

## Report on the Spring Migration of 1913

COMPILED BY WITMER STONE

Only thirty-eight schedules were received for the spring of 1913. The increasing importance of this series of migration records makes it imperative that the observations should be kept up and that the corps of observers should be increased. Arrangements have been made, by which inquiries will be answered promptly and schedules furnished to any one applying to Dr. Witmer Stone, Academy of Natural Sciences, Logan Square, Philadelphia.

The observers for 1913 were the following:

### *New Jersey.*

Cape May, H. Walker Hand.  
Atlantic City, Mrs. Norma S. Cromie.  
Vineland, Mrs. Alice K. Prince.  
Downtown, Wm. W. Fair.  
Yardville, Rachel E. Allinson.  
Bordentown, Minnie V. Flynn.  
Three miles S. E. of Trenton, Richard M. Abbott.  
Beverly, J. Fletcher Street.  
Bernardsville, J. D. Kuser.  
Rancocas, Frances B. Stokes and Emily Haines.  
Moorestown, Anna A. Mickle.  
Moorestown, Agnes M. Wierman.  
Camden, Julian K. Potter.

### *Pennsylvania.*

Concordville, Katherine R. and Elizabeth P. Styer.  
West Chester, Isaac G. Roberts.  
West Chester, Robt. P. Sharples.  
Westtown, E. L. Nicholson.

Westtown, E. M. Webster.  
Swarthmore, H. M. Harrower.  
Swarthmore, Samuel C. Palmer.  
Addingham, D. E. Culver.  
Lansdowne, John D. Carter.  
Media, Lydia G. Allen.  
Ardmore, Wm. L. Baily.  
Haverford, Wm. J. Serrill.  
Wayne, Mary K. Baker.  
Wayne, Leonard S. Pearson.  
Rosemont, Saml. Scoville, Jr.  
Bryn Mawr, Emily H. Thomas.  
West Philadelphia, Thomas R. Hill.  
Norwood, Jesse E. Packer.  
Germantown, Arthur C. Emlen.  
Holmesburg, Henry W. Fowler.  
Frankford, Richard F. Miller.  
Newtown, Alexander Patman.  
Newtown, Cornelia Hicks.  
Newtown, Nancy Emhardt.  
Melrose, Saml. H. Barker.  
Doylestown, Russell Mason.  
Easton, Edw. J. F. Marx.  
Lopez, Otto Behr.

The weather during the first half of February, 1913, was cold, but the last two weeks were for the most part mild, the temperature reaching its maximum on the 20th, on which date Purple Grackles, Robins and Killdeers were reported.

Early March was cold, with rising temperature March 12-15 accompanied by rain. The highest temperature of the month was registered on March 21, following a heavy rain, marked by arrivals of Phoebes and Field Sparrows. A considerable migration took place on the 28th and 29th, clear days following rain—Kingfishers, Grackles, Vesper Sparrows and Chipping Sparrows.

The first half of April was generally rainy, clearing on the 17th, with no more rain until the 27th. There was a marked

migratory movement on the 18th and 19th and another on the 25th and 26th and on the 30th, which was a clear day, following three days of rain.

The first of these waves brought the Towhee, Tree Swallow, Myrtle Warbler and Brown Thrasher; the second the Chimney Swift, Black and White Warbler, Yellow-throat and House Wren; and the last the Spotted Sandpiper, Whip-poor-will, Ovenbird, Catbird and Wood Thrush.

May was clear until the 13th, with an enormous migratory movement on the 3d and 4th.

The spring was noteworthy for the great number of rarer warblers observed, notably the Cape May, Bay-breasted and Wilson's.

The autumn of 1912 was characterized by the great abundance of Red-breasted Nuthatches, which remained through the winter and well into the spring at a number of stations. In the autumn of 1913 came an unusual influx of Black-capped Chickadees.

A table similar to that prepared last year is appended showing the number of days earlier (+) or later (—), by which the 1913 bulk-arrival dates for the Philadelphia district differed from the average.

Purple Grackle . . . . .	Feb. 28	+	7
Robin . . . . .	Mar. 1	+	9
Fox Sparrow . . . . .	" 7	+	12
Red-winged Blackbird . . . . .	" 9	+	6
Flicker . . . . .	" 14	+	1
Phoebe . . . . .	" 21		0
Cowbird . . . . .	" 24	—	1
Kingfisher . . . . .	" 29		0
Vesper Sparrow. . . . .	" 30	+	2
Chipping Sparrow . . . . .	" 31	+	2
Sapsucker . . . . .	Apr. 7	+	3
Hermit Thrush . . . . .	" 11	—	4
Ruby-crowned Kinglet . . . . .	" 14	+	9
Yellow Palm Warbler . . . . .	" 17	+	4
Towhee . . . . .	" 19	+	1
Barn Swallow . . . . .	" 22	+	3

Chimney Swift . . . . .	" 23	0
Brown Thrasher . . . . .	" 23	+ 3
House Wren . . . . .	" 26	+ 2
Black and White Warbler . . . . .	" 26	+ 2
Spotted Sandpiper . . . . .	" 27	- 3
Maryland Yellow-throat . . . . .	" 28	+ 2
Grasshopper Sparrow . . . . .	" 29	- 4
Yellow Warbler . . . . .	" 30	+ 2
Catbird . . . . .	" 30	0
Oven-bird . . . . .	" 30	0
Wood Thrush . . . . .	" 30	+ 2
Redstart . . . . .	May 4	0
Black-throated Blue Warbler . . . . .	" 4	0
Parula Warbler . . . . .	" 4	0
Crested Flycatcher . . . . .	" 4	0
Kingbird . . . . .	" 5	+ 1
Baltimore Oriole . . . . .	" 5	0
Scarlet Tanager . . . . .	" 6	+ 2
Blue-winged Warbler . . . . .	" 6	+ 3
Chestnut-sided Warbler . . . . .	" 7	+ 2
Red-eyed Vireo . . . . .	" 8	+ 3
Chat . . . . .	" 8	+ 4
Rose-breasted Grosbeak . . . . .	" 8	+ 3
Indigobird . . . . .	" 8	+ 2
Magnolia Warbler . . . . .	" 8	- 2
Bobolink. . . . .	" 9	+ 4
Olive-backed Thrush . . . . .	" 9	+ 1
Hummingbird . . . . .	" 10	- 6
Wood Pewee . . . . .	" 11	- 5
Yellow-billed Cuckoo . . . . .	" 11	- 5
Blackpoll Warbler . . . . .	" 12	+ 5
Canada Warbler . . . . .	" 12	- 2

Horned Grebe, *Colymbus auritus* Westtown, April 5 (*Webster*).

Pied-billed Grebe, *Podilymbus podiceps*. Holmesburg, March 31 (*Miller*).

Loon, *Gavia immer*. Fish House, N. J., April 12-16 (*Potter*); Atlantic City, N. J., May 3 (*Cromie*).

Wilson's Petrel, *Oceanicus oceanites*. Delaware Bay below Ledge Light, June 5 (*Prince*).

Bonapart's Gull, *Larus philadelphia*. Delaware River at Chester, April 8, five; April 9, one; April 15, 16, numerous; and a few April 18 (*Carter*); Fish House, N. J., April 9-24 (*Potter*).

Laughing Gull, *Larus atricilla*. Delaware River at Chester, one, April 29 (*Carter*); mouth of Maurice River, N. J., August 22-23, 1912, several (*Prince*).

Black-backed Gull, *Larus marinus*. Atlantic City, N. J., January 5 (*Cromie*).

Common Tern, *Sterna hirundo*. Gloucester, N. J., Sept. 2, 1912 (*Potter*).

Black Tern, *Hydrochelidon nigra surinamensis*. Pensauken Creek, N. J., July 8-9 (*Miller*).

Merganser, *Mergus americanus*. Delaware River at Camden, N. J., Feb. 2-April 27 (*Potter*).

Red-breasted Merganser, *Mergus serrator*. Buckshutem, N. J., April 6 (*Prince*).

Black Duck, *Anas rubripes*. Swarthmore, April 17, three (*Harrower*); Buckshutem, N. J., July 25, 1912, flock of 7 (*Prince*).

Redhead, *Marila americana*. Fish House, N. J., March 30, four (*Potter*).

Scaup, *Marila marila*. Delaware River at Camden, N. J., March 16-May 4 (*Potter*); a pair seen in a little cove of Maurice River, N. J., May 30, 31, and June 5, nesting? (*Prince*).

Goldeneye, *Clangula americana*. Fish House, N. J., April 18, two seen (*Potter*).

Bufflehead, *Charitonetta albeola*. Buckshutem, N. J., pair shot, Nov. 28, 1912 (*Prince*).

Old Squaw, *Harelda hyemalis*. Tinicum, one shot April 5 (*Pearson*).

Ruddy Duck, *Erismatura jamaicensis*. Maurice River, N. J., Oct. 15, 1912; Delaware Bay, May 22 (*Prince*).

Canada Goose, *Branta c. canadensis*. Six over river at Chester, May 6 (*Carter*); Buckshutem Pond, N. J., over 30 left each day, flying down Maurice River and returning at night for two

weeks in November (*Prince*); Richmond, two on river May 4 (*Miller*).

Brant, *Branta bernicla glaucogaster*. Several at Buckshutem, N. J., for two weeks in November (*Prince*).

Bittern, *Botaurus lentiginosus*. Trenton, N. J., April 12 (*Abbott*); last seen at Buckshutem, N. J., Nov. 2, 1912, were present all summer (*Prince*); Bridesburg, May 22, and Pensauken, N. J., July 7 (*Miller*).

Least Bittern, *Ixobrychus exilis*. Bridesburg, May 19, three nests with eggs (*Miller*).

Great Blue Heron, *Ardea h. herodias*. Moorestown, N. J., March 9 (*Mickle*); Yardville, N. J., May 26 (*Allinson*); Atlantic City, N. J., Nov. 28, 1912, and Jan. 19. Counted over 400 on Grassy Bay, Aug. 31, 1912 (*Cromie*); Tinicum, Jan. 29, two (*Pearson*); first seen at Maurice River, N. J., June 10–July 16; last, October 4 (*Prince*); Wayne, Oct. 4–6, 1912, May 10 (*Baker*); Lester, January 29 (*Pearson*); Riverside, N. J., February 17–18 (*Street*).

Green Heron, *Butorides v. virescens*. Last seen 1912, Nov. 30, Camden, N. J. (*Potter*).

Clapper Rail, *Rallus c. crepitans*. Many at mouth of Maurice River, N. J., May 21 (*Prince*).

Florida Gallinule, *Gallinula galeata*. Richmond, Feb. 12 caught alive; also nest and 12 eggs at Bridesburg May 29 (*Miller*).

Coot, *Fulica americana*. Fish House, N. J., April 9–11 (*Potter*).

Woodcock, *Philohela minor*. Yardville, N. J., Jan. 18 (*Allinson*); Trenton, N. J., March 29 (*Abbott*); Buckshutem, N. J., Nov. 2 (*Prince*); Haverford, May 4 (*Serrill*).

Wilson's Snipe, *Gallinago delicata*. Addingham, April 19 (*Culver*); Tinicum, April 5, Ocean City, N. J., April 11 and Wayne, May 18 (*Pearson*); Buckshutem, March 9–11 (*Prince*); Aramingo, March 29 (*Miller*).

Least Sandpiper, *Pisobia minutilla*. Camden, N. J., May 15 and 30 (*Potter*); Atlantic City, N. J., May 30 (*Cromie*).

Yellow-legs, *Totanus melanoleucus*. Camden, N. J., April 6–May 25; Bernardsville, N. J., May 6 (*Kuser*); Atlantic City,

N. J., April 23 (*Cromie*); Pensauken, N. J., April 26; Tinicum, April 28, and Bridesburg, May 19 (*Miller*).

Upland Plover, *Bartramia longicauda*. Swarthmore, April 26 (*Palmer*); Doylestown, May 11, one (*Mason*).

Semipalmated Plover, *Aegialitis semipalmatus*. Camden, N. J., May 20–June 1 (*Potter*); Atlantic City, May 14 (*Cromie*).

Bobwhite, *Colinus v. virginianus*. Covey of 15 wintered at Yardville, N. J. (*Allinson*).

Mourning Dove, *Zenaidura macroura carolinensis*. Nest and eggs, Swarthmore, April 12 (*Harrower*); Buckshutem, N. J., all winter, a roost at Buckshutem Pond contained over 60 doves Sept. 8, 1912 (*Prince*); Haverford, Jan. 26 (*Serrill*).

Osprey, *Pandion haliaëtus carolinensis*. Arrived Maurice River, N. J., March 18, and began repairing old nest. Young leaving nest July 17 (*Prince*).

Barn Owl, *Aluco pratincola*. Gloucester, N. J., March 21 (*Potter*); Timber Creek, N. J., August 24, 1912 (*Potter*); Vine-land, N. J., Sept. 20 (*Prince*); Lansdowne, Feb. 4 (*Carter*); Tinicum, nest and six eggs, Feb. 22 (*Pearson*).

Long-eared Owl, *Asio wilsonianus*. Camden, N. J., Feb. 9 (*Potter*).

Great-horned Owl, *Bubo v. virginianus*. Fish House, N. J., April 24 (*Potter*); nest and eggs, Tuckahoe, N. J., April 10–20, 1906 (*R. T. Moore*).

Saw-whet Owl, *Nyctala acadica*. Frankford, Jan. 22 and Feb. 22 (*Miller*).

Kingfisher, *Ceryle a. alcyon*. Haverford, Feb. 9 (*Serrill*). Melrose, Jan. 7 (*Barker*).

Flicker, *Colaptes a. luteus*. Holmesburg, Jan. 24 and Feb. 28 (*Miller*).

Red-headed Woodpecker, *Melanerpes erythrocephalus*. Swarthmore, May 20 and 23 (*Palmer*); Norwood, March 15 (*Packer*).

Yellow-bellied Flycatcher, *Empidonax flaviventris*. Trenton, N. J., May 6 (*Abbott*).

Olive-sided Flycatcher, *Nuttallornis borealis*. Marple, one shot August 29 (*Culver*).

Horned Lark, *Otocoris a. alpestris*. Rosemont, February 16, six (*Scoville*); Easton, Oct. 26, 1912, March 17 (*Marx*).

Blue Jay, *Cyanocitta c. cristata*. Several wintered at Wayne (Pearson); and in New Jersey, but at most localities they were not recorded till spring; Walnut Hill, April 29 (Miller); West Chester, April 17 (Roberts); Easton, April 27 (Marx); Camden, N. J., April 22 (Potter).

Starling, *Sturnus vulgaris*. Abundant breeder all over northeast Philadelphia. Nest with young at Sandiford April 21, young on wing May 8 at Frankford (Miller); Wayne, scattered flocks of 5-20 also at Tinicum (Pearson); Doylestown, several pairs nested in 1912, and several wintered; common spring of 1913 with Grackles (Mason); Melrose, flock of 20-50 present for over a year (Barker); Paoli, May 18 (Baily); Swarthmore, February 8-15 and May 22 (Harrower); Yardville, N. J., flock Jan. 21, but not seen after spring opened (Allinson); more abundant every year at Atlantic City, N. J. (Cromie).

Bobolink, *Dolichonyx oryzivorus*. Arrived Moorestown, N. J., Aug. 28, 1912 (Mickle); two at Pensauken Creek, July 8 (Miller).

Purple Grackle, *Quiscalus q. quiscula*. Doylestown, Nov. 15, 21; Dec. 25, 29, 1912, and Jan. 12, 16 (Mason); Rosemont, Jan. 27 (Scoville); Downstown, N. J., January 2 (Fair); Easton, Jan. 1 (Marx).

Pine Siskin, *Spinus pinus*. Swarthmore, May 4, three (Harrower); Westtown, May 2 (Webster).

Purple Finch, *Carpodacus p. purpureus*. Swarthmore, April 17, 22 and 24 (Harrower); Easton, April 20 (Marx); Ardmore, April 18 (Baily); West Chester, April 25-May 3 (Roberts); Vineland, N. J., Oct. 16-May 1 (Prince); Norwood, March 21 (Packer); Easton, April 20 (Marx); Addingham, one in January (Culver), Wayne, one January 18 (Pearson).

Tree Sparrow, *Spizella m. monticola*. West Chester, March 9 (Roberts); Doylestown, Nov. 29-April 1 (Mason).

Junco, *Junco h. hyemalis*. Last seen, Swarthmore, April 25 (Harrower); Easton, April 27 (Marx); Rosemont, May 18 (Scoville); West Chester, Oct. 16, 1912-May 3 (Roberts); Doylestown, Oct. 5, 1912-May 2 (Mason).

White-throated Sparrow, *Zonotrichia a. albicollis*. Last seen, Swarthmore, May 15 (Harrower); West Chester, March 22-May

14, few if any during winter (*Roberts*), to May 18 (*Sharples*), Doylestown, Oct. 5, 1912–May 17 (*Mason*); Rosemont, May 18 (*Scoville*).

White-crowned Sparrow, *Zonotrichia l. leucophrys*. Concordville, May 18 (*Styer*).

Swamp Sparrow, *Melospiza georgiana*. Tinicum, Jan. 29 (*Pearson*).

Fox Sparrow, *Passerella i. iliaca*. Wayne, Jan. 18, two (*Pearson*).

Towhee, *Pipilo e. erythrophthalmus*. Melrose, Jan. 1, 3 and March 28 one individual, (*Barker*).

Cardinal, *Cardinalis c. cardinalis*. Nest and eggs, Swarthmore April 15 (*Harrower*).

Rose-breasted Grosbeak, *Zamelodia ludoviciana*. Rancocas, N. J., June 19, 1912 two in song. (*Haines*). Nest, Pensauken Creek, N. J., July 7 (*Miller*).

Bank Swallow, *Riparia riparia*. A large colony nesting at Manantico, N. J. on Maurice River. (*Prince*).

Migrant Shrike, *Lanius ludovicianus migrans*. Frankford, Sept. 4 (*Miller*).

Warbling Vireo, *Vireosylva g. gilva*. Paoli, May 18, with newly made nest. (*Baily*).

Nashville Warbler, *Vermivora r. rubricapilla*. Atlantic City, N. J., May 18 (*Cromie*); Lansdowne, May 4 (*Carter*).

Golden-winged Warbler, *Vermivora chrysoptera*. Norwood, May 4 (*Packer*); Doylestown, May 6 (*Mason*).

Myrtle Warbler, *Dendroica coronata*. Lansdowne, noted frequently during February, probably one individual (*Carter*); Wayne, Jan. 12–19, several (*Pearson*).

Bay-breasted Warbler, *Dendroica castanea*. Moorestown, N. J., May 19, several (*Mickle*); Fish House, N. J., May 18 (*Potter*); Bernardsville, N. J., May 8–24 (*Kuser*); Lansdowne, May 17–24, numerous (*Carter*); Addingham, May 18 (*Culver*); Haverford, May 18 (*Serrill*); Swarthmore, May 18 and 20 (*Palmer*); Paoli, May 18 (*Baily*); Bryn Mawr, May 17, abundant (*Thomas*); Concordville, May 18 (*Styer*); Doylestown, May 18 (*Mason*).

Cape May Warbler, *Dendroica tigrina*. Trenton, N. J., May

3 (*Abbott*); Bernardsville, N. J., May 8 and 12 (*Kuser*); Swarthmore, May 12-15 and 20, a number (*Palmer*); Haverford, May 10 and 15 (*Serrill*); Paoli, May 18 (*Baily*); Concordville, May 5-18 (*Styer*); Doylestown, May 18 (*Mason*).

Louisiana Water Thrush, *Seiurus motacilla*. Swarthmore, April 17, May 14-19 (*Harrower*); Wissahickon Creek, pair at Valley Green, June 6 (*Miller*).

Mourning Warbler, *Oporornis philadelphia*. Addingham, one shot, May 25 (*Culver*); Paoli, May 18 (*Baily*).

Kentucky Warbler, *Oporornis formosa*. Fox Chase, nest and four eggs, May 27 (*Miller*).

Hooded Warbler, *Wilsonia citrina*. Swarthmore, May 5 (*Harrower*); Bustleton, May 8 (*Miller*).

Wilson's Warbler, *Wilsonia pusilla*. Swarthmore, May 15 (*Palmer*); Fish House, N. J., May 18 (*Potter*); Wayne, May 18 (*Pearson*); Doylestown, May 18 (*Mason*); Haverford, May 11 (*Serrill*); Paoli, May 18 (*Baily*).

Pipit, *Anthus rubescens*. Doylestown, November 25, 1912-April 20 and 28 (*Mason*).

Catbird, *Dumetella carolinensis*, Haverford, March 30 (*Emlen*).

Winter Wren, *Nannus h. hiemalis*. Swarthmore, April 30 (*Harrower*); Doylestown, Oct. 5, 1912 (*Mason*); Westtown, Jan. 5; West Chester, Dec. 11, 1912 (*Roberts*); Ardmore, May 4 in song (*Baily*).

Short-billed Marsh Wren, *Cistothorus stellaris*. Pair breeding near Haddonfield, N. J. Male singing and scolding about July 1, and fledgeling found in same place two weeks later. Nest not found (*S. N. Rhoads*).

Brown Creeper, *Certhia fam. americana*. Last seen, Swarthmore, April 22 (*Harrower*); Wayne, April 19 (*Baker*); West Chester, April 22 (*Roberts*); Doylestown, Nov. 21, 1912-April 20 (*Mason*); Easton, April 20 (*Marx*).

Red-breasted Nuthatch, *Sitta canadensis*. Rancocas, N. J., Oct. 13, 1912, and quite often during the winter (*Haines*); Moorestown, N. J., Aug. 28, 1912, and common all the early part of the winter (*Mickle*); Atlantic City, N. J., seen all winter and as late as May 31 (*Cromie*); at Vineland, N. J., April 30; Frankford, arrived Sept. 3, 1912, in abundance during Sept.,

disappeared in October, one on April 21 and May 3 (*Miller*); Swarthmore, April 15, 17, 21, 22, 24, May 5 (*Harrower*); Ad-  
dingham, Dec. 24, 1912, to March 20 (*Culver*); Haverford,  
April 12 (*Serrill*); Wayne, March 21 (*Pearson*); Doylestown,  
Sept. 9, 1912–April 20 (*Mason*); Easton, Oct. 17 (*Marx*).

Black-capped Chickadee, *Penthestes a. atricapillus*. Last seen,  
Swarthmore, March 24 (*Harrower*); West Chester, December  
11, 1912–March 3 (*Roberts*); Doylestown, Nov. 10, 1912–April  
13 (*Mason*).

Golden-crowned Kinglet, *Regulus s. satrapa*. Last seen  
Swarthmore, April 10 (*Harrower*); West Chester, Oct. 16, 1912,  
to April 9 (*Roberts*); Doylestown, Nov. 21, 1912–April 20  
(*Mason*); Ardmore, April 18 (*Baily*); Wayne, April 19 (*Baker*);  
Easton, April 10 (*Marx*).

Blue-gray Gnatcatcher, *Poliophtila c. cærulea*. Fish House,  
N. J., March 28 (*Potter*); Atlantic City, N. J., April 23  
(*Cromie*).

Hermit Thrush, *Hylocichla guttata pallasi*. Easton, Decem-  
ber 25, 1912, one (*Marx*); Wayne, Jan. 18 (*Pearson*).

NAME.	Ranococas, N. J. E. 16; N. 4.	Moorestown, N. J.; E. 12.	Ganden, N. J. N. 0; E. 2.	Media, Pa. S. 2; W. 12.	Swatthmore, Pa. S. 3; W. 10.	Lansdowne, Pa. S. 1; W. 6.	Addingham, Pa. S. 1; W. 8.	Norwood, Pa. S. 5; W. 7.	Haverford— Ardmore, Pa. N. 4; W. 8.	Bryn Mawr— Rosemont, Pa. N. 4; W. 9.	Wayne, Pa. N. 6; W. 11.	West Phila. N. 0; W. 2.	Frankford, Phila. N. 5; E. 5.	Oak Lane, Pa. N. 7; E. 2.	Bulk Arrival Phila., 1913.
Canada Goose	May 12	Apr. 24	Apr. 24	Apr. 25	Apr. 25	Apr. 25	Apr. 25	Apr. 20	May 15	May 15	May 16	May 16	Mar. 8	Mar. 8	Apr. 25
Green Heron	Apr. 9	Apr. 26	Apr. 26	Apr. 3	Apr. 3	Apr. 3	May 2	May 4	May 4	May 4	May 10	May 10	May 3	May 5	Apr. 5
Night Heron	Apr. 30	Apr. 27	Apr. 27	Apr. 30	Apr. 26	Apr. 26	May 11	May 4	May 4	May 4	May 10	May 11	May 3	Apr. 22	Apr. 30
Spotted Sandpiper	May 7	May 11	May 11	May 10	May 10	May 10	May 11	May 4	May 4	May 4	May 10	May 11	May 3	May 5	May 4
Solitary Sandpiper	Feb. 15	Feb. 27	Feb. 2	Mar. 9	Mar. 9	Mar. 9	Feb. 22	Feb. 20	Feb. 20	Mar. 31	Mar. 12	Mar. 12	Feb. 20	Mar. 16	Mar. 18
Killdeer	Mar. 16	Mar. 19	Mar. 8	May 9	Mar. 20	Mar. 21	Apr. 2	Apr. 6	Mar. 16	Mar. 13	Mar. 21	Mar. 21	Mar. 18	Mar. 18	Mar. 18
Dove	Apr. 20	Apr. 18	Apr. 18	Mar. 24	Mar. 24	Mar. 24	Apr. 17	Apr. 20	Apr. 20	Apr. 20	Apr. 6	Apr. 6	Apr. 3	Apr. 3	Apr. 3
Osprey	Mar. 4	Apr. 23	Mar. 23	Apr. 19	Apr. 19	Apr. 19	Res.	Mar. 23	Res.	Feb. 23	Mar. 21	Mar. 21	Mar. 4	Mar. 4	Mar. 4
Turkey Vulture	Apr. 17	Apr. 20	Mar. 28	Mar. 16	Mar. 16	Mar. 16	May 17	May 14	May 16	May 16	May 18	May 18	Mar. 4	Mar. 4	May 16
Yellow-billed Cuckoo	Mar. 16	Mar. 4	Mar. 4	May 14	May 14	May 14	May 17	May 14	May 16	May 16	May 18	May 18	Mar. 4	Mar. 4	May 18
Black-billed Cuckoo	Apr. 17	Apr. 20	Mar. 28	Mar. 16	Mar. 16	Mar. 16	Res.	Mar. 10	Mar. 23	Mar. 31	Mar. 1	Mar. 1	Mar. 29	Mar. 29	Mar. 29
Kingfisher	Mar. 16	Mar. 4	Mar. 4	Apr. 19	Apr. 19	Apr. 19	Apr. 6	Apr. 27	Apr. 4	Apr. 4	Apr. 15	Apr. 15	Apr. 28	Apr. 28	Apr. 4
Yellow-bellied Sapsucker	May 23	Mar. 25	Res.	May 10	May 10	May 10	May 11	May 2	May 2	May 2	May 18	May 18	May 1	May 1	Apr. 4
Red-headed Woodpecker	Mar. 21	Mar. 25	Res.	Mar. 17	Mar. 20	Mar. 16	Res.	Mar. 3	Feb. 9	Mar. 13	Mar. 21	Mar. 21	Mar. 15	Feb. 28	Res.
Flicker	Apr. 23	Apr. 23	Res.	Apr. 22	May 3	May 3	May 12	May 12	May 18	Apr. 23	May 13	May 13	May 8	May 8	May 8
Whip-poor-will	Apr. 25	Mar. 22	Apr. 13	Apr. 20	Apr. 23	Apr. 24	Apr. 23	Apr. 20	Apr. 26	May 3	May 4	May 4	Apr. 21	Apr. 21	Apr. 23
Nighthawk	Apr. 25	Mar. 22	Apr. 13	Apr. 20	Apr. 23	Apr. 24	Apr. 23	Apr. 20	Apr. 26	May 3	May 4	May 4	Apr. 21	Apr. 21	Apr. 23
Chimney Swift	May 8	May 20	May 11	May 31	May 31	May 31	May 21	May 21	May 16	Apr. 28	May 28	May 28	May 15	May 15	May 15
Hummingbird	May 8	May 7	May 11	May 1	May 7	May 7	May 11	May 2	May 4	May 4	May 18	May 18	May 3	May 3	May 4
Kingbird	May 4	Apr. 26	May 4	May 9	May 3	May 3	May 11	May 11	May 4	May 4	May 5	May 5	Apr. 29	Apr. 29	May 4
Crested Flycatcher	May 4	Apr. 26	May 4	May 9	May 3	May 3	Apr. 27	May 11	May 4	May 4	May 5	May 5	Apr. 29	Apr. 29	May 4
Phoebe	Apr. 23	Mar. 28	Mar. 28	Mar. 24	Mar. 13	Mar. 13	Mar. 15	Mar. 21	Mar. 21	Mar. 21	Mar. 16	Feb. 22	Mar. 22	Mar. 29	Mar. 21

NAME.	Ranocas, N. J.	Moorestown, N. J.	Camden, N. J.	Media, Pa.	Swarthmore, Pa.	Lansdowne, Pa.	Addingham, Pa.	Norwood, Pa.	Haverford and Ardmore, Pa.	Bryn Mawr and Rosemont, Pa.	Wayne, Pa.	West Phila.	Frankford, Phila.	Oak Lane, Pa.	Phila., 1913.
Wood Pewee . . . . .	May 17	May 15	May 18	May 15	May 18	May 18	May 18	May 1	May 17	May 10	May 16	May 3	Mar. 20	May 6	May 16
Acadian Flycatcher . . . . .	May 17	May 4	May 4	May 8	May 17	May 17	May 17	May 11	May 11	May 10	May 16	May 3	May 21	May 6	May 16
Least Flycatcher . . . . .	May 17	May 22	May 22	May 4	May 4	May 4	May 4	May 4	May 4	May 15	May 15	May 3	May 3	May 4	May 4
Bobolink . . . . .	May 1	Feb. 12	Mar. 20	Mar. 25	Apr. 5	Apr. 5	Apr. 6	Apr. 20	Mar. 23	Mar. 25	Apr. 5	Apr. 20	May 16	May 6	May 6
Cowbird . . . . .	May 1	Feb. 12	Mar. 20	Mar. 25	Apr. 5	Apr. 5	Apr. 6	Apr. 20	Mar. 23	Mar. 25	Apr. 5	Apr. 20	May 16	May 6	May 6
Red-winged Blackbird . . . . .	Mar. 3	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.	Res.
Meadowlark . . . . .	May 4	May 3	May 3	May 2	May 4	May 4	May 4	May 5	May 4	May 18	May 10	May 11	May 6	May 4	May 4
Orchard Oriole . . . . .	May 4	May 3	May 3	May 2	May 4	May 4	May 4	May 5	May 4	May 18	May 10	May 11	May 6	May 4	May 4
Baltimore Oriole . . . . .	May 5	May 3	May 3	May 2	May 4	May 4	May 4	May 5	May 4	May 18	May 10	May 11	May 6	May 4	May 4
Rusty Blackbird . . . . .	Apr. 20	Apr. 20	Mar. 21	Mar. 24	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21	Mar. 21
Purple Grackle . . . . .	Feb. 22	Feb. 28	Feb. 26	Feb. 28	Feb. 20	Mar. 1	Feb. 22	Feb. 24	Feb. 9	Feb. 25	Feb. 16	Mar. 23	Jan. 30	Feb. 22	Feb. 20
Vesper Sparrow . . . . .	Apr. 1	Apr. 29	May 30	Apr. 6	Mar. 28	Mar. 1	Apr. 6	Mar. 21	Mar. 23	Apr. 6	Mar. 16	Mar. 21	Mar. 25	May 4	Feb. 20
Savannah Sparrow . . . . .	May 4	Apr. 23	May 18	May 1	May 1	May 1	May 1	Mar. 30	Mar. 21	Apr. 6	Mar. 16	Mar. 21	Mar. 14	May 4	Feb. 20
Grasshopper Sparrow . . . . .	May 4	Apr. 23	May 18	May 1	May 1	May 1	May 1	Mar. 30	Mar. 21	Apr. 6	Mar. 16	Mar. 21	Mar. 14	May 4	Feb. 20
Chipping Sparrow . . . . .	Mar. 27	Mar. 30	Mar. 30	Apr. 6	Mar. 19	Mar. 29	Mar. 23	Apr. 8	Apr. 5	Mar. 31	Mar. 29	Apr. 5	Mar. 10	Mar. 31	Mar. 29
Field Sparrow . . . . .	Mar. 8	Apr. 15	Mar. 21	Mar. 24	Apr. 5	Mar. 30	Mar. 28	Mar. 9	Apr. 21	Mar. 16	Apr. 19	Apr. 12	Jan. 15	Mar. 22	Mar. 21
Swamp Sparrow . . . . .	Apr. 18	Apr. 20	Res.	Feb. 28	Mar. 31	Mar. 31	Apr. 17	Feb. 16	Apr. 26	Mar. 23	Apr. 19	Apr. 19	Jan. 15	Mar. 22	Mar. 21
Fox Sparrow . . . . .	Mar. 23	Feb. 20	Feb. 20	Feb. 28	Mar. 15	Mar. 15	Feb. 22	Feb. 15	Feb. 23	Feb. 23	Mar. 24	Apr. 23	Apr. 23	Mar. 7	Feb. 23
Cheewink . . . . .	Apr. 18	Apr. 23	Apr. 18	Apr. 14	Apr. 30	Apr. 18	Apr. 19	Apr. 19	Apr. 26	Apr. 18	Apr. 17	Apr. 20	Mar. 10	Mar. 7	Feb. 23
Rose-breasted Grosbeak . . . . .	May 3	May 10	May 18	May 2	May 19	May 1	May 7	May 8	May 11	May 15	May 16	May 10	May 3	May 10	May 6
Indigobird . . . . .	May 6	May 14	May 11	May 4	May 4	May 5	May 6	May 11	May 11	May 15	May 16	May 10	May 3	May 10	May 6
Scarlet Tanager . . . . .	May 3	May 17	May 6	May 2	May 3	Apr. 30	May 4	May 4	May 4	May 3	May 10	May 10	May 6	May 4	May 4
Purple Martin . . . . .	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Mar. 31	Apr. 21	Mar. 31	Mar. 31



NAME.	Ranocas, N. J.	Moorestown, N. J.	Camden, N. J.	Media, Pa.	Swarthmore, Pa.	Lansdowne, Pa.	Addingham, Pa.	Norwood, Pa.	Haverford and Ardmore, Pa.	Bryn Mawr and Rosemont, Pa.	Wayne, Pa.	West Phila.	Frankford, Phila.	Oak Lane, Pa.	Bulk Arrival at Phila., 1913.
Pine Warbler . . . . .	May 17	Mar. 28	. . . . .	Apr. 2	. . . . .	. . . . .	Apr. 8	Apr. 20	. . . . .	. . . . .	Apr. 19	. . . . .	. . . . .	. . . . .	. . . . .
Yellow Palm Warbler . . . . .	. . . . .	Apr. 6	Apr. 17	Apr. 20	Apr. 17	. . . . .	Apr. 9	Apr. 30	Apr. 12	Apr. 19	Apr. 17	Apr. 8	Apr. 17	. . . . .	Apr. 12
Prairie Warbler . . . . .	. . . . .	May 13	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Ovenbird . . . . .	Apr. 30	Apr. 26	May 2	May 3	Apr. 26	Apr. 30	May 4	May 1	Apr. 26	Apr. 30	May 5	May 3	Apr. 30	May 1	Apr. 30
Water Thrush . . . . .	. . . . .	May 19	May 13	Apr. 30	May 3	May 2	May 24	Apr. 20	Apr. 26	May 18	May 5	May 10	May 11	May 9	May 2
Kentucky Warbler . . . . .	. . . . .	. . . . .	. . . . .	May 4	May 4	May 4	May 4	. . . . .	May 4	May 2	May 11	May 11	May 6	May 4	May 4
Maryland Yellowthroat . . . . .	May 1	Apr. 23	Apr. 26	May 1	Apr. 25	May 4	May 1	Apr. 26	Apr. 27	Apr. 30	May 5	May 3	Apr. 28	May 4	Apr. 26
Chat . . . . .	May 4	May 6	May 1	May 8	May 10	May 15	May 9	May 13	May 10	May 4	. . . . .	. . . . .	May 6	May 2	May 4
Canada Warbler . . . . .	May 16	May 3	May 18	May 10	May 10	May 15	May 9	May 13	May 11	May 15	May 16	. . . . .	May 20	May 14	May 14
Redstart . . . . .	May 3	May 4	Apr. 24	May 18	May 3	. . . . .	May 4	Apr. 30	May 4	Apr. 30	. . . . .	. . . . .	May 4	May 2	May 4
Catbird . . . . .	Apr. 28	Apr. 27	Apr. 30	Apr. 27	Apr. 26	May 3	Apr. 26	Apr. 27	Apr. 29	May 4	May 4	Apr. 30	May 1	May 4	Apr. 30
Brown Thrasher . . . . .	Apr. 21	Apr. 20	Apr. 19	Apr. 21	Apr. 21	Apr. 24	Apr. 12	Apr. 19	Apr. 4	Apr. 12	May 4	Apr. 19	Apr. 25	Apr. 23	Apr. 19
House Wren . . . . .	Apr. 24	Apr. 20	Apr. 24	Apr. 22	Apr. 22	Apr. 23	Apr. 30	Apr. 23	Apr. 25	Apr. 23	Apr. 27	Apr. 30	Apr. 24	Apr. 27	Apr. 24
Long-bill'd Marsh Wren . . . . .	. . . . .	Apr. 30	. . . . .	. . . . .	. . . . .	. . . . .	May 4	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	May 2	. . . . .	. . . . .
Ruby-crowned Kinglet . . . . .	Apr. 3	Apr. 22	Apr. 6	Apr. 20	Apr. 3	Apr. 2	Apr. 6	Apr. 14	May 2	Apr. 18	Apr. 19	Apr. 7	Apr. 17	. . . . .	Apr. 4
Wood Thrush . . . . .	May 4	May 9	Apr. 30	May 3	Apr. 26	Apr. 27	Apr. 26	Apr. 27	Apr. 28	Apr. 27	May 1	May 3	Apr. 29	May 2	Apr. 28
Wilson's Thrush . . . . .	. . . . .	. . . . .	May 4	May 15	May 6	May 19	May 11	May 1	May 13	May 4	May 18	May 4	Apr. 25	May 4	May 4
Gray-checked Thrush . . . . .	. . . . .	May 17	. . . . .	. . . . .	May 17	. . . . .	May 17	. . . . .	May 6	May 18	. . . . .	. . . . .	May 10	May 4	May 4
Olive-backed Thrush . . . . .	. . . . .	May 18	. . . . .	May 14	May 14	May 14	May 1	. . . . .	May 4	May 17	May 10	May 10	May 21	. . . . .	May 10
Hermit Thrush . . . . .	May 4	Apr. 20	Apr. 16	Apr. 21	Apr. 10	Apr. 17	Apr. 14	Apr. 8	Apr. 5	Apr. 15	Apr. 17	May 24	Apr. 3	. . . . .	Apr. 15
Robin . . . . .	Feb. 20	Feb. 7	Res.	Mar. 5	Feb. 28	Mar. 4	Res.	Mar. 11	Mar. 9	Feb. 22	Mar. 1	Feb. 12	Feb. 28	Mar. 11	Feb. 20
Bluebird . . . . .	Feb. 21	Mar. 9	Res.	Res.	Feb. 28	Mar. 14	Res.	Feb. 28	Feb. 22	Feb. 22	Res.	Feb. 12	Feb. 22	Mar. 13	Feb. 22

NAMES.	Cape May, N. J. E. 13; S. 72.	Atlantic City, N. J. E. 42; S. 42.	Vineland to Maurice River, N. J. E. 7; S. 32.	Downtown, N. J. E. 11; S. 28.	Concordville, Pa. W. 20; S. 5.	West Chester, Pa. W. 24; N. 0.	Westtown, Pa. W. 21; S. 2.	Beverly, N. J. E. 13; N. 8.	Bordentown, N. J. E. 25; N. 13.	Newtown, Pa. N. 19; E. 10.	Yardville, N. J. E. 25; N. 15.	Trenton, N. J. E. 23; N. 16.	Bernardsville, N. J. E. 30; N. 54.	Doylestown, Pa. E. 1; N. 26.	Easton, Pa. W. 2; N. 50.	Lopez, Pa. W. 60; N. 103.
Flicker.....	Res. Jan. 19	Res. Mar. 20	Feb. 28	Mar. 9	Mar. 11	Res. Mar. 10	Mar. 28	Feb. 10	Mar. 22	Apr. 8	Res. Mar. 30	Mar. 30				
Whip-poor-will.....	Apr. 30	Apr. 22	Apr. 24	Mar. 11	Apr. 25	May 18	May 8	May 16	.....	May 1	Apr. 23	.....	Apr. 23			
Nighthawk.....	.....	.....	.....	.....	.....	May 18	May 8	May 16	.....	.....	.....	.....	.....	May 6	.....	
Chimney Swift.....	.....	Apr. 14	Apr. 25	Apr. 20	Apr. 20	Apr. 24	Apr. 27	Apr. 18	Apr. 12	Apr. 23	Apr. 22	Apr. 27	Apr. 22	Apr. 30	.....	
Hummingbird.....	.....	May 4	.....	.....	.....	May 5	May 25	May 18	May 2	.....	.....	.....	.....	.....	.....	
Kingbird.....	Apr. 18	May 7	May 4	Apr. 25	Apr. 29	Apr. 26	Apr. 28	May 11	May 1	.....	May 4	May 10	May 2	.....	May 11	
Crested Flycatcher.....	May 3	.....	May 3	May 4	May 6	Apr. 28	Apr. 27	Apr. 25	Apr. 25	May 2	Apr. 24	May 5	May 4	.....	.....	
Phoebe.....	.....	Mar. 20	.....	.....	.....	Mar. 18	Mar. 16	Mar. 15	Mar. 23	Mar. 20	.....	Mar. 18	Apr. 23	Mar. 21	Mar. 30	Mar. 21
Bobolink.....	.....	.....	.....	.....	May 3	May 9	May 11	.....	.....	May 14	.....	.....	May 18	May 10	.....	.....
Cowbird.....	Res. ....	.....	.....	.....	Mar. 29	Mar. 21	Mar. 9	.....	Mar. 30	Apr. 24	.....	Mar. 22	Apr. 23	Mar. 7	Mar. 16	.....
Red-winged Blackbird.....	Res. Mar. 9	Res. Feb. 2	Feb. 28	Mar. 1	Mar. 1	Feb. 22	.....	.....	.....	Mar. 6	Feb. 28	Apr. 8	Mar. 4	.....	Mar. 12	.....
Baltimore Oriole.....	Apr. 30	May 14	May 4	May 6	.....	Apr. 30	Apr. 28	May 4	Apr. 30	May 9	May 15	May 4	May 4	May 4	May 6	May 3
Purple Grackle.....	Feb. 26	Res. Jan. 2	Feb. 21	Feb. 20	Feb. 27	.....	.....	.....	Feb. 26	Feb. 21	Feb. 21	Feb. 22	.....	Feb. 22	Feb. 28	.....
Chipping Sparrow.....	Apr. 4	Mar. 11	Mar. 29	Mar. 30	Apr. 4	Mar. 28	Mar. 27	Mar. 27	Mar. 28	Mar. 24	Apr. 3	Mar. 25	.....	Apr. 7	Mar. 30	Apr. 23
Chewink.....	Res. ....	Apr. 17	Apr. 23	.....	Apr. 19	Apr. 11	Apr. 26	Apr. 10	Apr. 9	Apr. 25	Mar. 26	Apr. 24	Apr. 20	Apr. 27	Apr. 25	.....
Indigobird.....	.....	May 4	.....	.....	May 5	May 12	May 4	May 5	May 3	Apr. 26	May 20	May 11	May 4	May 6	May 16	.....
Scarlet Tanager.....	.....	May 3	.....	Apr. 30	May 5	Apr. 29	May 6	May 6	May 7	May 15	May 4	May 17	May 4	.....	May 7	.....
Purple Martin.....	Apr. 12	Apr. 3	Apr. 13	.....	Mar. 25	.....	.....	Apr. 19	.....	.....	.....	.....	Apr. 5	May 10	.....	.....
Barn Swallow.....	Apr. 18	Apr. 17	.....	Apr. 29	Apr. 20	Apr. 4	Apr. 29	Apr. 10	Apr. 4	Apr. 27	Apr. 19	Apr. 27	Apr. 20	Apr. 29	Apr. 22	.....
Red-eyed Vireo.....	.....	Apr. 26	.....	May 2	May 4	May 1	May 2	May 1	May 2	May 8	.....	May 3	May 4	.....	May 7	.....
Black and White Warbler.....	Apr. 19	Apr. 17	May 4	Apr. 26	May 3	Apr. 24	May 2	Apr. 20	Apr. 26	Apr. 25	Apr. 23	Apr. 25	May 4	.....	May 3	.....
Chestnut-sided Warbler.....	May 3	.....	.....	.....	May 14	May 6	May 6	.....	.....	.....	.....	.....	May 4	May 4	.....	May 4
Ovenbird.....	May 4	.....	May 4	Apr. 30	Apr. 26	Apr. 29	May 1	Apr. 25	May 3	May 3	May 4	May 4	May 4	.....	May 5	.....
Maryland Yellow-throat.....	Apr. 30	Apr. 25	Apr. 30	Apr. 29	Apr. 22	Apr. 25	Apr. 29	Apr. 27	Apr. 20	.....	Apr. 25	Apr. 23	May 4	.....	.....	.....
Chat.....	.....	May 1	.....	.....	May 15	May 17	May 18	.....	May 10	.....	May 6	.....	May 4	.....	.....	.....
Catbird.....	Apr. 30	Apr. 8	.....	Apr. 29	Apr. 26	Apr. 29	Mar. 27	Apr. 15	Apr. 23	May 4	May 3	Apr. 30	May 4	May 6	May 4	.....
Brown Thrasher.....	Apr. 18	Apr. 29	Apr. 20	Apr. 19	Apr. 22	Apr. 17	Apr. 24	Apr. 19	Apr. 16	Apr. 22	Apr. 22	Apr. 18	Apr. 24	Apr. 24	May 5	Apr. 27
House Wren.....	May 3	Apr. 30	Apr. 23	Apr. 22	Apr. 19	Apr. 20	Apr. 17	Apr. 15	Apr. 24	May 3	Apr. 25	Apr. 23	Apr. 24	Apr. 27	Apr. 25	.....
Wood Thrush.....	.....	.....	May 4	May 2	May 2	Apr. 27	May 2	Apr. 28	Apr. 28	May 1	May 3	May 4	Apr. 25	May 7	.....	.....
Hermit Thrush.....	Apr. 21	Apr. 20	.....	Apr. 21	Apr. 4	Apr. 8	Mar. 16	.....	Apr. 21	Apr. 25	.....	.....	Apr. 20	Apr. 5	Apr. 5	.....
Robin.....	Res. Mar. 9	Res. Jan. 4	Mar. 9	Feb. 22	Feb. 16	Res. Feb. 10	.....	.....	Res. Feb. 10	.....	.....	.....	Res. Mar. 7	Mar. 10	Mar. 12	.....
Bluebird.....	Res. ....	Res. ....	.....	.....	.....	.....	.....	.....	Res. Feb. 10	.....	.....	.....	Res. ....	.....	.....	.....

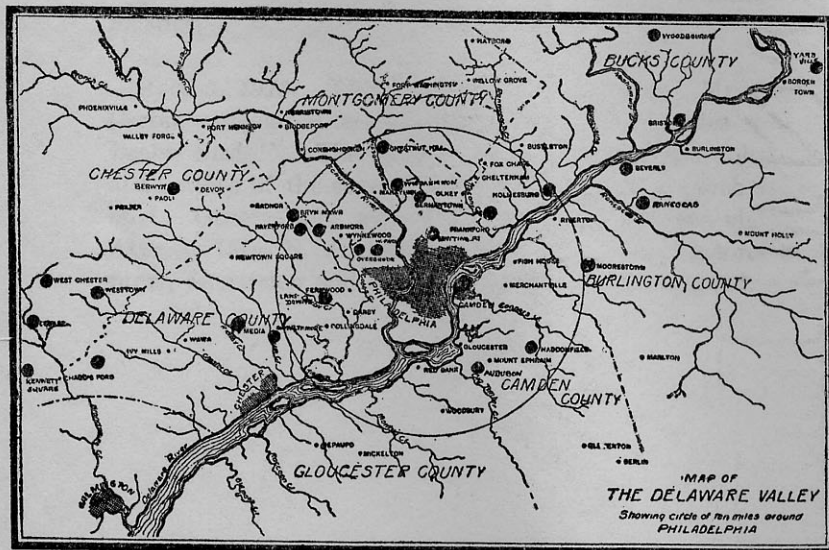


TABLE II.

SPRING MIGRATION, 1913.

EARLIEST DATES OF ARRIVAL OF THIRTY-TWO SPECIES AT SIXTEEN STATIONS OUTSIDE THE PHILADELPHIA CIRCLE.