

on the food directly from the air. Whenever a number are gathered in close proximity upon the ground their black backs cry the message to the wide heavens for all that fly to see, "here is food and safety." Crow and Vulture read the sign alike.

Are Crows conscious that their actions are carrying messages to their fellows? I doubt it. Just as an excited crowd of human beings unconsciously attracts others from as far as it can be seen or heard, so the crowd of noisy Crows circling over my head attracted others to the scene.

It is fully realized that behavior about a trap does not by any means tell the whole story of a bird's mind. But still the lessons that can be thus learned have much value in judging their mental ability.

KANSAS, ILLINOIS.

HIGHWAY MORTALITY AND SPEED OF FLIGHT

BY LYNDS JONES.

The writer has crossed the United States in automobiles, from Oberlin, Ohio, to the Pacific coast, nine times from east to west and eight times from west to east. The total mileage is above 60,000. The states traversed include all of those touching the Mississippi River and west of it, except Oklahoma and Kentucky; and of the states east of the river the following were crossed: Ohio, Indiana, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, North and South Carolina, Georgia and Florida. All but one of the trips have been class trips with a party of students, with from two to six cars, four persons to the car. The one exception was a trip west in the autumn and east in the spring with one car and two passengers, in 1925-26.

Among the studies undertaken on these trips was the counting of the dead animals noted on the roads, particularly the birds, and the speed of flight of such birds as flew parallel to our line of travel. Someone in the first car and someone in the last car was delegated to make the counts of the victims, but everybody was expected to note the flight.

All victims were recorded, whether or not determinations of the species could be made. Of course, when the species was known the name was recorded. Impressions of the numbers seen without making actual counts were compared with the actual numbers, and the impressions were invariably too high.

The first trip was made in the summer of 1919, beginning in late June, continuing through all of July and August, and into the first week of September. The route was across northern Indiana, central

Illinois, Iowa and Nebraska, across Wyoming to Yellowstone Park, Idaho, northern Oregon and western Washington, and home through the northern tier of states to Wisconsin. In that year paved roads were the exception, and there were many miles of barely improved roads. Therefore the speed of travel was much slower than it is now. Dead birds in the road were relatively few, but the numbers of rodents and snakes, particularly from Nebraska westward and northward, were more numerous than we found them on the last trip. Dogs and chickens were more numerous then, cats fewer than now. As pavements have increased and the speed of travel has accelerated there has been a change in the kinds of victims found on the road, as well as in the numbers. In the drier parts of the country the jack rabbits still lead in numbers. In the prairie sections the ground squirrels lead in numbers. Among the birds the English Sparrow comes first with 57 in 1926, the Red-headed Woodpeckers second with 31. The next was Bronzed Grackle, six; then Flicker and Kingbird, five each; four each of Robin and Dickcissel, three each of Sharp-tailed Grouse, Western Meadowlark, Crow, Western Crow, Black-billed Magpie, Raven, Song Sparrow; there were two each Prairie Horned Lark, Desert Horned Lark, Northwest Crow, Vesper Sparrow, Brown Thrasher; one each of California Gull, Turkey Vulture, Swainson's Hawk, Mourning Dove, Bob-white, Nighthawk, Yellow-billed Cuckoo, Texas Woodpecker, Arizona Woodpecker, Red-shafted Flicker, Arkansas Flycatcher, Red-winged Blackbird, White-necked Raven, Western Vesper Sparrow, Field Sparrow, Grasshopper Sparrow, Pale Goldfinch, Lark Bunting, Migrant Shrike, Curve-billed Thrasher, Western Mockingbird, Western Robin, Bluebird, Mountain Bluebird. It is likely that the Swainson's Hawk and the Prairie Falcons were not killed by cars, but that somebody shot them and brought them to the road. Certain tourists have that habit. This was the 1926 count of birds, over an 11,000 mile trip, that included the southwestern and southern states in the return.

A trip made from September 17 to October 23, 1925, with one car and two people, but over the same route as that of 1926, yielded 15 English Sparrows, one Crow, one Florida Gallinule, one Pheasant, one Magpie, one Swainson's Hawk, and three Sparrow Hawks. There were also four skunks, one rat, one mouse, four squirrels, one spermophile, twenty jack rabbits, one dog, one cat, one horse, three snakes, seven turtles, one frog, fifteen chickens. But this was but 3,500 miles and ended at San Francisco.

The question is "Does the automobile materially help in reducing the numbers of our native birds?" The 1926 trip was typical of the series, and probably represented a fair average. In 11,000 miles there were 106 native birds found on the roads traversed. Of these one was a Swainson's Hawk and three were Prairie Falcons, which were probably not killed by automobiles. If 106 represents the daily average for the entire year of 365 days we would have 38,690 native birds killed by automobiles during a year. These distributed over 11,000 miles make approximately three birds per mile. But some of the victims were certainly not killed on the day that we saw them, since they were flattened out by the passage of many wheels, and dry. And of the 106 there were 31 Red-headed Woodpeckers, leaving 25,911 native birds, not counting the woodpeckers and hawks, or slightly more than two per mile. And we need to remember that many of these birds would probably have been killed by some other agency if the automobile had not reached them first. In the light of these findings it seems to me clear that the automobile is not a menace to our native birds, although it is just one more agent of destruction. But for the most part the birds that do get under the wheels belong to the more common species that are not in any danger of becoming extinct.

As to the speed of flight of birds. In only one instance did I feel sure that the observed flight was normal. That was a flock of twelve gulls that we paced as they flew along the beach of the Pacific Ocean where the road parallels the beach south of San Louis Obispo. We paced them for over half an hour, and found that they were going about 30 miles an hour. All other instances had an element of uncertainty in that one could not be sure that the flying bird was not disturbed by the proximity of the speeding car. One might say that the birds that fly parallel to the automobile along the average road fly at a speed between 25 and 35 miles an hour, with the average below 30. The swallows undoubtedly fly faster, and the Mourning Dove often does. We followed a Long-billed Curlew, that had jumped up in the road ahead of us, at 35 miles an hour for more than half a mile, but three times, going at that speed, he tried to light in the road ahead of the car. How fast could he have gone? Horned Larks, longspurs and Vesper Sparrows do the same, sometimes.

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