MUSSELMAN

A Comparative Study of Bird Migration in
Illinois along the 40th Parallel of Latitude

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A COMPARATIVE STUDY OF BIRD MIGRATION IN
ILLINOIS ALONG THE 40TH PARALLEL
OF LATITUDE

BY

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A. B. University of Illinois,

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THESIS

Submitted in Partial Fulfillment of the Requirements for the

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

THOMAS EDGAR MUSSELMAN

ENTITLED A COMPARATIVE STUDY OF BIRD MIGRATION IN ILLINOIS ALONG
THE 40TH PARALLEL OF LATITUDE

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ARTS IN ZOOLOGY

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I. GENERAL INTRODUCTION.

Bird Migration is a study which has called forth many theoretical solutions during the last several centuries, yet it is universally acknowledged that no acceptable theory has been produced which determines the cause, time and general flight courses of our bird visitors.

It was with the hope of gaining information on the migratory movements of Illinois Birds that I began my research first in Champaign County in 1907-8-9; then in 1910 I made a comparative study of migratory movements along the Sangamon River at White Heath, Piatt County, with those at Champaign and Urbana, Illinois, and in 1911-12-13 I continued my research along the Mississippi River at Quincy, Ill., making comparisons with the Champaign County records.

It should be remembered that these comparisons are based on regular morning trips; the same time being spent each morning and a regular course covered. I have had companionship on my trips, but the records are my own records, the records of one person. In Champaign - Urbana the comparative records are those of Professor Frank Smith and his Bird Study Classes in the University of Illinois. These university records are also records based on a time limit and a course limit.

I am greatly indebted to Professor Smith for data supplied by him and for suggestions and ideas along the lines of working methods. I have also to thank Mr. O. C. Poling of Quincy for many records gathered in previous years.

A comparative study of migratory activities at Champaign - Urbana, White Heath and Quincy is particularly useful because these points are located practically on the 40 parallel of latitude.

Champaign and Urbana are located in the midst of the huge Agricultural district in Eastern Illinois. The land for miles stretches away in gently rolling plains, the horizon being broken only by an occasional farm house or a clump of trees. The only water body near Champaign and Urbana is a large drainage ditch passing irregularly from the north to eastward beyond the cities. There are several very fair sized wood clumps along this ditch. Crystal Lake, a broadened portion of this drainage ditch has been a good record site, and lies directly northeast of Urbana. The drainage ditch flows irregularly until it empties into the Salt Fork River which in turn empties into the Vermilion River near Danville, Ill.

In Champaign County there is very little wooded land, the greatest proportion of the territory being devoted to farm purposes. Consequently, only the commoner prairie and field birds may be expected to migrate to this district with the view of nesting. Numbers of the commoner woods birds also find enough nesting sites to warrant their appearance. Yet the migrants in Champaign Co. are by no means limited to a few farm yard pets which nest in the old mail box and apple tree. An average of 185 birds travel through yearly from somewhere, going somewhere, and they appear with a re-

gularity which is noticeable.

18 miles westward towards the center of the state is the quaint little town of White Heath, in Piatt Co. Here the land is also an agricultural area but larger hills, rougher rolls and heavier tree clumps all indicate the presence of a stream. The Sangamon River is the cause of this change. One mile north of White Heath, on the Illinois Central tracks, we come to the heavily wooded banks of a clear stream which is from 30 to 50 yards wide. This is the Sangamon River.

The Sangamon River rises in northern Champaign County and after a snake like course through the state enters the Illinois River at Browning, Schuyler Co. This gives a long pathway along which birds might direct their course of travel.

From an ecological point of view, we might expect nearly any variety of bird along the Sangamon River at Piatt County. The trees are large enough to allow hawks, crows and owls to nest. The limbs are old allowing the presence of wood peckers; the undergrowth is dense allowing thrushes, thrashers, etc; the river edge is sandy, muddy or gravelly and the banks are steep. Thus the swallows, kingfisher, snipe, plover etc. all find suitable nesting sites. Consequently, any migrant, water or land bird, might reasonably be expected here as a summer resident.

Quincy, Adams Co., Ill. is on the steep lime stone bluffs about 4 miles south of the 40th parallel facing the giant Mississippi River. Along the river are sand bars, gravel beds, heavily wooded islands and underbrush. Sloughs, creeks, bays and rivers open or flow into the river. The bluffs invite hawks, cliff birds and the kingfisher. Upland we find farm land, woodland, second growth

timber land, in fact, there is not a condition for which nesting birds seek, that may not be found within a few miles of Quincy. Why not expect every known migrant? These are the conditions which confronted me in my work and it is results from data collected in this series of counties from which I draw my conclusions.

II. MIGRATORY COURSE THEORIES.

We next consider for a moment some of the more prominent migratory course theories which are as follows:-

(a) River valley theory. This theory when summed up in a few words amounts to this: Birds are known to migrate northward in spring, southward in the fall, and these migrations are largely river valley migrations. The birds gather in huge flocks, making the flight northward or southward generally at night and they direct the flight along some large river course. In travel northward the birds follow tributary streams and are gradually distributed generally throughout the whole country, having travelled the greater distance along the large river courses until the nesting sites are practically reached, then they leave the large stream course and settle where the environment suits their particular nesting requirements.

(b) The valley wide wave theory accepts the proposition that birds migrate regularly twice a year but the migration appears as a wave covering the whole width of a valley. Thus the crest of a wave (all things being equal) should reach rivers and inland towns at the same time.

(c) The inherited migratory path, governed by conditions long since obsolete. In ages past, certain conditions; viz, geological obstructions, zoological enemies, meteorological phenomena; have caused the ancestral birds to follow a definite path for safety. Thus different birds follow certain routes, not because of any pre-

sent danger but because, each bird follows the older ones and the course has been the same for centuries. Each bird may thus be said to follow a hereditary course.

III. BIRD RESIDENTS DURING THE WINTER.

A comparative study of the permanent residents in Adams, Champaign and Piatt Counties should be made so that an absolute discrimination of migrant birds will be possible.

289. Quail.

Adams, very common; Champaign, uncommon; Piatt, common.

I obtained daily records in Piatt and Adams Cos. Champaign Co. is cultivated so extensively that it is difficult for the Quail to exist excepting in certain isolated tracts.

Hawks.

337. Red-tailed Hawk, 343. Broad-winged Hawk, 339. Red-shouldered Hawk. These hawks appear in some numbers in Piatt and Adams Co. throughout the year.

373. Screech Owl.

Adams, common; Champaign, not common; Piatt, common.

Nesting sites are hard to find in Champaign Co., but this bird is common in both Adams and Piatt Cos. as a permanent resident.

375. Great Horned Owl & 368. Barred Owl.

Adams, common; Champaign, rare; Piatt, common.

The heavily timbered districts of both Adams and Piatt Cos. afford these large owls plenty of protection and they are plentiful throughout the year.

393. Hairy Woodpecker.

Adams, common; Champaign, common; Piatt, common.

The Hairy Woodpecker nests in the more heavily wooded districts yet is a permanent resident in Champaign County being de-

cidedly more abundant in the winter than the summer throughout.

394. Downy Woodpecker.

Adams, common; Champaign, common; Piatt, common.

He is a cheerful little neighbor all winter, less conspicuous in summer, yet always present.

406. Red-headed Woodpecker.

Adams, very locally; Champaign, no; Piatt, seldom.

From fifty to one hundred Red-headed Woodpeckers gather yearly on Long Island above Quincy, at a spot where a forest fire killed many sturdy oaks. These oaks are honey combed with holes. This tract of burnt timber lies south of a huge oak woods where acorns are plentiful. I have never failed on any severe winter day to get at least 25 records from this one locality.

The Red-headed Woodpecker also appears as a migrant during the middle of April.

409. Red-bellied Woodpecker.

Adams, few; Champaign, occasional; Piatt, few.

More abundant in Adams and Piatt Counties because of the wooded tract. It is more noticeable as a spring migrant in Champaign Co. Any tendency towards a migration appears in Piatt and Adams Co. during early March.

412. Flicker.

Adams, few; Champaign, occasional; Piatt, few.

The Flicker is permanent in small numbers in all three countries. Piatt and Adams Cos. having a more numerous supply because of the wooded tracts which furnish food and shelter during the winter months. A definite migration appears in each county during March, and Spring is foretold by the flickers' roll or tattoo, by many a farmer boy.

477. Blue Jay.

Always numerous and noisy everywhere within our study borders.

488. American Crow.

Adams, abundant; Champaign, numerous; Piatt, numerous.

In Piatt Co. crows are irregular, travelling up the Sangamon and living on fish. They have no good congregating grounds and consequently they gather in small flocks of from 15 to 40.

In Champaign County the Crow is a bird of the fields and altho one often sees a scattered number of birds high in the air, yet the Crow cannot be called there, a noisy pest.

In Adams Co. there are a number of pine woods in farm districts and in private yards and the parks. The Crows begin to gather during October, and before December thousands upon thousands of these huge black birds have come in from their haunts inland, and up river to spend the winter about Quincy. It is not uncommon in the afternoon at 4 o'clock to see a lone bird fly in, high over town, circle and finally drop into a huge elm tree and sit watching everybody who passes with much displeasure and suspicion. A dozen more soon circle, then pounce pell mell upon the elm until numerous small flocks of from 15 to 40 have alighted on the trees which are conveniently situated near a pine grove. I have counted 174 birds in one tree, every branch having a goodly number. Thus many elm trees hold the birds until they are frightened away, or they rise and settle in the pine clump near by. Here they come until long after dark to roost. Morning is a general break up period. The birds rise by the thousands, moving away over town and then scatter to the farms to live off of corn and other accessible grain. There is, each morning until pairing time comes, a continual chatter and clatter of caws for an hour or more as one huge flock after

another flies over.

This appearance of Crows by the thousands is in reality a winter migration, for altho the Crows nest in this vicinity in quantities yet they do not stay in the enormous numbers that live here throughout the winter. The Crows do not appear with the regularity of some birds. It is not a matter of meteorological conditions apparently, but largely a matter of the combination of the best roosting and feeding grounds in one vicinity, where they come at the first heavy frost.

529. American Goldfinch.

Adams, numerous; Champaign, a few; Piatt, common.

This little bird is very inconspicuous in his winter garb yet the distinctive white wing bars are in evidence all winter about the weed patches. He nests throughout central and northern Illinois during July and Aug. Late in April or early May the most noticeable migration of these birds occurs.

581. Song Sparrow.

Adams, occasional; Champaign, not rare; Piatt, occasional.

The song sparrow retreats to weed thickets and brush piles along streams. They are easily stirred up in the low lands of the Mississippi River, in the brush heaps along the Sangamon River, and any bright day during winter one may hear the cheerful song of this bird along any of the small streams in Champaign Co. They nest generally throughout the northern and central part of Illinois. There is a very noticeable movement yearly during the last few days of March.

718. Carolina Wren.

Adams, some; Champaign, rare; Piatt, few.

This bird is reared and dies within a very small radius. Champaign having no suitable nesting sites, seldom reports this wren. They occur in some numbers as a permanent resident both in Adams and Piatt Co.s In certain isolated communities in Adams Co. this wren is really quite common.

727. White-breasted Nuthatch.

Adams, common; Champaign, occasional; Piatt, common.

Seen in all localities and nesting in all. It is noticeably more abundant in Adams and Piatt than in Champaign Co. The low-land willows seem to be its favorite nesting site consequently the lowlands of the Mississippi and Sangamon Rivers are never without this bird.

728. Red-breasted Nuthatch.

The Red-breasted Nuthatch appears very irregularly every four to six years. During the winter of 1912-13 numbers of these birds were reported daily both in Adams and Champaign Counties.

The last year that this Nuthatch was seen in Adams Co. was in 1907.

735. Black-capped Chickadee.

Adams, common; Champaign, rare; Piatt, common.

In Champaign Co. there is a lack of suitable nesting and food locations. The Chickadee being largely a permanent resident will live in localities suited to his needs. I always considered a record for the Chickadee an unusual record in Champaign Co., finding it usually in the Crystal Lake district. The rotten swamp willows of the Sangamon and Mississippi make him a very common, permanent

resident in the Adams and Piatt Co. localities.

736. Carolina Chickadee.

Adams, rare; Champaign, occasional; Piatt, rare.

761. American Robin.

Adams, rare; Champaign, rare; Piatt, rare.

A few Robins each year winter in these localities in protected quarters. Any warm winter or spring day a Robin's note may be heard in each of these localities. However, the Robin is in reality a migratory bird. He is one of our first regular spring migrants.

Migrations appear as follows:

Adams	Champaign	Piatt
1910	Mch. 3, - 4 - 4 or 5 birds	Mch. 5, 20 birds.
1911		
Feb. 16 - 350	Mch. 11, 25 birds	
1912		
Jan. 14 - 200		
Mch. 30 - 160	Mch. 17, 30 birds	
1913		

The Robin lives at the edge of cold weather flying north in the spring, close upon the snow and ice.

A peculiar phenomenon occurred in the winter of 1911 - 12. Due to a natural desire for protection thousands of robins flocked together in the Mississippi Valley and disappeared towards the south on the same north wind that brought a blizzard and snow on November 27 - 28, 1911. For a week or ten days scarcely a Robin was seen. Warm weather and south winds appeared during the middle of December lasting throughout the month. On Dec. 25th I was awoken by a Christmas carol from the throat of a Robin. I counted flocks of Robins travelling northward to the number of 6 or 8 totalling 300 or 400 birds.

The south winds continued until thousands of Robins and some Bluebirds appeared. Dec. 31, a wave of cold weather appeared. The

Robins stopped migrating, gathering by thousands about springs, whence they travelled to orchards, there living off of the frozen rotten apples. For this season records were obtained daily from the number of 30 to 100, from January on through the spring, and it mattered not whether the weather was zero or 60. This movement was general throughout the state.

Thus we find about twenty-two permanent residents in the respective counties. Many of these birds such as Robins, Goldfinches, Red-bellied Woodpeckers, Red-headed Woodpecker, Flicker, Song Sparrow and even the Tufted Titmouse have noticeable migrations in spring. Large flocks of these birds appear at regular periods, moved by some unknown impulse. Their movements will be noticed during the study of spring migration.

Winter Residents.

During the fall months a great number of birds from the far north land migrate southward, spending the severe winter months in this latitude. These winter residents are practically the same in Adams, Piatt and Champaign Co.s

Those birds which are regular winter residents in Adams, Champaign and Piatt Counties are:

372. Saw-whet Owl

474b. Prairie Horned Lark

528. Redpoll

536. Lapland Longspur

559. Tree Sparrow

567. Junco

722. Winter Wren

726. Brown Creeper

748. Golden-crowned Kinglet (late winter)

Unusual Migrants.

In our trips an occasional migrant appears which is not common to all three counties. Adams Co. gets a number of western varieties Champaign gets eastern varieties.

In Adams Co. the (501a) Western Meadowlark, (697) American Pipits, (1) Western Grebe, (553) Harris Sparrow, (399) White-headed Woodpecker and (567) Montana Junco are occasionally seen, the (567) Montana Junco has also been seen in Champaign by Frank Gates and T. E. Musselman in 1907 - 08.

IV. SUMMARY OF RECORD OF PREVIOUS YEARS.

Mr. O. C. Poling of Quincy kept a record of the appearance of birds for a number of years. His trips were limited to Sundays, yet his records are fairly complete for he lived on the edge of a large meadow land called Lawndale, and got many first arrivals on the day of migration. A study of these records, incomplete as they may be, will be interesting in comparison with similar birds arrivals during the same years in Champaign Co.

Records were taken and comparisons made of the first arrivals in 1887-1897-1898-1899-1900-1901-1902-1903-1904-1905-1906. The dates were totaled and an average struck which gives in the case of a number of the commoner birds some very interesting material.

	Adams Co.	Champaign
230. Wilson's Snipe	April 12	April 13
406. Red-headed Woodpecker	April 5	April 7
420. Nighthawk	May 8	May 9
423. Chimney Swift	April 15	April 19
506. Orchard Oriole	April 29	May 6
507. Baltimore Oriole	April 27	April 28
563. Field Sparrow	March 24	March 25

584. Swamp Sparrow	March 19	March 21
595. Rose-breasted Grosbeak	April 26	April 28
608. Scarlet Tanager	May 4	May 5
613. Barn Swallow	April 20	April 20
622. Migrant Shrike	March 14	March 16
652. Yellow Warbler	April 28	May 2
704. Catbird	April 30	April 28
751. Blue-gray Gnatcatcher	April 16	April 16
755. Wood Thrush	April 13	April 27
761. American Robin	Feb. 22	Feb. 6
766. Bluebird	Feb. 16	Feb. 18

In practically every case, notice that the common birds have arrived identically on the same day or a day earlier in Quincy than in Champaign for a number of years.

The records are not complete enough to warrant a more thorough study than this, yet a later reference may be made to this data. However, it gives us a working basis upon which to begin our study.

V. BEGINNING OF GRADUATE WORK ON THE SANGAMON RIVER.

After having taken all the elementary work in bird study at the University of Illinois, I found myself in the spring of 1910 clear of my undergraduate work, so I obtained permission to spend my Spring on the Sangamon River in graduate research work, making a study of bird migration as it appeared in Piatt Co., Ill.

Beginning the first day of March 1910, I took the early morning interurban to White Heath, walked to the Sangamon River a mile northwest, and then followed a regular course three miles up one side of the stream and down the other shore. I planned to catch a 4 o'clock afternoon interurban for Champaign which gave me suffi-

cient time to post my records in regular order. This was my daily programme.

Beginning Mch. 1st, I found the regular winter residents, including some Flickers. The bird inhabitants were such as would naturally be expected in a heavily wooded river valley. The Great Horned and Screech Owls were abundant and the hawks and Crows were decidedly more numerous than in Champaign Co., 18 miles away.

In Champaign Co. there were no unusual records in February 1910 so the comparison started with a clear record of regular winter residents.

VI. COMPARATIVE RECORDS OF 1910 ARRIVALS.

Piatt Co.	Champaign Co.
Mch. 1, 722. Winter Wren	Mch. 1, 273. Killdeer
718. Carolina Wren	
2, 360. American Sparrow Hawk	2, 517. Purple Finch
273. Killdeer	
766. Bluebird (heard)	
3, Northeast wind (light)	
766. Bluebird (seen)	3, 766. Bluebird
554. White-crowned Sparrow	501. Meadowlark
511b. Bronzed Grackle	498. Red-winged Black-bird.
132. Mallard Duck	132. Mallard Duck
143. Pintail Duck	331. Marsh Hawk
4,	4, 761. American Robin
585. Fox Sparrow	581. Song Sparrow
501. Meadowlark	511b. Bronzed Grackle
306. Prairie Hen	360. American Sparrow Hawk.

March 4, 139. Green-winged Teal

5, 498. Red-winged Blackbird

495. Cowbird

331. Marsh Hawk

333. Cooper's Hawk

619. Cedar Waxwing

761. American Robin

6, 719. Bewick's Wren

8, 542. Savanna Sparrow

558. White-throated Sparrow

9, 587. Towhee

567. Montana Junco

11, 564. Swamp Sparrow

13, 622. Migrant Shrike

546. Grasshopper Sparrow

16, 390. Belted Kingfisher

149. Lesser Scaup Duck

18, 325. Turkey Vulture

19, 563. Field Sparrow

368. Barred Owl

March 5, 495. Cowbird

585. Fox Sparrow

558. White-throated
Sparrow

542. Savanna Spar-
row

540. Vesper Sparrow

529. American Gold-
finch

6, 139. Green-winged
Teal

333. Cooper's Hawk

7, 456. Phoebe

9, 619. Cedar Waxwing

11, 332. Sharp-shinned
Hawk.

13, 306. Prairie Hen

17, 367. Short-eared
Owl.

18, 149. Lesser Scaup
Duck

19, 563. Field Sparrow
140. Blue-winged
Teal

Piatt Co.

Champaign Co.

Mch.

Mch. 19, 546. Grasshopper Sparrow

584. Swamp Sparrow

20, 540. Vesper Sparrow

20, 560. Chipping Sparrow

456. Phoebe

144. Wood Duck

316. Mourning Dove

390. Kingfisher

22, 169a. Greater Snow Goose

22, 416. Mourning Dove

23, 560. Chipping Sparrow

23, 622. Migrant Shrike

24, 749. Ruby-crowned Kinglet

24, 722. Winter Wren

402. Yellow-bellied Sapsucker

140. Blue-winged Teal

27, 705. Brown Thrasher

554. White-crowned sparrow

29, 705. Brown Thrasher

29, 194. Great Blue Heron

230. Wilson's Snipe

194. Great Blue Heron

30, 547. Henslow's Sparrow

30, 6. Pied-bellied Grebe

703. Mocking Bird

749. Ruby-crowned Kinglet

April Records. April was a cold month with many north winds and few bird movements. There were no large movements in either Champaign or Piatt Co. and just an occasional stray arrival was reported.

Piatt Co.

Champaign Co.

Apr. 7, 655. Myrtle Warbler

Apr. 4, 751. Blue-gray Gnat-

catcher.

8, 751. Blue-gray Gnat-

catcher.

8, 239. Pectoral Sandpiper

9, 759b. Hermit Thrush

9, 655. Myrtle Warbler

11, 611. Purple Martin

274. Semipalmated Plover

Piatt Co.

Champaign Co.

Apr. 23, 406. Red-headed Woodpecker

24, 221. American Coot

26, 190. Bittern

Apr. 27, 406. Red-headed

Woodpecker

29, 671. Pine Warbler

29, 423. Chimney Swift

657. Magnolia Warbler

423. Chimney Swift

30, 420. Nighthawk

30, 494. Bobolink

604. Dickcissel

255. Yellow-legs

452. Great-crested Fly-catcher.

May Records. May was characterized by three large migratory bird movements. May 1st and 2nd, 11th and the 29th.

May, 1910.

Piatt Co.

Champaign Co.

May 1, 452. Crested Flycatcher

May 1, 757. Grey-cheeked Thrush

444. Kingbird

677. Kentucky Warbler

239. Pectoral Sandpiper

614. Tree Swallow

190. Bittern

612. Cliff Swallow

201. Little Green Heron

627. Warbling Vireo

675. Water-Thrush

725. Long-billed Marsh Wren

598. Indigo Bunting

645. Nashville Warbler

552. Lark Sparrow

444. Kingbird

201. Little Green Heron

2, 467. Least Flycatcher

2, 202. Black-crowned Night
Heron

Platt Co.

May 2, 459. Olive-sided Flycatcher
 255. Yellow Legs

 758a. Olive-backed Thrush
 755. Wilson's Thrush
 704. Catbird
 681. Northern Yellow Throat

 674. Oven-bird

 636. Black & White Warbler
 614. Tree Swallow

3, 417. Whip-poor-will

755. Wood Thrush
 667. Black-throated Green
       Warbler
 617. Rough-winged Swallow
 725. Long-billed Marsh Wren

4, 120. Double-crested Cormorant

Champaign Co.

May 2, 420. Nighthawk
 507. Baltimore Oriole
 755. Wood Thrush
 636. Philadelphia Vireo
 629. Blue-headed Vireo
 652. Yellow Warbler
 667. Black-throated Green
       Warbler.
 659. Chestnut-sided
       Warbler
 660. Bay-breasted Warbler
 654. Black-throated Blue
       Warbler
 674. Oven-bird
 675. Water-Thrush
 681. Northern Yellow-
       throat
 683. Yellow-breasted Chat
 704. Catbird
 3, 687. Redstart Warbler
 598. Indigo Bunting
 456. Phoebe

 4, 548. Le Conte's Sparrow

Piatt Co.

Champaign Co.

May 4, 364. American Osprey
595. Rose-breasted Gros-
beak

5, 507. Baltimore Oriole
494. Bobolink
627. Warbling Vireo
645. Nashville Warbler
641. Blue-winged Warbler
659. Chestnut-sided Warbler
660. Bay-breasted Warbler
677. Kentucky Warbler
687. Redstart Warbler

6, 628. Yellow-throated Vireo
613. Barn Swallow
612. Cliff Swallow
140. Blue-winged Teal

7, 608. Scarlet Tanager
626. Philadelphia Vireo

9, 686. Canadian Warbler
461. Wood Pewee

10, 683. Yellow-breasted Chat
679. Mourning Warbler
648. Parula Warbler
506. Orchard Oriole

11, 685. Wilson's Warbler
662. Blackburnian Warbler
642. Golden-winged Warbler

May 4, 256. Solitary Sandpiper

417. Whip-poor-will

5, 461. Wood Pewee

10, 637. Prothonotary Warbler
604. Dickcissel

11, 679. Mourning Warbler
685. Wilson's Warbler

661. Black-poll Warbler

Piatt Co.

May 11, 624. Red-eye Vireo
 661. Black-poll
 Warbler
 465. Acadian Flycatcher
 208. King Rail

Champaign Co.

May 11, 662. Blackburnian Warbler
 648. Parula Warbler
 624. Red-eye Vireo
 647. Tennessee Warbler
 645. Nashville Warbler
 765a. Willow Thrush
 14, 678. Connecticut Warbler
 631. White-eye Vireo

Rearranging the above data so that we may see the relative appearance of individual species and the number of arrivals we find the following:

132. Mallard Duck.

Mch. 3
 Piatt 20
 Champaign 18

201. Little Green Heron.

May 1 - 2 - 3
 Piatt 2 2 2
 Champaign 1

208. King Rail.

May 11
 Piatt 1
 Champaign 1

221. Coot.

Apr. 19 - 24 - 27
 Piatt 1 2
 Champaign 1

273. Killdeer.

Mch. 1 - 2 - 5 - 6
 Piatt 1 10 6
 Champaign 1 6

316. Mourning Dove.

Mch. 20 - 22
 Piatt 1 2
 Champaign 2

333. Cooper's Hawk.

Mch. 5 - 6
 Piatt 1
 Champaign 1

360. American Sparrow Hawk.

Mch. 2 - 3 - 4 - 5
 Piatt 1 1 3
 Champaign 1 1

390. Belted Kingfisher.

Mch. 16 - 17 - 20
 Piatt 2 2 3
 Champaign 2

406. Red-headed Woodpecker

Apr. 27 - 28 - 29 - 30
 Piatt 2 1 5
 Champaign 3

417. Whip-poor-will.

May	1	-	3	-	4	-	5
Piatt			1		2		
Champaign	1				1		

423. Chimney Swift.

Apr.	29	-	30
Piatt	2		25
Champaign	1		

452. Great-crested Flycatcher

Apr.	30		May	1
Piatt				3
Champaign	1			

495. Cowbird.

Mch.	5	-	6	-	7	-	8	-	9
Piatt	60		20		28		75		
Champaign	1				9		1		

501. Meadowlark.

Mch.	3	-	4	-	5	-	6
Piatt			2		20		20
Champaign	3		10		9		3

507. Baltimore Oriole.

May	2	-	5	-	6	-	7
Piatt			9		10		10
Champaign	1						1

546. Grasshopper Sparrow.

Mch.	13	-	16	-	17
Piatt	2				3
Champaign					1

538. White-throated Sparrow.

Mch.	5	-	6	-	7	-	8
Piatt							9
Champaign	1						

585. Fox Sparrow.

Mch.	4	-	5	-	6	-	7	-	8	-	9
Piatt	3		4		6		7		12		35
Champaign			1								

420. Nighthawk.

Apr.	30
Piatt	1
Champaign	

444. Kingbird.

May	1	-	2
Piatt	1		
Champaign	1		1

456. Phoebe.

Mch.	7	-	8	-	20	-	23	-	24
Piatt					2		2		3
Champaign	1						1		1

498. Red-winged Blackbird.

Mch.	3	-	5	-	7
Piatt			60		25
Champaign	1				18

506. Orchard Oriole.

May	2	-	10	-	11
Piatt			2		1
Champaign	1				

511b. Bronzed Grackle.

Mch.	3	-	4	-	5
Piatt	1				50
Champaign			1		2

532. Lark Sparrow.

Apr.	30
Piatt	2
Champaign	

581. Song Sparrow.

Winter Residents in quantities
in Piatt County.

584. Swamp Sparrow.

Mch.	11	-	19
Piatt	1		2
Champaign			1

595. Rose-breasted Grosbeak.

May	2	-	5	-	6	-	7
Piatt			9		10		10
Champaign	1						1

604. Dickcissel.

Apr.	30
Piatt	2
Champaign	

624. Red-eyed Vireo.

May	11
Piatt	2
Champaign	1

636. Black & White Warbler.

May	2
Piatt	2
Champaign	4

647. Tennessee Warbler.

May	11	-	13	-	18
Piatt					1
Champaign	1		1		

654. Black-throated Blue Warbler

Apr.	22	-	28
Piatt	1		1
Champaign			

657. Magnolia Warbler.

Apr.	29
Piatt	3
Champaign	1

660. Bay-breasted Warbler.

May	2	-	5	-	11
Piatt			1		3
Champaign	1				

667. Black-throated Green Warbler.

May	2	-	3
Piatt			2
Champaign	5		2

598. Indigo Bunting.

May	1	-	2	-	3
Piatt	1		1		2
Champaign	2				8

611. Purple Martin.

Apr.	11	-	12
Piatt	5		6
Champaign			2

627. Warbling Vireo.

May	1	-	5
Piatt			2
Champaign	1		

645. Nashville Warbler.

May	5	-	10	-	11
Piatt	1		3		4
Champaign					2

648. Parula Warbler.

May	10	-	11
Piatt	2		1
Champaign			1

May	2	-	10	-	11
			1		4
	1				8

659. Chestnut-sided Warbler.

May	2	-	5
Piatt			2
Champaign	1		

661. Black-poll Warbler.

May	11
Piatt	3
Champaign	1

671. Pine Warbler.

Apr.	27	-	29	-	30	May	4
Piatt			2		2		
Champaign	1						3

672. Palm Warbler.

Apr.   22 - 27 - 29
 Piatt   2   1   3
 Champaign

677. Kentucky Warbler.

May   1 - 5
 Piatt   2
 Champaign   1

679. Mourning Warbler.

May   10 - 11
 Piatt   1   6
 Champaign   1

704. Catbird.

May   2 - 3 - 5
 Piatt   4   5   4
 Champaign   2   2   1

721. House Wren.

Apr.   22 - 28
 Piatt   3   4
 Champaign   1

766. Bluebird.

Mch.   3 - 4 - 5
 Piatt   8   14   12
 Champaign   1   5   3

VII. SUMMARY OF FIRST ARRIVALS, 1910.

Piatt Co.

221. Coot
 316. Mourning Dove
 333. Cooper's Hawk
 360. Sparrow Hawk
 390. Belted Kingfisher
 406. Red-headed Woodpecker
 420. Nighthawk
 467. Least Flycatcher
 511b. Bronzed Grackle
 546. Grasshopper Sparrow
 552. Lark Sparrow
 584. Swamp Sparrow
 585. Fox Sparrow
 604. Dickcissel
 611. Purple Martin

675. Water Thrush.

May   1 - 2
 Piatt   3
 Champaign   1

681. Northern Yellow Throat.

May   2
 Piatt   3
 Champaignl

685. Wilson's Warbler.

May   11
 Piatt   1
 Champaignl

705. Brown Thrasher.

Mch.   27 - 28 - 29
 Piatt   2
 Champaign 1   1   1

758a. Olive-backed Thrush.

May   2
 Piatt   1
 Champaign   4

Champaign Co.

273. Killdeer
 417. Whip-poor-will
 452. Great-crested Flycatcher
 456. Phoebe
 498. Red-winged Blackbird
 501. Meadowlark
 506. Orchard Oriole
 506. Baltimore Oriole
 558. White-throated Sparrow
 560. Chipping Sparrow
 595. Rose-breasted Grosbeak
 627. Warbling Vireo
 647. Tennessee Warbler
 655. Myrtle Warbler
 659. Chestnut-sided Warbler

Piatt Co.

645. Nashville Warbler
 648. Parula Warbler
 654. Black-throated Blue Warbler
 672. Palm Warbler
 675. Water Thrush
 679. Mourning Warbler
 721. House Wren

22 Total

Champaign Co.

660. Bay-breasted Warbler
 667. Black-throated Green Warbler
 671. Pine Warbler
 677. Kentucky Warbler
 705. Brown Thrasher
 761. American Robin

21 Total

Arrival on Same Day.

132. Mallard Duck
 201. Little Green Heron
 208. King Rail
 423. Chimney Swift
 444. Kingbird
 495. Cowbird
 598. Indigo Bunting
 624. Red-eyed Vireo
 636. Black & White Warbler

657. Magnolia Warbler
 661. Black-poll Warbler
 662. Blackburnian Warbler
 674. Ovenbird
 681. Northern Yellow Throat
 685. Wilson's Warbler
 704. Catbird
 758a. Olive-backed Thrush
 766. Bluebird

18 Total.

which gives Piatt Co. 22 as first arrivals. Champaign Co. 21 first arrivals, and 18 birds arriving on the same day in both counties. A study of the movements will show many of the uneven first arrivals to be stray birds while the movement of these same birds appeared in both counties the same day. Regular daily records in numbers began the same day in both counties with the Meadowlark, Mallard, Bronzed Grackles, Grasshopper Sparrows, Mourning Dove, Brown Thrasher, Myrtle Warbler, Magnolia Warbler, Chimney Swift, Kingbird, Red-headed Woodpecker, Catbird and practically all the May Warblers.

VIII. CONCLUSIONS FOR 1910.

Thus a careful survey of the year's work in 1910 shows us three very large and noticeable migration movements. Neither March nor April produced a heavy bird movement. The birds appeared during these months in irregular order. Occasionally, the arrivals were on the

same day in both counties but no very definite conclusions can be arrived at, for the first arrivals are numerous both in Piatt and Champaign Counties. All general movements seemed to be as complete in Champaign Co. as in Piatt Co. and arrived the same day in each county practically without fail.

When I began this research work I had the idea that birds should arrive in Piatt Co. before Champaign Co., because Piatt was a river county. Yet upon returning from a successful day in Piatt Co. I could go into the Champaign and Urbana retreats and find evidences of as large and, in fact, the same movement there.

My belief in the priority of arrivals along river courses was much shaken on May 2 when arriving home from Piatt Co. with the biggest list of birds up to that time in 1910, I went to the fields and forestry and found the same birds in like abundance in Champaign Co. and later Prof. Smith presented me with a list which was practically identical with mine, especially in the matter of new arrivals. Even the increase and decrease in numbers of already recorded birds was similar.

May eleventh came bringing the greatest general bird movement of the year. Both Counties had large lists, Piatt Co. reported nine new arrivals while Champaign reported 15. Again the new arrivals overlapped noticeably in

208. King Rail

661. Black-poll Warbler

624. Red-eyed Vireo

662 Blackburnian Warbler

685. Wilson's Warbler.

while the Parula and Mourning Warblers which were seen as strays in Piatt Co. on the 10th were now seen in both counties in migration in abundance.

On May 29th another great wave appeared. There were no new birds excepting the Summer Tanager, but the birds which had already appeared swept in until the trees swarmed with bird life. This movement was noted and compared by me in both counties and was absolutely similar in nature.

Flycatchers, vireos, warblers, tanagers which had scarcely been seen since the movement of the 11th, and which then appeared in small numbers, now swarmed over both counties. This could not have been a river valley migration, but evidently was a huge wave which arrived in both counties at the same time in equal volume.

I noticed the meteorological conditions which preceded these huge bird movements and found that the birds in all cases had evidently been banked by north winds or local winds until the nights preceeding May 2nd, 11th and 29th, when a general heavy south wind prevailed, which in each case broke up the flocks of birds clustered together by the north winds, and swept them northward.

Any irregular arrivals in the meanwhile seemed to be in localities where the feeding conditions were very favorable. These appearances were not typically migratory in general nature. A bird or two appeared, fed, and remained a few days or a week; when this bird appeared in quantities, however, it migrated in during the night, swept on by a heavy south wind and often out again the next day on the same wind.

Thus it would seem that these three largest migratory movements of birds appear at times when an area of low pressure was moving from the west and a heavy south wind prevailed generally throughout the states south of Illinois.

Of course my study was not conclusive; for Piatt Co. was close to Champaign county and would be similarly affected in some degree.

A wind affecting one county would likewise affect the other county in a marked degree.

IX. QUINCY, ADAMS CO. NEW SITE.

Knowing that Quincy, Adams Co. Illinois was practically on the 40' parallel I asked and gained permission to continue my observations there. The comparison from that time was strictly between a River town and a typically Inland town on the 40th degree parallel.

We now proceed to make a comparison of the bird migration at Champaign, Urbana and Quincy in the spring of 1911. A general list will be made of the first arrivals but the principal comparison will be made of migratory waves in the hope of determining the relative or comparative date of arrival in relation to general wind shifts.

In Quincy during January, I noticed the usual residents. The river opened on the 26th and a number of Mallard and Pintail Ducks were in evidence, having been seen Jan. 19th and Jan. 21st respectively. No ducks were reported from Champaign Co. due presumably to the lack of open water.

Not until February, however, do we begin to have real migratory movements. On Feb. 4th, after three days of south winds, a flock of 15 Robins was seen. North winds prevailed until the 11th when southeastern winds began to blow.

This cyclone of Feb. 1st to 4th, brot Quincy the Robin, Red-winged Blackbird, Bronzed Grackle, Cowbird, and the Lesser and Greater Scaup Ducks. The flocks of Blackbirds and Cowbirds I saw, were small in number and were perhaps winter residents. The ducks, however, were certainly migrants. Hundreds of Herring Gulls followed the breaking up of the river, feeding on the dead fish which lay on the ice and shores.

On Feb. 11th a southeast wind blew up, shifting gradually to the south where it remained until the 17th. Wind, light; causing irregular migration.

Quincy.		Champaign.	
Feb. 11, 766.	Bluebird 1	Feb. 9, 412.	Flicker 3
	367. Short-eared Owl 11	12, 316.	Mourning Dove 1
15, 501.	Meadowlark 5	13, 273.	Killdeer 1
16, 560.	Sparrow Hawk 1	132.	Mallard 50
17, 153.	Butter-ball Duck 50	17, 366.	Long-eared Owl
		367.	Short-eared Owl

North winds prevailed throughout Feb. On Mch. 3rd and 4th the wind veered to the southwest, then to the southeast on the 5th. This shift brot a very noticeable bird movement.

Quincy.		Champaign.	
Mch. 2, 509.	Rusty Blackbird 30		
3, 585.	Fox Sparrow 1		
	172. Canada Geese 50		
4, 169a.	White Geese 10		
5, 548.	Le Conte's Sp. 1	Mch. 5, 509.	Rusty Blackbird 10
	273. Killdeer 3	6, 498.	Red-winged Black-
		bird.	1

From March 8th thru the 11th the prevalent wind was from the south and brot a good response.

Quincy.		Champaign.	
Mch. 8, 563.	Field Sparrow 15	Mch. 8, 511b.	Bronzed Grackle 1
		9, 622.	Migrant Shrike 1
		511b.	Bronzed Grackle 55
		585.	Fox Sparrow 5

Quincy.

Mch. 10, 221. Coot 2

390. Belted King-
fisher 1

584. Swamp Sparrow 4

11, 549. Golden Eagle 1

655. Myrtle Warbler 1

255. Yellow-legs 16

325. Turkey Vulture 2

364. American Osprey 2

339. Red-shouldered Hawk 2

230. Wilson's Snipe 5

142. Shoveler Duck 3

239. Pectoral Sandpiper 10

Champaign.

Mch. 9, 581. Song Sparrow 1

10, 273. Killdeer reported

11, 619. Cedar Waxwing 1

587. Towhee 3

456. Phoebe 2

390. Belted Kingfisher 1

12, 194. Great Blue Heron 1

150. Ring-necked Duck 1

On the 12th, a north wind blew flocks of Cedar Waxwings into Quincy. A one day southwind on Mch. 14th brot

Adams

Champaign

Mch. 14, 622. Migrant Shrike 5 Mch. 14, 584. Swamp Sparrow 1

501a. Western Meadowlark 1

I took unusually long trips on Mch. 18th and 19th and found a large number of birds. The prevalent wind for the 19th, 20th and 21st was from the south

Quincy.

Champaign.

Mch. 18, 6. Pied-billed Grebe 5 Mch.

560. Chipping Sparrow 2

19, 517. Purple Finch 2

456. Phoebe 6

722. Winter Wren 1

19, 540. Vesper Sparrow 2

722. Winter Wren 1

Some increase

Quincy.

Moh. 19. 724. Short-billed Marsh

Wren 2

21. 705. Brown Thrasher 2

139. Green-winged Teal

Common.

140. Blue-winged Teal

Champaign.

Mch. 19,   in number of all
                  birds present.

21. 456. 2nd appearance

Phoebe 2

239. Pectoral Sandpiper

142. Shoveler Duck 1

22, 140. Blue-winged Teal 2

149. Lesser Scaup Duck 2

402. Yellow-bellied

Sapsucker 2

749. Ruby-crowned

Kinglet 1

719. Bewick's Wren 1

705. Brown Thrasher 1

23. 230. Wilson's Snipe 2

This movement seemed from 24 to 36 hours later in Champaign than in Adams Co.

I did not find the Ruby-crowned Kinglet until Mch. 24. On the 25th and 26th there was another south wind.

Adams Co.

Mch. 25. 263. Spotted Sandpiper 3

616. Bank Swallow 1

135. Gadwall Duck 2

587. Chewink 4

Champaign Co.

Some increase
in number.

Adams Co.

Champaign Co.

Mch. 25, 194. Great Blue Heron 3

A north wind prevailed the rest of the month with but two new scattered arrivals in Adams Co. and one in Champaign.

Mch. 28, 558. White-throated Sparrow 1

31, 316. Mourning Dove 1 Mch. 31, 560. Chipping Sparrow 1

April opened auspiciously on the 1st with a strong south wind.

Adams Co.

Champaign Co.

Apr. 1, 554. White-crowned Sparrow

1

325. Turkey Vulture 5

Apr. 1, 246. Semipalmated Sandpiper 40

289. Quail 6

322. Sharp Shinned Hawk 1 331. Marsh Hawk 1

219. Florida Gallinule 10 343. Broad-winged Hawk 1

521. American Crossbills 15

2, 358. White-throated Sparrow 1

On the 5th another southwind sprang up, resulting

Adams Co.

Champaign Co.

Apr. 6, 554. White-crowned Sparrow 1 Apr. 5, 759b. Hermit Thrush 2

611. Purple Martin 2 6, 655. Myrtle Warbler 1

494. Bobolink 5 654. Black-throated

Blue Warbler 1

8, 759b. Hermit Thrush 8 8, 202. Black-crowned

Night Heron 1

9, 540. Vesper Sparrow 1 10, 542a. Savanna Sparrow 2

Adams Co.

Apr. 15, 579. Grey-cheeked Thrush 1
423. Chimney Swifts

The 15th opened with a north wind. One Little Green Heron was seen in Adams Co.

On the 16th another south wind brot

Adams Co.

Apr. 16, 617. Rough-winged Swallow 1
672. Palm Warbler 3

546. Grasshopper Sparrow 3
18, 612. Cliff Swallow 5

A north wind on the 19th veered to the south on April 20th evening.

Quincy.

Apr. 21, 721. House Wren 2
604. Dickcissel 3

357. Pigeon Hawk 2
23, 671. Pine Warbler 5
595. Rose-breasted Grosbeak 1

From Apr. 24th thru the month there was an irregular south wind, bringing in new birds each day.

Adams Co.

Apr. 28, 507. Baltimore Oriole 1
755. Wood Thrush 5

613. Barn Swallow 4
29, 627. Warbling Vireo 2

Champaign Co.

Apr. 12, 671. Pine Warbler 4
13, 417. Whip-poor-will 1

Champaign Co.

Apr. 17, 611. Purple Martin 1
672. Palm Warbler 3

18, 552. Lark Sparrow 1
413. Chimney Swift 1

Champaign Co.

Apr. 20, 672. Palm Warbler
6. Pied-billed Grebe 1

721. House Wren 1
23, 575a. Bachman's Sparrow 1

Champaign Co.

Apr. 26, 675. Water Thrush 26
636. Black & White Warbler 1

629. Blue-headed Vireo 1
608. Scarlet Tanager 1

Adams Co.

Apr. 29, 704. Catbird 1
624. Red-eyed Vireo 3

Champaign Co.

Apr. 28, 785a. Olive-backed Thrush 1
29, 757. Gray-cheeked Thrush 3
756. Wilson's Thrush 3
674. Ovenbird 1
667. Black-throated Green
Warbler 1
637. Prothonotary Warbler 1
604. Dickcissel 1
444. Kingbird 1
30, 755. Wood Thrush 1
681. Northern Yellow Throat 1
595. Rose-breasted Grosbeak 1

The last three days records Apr. 28, 29, 30 were incomplete for Adams Co. because of illness which caused me to go to bed for several weeks. Consequently my report for 1911 must end at this time.

X. SUMMARY, FIRST ARRIVALS, 1911.

Adams Co.

140. Blue-winged Teal
221. Coot
239. Pectoral Sandpiper
325. Turkey Vulture
412. Flicker
495. Cowbird
509. Rusty Blackbird

142. Shoveler Duck
230. Wilson's Snipe
263. Spotted Sandpiper
390. Kingfisher
423. Chimney Swift
507. Baltimore Oriole
511b. Bronzed Grackle

Adams Co.

517. Purple Finch	558. White-throated Sparrow
560. Chipping Sparrow	563. Field Sparrow
581. Song Sparrow	584. Swamp Sparrow
585. Fox Sparrow	595. Rose-breasted Grosbeak
604. Dickcissel	611. Purple Martin
613. Barn Swallow	616. Bank Swallow
624. Red-eyed Vireo	627. Warbling Vireo
655. Myrtle Warbler	672. Palm Warbler
676. Louisiana Water Thrush	704. Catbird
705. Brown Thrasher	755. Wood Thrush
757. Grey-cheeked Thrush	761. Robin
766. Bluebird	

Champaign Co.

273. Killdeer	316. Mourning Dove
360. Sparrow Hawk	456. Phoebe
501. Meadowlark	554. White-crowned Sparrow
587. Towhee	619. Cedar Waxwing
622. Migrant Shrike	671. Pine Warbler
721. House Wren	749. Ruby-crowned Kinglet
759b. Hermit Thrush.	

Total.

Adams County	37
Champaign	13
Same Day	1-Winter Wren

51 varieties compared.

Little can be determined from first arrivals. It is only from the migratory movement of the numbers and not of individuals

that we can arrive at definite conclusions.

Stray birds often precede a so-called bird wave many days, so my next summary will be a study and comparison of the migration of birds in numbers as they appeared in the spring of 1911. I shall merely take the commoner birds. Their appearance in numbers will be noticed to occur at the same time or within a few days of each other.

761. Robin.

On Feb. 4th, a flock of 15 Robins was seen travelling northward. North winds prevailed until the eleventh when southeastern winds began to blow. On Feb. 15th fifteen Robins were seen. On the 16th, 350 Robins passed over.

In Champaign the first Robins were seen Feb. 7th when 2 were reported. On Feb. 16th, 17th 6 and 7 birds were seen respectively. Robins were seen regularly after these dates.

Adams Co. reports its first migration in numbers Feb. 15th on the crest of a south wind. The next day Feb. 16th, Champaign saw its first Robins in number, also on the crest of the south wind.

766. Bluebird.

Champaign reports a stray Bluebird 13 days before Adams Co. On Feb. 15th Adams reports 5; on the 16th 7; while Champaign reports her second arrival and the first regular movement on Feb. 16, when 8 were seen followed by 2 on the 17th. This suggest that the migration was one day earlier in Adams Co. than in Champaign.

The Cowbird, Bronzed Grackle, Mallard, Pintail, Grebes(1, 6) Coots, Scaup Ducks, Shoveler Duck and Crow movements were all from one to four weeks earlier along the Mississippi River than Champaign, and the quantities were greater by far.

501. Meadowlark.

Champaign reports a stray bird Feb. 14th. Adams Co. responded with 5 on the 15th, and 7 on the 16th. Not until the 3rd of March were more reported, then 20 from Adams and 1 from Champaign. On the 4th 20 more Meadowlarks were reported from Adams Co. and 1 from Champaign, from that time they were more numerous. Thus the regular appearance began Mch. 3rd with Adams 20 time stronger than Champaign for this date.

412. Flicker.

Flickers are occasional winter residents, however the migratory movements arrived in Adams Co. Mch 5th with an appearance of 20 birds. Champaign Co, seems to have been affected also. One bird is reported on the 5th, with three more Flickers on the 6th. It is difficult to determine whether the migration movement should be considered as appearing the same day or one day later in Champaign. Judging purely from the stand point of numbers, Adams Co, was affected one day earlier than Champaign.

No definite migratory movement of size is noticeable in the Sparrow Hawk or Killdeer, while the regular appearance of the Mourning Dove was two weeks earlier in Champaign than Adams Co. However, these latter records are of a single pair which may have been winter residents or stray early migrants.

The Fox Sparrow appeared on the same wind both in Adams and Champaign Co.s In Adams Co. on Mar. 9th one stray bird was seen. On Mar. 9th Champaign reported 5. Mch. 10th Adams Co. reported 2 and both counties had regular records from that time.

The Kingfisher arrived one day earlier in Adams than in Champaign as a migrant. Mch. 10th and 11th respectively being the appearance.

Both the Field and Chipping Sparrows appeared a week or ten days earlier in Adams than in Champaign.

The Migrant Shrike appeared in Champaign Mch. 8th and 11th. Regular daily records were reported in Adams Co. beginning Mch. 14th when 5 were seen. The regular daily appearance in Champaign began one day later. Mch. 15.

Champaign reports 2 Phoebees on Mch. 11th. Adams Co. began its regular daily records, Mch. 19th, while Champaign began its daily records Mch. 21st.

The Chimney Swift as usual was seen much earlier in Adams than in Champaign. House Wrens are seen first, April 20th in Champaign. Regular records from Adams beginning April 21st in Champaign Apr. 22. The appearance seems, however, practically simultaneous.

The Wood Thrush was seen as a regular record in Adams Co. Apr. 28th. One day later it arrived in Champaign. Catbird appeared in Adams Co. Apr. 29th as a regular resident. Two days later it appeared in Champaign.

Thus I have taken those birds whose appearance in numbers were very closely allied, and I find that as wave movements, birds arrive either the same day or from 18 to 24 hours earlier in Adams Co. than in Champaign Co. as the case may be.

There are a number of notable exceptions to this as a general rule. The Swallows, Ducks and the Swift all appeared in Adams Co. decidedly earlier as migrants, than in Champaign Co. in 1911.

We may also notice that the most extreme differences in bird arrivals are in the birds which appear as early migrants. Those appearing later are closely related in the matter of the time of appearance.

XI. CONCLUSIONS FOR 1911 RECORDS.

Upon noticing these conditions I determined to watch more closely for the extreme cases early in 1912 and 1913, and for the closely allied movements which appear later in the season. I determined to study the wave movements in relation to the meteorological conditions as shown on the weather maps, for the irregular arrivals of February and March were the results no doubt of scattered and irregular winds with no decisively general wind movement. However, in late April with the heavy north and south winds we find the appearances in both counties decidedly more closely allied. Consequently, a study of the arrival of birds, studied in relation to the appearance of the areas of low and high pressure was necessary in 1912.

I have summed up the appearance of individual birds so that a better idea may be had concerning each bird's arrival.

Migratory Record.

1911.

140. Blue-winged Teal.

Mch.	19 - 20 - 21 - 22
Adams	11
Champaign	2

263. Spotted Sandpiper.

Mch.	25	Apr.	16
Adams	3		8
Champaign			

316. Mourning Dove.

Feb.	12	Mch.	16 - 23 - 30
Adams			1
Champaign	1	1	3 2

360. Sparrow Hawk.

Feb.	11 - 16
Adams	1
Champaign	1

142. Shoveler Duck.

Mch.	11 - 12 - 21
Adams	3 10 10
Champaign	1

273. Killdeer.

Feb.	14 - 16	Mch.	5 - 11
Adams			3 5
Champaign	1 1		1

325. Turkey Vulture.

Mch.	11 - 18 - 25	Apr.	1
Adams	5 2 3		3
Champaign			5

412. Flicker.

Jan.	8	Mch.	5 - 6 - 8
Adams	21		20 3
Champaign		1	3 1

616. Bank Swallow.

Mch.	25	Apr. 12 - 29 - 30
Adams	1	25
Champaign		1 6

627. Warbling Vireo.

Apr.	29	May 6 - 8
Adams	2	
Champaign		1 1

671. Pine Warbler.

Apr.	12 - 20 - 23 - 25
Adams	5 1
Champaign	4 2 1

674. Louisiana Water Thrush.

Apr.	23 - 26 - 28
Adams	1
Champaign	2 1

705. Brown Thrasher.

Mch.	20 - 21 - 22 - 31
Adams	2 1 1
Champaign	1

721. House Wren.

Apr.	20 - 21 - 22 - 24
Adams	2 15 16
Champaign	1 1 1

749. Ruby-crowned Kinglet.

Mch.	22 - 23 - 24
Adams	2
Champaign	1

757. Grey-cheeked Thrush.

Apr.	13 - 16 - 24 - 29 - 30
Adams	2 1 1
Champaign	4 1

761. Robin.

Feb.	4 - 6 - 7 - 9 - 10 - 14 - 15 - 16.
Adams	15 1 1 1 3 15 350
Champaign	2 6

766. Bluebird.

Feb.	2 - 15 - 16 - 17
Adams	7 8 8

624. Red-eyed Vireo.

Apr.	29	May 10 - 11
Adams	3	1
Champaign		2 1

655. Myrtle Warbler.

Mch.	11	Apr. 6 - 7 - 8
Adams	1	19
Champaign		2 1

672. Palm Warbler.

Apr.	16 - 17 - 18 - 19 - 20
Adams	2 3 2 4 1
Champaign	1

704. Catbird.

Apr.	28 - 29 - 30	May 1 - 2
Adams	1 3	
Champaign		5 5

Apr.	1 - 8 - 10
Adams	1 60 150
Champaign	1 3 9

722. Winter Wren.

Mch.	19 - 26
Adams	1 2
Champaign	1

755. Wood Thrush.

Apr.	28 - 29 - 30
Adams	5
Champaign	3 1

759b. Hermit Thrush.

Apr.	5 - 8 - 9
Adams	8 3
Champaign	2 1 5

Feb.	2 - 15 - 16 - 17
Champaign	1 7 2

In noticing this data of individual appearance we quickly see that during the early months of irregular winds the arrivals are irregular, while during April the arrivals are more closely allied, due, no doubt, to the regular general wind movements.

XII. PERMANENT AND EARLY RECORDS FOR 1912.

Jan. 1912 began with practically the same birds as winter residents that we considered in 1911. During the month there were two good periods of south winds which brought bird movements. On the 13th and 14th later on Jan. 20th and 21st.

The flight of Prairie Horned Larks on the 21st was the largest that I have ever seen.

February was a cold blustry month and those birds which appeared were irregular in their arrival.

Adams Co.		Champaign Co.
367. Short-eared Owl	Jan. 21.	Feb. 11
412. Flicker	Jan. 17	Feb. 9
474b. Prairie Horned Lark	Jan. 21	Feb. 13
517. Purple Finch	March 10	Feb. 16
748. Golden-crowned Kinglet	Jan. 30	Feb. 8

None of these records are unusual. Only the Horned Lark made its appearance in a migratory wave movement. The other birds were irregular or might have been winter residents. The south winds only seemed to increase the number of the birds all ready present.

North winds prevailed generally throughout early March until the 16th. Adams Co. had nothing to report thus far excepting one Purple Finch on the 10th. Flickers were somewhat more numerous in both counties than in February.

Occasional Purple Finches are reported from Champaign Co. with the only new records being a Red-headed Woodpecker on March 2nd and

10th, a pair of Mourning Doves on the 9th and a small flock of Red-polls on the 12th.

In neither County had there been any movement of birds. North winds had prevailed and banked the birds to the south of us. Suddenly on March 17th one of the most wonderful bird movements ever recorded occurred.

XIII. STUDY OF THE MIGRATION, MARCH 17, 1912.

A study of weather maps and weather conditions is necessary to fully understand the meteorological conditions.

March 16, 1912.

Notice the general south wind west of the Mississippi River, without a contrary wind to hold back the migration.

March 17, 1912.

The winds south of Illinois and Indiana, practically to the gulf, were south winds. It was this general wind which caused the general migration.

Discussion.

I started early Sunday morning Mch. 17th up the river bottoms. A southeast wind had been blowing for twelve hours and I felt this should bring birds. At day break a hard hot wind blew up from the southeast, melting snow, and converting small creeks into raging torrents. I quickly appreciated that a great bird day was present, for many new birds were early encountered.

Herring Gulls were seen over the river by the hundreds. Many strings, thousands of birds in fact, of Canada Geese, Brant, Mallard Greater and Lesser Scaup Duck, and Pintail Ducks crossed and re-

crossed the river, circling until they found feeding grounds. Huge flocks of Bronzed Grackles and Cowbirds mixed with Red-winged Blackbird came sailing in, in their noisy manner. From the lowland brush came the "Chewink! Twee!" announcing the arrival of the Ground Robin. Meadowlarks seemed to literally rise from the ground. Every fence post possessed one. High above me a ventriloquil note lost itself, but the owner, a Bluebird, followed by 4 others alighted on a wire fence for a rest. Forty-five or fifty Fox Sparrows suddenly appeared in the underbrush growth as if by magic, hunting for a bite to eat. The Savanna Sparrow and the Field Sparrow both made their appearance. A distant Great Horned Owl hooted a few times to announce that he too had felt the spell and hailed with delight the thought of a meal of fresh tender bird flesh from the southland.

Up above circling, circling, ever watchful on the crest of this bird movement, was a huge flock of 25 Red-tailed Hawks, while an occasional Cooper's Hawk darted with its swift flight back and forth, hunting as it travelled.

On Mch. 18th the wind began to turn toward the north, passing from south to southwest then north. Both Adams and Champaign Counties report many first records on the 17th. A few birds may have come in on the 18th but the chance is, that these birds came in on the wind of the 17th, because Quincy reports birds on the 18th seen in Champaign on the 17th and vice versa.

Adams Co. reports on the 18th, White-throated Sparrow 3, Phoebe 3, reported by companions on the 17th. Belted Kingfisher 2, also reported by friends on the 17th, Butter-ball Duck 50, Green-winged Teal 300, Swamp Sparrow 5.

Champaign Co. responds on the 18th with Savanna Sparrow 4, Mal-

lard 132 both of which were seen in Adams Co. on the 17th.

List of March 17, 18, 1912 arrivals.

Adams Co.

Champaign Co.

Mch. 17th, 1912.

Mch. 17th, 1912.

51a. American Herring Gull	500	172. Canada Goose	50
132. Mallard Duck	400	273. Killdeer	1
149. Lesser Scaup Duck	3	331. Marsh Hawk	1
173. Brant	1500	377. Red-tailed Hawk	1
172. Canada Goose	75	390. Kingfisher	1
333. Cooper's Hawk	1	456. Phoebe	1
375. Great Horned Owl	3	495. Cowbird	45
377. Red-tailed Hawk	23	498. Red-winged Blackbird	100
495. Cowbird	40	501. Meadowlark	15
498. Red-winged Blackbird	40	766. Bluebird	5
501. Meadowlark	15	563. Field Sparrow	1
511b. Bronzed Grackle	150	584. Swamp Sparrow	3
563. Field Sparrow	2	585. Fox Sparrow	18
542a. Savanna Sparrow	2	587. Towhee	11
585. Fox Sparrow	45	722. Winter Wren	1
587. Towhee	5	511b. Bronzed Grackle	150
766. Bluebird	5		

Mch. 18th, 1912.

Mch. 18th, 1912.

139. Green-winged Teal	3500	132. Mallard Duck	132
153. Butter-ball Duck	50	542a. Savanna Sparrow	4
258. White-throated Sparrow	3		
390. Kingfisher	2		
456. Phoebe	3		
584. Swamp Sparrow	5		

Thus on the 17th Adams Co. reports 10 arrivals the same as Champaign Co.

Adams reports the Savanna Sparrow and Mallard Duck on the 17th which were reported on the 18th in Champaign.

Champaign Co. reports the Phoebe and Kingfisher which has a first record on the 18th in Adams but which likewise were reported on the 17th by friends. Thus the huge bird wave brought the same birds to both counties on the same day. The migration was not local in nature but general and includes all families of birds. We find everything, ducks, sparrows, and hawks, so undoubtedly all were compelled by one and the same general impulse.

North winds prevailed throughout March until the 30th. Few new birds appeared. These birds reported as first from Adams are largely water birds and undoubtedly came in on the south winds on Mch. 17th and 18th. I found new birds only on my long Saturday river trips, but little or nothing on my daily trips. This lethargic condition prevailed likewise in Champaign Co.

A long trip on the 23rd resulted in a number of firsts that I had missed before. There was no indication of a migration, however, The wind was from the north driving sleet and snow before it. There was no increase in number and my only reward for a long journey was a number of stray birds which I found near a sheltered river bank. Greater Snow Goose 1, American Coot 6, Loon 2, Long-billed Marsh Wren 1, Turkey Vulture 2, Ring-billed Gull 50, Marsh Hawk 1. On the 24th I found Killdeer 3, Shrike 1, Chipping Sparrow 3, and on the 26th one Vesper Sparrow.

A one day south wind sprang up on the 30th. The small migration was general, increasing all local birds in numbers and bringing the

Cliff Swallows and Rough-winged Swallows in quantities. On the 31st I saw my first Mourning Dove and Henslow's Sparrow.

After Mch. 17th and 18th there was but the one noticeable increase of birds, on the 30th. Thus practically speaking all the arrivals in March responded to our huge wind movement and travelled northward in response.

Champaign reports practically no arrivals after the 18th. A Saw-whet Owl and Cooper's Hawk on the 24th, 2 Golden-crowned Kinglets were seen on the 26th, 2 Great Blue Heron on the 27th, one Brown Thrasher on the 31st.

Similar to the conditions in Adams Co. are those in Champaign Co. Those new arrivals reported are irregular and no migratory move is perceptible in the matter of numbers excepting on the 30th and 31st, when the number of birds seen was somewhat larger than usual.

XIV. THE MIGRATION ON APRIL 4TH AND 5TH.

April opened without any noticeable change until the nights of the 3rd the 4th and 5th.

April 4, 1912.

The low in the previous map approached thru Canada with highs on the Atlantic and Pacific which opens the whole Mississippi Valley to south winds.

General south winds throughout Mississippi River Valley.

This series of winds brought a fine migration to both Adams and Champaign Co.

Adams Co.

Apr. 4, 1912.

611. Purple Martin 9
749. Ruby-crowned Kinglet 2
406. Red-headed Woodpecker 3

5, 616. Bank Swallow

Champaign Co.

Apr. 4, 1912.

540. Vesper Sparrow 1
474b. Prairie Lorned Lark 3
409. Red-bellied Wood-
pecker 1
719. Bewick's Wren 1

2

Adams Co.

Champaign Co.

Apr. 5, 1912.

Apr. 4, 1912.

423. Chimney Swift 50
 6, 230. Wilson's Snipe 40
 246. Semipalmated Sand-
       piper 50
 142. Shoveler Duck 20
 140. Blue-winged Teal 20
 6. Pied-billed Grebe 4

331. Marsh Hawk 1
 622. Migrant Shrike 3
 367. Short-eared Owl 1

A north wind on the seventh veered again to the south and remained through the 11th.

Adams Co.

Champaign Co.

Apr. 9, 1912.

Apr. 9, 1912.

501a. Western Meadowlark 2

749. Ruby-crowned Kinglet
 1

705. Brown Thrasher

722. Winter Wren 1

Apr. 11, 1912.

Apr. 10, 1912.

546. Grasshopper Sparrow 5

325. Turkey Vulture

759b. Hermit Thrush 2

11, 546. Grasshopper Sparrow 1

420. Nighthawk 3

375. Great Horned Owl 1

417. Whip-poor-will 1

From the 11th through Apr. 20th the winds prevailed in the north. The few arrivals reported, either from Adams and Champaign, were irregular. Birds did not increase in numbers at any time to suggest a movement. The following is a general list of first arrivals from the 12th to the 13th during the period of north winds.

Adams Co.

Champaign Co.

Apr. 11, 613. Barn Swallow 2

Apr. 12, 751. Blue-gray Gnat-
                   catcher 1

Adams Co.

Apr. 14, 655. Myrtle Warbler 4

Champaign Co.

Apr. 13, 608. Scarlet Tanager 1

14, 675. Water Thrush 1

15, 536. Lapland Longspur 14

201. Little Green Heron

1

18, 6. Pied-billed Grebe

1

19, 202. Black-crowned

Night Heron 1

On Apr. 20 and 21 there was a sudden shift of winds to the south decidedly stronger in Champaign than Adams Co.

Adams Co.

Apr. 20, 671. Pine Warbler 1

Champaign Co.

Apr. 21, 758a. Olive-backed

Thrush 1

21, 200. Little Blue Heron 2

721. House Wren 1

194. Great Blue Heron 1

672. Palm Warbler 2

671. Pine Warbler 1

636. Black & White

Warbler 2

613. Barn Swallow 3

444. Kingbird 1

423. Chimney Swift 2

255. Yellow Legs 2

Excepting the 23rd mild south winds blew until the 29th. Each morning brot its few new arrivals. The Migrations were general and gradual.

Adams Co.

Champaign Co.

Apr. 24, 595. Rose-breasted Grosbeak	1	Apr. 24, 140. Blue-winged	
		Teal	1
25, 721. House Wren	13	23, 704. Catbird	1
604. Dickcissel	2	757. Grey-cheeked	
		Thrush	2
26, 202. Black-crowned Night			
heron	1	25, 674. Ovenbird	1
190. Bittern	1	667. Black-throated	
		Green Warbler	3
704. Catbird	5	637. Prothonotary	
		Warbler	1
583. Lincoln's Sparrow	2	529. Goldfinch	2
444. Kingbird	3	417. Whip-poor-will	
			2
27, North wind		26, 681. Northern Yellow	
		Throat	1
28, 552. Lark Sparrow	2	616. Bank Swallow	2
452. Great-crested Fly-			
catcher	5	27, 629. Blue-headed	
		Vireo	1
28, 755. Wood thrush	2	256. Solitary Sand-	
		piper	1
627. Warbling Vireo	1		
624. Red-eyed Vireo	2		
636. Black and White Warbler	2		

XV. THE BIRD MIGRATION ON MAY 1ST, 2ND AND 3RD.

May opened and continued with south winds thru the 11th in

Adams and the 12th in Champaign Co. The 11th was probably the biggest bird day of the season in Adams while the 12th holds that distinction for Champaign.

Adams Co.

Champaign Co.

May 1, 647. Tennessee Warbler 3

May 1, 595. Rose-breasted Gros-
beak

657. Magnolia Warbler 4

672. Palm Warbler 4

685. Wilson's Warbler 2

758a. Olive-backed Thrush 5

May 1, 1912.

A general south wind blows throughout the Mississippi River Valley. Champaign was scarcely affected because no general south wind occurred in the states south on the hours previous to the general wind shift. South of Adams was a stronger and more general south

May 2, 1912.

There is a general south wind south of Illinois. Champaign is affected by southeast winds while Adams was effected by a northeast wind which checked the Adams Co. migration, making a strong contrast between the May 2 records.

Adams Co. had a cross wind from the northeast while Champaign got a direct south wind.

Adams Co.

Champaign Co.

May 2, 461. Wood Pewee	15	May 2, 452. Great Crested Flycatcher	3
629. Blue-headed Vireo	5	459. Olive-sided Flycatcher	1
652. Yellow Warbler	2	461. Wood Pewee	2
659. Chestnut-sided Warbler	10	467. Least Flycatcher	2

Adams Co.

May 2, 756. Wilson's Thrush 2

Champaign Co.

May 2, 604. Dickcissel 1

628. Yellow-throated Vireo 1

642. Golden-winged Warbler 2

645. Nashville Warbler 1

650. Cape May Warbler 1

654. Black-throated Blue
Warbler 6

652. Yellow Warbler 1

657. Magnolia Warbler 5

659. Chestnut-sided Warbler 1

687. American Redstart 4

756. Wilson's Thrush 1

May 3, 1912.

General south winds in Mississippi Valley, causing general migrations.

Adams Co.		Champaign Co.	
May 3,	506. Orchard Oriole	5 May 3,	465. Acadian Flycatcher
	667. Black-throated		494. Bobolink
	Green Warbler 2		583. Lincoln's Sparrow
	675. Water Thrush 2		598. Indigo Bunting
	677. Kentucky Warbler 1		610. Summer Tanager
			624. Red-eyed Vireo
			647. Tennessee Warbler
			661. Black-poll Warbler
			679. Mourning Warbler
4,	481. Northern Yellow Throat 1		
	554. White-crowned Sparrow 1	4,	420. Nighthawk
	598. Indigo Bunting	5	641. Blue-winged Warbler
	628. Yellow-throated Vireo 60		677. Kentucky Warbler
	631. White-eyed Vireo	24	683. Yellow-breasted Chat
5,	399. White-headed Wood-		
	pecker		1
	467. Least Flycatcher	12	5, 660. Bay-breasted Warbler
	494. Bobolink	15	756a. Willow Thrush
	608. Scarlet Tanager	10	
	667. Black-throated Warbler	7	
	674. Ovenbird	12	
	687. American Redstart	10	6, 627. Warbling Vireo
6,	648. Parula Warbler	1	6, 648. Parula Warbler
	757. Grey-cheeked Thrush	30	
9,	626. Philadelphia Vireo	1	
10,	660. Bay-breasted Warbler	2	
11,	661. Black-poll Warbler	30	

Adams Co.

Champaign Co.

May 11, 679. Mourning Warbler 5	May 11, 463. Yellow-bellied Fly-	
459. Olive-sided Fly-	catcher	2
catcher	5	
463. Yellow-bellied Fly-		
catcher	20	
466a. Traill's Flycatcher	4	
637. Prothonotary Warbler	4	
16, 428. Ruby-throated Humming-	12, 631. White-eyed Vireo	2
bird	Great increase	

XVI. SUMMARY FIRST ARRIVALS, 1912.

Comparison of the Complete List of First Arrivals in Adams County and Champaign County for 1912.

In order to give a comparison of the first arrivals, in each County and the first arrivals common to both counties on the same day I make the following table:

Adams Co.

6. Pied-billed Grebe	132. Mallard
325. Turkey Vulture	420. Nighthawk
423. Chimney Swift	452. Great-crested Flycatcher
540. Vesper Sparrow	542a. Savanna Sparrow
552. Lark Sparrow	560. Chipping Sparrow
583. Lincoln's Sparrow	595. Rose-breasted Grosbeak
604. Dickcissel	611. Purple Martin
612. Cliff Swallow	613. Barn Swallow
616. Bank Swallow	622. Migrant Shrike
624. Red-eyed Vireo	627. Warbling Vireo
637. Prothonotary Warbler	647. Tennessee Warbler
657. Magnolia Warbler	671. Pine Warbler

Adams Co.

685. Wilson's Warbler

749. Ruby-crowned Kinglet

Champaign Co.

272. Killdeer

390. Kingfisher

444. Kingbird

467. Least Flycatcher

558. White-throated Sparrow

598. Indigo Bunting

636. Black and White Warbler

655. Myrtle Warbler

667. Black-throated Green Warbler

681. Northern Yellow Throat

704. Catbird

721. House Wren

758a. Olive-backed Thrush

722. Winter Wren

755. Wood Thrush

331. Marsh Hawk

406. Red-headed Woodpecker

456. Phoebe

517. Purple Finch

584. Swamp Sparrow

628. Yellow-throated Vireo

654. Black-throated Blue Warbler

661. Black-poll Warbler

672. Palm Warbler

687. American Redstart

705. Brown Thrasher

757. Grey-cheeked Thrush

759b. Hermit Thrush

Same Day.

172. Canada Goose

461. Wood Pewee

495. Cowbird

501. Meadowlark

511b. Bronzed Grackle

563. Field Sparrow

587. Towhee

659. Chestnut-sided Warbler

756. Wilson's Thrush

377. Red-tailed Hawk

463. Yellow-bellied Flycatcher

498. Red-winged Blackbird

506. Orchard Oriole

546. Grasshopper Sparrow

585. Fox Sparrow

652. Yellow Warbler

677. Kentucky Warbler

766. Bluebird

XVII. CONCLUSIONS FOR RECORDS, 1912.

Taking a survey of the first arrival of 73 of the most nearly

related records, all common birds, we find a very noticeable condition. Adams Co. reports 28 first arrivals, Champaign Co. reports 28 first, while the balance 18 arrived the same day in both Counties.

In studying more closely these conditions I find that those birds reported on the same day from both counties came in largely on our two biggest storms, the storm of Mch. 17 and that of May 2nd.

The general movements of the birds may give us a better basis for conclusions as compared with similar movements and conditions in 1911. However, the firsts which are reported from Champaign and Adams Co. vary but a day or two at the most, and the number 28 from Adams Co. and 28 from Champaign Co. shows that the birds have arrived at practically the same time in both Counties, for had any law caused the birds to arrive first in numbers in either County the general average could not be so close.

The Bluebird, Meadowlark and Bronzed Grackle, Cowbird, Towhee, Canada Goose, Field Sparrow and Red-tailed Hawk appeared in numbers Mch. 17 in both counties and were reported regularly.

The Flicker was reported regularly from both counties Mch. 6th.

The Red-headed Woodpecker movement is the same in both counties being Apr. 25th.

The Chimney Swift movement is decidedly earlier in Adams than in Champaign.

The Phoebe and Kingfisher were reported on Mch. 17th in Champaign also in Adams, my record was a day later however. Records occur regularly from this time. The Winter Wren records are regular in both counties, from Mch. 24th.

The Kingbird movement seems one day earlier in Adams Co.

The Yellow-bellied Flycatcher appeared the same day in quantities May 11.

The Rose-breasted Grosbeak is many days earlier in Adams than in Champaign Co.

The Orchard Oriole appeared in both counties on the same day, May 6.

The Purple Martins appeared in movement earlier in Adams than in Champaign.

The White-throated Sparrow is reported in movement one day earlier in Champaign than in Adams.

The Vesper Sparrow was reported regularly in both counties after Apr. 7th.

The Dickcissel is reported irregularly from Adams until May 2 when 35 were seen. This movement gave a first record to Champaign which reacted one day later in quantities. The movement is one day late in Champaign Co.

The Lark Sparrow movement was the same, May 2 in both counties.

Likewise, the Black and White Warbler, is reported irregularly until May 1 which is the date in both counties for regular daily records in numbers.

The Black-throated Green Warbler appeared as a movement one day before in Champaign.

The Kentucky Warbler appeared on same day, May 4.

Champaign Co. reports the Palm Warbler thru April until the 26. On May 1 the bird is first reported regularly in both counties.

Catbirds were seen in quantities earlier in Adams. Irregularly in Champaign Co. before Adams.

The Brown Thrasher is reported earlier in Champaign Co., however the appearance of birds in quantities begins in both counties on Apr. 11th.

The Hermit Thrush seems to be reported in movement earlier in Champaign Co.

The Olive-breasted Thrush is reported irregularly until May 1, which movement made it common in both counties.

The Wood Thrush is reported first in Adams, however, the wind which first brot birds to Adams in number gave Champaign Co. its first record.

Following is a bird chart for the individual arrival of the common birds in relation to time and number in both Adams and Champaign Co.

Bird Study Chart.

6. Pied-billed Grebe.

Apr.	5 - 17
Adams	4
Champaign	1

172. Canada Goose.

Mch.	17 - 18
Adams	75
Champaign	50

325. Turkey Vulture.

Mch.	23 - 24
Adams	2 1
Champaign	

377. Red-tailed Hawk.

Mch.	17
Adams	23
Champaign	1

406. Red-headed Woodpecker.

Mch.	2	Apr. 2 - 4 - 25
Adams		3 15
Champaign	1	3 2

420. Nighthawk.

Apr.	11 - 28	May 4
Adams	2 1	
Champaign		1

132. Mallard Duck.

Mch.	17 - 18
Adams	400
Champaign	132

273. Killdeer.

Mch.	17 - 18 - 19 - 24
Adams	3
Champaign	1 2 1

331. Marsh Hawk.

Mch.	17 - 23 - 24
Adams	1 1
Champaign	1

390. Kingfisher.

Mch.	17 - 18
Adams	2
Champaign	1 1

417. Whip-poor-will.

Apr.	11 - 26 - 27
Adams	1 6
Champaign	2 1

423. Chimney Swift.

Apr.	5 - 8 - 21
Adams	50 50 150
Champaign	2

444. Kingbird.

Apr.	26	-	27	-	28	-	29	-	30
Adams			4		15		8		10
Champaign	3		1		1				

456. Phoebe.

Mch.	17	-	18	-	19
Adams			3		1
Champaign	3		1		1

463. Yellow-bellied Flycatcher.

May	11	-	12
Adams	20		10
Champaign	2		2

495. Cowbird.

Mch.	17	-	18
Adams	40		10
Champaign	25		6

501. Meadowlark.

Mch.	17	-	18
Adams	15		5
Champaign	29		40

511b. Bronzed Grackle.

Mch.	17	-	18
Adams	150		20
Champaign	188		33

540. Vesper Sparrow.

Mch.	26	Apr.	4- 7
Adams	1		2
Champaign		1	2

546. Grasshopper Sparrow.

Apr.	11	-	26	-	27	-	28
Adams	5		1		2		15
Champaign	1						

558. White-throated Sparrow.

Feb.	12	-	17	-	18
Adams					3
Champaign	15		5		3

563. Field Sparrow.

Mch.	18	-	23	-	27

452. Great-crested Flycatcher.

Apr.	28	May	2	-	4
Adams	5		6		
Champaign			3		2

461. Wood Pewee.

May	2	-	3
Adams	15		20
Champaign	2		1

467. Least Flycatcher.

May	2	-	3	-	4	-	5	-	6
Adams							12		8
Champaign	2		3		2				

498. Red-winged Blackbird.

Mch.	17	-	18
Adams	40		5
Champaign	100		33

506. Orchard Oriole.

May	3	-	4
Adams	5		10
Champaign	1		2

517. Purple Finch.

Feb.	16	Mch.	10	-	16	-	17
Adams			1		1		2
Champaign	2						8

542a. Savanna Sparrow.

Mch.	17	-	19
Adams	2		
Champaign			4

552. Lark Sparrow.

Apr.	28	May	2
Adams	2		4
Champaign			10

560. Chipping Sparrow.

Mch.	24	-	26	-	30	-	31
Adams	3		2		12		60
Champaign							

Adams		12	20
Champaign	1		1

583. Lincoln's Sparrow.

Apr.	26 - 27	May	3
Adams	2 1		
Champaign			1

585. Fox Sparrow.

Mch.	17
Adams	45
Champaign	18

595. Rose-breasted Grosbeak.

Apr.	24 - 25	May	1
Adams	1 10		15
Champaign			1

604. Dickcissel.

Apr.	25 - 26	May	1 - 2
Adams	2 1	1	35
Champaign			1

612. Cliff Swallow.

Mch.	30 - 31
Adams	35 10
Champaign	

616. Bank Swallow.

Apr.	5 - 12 - 13 - 26
Adams	2 15 25
Champaign	2

624. Red-eyed Vireo.

Apr.	28	May	2 - 3
Adams	2	1	5
Champaign			2

628. Yellow-throated Vireo.

May	2 - 4
Adams	50
Champaign	1

636. Black and White Warbler.

Apr.	21 - 28	May	1
Adams	2		15
Champaign	2 1		1

584. Swamp Sparrow.

Mch.	17 - 18 - 19
Adams	5
Champaign	3 1

587. Towhee.

Mch.	17 - 18
Adams	5 1
Champaign	11 8

598. Indigo Bunting.

May	3 - 4
Adams	15
Champaign	1 2

611. Purple Martin.

Apr.	4 - 7 - 23
Adams	9 20 20
Champaign	2 5

613. Barn Swallow.

Apr.	15 - 21
Adams	2
Champaign	5

622. Migrant Shrike.

Mch.	24 - 30
Adams	1 4
Champaign	1

627. Warbling Vireo.

Apr.	28 - 30
Adams	1 1
Champaign	

629. Blue-headed Vireo.

Apr.	27	May	2 - 3
Adams		5	6
Champaign	1		5

637. Prothonotary Warbler.

May	11 - 12
Adams	4 1
Champaign	1

641. Tennessee Warbler.

May	1 - 3
Adams	3
Champaign	2

654. Black-throated Blue Warbler.

May	2 - 6
Adams	7
Champaign	6

657. Magnolia Warbler.

May	1 - 2 - 5
Adams	4 3
Champaign	5 5

661. Black-poll Warbler.

May	3 - 6
Adams	30
Champaign	4 3

671. Pine Warbler.

Apr.	20 - 21 - 25 - 30
Adams	1 2
Champaign	1 4

677. Kentucky Warbler.

May	4
Adams	1
Champaign	1

685. Wilson's Warbler.

May	1 - 4 - 5
Adams	2
Champaign	1 2

704. Catbird.

Apr.	23 - 26	May	1 - 3
Adams	5		8 30
Champaign	1		1 3

721. House Wren.

Apr.	21 - 26
Adams	15 20
Champaign	1

749. Ruby-crowned Kinglet.

Apr.	4 - 7 - 9

652. Yellow Warbler.

May	2 - 3
Adams	2 5
Champaign	1 2

655. Myrtle Warbler.

Apr.	12 - 14 - 15 - 20 - 21
Adams	4 2 24
Champaign	8 5 1 2

659. Chestnut-sided Warbler.

May	2 - 3 - 4
Adams	10
Champaign	1 1 2

667. Black-throated Green Warbler.

May	2 - 3 - 5
Adams	2 3
Champaign	6 5 3

672. Palm Warbler.

Apr.	21 - 22	May	1 - 2
Adams			4 3
Champaign	2 3		5 21

681. Northern Yellow Throat.

Apr.	26	May	2 - 4
Adams			1
Champaign	1		4 1

687. American Redstart.

May	2 - 3 - 4 - 5
Adams	10
Champaign	4 5 1 3

705. Brown Thrasher.

Mch.	31	Apr.	1 - 8 - 9 - 11
Adams			1 1 25
Champaign	1		1 2 1 3

722. Winter Wren.

Jan.	14	Feb.	11
Adams	2		3
Champaign			

Adams	2	100
Champaign		1

755. Woodthrush.

May	1	2	3	4
Adams	30	30	30	30
Champaign	1	3	5	

756. Wilson's Thrush.

May	2	3	4	5
Adams	2		1	3
Champaign	1	1	1	1

758a Olive-backed Thrush.

Apr.	21	May	1
Adams			5
Champaign	1		1

759b. Hermit Thrush.

Apr.	3	4	6	10	11
Adams					2
Champaign	1	2	1	4	1

757. Grey-cheeked Thrush.

Apr.	24	25	May	1	6
Adams					30
Champaign				1	

766. Bluebird.

Mch.	17	18
Adams	5	2
Champaign	5	4

XVIII. GENERAL SUMMARY.

From the above data we will readily notice that the 1912 bird movements arrived on the same days or that the majority of those which arrived unequally arrived in Adams Co. one day earlier than in Champaign Co.

A heavy movement arrived the same day in both counties on March 17, 1912. The low approached from the west at 40 miles an hour and with the highs located as they were one directly east and one to the southwest, the general wind movement was from the south or southeast toward the low north of Illinois.

Thus it seems that on days when the same birds are reported from both Counties that the approach of the area of low pressure is so located as to cause a general southeast wind which effects both counties about equally in the matter of time and velocity.

This condition being so, an arrangement of highs and lows which would cause a general southwind to arrive in Adams Co. from 8 to 24 hours earlier than in Champaign Co. should cause the arrival of birds 8 to 24 hours earlier in Adams Co.

We have a number of very noticeable evidences of the first condition. For the second I refer notice to the meteorological condi-

tions on April 10 - 11, 1912. On the 10th Champaign Co. was still under the influence of the low which passed thru the New England States. The winds directly south of eastern Illinois and Indiana were varied from southwest to northeast.

April 10, 1912.

Wind, Adams Co., south; Champaign Co., northwest. General winds south of Adams Co., south and southeast. General winds south of Champaign Co., north and northeast.

Adams Co. at the same time was beginning to be affected by an area of low pressure approaching from the west. Adams Co. was soon within the influence of this western area of low pressure, with South and Southeast winds prevailing not only in Adams County but thru Missouri which is directly south of Adams Co. and from which Adams Co. draws her bird visitors.

The wind not being extremely general and the isobars far apart-indicating moderate winds, a general movement could not be expected, yet a few first records were reported late on the 10th and on the 11th in Adams Co. somewhat earlier than in Champaign Co.

On the Apr. 11th a high passed thru northern Wisconsin yet the general south winds prevailed throughout Adams Co. The difference in wind shifts between the two counties was about 16 or 18 hours.

April 11, 1912. .

This gave a second day of general south wind, of little velocity however, to Adams Co. Champaign Co. got its first south wind with practically no wind in the states south, so practically no migration was noticed in Champaign while Adams had new arrivals, not many however, for the winds were very light.

Resulting Records.

Both counties report the Grasshopper Sparrow, but Adams got the benefits of a general south wind in Missouri which brought the Hermit Thrush, Whip-poor-will and Nighthawk, while the wind south of eastern Illinois and Indiana were varied and choppy and only the one new record was reported in Champaign Co.

Thus the position and approach of areas of high and low pressure make a great deal of difference in the records to be expected. A south wind in both Counties does not insure new arrivals or the same arrivals on the same day.

The condition seen on April 10th and 11th shows how the county from which Adams Co. drew its birds had a light but general south wind which no doubt moved some birds towards the northward.

Champaign Co. was affected by the same wind shortly after Adams Co. yet the migration was not so noticeable either in varieties or numbers because the wind in states south was varied.

Thus we will quickly notice that the 1912 bird movement arrived on the same days, or the majority of those which arrived unequally, arrived in Adams Co. one day earlier than in Champaign Co.

Heavy movements arrived in both counties the same day on March 17, 1912. The low approached from the west at 40 miles an hour and with the highs located as they were one directly east on the Atlantic one west in S. Dak. the wind was from S. E. to N. W. and the movement of birds from the south came in in both counties on this wind movement with practically no difference in time.

The next largest numbers of common arrivals occurred in both Counties May 2.

On the night of May 1 a high pressure passed south of Illinois

and passed on to the Atlantic thru the Carolinas. Low pressures advanced from Arizona and Colorado affecting Illinois with isobars which brought southeast and coast winds which affected Champaign and Adams Co. with winds of practically the same velocity and winds which arrived at the same time. Thus the onward movement of birds from the southward to the northland arrived in both counties at approximately the same time, bringing similar birds to both counties the same day.

Notice the weather maps before the large waves of March 17 and May 2. A strong general south wind prevailed throughout the whole south country. It simply had to stir and move the birds.

Noticing all of the big movements of the last three years, we find that all unusual bird waves were correlated with heavy general winds south of Illinois and thru the 40 th degree. I refer to the following great movements of May 2, 11, 29, 1910; May 13, 1911; Mch. 17, May 2, 1912; Mch. 9, 1913.

In each of these movements from 6 to 25 birds arrived in quantities. At no other time did we have large migrations nor did we have an arrangement of highs and lows which produced general south winds throughout Kentucky, Tennessee, Arkansas, Missouri and Illinois.

If we notice the first arrivals, we find that with the exception of a few birds; viz, the Swift, Swallows, Ducks and water birds, the arrivals of birds are practically identical in Champaign and Adams Co. This may seem strange for Quincy is about 200 miles west of Champaign or a difference of 6 hours to a 30 mile cyclone movement.

If we do find a difference, excepting the stray birds, the difference is never more than 24 hours in favor of Adams Co. and at that time the arrangement of high and low areas of pressure, force south winds thru Adams Co. some hours before Champaign Co.

I repeat the statement that birds generally arrive during the same day or night in both counties.

A great many approaching cyclones affect both counties with isobars which practically cause the same wind reactions simultaneously in both counties. A wind which blows from the south thru Adams Co. during the afternoon and early evening is sure to affect Champaign Co. before the night is over even tho it travels but 30 miles an hour. Naturally both counties will have first arrivals, Adams having a greater number of each variety because of a longer period of wind movement.

Thus one should generally expect bird records in both counties on the same day. Cases where Adams has a general movement one day early are indeed the exceptions and have not often been encountered during the time covered by this thesis. A general movement being one day earlier in Adams than in Champaign Co. is practically impossible unless the heavy south winds began to affect Adams Co. in the early morning hours and Champaign would not be affected until later in the day. Thus Adams would get a night migrations while Champaign Co. would probably not be affected until the following night. The migrations from the middle of March thru May will justify these conclusions, but the January, February and early March birds, which arrive as strays, give records from which it is hard to generalize. Such movements as that of Mch. 17, 1912 and Mch. 9, 1913, will satisfy these general conclusions but January, February and early March are months of irregularly changing wind forces. A one or two day south wind may blow in a few stray Goldfinches, a Song Sparrow, a Flicker, a Fox Sparrow or Bluebird, while the next days cold northern wind may drive these birds into cover only to bring in a silent flock

of Cedar Waxwings.

Comparing the stray records during the early months in Champaign and Adams Co. we will find more new records and earlier records in Adams Co.

This I believe is due to several things. First, the splendid woodland cover of the river bottoms gives sufficient cover for the birds.

After the river is once open, the atmospheric changes are not so severe over the water as elsewhere. Naturally, the water birds follow the open water and the Mississippi opens earlier than the still waters near Champaign.

Thus many stray birds, not involving general movements, wander farther and farther to the north before each warm irregular south wing only to be checked and held by unfavorable north winds.

The Chimney Swift in particular arrives from 10 days to two weeks earlier in Adams than in Champaign Co. The Swift cannot migrate beyond the realm of flying insect life. This insect life appears over the huge river basin earlier, I believe, than over the plains because of the less violent atmospheric changes over the Mississippi River. Thus the Swallows and the Swift can support themselves along the river basins when they could not travel over the prairie areas. Thus one might be led to believe that it was food that causes these migrations. No! not necessarily. These irregular arrivals will not migrate to places where food does not abound, but they will stay in a situation of bountiful food supply while the north winds blow, only to desert the place and travel on northward to a land of uncertainty on the crest of a short lived south wind.

In the fall of 1911, thousands of Robins gathered in the Mississippi bottom lands feeding throughout the lowlands. Cold north

winds drove them southward. A week of south winds in late December brought thousands of these birds back north. It surely was not the cockle burrs and seeds of the northland that caused these flocks of Robins, a few Bluebirds and even Meadowlarks and Flickers to fly north. A sudden cold snap appeared and the birds were blown hither and thither on changeable winds. They were forced to live on frozen rotten apples etc. North winds continued, yet the birds did not desert. The north trip had begun and they stayed until they could travel farther. The diet of rotten apples certainly did not hold them in this locality. A big undefinable "something" did, however.

We have Goldfinches which stay throughout the winter feeding on the weed seeds, yet the migration in clouds by these little fellows is late in May after weed seed time and before the thistle and milkweed time.

The fall migrants begin to appear almost before the last spring migrants have passed. The Redstart appears in July. His diet is of worms and larvae. His warbler cousins the Myrtle, Magnolia, Blackpoll are still up north doing good service in the forests. It can't be lack of food that brings him, yet during July when ever a high approaches from the northwest and an area of low pressure is south of us causing winds to blow from the north, down come the Redstart and Yellow Warbler towards the southland leaving a well stocked country behind, for their cousins.

The food supply may cause the irregular migrations occasionally, especially of the roving bands of birds such as the Waxwings but the cause of the general movement is more deeply seated, it would seem. Argue as one may, he cannot dispute the fact that any general appearances of movement in the spring time is only after a general south

wind, while the fall movements appear under reversed conditions and the birds appear food or no food.

And do birds migrate along the rivers, then spread over the country by following tributary streams or do they migrate in waves, valley wide? I believe the data on comparative records shown on the dates May 2, 11, 29, 1910, Mch. 17, May 2, 1912 and Mch. 9, 1913 will show that the movement is general in one huge valley wide wave, the appearance being controlled by meteorological conditions as shown by the positions of the areas of high and low pressure.

Were the first alternative correct, birds could not possible arrive in Champaign for several days after their arrival in Adams Co. for the winding river course up the Illinois, along the Sangamon River then over to Champaign Co. would delay their appearance at least 24 hours. Records show the birds present in both locations the same day.

As to the inherited migratory path, there is little doubt of the existence of such a condition, altho a study along the 40th degree would scarcely show this very well. While in Minnesota at school I lived close to the Mississippi River and I saw Bobolinks and Yellow-headed Blackbirds in great numbers, yet at Quincy the Bobolink is seldom seen. The path of migration is not along the Mississippi Illinois Rivers, nor thru Champaign Co. any of which places might seem to be in the natural route, so the path must be thru another part of the country.

XIX. CONCLUSIONS.

In summing up the data I find that irregular arrivals appearing as they do in ones or twos are evidently strays from a general wave which is controlled by the areas of high and low pressure. An ad-

justment of highs and lows causing a general wind from south to north (in spring) is sure to cause a large movement of this whole bird wave and other birds which wintered farther south will move northward to the place just vacated by the first large wave.

These waves are river valley wide, extending for several hundreds of miles across country. The wave may be a trifle irregular at times but the appearance depends upon the relative appearance of the general wind movements. Therefore, I have concluded that a person knowing the sequence of bird arrivals can fortell the arrival of birds with a sense of certainty if he knows and studies his weather maps during the big migration seasons. Except in less common cases Champaign Co. may expect the same general bird movements on the same day as Adams Co.

I maintain that birds do not move irregularly but may be expected at a definite time each year. The time of appearance is governed largely by the distances from the location of the winter home.

Just what causes migrations has yet to be determined, certainly we cannot give food nor cold weather as the cause which influences birds to leave the northlands at the season when insects are most common and the seed eaters to leave before their harvest of food is at its height.

Cold weather cannot be the cause; for birds migrate long before the arrival of cold spells.

I shall not venture to assign the immediate cause of migration, but a study of the forgoing data convinces me that birds migrate in huge valley wide flocks or waves.

A certain series of birds seem to travel together and usually appear on the same wind movement.

Consequently, if we find that any variety has appeared on the

crest of a general wind movement we may naturally expect the others, which generally travel as its companions, and finally, Champaign Co. may be expected to report arrivals on the same day as Adams County for the migratory bird waves are certainly valley wide in extent.

The End.

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