1948). In Puerto Rico only *Cypseloides niger* occurs; it is primarily a summer resident, being very rare in winter (Leopold, op. cit.; personal observation). Thus Puerto Rico is the only major island in the West Indies that lacks a substantial year-round swift population. Puerto Rico's location near the terminus of the normal routes of dispersion from either South, Central, or North America (see Lanyon, Bull. Amer. Mus. Nat. Hist. 136: 329–370, 1967) has certainly reduced the numbers of birds reaching it. Although Bond (1948, op. cit.) suggests that the dry islands of the northern Lesser Antilles, which are too small to maintain swifts, cannot act as stepping stones for the northward dispersal of these birds, one specimen of *Chaetura brachyura* exists from St. Croix (Leopold, op. cit.). Thus occasional dispersal may occur from the east. The present sighting documents dispersion from the west, and suggests that some ecological limitation may exist in addition to the island's isolation. Throughout its range *Tachornis* is closely associated with Royal Palms (*Roystonea* spp.), and an endemic species (*R. borinquena*) is widely distributed in Puerto Rico. Although it would appear to offer similar ecological conditions, important differences between this and other species could pass unnoticed. Unfortunately ecological studies of *Tachornis* and the other West Indian swifts are particularly lacking, so I can only speculate at this point that Puerto Rico lacks suitable ecological conditions for the birds once they do arrive.

I thank James Bond for his comments on the manuscript.—CAMERON B. KEPLER, *Patuxent Wildlife Research Center, Puerto Rico Field Station, P.O. Box 442, Palmer, Puerto Rico 00721, 31 October 1970.*

Some spatial and temporal dimensions of kingbird foraging-flights.—The Eastern Kingbird (*Tyrannus tyrannus*) characteristically feeds on flying insects, and remains perched until a potential prey is sighted. In the late summer and winter berries are added to the diet, but they too are taken in flight. This note describes some of the dimensions of foraging-flights in relation to prey categories. Birds were observed on open-habitat study plots in the southwest corner of Middlesex County, New Jersey, during July, 1970.

Only flights associated with feeding or attempted prey capture were considered (eliminating territorial pursuits, escapes, and flights related to maintenance behaviors). Foraging-flights were noted to comprise two distance sets—those greater than 40 feet (hereafter termed "Long Flights") and those less than 30 feet ("Short Flights"). All but a few of the 300 recorded flights could be assigned to one of the sets. A stopwatch analysis showed the Short Flight ($n = 11$, $\bar{x} = 2.82$, $s = 1.17$) to be less than 5 seconds in duration and the Long Flight ($n = 11$, $\bar{x} = 10.02$, $s = 3.39$) to be greater than 5 seconds. Further, Short Flights would end at the original (same) perch or a new perch with similar frequencies ($n = 51$ and $n = 69$ respectively, from a sample of 120), but Long Flights greatly increased the adoption of new perches ($n = 68$ from a sample of 75). The feeding behaviors associated with different flight characteristics are described below. It will be seen that these foraging patterns can reflect relative prey sizes and distributions.

New Perch–Long Flight.—Most commonly it appeared that this flight pattern resulted from the pursuit of larger insects. The large prey size permitted distant sighting, and made the pursuit energetically worthwhile. After the capture there was not sufficient advantage in returning to the original perch. The pattern was also noted when adult birds made a capture and then continued in flight to their young (which were still being fed). Less frequently, the pattern occurred as a bird continued to pursue a missed prey, or made multiple captures on a single flight.

New Perch–Short Flight.—This pattern was usually associated with pursuit of small insects that were not immediately caught. The temporal delay leads the bird away from the original perch and although a distance of less than 30 feet is involved, it can be efficient to select a new perch.

Same Perch–Long Flight.—All such combinations resulted from multiple captures, where the bird apparently sighted successive prey with each capture in an area of high prey density. One gains the impression that the bird has undertaken a short sally with "planned" perch return, but that the sally becomes elongated with the opportunistic pursuit of the second (and sometimes third) prey. In spite of the distance thus covered, the Same Perch is assumed, perhaps because of original short-sally intentions or because the bird is in the same immediate region, for which the original perch is optimal. (One almost *vertical* Long Flight did have its last capture near the original perch.)

Same Perch–Short Flight.—This pattern was commonly observed with the capture of small insects near the original perch. An immediate capture thus permitted easy return to the perch that might be particularly favorable (e.g., located in the shade). Larger insects were not involved because their greater size and speed lead to long pursuits. Also, this was the pattern of foraging associated with taking fruit. Immature and adult birds fed at elderberry (*Sambucus canadensis*) and the fruits of nightshade (*Solanum dulcamara*), with brief hoverings in the Short Flights to pluck the berries. The immature birds were particularly frequent at the plants (taking up to eight berries per minute), probably because of the combination of inexperience in flight and the fact that fruits are much easier prey than insects. As reported by Morehouse and Brewer (Auk, 85:44–54, 1968), fruits can sometimes be important even to nestling kingbirds.

The immature birds were repeatedly chased from the fruiting shrubs by a Mockingbird (*Mimus polyglottos*). Of course the latter species frequently established interspecific territories about food sources, reducing the feeding efficiency of other birds by vigorous supplanting attacks.

In summary, the dimensions of foraging-flights can provide a potential ecological index of the dispersion and abundance of different prey categories. Short Flights are associated with small insects while Long Flights usually reflect larger prey. Same Perch returns can be indicative of favorable locations (e.g., with high prey density), while repeated New Perch flights may suggest more widely distributed prey. A measure of changes in foraging patterns with different habitats or seasons might thus provide interesting information on the concomitant changes in prey size and availabilities. The method would also be worthwhile for studies on a comparative basis within Tyrannidae. As a brief example it is noted that the Same Perch–Long Flight, while rare in the Kingbird, is the most common foraging-flight pattern (pers. obs.) of the Olive-sided Flycatcher (*Nuttallornis borealis*), which takes large insects and has strict perch preferences.

Technical problems associated with this method include extraneously induced variations in foraging patterns. The variations or perturbations may result, for example, from intraspecific social relationships, avoidance of predator exposure, or thermal considerations. Such influences should be acknowledged although their importance is probably limited to unusual situations. A more significant variable may be the habitat's density of "suitable" perches. This density can be estimated in future work by simply recording the total number of perches used for each study area.—CHARLES F. LECK, *Department of Zoology, Rutgers University, New Brunswick, New Jersey 08903, 2 October 1970.*