The two methods agree in assigning a major role to year class 1948. Method II indicates a smaller contribution by the classes of 1949 and 1950 than does Method I. Since the banding began in 1946 that year class must include some carry-over from earlier years. The 100 per cent figure is too high and the average for age 1 is likely to be nearer 55 per cent.

It will be noted from the totals in Table II that the assumed size of the breeding stock rose noticeably in 1951. No reason is known for this. If we compare, as in Table IV, the size of the supposed immature population that can be assigned to a given breeding season we find no evident proportionality. It is, of course, an assumption that the number of immatures trapped is the same as the number of independent young produced by the adults assumed to be present in the same area during the given breeding season. On the other hand, it would not be surprising if the number of independent young per breeding pair should vary somewhat from year to year.

TABLE IV.

Year	Assumed breeding population	Assumed no. of independent young	Ratio
1947	12	48	4.0
1948	12	30	2.5
1949	12	57	4.7
1950	13	34	2.6
1951	20	74	3.7
1952	20	79	4.0
1953	19	33	1.7

There are some reasons for preferring Method II to Method I. The contributions obtained for any one year class reflect to some degree the survival history and the initial size of that year class but relate these to other classes living at the same time. More available information is used than in Method I. Also Method II gives the same type of result as is already in use for the study of fish populations.

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SOME BIRD WEIGHTS FROM JAMAICA

By Charles H. Blake

In the course of my stay in Jamaica in 1955-56 as a Fulbright Fellow, I handled not only a good many birds during banding operations but also a number of specimens that came into the Institute of Jamaica in the flesh. It was possible to weigh some of these birds and I here submit the results. The average weights, grouped as far as possible by age and sex, are shown in Table I. In some cases comparison material is available either from the United States or from tropical America. I have not tried to search out every recorded weight.

TABLE I. WEIGHTS OF JAMAICAN BIRDS

	No.	Weight g.
Green Heron, *Butorides v. virescens*	1	191
American Widgeon, *Anas americana*	1	682.4
Blue-winged Teal, *Anas discors*	1	351.8
Ring-necked Duck, *Aythya collaris*	1	562.8
Swallow-tailed Kite, *Elanoides f. forficatus* imm.	1	414
Clapper Rail, *Rallus longirostris caribaeus*	1	213
Purple Gallinule, *Porphyrula martinica*	1	144
Bridled Tern, *Sterna anaetheta recognita* imm.	1	36.8
White-crowned Pigeon, *Columba leucocephala* ♂	1	250
White-winged Dove, *Zenaida a. asiatica*	1	126.4
Ground Dove, *Columbigallina passerina jamaicensis* ad.	4	40.6
♀	2	38.5
imm.	1	37.3
Mangrove Cuckoo, *Coccyzus minor nesiotes*	1	59.2
Yellow-billed Cuckoo, *C. a. americanus* imm. ♀	1	38.7
Ani, *Crotophaga ani*	1	107.5
Jamaican Mango Hummingbird, *Anthracothorax mango*	2	9.1
Streamer-tailed Hummingbird, *Trochilus p. polytmus* ♂	1	4.3
Northern Mockingbird, *Mimus polyglottos orpheus*	2	48.6
Bananaquit, *Coereba f. flaveola* imm. ♂	1	9.6
imm.	1	8.2
ad.	2	9.2
Orangequit, *Euneornis campestris*	2	16.3
Black and White Warbler, *Mniotilta varia* ♂	1	10.7
♀	2	7.7
	2	9.5
Parula Warbler, *Parula americana*	1	8.0
Cape May Warbler, *Dendroica tigrina* imm.	4	9.2
Prairie Warbler, *D. discolor*	5	7.1
Western Palm Warbler, *D. p. palmarum*	5	9.5
Ovenbird, *Seiurus a. aurocapillus*	1	19.0
Yellowthroat, *Geothlypis trichas*	1	9.3
Redstart, *Setophaga ruticilla* imm.	2	6.9
Jamaican Euphonia, *Pyrrhuphonia jamaica*	1	15.5
Yellow-faced Grassquit, *Tiaris o. olivacea* ♂	2	9.5
Black-faced Grassquit, *T. bicolor marchii* ♂	2	11.5
imm.	1	11.2
Saffron Finch, *Sicalis f. flaveola* ♂	3	19.5
	1	20.0
Grasshopper Sparrow, *Ammodramus s. savannarum*	2	16.8

Butorides v. virescens—Poole (1938) records a weight of 230 g., considerably greater than that of my one bird. On the other hand Weatherbee (1934) gives the weight of an immature as 119.1 g.

Anas discors—By contrast, Poole's (op. cit.) weight for this species is 332 g., a little less than mine.

Aythya collaris—Poole (op. cit.) averages three weights at 757.3 g., which is some 40 per cent more than that of my one example.

Porphyrula martinica—Miller (1947) gives the weight of a female from equatorial Colombia as 179 g. My bird was a captive specimen and perhaps under normal weight.

Zenaida a. asiatica—Paynter (1955) had a male weighing 168.0 g. and a female weighing 150.2 g. from the Yucatan peninsula. My bird was a captive which might have been below normal weight.

Columbigallina passerina jamaicensis—Paynter (op. cit.) gives data on *C. p. pallescens* from Yucatán, five males average 43.2 g. and seven females 40.8 g. The Jamaican race seems to be slightly lighter in weight. However, the Colombian *C. p. parvula* seems to be slightly smaller than *jamaicensis*. Miller (op. cit.) records a female and two males as each weighing 32 g. These were midwinter weights.

My two females were weighed 30 Oct. 1955 and 12 Jan. 1956. Both had lost weight, the average loss being 2.7 g.

Coccyzus minor nesiotes—Paynter (op. cit.) gives weights for a male, 76.6 g., and four females averaging 68 g. These birds belong to the race *continentalis*. The one Jamaican example of *nesiotes* is distinctly lighter.

Coccyzus a. americanus—Voous (1953) weighed two in the Dutch South Caribbean Islands; one weighed 3[illegible] g. and the other 45 g. The latter had a full stomach while the former was very emaciated. The Jamaican example was in fair condition. Perhaps Voous' birds were not as much off weight as he supposed. On the other hand, the one North American weight available (Poole, op. cit.) is 61 g.

Crotophaga ani—From the weights given by Miller (op. cit.) for its two congeners, it appears that the present species is intermediate between them in weight. A male of *C. major* weighed 165 g. and a female 156 g., while two males of *C. s. sulcirostris* averaged 72½ g. and a female weighed 69 g.

Anthracothorax mango—This is a very large hummingbird, actually weighing more than some warblers. *Anthracothorax p. prevostii* of Yucatán is evidently smaller, a female weighing 7.0 g., and four males averaging 6.5 g. (Paynter, op. cit.). *A. n. nigricollis* also appears to be smaller, Miller (op. cit.) notes four males as each weighing 7 g.

Coereba f. flaveola—Paynter (op. cit.) gives weights for the Yucatán form, *C. f. caboti*, as male 12.4 g. and three females averaging 11.8 g. Again the Jamaican form is lighter. *C. f. columbiana* is about the same in weight as *flaveola;* Miller's (op. cit.) single male weight is 10 g.

Mniotilta varia—From Ohio, Baldwin and Kendeigh (1938) had three males averaging 11.1 g. and a female of 9.2 g. and I have from Massachusetts a male of 10.8 g. and two immatures averaging 11.1 g. Poole (op. cit.) is within this range, giving 10.5 g. Paynter (op. cit.) gives two males as averaging 9.9 g. and two females averaging 8.7 g. There is a mere suggestion here that the species weighs less in winter quarters than on or near its breeding grounds. However, the Jamaican female average is pulled down because the lighter one, a January bird, weighed only 6.7 g.

There is some evidence from my series of weighings that North American birds lost weight around January 1956 in Jamaica. The month was notably cool, being the coldest in some 40 years.

Parula americana—Paynter (op. cit.) provides a male weight of 7.1 g. and an average of two females of 6.8 g., both distinctly below my one weight. On the other hand, Poole (op. cit.) cited the almost incredibly great weight of 11.8 g. His single bird must have been near its greatest pre-migration weight.

Dendroica tigrina—The only comparison here is with three immatures from Ohio (Baldwin and Kendeigh, op. cit.) which averaged 10.3 g. This is clearly heavier than my average.

Dendroica discolor—Three immatures in autumn (New England) averaged 7.2 g. (Weatherbee, op. cit.)

Seiurus a. aurocapillus—Baldwin and Kendeigh (op. cit.) give an average of 18.3 for two males and 19.8 g. for three females. I have (Massachusetts) an average of 19.4 g. for two immatures and one adult weighed 18.7 g. Weatherbee's (op. cit.) six immatures from New England averaged 20.4 g. Paynter's (op. cit.) four male weights from Yucatán average 17.1 g. No clear pattern emerges from these weights.

Geothlypis trichas—The mean of two Ohio males is 10.5 g. (Baldwin and Kendeigh, op. cit.) and one from Massachusetts weighed 11.8 g. Stewart (1937) gives an average of 9.5 g. for three females from Ohio, agreeing with Poole (op. cit.) who does not state sex or other data. Weatherbee (op. cit.) gives a more detailed statement for New England: one adult male 9.7 g., an adult female 10.0 g., and 20 immatures averaging 10.4 g.

Paynter (op. cit.) gives a mean of 9.6 g. for eight males from Yucatán and his three females average 9.2 g. Here we seem to have a reasonable likelihood that the species weighs less in winter quarters. Probably all the birds given above should be considered *brachidactyla*.

Setophaga ruticilla—Baldwin and Kendeigh (op. cit.) have an average of 8.2 g. for four Ohio males and 7.2 g. for a female. A Massachusetts immature weighed 8.5 g. and Poole (op. cit.) records 8 g. Paynter (op. cit.) in Yucatán had two males averaging 6.8 g. and a female weighing 6.5 g. Miller (op. cit.) took two adults in the winter in equatorial Colombia, each weighing 7 g. Voous (op. cit.) recorded some weights during the fall migration in the Dutch South Caribbean Islands. Eight Redstarts ranged from 5 to 7.5 g., with a mean of 6.2 g. Although he thought the weights rather low they may prove to be near normal for the species in winter quarters. Both of my Jamaican weights were obtained in January.

Tiaris o. olivacea—Paynter (op. cit.)provided data on two other races. Three males of *T. o. pusilla* average 9.8 g. and three females 9.0 g. Four males of *T. o. intermedia*, confined to Isla Cozumel, give a mean of 9.1 g. There is no striking difference between these two races and *T. o. olivacea*.

Tiaris bicolor marchii—Miller (op. cit.) records one male of *T, b. omissa* from Colombia as weighing 12 g. This is not very different from my weights. This species is actually larger than *olivacea*.

Ammodramus s. savannarum—This race is confined to Jamaica but some information is available on the migratory North American race, *A. s. pratensis*. Stewart (op. cit.) weighed two in Ohio with an average of 14.1 g. Paynter's (op. cit.) two females in Yucatán averaged 16.1 g. Poole (op. cit.) records the still higher weight of 18.5 g. Weatherbee's (op. cit.) mean of 17.7 g. for six adults is not very different. The Jamaican race does not seem significantly different in weight from the North American race in winter quarters.

DISCUSSION

The interpretation of bird weights, as I have already shown, (Blake 1956) is fraught with difficulties. Dealing, as we are here, with a scattering of weights taken at divers times and places only increases the difficulties.

The only general statement that seems justified is that the migrant warblers showed a tendency toward a minimum weight in January. Two causes may have been cooperating: the unseasonable cold of January 1956 and a normal "off passage" fall in weight. We may propose a working hypothesis for the weight pattern of migrants. An individual arrives on its wintering ground at low to very low weight; the bird rests and feeds, probably overshooting the mark and attaining somewhat more than normal winter weight. The excess is gradually lost and the weight may even go below seasonal normal. Toward spring heavy feeding is renewed and a relatively high weight is attained just at the beginning of spring migration. These changes will probably involve a normal sequence of changes in fat metabolism. This pattern is what one would infer from the work of Odum, Wolfson, and others on sparrows.

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THE SOFT PARTS OF SOME JAMAICAN BIRDS

By Charles H. Blake

During my tenure of a Fulbright fellowship in Jamaica, B.W.I., between August 1955 and May 1956, as a by-product of bird-banding operations, I made notes on the soft parts of a number of local birds. For the most part these birds appeared to be adult. Leg sizes will be included in another paper. It should be noted that I use the term "gape" for what is more formally the rictus of the gape.