

early May, when it again rose to 60° F. It averaged between 55° F. and 60° F. for the first two weeks of May, and the first 70° F. temperature of the year was not recorded until May 15th. To this long, drawn-out, cold spring, can be attributed the gradual movement of the birds.

To date but one of the Tree Sparrows we banded has been picked up elsewhere. This bird was banded December 3, 1931, and never repeated. It was found dead at Portland, Maine, on April 21, 1932, evidently well on its way to its northern breeding grounds, at the time when most of the wintering birds were just leaving the Cape.

U. S. Bureau of Biological Survey,
North Eastham, Cape Cod, Mass.

INDIANA BRONZED GRACKLE MIGRATION

By SAMUEL E. PERKINS, III

THE whole State of Indiana is a breeding ground for the Bronzed Grackle (*Quiscalus quiscula æneus*), which throughout the summer is very numerous. It nests principally in groups of evergreens, both as planted by nature and when grouped by man. Park groves of white pines have been occupied by this race in such numbers per tree that they may well be called colonial nesters. In the same trees Robins and Mourning Doves often build and rear their broods successfully without molestation from the Grackles.

The east and west Indiana watershed is situated about two-thirds up-state, the southern drainage area falling toward the Wabash and Ohio Rivers. The Ohio River flows in a general southwesterly direction till it joins the Mississippi River, which takes a more southerly course. The largest tributary to the Ohio south of Indiana is the Tennessee River, which flows substantially northwest, across western Kentucky to Paducah after flowing west across Alabama and the northeast corner of Mississippi and due north across Tennessee.

Numerous bird-banding stations are in operation in the State where hundreds of adult Bronzed Grackles, or Crow Blackbirds, have been banded. Some fledglings have also been tagged. Banding stations in Indiana which have reported southern recoveries of this race that have come to my attention (the first being in 1925) are well distributed over the State and are located as follows (see also map I), the column of capitals refers to location of stations shown on map:

| | <i>Location of Station</i> | <i>Operator</i> |
|---|----------------------------|---------------------------|
| B | West Lafayette | Dr. L. A. Test |
| E | Crawfordsville | Mr. Frank C. Evans |
| A | Carmel | Mrs. Sue Sims |
| C | Noblesville | Dr. Earl Brooks |
| D | Muncie | Harold A. Zimmerman |
| G | Greensburg | Mrs. Anna C. Goddard |
| F | Indianapolis | Mrs. Elsa K. Glossbrenner |
| | " | Mrs. Belle Brown |
| | " | Mrs. Georgia B. Thomas |
| | " | Miss Helen E. Clayton |
| | " | Linton A. Wood |
| | " | Samuel E. Perkins, III |

The following Indiana banding stations report recoveries:

| | |
|----------------------|----|
| West Lafayette | 10 |
| Crawfordsville | 1 |
| Carmel | 2 |
| Noblesville | 1 |
| Muncie | 2 |
| Greensburg | 2 |
| Indianapolis | |
| Clayton | 2 |
| Wood | 2 |
| Glossbrenner | 10 |
| Brown | 2 |
| Thomas | 7 |
| Perkins | 13 |

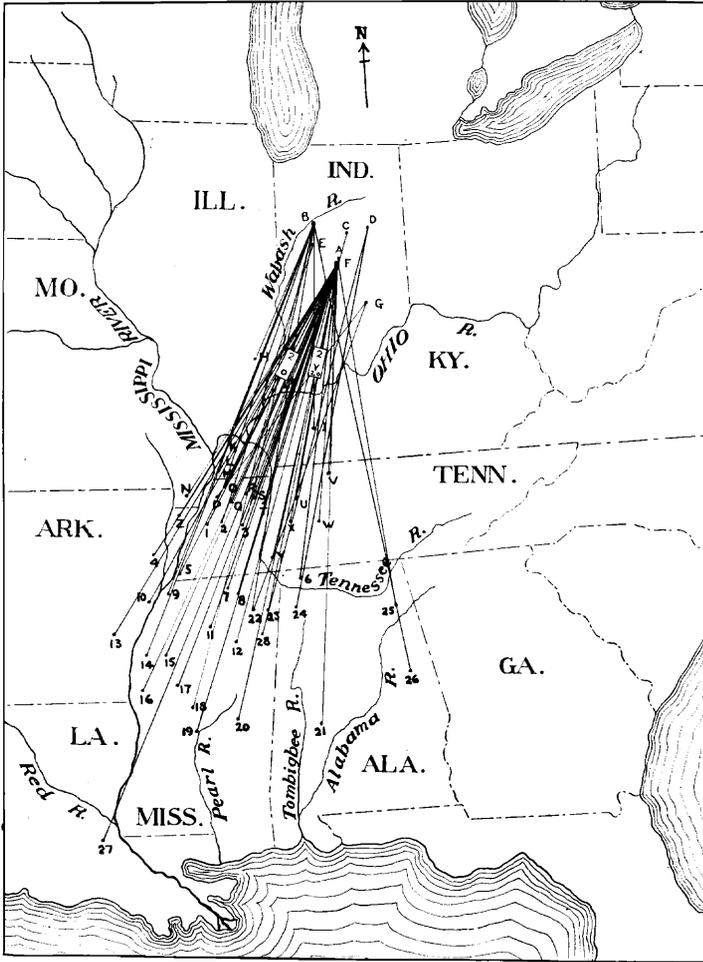
The recoveries of Bronzed Grackles to date, reported from southerly localities, are as follows:

| | |
|-------------------|----|
| Indiana | 1 |
| Illinois | 1 |
| Kentucky | 5 |
| Missouri | 1 |
| Arkansas | 4 |
| Tennessee | 18 |
| Louisiana | 1 |
| Mississippi | 17 |
| Alabama | 5 |

The following table shows the months these fifty-three recoveries were banded in Indiana:

| | |
|-----------------|----|
| January | 1 |
| February | 1 |
| March | 3 |
| April | 5 |
| May | 7 |
| June | 10 |
| July | 5 |
| August | 5 |
| September | 7 |
| October | 3 |
| November | 5 |
| December | 1 |

PLATE I



MAP I. INDIANA BRONZED GRACKLE RECOVERIES

The recoveries of these same birds, by months, are as follows:

| | |
|-----------------|----|
| October | 1 |
| November | 7 |
| December | 12 |
| January | 6 |
| February | 16 |
| March | 9 |
| April | 1 |
| May | 0 |
| June | 0 |
| July | 1 |
| August | 0 |
| September | 0 |

There have been no out-of-State recoveries in May, June, August, September, or October, and but one each in April and July. The Grackle banded by Dr. Test in West Lafayette on the 2d of February had flown to Cub River in Hart County, Kentucky, between then and April 14th of the same year, when it was reported there. This is, to say the least, unusual and from causes unknown. The other summer record from the South is of a bird at least two years old. When we learn that this adult was caught by a cat in midsummer at Medina, Tennessee, July 5, 1927, it is a fair assumption that it had been ailing, so did not make the return journey to Indiana that spring. Its stay in the South was not normal.

In five different places in three States two recoveries or more have been reported. They are as follows:

| <i>Place recovered</i> | <i>Recovered</i> | <i>Banded at</i> | <i>Banding Date</i> | <i>Bander</i> |
|------------------------------|------------------|------------------|---------------------|---------------|
| Paducah, Kentucky | Dec. 2, 1927 | Indianapolis | Nov. 1, 1927 | Glossbrenner |
| | Mar. 12, 1929 | West Lafayette | Apr. 4, 1925 | Test |
| Union City, Tennessee | Jan. 4, 1928 | West Lafayette | Nov. 21, 1927 | Test |
| | Feb. 25, 1928 | Indianapolis | Nov. 25, 1927 | Glossbrenner |
| Savannah, Tennessee | Jan. 6, 1930 | Indianapolis | Aug. 21, 1929 | Glossbrenner |
| | Feb. 4, 1930 | Indianapolis | May 30, 1929 | Perkins |
| Tupelo, Mississippi | Feb. 19, 1931 | Carmel | May 28, 1930 | Sims |
| | Feb. 15, 1926 | West Lafayette | Apr. 24, 1925 | Test |
| Philadelphia, Mississippi | Feb. 7, 1930 | Greensburg | Aug. 30, 1929 | Goddard |
| | Feb. 1, 1931 | Indianapolis | May 15, 1928 | Brown |
| | Feb 2, 1931 | Indianapolis | Oct. 10, 1928 | Clayton |

These double recoveries are seen to be almost due south of Indiana.

The oldest recovery is of a bird three years and nine months old, having been banded by Test, April 4, 1925, and recovered March 12, 1929.

The most distant recovery reported was of a bird banded by Perkins taken at Marksville, Louisiana.

Short-time migration recoveries are:

Seven days, West Lafayette to Noble, Illinois.

One month and ten days, West Lafayette to Union City, Tennessee.

One month and twenty-five days, Indianapolis to Cleveland, Mississippi.

Two months and six days, Indianapolis to Canton, Mississippi.

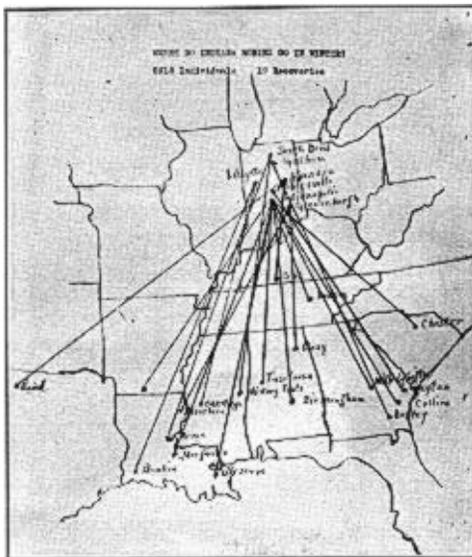
Two months and nine days, West Lafayette to Clayton, Mississippi.

Three months and eight days, Indianapolis to Winburn, Mississippi.

I would call attention to the migration routes and wintering areas of some other migrating species by way of comparison. I find from my records that a Phoebe banded as a fledgling in northern Indiana was taken six months later at Zwolle, Louisiana, sixty miles south of Shreveport, in the far western part of the State.

The records of the migration of Robins which were tagged in Indiana and became out-of-State recoveries were collected by Dr. Earl Brooks of Noblesville and published in the *Indiana Audubon Society Bulletin* for 1931. A map printed therewith and reproduced here (Map II) shows that they spread out fan-

PLATE II



MAP 2. INDIANA ROBIN RECOVERIES

like and that they were taken as far west as Bairdstown, Texas, and east to Chester, South Carolina.

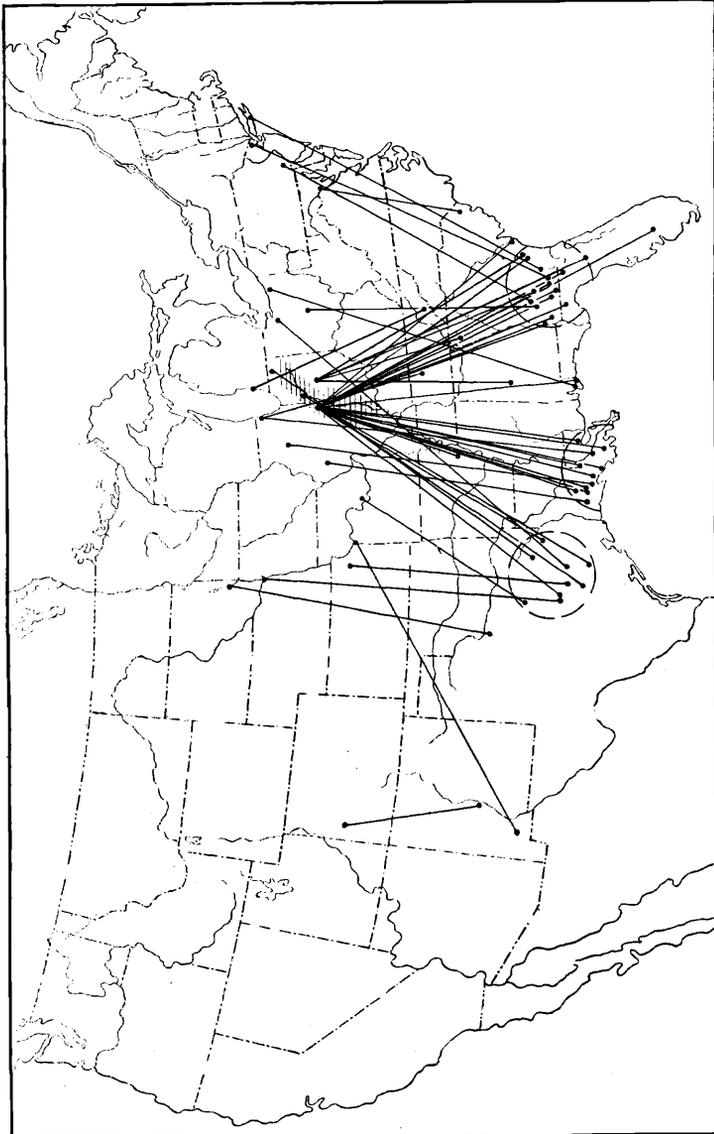
In the same way W. B. Taber, Jr., of the town of Kansas, Illinois, mapped the migration routes of Mourning Doves banded in Illinois and Indiana and published his preliminary deductions in the *Wilson Bulletin*, Vol. 42, p. 17, (republished as Map III). It will be noted that they, likewise, spread out in migration and that they congregated during the winter largely in three concentration areas, each far from the others. Indiana Doves are mostly recovered from the eastern side of Georgia near the Florida line.

From the above data it is evident that the behavior of Bronzed Grackles in the matter of journeying to their winter range is different from that of some other species, as is the range itself. The Phoebe, the Dove, and the Robin follow some other routes to their wintering places than watercourse flyways. They may use such a course part way and then diverge from it, guided thereafter through some internal directional sense, or they may migrate "as the crow flies" from the summer range. Their wintering grounds are far removed from any watercourse flyway or any valley that leads south from Indiana. On the other hand, every recovery of a Bronzed Grackle reported south of mid-Indiana has been from the valley of the Mississippi River or its important tributaries and not over fifty miles from a major river. Most records are from the immediate neighborhood of the Mississippi River itself. Every State touching the river south of the confluence of the Wabash and the Ohio has afforded recoveries and, with the exception of Alabama, no State which does not touch the Mississippi River reports recoveries. Birds taken in that State we believe followed (back-tracked) the large Tennessee River, which flows into the Ohio near Paducah after crossing Tennessee and Kentucky in a northerly course (Map I).

There seems to be no rule governing the distribution of Grackles while on their winter range. They are as generally distributed over their range all winter as the range itself is limited or restricted. In November, their first month in the South, all recoveries were made within a few miles of the Mississippi River. The birds thereafter spread over all of the States heretofore referred to, as is shown by succeeding monthly recoveries. All of the recoveries from the three States west of the Mississippi River have been extremely close to this waterway, which is the State boundary in each case.

The longest journey of a recovered Purple Grackle, as reported by McCann (*Bird-Banding*, October, 1931, p. 174), is

PLATE III



MAP 3. INDIANA MOURNING DOVE RECOVERIES
SHOWING THREE MARKED WINTERING CONCENTRATION AREAS

only a little over three hundred miles, while that of the farthest Bronzed Grackle indicates a journey three times that distance—Indianapolis to Marksville, Louisiana.

The Purple Grackles from Paoli, Pennsylvania, appear to have the same habit of keeping to a restricted east-to-west winter range, not more than one hundred miles across, as shown in McCann's map in the article referred to *supra*.

The Tables A and B, which follow, give the Indiana Grackle recoveries by States and by months:

TABLE A, INDIANA GRACKLE RECOVERIES BY STATES¹

| | | <i>Banded</i> | <i>Recovered</i> | <i>Bander</i> |
|----------|---------------|---------------|------------------|---------------|
| INDIANA | | | | |
| I | Cypress | 6-27-25 | 10- 6-25 | Perkins |
| ILLINOIS | | | | |
| H | Noble | 11- 6-27 | 11-13-27 | Test |
| MISSOURI | | | | |
| N | Holland | 6-24-26 | 2-16-28 | Perkins |
| KENTUCKY | | | | |
| J | Cub Run | 2- 4-30 | 4-14-30 | Test |
| M | Oakton | 4-26-27 | 11-26-28 | Thomas |
| L | Bardsville | 1-12-29 | 12-23-29 | Test |
| K | Paducah | 11-21-27 | 12- 2-27 | Glossbrenner |
| K | Paducah | 4- 4-25 | 3-12-29 | Test |
| ARKANSAS | | | | |
| 10 | Helena | 5-30-27 | 11- 8-30 | Wood |
| Z | Armored | 8-17-27 | 12-28-29 | Thomas |
| 13 | Almyra | 9- 4-28 | 3- 3-29 | Glossbrenner |
| 4 | Cherry Valley | 9-25-28 | 3-15-29 | Perkins |

¹Numbers and letters in first column give recovery locations shown on Map I.

| TENNESSEE | | | | |
|-------------|-------------------|----------|----------|--------------|
| 3 | Medina | 7- 2-25 | 7- 5-27 | Thomas |
| 1 | Halls | 3-23-27 | 11- 7-28 | Perkins |
| U | Hurricane Mills | 6-10-29 | 11- 8-29 | Thomas |
| S | McKenzie | 12- 7-27 | 12-24-29 | Glossbrenner |
| X | Linden | 6-22-26 | 12-19-27 | Perkins |
| O | Union City | 11-23-27 | 1- 4-28 | Test |
| 2 | Crockett Mills | 5- 2-24 | 1-15-25 | Evans |
| R | Sharon | 7-24-26 | 1-24-27 | Brown |
| O | Union City | 8-21-29 | 1- 6-30 | Glossbrenner |
| Y | Savannah | 5-28-30 | 2-19-31 | Sims |
| Y | Savannah | 5-30-29 | 2- 4-30 | Perkins |
| O | Union City | 11-25-27 | 2-25-28 | Glossbrenner |
| Q | Trenton | 6-17-28 | 2-18-29 | Sims |
| W | Columbia | 9-19-28 | 2-28-29 | Perkins |
| V | Springfield | 10- 3-29 | 3-25-30 | Glossbrenner |
| P | Obion | 9- 6-27 | 3- 8-28 | Goddard |
| T | Huntingdon | 9-14-27 | 3- 1-28 | Glossbrenner |
| 5 | Normal | 5-23-23 | 3-20-26 | Perkins |
| LOUISIANA | | | | |
| 27 | Marksville | 5-27-28 | 1-19-29 | Perkins |
| MISSISSIPPI | | | | |
| 14 | Symonds | 4-29-28 | 11-27-28 | Test |
| 9 | Clayton | 9-20-29 | 11-29-29 | Test |
| 19 | Canton | 10- 3-29 | 12- 9-29 | Clayton |
| 23 | Fulton | 8-15-29 | 12-13-30 | Glossbrenner |
| 7 | Winburn | 9-12-30 | 12-20-30 | Perkins |
| 15 | Cleveland | 11- 5-27 | 12-30-27 | Glossbrenner |
| 18 | Thornton | 4- 9-27 | 12-31-27 | Test |
| 12 | Calhoun | 3-31-27 | 1- 3-29 | Brooks |
| 20 | Philadelphia | 5-15-28 | 2- 1-31 | Brown |
| 20 | Philadelphia | 10-10-28 | 2- 2-31 | Clayton |
| 16 | Longwood | 6- 1-27 | 2-27-30 | Glossbrenner |
| 28 | Amory | 7-19-29 | 2- 2-30 | Zimmerman |
| 22 | Tupelo | 8-30-29 | 2- 7-30 | Goddard |
| 22 | Tupelo | 4-24-25 | 2-15-26 | Test |
| 8 | LaFayette Springs | 6- 6-26 | 2- 5-28 | Thomas |
| 17 | Indianola | 7-22-29 | 2-17-30 | Thomas |
| 11 | Water Valley | 6-28-28 | 3-12-29 | Wood |
| ALABAMA | | | | |
| 21 | Tuscolusa | 6-26-29 | 12-23-29 | Perkins |
| 25 | Murray Cross | 8-16-30 | 12- 8-30 | Perkins |
| 6 | Sheffield | 3-27-29 | 2-23-31 | Perkins |
| 24 | Phil Campbell | 7-19-29 | 2-28-30 | Zimmerman |
| 26 | Lineville | 6-30-28 | 3-13-30 | Test |

TABLE B, INDIANA GRACKLE RECOVERIES BY MONTHS

| | <i>Banded</i> | <i>Recovered</i> | <i>Place</i> |
|----------|---------------|------------------|---------------------------|
| October | 6-27-25 | 10- 6-25 | Cypress, Indiana |
| November | 4-29-28 | 11-27-28 | Symonds, Mississippi |
| | 9-20-29 | 11-29-29 | Clayton, Mississippi |
| | 4-26-27 | 11-26-28 | Oakton, Kentucky |
| | 6-10-29 | 11- 8-29 | Hurricane Mills, Tenn. |
| | 11- 6-27 | 11-13-27 | Noble, Illinois |
| | 5-30-27 | 11- 8-30 | Helena, Arkansas |
| | 3-23-27 | 11- 7-28 | Halls, Tennessee |
| December | 10- 3-29 | 12- 9-29 | Canton, Mississippi |
| | 8-15-29 | 12-13-30 | Fulton, Mississippi |
| | 6-26-29 | 12-23-29 | Tuscaloosa, Alabama |
| | 8-16-30 | 12- 8-30 | Murray Cross, Alabama |
| | 9-12-30 | 12-20-30 | Winburn, Mississippi |
| | 8-17-27 | 12-28-29 | Armored, Arkansas |
| | 1-12-29 | 12-23-29 | Bardsville, Kentucky |
| | 12- 7-27 | 12-24-29 | McKenzie, Tennessee |
| | 11-21-27 | 12- 2-27 | Paducah, Kentucky |
| | 11- 5-27 | 12-30-27 | Cleveland, Mississippi |
| | 4- 9-27 | 12-31-27 | Thornton, Mississippi |
| | 6-22-26 | 12-19-27 | Linden, Tennessee |
| January | 11-23-27 | 1- 4-28 | Union City, Tennessee |
| | 5- 2-24 | 1-15-25 | Crockett Mills, Tenn. |
| | 5-27-28 | 1-19-29 | Marksville, Louisiana |
| | 7-24-26 | 1-24-27 | Saron, Tennessee |
| | 3-31-27 | 1- 3-29 | Calhoun, Mississippi |
| | 8-21-29 | 1- 6-30 | Union City, Tennessee |
| February | 5-15-28 | 2- 1-31 | Philadelphia, Miss. |
| | 10-10-28 | 2- 2-31 | Philadelphia, Miss. |
| | 6- 1-27 | 2-27-30 | Longwood, Miss. |
| | 5-28-30 | 2-19-31 | Savannah, Tennessee |
| | 5-30-29 | 2- 4-30 | Savannah, Tennessee |
| | 3-27-29 | 2-23-31 | Sheffield, Alabama |
| | 7-19-29 | 2- 2-30 | Armory, Mississippi |
| | 7-19-29 | 2-28-30 | Phil Campbell, Alabama |
| | 8-30-29 | 2- 7-30 | Tupelo, Mississippi |
| | 4-24-25 | 2-15-26 | Tupelo, Mississippi |
| | 11-25-27 | 2-25-28 | Union City, Tennessee |
| | 6- 6-26 | 2- 5-28 | Lafayette Springs, Miss. |
| | 7-22-29 | 2-17-30 | Indianola, Mississippi |
| | 6-17-28 | 2-18-29 | Trenton, Tennessee |
| | 9-19-28 | 2-28-29 | Columbia, Tennessee |
| | 6-24-26 | 2-16-28 | Holland, Missouri |
| March | 10- 3-29 | 3-25-30 | Springfield, Tennessee |
| | 6-28-28 | 3-12-29 | Water Valley, Mississippi |
| | 9- 6-27 | 3- 8-28 | Obion, Tennessee |
| | 6-30-28 | 3-13-30 | Lineville, Alabama |
| | 9- 4-28 | 3- 3-29 | Almyra, Arkansas |
| | 9-14-27 | 3- 1-28 | Huntingdon, Tennessee |
| | 4- 4-25 | 3-12-29 | Paducah, Kentucky |
| | 5-23-23 | 3-20-26 | Normal, Tennessee |
| | 9-25-28 | 3-15-29 | Cherry Valley, Arkansas |
| April | 2- 4-30 | 4-14-30 | Cub Run, Kentucky |
| July | 7- 2-25 | 7- 5-27 | Medina, Tennessee |