof-26 $5_{2+1}^{2}+12 x$ des
out of the SE. $M 53$ has sung 24 times to now. He sines 6 more songs in a minute or so, seems to quit. Is it because of 53F's presence? Note that he and 1554 sing back and forth so frequently and never he and $M 55$. Some of the duets
 with 1054 involve very frequent songs, possibly every 6 second or 30 .

0812 - Both males are still singing; but often I cant hear over the wind. It is partly cloudy but the sum has shone substantially the entire day.

0811 - 1153 has switched to loud skids. He goes on singing these songs, evidently moving consistently though slowly from $S$ to $\mathbb{N}$, on the $\mathbb{E}$ part of the territory.

$$
\underline{082 h} \text { - I hear } 53 \mathrm{~F}^{\circ} \text { calling "check" in the woods trees of on } 6
$$ above and behind one. The male sings on, goes to where she Was; she is now at 0825 about 5 yards from the nest.

$$
\underline{0826}-53 F \text { enters the nest and faces SSIV as before. }
$$

At this time M53's songs stop after 54 since 0809. Of these about 40 have been loud skids; the first 14 or so were insifid steps probably sung at 1154 .

It is $57^{\circ}$ and the 7 light clouds are disappearing.
0845 - It has been silent since C826; all the males have quit so far as I can tell.
084.6 - 1153 begins loud skids in the edge of the woods

$$
\text { J ca } 2 r^{-Y}
$$ near me, goes SW into the pine field. At $0846-1 / 2$ he stops after 13 sones.

0858 - I may hear some faint $P N$ songs to the $\mathbb{E}$, far in the woods.

0859 - 1453 and 1544 start a duet. To $0900 \mathrm{M53}$ sings 3 songs. I'll count anew from 0900.

0900-53F leaves the nest.
1153 is still singing insipid steps; M54 did so for only about 1 minute. 1453 leaves the usual spot SE of 2 where he sings this song, and comes $\mathbb{V E}$ into the pine field. At $0905-1 / 2$ he stops after 18 songs. At 0907 he sings type -8's, first faintly near the NE corner, then loud in the field. $M 55$ is audible on his territory. Rapid, irequant songs by both males. At 09121553 is silent after 23 type-8's. He resumes in 1 minute, sings 16 to 0916. The last 2 or 3 songs are insipid steps.

0920 - 1153 begins to sing his insipid step, and $M 55$ sings a quick, faint type-8. Ind guess they are singing at each other. N53 moves around the territory. M54 comes and joins on his side.

0930 - 53 F begins to call "check" above me. In I minute she flies to within 5 yards of the nest and calls. M53 very alertly flies to a pine and peers at her, then seems to leave.
$0932-1 / 2-53 P$ enters and faces S. N53 hes sung 36 36 times since 0920. He keeps on; since they're steps and other
males are singing too, they're hard to count. 1453 is the other singer now.

It's $61^{\circ}$, clear, still breezy.
0951 - 53F backs off the nest and pokes into it. Ypobe
0952 - 1153 switches from insipid steps, after about
4. Lh of them, to 2 skids, then back to steps. I start a new count.
$\underline{1000}-1153$ has probably sung about 18 songs. M55 is singing steadily and often.
$1000-1 / 2$ - It is $65^{\circ}$. 53 F has just changed position to face SE instead of SSN. I don't hear M53 for a minute, then he starts his steps.

1008 - She leaves the nest. N53 has sung about 11 steps to now. At $1008-1 / 2$ he begins skids just $N$ of 1 , continues With regularity until 1017, when after 29 skids he shifts to steps.

1021-1/2 -53 F begins to call "check" between me and the nest which is 25 yards $W$ of me. $M 53$ has sung 10 times. It's windy, and he may be singing now.

1025 - She goes to the nest tree, enters and faces IN for f N , th er a. second, gets out, enters facing $S$.

1025-1/2 - M53 begins again (or I begin to hear him); high insipid steps. Apter 6 he changes to skids at 1028-1/2. He sings 6 of these in $1-1 / 2$ minutes, becomes silent at 1030 .

It is $70^{\circ}$.
$1040-1153$ sines skids in the pine field. I probably miss hearing some in the heavy wind; I hear 2 .

1045-1453 is singing high insipid steps in the $\mathbb{N E}$ corner. He sings 16 times to 1049-1/2.

10L8-53F pokes around in the nest.
1051 - 538 leaves the nest. $1 M 53$ is silent.
$1055-1453$ sings steps near 1. After 4 songs in 1-1/2 minutes, he quits.

1700-1453 is silent.
2102-1/2 - 53 F calls as usual, $N$ of the nest.
1103-1/2 - 1553 sings a quick skid from the place where
53 F is calling. They must be together.
1204 - 53F quickly goes to the nest tree from the 1 , lands 1 foot below the nest, hops up, enters facing $S$. It's still $70^{\circ}$.
$\underline{\underline{1705}-1153 \text { begins type-8's in the NE comer. I cant }}$ hear all of then; probably there are 5. He then switches to

## Insipids.

$\underline{1120}-53 \mathrm{~F}$ rises, probes for 5 seconds in the nest, resettles.

There is probably a duet between 1.53 and 154 , in the usual spot between 1 and 2 . I'm pretty sure of this. By 1125 I've heard about 39 songs since 1105 , all insipids. I think that $M 53$ has just fallen silent. He sings about 15 more songs from 1127 to 1133 , probably at 1454 .

1730 - It's getting cloudy in the IW.
1135 - M53 begins skids $\mathbb{N}$ of 1 a few yards.
1738-53F leaves the nest. 1153 goes right on singing
loud skids, now between 1 and 2. $M 54$ answers with skids at least some of the tine.

It is now sunny only about $50 \%$ of the time (since 11.30); it is $69^{\circ}$.

171,8 - I quit hearing NK53 about 2 minutes ago after 36 songs.

1154 - 537 flies straight to the nest and settles facing $S$ as before. I heard and saw no preliminaries on this trip. $\underline{\underline{1157}}$ - W53 begins chatter songs at the II edge. 1154 sings insipid somewhere.

1200-1553 has sung 7 times, is continuing his chatters. I start a new count.

It's sumner with only scattered clouds; $72^{\circ}$. Very windy. 1208-1153 is continuing his chatter. I hear 154 chatter now too. They are not near each other; M54 is S of 2 and M 53 V of the nest toward the woods edge.

1209-1153 quits after 28 songs since 1200 , begins again
in 1 minute, singing as before but moving $S$ toward $I$.
127) - He's sung 13 songs and stopped.

1217-1/2 - The wind tosses the nest tree violently. It is in the NW at the moment.
$1219-1553$ chatters in 1.
1223 - Very strong N wind.
1225 - The male is probably silent. He's sung 7 times since 1219, so far as I can hear.

1232 - 53F rises and pokes in the nest.
1233 - 1453 begins type-8's just NW of 1.
$1237-53 F$ leaves and flies toward the area where the male sings. I hear $145^{\prime} 4$ singing insipids $S$ of 2 .

1238-I don't hear M53. He sang 21 songs that I know of.

1219 - 53 F flies to a pine 4 yards from the nest, calls "check" about once every 2 seconds.

1251 - She comes to the bottom of the nest tree, hops up, enters in 3 seconds and faces as before. It's sunny, $73^{\circ}$.
$1250-1954$ and 1453 are singing at each other, high faint steps that I can barely hear.

1300 - I've heard only 6 songs; the singing match was short-lived.

1303 - I hear an insipid step.
$1308-1 / 2-53 \mathrm{~F}$ moves about, settles as before.
$1315-B 1$ asts of wind from the $S$.
7321 - 53 F leaves the nest.
1323-1/2 - M53 sings a type -8 and later some skids N of 1.

1331 - He's sung 15 times, the last 14 skids and
$1332-53 \mathrm{~F}$ calls "check" near the nest.
1333 - She enters immediately on landing, faces S.


1334-M53 sings I slid near 1 .
1336 - I can hear 12 insipid steps in lulls between
the heavy winds. (It has blown my blind down flat; I've not used it today, luckily.)

1400 - Silence.
1402-53F leaves the nest.
1422 - She returns quickly, goes straight in, faces 11 . It is $74^{\circ}$.

11,30 - The wind is abating somewhat, is coming from the SW. The temperature is $76^{\circ}$. There are clouds which occasionally cover the sun. So far there has been $90 \%$ sunshine, perhaps a little more.

II 36 - 53F pokes around in the nest.

7140 - She leaves. 1453 is still silent.
1500 - Still silent. I've heard no PV for over an hour, and other species are quiet, too.

1501 - 532 begins to call "check" and "tsu" ("tsip") 10 yards $N$ of the nest. She goes to within 2 yards of it at 2503, then seems to discover something on the ground below her. She sits silent and practically motionless (not frozen, just looking dow, turning her head from time to time) 3 feet
up on a blackberry stem for 5 minutes.
1510-53F flies to her tree, hops up to nest level, enters facing $S$.

Vegetation is nearly full. Locust have their leaves (not quite full grown) and osage orange is half out. Oaks have leafed out within the last 5 days and are nearly fullsized, and walnut and pignut hickory are half out. Sycamore leaves grew to nearly full size on May L-6. Maples look as they do in mid-summer; they began to leaf out about 12 days ago here, grew fast and were pushed along by the heat on May L-6 and the recent rain. When 53F started her nest the little tree was about half in leaf and the nest could be seen easily at some distance after a day of building. Now it's very well concealed.

1537-1/2 - 53F leaves the nest, going down and to the W as I think the has done the great majority of times today. It's sunny, pretty windy again (w); $77^{\circ}$. .

1555-1/2 - 53F flies straight to the tree from the $S$ and enters facing around to the S .

1600 - Still silence. It is $74^{\circ}$.
1617-53F resettles on the nest after looking in, lowering her head into the cavity.

time. He continues for about 10 minutes.
1630-53F leaves and goes V .


1657 - 53 R begins to call all of her notes near the
nest, "chick," "check," and "tiu." I think M53 may be with her.

1700 - Still no more songs.
1703-1/2 - 53F goes to the nest, flying to the base of the tree and hopping up. She faces S. Calls stop the instand she gets into the nest. - I never see 1153; but about 10 seconds after she's in, he sings 3 type- 3 's in the genaral vicinity. He was very likely with her.

Clouds are occasionally covering the sun from the W , but it's still $90 \%$ sunny. It's $70^{\circ}$.

1713 - 53 F rises, pokes into the nest, settles. These maneuvers today have taken no more than 4 or 5 seconds each time.

1725 - I hear very faint steps on $V$; they sound close and may be 1153 .

1728-53F leaves the nest. I've heard 7 sones to now, and they continue faintly.

1746-53F begins her usual "chick" calling $S$ of the nest, having come from that direction.

1748 - She flies as before to the nest tree, hops up, enters quickly and silently, and faces $S$. It is $68^{\circ}$.

M53 has probably sung 12 high, faint insipid steps, possibly more. I don't hear 1555 and haven't since I last
noted it.
1800 - Silence from all males.
1805-53F stands and then settles down in the nest.
1816 - She repeats this. Her motion is to back up

and thus leave room to look down or probe.
1821 - I hear high faint steps. They quit after 3. 1822-53F leaves the nest.

1821 - The singing begins again; 5 times.
1830 - It is sunny, $66^{\circ}$. The wind has died down a good
deal; it blows most steadily. from the $N$.
1832 - Insipid steps come from $\mathbf{E}$ of 2. It seems clearto be 1553 . At 1835 he stops after 10 songs, all faint.

1839-1/2 - M53 sings faint insipid steps in the II part of the pine field.

2856 - He stops after 51 songs, all the same type. He covered the pine field from $N$ to $S$ in the 2 area. His songs Were on an average of 15 seconds apart with occasional longer pauses of $3 / 4$ to a full minute. No sign of the female, and I only heard the male.
1900 -Silence.

1901 - A PN, I think 53F, begins to call "check" above me. 1153 flies in very fast, perches with drooped wings, flies on toward the other. It must be the female, but if so the

$1900-1 / 2-153$ begins loud chatters at 1 .1901 - A PNI, I think 535, begins to call "check" above implication is that 1533 failed to recognize her voice. He
stopped after 5 chatters when he came in, was silent for a minute, now at 1904 has sung 5 more chatters. Since the calling goes on, it must surely be 53F. (1554 is singing high steps to the W.)

To $1907-1 / 2$ there are 20 more chatters, 1 or 2 fragmentary and several given within 5 second intervals; also the volume falls and the last ones are faint.

1908-1153 begins his chatter (or continues it) again In the woods edge trees above me, moves out to the field for 1 skid, returns to the trees and sings.

2910-53F goes above to the nest tree, calling till within 5 yards ("chick"). She enters and faces $\mathbb{H}$. It is
 $64^{\circ}$; the sun is up but getting low.

353 goes $S$ to the 1 area and sings loud chatters very often and regularly. He starts slowly but his interval soon becomes a steady 12 seconds.

1920-1:53 stops after 46 chatters since 1908. He begins again in 4.5 seconds, goes on to 2934 singing 40 times. Some of these he sings in the edge trees, high ( 20 feet or more). He then switches to 2 insipid steps, and at 1935 resumes his chatters.

1937-1/2-53F suddenly leaves the nest and comes B 1937-1276 toward me, the first such exit today. She goes $S$ though. 1953 is singing here, but he quits after 10 chatters.
dep $E$, to $s$ It is $60^{\circ}$.
194.8-53F calls "check" between me and the nest; goes quickly and enters facing $S$ at $1948-1 / 2$.

I leave the territory.
754 at 1955 - In passing T54 I look at the nest. I

2000 - I leave.
It has been about $92 \%$ sunny.

May I8, 1956

A completely still, cloudless dam; temperature $46^{\circ}$ at OLuL5. Present from OL4 5 to, 2000.

T544-I sit to watch the nest all day. SLiP isn't on it, to my surprise. I feel the ${ }^{\mathbf{8}}{ }^{\mathbf{e}}{ }^{\text {ergs }}$ at 0515 ; they are cold, so I must have been mistaken about seeing her last night. [or else she didn't incubate, only roosted on the nest.]

I hear no PN sounds till about 0525 when there are I or 2 very faint songs to the $\mathbb{E}$.
054.3 - 54F comes to the pine trees. She may call once or twice, but I cant be sure because there are many warblers around.
$0545-54 F$ goes to the nest after a rather leisurely feeding or hopping through the pines. However, she doesn't enter; instead she flies straight at me, veering off at the last minute; there is a little noise from her wings. I've seen this before; it may be bluff or just curiosity. Males do it rather often.

I retire to let her lay the egg, which will probably not be her last one in the clutch. She enters the nest at

$$
\begin{aligned}
& \text { no }^{2} \text { on fire } \\
& \text { os } \\
& =60
\end{aligned}
$$ 0552.

0547 - 1544 comes to 5 and sings loud steps [?], 17 close together at 15-20 second intervals for 5 minutes; then after a pause 2 more.

0600 - Silence.
0671 - 54 F seems to be looking dom into the nest.
0612 - 1454 sings 2 skids to the S . Note how his song here is usually a skid while on the $\mathbb{E}$ part of the territory it's usually a step.

$061.0-54 \mathrm{~F}$ drops from the nest and flies low at least 30 yards, disappearing into 5. (It is $47^{\circ}$.) Four eggs.


At 0615 I saw a chat take a dew bath on the wet leaves of a locust, just as Pits do. It shook itself and bumped into the leaves and branches for 2 or 3 minutes.
$0659-54 F$ flies past me to the pines, seams to take a dow bath among some needles for a moment, goes silently to the nest and begins to incubate at 0659-1/2. She faces SE.

0700 - After 9 skids and then 5 minutes of silence, 1544 begins type-8's at this moment. At 0706-1/2 he comes to the clearing (I'I] call the spot It sitting in by this term) and sings loud type-8's with regularity until 0707. He then goes S and continues. By $0708-1 / 2$ he's sung 23 times since 0700 . Now he falls silent.

It seems possible that females leave the nest early on the morning the last egg is laid and return to it after a lone feeding period. Perhans they then lay the age and incubation begins. It is significant that the eggs were cold at 0515, since they couldn't have lost much heat by that hour. I think that the first night on the nest is not if iv n spent in true incubation but only sitting in the cavity.


Hatching sequence will probably help test this.
$0722-1 / 2-154$ begins to sing skids in the 3 area, comes $W$ and sings 2 loud ones in the clearing; goes back E and sings till 0726. There are 15 skids in the period.

0731 - 54 P leaves the nest as before, going at least 40 yards SE through 5. It is $52^{\circ}$.

0733 - I hear 2 or 3 high steps to the $\mathbb{E}$.
07l43-545 flies in high, evidently from a woods edge tree to the NE. She lands 5 yards $S$ of the nest tree, sits there for about 20 seconds, goes about 3 yards closer where she waits another few seconds.
074.4 - She enters and faces $\mathbb{E}$. I didn't hear any sounds from her but her bill opened occasionally. She proably called very faint "tsus."

0749-54F has turned a little and faces SE as she did earlier.

0750 - $1 \times 54$ begins high insipid steps, probably in 3. After 11 he changes to skids, comes to the clearing and gives 6 loud skids, goes $1 \mathbb{E}$ and gives 8 more on $X$ or in the moods. His interval for these last 8 is very irregular. He stops at 0759 after 27 songs.

0800 - Silence. It's $54^{\circ}$ in the shade, much hotter. in the sun. It is perfectly cloudless with a mild $S$ wind since about 0700.
(A Field Sparrow is building a nest 8 yards from me. I forgot to note that I found a Cardinal on 3 eggs, Ia Cowbird's, on this territory 2 days ago. I've found 3 Cardinal's nests, 2 of which were parasitized. of 4 Field Sparrow nests, all on the ground, all had 4 eggs but in one nest I of these was a Cowbird's.)

0808-1/2 -1554 flies without preamble to the top of a pine 3 yards from the nest, 3 feet above it. One of the
 pair gives I call note, "check," and he sings I half-volume skid. He then hops to the nest tree, goes to within I foot, simply loiters within 2 or 3 feet feeding for 20 seconds, goes into the pines to the $S$ and disappears. 54 F looks out at him during this episode.

0812 - She leaves the nest.
$\underline{0818-1 / 2}-1154$ comes to the clearing, sings 17 loud chatters from high trees to 0822 . He then goes $\mathbb{E}$ and in half a minute sings 3 insipid steps.

0823 - I hear 54F calling "check" in 5. She comes closer, feeding low and calling. M54 is not near her; he's singing to the E. Her calls are not directed at me.
$\underline{082 h}-54$ F flies quickly to a tree 5 feet from hers and in 20 seconds enters and faces SE as before.
$\underline{0824-1 / 2}-1454$ [error] has just begun loud chatters at the clearing. He circles the clearing singing at the tops of the trees around it. After 31 songs to 0829 I suddenly see that this male has one silver band on his right leg. He is
last year's M48, the male from this territory, the first to arrive this year. He's sitting in the pines 8 yards 5 of the nest. The last 31 songs have been M\& 's. The male I've been calling 1554 this morning has been 1554 and not 1948 ; I looked at him near the nest when he went at $0808-1 / 2$, and he was unbanded.

0831 - 1154 sings 1 insipid step in a 50 -pot ash at the If edge. M48 flies to the same tree. He sits 10 feet from 1554 in a pose that makes him look as if he's cold. His head is pulled in, his feathers puffed. M54 silently looks dow at ML8. They sit motionless for about 10 seconds except for 7154 's bobbing his tail. To 0837 they stay in the ash, moving about in it at from 40 inches to 20 feet, most of the time at the high level. They are often sitting within 4 or 5 feet of each other just looking carefully. No calls, but each sings once or twice. Once they go into a flutter fight goes on as they slowly descend in the air, never quite break ing off permanently until they are at about 15 feet. They come down so slowly I can see a detail I've never noticed before: They are thrusting out their feet at each other, kicking. This must account for the vertical position of the body in the usual flutter -up.

After the flutter they again face off in the ash. $M 54$ (I think) has an insect between his mandibles; he just holds
it and looks at the other male, eating it in possibly 6 seconds. All the foregoing description of their positions and movements (fer, silent) applies to their actions in the tree after the flutter.

0837 - They fly down into the $W$ edge of 5 in a bouncine flight, slow, tails spread, wing beats erratic (i.e.; sporadic). They face off at a 3 foot height but don't fight; still silent.

0838 - They are in a pursuit with one about 10 feet behind the other; the night is bouncing, and they cross the pines and disappear to the $W$.
$\underline{0842}-154$ comes to the clearing, gives 6 skids from a tree top, goes E. Thereafter to 0900 he moves all over the territory, at least its $\mathbb{N}$ and $W$ part, singing from high perches. Three times he comes to the $\mathbb{E}$ edge of the clearing. His procedure is to 80 to a tree top, sing about 5 to 70 songs at l2-second intervals, move on, and after a slightly longer pause repeat the series. He sings 51 times between 0842 and 0900, but note the brealcs from perch to perch, his rapid covering of the temitory.

I see and hear nothing of 1448 .
54 sits quietly on the nest all this time.
$0900-1554$ is stil1 singing as just described. At 0903 he chatters twice, but the rest are skids. By 0913 he's visited the clearing 3 more times.

0906 - 545 leaves the nest. Clearly M54 is paying no

0913-1/2 - After 42 songs, M54 quits.
0915-1/2 - He begins again near 3 or the fox den. After 10 not quite so loud skids to 0920, he comes to the clearing, and at 0920-1/2 begins very loud skids 30 feet up in a locurt. After 9 to 0922 he goes $\mathbb{E}$ and sings 9 more to 0925 . These latter are less ringing again.

0922 - I hear 54 F calling to the $\mathbb{N E}$ near the ravine. 1154 is singing elsewhere.

0926 - She appears 12 feet from me, feeding silently and without hurry on the ground and the field cover. She disregards me altogether.


0927-54F flies to a tree beside the nest, enters in 10 seconds, going in from the $\mathbb{E r i m}$. This is the first such entrance today. She faces SE. It is $66^{\circ}$.

0922 - 1154 begins to skid again, moving over the territory just as before but singing less frequently and in shorter series. However, at 0934 he comes to the clearing and sings 12 times to 0937 (I'7l not give the total from 0929 yet). He is in a tall locust, then drops into the pines and falls silent at 0937 after 30 songs.

The entire episode of the last hour is one of the most informative I've seen. Note that Nhl 8 first appeared 3 weeks ago today and that he has been defeated on his old territory by both M53 and 1154 .

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$$

$0939-1 / 2-1154$ begins to skid at the $N$ end of the pines, then moves all over the $W$ part of the territory. I'd guess he seldom sings from the same perch more than 2 or 3 times except at the clearing. Presumably the nests location here and the fact that this is where Mh8 appeared account for special attention here.

0949 - After 36 songs since 0939-1/2, M54 falls silent somewhere near 3 .

0951-54F leaves the nest.
0953 - M54 comes to the clearing, begins to sing loud skids. He stays $W$ of the ravine, evidently singing high, until 0957-1/2. At that time after 17 songs he goes E and skids from the fox den or 2 until 0959. Then, after 3 songs, he's in the $S$ part of 4 or 5 . His 3 skids there to 1000 are rather faint.

7000 - He falls silent.
1001-53F flies straight W from behind me, about 15 or more feet high. She lands 4 yards S of the nest (the last fen trips have been $N$ of $i t$ ). At 1002 I see her with a large (1 inch) insect, about 3 feet from the nest. She carries it away to the V , and I don't think she flew away in order to get a better eating perch; it looked more like nest sanitation behavior.

1003 - 54F flies to the nest from a tree just $W$ of it,
faces due $\mathbb{E}$ but immediately sidles around till she's heading SE as before. It's $72^{\circ}$.
$1010-1 / 2-1954$ begins skids in the $1 \%$ end of 4 , goes $E$ and sings, 17 times to 1015 . The songs are rather faint, or they are quite distant.
$1016-1 / 4-M 5 / 4$ begins loud skids around the clearing, staying in general at the $N 1$ edge and most of the time 25 feet up in the ash where he met M48. There is a break of 45 seconds, after 11 songs, at 1019. Then he sings 13 times from the ash, as described. Then he moves somewhere, sings 2 more to 1023-1/2. Then silence.

1027 - 54 ए leaves to the SE, landing about 15 yards saury and not over that distance from me. At this time, possibly 2 or 3 seconds before she left, M54 begins to sing skids at the clearing. The songs are irregular; he moves MV to the tall trees and then on to $X$. Almost surely he and 54F aren't together. He's quiet at 1030 after I4 songs. 1038 - Without warning I see both 54 's in the pines 10 feet If of the nest. They go out of sight.

1038-1/2 - 545 flies to the nest silently, enters and faces ii. 1554 flies to a branch I foot from the nest, in 3 seconds flies to the nest. He stands on the rim immediately next to the female, not looking in at her head-first but standing parallel to her. After 8 seconds he leaves the tree, I think Muttering or eliding. He sits motionless 4

feet up in a redbud 12 feet from the nest, goes in 20 seconds to a 6 -foot perch 25 feet away from the nest. Here he sits without moving till $1040-1 / 2$, when he Plies out of my sight. At 1041 he sings 4 rather weak skids, going SE into 5 . He then falls silent at 1042 .

1046 - I hear 1 weak skid. 54? has turned in the nest to face SE again.

It is $75^{\circ}$.
1100 - Silence.
1102-1154 begins to skid in the clearing, goes to the pines and sings 4 songs more softly. At $1103-1 / 2$ he's silent after 6 songs.

7179-1/2 - 1954 begins to sing skids near 3 or 4 . He sings 18 to 1725 , falls silent.

1126 - After what seems to me a. good deal more restLesses and looking out than usual during the last 15 minutes, 54p leaves, miss at least 30 yards E low and past me. Ny thermometer shows $80^{\circ}$, though I suspect my position is especially hot because it's relatively unsheltered.

Note that 54 F 's most recent period on the nest was exceptionally long. It was her seventh on the nest; yesterday $53 \mathrm{~F}^{\prime}$ 's seventh on was unusually long too.

11/10-1/2 - 1154 begins to sing skids $\mathbb{E}$ of the clearing, comes $W$ to it, goes $\mathbb{E}$ again in a minute. He sines 12 times to 27wh, quits.

1748 - 54F Plies by me to a tree 12 yards $N$ of her nest. She hops along calmly and silently, going to the nest.
711.9 - She enters, settles facing le a little, but ingediately starts inching around till she looks E.

1150-1544 comes to the clearing and goes right to the pines. He sings 12 times there and possibly on $W$ a little until 1153. He then roes E at 1153. I think I hear 1553 there; there is a skid, and it doesn't sound like ML 6 and isn't 154 .

It is about $77^{\circ}$.
1200 - Silence.
1201-1/2 - M54 begins skids at the $1 \mathbb{E}$ comer of the clearing, since 30 times to 1210. All sones are loud, regular, given from 25 feet up or more. During the first 15 or so he moves little, possibly feeds or gleans among the leaves the rest of the time. He then moves $\mathbb{I E}$ to $X$ and continues to sing. By 1228 he's sung 28 more. He then becomes silent.

A little more wind came up at about 1100 or so, and there are occasional mild SW winds now (e.e., a net could still be operated).

1225 - 5 lap leaves the nest, going NE to the ravine, a
off $1225-38$ 305 distance of about 40 yards or more in low flight.
1222. - M54 begins to sing loud skids while feeding low in the clearing, staying at 6 feet and under. I lose sight of him within 3 minutes, but he sings till 1238-1/2, 31 loud skids.

1233-1/2 - I think I hear the "check" calls of 54.
1235-54p is feeding on the field cover within 10-15 feet of me, calling "check" but pretty obviously not because of alarm at me.

1236 - She has gone into the pines S of the nest. Now she picks up something (I think) about a foot from the nest, takes it. W.

1238-54F flies to the nest, enters from the E side, turns around to face ESE as usual. 1154 is singing nearby during all this; he and the female pay no attention to each other that I can detect.

I've noticed a trick of this female several times. If she is surprised by a noise into sticking her head out of the nest suddenly (sometimes I squeak to see if she's still. present), she pulls it in very slowly and gradually, like a Grebe submerging.
121.3 - 1.54 singe 6 skids far to the $\mathbb{E}$; they are spread out over 4 minutes.
$1254-1454$ sines slide to the E as before; it is difficult to hear them, but I think he sings only 2. It is still $78^{\circ}$.

1259 - 54 P Pies ESE 30 yards into or across 5.
1300 - Silence.
1308-15\% skids I time, waits nearly a minute, begins again and goes to X .

1310-54F begins to call at the $N$ edge, about once a. second. She moves low toward the pines. M54 comes from $X$ to the high trees at the edge and sings loud skids. Twice 54 gives a very audible "trip" as his song is completed.

1311 - 54F goes to the nest from the N, enters from the W, faces $E$ and SE. M5 4 goes on singing about 10 times, sitting quietly 35 feet up on a dead limb at the If edge. He moves $\mathbb{E}$ and probably onto $X$ at 2315 . At 1316 he quits after 23 songs since 1308. At 1317 he begins again; still on $X$; after 3 slide he begins a chatter. He then comes to the tree row and sings about 12 abortive songs which all begin with I4 shrill step notes; some end there, but others wind up with a series of sounds most like fight calls. He is obviously excited while he sings these. He is 25 feet up, looking toward the clearing, his body horizontal, tarsi bent so that he stands low, wings slightly drooped. He then goes SE to the $S$ end of 4 and sings first a series of skids, then 2 or 3 chatter songs. No sign of M48. At 1325, M54 quits after 35 songs since 1327.
$1329-1 / 2-1554$ chatters once $S$ of 4 .
1331-1/2 - The female pokes into the nest.
$\underline{1349-1 / 2}-54 F$ leaves, Pies E within 3 or 4 feet of me,

ILo - 54F flies to a redbud 10 yards from the nest. She hops around in it silently, about 3 feet up.
$14,00-1 / 2$ - She Plies to the nest tree and enters from the $W$. She faces $\mathbb{E}$ and $S E$ again.

11,09-1/2 - I think I hear 2 skids, faint and well to the $\mathbb{E}$.
$17.15-154$ comes to the $\mathbb{E}$ edge of the clearing and begins to sing loud skids, not very frequently. After 5 in 2 minutes he moves to $X$ and goes on. He stops at Ily22 with 20 sones in 227.

7h27 - 1 Ny thermometer shows $89^{\circ}$. S4ए is sitting with her bill open; she closes it, opens it again. I have the feeling she's been sitting a little higher off the nest since about 1100; she's undoubtedly easier to see than she was earlier. The sun shines on her head through the light pine needle shade.

1431-1/2 - 54 leaves the nest exactly as she did last time, practically flying into me.
$1456-1 / 2-54$ plies without warning to a point 3 feet 11 of her nest. Here she sits for 20 seconds while calling "check" once every 2 seconds and bobbing her tail. She starts toward the nest but when I foot from it she pulls a good-sized caterpillar (about I inch) from a limb. She immediately takes it $W$ either to the field or to the edge of the pines. This reminds me very much of sanitation; III
try to see what she does with the larvae.
$11,58-1 / 2-54$ comes to a tree 3 feet from the nest, then quickly enters the nest from the $W$ and faces $E$.

1500-Silence. It's $82^{\circ}$.
1501-1/54 sings 2 high steps, then comes to the clearing and sings high, not very audible skids. The ninth song at 1503-1/2, and those that follow it to number 14. at 1505 are loud skids. Then come 4 chatters, and then 6 faint skids, then 12 chatters to 1511 . 1154 has thus sung 38 times since 1501; all but the first 8 songs are uttered In the pines somewhere not far from the nest, perhaps 20 or 15 yards away.

7515 - 54F has her bill open. It's still $82^{\circ}$.
1532-54 leaves. I check the nest; there are 4 eggs.
1547-54F returns to the nest, faces WWW for the first time. At 1555 she resettles and faces straight $\mathbb{V}$.

1600-Silence.
$1603-1454$ starts skids in 5 to the $s$. The songs are Weak, not faint but lecking vigor. See below for further details.

I squeak at 547 and see the slow pulling in of her head. 1610-54? leaves the nest, going rather slowly on the get-away from the rim. She heads S . M54 is still singing at the time; he has gone N to the thin woods between $V$ and X. She thus headed in nearly the opposite direction from hin.

1617-1/2 - M54 quits after 45 songs. They were sung while he moved through 5 toward the $N$ and into the $X-V$ woods, where he's been for 8 minutes. He began with weak skids, seemed to sing more lustily as he passed the $\mathbb{E}$ edge of the clearing. In $X$ he first fell back to weak skids, then sang an abortive chatter or 2 , and wound up with 15 or 20 chatters. In trying to describe this song, a fair representation is to utter the J sound, as in Jack, 10 times without voculel any special consonant following. This gives the 10 syllables that are usual the proper quality; note the typical slight drop in pitch on the last note.

1638-1/2 - 54 F flies $\mid V$ across the clearing to a Virginia pine 5 feet from her nest. She feeds on the new candles, calling "check." She then goes to a limb frequently visited en route to her nest. It is I foot from the nest. She searches it carefully, seizes an insect and Mies qui.ckly SE. I think she goes only 5 or 10 yards; I lose sight of her.

161,0 - 545 Plies to the nest, calls "check," enters and faces WNW. At 1650 she turns and faces E.

16177-N54 sings 6 weak skids at the $1 \mathbb{N}$ comer of the clearing or in the woods. He stops at 1650 .

1652 - He now sings 10 chatters to 1.656 in the same place, the $V-\bar{X}$ border.

1700 - Silence.
$1705-1 / 2-54$ leaves the nest, passes close by me, pes on 8 about 30 or 40 yards in all. It's $80^{\circ}$.

1721-1/2 - 54F calls "check" behind me, roes in 30 seconds to the pines where she continues to call.
$172 ?-1 / 2-54 \mathrm{P}$ goes to the nest, enters facing : 1722-1/2 - 154 begins to sine in the center of the locusts in 5. He seems to be 20 feet or so high. He moves to the trees on V by the ravine, then comes WV again. His sony is a fairly vigorous slid id after a few mali ones at first. A17 the sens are widely spaced. By 1731, herb sump 13; he bering 1-1/2 minutes later. Hots in 5 due 3 of the nest, and be's been here nearly the entire tine he's sung. After 10 to 1735, I hear no more; thea 10 were weak.

## 1742-548 leaves the neat.

175? - Ship begins to call "check" a four yards s of the
nest.
2757-1/2 - She goes to it and enters from the iv to face B.

1800 - Silence.
1805-1/2 - A waring's whistle causes 5LF to s tick her head out of the nest to investigate.

2827-7/2 - M54 boffins veal: sleds to the B in 4 or 5 . After 6 he coos to the $S$ edge of $X$ and sines an abortive chatter or two, a type- 3 step, and then some peculiar short songs, which I have called "Goldfench-like" in other years.

They are from 4 to 6 notes long, have the quality of the Goldfinch note rendered "sweet".

1830-1/2 - 54 ie jumps to a supporting limb 3 inches from the nest and after a second's pause flies $S$, away'
 from the sones of $1 M 54$. I thought she looked out of the nest when he first began to sing.
$1835-154$ quits after 21 songs, the last 15 or so the sort just described. Some Goldfinches are in fact calling here while 1554 is singing, including the note in question, but it seams pretty far-fetched to suggest a connection.

1840-1/2 - 1.544 and 54 F return to the nest together, one or both of them uttering high "tseep" notes just before. Possibly movements by me alarmed them and caused the calls.

1847-54F goes straight to the nest. 1554 flies up to it, flutters before it for a second as though catching an insect at it (he is about 2 inches from it); then he goes SE a few yards. He may glide or flutter. She faces E or SE.

18142 - 154 begins to sing loud skids in the clearing, moves away to the SE singing them. By $1844-1 / 2$ he's sung 7. He then quits.

It is $66^{\circ}$ and the sun is just dropping behind the trees so that it doesn't shine on the nest tree.

1900 - Silence.
$1937-1054$ sings about 10 faint, insipid steps to 1947.
$54 F$ never leaves the nest again. I can't even get her to raise her head. At 1950 I think I must be mistaken and 80 forward to look; but she's there, very much crouched dom.

2000 - I Ieave. It's been $100 \%$ suiny today.

Kay 19, 1956

A completely gray morning with a 1 W wind, not strong; temperature $60^{\circ}$ at 0615 . Unlike yesterday, there is no dew. Present from 0630 to 1045 .

T55 at 0630 - 1455 is singing irregularly in the SB cornerf; most of the songs are his step-skid which is so peculiar. I hear some calling and find 55F feeding in the low brushy growth. She is still unable to fly--but can move very fast otherwise. I haven't time to follow her today, but her preseance may explain why 1555 hasn't behaved like an unrated bird. 55 shows what seems like freezing behavior when I get near her.
\$53 at O649 - N53 is singing and I begin to count his sones; they are chatters for about the first 30 , then become insipid steps.

I sit to watch the nest.
$0705-53 F$ leaves the nest. It is $62^{\circ}$. 1453 has sung 38 times to now, and his irregular songs po on. Again today counting is difficult because $1544^{1}$ s step can be heard nearby. Presumably the arrival of $1 l_{4} 8$ yesterday accounts for the fact that step songs were so scarce (ie., that 1153 and 1154 had few bouts).
$0714-53 \mathrm{~F}$ flies to the nest from the S , the opposite of the direction in which 153 sings occasionally. I can now tell that 1454 is the only step singer and that M53 is not
singing in opposition to him; the latter's chatter songs are short and rapid. (Does 1454 reserve his step songs for the E side of his territory?)

0719 - 1553 has sung 65 times in the 30 minutes I've a -th been here.

0748-53F leaves the nest, flies low to the 18.1453 is singing to the S . It is $63^{\circ}$.

0749-1153 has sung about 59 tires in the last half hour. oh, mun in the first period most songs were chatters with a few slcids. $2+2$ This tine they have been insipid steps after an initial few chatters, and the last 2 were type-8's. In the first period he was $N$ of the nest nearly the entire time, this period $S$ of It near 1. At 0753 he is singing type- $8^{\prime \prime}$, and 154 is
 doing the same. They aren't together; 1453 is now near me and Il of the nest. I think $M 5 h^{\prime}$ 's type-8 singing is socially facilitated or imitative; it's too much of a coincidence that he just began it after 1153 .

0756 - It is getting a little brighter with enough light now to cast a slight shadow.

0758-53F begins to call mild "checks" near me. At 0800 she flies out to within 5 yards of the nest, hops around in a pine tree in some alan at me, calls "chick" loud once and "check" and "tsu" several times.

0801 - She enters the nest and faces S or SW as she has every time this morning. It is $64^{\circ}$. N53 is singing irregulaxly at an average rate now of once every 25 seconds or so;
his interval runs from 60 to about 17 seconds, with most at 25 and 30 . $\mathrm{He}^{\prime}$ s in the NE corner, but I cant tell his height; I've looked for him and he seems to be stationary, feeding or singing in the high trees along the If edge. 0819 - He's sung 94 times in the last half hour, all type-8's except a very few skids at the beginning of the period. His rate has picked up in the Inst 5 minutes, though there is still a range of from 13 to 30 seconds and sometimes a little more. At 0824 he stops after 75 songs, beginning again in $1-1 / 2$ minutes; I' ll not start a new count.

0830 - M53 and 1554 both begin to sing chatters though they aren't near each other.
$\underline{0832}-537$ leaves the nest and Plies $E$ into a tree 20 feet from me. She does not stay to call at me, however. 153 goes on singing. He quit for 3 minutes or so at about 0826.

0831 - The sun cones out. It is down to $62^{\circ}$, but I'm in full shade.

1954 has been audible ever since I got here. He must be in the $2-3$ area most of the time. Now he's singing frequent insipid steps.
$0840-53 \%$ goes to the nest without preliminaries and

$$
\mathrm{HP}
$$ begins to incubate. She faces S or SW as usual today.

08149 - M53 has sung 63 times in the half hour. Nearly
all have been chatters delivered in the Il part of the territory. Note that he has not really quit singing for any sustained period since I've been here.
$\underline{0900}-1153$ falls silent, begins again at 0906.
0907-53F leaves the nest, woes SE. It is $65^{\circ}$, com- der SE pletely cloudless.

0917-1/2-53F returns quickly to the nest, with no calling or other delay. She comes from the $S$ and faces as before. 1153 is singing in that direction, N of I. It is $67^{\circ}$ in the shade.
$0919-153$ sang 77 times in the half hour, with the $6-$ minute pause indicated above. His songs were chatters at first, then later many insipid steps near 1. (M5') was not singing.) At the end of the time his songs became skids and are that now, at 0921.

0921 - 1953 quits singing. In a minute he begins (after 9 sones) with insipid steps. 1554 is singing $W$ of $I$, and they are engaged in a duet.
$\underline{09145}-53 F$ leaves the nest and goes SE. It is $77^{\circ}$. dup E
0949-1553 has sung nearly continuously during the half hour, about 90 songs. He began with skids, got into a fiveminute duet with M54, then sang chatters iN of 1 , and at the end sang insipid steps at 7554 again. In both the matches with M54, the males were in the I-2 area and completely accurate counting was impossible.

At 0948 MF 3 fell silent. Note that the female was off the nest at this time.
$0957-1 / 2-53 \mathrm{~F}$ returns to the nest and faces as before. Again she comes in without warning.

0958 - M53 begins to sing (note the possible connection with the female's return). M54 has been singing insipid steps since 0953 without a response from M53. Now 1153 sings slides $S$ of the nest, and at 09591754 begins skids too. Id say that 1554 sings more often than 1953 as a general proposition.

1018-53F leaves to the S. It is $74^{\circ}$.
1019 - M53 has sung 59 times, 211 skids, in the area near 1, since 0958. In the last few minutes 1154 has sung skids too.

I quit counting songs since I must leave before the next half hour ends.
$1022-53 P$ comes to the pine tree 5 yards $W$ of the nest calls "check" twice, then calls "tsip" ("tsu") for a minute.

1023 - She goes to the nest, lands below it about a foot, climbs up, enters facing $S$ as before.

1030 - I quit watching the nest.
The 2 males are singing, both staying in the low trees and bushes, feeding at 15 to 5 feet.

10L5 - I leave.
It has been cloudless since 0834 [and remains so the rest of the day, which is $85 \%$ sunny].

## May 20, 1956

A cloudless dawn with a light frost in the low meadows; IE wind, moderate; temperature $42^{\circ}$ at 0600 . Present from 0600 to 1200 .

VII - An unbanded male is singing chatters here. I don't recognize him; his back is striped but not very heavily.

IV from 0615 to 0645 - Complete silence.
XII - Silence.
T25 for 25 minutes - 1455 is singing his usual song, feeding from 5 to 20 feet. He quits in 10 minutes, and I don't see him again. No sign of the female.

2153 at 0730 - 1553 has been singing since I've been Within hearing, most of the time near 1. His songs have been insipid step, skid, and now frequent chatters. The female is on the nest. I'm going to try to measure the eggs.

0747-53F leaves and I measure 2 eges without disturbIng her. However, in view of her short periods off the nest yesterday, I'll wait to take the others.
$2-15.5 \times 12.5 \mathrm{~mm}$.
$4-25.6 \times 12.4 \mathrm{~mm}$.
0748 - I. leave the termitory.
T154 at 0750 - I sit to watch the nest. 54 F is incubating and. 1554 sings 2 or 3 slids, then quits. I'll begin my count from his next songs.
$0757-1 / 2-1154$ skids to the $\mathbb{E}$, not very audibly, he comes to 4 or 5 and continues. At 0800 he is in the woods IE of the clearing.

0800 - It is $54^{\circ}$. 1454 at 0804 is at the $\mathbb{E}$ edge of the clearing singing skids after 2 chatters in his series. At 0806 he goes $\mathbb{E}$ again, probably to 3 .

0810 - He quits after 38 sones.
0815 - 54 P leaves the nest and Mies E past me, at least as far as the locusts.

The wind is fairly gusty, making a good deal of noise in the trees. It came up about half an hour aco.

0821 - 54 P flies in from the B and lands in a pine 5 or 6 feet 11 of the nest, calling "check" twice. She had flom some distance. She irmediately (within 5 seconds) goes to the nost, enters, faces $\mathbb{E}$ as she did before she left. I note she always looks into the nest just before she gets in. She entered from the $W$.

It is $56^{\circ}$.
$\underline{0825}-1154$ sings skids to the $\mathbb{E}$, from about the fox den; they are infrequent, and after 6 to 0828 , he stops. He begins again at 0830-1/2 (or possibly I couldn't hear them in the interim) and sings in 2. He cones W and sings 2 or 3 , but by 0834 he's silent after 15 songs.
$0848-1 / 2-54 i \operatorname{leaves}$ the nest and Niies $\mathbb{I}$, passing me to the N this time instead of to the S .

0856-1/2 - 54 filies silently to a redbud 10 yards from the nest. There she perches 3 feet up and wipes her bill. In 15 seconds she goes to the pines, Iow. She is out of sieht 15 seconds.

0857 - She Mies to the nest, enters from the $W$ and faces $\mathbb{E}$. It is $65^{\circ}$ in the shade.

0900 - M54 has been silent since last noted.
0910-1154 sings high skids to the W . I hear only 9 songs to 097l.

0920 - 1.154 begins type-8's in 4. After 6 he comes at 0926 to the $\mathbb{E}$ edge of the clearing and sings these songs. 0922 - 5Lipleaves the nest and flies low SE at least 40 yards. 1154 has sung 10 times to this point, but he falls silent inmediately as 54p flies $\mathbb{E}$.

It is $66^{\circ}$.
0928 - I hear a few "oheck" calls to the SE of the nest about 20 yards.

0929-54P flies quickly in from the Sy, lands I foot fran the nest, enters it imediately from the if and faces $\mathbb{E}$.

0929-1/2 - M54 sings 7 skids to 0932, all from about 15 yards from the nest, either in the pines or beside them. He must be about 12 feet up. At 0932 he sings a chatter from the $1 \mathbb{E}$ corner of the clearing, then waits 1-1/2 minutes before continuing with that song. It is loud, but the skid
was high in pitch and therefore seemed to lack volume. The chatter interval is about 15 seconds till 0935. He
then is quiet after a total of 16 sones.
$\underline{0952}-54 \mathrm{~F}$ leaves the nest, first sitting up in it or possibly hopping to its E rim; her breast showed in any event. She then hovered for 2 seconds, at a pine branch 5 inches from the nest and a little above it, took an insect (it looked a little like a moth or other winged adult) from the limb, and Mem upward about 30 yards to the $\mathbb{E}$. I A couldn't see where she landed. Note again this sanitation behavior. Possibly she left early because she saw the insect; certainly she saw it before she left or she would have dropped straicht out low.

0959 - 542 goes directly to the nest from the pines $N T$ of it. I didn't see her prior to that. She is silent, enters immediately from the $W$, faces $\mathbb{E}$. It is $65^{\circ}$.

1000 -Silence.
1027 - 54 ip leaves the nest, pausing a fraction of a
second as she passes by a small pine branch near the nest.
The movement was scarcely perceptible, but she picked at some- A NS thing. She drops low and Plies past ne (N) to the E probably 35 yards.

It is $68^{\circ}$, and the wind is dow, blowing mildly from time to time.

1038-51Fflies right over my head, calls "check" at that moment, and goes on to land in a little pine (5 feet) just in front of hers. There she calls again about 6 times. 1038-1/2 - She hops up to the nest, picking at something on her way when about 2 feet from it, and enters and faces as usual.

1059-1/2 - 54Fhops to the nest rim or rises up in the nest, flies out and flutters a second at a pine candle 6 inches away (not the one she hovered at before), seizes a. lepidopteron of some sort and goes E right past me carryIng the insect in her bill. Again I can't see her land, so I don't know how she disposes of the insect. I'd guess that she may pause in the nest while she looks for the object to carry away and therefore that her periods are not influenced by this behavior.

1700 - Silence, lilo songs this hour. It is $70^{\circ}$.
1104-1/2-54F flies into the pines $N$ of the nest and sits 20 seconds. She wipes her bill twice. She then moves nearer the nest but out of my sight.
$1705-1 / 2$ - She flies to the underside of the nest and hangs upside down, picks at the nest. She then climbs into
 the cavity from the $B$ and faces $W$.
$1713-155$ begins rather high thin skids in the 11 end of 5 , moves to the woods edge at the NE end of the clearing. At
seconds about 2 inches away, goes to a pine branch 1 foot S, picks at something, flies SE. M54 is singing in that direction and he falls silent at exactly this time.

I'd say that $54 \mathrm{~F}^{\prime}$ 's behavior in leaving this time confirms my guess that she only starts looking for an insect apter she has been moved to leave the nest.

1152 - 54 P flies alone to the pines, landing just about 5 feot below her nest. She is silent.
$7152-1 / 2$ - She enters from the $W$ and faces $\mathbb{E}$.
1153-1154 begins to give high sldids near the fox den. He continues regularly.

1200 - I Ieave.
It's hard to judge the heat by my themometer at this time, because I can't get out of the sun. I'd say it's $78^{\circ}$. It is cloudless, with a light breeze. The day is $100 \%$ sunny.

## May 21, 1956

A humid day with a slight overcast throughout, a S wind, and fairly high temperatures. It threatened to rain in the mid-morning, but most of the time the sun occasionally comes through and a little blue can be seen; $15 \%$ sunshine for the day. Temperature $74^{\circ}$ at 2530 . Present from 1530 to 1800 .

VII and II - Silence.
XII - Silence during 10 minutes.
T53 at $1550-1553$ is singing and he does so with considorable regularity and frequency until I leave at 1635 . He sings probably 175 songs. The first few are type-8's, the last few insipid steps; most are chatters. He is in the area of $I$, much of the time in the medium growth from 6 to 10 feet high. I time his intervals from 1611 to 1615 : $22-19-19-11-20-1)_{4}-10-11_{4}-12-21-19-15-16-16-28$. At this tine 155) is singing chatters too, in the area $S$ of 2. Note that insipid steps seems to have fallen off in numbers and proportron.

I sit to watch the female so I can measure her eggs. She faces $\pi$, the first time I've seen her do so, and leaves at 1618 . She returns at 1633 .

The eggs have taken on the chalky whiteness that goes with aging; they had not done so yesterday, so this stage is reached on about the fifth day. Their measurements are:


1-16.6 x 11.9 mm .
$3-15.8 \times 12.4 \mathrm{~mm}$.
355 at 1635 - Silence to 1645 and thereafter. I heard 1 or 2 songs from hore while I was on $\mathbb{T} 53$.

1735-155 has sung only about 8 songs, 10 minutes ago. They were type-8's. I've covered the territory many times without seeing him or a female.

Is it significant that $M 55$ seldom sings anything but type-8's? It may be that because he is relatively isolated and hears no other birds regularly (I assume) he therefore doesn't sing imitatively.

T54 and 153 - The 2 males are sincing insipid steps between 2 and $I$ when I go, although they are not together and there seems to be no encounter,

154-54 is not on her nest, but the eges are intact. They look a littile chalky in my mimor.

1800 - I leave.

An overcast morning after a light shower sometime near dam and with very slight sprinkles at 0600 and at 0900; no wind; temperature mild, about $68^{\circ}$ at 0630 . Present from 1500 to 1918. A mild $S$ breeze is blowing and it is hot, sunny, and humid; $82^{\circ}$ at 1500 .

II - A male sings a skid in the little tree strip between 2 faimeys. He is 25 feet up, unoanded. I suspect a nest in this area.

XII - Silence during 10 minutes.
T54 at $1529-1 / 2-54$ is off the nest and 1544 is singing hivh skids to the $\mathbb{E}$.
$1535-1 / 2-54 \mathrm{~F}$ retums. 1554 is still singing, and he comes somewhat closer when the female returns. She calls "check" for 20 seconds, enters from the $W$ and faces SE. She opens her bill part of the time.

1543-1954 falls silent after 37 skids; none as far $W$ as the clearing.

I sit to wait till 5 LiF Ieaves so I can measure her ergs.
1555 - She leaves. I measure eggs 2 and 4 as follows:

$$
\begin{aligned}
& 2-16.2 \times 12.7 \mathrm{~mm} \\
& 4-16.3 \times 12.7 \mathrm{~mm}
\end{aligned}
$$

I then quit for fear she'll return too soon.
1609-1/2 - 5LFreturns silently, looks into the nest, settles facing S. Shortly she seems to move around so that
she's looking SE pretty much as usual.
1614-1/2 - M54 begins to sing skids near the fox den or possibly on $X$. He sings 8 songs to 1618 , another in 30 seconds, and quits.

1621-1/2-54F leaves, flies E past me, turning S. I get and measure the other 2 eggs.

$$
\begin{aligned}
& 1-16.2 \times 12.5 \mathrm{~mm} \\
& 3-16.1 \times 12.5 \mathrm{~mm} .
\end{aligned}
$$

$1630-54$ F returns, enters from the V , faces straight B. She came silently and directly.

I quit watching this nest for the time being.
253 - 153 sings type-8 steps near I from 1635 when I arrive to 1650 when I go. His interval is about 20 seconds.

535 is off the nest at 1636 , returns at 1649 .
(It is now nearly wholly clear and sunny, with a stiff wind blowing in gusts from different directions but predominantly from the SN.)
(Yesterday I found a Field Sparrow nest with I Field Sparrow egg, built 4 inches up in an elm seedling; it was on T53. On T55 I found a Field Sparrow nest built into the side of a broom sedge plant; in it were 4 young in their second day, the first nestlings of the species this year.)

T255 at 1650 - Silence. I walk over the territory until 1725 and see and hear nothing. I would int bo surprised if this territory dissolved, although my time on it recently has been in the afternoon and therefore does not provide a cod basis

## for judgment.

253 is silent.
254 at 1740 - 1554 is sinqing the flat, completely toneless buzz that reminds me of a Colden-winged Warbler. The sone varies from 5 to 9 notes, but most Irequently consists of from 6 to 8. It is slow and I note he switches to a chatter (alter 25 buzzes) without much dieference in the quality of the songs; the chatter is much faster though.

1554 is ranging in height from 6 to 35 feet, staying in the trees all the time. I watch him for 10 minutes. He feeds little, moves without haste, but covers the distance from 3 to $X$ and back to the trees at the 11 edge of the clearing. He then moves $W$, singing without any long pauses for 20 minutes at least. On $X$ his song becomes irregular and sometimes sung With a very short interval; it also is quite rapid, a speededup chatter.
271.0 - 54 is on the nest. I sit to see if she retires early again tonipht, as she did on May 18 .

1752-1454 goes $W$ and becomes silent.
$1817-54 \mathrm{~F}$ jumps to the rim, sits 15 seconds, flies
low to the ME toward the woods. She probably paused because I moved just as she hopped to the edge of the nest.

A Catbird is singing a full song in the pines. I think a pair (possibly 2) must surely be on territory on $V$.

1847 - 54F goes to the nest and faces E. She may have called some beforehand, possibly for as long as 5 minutes; I heard occasional notes that may have been hers.

1902-5 5 sticks her head out of the nest when a chat gives a "caiow" call.
(It will stay clear till dark. I'd say that the day has had $55-60 \%$ sunshine.)

1917-54F leaves the nest, so she isn't retiring early as she did the other day.

1918-I Ieave.

## Nay 23, $195^{\circ} 6$

Cloudy in the mowing after a heavy rain about midnight; partly cloudy with some sun in the aftemoon; the day about 20\% sumy, cool, in the low $70^{\prime \prime}$ s. Present with Alan Garrett from 1500 to 1745 .

IV 1 - We hear a male singing a very few skids well to the $\mathbb{E}$ and finally see him fly NE possibly across the fairway.

IV 8 - Silence here for 15 minutes. Then we find a male at the ravine near the pines. He is very wet, and since there is no other possible source, he must have been bathing in the stream here. He sings slide 2 or 3 times in 25 minutes, once goes far $\mathbb{E}$ at the line of the ravine. I cant tell if he's the male we saw to the $N$ or not. Once more we find a male near the pines, and he flies low out of sight, Ism nearly sure to the ground. In a minute or so when I see him I think I can see that he is wet.

We leave IV. There is I male at least, and probably there are 2.

VII - The male is calling here and then singing, really on the W part of II. We go to see him and find a female. As I watch she gathers strips of grape bark while moving with great rapidity and apparent energy about 25 or 30 feet up in a tree. She lets the bark drop. However, I look in a likely tree covered with creeper on II $W$ and find a nest that has been worked on for about a day, As we leave the male is
singing and the female goes to the nest.
I'7I call this pair the 561 s.
XII - A male is singing here too. We stay for 20
minutes, but he quits a few seconds after we arrive and we learm nothing.

255 - We wait here and work it over for 25 minutes. 195 sings 2 little snatches of 2 and 5 songs, but we never see him.

253 - The male sings, and the nest is all right.
T54 - The nest is safe. 1554 is singing near 3 .
171.5 - We Ieave.

I found a Towhee's nest with 4 young about 2 days old, tow on IV ll. I think the male was brooding.

A clear calm morning; temperature $42^{\circ}$ at 0500 . Present from 0500 to 2000 .

T53 - 1053 is near I calling the angry notes of a fighting male, and 1154 is $S$ of 2 doing the same and singing insipid steps. They are not near each other ( 30 yards), but the sound is as though they were fighting.

0505 - 53 F is on the nest.
I sit to watch it all dey.
0514 - 1453 sings 2 or 3 insipid steps; as usual I cant be exactly sure how many because of 154 .
$0515-53$ r shifts on the nest, i.e., rises up. She is facing $S$, her usual direction.

0525 - I've heard only insipid steps so far from both and direct.

0600 - 7153 has sung 72times, irregularly, all insipids, since 0530. At about 05451554 quit singing here, and 1053 came well E to the area just 11 of I, about 30 yards from the
nest.
53 F is moving little or not at all on the nest. It is still $42^{\circ}$.
$0603-1 / 2$ - I can see $53 \mathrm{R}^{1 / s}$ tail; she is moving a good deal now, for 1 minute.

0607 - 53 F jumps quickly out of the nest and goes $\mathrm{W}_{\text {. }}$ OS 1153 has sung 23 times to this point, and he now quits. However, I think I can hear 535 calling "check" to the $N$, and if so that is not where the male has been.

0613 - 535 returns to the nest from the N, but I don't Net $N$ know how far she came from. After 20 seconds of nervous attention to me she flies to the foot of the nest tree, climbs \& 5 up, faces S.
$\underline{0620}-1553$ begins insipid steps near 1. After 16 songs to 062$)_{i-1 / 2}$ he quits.

0627 - 1153 begins again, same song; he stops after 2 .
0630 - It's $144^{\circ}$, still windless. 1453 sings again, faint stops, 3 times.
$0632-53 F$ backs off the nest and looks in or probes for prides 10 seconds. She repeats this at 0648 .

0633 - M53 starts to sing faint steps. His songs are so irregular I'II count totals for a while and not try to get every little series. At 0639 he's sung 5 times. At 0640 I start to count over. He seems to be moving about,
though not fast; he goes W to a point not far from the IllS center of 2.

0700 - It is $45^{\circ}$. 1553 has sung 47 times after 0640, 471 but since all songs are still steps and 1154 began to sing them too about 5 minutes or more ago this number is only approximate.

At 0652 I first detected a VIS wind beginning, and it is still blowing though never hard.

0708-53F leaves to the $\mathbb{E}$, flies up to the trees over me and to the IN at the edge of the woods; this is on one direct flight from the nest.

0709-153 has sung 16 times. He now switches to loud chatters, and I count over. He stops after 4.

535 is calling quiet "checks" nearby, I think above me in the woods.

It is $46^{\circ}$.
$0712-1 / 2-535$ goes straight back to the nest and ingediately enters and faces S . She was silent.
$0715-1 / 2-2153$ begins to sing loud chatters 15 or 20 1 when he falls silent for 1 minute. He seams to be in the 1. ch pine field to the $S$, moving along slowly. Ind guess he is singing and foraging rather inactively. Now he is probably in the trees along the edge of the woods, but in any event he
is not staying in the tops; his height probably ranges between 8 and 25 feet.

At 0735 another male begins to sing, from behind me in the woods. His song is a high skid, unlike H55's song, but the direction suggests M55.

M53 goes on singing chatters. His first 38 were at 15-second intervals. Then he paused about a minute or less and resumed a little more slowly. For at least 10 minutes I've been able to detect no change in his location, in the SE comer of the pine field.
071.0 - The sum hits the nest tree.

0743-53F leaves the nest. It is $49^{\circ}$.
071 L - M53 quits after 51 songs since $0725^{\circ}$. The other male is singing skids loud, but it's hard to tell where. Ho seams actually to be in the NE comer of $V$.

0749-53F calls "check" 3 or 4 times, goes low to the

I've checked the skid songs and now think they might be M54's. Some were possibly coming from $V$ to the $V$, but at 13912755 a male sings on T53 in of the nest. This is surely N53, and the earlier songs I'7l have to give up on. 143 quits after 13 songs to exactly 0800 .

$$
\begin{aligned}
& 0800-\text { It is } 50^{\circ} \text {. The wind is mild and in the SE. } \\
& \underline{0816-1 / 2} \text { - A male, probably } 1453 \text {, sings } 8 \text { high skids in } 3
\end{aligned}
$$ minutes. The direction of the song is very hard to be sure of.

0822-1/2 - M53 begins loud type-8 steps near the SE corner of the pine field.

0831-1/2 - 535 jumps to the rim of the nest, pauses

$$
\begin{gathered}
0=0 \delta 3=-9 \\
2+15
\end{gathered}
$$ there for a second, flies S. 1553 sings once more, stops at 0832. He resumes in I minute, so III not quit counting. His songs all sound as though he is at medium height, at least no higher. He sings only once more. By 0833 he's sung 30 times since $0822-1 / 2$, with the 1 -minute break already mentioned.

083B-535 calls faint "checks" 2 or 3 times near the nest. She is about 1 foot from the ground, moving quickly. $M 53$ begins to sing type-8's to the $S$.
$083-1 / 2-53 F$ goes $10 \%$ to the nest tree, climbs to the most, enters from the $N 1$ and faces S. It is $52^{\circ}$.

OBI $]_{1}$ - 1453 quits after 17 type-8's that sound again as 1. $44(2,4)^{\text {though he is not high. In } I \text { minute he begins again in the }}$ pine field and sings to 0903, 4 lt times.
$\underline{0900}$ - A fairly strong $\mathbb{E}$ wind is blowing. It is $53^{\circ}$.

$0909-1 / 2-1153$ begins type-8's near the W part of 1 , comes E to the spot he's strayed in most of the morning.

A Fox Squirrel comes to within 2 feet of me. Both squirrels and chipmunks are seen on the edges of $\nabla$ fairly often.

1553 moves if in the pine field and sings type-8's within

15 yards of the nest, then goes on II.
$57+8(2.3)$

204

0927 - H53 stops his type-8's after 57 more. Another male probably sane type-8's too during the end of this period. 1453 may have sung 2 high steps at 0927 , another at 0930.

212
294
$0958-1 / 2-1153$ sings 2 chatters $S$ of the nest near 1 , then sines an odd song which combines a chatter and an insipid
nh
34 tron step (in a pine HI of the nest). He flies into a tree just above me and sings for 5 minutes there at 25 feet. His first 3 songs are double, full type- 8 's followed almost without
hard to tell where from. I hear 12 songs in about 3 minutes.
0958-538 flies straight to the nest, calls once before reaching it, enters from the $\mathbb{N}$ and faces $S$. It is possible
ar, wo os that M53 went just after she did and got side-tracked by chasing a bird near the nest. She may have called to the lis for a minute or so before going.

$$
54
$$

any pause by chatters. He then sings chatters to $\mathbf{I 0 0 6}$, and flies SW to the field $V$ of $I$. I have counted double songs as 2 ; he sang 34 times.

1007 - 1.53 is singing type-8's to the W. He moves Into the pine field and continues till 1018-1/2. 1154 30 sings skids for a few minutes of this time. M53 sings 30 times.

It is $63^{\circ}$ at 1025 .
1027 - 1153 begins type-8's II of the nest, moves $S$ in the pine field. As he continues to sing, mostly in the SE cornor of the field, M5) skids repeatedly near 2. (Is the instpic step ever sung from a high perch?) $25^{\prime} 3^{\prime}$ s interval is irregular, ranting between 10 and 25 about like this: 10-18-
(3.1) 7047-53F leaves the nest and 2553 quits after 72 songs (with M5'l still skidding quite nearby), but I don't see the female leave and cant tell whether the male quit first or vice versa.
$1052-1 / 2-1053$ sings again, type-8's from 1 and then from the pine field on the E edge.

1057-53F returns quickly and silently to the nest, faces S.

1100-1153 has sung 27 times since he began at 1052-1/2, is continuing. I wont start counting over again.

1106-M53 switches to insipid steps after 48 typeof the field. He must be simply perching and singing a good deal of the time. After 4 in 1 minute he quits. Then inspid step and perhaps 2 more can be heard very faintly. At 17111453 sings an abortive song near 1 , begins with type-8's. (I think I hear M55 on his territory.) After 2 of these songs, M53 sings insipid steps $N$ of the nest. Then after 9 he sings a chatter followed rapidly by a type-8. At 1116 he is silent.
$1117-1 / 2-153$ sings 3 type- $8^{\prime}$ s, quits.
It is $64^{\circ}$, still rather breezy and cool.
$1120-1 / 2-153$ sings a type-8 at the 11 edge, cones $S$, and finally moves into the little area most frequented today. In 1 minute he moves N again, toward the NW comer of his territory. At 1128 he quits after 23 songs.

1130 - Evidently M53 and M54 are singing insipid steps near the IN end of 2 .

1139 - After about 22 insipid steps sung at 1554 , 1953 sings a loud chatter, still in the $W W$ part of the territory. He then goes to the SE corner and continues slowly. He sings 6 times in 3 minutes, stops.

17147-N53 sings an insipid step in the NN, then another. Some of his type-8's today have had only 7 notes, but these have been rare.

1151-1/2-1553 begins occasional chatters in the $1 \mathbb{E}$ corner, near the woods, interspersing themwith little quick bursts of about 6 harsh calls like anger notes but not quite so loud.

11153-53F leaves the nest.
1200 - M53 has sung 7 times since 1151-1/2 and his anger notes go on. At 1201 he sings 2 notes of an insipid step.

1201-53F begins to call "check" in the NE corner, prosumably near the male. She moves closer to me and I see her feeding very actively in the trees 28 feet over my head. She continues calling.

1205-535 Plies straight to the nest tree I foot below the nest, hops up enters facing $S$, It is $63^{\circ}$.
$1210-53 \mathrm{~F}$ shifts a little but doesn't probe.
1213 - The female probes in the nest for 5 seconds.
1216-1/2 - She raises her head a little.
1218 - She rises and probes for 5 seconds.
1223 - She raises her head and looks out.
1229-1/2 - She stirs, rises a little.
1232 - She leaves the nest quickly, going S. I watched It with glasses during all the time she was on in order to see how much ege turning, etc., there is. I'II do it again 2 or 3 more times today.

M53 has sung chatters th times since 53 F began to incubate at 1205. He has been in the SB part of the field most of this
time. He became silent about when 53F left, i.e., he was singing before and has not done so since.
121.3-1/2-53F returns to the nest from the $N$, goes straight to it in silence, looks in for a second (as she may always do), enters facing S .

1251 - 1453 sings a high skid, then near me he begins loud insipid steps that lack the usual thin quality and could well pass as loud Field Sparrow songs. After 6 such sones he begins chatters. He's in the woods edge trees over my head, about 25 feet up. He sings 45 songs to 1308 and most of the time is in sight, ranging between 25 and 10 feet. His movements are active but not especially quick, and he sometimes sits in the same prInce looking around for about 1 minute. He forages the whole time, not confining himself to the leafy parts of the branches. There is a dead sassafras limb, e.E., over which he moves in just the same way that he covers a live limb. I see hin catch I caterpillar.

1308-53F leaves the nest. Again this coincides with M53's silence, but I don't see the departure and the exact sequence is unknown.


1316-53F goes to the nest tree, leaves it, in 5 seconds is back. She is out of sight in the lower leafy part for 10 seconds, then hops up, looks in, enters facing S. None of
 this was because of me. She called once just before she went to the nest the first time; she was near it when she did so.

It is $70^{\circ}$.
1055 is singing his peculiar combination that begins as an insipid step and changes to a slid.

1322-1/2 - M53 starts his chatter songs again where he was before, in the trees over my head and a little N . He immediately goes into the pine field and keeps on singing. At 1328 he flies into the trees right above me and goes on foraging as usual, about 30 feet up. Then he goes to 40 , eats a large green caterpillar on a hickory. He's in motion now most of the time. At $131 / 7$ he stops singing after 33 songs but in 40 seconds begins again still chattering in the same place. 1454 sings insipid steps $1 \mathbb{E}$ of 2 . At 1344-1/2 1553 moves well NW, probably out into the pine field and not far from 2. He's sung 5 more songs by this time, but since he's still singing I don't break my count.

1342 - 53 F leaves the nest. 1253 sings once after she leaves, then quits; he's sung 21 times.

H400 - I hear a "check" or two, probably from 53F.
11101 - She goes straight to the nest tree, waits in the lower part for 15 seconds, enters and faces $S$.

1,00 - She looks out.
1120 - He chatters in the trees above me, continuing to I/4,40 and beyond. (Is it possible that a male becomes temperartily attached to one place? 1153 has sung today first $S$ of 1 and then here for long periods.)
14.33-532 looks out of the nest, probably at me.

7l1t0 - She leaves the nest and flies IB to the tree tops above me. Here, where M53 is, she Reds very rapidly
$0.1440-50$ $3+75$ and nervously about 35 feet high, seeming to concentrate on the leafy branch ends. She calls "check" about 7 times after arriving, and the calls are not directed at me. 153 quits singing for $1-1 / 2$ minutes after she gets to the trees, then 1) $C h$ begins again with the same chatters.

Note that I watched the female with classes the entire time on the nest and she never probed in it or did anything
 but look around.

It is $74^{\circ}$.
11177 - M53 quits singing again after 11 songs.
11.50-53F pives I call "check", flies to the nest tree, climbs up from the SE, looks in, enters and faces MN for the first time today.

31158 - 1453 begins to chatter in the trees above me, then goes out into the pine field II of the nest. His singing is very infrequent at first, then quite frequent. A sample run of intervals; 18-10-12-11-II-714-38. At 1516 he quits after 38 songs.

1516-53F leaves the nest. Mote the association with the male's silence. It is $68^{\circ}$ in the shade.

752) - 53F calls "check" in the NE part of the pine field, continues.

1526 - She flies silently straight to the nest, enters Prom the $H$, faces $S$.

1528-M53 begins to sing his chatter in the SB part of the pine field. As has been true several other times today,
$3 a$ the first few songs are widely spaced (as much as a minute); if he follows his earlier form, the rate will increase a lot. At 1534 he skids once, reverts to chatters. His rate has not accelerated noticeably at $\mathbf{7 5 4 5}$. At 1555 he quits after 49 sones.
$1602-535$ rises and looks or pokes in the nest. I have not attempted to see all such acts except when indicated above. Thrice I have omitted mention of this behavior, both instances between 1200 and 1300 . It 1608 she repeats the maneuver.
$1617-1 / 2-535$ hops to the nest rim, looks out at me for 2 seconds, and Plies $\mathbb{E}$ to the woods $\mathbb{N I}$ of me.

It is $67^{\circ}$. It is very quiet; the only bird singing is a distant Red-eyed Vireo (occasionally a Goldfinch and a tanager).

1628-1/2 - 53F plies straight to the nest tree, pauses 3 seconds at nest level, hops to it and looks in for 3 more seconds, enters fecino $S$.

1632 - M53 sings a skid near I but a little W of it. He then comes to the pine field and continues his high skid to 1640, 9 songs.


22
3 wis
$21 m+x$ son

12 ms


1648-M53 sings the Golden-wing song near the 11 woods edge; 6 songs in $2-1 / 2$ minutes.

1700 - Silence.
1703-535 rises and pokes in the nest.
1712 - M53 since a faint insipid step, goes on infrequently, then a little more often.

1728-53F gets up, perches about I second on the nest rim, flies SE. M53 is here, still singing as described above, and he doesn't stop or pause with $53 F^{\prime} \mathrm{s}$ arrival.

It is $64^{\circ}$ in the shade.
171.0-1553 falls silent after 59 insipid steps, some not quite complete; e.g., some had 7 notes. All were faint.
$174-1 / 2-53 F$ goes straight to the nest rim , seems to $\mathrm{ON}-\mathrm{s}^{2 .}$ UR peck sharply at the rim or a nearby leaf (presumably at an insect), settles facing $\mathbb{N W}$. She entered from the E side.

1714-153 begins his high steps, sings 12 to 1756. He then is quiet.
$1758-53$ leaves the nest. 25 die
$1800-1 / 53$ sings 2 very faint steps. It is $63^{\circ}$.
1807-53F comes to the nest tree from the $W$, evidently an W having fed nearby in the field cover. She enters quickly from the $H$ and faces $S$.

2817-53F 1 eaves.
c) $1517-23$
0.5

1822-I/2 - She returns. I don't see her until she is
Ft the nest and entering. She faces S .
18143-53F leaves the nest. It is $60^{\circ}$.
$1848-1 / 2-53$ calls "check" 3 or 4 times between me and
the nest, Pies to the tree and sits I foot below the nest for 5 seconds. Then she jumps to the SB side of the tree, enters from that side, faces 1 WW .

1850-1053 sings a weak chatter.
1902 - For 2 minutes the female preens herself on the nest and also looks out cautiously at me. I squeaked to see if she was there a minute ago, which accounts for her concorn about me. She withdrew her head very slowly, as 54 F does under the same circumstances.

2928 - I hear no more insipid steps. There were about 3 16 from 153.

1934-53F leaves the nest.
1937-53P calls "check" above me 3 or 4 times.
1937-1/2 - 53 F ल Mines straight to the nest itself, looks in, enters from the $\mathbb{E}$, faces $\mathbb{N}$. It is $56^{\circ}$.
as, ext

1955 - She is clearly on the nest for the night. It's getting quite gray, although the clear sky makes it still Iuminous. The day has been $100 \%$ sumny.

$$
\underline{2000} \text { - I Ieave. It's } 52^{\circ} \text {. }
$$

## 15ay 25, 1956

A perfectly clear cool morning with a fair breeze from all parts of the E; $50^{\circ}$ at 0700. Present from 0730 to 1215.

III - A male sings very frequent loud skids near the big hackberry. The road work here is extensive, but the male is surely on territory. He is probably the bird I saw here scme time ago. He could be unmated, for he stays quite hich. [Error, this was surely 1558.]

XII - I find a nest, though I see no PW's and hear none. It is about 1 foot high in a $2-1 / 2$ foot cherry, bound between 2 upright leaders and about at the level of the field cover. It is complete, empty, lined with feathers. P55 at 0840 -1555 is singing type-8's when I arrive, not very often. An occasional song is his special combination. I soo him flutter out of a high dogwood, so I begin to look for a female. M55 quits singing, but I get the impression that the dogwood is the center of activity. Also when he sings again I hear a female call irmediately afterward there. I therefore sit to watch and after 5 minutes see a fenale hopping very actively in the top. The light is bad and the wind makes Vision difficult, so I can't see the red paint that 55 F has. I think, though, that I see her bands. Also the fact that she has apparently stayed in the tree for 15 minutes or so sugrests it is the injured bird. At the end she does fly 10
yards to a hawthorn, and I Iose her.
1555 sings only 19 times to 0925. I'd say he is behaving like a male whose mate has a complete nest without eggs, though the flutter is not consistent wi.th this. I doubt if there is a nest of course. I'II check it again soon.

T53 - 53F returns to the nest while I watch; 153 sings type-8's.

254-54F incubates.
T56 at 0947 - 56 is building actively, but I take other notes to 1005 and then begin to watch the nest. $M 56$ sings trice near the nest at 0954 and 4 times at 1004. I notice the female calls at the nest once when he sings.
$1002-1 / 2-56$ to the nest for 10 seconds.
1016 - For 5 seconds. This nest is about 4 feet high, built in a deep cluster of creeper that has pulled a 10-foot high elm branch over till it touches the ground.

1018 - For 10 seconds.
1020 - Por 5 seconds.
1023-1/2 - M56 begins high skids olf to the $\mathbb{E}$.
1021 - For 7 seconds.
1025-1/2 - For 50 seconds. 1456 is now right here, still singing. He quits though at $1026-1 / 2$, singing only once after the female leaves. In all, 10 songs.

1022 - For 38 seconds. M56 begins to sing again when she
comes; he's to the $\mathbb{E}$, then again comes to the nest area. His songs here are a little fainter. To 1033, 7 songs.

1036 - The male begins to sing far to the E.
1039-1/2 - 56F to the nest for 50 seconds. 1456 comes and sines overhead, I short skid, I faint one, several loud and shrill.

1042 - For 7 seconds. The male still sings rather loudly.

1049-1/2 - For 110 seconds. 1556 has been singing loudly, frequently, and regularly not far to the $W$ in the tree row. His interval is about 12 seconds. He's sung 52 times since 2036, but now his song gets faint. He quits on number 53 as the female goes Nil from the nest at 1052.

1054 to 1059 - 1556 sings 7 faint songs nearby to the $W$.
1059-56F for 30 seconds.
1102 - For 105 seconds, working all the time.
1102 - 1556 begins very faint songs to the $N$, comes to the nest area and continues till she leaves, 13 times. One is short.

7106 - I hear a twittering noise as though many "tsu" calls were boink given with only a slight pause between. In about 2 seconds a Blue Jay flies straight to the nest tree, sees me, but hops along the branch and puts its head dow into the creeper. It then withdraws it and sits there for 10 seconds. $56 \%$ is calling and hopping around the jay in

2lam. Most calls are the light "tsip" with only 2 or 3
"checks." I don't see the male, but my field is limited. After the jay leaves the female calls and moves about nervousTy for 30 seconds.

Note that $56 \%$ bean the alarm notes before the jay came to the nest tree, so she must recognize the bird as a menace; and he went straight to the nest, so he must have been watching her build. Wi.71 she desert? Why a different alarm note for jays and for me (e.g., when I have the young)?
$1122-568$, which has to this point completely disregarded. me though III only 20 feet from the nest, comes into the tree above me and calls "check" and "tsu." Presumably the Blue Jay has distpulbed and frightened her generally. I withdraw and she follows me, calling. Note this is the way PW's act after you've taken their young. I' II check back in 30 minutes or 80.

When I retum 156 is singing. 56F shows alarm ("checks") so I leave.

1215 - I leave the study area.

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\text { May } 26,1956
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A cloudy dam with rain all day; no wind at dawn; temperature $57^{\circ}$. Present from 0430 to $\$ 500$.

T54 at O44.5 - It's dark so I cant see the female. Presumably she's incubating. The male is silent and he remains so, although all resident species except the White-eyed Vireo sing normally.

0555-54F leaves the nest for the first time, comes E. She was facing $S$.

0602-54F goes straight to the nest, faces 37 .
0638-154 sings 3 skids well to the $\mathbb{E}$, his first songs today.

It is still drizzling a little but the weather is mild and the rain seems too light to influence bird behavior much. The only real factor would seen to be the absence of the sun. It is $57^{\circ}$.

06149 - 54 F leaves, Pies E 40 yards or so. She flies low till 25 yards from the nest, then evidently. climbs to go into the trees.

0657 - She goes straight back, faces 11 .
0700 - It rains hard for 70 minutes.
$0717-1054$ begins to sing slide, comes $W$ to 4 or 5 .
5) 4 is now facing $E$.

0720 - While M5 li sings to the E an unbanded male flies into the pines within 10 feet of the nest. He hops around
in them for 45 seconds, silently. 54F looks out of the nest but stays in it. The male then goes $\mathbb{B}$. 1554 switches to 5 chatters about this time, reverts to skids. At 0725 he poes IV in 4 to near the woods. He then goes $\mathbb{E}$, and his sones become harder to hear.

0730-54F leaves, Plies low past me to the E. 1154 quits singing at about this time (sequence uncertain) after 34 songs.

0736-1/2 - She flies directly to the nest, as she has every tive this morning, and faces $N$.

It is $60^{\circ}$, has quit raining, and I can see where the sun is. The overcast is still complete, though, and it's still a very threatening looking day.

0737 - 1154 begins to sing skids to the E. If I hear them all, they're quite irregular. He quits at about 0745 arter 22 songs, the last 12 or so insipid steps.

0759-1554 sings 2 insipid steps.
0800 - It begins to sprinkle liphtly. It is $61^{\circ}$.
$0809-54$ leaves, mies quickly to the E as she has each time this morning. 1154 is singing occasionally at the time and has been since 0803. He hasn't sung series, so I'II give his total for the period at a convenient time.
$0815-54 \mathrm{~F}$ returns directly, faces N. (She switched to 12 face $W$ part of her last time on.) M54 has sung 12 times sirce

0803, twice while the female was off the nest. He sings
2 ah 2 loud skids in 4 or 5 within 30 seconds of her retum; he goes on singing.

0830 - M ${ }^{\prime} 4$, which has sung 29 tires (the last 2 skids at the $\mathbb{E}$ edge of the clearing), flies to a branch about I foot from the nest. He is carrying a l-inch green larvae. He waits about 10 seconds, goes to the nest and stands there for nearly a minute. I can see only his back. He makes no motions to suggest that he is eating the larva, and since he doesn't have it when he leaves I assume he gave it to Ship on the nest. He flies out about 10 yards to a little tree, perches 4 feet up, Pies on E out of sight.
$\underline{0835}-1154$ sings 11 skids to 0837 .
$0840-545$ leaves the nest.
0814-1/2 - She returns to a branch 10 feet away, in 10 seconds enters and faces $\mathbb{E}$. About 10 minutes later she turns to face $S$.

092 $1-1 / 2-54 \mathrm{~F}$ leaves, dropping low and flying E past me into the trees as she almost invariably does.

0931 - She flies to a branch I foot below the nest, enters from the $S$ and faces $\mathbb{N}$. Note that she seems to have paths into the nest but that she neither uses one to the exclusion of others nor do they remain unchanged from day to day.

It is $63^{\circ}$. A ST wind is blowing and has been since 0600 .

54F has shifted to face E.
1003 - 54 leaves the nest as usual.
1010-1/2 - She flies to the pines 7 yards $S$ of the nest.

1012 - She returns and faces $\mathbb{E}$, entering from the $W$. 1047-105h sings once, the first in quite a while. He sings 7 scattered songs to 1100 .

1703 - 545 leaves as usval.
1708-1554 sines 2 chatters E of the clearing. He then flies with a green caterpillar to the nest and sits for 30 seconds on the E rim looking in. 54 F is not there. He flies Without the larva out to a tree near me, goes $\mathbb{E}$ and sings 8 chatters. He eithar ate the larva or left it in the nest.

I1. $1720-1144$ skids to the $\mathrm{S}, 11$ songs to 1125 .
1121-547 retums from the NE (the opposite direction from the male's songs), enters from the $S$, faces NE. She looked into the nest and ate nothing, so clearly $M 5{ }^{\prime} 4$ ate the caterpillar himself.

19 $1136-1 / 2-154$ begins to sing type-8's in the $s$ part of 5, 10 times. It is raining too hard to keep getting my equipment out to time the rate of song. Some of these are short series sung together, and some are very occasional songs; the former predominate.
(1) 7 Cl (1755-1554 sings to the S , 11 times in 10 minutes. The first 7 are skids, the last 4 chatters.

1205-54P leaves exactly as usual, dropping low, Eying E for 30 or more yards, probably rising once she's well into the trees.

1205 to $1210-154$ sings 7 songs.
1211-1/2-54 returns directly to the nest and faces NE.

1215 to $1220-1544$ sings 5 times.
121.8-54ए leaves as usual.

1254-1/2 - She retiums directly, faces NV.
1302-M54 sings once.
1323-54i Leaves as usual.
$\underline{1330}-1 / 54$ begins frequent slide to the 3 , sings 42
times, at about 3 songs per minute.
1335-1/2 - 54/ returns and faces IE.
Inly - 54 F leaves as usual. It has been raining harder than ever, which might have caused the prolonged stay on the nest. During the morning the rain was a steady light shower with little intervals of heavier or lighter fall. I detected no special correlation of her departures with the lighter rainfall, though she never left when it happened to be innsua77y heavy.

$$
\begin{aligned}
& \text { 711.15-1/2 - th. returns as usual. } \\
& \text { 7h16 - I reeve the territory. } \\
& \text { XII - Silence. The nest has no agr. A good deal of } \\
& \text { water is standing in it. }
\end{aligned}
$$

T56 - The nest is incomplete, ready for the last grass lining. I see dogbene seeds in it. Silence.

1500 - I Ieave.
The temperature never varied between $57^{\circ}$ and $63^{\circ}$, with my thermometer showing 62 most of the tine. Rain all day and night.

May 27, 1956

A warn day with rain constantly till 1200 and from 1630 on in great guantities; no sum except for a ferr minutes about 1400; temperature in the 60 's and at 1300 about $74^{\circ}$. Present from 1330 to 1600 .

T56 - The nest is fuIl of water; at least $1 / 4$ inch is standing in it. It has a little grass lining, but it isn't quite complete. 1456 sings as I come up, but in 30 minutes of waiting I don't hear him again.

III - I can hear the male here.
XII - The nest is empty, still holds a good deal of water. I walk around and find the female. She pulls a strip of fiber from an osage orange, 35 feet high. The male is staying with her.

In a little while I see the female go to a spot twice and then see her carry material. When I investigate I can see nothing and have to wait to watch her go arain. There are a very few strands of material about I foot high where 2 blackbermies touch, only a few yards from the first nest. The morning's rain would have washed away anything so insubstantial, so this is certain to have been begun since noon.

157 (the paits new number) behaves typically, flying between 2 or 3 bigh perches and watching the female. He sings irregularly, with some frequent bursts at half volume,
a few at full; many periods of silence.
T53 - The nest is safe. 153 is singing in the B trees.
T55 - $\mathbf{7 5 5 5}$ sines type-8's from a 30-foot perch with
great regularity. I find 55 F off about 20 yards awry. She is very agile, bobs her tail a lot when she sees me, can climb well but evidently cant fly. When I walk up to her she stays in the tree. M55 flies dom and sits quietly about 12 feet up, obviously responding to her.
$\underline{T 54}-54 \mathrm{~F}$ is on the nest.
1630 - I leave.

