

It may be worthwhile to calculate the significance of a difference. Nice (*op. cit.*, p. 141) states that the probability of fledging was far less in 1933 than in 1932. In 1933, 27 (19.0%) of 142 eggs fledged; in 1932, 76 (36.8%) of 206 eggs fledged. Utilizing the formula given above the calculations are:

$$\sqrt{\frac{.368 - .190}{(.296) (.704) \left(\frac{1}{206} + \frac{1}{142}\right)}} = \sqrt{\frac{.178}{.00232}} = 3.8$$

This result is statistically significant, if we can assume that the deaths are independent. If, however, most of the deaths are dependent, then the difference probably is not significant and needs further analysis.

It is hoped that this systematization of data will permit more uniformity of analysis and stimulate the collection of more adequate data.

I am indebted to D. F. Farner, R. V. Rider, and C. A. Bachrach for criticism of the manuscript at various phases of its development.—DAVID E. DAVIS, *Division of Vertebrate Ecology, Johns Hopkins School of Hygiene and Public Health, Baltimore, Maryland.*

Notes on Birds of Jamaica.—This note concerns some observations made in the winter of 1946-47 on transient or winter visitant birds of Jamaica. I wish to point out that I made my records available to James Bond, of the Philadelphia Academy of Natural Sciences, for use in his 'Field Guide to Birds of the West Indies' (1947) and his 'Check-list of Birds of the West Indies' (1950). Thus, it will be noted that all species here recorded as new to the Jamaican avifauna have already been listed by Bond for the island. However, lack of space prevented Bond from giving details of the records here presented.

For aid in many ways I am indebted to Mr. Bond, to Mr. C. Bernard Lewis, Curator of the Science Museum of the Institute of Jamaica, Kingston, to Dr. Bernard Williams of Greenwood, Salt Marsh P. O., Jamaica, to the Hon. Theodore R. Williams of Kew Park, Westmoreland Parish, Jamaica, and to many other Jamaican friends. Dr. George M. Sutton of the University of Michigan helped me secure some essential supplies. I also owe my thanks to Mr. Lewis, Dr. Williams, and other members of the Natural History Society of Jamaica for permitting me to publish here some of their notes from the Society's mimeographed 'Natural History Notes' (see literature cited).

All specimens taken are in the collection of the Science Museum of the Institute of Jamaica.

Plegadis falcinellus, GLOSSY IBIS, and *Guara alba*, WHITE IBIS.—I saw two Glossy Ibises and two flocks of about 12 birds each of White Ibises on November 29, 1946, in the Dawkin's pond area, Port Henderson, St. Catherine Parish. May Jeffrey-Smith (1947: 116) reports 15 White Ibises at the mouth of the Martha Brae River, Trelawney Parish, on June 22, 1947. C. B. Lewis (1948: 142) reports an unverified observation of "dozens of Glossy Ibis and a lesser number of White Ibis . . . feeding at the mouth of the Duhaney River." Bond (1950: 12-13) gives no other Jamaican records for the Glossy Ibis. Concerning the White Ibis, he writes (*loc. cit.*) "apparently rare in Jamaica, though formerly a not uncommon resident." Jamaican observers would do well to obtain specimens to serve as concrete evidence of the present day occurrence of these two ibises on the island.

Coccyzus erythrophthalmus, BLACK-BILLED CUCKOO.—According to Bond (1950: 71) this cuckoo is casual in the West Indies on migration, being recorded from Cuba,

the Isle of Pines, Jamaica, Puerto Rico, and Dominica. The single Jamaican specimen was shot by Dr. Williams at Greenwood, near Salt Marsh, St. James Parish, in September, 1946. I examined the specimen while collecting at Greenwood. Dr. Williams also reports (1949b: 56) seeing two Black-billed Cuckoos at Greenwood on July 24, 1949. It would be desirable to have specimens substantiating this unusual summer record.

Contopus richardsonii richardsonii, WESTERN WOOD PEWEE.—An immature male (HBT 166) which I took on October 10, 1946, constitutes the only West Indian record of this western North American pewee (Bond, 1950: 100-101). It was taken near the margin of a mangrove swamp at the edge of Portland Ridge, a hilly limestone point in Clarendon Parish, on the hot, dry southern coast.

The Eastern Wood Pewee, *Contopus virens*, has yet to be recorded from Jamaica, although it has occurred rarely in migration on Cuba and several small islands of the western Caribbean (Bond, 1950: 100).

Dumetella carolinensis, CATBIRD.—Bond (1950: 115-116) lists the Catbird as "rare in Jamaica." The only records known to me are listed below. On February 17, 1947, I saw a Catbird which I failed to obtain at Greenwood, St. James Parish. The following day I shot a female (HBT 346) approximately 1000 yards from the thicket in which I saw the first bird. Both birds (if different individuals were involved) responded to "squeaking." Had they not thus responded they would have gone unnoticed, since they were in dense thickets. Dr. Williams (1949a: 17) records "two [Catbirds] seen and heard calling at Greenwood on 18th February [1949, that] came to squeaking." Catbirds are common on Cuba, the Isle of Pines, and the Cayman Islands in winter (Bond, *loc. cit.*). Probably they are more numerous and regular in Jamaica (at least along the north coast) at this season than the records given here indicate.

Limnothlypis swainsonii, SWAINSON'S WARBLER.—Ludlow Griscom (1945: 109), in commenting on the winter range of this species, writes, "Among the earliest records for this bird were winter records from Cuba and Jamaica, now nearly one hundred years old. It was naturally supposed to winter in the West Indies. As a matter of fact it has never been seen or heard of again there It is consequently possible that it is a mere straggler to the West Indies, and that its real winter quarters are in southern Mexico." Bond (1950: 133) corrects this supposition by referring briefly to my winter records of Swainson's Warbler, which are given here in greater detail. I collected three female Swainson's Warblers in the winter of 1946-47 (December 31, HBT 274; February 5, HBT 323; February 7, HBT 329) within 15 miles of Kingston. In addition, I saw at least nine others between December 31 and February 7. On two occasions I saw three in one day. My observations indicate that this warbler winters in Jamaica in fair numbers. Six of the individuals that I saw were in dry lowland woods; the rest were in damp forests in the hills north of Kingston (at Hermitage, St. Andrew Parish).

Helmitheros vermivorus, WORM-EATING WARBLER.—Bond (1950: 134) lists this species as a rare winter resident in the Greater Antilles. In view of this, it seems worthwhile to record that I saw seven individuals, three of which I collected (two males, one female), at various localities in the wooded hills near the southern coastal plain. The westernmost locality was Chapelton, Clarendon Parish; the easternmost was 14.5 miles east of Kingston along the Morant Bay Road, St. Thomas Parish. Dates were December 23, 1946, January 21, January 24, and February 2, 1947.

Dendroica magnolia, MAGNOLIA WARBLER.—The first Jamaican record of this species is of a male (HBT 352) which I took February 25, 1947, at Kew Park, West-

moreland Parish. Since that time, Dr. Williams has observed Magnolia Warblers on February 15 and 18, 1949, at Greenwood, St. James Parish (Williams, 1949a: 17). R. G. Taylor (1949: 56) has reported another individual seen on November 8, 1948, in St. Andrew Parish, near Kingston.

Dendroica virens, BLACK-THROATED GREEN WARBLER.—A male (HBT 333) which I obtained on February 12, 1947, at Greenwood, St. James Parish, seems worthy of note since this species, although previously recorded, is rare in Jamaica.

Passerina cyanea, INDIGO BUNTING.—A female (HBT 340) which I took on February 15, 1947, at Greenwood, St. James Parish, is the first Indigo Bunting taken in Jamaica. Dr. Williams told me he had seen a male Indigo Bunting near Kingston in March, 1946. No other Jamaican records of this species have come to my attention.

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NOTES AND NEWS

An important advance in the study of bird migration in America was marked by the appearance last year of George H. Lowery's 'A Quantitative Study of the Nocturnal Migration of Birds' (Univ. Kansas Publ., Mus. Nat. Hist., 3 (2): 361-472). This paper presents a technique for measuring the comparative volumes of migration at different times and places by counting the birds passing before the disc of the moon through a small telescope. Applying this technique, Lowery discovered that the nightly flights of migrants in spring follow a surprising time pattern, typically increasing in intensity until the hour before midnight and subsiding to near-zero in the hour before dawn. He also found evidence that nocturnal migration, unlike diurnal migration, is characterized locally by a remarkably uniform dispersal of birds in the sky; that heavy migrations in the air are not likely to produce heavy densities of migrants on the ground, unless concentrative factors come into play; and that the movement of birds at night is profoundly affected by the movement of air masses.

These conclusions were made possibly by observations gathered in the spring of 1948 at 30 stations on the North American continent by over 200 ornithologists and astronomers. An even wider coverage could have been arranged, had it not been for the difficulty at that time of processing data in large numbers. Since then, the